

## Model for Migration into a Cloud for Educational Institutions

Dr. Vinayak D. Shinde

*Department of Computer Engineering  
S.L.R.T.C.E*

*Mira Road, Thane, India*

vdshinde@gmail.com

**Abstract** -Cloud computing technology is new era which gives various promises to organizations. Its adopting can reduce their operational cost and also we can extend business with help of elasticity characteristics. Metered units allow us to pay only for amount of utilization. Most of the industries in world migrated from traditional computing platform to Cloud platform by considering its benefits to the business enhancement. As we know education is most important phenomena to any country for its growth. Every country is trying to adopt new technologies to reach education at every corner without much more expanses. The Cloud technology provides one of better and affordable platform to the educational organizations which can be migrated from traditional education system to modern education system. Higher education is more focused sector started to migrate from traditional to Cloud by providing various online courses to develop skills to learners, virtual laboratories to perform practical without labs, and access of learning resources like books, manuals, literatures, journals online. This paper focuses on roadmap for migration from traditional system to cloud computing for educational institutions.

**Index Terms** – *Cloud computing technology, educational cloud, migration techniques, educational data.*

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### I. INTRODUCTION

Cloud computing is facing several issues in gaining recognition for its merits. Its security deficiencies and benefits need to be carefully weighed before making a decision to implement it. However, the future looks less Cloudy as far as more people being attracted by the topic and pursuing research to improve on its drawbacks[1].

The expectation is that Cloud computing will undergo several changes in the future, in terms of resources, issues, risk, and ultimately best practices and standards. However, there are some sought of great advantages it can potentially provide value for institutions of higher education. On-demand services can reverberate positively with the institutions tight budgets across the nation and other parts of the world.

Every sector has their own barrier according to their work and operations. This examination is on educational sector and especially higher education. Tight budgets, absent of industrial skills, less interaction with industry and absent of practical implementation cloud computing technology, encourage to investigate various reasons about adoption of cloud computing technology in educational institutions[2].

Cloud computing technology that were previously expensive or unavailable are now becoming free to anyone with a web browser with web sites, blogs, video sharing, music sharing, social sharing, collaboration software, editing and publishing, and computing platforms in the Cloud. These technologies already used in practical way by the students. While appears Cloud computing, it provides a new solution to

establish a unified, open and flexible network teaching platform and reduce the hardware input.

Adoption of Cloud computing solution represent a step toward the empowering vision of the meta-university. Above campus IT service offerings will ultimately empower faculty and students to customize, remix, and reuse information for their local needs and will provide staff with access to the latest tools and services developed by the best and the brightest that higher education has to offer.

Present economic situation will force more and more organizations at least to consider adopting a Cloud solution. Universities have begun to adhere to this initiative and there are proofs that indicate significant decreasing of expenses due to the implementation of Cloud solution.

To migrate from existing system to cloud based system required proper assessments. Significantly, it consists of identification of various issues involved in the process of migration at the levels of application, the architecture, the design, and usage. Mostly in assessment of migration executing by using tools which are used to determine actors for various test cases and configurations for test of functionalities and non-functional requirements of the enterprise application. The proper strategy of migration possible to define with the help of this results.

There are several tested models available which help in migration process from traditional system to cloud system. Basically, at the evaluation level the first venture of the procedure for migration is the seven-stage model. The utilizing of esteeming parameters empowers one to make proper evaluations with the Proof of thoughts or models for different

strategies to the migration. In the case of production version, these assessments can achieve the cost of migration and the ROI[3].

All systemic and ecological dependences of the activity application segments inside the subjugated data centre is isolated in the following stride of the procedure. This, thus, a portrait of the level of multifaceted nature of the relocation is created. After the disengagement is more than, one then approaches creating the mapping makes between what might presumably hold on in the nearby oppressed data centre and what goes onto the Cloud.

Maybe a broad part of the activity application should be re-architected, rebuilt, and re-actualized on the Cloud. This is just about the usefulness of the first activity application. Because of the movement, it is likely that some usefulness is absent. In the following stride we pull the key elements of the Cloud technology computing administration to grow the venture application in its own particular manners. Having done the extension, we approve and test the new type of the activity application with a general test suite that comprise of testing the segments of the activity application on the Cloud. These test outcomes might be certain or blended[4].

In the second case, we discover rehash and enhance as appropriate. After a few these streamlining redundancies, the movement is viewed as effective. Our best perceives show that it is best to rehash through this seven-stage demonstrate handle for advancing and guaranteeing that the movement into the Cloud is both solid and far reaching. Figure 1 demonstrates the common segments of the best perceives gathered in the practice of the Seven-Stage Model of migration into the Cloud. Though not comprehensive in details, it is an illustrative.



Figure 1 Details of the iterative Seven-Step Model of Migration into the Cloud.

## II. THE ADOPTION STRATEGY CLOUD COMPUTING FOR HIGHER EDUCATION

Moving headed for the Cloud required an all-around characterized system that backings Cloud technology computing skills. Speaking to IT system as a vital part of the association, Migration must be adjusted to the methodology. The achievement of the system execution decided on the nearness of an administration situated engineering at the establishment level that offers the required framework for Cloud usage. Moving towards the Cloud has no significance without SOA and BPM (Business Prepare Administration), because of the budgetary perspective and it moves to high expenses with re-organizing of current frameworks[5]. Likewise, keeping in mind the end goal to succeed, the Cloud procedure ought to be line up with the college system. Beginning from the current works which are identified with the change to Cloud technology computing and the experience of colleges.

A migrating strategy towards the Cloud, follows the subsequent stages (figure 2):

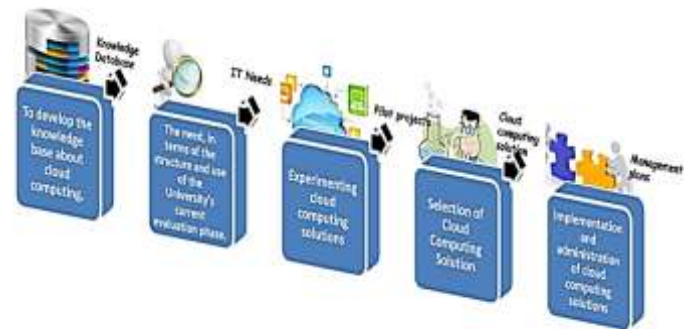


Figure 2: Cloud Strategy in Higher Education

### A. Developing the knowledge base about Cloud Computing.

The initial step is to build up the information base through the interest in meetings, sessions, considerations with the suppliers and counseling the most momentum inquires about in the region. The accomplishment of the stage lay on the arrangement of satisfactory assets for research, and comprehension of how Cloud technology computing capacities in different authoritative structures and security risks, approaches and the utilization practices of Cloud computing technology. The group of IT staff leads this exploration who will enduringly speaks with the users of the solution concerning the objectives, the progression, costs and benefits of the Cloud computing solution.

### B. The need, in terms of the structure and use of the university's (Institutions) current evaluation phase.

The following stride is for to comprehend the college IT foundation. The foundation denotes by service oriented architecture which gives understanding the data, its associated services, procedures and system applications for taking decision about migration or maintaining within institute. With

the regard to the IT necessities, IT structure and its use, the review begins from the classes of workers who speak with the present IT framework and their prerequisites. By and by, the Cloud Computing business sector is constant developing and growing[4]. With the help of available Cloud Computing solutions in market, we proposed a couple of the most utilized arrangements in colleges as per the three supply models demonstrated in figure 3.

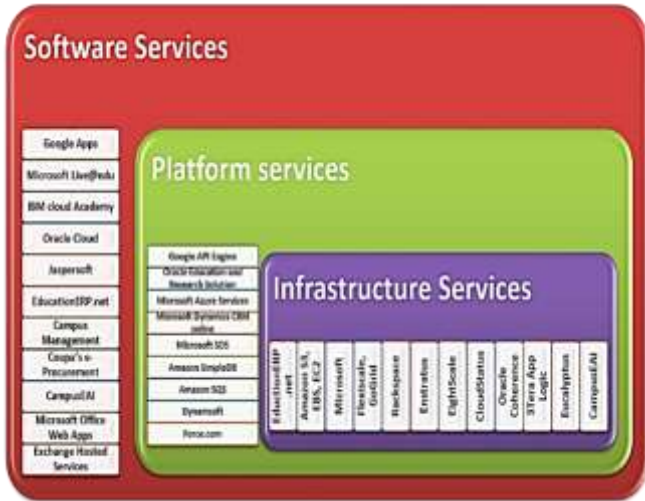


Figure 3 Cloud Taxonomy for Education

C. Experimenting the Cloud Computing solutions.

The move to Cloud can be refined gradually, at first from a pilot extend in a Cloud and after that communicating the applications favored for Cloud. The initial step includes setting up some Cloud targets, for example, improvement and environment testing or putting away couple of information inside the Cloud[6]. The subsequent step involves the everyday processing of various inside jobs by considering components associate with public or private cloud keeping in mind the end goal to secure the security and protection policies.

D. Selection of Cloud Computing solution.

The deep analysis required to identify data sources, its functions and associated processes, applications within the educational institution. Data analysis allow us to categorized it in six groups considering related activities in the university or Institute (figure 4). Later stride is spoken to by the assessment of the components which are recognized in the initial step as indicated by a few criteria like mission, interior significance, affectability, secrecy, unwavering quality, attainable quality, with a specific end goal to choose the hopeful components for Cloud. The last stride incorporates the decision of the adoption of Cloud model i.e. either private or public and somewhere may be hybrid or community. The essential distinguishing proof measures of the hopeful applications to Cloud are the mission and significance of business practices (table1).

TABLE I  
 CLOUD MODEL SELECTION CRITERIA

Business Practices -> Mission	Non-Core	Core
Non-mission critical	Public Cloud	Private Cloud or Non Cloud
Mission critical	Private Cloud	Private Cloud or Non Cloud

Hybrid cloud is more preferable cloud model mostly which helps to preserve objective of organization by keeping key elements in-house. It also allows to take direct control and articulating components[7].

Strategic analysis required to conduct by organizations before integration or migration about execution of solution.



Figure 4 Main data sources in Higher Education

E. Implementation and management of the Cloud Computing solution.

The iterative method is used to implement solution. This method allows to observe a continuous transition of the data and services inside cloud during processes. The cloud computing technology performance and benefits are observed during this process considering fulfilment of objectives set by institutions. In the meantime, usage sets up an unpretentious program of risk management for the constant development in the solution performance and implementation management[8].

The movement of the information, administrations and procedures set out toward the Cloud stage ought to be readied grounded on some very much characterized cloud models or methodologies. As per the association strategy, control and data security, every movement model ought to receive particular targets to be achieved. Through an ideal harmony between the information precision, speed, non-working time and lower costs information relocation must be performed. At the association level an administration demonstrate must

incorporate the arrangements of security, organization of the applications and foundation, supervision of the dangers and the nonstop appraisal of the Cloud Computing arrangement. A quality management of programs is very essential for an efficient organization. The productive assurance of quality depends on it[5].

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### III. CLOUD COMPUTING SOLUTION FOR EDUCATIONAL ORGANIZATIONS

Many driving IT organizations are receiving the pattern of educational Cloud Computing. In Cloud Computing, Google Apps for training are accessible at free of cost to schools, colleges and different educational groups[1]. Hybrid model of resources provided by Microsoft azure helps the students and researcher to move to such an extent or little to the cloud whereas Amazon Web services (AWS) provides different type of web service platform which helps universities and institutions to migrate into educational cloud. IBM cloud computing technology is one of existing company allow educational institutions by providing IBM cloud Academy platform for production and technical projects. There are other IT companies those are providing educational cloud solutions, the brief comparisons shown in figure 5.

Solution → Activities ↓	Microsoft Lync/Share	Microsoft Office Live workspace	Microsoft Dynamics CRM Online	Amazon/Al Private Cloud	Dropbox and RightScale	Google Docs	educationE-Proc	Campus management	Campus Procurement	Course Networking
Cloud Service	SaaS	SaaS	SaaS, PaaS	SaaS, IaaS	SaaS, IaaS	SaaS	SaaS, IaaS	SaaS	SaaS	SaaS
Cloud Model	Public	Public	Private Hybrid	Private	Private Hybrid	Public	Private Community	Private Community	Private	Public Community
Business Intelligence	No	No	No	No	Yes	No	No	Yes	No	Yes
Student Library	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes
E-learning	Yes	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Admission	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Accounting-Financial	No	No	No	No	No	No	No	Yes	No	No
Human resources	No	No	Yes	No	No	No	Yes	Yes	No	No
Acquisition	No	No	No	No	No	No	No	No	Yes	No
Case management	No	Yes	Yes	No	No	Yes	No	Yes	No	No
Building administration	No	No	No	No	No	No	No	Yes	No	No
Digital Library	No	No	No	No	No	No	Yes	No	No	No

Figure 5 Cloud Solution for Higher Education

### IV. CONCLUSION

Cloud Computing Technology migration in educational organizations though systematic approach gains performance and reliability. Many factors need to be considering for selection and migration of cloud computing, it is important path between two systems and performs coordination with them. Failed system can result in severe data and monetary loss will create havoc for the process and to the organization. Cloud migration is very important in achieving high system performance and can boost system's ability to introduce multiple technologies and functionalities.

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