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E- Learning using Cloud Computing

A Project Report Evaluation 3 of Capstone Project - 2

Submitted by

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(1613101615/16SCSE101014)

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BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

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Under the Supervision of

Ms. Nidhi, Assoc.Prof.

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SCHOOL OF COMPUTING AND SCIENCE AND ENGINEERING BONAFIDE CERTIFICATE

Certified that this project report " E-Learning using Cloud Computing" is the bonafide work of "SAKSHI GUPTA (1613101615)" who carried out the project work under my supervision.

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CHAPTER 1

Introduction to E-learning

E-Learning is the topic related to the virtualized distance learning by means of electronic communication mechanisms, specifically the Internet. They are based in the use of approaches with diverse functionality (e-mail, Web pages, forums, learning platforms, and so on) as a support of the process of teaching-learning. The Cloud Computing environment rises as a natural platform to provide support to e-Learning systems and also for the implementation of data mining techniques that allow to explore the enormous data bases generated from the former process to extract the inherent knowledge, since it can be dynamically adapted by providing a scalable system for changing necessities along time. In this contribution, we give an overview of the current state of the structure of Cloud Computing for applications on e-learning. We provide details of the most common infrastructures that have been developed for such a system, and finally we present some examples of e-learning approaches for Cloud Computing that can be found in the specific literature.

In the present day scenario of the education system it is very difficult for the education institutes/colleges to provide quality education to the students. The number of increasing infrastructure & facilities are still not making much progress due to the cloud approach but with the use of information technology the problems faced by the students and the educational institutes can be solved. Internet now a days is accessible from maximum telecommunication devices like desktops, laptops, tablets, mobiles, Music players, I-Pad, I-Pods etc making it more distributed compare to any centavos . Cloud computing is widely used in many fields due to its more advantages the services provided by the cloud computing can add good impact to educational institutes by reducing the cost of infrastructure compared to present working system.

The E – learning system and stores e-books information electronically according to categories. The system helps both students and other users to keep a constant track of all the books and videos available

in the system, download or watch/read them online. It becomes necessary for colleges to keep a continuous check on the books issued and returned. Also it happens when students don't return book or loses it. The college has to then bear the loss of book lost. Hence the system eliminates the need of issuing books and keeping a manual track of it by providing students with the facility of downloading e-books from the system. It contains books listed according to semesters and branches so that students can easily find their desired e-books and learning videos. It moreover makes convenient for the student to download e-books whenever required.

Cloud computing refers to applications and services that run on a distributed network using virtually resources and accessed by common Internet protocols and networking standards. It is distinguished by the notion that resources are virtual and limitless and that details of the physical systems on which software runs are abstracted from the user.

Cloud computing takes the technology, services, and applications that are similar to those on the Internet and turns them into a self-service utility. The use of the word "cloud" makes reference to the two essential concepts.

1.1 Overall Description

• Abstraction: Cloud computing abstracts the details of system implementation from users and developers. Applications run on physical systems that aren't specified, data is stored in locations that are unknown, administration of systems is outsourced to others, and access by users is ubiquitous

• Virtual Cloud computing virtualises systems by pooling and sharing resources. Systems and storage can be provisioned as needed from a centralised infrastructure, costs are assessed on a metered basis, multi-tenancy is enabled, and resources are scalable with agility. . Cloud Models

2.1 Deployment models A deployment model defines the purpose of the cloud and the nature of how the cloud is located, the NIST definition for the four deployment models is as follows • Public cloud:

The public cloud infrastructure is available for public use alternatively for a large industry group and is owned by an organisation selling cloud services.

• Private cloud: The private cloud infrastructure is operated for the exclusive use of an organisation. The cloud may be managed by that organisation or a third party. Private clouds may be either on- or off-premises.

• Hybrid cloud: A hybrid cloud combines multiple clouds (private, community of public) where those clouds retain their unique identities, but are bound together as a unit. A hybrid cloud may offer standardised or proprietary access to data and applications, as well as application portability.

• Community cloud: A community cloud is one where the cloud has been organised to serve a common function or purpose.

1.2 User list

Service models In the deployment model, different cloud types are an expression of the manner in which infrastructure is deployed.

Three service types have been universally accepted.

• Infrastructure as a Service: IaaS provides virtual machines, virtual storage, virtual infrastructure, and other hardware assets as resources that clients can provision. The IaaS service provider manages all the infrastructure, while the client is responsible for all other aspects of the deployment. This can include the operating system, applications, and user interactions with the system.

• Platform as a Service: PaaS provides virtual machines, operating systems, applications, services, development frameworks, transactions, and control structures. The client can deploy its applications on the cloud infrastructure or use applications that were programmed using languages and tools that are

supported by the PaaS service provider. The service provider manages the cloud infrastructure, the operating systems, and the enabling software. The client is responsible for installing and managing the application that it is deploying. E- learning Using Cloud Computing

• Software as a Service: SaaS is a complete operating environment with applications, management, and the user interface. In the SaaS model, the application is provided to the client through a thin client interface (a browser, usually), and the customer's responsibility begins and ends with entering and managing its data and user interaction. Everything from the application down to the infrastructure is the vendor's responsibility. The major players in

the field of cloud computing are Google, Microsoft, Amazon, Yahoo and some legacy

hardware vendors like IBM and Intel.

In recent years e-learning has grown into a widely accepted way of learning, and the usage of the global network is inevitable in every education process. Ubiquitous learning integrates wireless, mobile and context awareness technologies in order to detect the situation of the learners and provide more seamless adaptive support beyond formal learning In order to support modern pedagogical approaches, as well as a variety of learning resources within courses, ubiquitous learning environments need to be based on a powerful IT infrastructure. At the same time, in order to be efficient, ubiquitous learning environments need to be based on learning management systems (LMS) and integrated into an existing e learning environment of educational institutions.

The proposed e- learning cloud architecture can be divided into the following layers: Infrastructure layer as a dynamic and scalable physical host pool, software resource layer that offers a unified interface for e-learning developers, resource management layer that achieves loose coupling of software and hardware resources, service layer, containing three levels of services (software as a service, platform as a service and infrastructure as a service), application layer that provides with content production, content delivery, virtual laboratory, collaborative learning, assessment and management features.

1) Infrastructure layer: is composed of information infrastructure and teaching resources. Information infrastructure contains Internet/Intranet, system software, information management system and some common software and hardware; teaching resources is accumulated mainly in traditional teaching model and distributed in different departments and domain. This layer is located in the lowest level of cloud service middleware, the basic computing power like physical memory, CPU, memory is provided by the layer. Through the use of virtualisation technology, physical server, storage and network form virtualisation group for being called by upper software platform. The physical host pool is dynamic and scalable, new physical host can be added in order to enhance physical computing power for cloud middleware services.

2) Software resource layer: mainly is composed by operating system and middleware. Through middleware technology, a variety of software resources are integrated to provide a unified interface for software developers, so they can easily develop a lot of applications based on software resources and embed them in the cloud, making them available for cloud computing users.

3) Resource management layer: is the key to achieve loose coupling of software resources and hardware resources. Through integration of virtualisation and cloud computing scheduling strategy, on-demand free flow and distribution of software over various hardware resources can be achieved.

4) Service layer: has three levels of services namely,SaaS (Software as a service), Paas (Platform as a service), IaaS (Infrastructure as a service). In SaaS, cloud computing service is provided to customers. As is different from traditional software, users use software via the Internet, not to

need a one-time purchase for software and hardware, and not to need to maintain and upgrade, simply paying a monthly fee.

5) Application layer: is the specific application of integration the teaching resources in the cloud computing model, including interactive courses and sharing the teaching resources. The interactive programs are mainly for the teachers, according to the learners and teaching needs, taken full advantage of the underlying information resources after finishing made, and the course content as well as the progress may at any time adjust according to the feedback.

1.3 Key Benefits of Cloud Based E-Learning

There are numerous advantages when the e-learning is implemented with the cloud computing technology, they are:

1) Low cost: E-Learning users need not have high end configured computers to run the e- learning applications. They can run the applications from cloud through their PC, mobile phones, tablet PC having minimum configuration with internet connectivity. Since the data is created and accessed in the cloud, the user need not spend more money for large memory for data storage in local machines. Organisations also need to pay per use, so it’s cheaper and need to pay only for the space they need.

2) Improved performance: Since the cloud based e-learning applications have most of the applications and processes in cloud, client machines do not create problems on performance when they are working.

3) Instant software updates: Since the cloud based application for e-learning runs with the cloud power, the software's are automatically updated in cloud source. So, always e-learners get updates instantly.

4) Improved document format compatibility: Since some file formats and fonts do not open properly in some PCs/mobile phones, the cloud powered e-learning applications do not have to worry about those kinds of problems. As the cloud based e-learning applications open the file from cloud.

5) Benefits for students: Students get more advantages through cloud based e-learning. They can take online courses, attend the online exams, get feedback about the courses from instructors, and send their projects and assignments through online to their teachers.

6) Benefits for teachers: Teachers also get numerous benefits over cloud based e-learning. Teachers are able to prepare online tests for students, deal and create better content resources for students through content management, assess the tests, homework, projects taken by students, send the feedback and communicate with students through online forums.

7) Data security: A very big concern is related to the data security because both the software and the data are located on remote servers that can crash or disappear without any additional warnings. Even if it seems not very reasonable, the cloud computing provide some major security benefits for individuals and companies that are using/developing e-earning solutions.

E-learning is an Internet-based learning process, using Internet technology to design, implement, select, support, extend learning.As a computer and usage of Internet has made the life of the

business people easy company from the world have started to consider the fact that information and knowledge can be imparted to people using technology. E-Learning is one such method in this direction. The big advantage of E- Learning is that it helps to provide information to a very large and big group of individuals who can't attend an institution. It also reduces the classes to a student who has to pay for the classes. E -learning is the best way to catch the online classes in case if you are not coming to universities and it is a electronic technologies to access the classes and it is very high performance techniques. It is completely changed the view of both academic education as well as training area. Today, uses of E learning is as much .It also Content (E-learning) structure of student and also communicate to the teacher in cloud apps. Cloud computing introduces efficient large scale of E- learning to supplies and provide a new E-Learning Institution can take advantage of the cloud computing. It provided free and low cost efficient for teachers and the student .

1.4 PURPOSE

The purpose is to design a e-learning platform for students so that many students can access the same book at same time. That should improve institutional productivity and makes academic process more efficient.

SOME POINTS:

•It can be helpful such that - Books are always updated.

•Manpower is decreased or reduced.

•Large amount of data regarding college and their modules can be stored.

•Fine System will be removed.

•Management of all stuffs is efficient and flexible.

The e-learning cannot completely replace teachers; it is only an updating for technology, concepts and tools, giving new content, concepts and methods for education, so the roles of teachers cannot

be replaced. The teachers will still play leading roles and participate in developing and making use of E-learning cloud. Fig 3 Modified E-learning System Architecture.

The blended learning strategy should improve the educational act. Moreover, the interactive content and virtual collaboration guarantee a high retention factor.

On the other hand, E-learning cloud is a migration of cloud computing technology in the field of e-learning, which is a future e-learning infrastructure, including all the necessary hardware and software computing resources engaging in E-learning. Poonam R. et al, International Journal of Computer Science and Mobile Computing, Vol.3 Issue.5, May- 2014, pg. 1281-1287

CHAPTER 2

Software and Hardware Requirement

2.1 Software Requirement

- OS : Window 7 or above
- Tool : Net Beams 8.0.2
- Web Server : Tomcat Apache 8.0.15 or Glass 4.0
- Platform : Java
- Scripting : JSP

2.2 Hardware Requirements

- Processor : Intel Dual core and all above
- Main Men : 1GB DDR3
- Hard Disk : Approximate of 10 GB of Disk Space
- Keyboard : 109 Keys
- Monitor : 18”Colour LCD

CHAPTER 3

Project Analysis

3.1 Project Instructions

• Based on the given requirements, conceptualise the Solution Architecture, depict the various architectural components, show interactions and connectedness and show internal and external elements. Design the web services, web methods and database infrastructure needed both client and server.

• Provide an environment for up gradation of application for newer versions that are available in the same domain as web service target.

3.2 Modules

3.2.1 Admin

• Admin Login

• Admin Home

3.2.2 Student

• Student Registration

• Student Login

• Forgot Password

• Student Home

• Online classes

• Take Classes online

•Saved the video of online class

3.3 Modules Description

3.3.1 Faculty

•Faculty Login

Faculty should Login the system.

• Faculty Home

The Faculty should be able to perform the following actions-

1. View the list of online classes.

2. View the Classes in time slot.

3. Should be able to cancel classes when required.

4. Should be able to update total number of students .

5. Should be able to add new students to the classroom.

6. Should be able to modify the students in the class.

3.3.2 Student

• Student Registration

The user should enter valid credentials. An auto generated password should be sent to the entered email address for verification purpose.

• Student Login

The Student should enter his email address as user id and the auto generated password received during registration to login the system. The student can

change this password later.

• Forgot Password

In case the student forgets his password, a new password should be sent to his registered email address which can be used to login the system.

• Student Home

The student should be able to perform the following actions-

1. Present in classes.

2. Feedback of the classes.

3. Online quiz, assignment .

4. Online exam.

5. View the teacher ,Profile and Contact information of the Faculty.

• Online classes Informational

The student should be able to continue the classes online by

1. Going to the offline and save the videos.

2. Continue the class after break.

3. Go to the cart easily.

4. Edit the real address or use the default address.

5. Click Start now.

6. After redirection to payment , choose payment mode and pay the classes.

• Certificate classes.

The student should be able to certification online by-

1. Going to pay of the modules..

2. Choose date, slot and number of class..

3. Click start .

4. After redirection to pay, choose payment mode and pay

the billing amount.

• Cancellation of booking of class.

The student should be able to cancel booked class lectures through booking id.

The refund amount should be initiated to his account.

• Payment

The student should choose the payment mode and pay the billing.

CHAPTER 4

Literature Review

Cloud Computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralising data storage, processing and bandwidth.

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation.

According to the official NIST (National Institute of Standards and Technology) definition, "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." The NIST definition lists five essential characteristics of cloud computing: on-demand self-service, broad network access, resource pooling, rapid elasticity or expansion, and measured service. It also lists three "service models" (software, platform and infrastructure), and four "deployment models" (private, community, public and hybrid) that together categorise ways to deliver cloud services. The definition is intended to serve as a means

for broad comparisons of cloud services and deployment strategies, and to provide a baseline for discussion from what is cloud computing to how to best use cloud computing.Cloud computing employs a service driven business model. Cloud offers services that can be grouped into the following categories:

A. Cloud Services

1) Infrastructure as a service (IaaS): Hardware resources (such as storage) and computing power (CPU and memory) are offered as services to customers. This enables businesses to rent these resources rather than spending money to buy dedicated servers and networking equipment.. 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.

2) Software as a service (SaaS): In this model, software applications are offered as services on the Internet rather than as software packages to be purchased by individual customers. One of the pioneering providers in this category is Salesforce.com offering its CRM application as a service. Other examples include Google web-based office applications (word processors, spreadsheets, etc.),

3) Platform as a service (PaaS): This refers to providing facilities to support the entire application development

lifecycle including 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. Examples of platforms in this category are Microsoft Azure Services platform6, Google App Engine7, Salesforce.com Internet Application Development platform8 and Bungee Connect platform9. PaaS enables SaaS users to develop add-ons, and also develop standalone Web based applications, reuse other services and develop collaboratively in a team.

B. Models of Cloud

1) Private Cloud: The cloud infrastructure is provisioned for exclusive use by a single organisation comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organisation, a third party, or some combination of them, and it may exist on or off premises.

2) Public Cloud: Public cloud applications, storage, and other resources are made available to the general public by a service provider. These services are free or offered on a pay-per-use model. Generally, public cloud service providers like Amazon
AWS, Microsoft and Google own and operate the infrastructure and offer access only via Internet (direct connectivity is not offered).

3) Community Cloud: Community cloud shares infrastructure between several organisations from a specific community with common concerns (security, compliance,

jurisdiction, etc.), whether managed internally or by a third-party and hosted internally or externally. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realised.

4) Hybrid cloud: Hybrid cloud is a composition of two or more clouds (private, community or public) that remain unique entities but are bound together, offering the benefits of multiple deployment model

Fig 1 Cloud Model

III. E-LEARNING

A. From Traditional E-learning Network to Cloud E-Learning

E-learning is an Internet-based learning process, using Internet technology to design, implement,

select, manage, support and extend learning, which will not replace traditional education

methods, but will greatly improve the efficiency of education. As e-learning has a lot of advantages like flexibility, diversity, measurement, opening and so on, it will become .

Mendez illustrates that in traditional web-based learning mode, system construction and maintenance are located inside the educational institutions or enterprises, which led to a lot of problems, such as significant investment needed but without capital gains for them, which leads to a lack of development potential. In contrast, cloud-based e-learning model introduces scale efficiency mechanism, i.e. construction of e-learning system is entrusted to cloud computing suppliers, which can make providers and users to achieve a win-win situation. The cloud-based environment supports the creation of new generation of e-learning systems, able to run on a wide range of hardware devices, while storing data inside the cloud.

Of the presented an innovative e-learning ecosystem based on cloud computing and Web 2.0 technologies. The article analyses the most important cloud-based services provided by public cloud computing environments such as Google App Engine, Amazon Elastic Compute Cloud (EC2) or Windows Azure, and highlights the advantages of deploying E-Learning 2.0 applications for such an infrastructure. The authors also identified the benefits of cloud-based E-Learning 2.0 applications (scalability, feasibility, or availability) and underlined the enhancements regarding the cost and risk management.

Chandra focused on current e-learning architecture model and on issues in current e-learning applications. The article presents the Hybrid Instructional Model as the blend of the traditional classroom and online education and its customisation for e-learning applications running on the cloud computing infrastructure. The authors underline the e-learning issues, especially the openness, scalability, and development/customisation

costs. The existing e-learning systems are not dynamically scalable and hard to extend – integration with other e-learning systems is very expensive. The article proposed the hybrid cloud delivery model that can help in fixing the mentioned problems.

In this article a new paradigm is highlighted in educational area by introducing the cloud computing in order to increase the scalability, flexibility and availability of e-learning systems. The authors have evaluated the traditional e-learning networking model, with its advances and issues, and the possibility to move the e-learning system out of schools or enterprises, inside a cloud computing infrastructure. The separation of entity roles and cost effectiveness can be considered important advantages. The institutions will be responsible for the education process, content management and delivery, and the vendor takes care of system construction, maintenance, development and management. The e-learning system can be scaled, both horizontally and vertically, and the educational organisation is charged according to the number of used servers that depends oB. Cloud based E-Learning architecture

The e-learning cannot completely replace teachers; it is only an updating for technology, concepts and tools, giving new content, concepts and methods for education, so the roles of teachers cannot be replaced. The teachers will still play leading roles and participate in developing and making use of E-learning cloud. Fig 3 Modified E-learning System Architecture.

The blended learning strategy should improve the educational act. Moreover, the interactive content and virtual collaboration guarantee a high retention factor.

On the other hand, E-learning cloud is a migration of cloud computing technology in the field of e-learning, which is a future e-learning infrastructure, including all the necessary hardware and software computing resources engaging in E-learning. Poonam et al, International Journal of Computer Science and Mobile Computing, Vol.3 Issue.5, May-13Mendez illustrates that in traditional web-based learning mode, system construction and maintenance are located inside the educational institutions or enterprises, which led to a lot of problems, such as significant investment needed but without capital gains for them, which leads to a lack of development potential. In contrast, cloud-based e-learning model introduces scale efficiency mechanism, i.e. construction of e-learning system is entrusted to cloud computing suppliers, which can make providers and users to achieve a win-win situation. The cloud-based environment supports the creation of new generation of e-learning systems, able to run on a wide range of hardware devices, while storing data inside the cloud.

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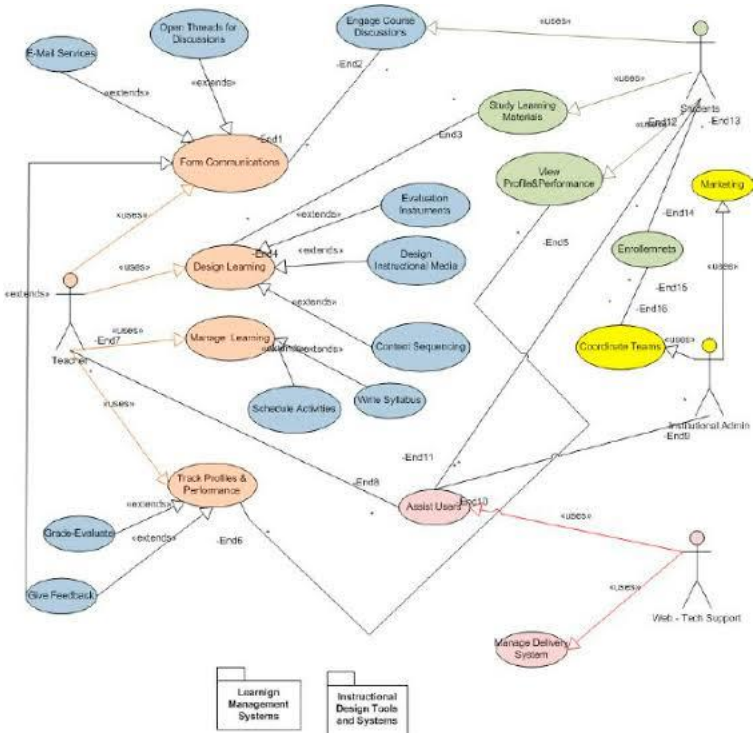
businesses to rent computing resources. E-learning cloud architecture .

CHAPTER 5

Software design

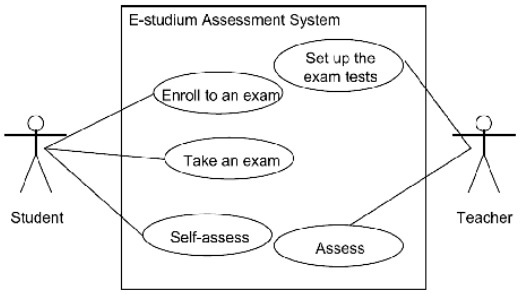
1. A New E-Learning Platform

2. UML (Uniform Modern Language)



•UML of students teacher

by the teacher, students can effectively sit for the



UML use case diagram of e-studium assessment system

Use Case Specification

Use Case Name: Registration

Summary :Student enter their details into the system.

Details of the student used to be validated by the system before saving into the database.

Actor students

Precondition:Students need to access the system through web browser

Main Sequences

1. Student provide their details.

2. System validate customer's details.

3. System then save customers details into the database.

4. System register new customers.

5. System shows the message after saving the details successfully.

Alternative Sequence N/A

Post Condition: System create account for the new customer.

Use Case Name: Login

Summary: Customer enter their username and password to access their account Actor: Customers

Precondition: Customer need to register as a member

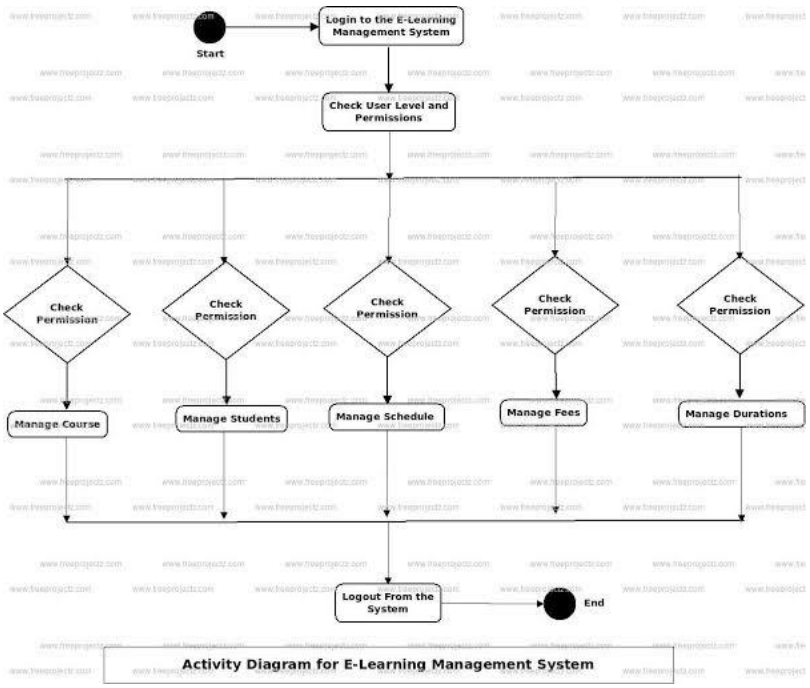
Main Sequences

1. Customers enter user credentials. 2. System verify users.

3. System redirect to the user page. Alternative Sequences

If customers are unable to login to the system then the system will show customers "Forget Password" link where they can change their password.

• Activity diagram



Login

• Start

• Registration

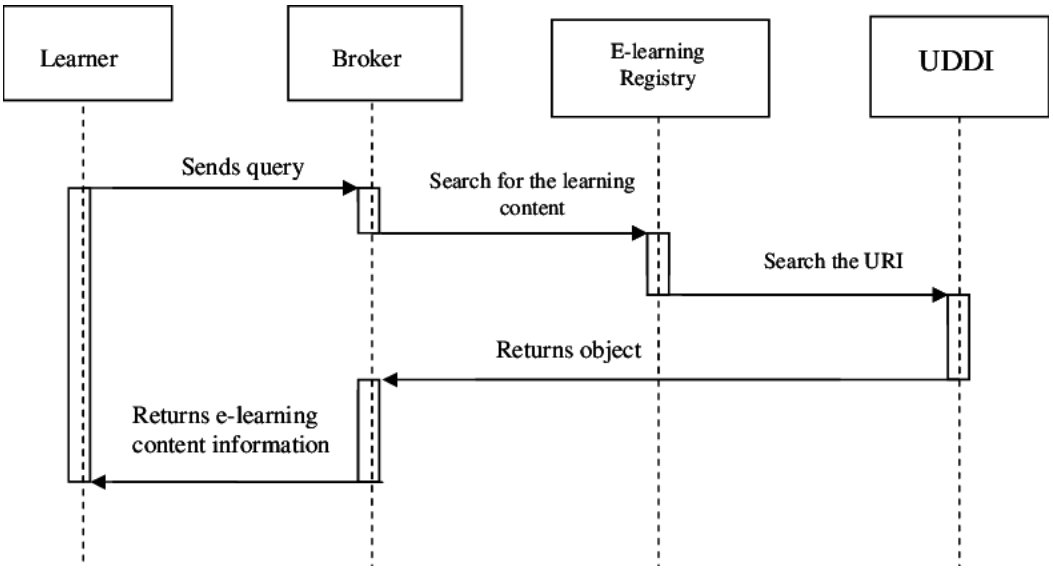
• Check permissions

• Manage student

• Logout from the User

• . End

• Sequence Diagram



CHAPTER 6

Code Implementation

DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"

"http://www.w3.org/TR/xhtml1/DTD/xhtml1-traction .d;

<head>

<meta http- per ="Content-Type" content="text/html; charset=UTF-8" /> <link href="bootstrap/css/bootstrap.min.css" real ="stylesheet">

<link href="bootstrap/css/ - " l"> <link type="text/css" DOCTYPE PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional ">

<head>

<meta http- ="Content-Type" content="text/html; charset=UTF-8" /> <link

href="bootstrap/css/bootstrap.min.css" re="stylesheet">

sink ="stylesheet"> <link type="text/css" re="stylesheet" href="css/style.css" />

scrips

<title>Bus Scheduler</title> </head>

<body>

Bus Scheduler

Sign Up / Sign In

37

 <%

String msg=(String)session.getAttribute("msg"); if(msg!=null)

{

%>

 <%=msg%>

<%

session.setAttribute("msg", null); }

%>

< src=" /signup.jpg">

<h5 class="text- "> Fill up the form to Sign Up </h5>="stylesheet" href="css/style.css" />

<script type="text/javascript" src="1.8.2.m"></script> <script src="bootstrap/."></script>

<title>Bus Scheduler</title> </head

<body>

Bus Scheduler

<a href=" Up / Sign In

37

 <%

String msg=(String)session.getAttribute("msg"); if(msg!=null)

{

%>

 <%=msg%>

<%

session.setAttribute("msg", null); }

%>

<m src=" /signup.jpg">

<div class= col-ad-4 pull-right">

<h5 class=Fill up the form to Sign Up </h5>

CHAPTER 7

Software Testing

Testing a program consists of subjecting the program to a set of test inputs and observing if the program behaves as expected. If the program fails to behave as expected then the conditions under which failure occurs are noted for later debugging and correction. Various terms associated with Testing are:

FAILURE: It is a manifestation of the error. But the mere presence of an error may not necessarily lead to failure.

TEST CASE: It is the Triplet [I, S, O] where I is the data input to the system, S is the state of the system at which data is input, and O is the expected output of the System.

TEST SUITE: It is the set of all test cases with which a given software product is to be tested.

Software testing is the process used to measure the quality of developed computer software. Testing is a process of technical investigation, performed on behalf of stakeholders, that is intended to reveal quality-related information about the product with respect to the context in which it is intended to operate.

There are essentially two approaches to systematically design the Test Case:

➢ Black box testing treats the software as a black-box without any understanding as to how the internals behave. Thus, the tester inputs data and only sees the output from the test object. They are designed using only the software specification of the software.

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➢ White box testing, however, is when the tester has access to the internal data structures, code, White box testing, however, is when the tester has access to the internal data structures, code, and algorithms. It is therefore also called the Structural testing.

7.1 Levels of Testing

➢ Unit testing tests the minimal software component, or module. Each unit (basic component) of the software is tested to verify that the detailed design for the unit has been correctly implemented.

➢ Integration testing exposes defects in the interfaces and interaction between integrated components (modules).

➢ Functional testing tests at any level (class, module, interface, or system) for proper functionality as defined in the specification.

➢ System testing tests a completely integrated system to verify that it meets its requirements.

➢ Alpha testing refers to the system testing carried out by the test team within the developing Organisations.

➢ Beta testing it is the system testing performed by selected group of friendly customers.

➢ Acceptance Testing refers to the System testing performed by the customer to determine

PROBLEM STATEMENT:

Among the learning technologies, web-based learning offers several benefits over conventional classroom-based learning. Its biggest advantages are the reduced costs since a physical environment is no longer required and therefore it can be used at any time and place for the convenience of the student.

Additionally, the learning material is easy to keep updated and the teacher may also incorporate multimedia content to provide a friendly framework and to ease the understanding of the concepts. Finally, it can be viewed as a learner-c-entered approach which can address the differences among teachers, so that all of them may check the confidence of their material to evaluate and reutilise common areas of knowledge .However, there are some disadvantages that must be addressed prior to the full integration of e-Learning into the academic framework.

Currently, e Learning systems are still weak on scalability at the infrastructure level. Several resources can be deployed and assigned just for specific tasks so that when receiving high workloads, the system need to add and configure new resources of the same type, making the cost and resource management very expensive.

PROPOSED MODEL:

1. Admin login: Admin is the one who administers the system by adding or removing e-books into and from the system respectively.
2. User login: Students have to register themselves into the system to create an account. After registering successfully, they can then login into the system by entering 10 digit mobile number and their email id.
3. Categories of books: The e-books are organised according to categories. Thus this classifies the books and students can view the list of references books available.
4. View Videos: Students can watch videos with ease due to efficient streaming on cloud infrastructure
5. Search option: Students can even search for books according to subjects and authors.
6. Students can then download the required e-book on selecting it.
7. Feedback form: Students can even provide their feedback into the system by filling up feedback form.

CHAPTER 8

Conclusion

We are concluding the previous studies of the cloud computing is the best of the solution for the all educational institutes and also universities. Cloud computing recently emerged the compelling the paradigm for the managing and the delivery the services over all over the internet. The rise of the cloud computing is also rapidly changing of information technology and ultimately to turning to long-held promise of the utility of computing in a reality.

Present the situation of economic will force the different education institutions and the organisations to consider and adopting the cloud solutions. All organisations have keep the reducing gap between the current situation and new development order to continue the offering their services on the sufficient way. The main aim of work was to the identify the architecture which will the using of cloud computing within higher education. We have considered benefits of the cloud architecture. Even though this dissertation could produce potential outcomes following the research question, there were some limitations, which could be improved in future research. In terms of the users' perceptions of the bus scheduler. However, there were some issues, which were brought up by the interviewees, such as enhancing customer service and the use by elderly people. Therefore, future research should carry out a case study based on this prototype to examine exact perceptions

CHAPTER 9

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