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CLOUD COMPUTING-FUTURE SOLUTION FOR EDUCATIONAL SYSTEMS

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Abstract

Cloud computing is an up-and-coming computing standard for providing computing services. This computing move toward relies on a number of existing technologies, e.g., the Web services, virtualization, grid computing, etc. Cloud Computing mean to provide reliable scalable and inexpensive on-demand computing infrastructures with good quality of service levels. It signifies a transfer away from today computing model as a product that is purchased, to a computing model as a service which is distributed to customers through cloud providers. It helps an business in economy costs and generating new business

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opportunities. This paper provides a structure, An Educational Cloud for the e Future Solution for Educational Systems. The Education Cloud can renovate an entire system, to achieve its mission and produce permanent impact in its community. This paper also presents the case study of Adesh Foundation, Faridkot, Punjab, India, which is using the education as the tool to solve the social issues.

Keywords: Adesh Foundation, Cloud Computing, ERP, SaaS

1. Introduction

Cloud Computing is not just a technology, hosting provider and platform . It is much more than a technology, hosting provider and platform. It is more than just an application hosted as a service. It is more than providing storage services on the Internet. It is a combinational set of all the above.[23] A 'cloud' is an flexible executional background of resources involving various stakeholders and providing a metered service at multiple granularities for a specified level of quality (of service). The definition of cloud computing provided by The National Institute of Standards and Technology (NIST), as it covers, in our opinion, all the essential aspects of cloud computing:

Cloud computing is a model for enabling convenient, on-demand network access to a:

□ **Infrastructure as a service (IaaS):** Infrastructural resources (such as networking equipments) and computing power (CPU and memory) are provided as services to clients through the cloud. As examples in this category, Amazon1 offers S3 for storage, EC2 for computing power, and SQS for network communication for small businesses and individual consumers.

□ **Storage as a service:** Storage as a Service is a business model in which a large company rents space in their storage infrastructure to a smaller company or individual. In the enterprise, SaaS vendors are targeting secondary storage applications by promoting SaaS

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as a convenient way to manage backups. The key advantage to SaaS in the enterprise is in cost savings -- in personnel, in hardware and in physical storage space.

- **Database as a service (DaaS):** A more specialized offering database facility as a service. Examples of service providers are Amazon SimpleDB, Google BigTable³, Force.com database platform and Microsoft SSDS⁴

- **Software as a service (SaaS):** Software applications are presented as services on the web rather than as software packages to be purchased by individual clients. Other examples include Google web-based office applications (word processors, spreadsheets, etc.).
- **Platform as a service (PaaS):** This refers to offering services to support the complete application development lifecycle together with design, implementation, debugging, testing, deployment, operation and support of rich Web applications and services on the Internet. Most often Internet browsers are used as the development environment.[23] Examples of platforms in this category are Microsoft Azure Services platform⁶, Google App Engine⁷.

2. Educational Cloud

Cloud computing services make available many of Foundations's with the chance to carry on to take benefit of innovative developments in IT technologies at reasonable costs. Cloud computing is expected to be a striking scheme to start-up, small to medium enterprises and educational establishments. The UK's National Computing Center (NCC) estimates that SMEs can reduce the total cost of ownership of technology using hosted solutions [14].

Students in the 21st century have different and vast learning needs which no longer can be satisfied with traditional teaching and learning methodologies [15] i.e. lecture-based, tutorial session, use of multimedia contents and etc. It is important for Universities, institutes and schools to agree to novel approach and technology that will enhanced prepare and train

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students for present and future job market requirements. Educational Cloud will deal with the function of cloud computing technology to improve education and learning methodology.

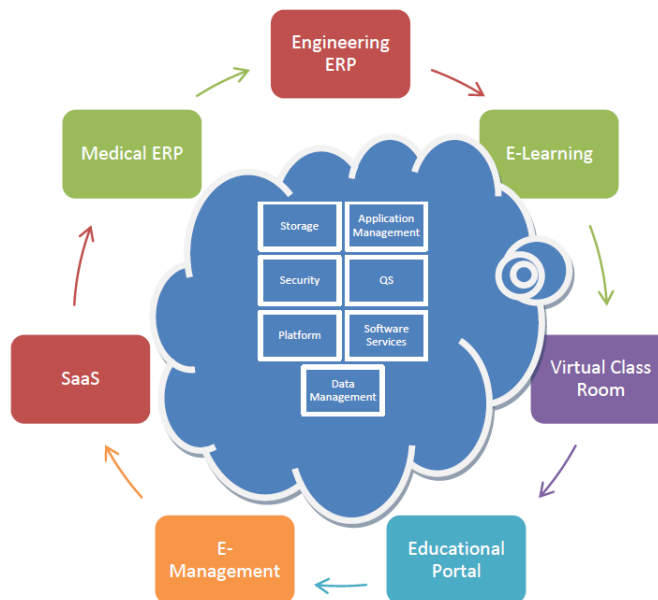


Figure 1 Educational Cloud

3. Benefits of Educational Cloud

The advantages of the Education Cloud to the educational Foundations, Societies and trusts are considered in the non functional, economic and technological areas.

1. Non-functional features:

□ **Elasticity** – It is an important fundamental feature of clouds and defines the potential of the primary infrastructure to adapt to changes potentially non functional requirements like

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application supported data size, number of simultaneous users etc. Elasticity does allow the dynamic integration and extraction of physical resources to the infrastructure. Whilst from the application perspective, this is identical to scaling[23].

□ **Reliability** – It is measured as major features to develop cloud capabilities. Reliability represent the ability to ensure regular operation of the system without disturbance.

□ **Quality of Service-** Quality of service is a appropriate potential that is necessary in many cases where particular requirements have to be met by the outsourced services and resources. With QoS controls available, cloud providers present a variety of services and price points that offer more alternative to clients and support these services with service-level agreements (SLAs) . The consequence for enterprises is cost effective infrastructure, relevant to a larger variety of application types, obtained by merging shared platform with high levels of performance guarantee.

□ **Availability** – Availability of services and data is an important facility of cloud computing. It is in the ability to introduce redundancy for services and data so crashes can be covered clearly. With growing simultaneous access, availability is mainly attained by duplication of data and services and allocate them across different resources to accomplish load-balancing.

2. Economic Aspects

□ **Cost decline** - cloud can familiarize yourself to varying customer behaviour and decrease cost for infrastructure maintenance and purchase. straight cost to run the system on the cloud is very lower.

□ **Pay per use** - The ability to build up cost according to the real utilization of resources is a appropriate characteristic of clouds. Pay per use powerfully relates to quality of service support, where precise requirements to be met by the organization and hence to be paid for can be particular.

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- **Improved Time** – Foundation can concentrate on meeting their objectives as an alternative of spending time on infrastructure.
- **Go Green**- Clouds mainly allow dropping the utilization of idle resources. Clients of cloud computing are further expected to significantly lessen the carbon footprint.

3. Technical Aspects

- **Ease of Use** – Cloud helps hide the complexity of the infrastructural management and configuration etc. Cloud make it easier for the users to build up new applications, as well as decreases the overhead for controlling the system.
- **Site independence**: services of cloud can be accessed independently without knowing the physical position of the user and the resources.
- **Multi-tenancy** - It is a extremely critical matter in cloud systems, where the location of data is mainly unknown and the similar resources may be allocated to various users at the same time.
- **Data Management** – data size may vary at any time, data management deal with both horizontal and vertical features of scalability. consumers need not be bothered about the databases.
- **Programming enrichment** – Developers can focus on the business as a replacement for of worrying about matters like scalability.

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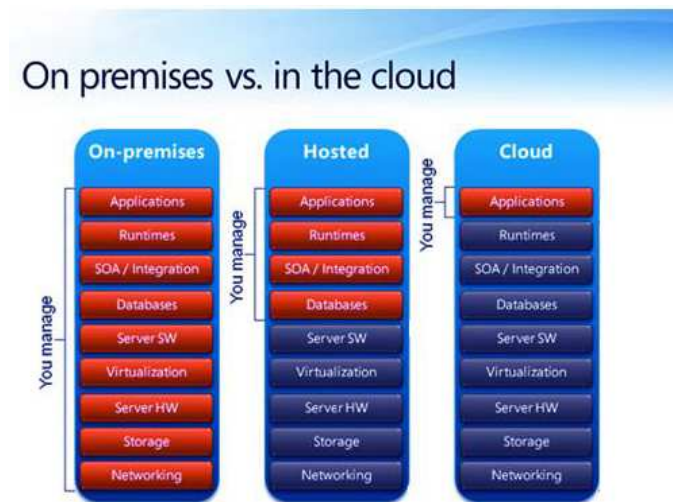


Figure 2 Cloud Deployment

4. Adesh Foundation Case Study

The management of Adesh Group of Institutions is headed by humble, dynamic, committed, planner & executer Dr. Harinder Singh Gill, M.D. (Medicine) who combines in him professionalism, entrepreneurship and vision of growth. Dr. Gill is a versatile genius, a man to be reckoned with in the field of medical and technical education in Punjab. As an educationalist he has gifted several medical, technical and engineering institutions under the banner of Adesh Group to the people of Nation. His vision and mission, his acumen and expertise, his efforts and accomplishments have made the Adesh Group an icon of excellence in education.

Adesh Group started its' journey in the field of professional education and health care with establishment of its first venture Adesh Hospital & Research Centre (P) Ltd., Muktsar in 1991. With time, it has emerged as a 300-bedded referral hospital having 30 specialist &

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superspecialist medical professionals, 65 qualified nursing & paramedical staffs and 55 trained administrative & supporting staffs. This hospital is the only of its kind in the region and offers integrated services in multiple specialities with facilities like Advanced Trauma Centre, ICU/ ICCU, Dialysis Unit, Poison Management Centre, Blood Bank, Neonate ICU, Laproscopy, Endoscopy, C.T. Scan, Ultrasound, TMT, EEG, Fully automatic Laboratories with Auto Biochemistry Analyser, Auto Cell Counter, Arterial Blood Gas Analyser (A.B.G.), Eliza Reader, Ventilators & Cardiac monitors, Central Gases and Suction etc. to tackle all medical and surgical emergencies round the clock. The hospital is also running a 25 bedded de-addiction centre at Free of Cost. The hospital has installed incinerator in its campus (first in Malwa) for bio-medical waste management and to deliver the society a healthy, pollution free environment.

The group has developed another venture aiming at development of top-notch diagnostic facilities in the field of Radio Diagnosis under the name and style as Adesh Diagnostics at Bathinda with latest models of MRI (Magnetic Resonance Imaging), Spiral C.T. Scan. No such facilities are available as on date in the southwestern region of Punjab and adjoining districts of Rajasthan & Haryana.

With the aim to provide comprehensive superspeciality medical care in cancer treatment, Adesh Group has developed a Cancer Hospital under the name and style as Adesh Charitable Cancer Hospital at Muktsar which is the very first cancer hospital in the Malwa belt and the most well equipped private cancer hospital in Punjab. The state-of-art latest models of Radiotherapy equipments (Cobalt 60: Kirlosker Theratronics) imported from Canada and Brachytherapy imported from Holland are functioning round the clock with approval of Bhaba Atomic Research Centre. This hospital is providing all necessary facilities for cancer treatment including Diagnostic facilities, Radiotherapy, Brachytherapy, Chemotherapy and Cancer Surgery.

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Adesh Group established Adesh Institute of Medical Sciences, Muktsar with a School of Nursing offering General Nursing & Midwifery (GNM) programme with 50 intake capacity as a first step in 1993. It has been upgraded to College of Nursing in 1998 offering B.Sc. in Nursing with 50 seats and added Post Basic Nursing with 35 seats in 2002-2003. From coming session M.Sc. Nursing programme is being added for which Govt. of Punjab has already granted approval. The group also started College of Physiotherapy offering Bachelor in Physiotherapy with 50 seats in the year 2000-2001 and College of Laboratory Technology offering B.Sc. in Medical Laboratory Technology with 30 seat capacity in the year 2002. College of Medical Radiography & Imaging Technology starting from the session 2004 with recognition of State Govt. and affiliation of Baba Farid University of Health Sciences, Faridkot.

In 1994 a polytechnic was established by the group under the name and style as Adesh Polytechnic, Muktsar and running diploma level courses in Computer Science Engineering, Electronics & Communication Engineering, Mechanical engineering , Electrical Engineering and Pharmacy with an annual intake of 300 students. The courses are duly approved by All India Council for Technical Education, Pharmacy Council of India, Punjab State Board of Technical Education & Industrial Training.

Adesh Group also established Adesh Institute of Engineering and Technology at Faridkot in the year 1997 with approval of All India Council for Technical Education and affiliation of Punjab Technical University. The college has emerged as one of the best college of the state. It is imparting degree programmes in Computer Science Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering and Electronics & Instrumentation Engineering with annual intake of 300 students.

The Group established its' second degree level institution in the sacred memory of Martyrs of Muktsar under the name Bhai Maha Singh College of Engineering in Muktsar from the

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session 2002 with an annual intake capacity of 240 students in four trades viz., Computer Science Engineering, Mechanical Engineering, Information Technology and Electronics & Communication Engineering duly approved by All India Council for Technical Education and affiliated to Punjab Technical University.

Another polytechnic is established under the name and style as Malwa Polytechnic, Faridkot from session 2003-04 and running diploma level courses in Computer Engineering, Mechanical Engineering, Electrical Engg., Electronics & Communication Engineering. The courses are duly approved by All India Council for Technical Education, Punjab State Board of Technical Education & Industrial Training.

The latest project completed by the group is establishment and development of a Medical College at Bathinda under the name and style as Adesh Institute of Medical Sciences & Research, Bathinda This is the latest venture of the Adesh Foundation with an annual intake capacity of 150 students in M.B.B.S. course with approval of Medical Council of India/ Govt. of India and affiliation of Baba Farid University of Health Sciences, Faridkot along with an advanced teaching hospital with all modern diagnostic and treatment facilities in a vast campus of 43 acres of land on National Highway 64. The 1st batch of 150 students has been admitted through central counselling conducted by Baba Farid University of Health Sciences in session 2006. The advanced teaching hospital has started functioning since July, 2005 with all clinical specialities and some superspecialities. The hospital has a bed strength of 750 besides 120 private rooms, ICU, ICCU, Neonate Nursery and Emergency Care. The hospital has the facilities for providing round the clock uninterrupted Emergency, ICU/ ICCU/ ICRU/ NICU/ PICU & Intensive Surgical Care Units, 12 ultramodern Operation Theatres with latest equipments, Ultramodern automated Laboratories, Dialysis, Blood Bank, Cancer Unit, Deaddiction Center etc. Presently, the hospital is providing speciality medical services in Medicine, Paediatrics, TB & Chest diseases, Skin & VD, Psychiatry, General Surgery, Orthopedics, ENT, Ophthalmology, Obstetrics & Gynaecology and super-speciality medical

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services in Neuro Surgery, Paediatric Surgery, Gastroenterology, Urology, Neurology, Nephrology, Cardiology, Nephrology and Oncology. It would be projected to 1000 bedded hospital with 300 beds for super-speciality treatment facility. The Institution has also established an Urban Health Center at Bucho Madi and a Rural Health Training Center at Bhallaiana (district Muktsar) for the benefit of population at large. The institution also established paramedical colleges in Nursing (G.N.M.: 100 seats), (B.Sc. Nursing: 60 seats & Post Basic B.Sc. Nursing: 60 seats), Pharmacy (D.Pharmacy: 60 seats, B.Pharmacy: 60 seats), Bachelor in Physiotherapy (60 seats) and different paramedical programmes viz., M.Sc. Clinical Microbiology, M.Sc. Medical Lab. Technology, B.Sc. Clinical Microbiology, B.Sc. Medical Lab. Technology, Diploma courses in Medical Lab. Technology, Operation Theater Technology, Medical Radiography & Imaging Technology, Dialysis Technology, Anaesthesia Technology and Neuro-OT Technology. In addition, the institution also started B.Sc. Medical (Anatomy, Physiology & Biochemistry : 25 seats) and M.Sc. courses in Medical Anatomy, Medical Physiology & Medical Biochemistry (8 seats) in the same campus.

The institution has also started degree level courses in Biotechnology and Medical Lab. Technology from the last academic session.

The latest venture of the Adesh Foundation is establishment of Adesh Institute of Dental Sciences & Research offering B.D.S. with 100 annual intake from academic session 2008-'09 in the adjoining campus of the Medical College.

The University Grants Commission has inspected the total infrastructure, facilities and growth potential of the Adesh Institutes through an Expert Committee comprising members from various Councils, Universities and Statutory bodies. The UGC has unanimously recommended for conferment of Deemed University status on account of high quality infrastructure, equipment and faculty created by the ADESH FOUNDATION under Section 3 of UGC Act to the Ministry of HRD, Govt. of India.

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This is imagined that this institution would be a premier institution in North India to deliver world-class healthcare services, medical, dental, paramedical and technical education and shall remain dedicated to the service to the humanity for all the times to come.

4.1 Uses of Cloud for Adesh Foundation

Seeing the growth of the Adesh Foundation programs, the scalability provided by Educational Cloud is most important benefit to them. By shifting from the usual capital upfront investment model to an operational expense, Educational Cloud promise to make possible Adesh Foundation to accelerate the development and adoption of ground-breaking solutions. Adesh Foundation can take of benefit of the infrastructure presented by the Educational Cloud and focus on building capabilities to support their objectives. Adesh Foundation can use the Educational Cloud for the following applications:

- 1. Integration of all the institutions over an Educational cloud:** - Educational Cloud will perform as central system which unites each Institutes that make coordination and communication real time. Educational cloud will include all the newest education systems and e learning software. The further academies can utilize these structures from the centralized system which will decrease the expenditure of the solution. Central system will include the data of all the colleges which will assist organization in making important business decisions in improving the quality of education in all the colleges.
- 2. Medical management System – Medical ERP system** which integrates student, teacher, accounts, library, facilities, research, treatment systems and administration.[23] The system will computerize the admission process, registration of students, course details, faculty's details, assignments, marks sheets, mid term tests and transcripts. Students will be able to download their data online.

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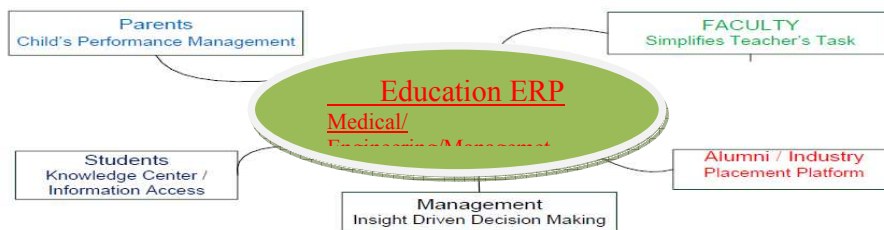


Figure 3 Educational ERP

3. Engineering management System – ERP like system that integrates and manages admissions, courses, students, teachers, accounts, facilities, research, library etc. The system will computerize the admission process, registration of students, course details, faculty's details, assignments, marks sheets, mid term tests and transcripts. Students will be able to download their data online.

4. Educational Portal- universal place where all the education associated resources accessible for higher studies. This can be used by students, faculty and parents. This can further divided into medical portal and the engineering portal.

5. Virtual Classroom - online proposal to encourage communication, collaboration and understanding among students, faculty, researchers and business around the world. This will assist the country to get the eminence education. It is observed that rural areas have very less quality faculty compared to urban areas. This will decrease this gap.

4.2 Business prospect

The Adesh Foundation is in the education area since 1991. Their strong domain knowledge combine with the Education Cloud can be returns generator for the Adesh Foundation. The

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educational Cloud is shaped on the concept of software as a service. The services from Educational Cloud can be sold to other institutes and universities. They just require maintaining one more application but can make available lot of value to their clients, i.e. other schools.

5. Conclusion

With Educational Cloud help, the Adesh Foundation can focus on the mission of civilizing lives. Educational Cloud can assist them in gathering their hard line future growth of institutes. in view of the fact that all the colleges are in the rural areas, this will help to eliminate the social evils from the civilization. Education Cloud offers cost effective result in providing the services to maintain their goal of eminence education. Educational cloud can help them in producing the revenue which can be used on their other humanitarian projects. With the help of the virtual classroom on Educational Cloud, the Adesh Foundation can start the quality education programs which can even reach students of other nations. This will also help to reduce the gap between the institutes and the business world which will finally help students in meeting their requirements of rewarding careers.

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