Collaborative Web based Cloud Services for E-Learning and Educational ERP

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***Abstract*— ERP today is very expensive and its not easy to procure it because educational institutions have limited budgets. So we have designed a modular system which can provide the educational systems more facilities with less budget also the system will be web based and it will have pay as you go model which can be achieved using the cloud based Educational ERP. E-learning tools available in the market are also costly and are not customizable, so there is a need to much easy and modularized tool, which will fulfill to the needs of the organization with minimal cost and high returns with Zero maintenance cost. Our E-Learning tool provides sharing of contents and information with the students, which is specific to the users. This tool is having Pay As You Go (PAYG) model because of which the today expenditure of the organization will reduce.**

Keywords*— *E-learning Cloud Services; Educational ERP; System Design for ERP; Datamining for ERP; IAAS; PAAS; SAAS; PAYG.

I. INTRODUCTION

In todays era of computing where information is a key constraint in the students and teachers community. Updated information plays a vital role in the development of the teaching and learning methodologies [1]. Most of the printed books are outdated as soon as they are released as information is evolving every second in this digital era so its important to keep your self updated all the teachers should get the updated contents so that they can delivery the latest information to there students. Today most of the books are digitized because of which its possible to keep the contents updated. Hence it is possible to impart updated knowledge to the teachers and students. Moving ahead of digitization of books today we have more advanced stages of books called the interactive books where the students and the teacher can interact with the books the books are no more static entities they are now having moving objects, videos and movies integrated in them. Moving ahead books are now more advanced we have today audio books where the information written in the book is converted to audio format and there is no need to read the book infact the students and teachers can now listen to the books. Today we are also facing the problem of global warming we the engineers can concentrate at this and reduce the carbon emission done by the heavy server machines running in the server rooms also the cost of cooling these servers can be neglected. Hence the web based cloud service for E-learning environment can be a boom for the society and green computing infrastructure can be used for E-learning purpose.

To manage all these contents we need integrated software which can manage contents and information together with a single user interface. The educational ERP software available in the market today do not provide this facilities infact they are more costly and need more infrastructure and maintenance throughout the academic year [2]. To bridge this gap between the need to the day and the cost we have designed an integrated solution, which will server the need of the users.

II. CLOUD SERVICES FOR E-LEARNING

Some of the functionalities, which will be provided as a service in the E-learning for both teachers and the students, are as follows.

1) User Authentication Service.
2) User Management for teachers
    a. Student Creation
    b. Result Generation
    c. Quiz, Assignment Creation.
    d. Inserting attendance
    e. Uploading teaching materials
    (Audio, Video, Books, PPT, DOCX. Etc.)
3) Students View
    a. Learning material
    b. Results
    c. Performance
    d. Attendance

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The Fig1. Below shows the web service which will be provided to the users of the system the authentication web service will provide user authentication for authorized users it will restrict the unauthorized users hence no access will be granted to the unauthorized users if the user is authorized then he will be able to use the other web service depending on the users level. There are two levels of users the Teacher View and the Students view. The teacher will have access to creation of documents, notes, student account creation etc. the student module will help the student to get all the learning materials also he will be able to check his performance online. The entire system is cloud based which will keep the information synchronized and updated.

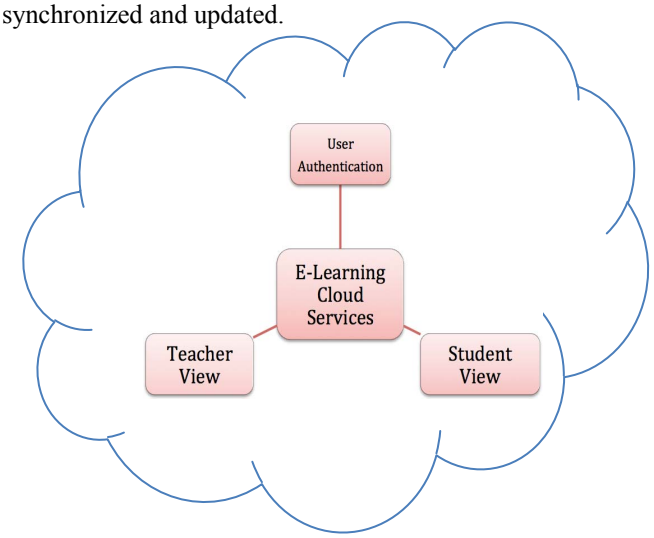

Fig 1. E-Learning Cloud Based Services

III. Cloud Services For ERP.

Cloud ERP is an ERP system that is hosted over the cloud platform and is available on demand [5]. It offers all the modules and services that are offered by any standard ERP application. The Educational ERP will have the following web services, which will help the organization to reduce the cost of infrastructure required to deploy the ERP [3]. Some of the Modules are listed below:

1) Finance Account
   a. Teachers Salary
   b. Students Fees
   c. Scholarship
2) Academic
   a. Student Admission
   b. Teacher recruitment
3) Alumni
4) Cloud Ready Library
5) DSR (Dead Stock Register)
6) Planning
7) Operation
8) HR

These individual cloud based modules will be provided as web services to the end users clients. The clients will have Zero maintenance cost and will require zero efforts to deploy the modules all the modules will be preconfigured on the cloud servers the end user will only get the API's or the URL's of the specific modules requested by the organizations. Hence the overall cost of the modules will be negligible as we are having Pay As You Go (PAYG) model for the cloud based Education ERP model.

The Fig 2. Below depicts the cloud based services for the ERP environment various phases are based on the levels of user authentication all the module are designed as web services and all the web services collaborate with each other the entire system is deployed on the cloud hence the synchronization is possible within various module of the ERP software.

A. Financial Account

The system maintains all the financial data over the cloud. The financial team is connected to the cloud web services designed the financial team can prepare the salary of the employees depending upon the number of days the employee has worked for the organization. As financial data is crucial its important to maintain replica of the data hence we have used Hybrid Cloud environment where the information about the employees salary is replicated from the global server to the local server which will be located in-house.

B. Academic

The Academic System will contain various functionalities such as student's admission and registration, Faculty recruitment all these functionalities are integrated and communicate with each other as and when required. Various departments and other modules of ERP require this information about students and faculties. Hence this information is synchronized across various servers in-house and globally.

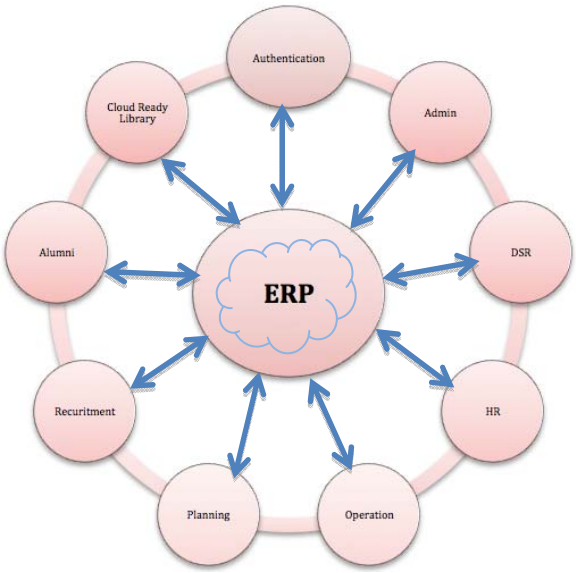

Fig 2. ERP Cloud Based Architecture

IV. Advantages of Using Cloud Services for E-Learning

Students today are becoming more used too E-learning environments also the use of cloud computing is increasing day by day.

The cloud services provide major advantages over the stand-alone application used today for E-learning [4]. Some of the major advantages are listed below

A. Accessibility

The cloud based E-learning system will be accessible across various platforms hence the system is platform independent and also is can be accessed on various devices so its hardware independent also.

B. Availability

Availability today is a major issue in the developing nations. This system will be available 24x7 and 356 days also the bandwidth will be unlimited both uplink and downlink hence there is no limitation on unloading and downloading file and data.

C. Scalability and flexibility

As the cloud based E-learning system is modular its highly scalable each module is a web service and all the web services can be upgraded without bringing down the whole system also the system is highly flexible as it can operate under various operating conditions the user interface will adjust it self automatically.

D. Modularity

The E-learning system will have various modules, which can communicate and mutually exchange information with the modules as and when required by the modules to perform various operations each module is independent service.

V. Advantages of Using Cloud Services for Educational ERP and E-Learning

The advantages of using cloud services for educational ERP and E-learning are as following:

- Creating Interactive teaching and learning material
- Maintaining students records and attendance
- Help improve productivity
- Prepare students for the future of work
- Reduce costs and simplify IT management
- Enjoy anywhere access
- User Authentication Services
- Teachers Management system

Empower teaching and learning, and help improve student outcomes, Deliver captivating courses make it easier for educators to create captivating multimedia presentations and course materials, with Windows, Microsoft Office, Microsoft SharePoint, and SkyDrive. Teachers can record their classes, edit them as professional podcasts and videos, and then upload them for students to access online. With Office Web Apps 2010—online companions to Word, Excel, PowerPoint, and OneNote—you can review, edit, share, and work together on documents from any supported web browser, across devices. And Office Mobile 2010 makes it easy to view and edit documents from supported smartphones

VI. Working Explanation of Various Cloud Services for E-Learning and ERP

The software is designed using Service Oriented Architecture (SOA) concept all the web services are individual designed and can communicate with each other information will be extracted and displayed using data mining techniques. Figure below shows some screen shots of the working environment of software application developed.

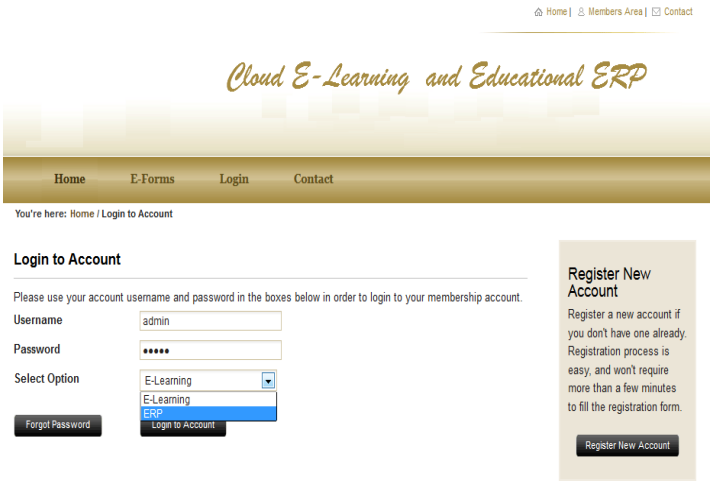

Fig 3. Authentication Module for E-Learning and ERP

Fig 4. Cloud based Teachers Module for E-Learning

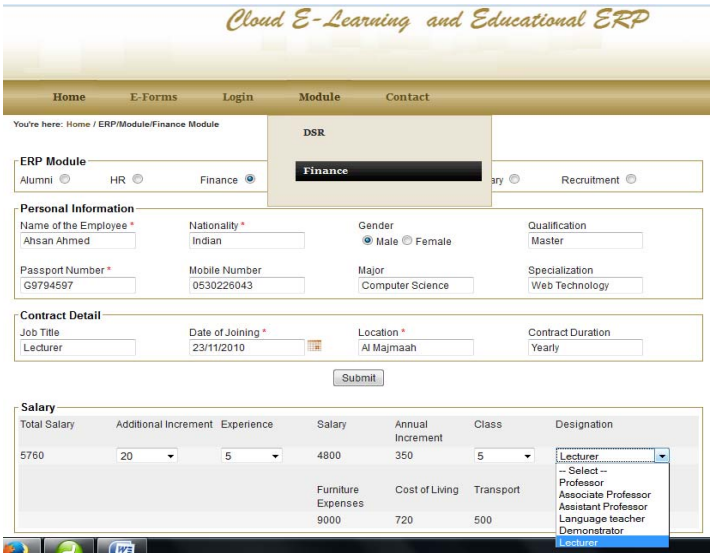

Fig 5. Cloud based Finance Module for ERP

CONCLUSION

The Cloud services for E-learning will provide a service based tool which will enhance the higher education. It will provide collaboration model, which will help in integration of the various features all the module of E-learning will be Web Services hence then its easy to integrate and plugin modules as an when required by the end users. The overhead of maintenance will be reduced software will be available 24x7 with out any maintenance cost. The ERP module will provide integration of various modules like DSR, Students, teacher's module and the management overview. All the modules will be independent and will communicate with each other as an when required information will be collaborative and data mining techniques will be used to pull information from the various sources to display the required information. The phases of the ERP will be individual modules, which are independent web services, and hence the overhead of procuring all the modules of ERP will be reduced also the maintenance and deployment cost of the ERP will be negligible.

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