Cloud-based OLPM System for Centralized Lesson Plan in Educational Institutions

Karthikayini.T[1], Priyaa.T[2]

[1]New Horizon College of Engineering, karthikayini@outlook.com, 9739042881.

[2]Member of CSI, priyaait.ramesh@gmail.com, 7373493776.

Abstract— Nowadays, maintaining and managing lesson plan for each course is a difficult task in educational institutes. Firstly, though the faculty members prepare their own lecture notes and access it through mails or any web storage resources, centralized system should be needed which enables the faculty members can upload their lecture notes through online and should be accessed by any device at any time by anybody. Secondly, though there are more existing technologies, but there is no automated task, also it needs more level of monitoring and optimization. With the cloud computing platform, it is possible to run an application in networked computers anywhere anytime. Taking cloud computing and Google platform as our benefits, we introduce an Online Lesson Plan Management system which minimizes the job of a lecturer at traditional educational institutes. The proposed system OLPM introduces a centralized system for an effective cloud lesson plan management system using google products such as google drive, google spreadsheet, google cloud SQL etc. This enables anyone can access the lesson plan documents at any time with their google account through any devices. The proposed system is capable enough to automate the tasks , requires less level of monitoring and optimization, Server is capable enough for the centralized system which provides efficient query performance.

Key terms—OLPM(Online Lesson Plan Management), LPSS(Lesson plan submission system), LVSS (Lesson plan verification system), RECORDS(google spreadsheets), IaaS (Infrastructure as a Service), PaaS (Platform as a Service), Software as a Service (SaaS), Google drive, Google Cloud SQL, Google Apps script.

INTRODUCTION

Cloud Computing is an evolved type of computing which provides platform, infrastructure and software as a service. Based on the types of provided services of cloud computing, it can be divided into 3 levels. Infrastructure as a Service (IaaS) provides infrastructure services like CPU, storage, etc. Platform as a Service (PaaS), is the hosting environment platform made for the special needs facing service. The top level Software as a Service (SaaS) provides users with applications which they are going to use. Cloud computing is one that transforms the way how service was delivered previously. An educational institute has various departments where every department comprises list of courses that has to be taught for each batch of students. Previously faculty members, who have been allocated for the course, will make lecture notes for the particular course for the odd and even semesters of every academic year. Earlier the teaching was confined to the physical domain of the student, teacher and the institute[1]. This leads to wastage of papers in preparing the lecture notes for the same courses for every consecutive year. Also, there is not a centralized approach in order to access the lesson plan documents in a federal way. The idea of national on-the-job professional and technical personnel "continuing education, lifelong learning" has become an important direction for the country's future education development[2]. With centralized approach, Lesson plans can be viewed and accessed even by the students for their references at any time provided with their privileges. It will be highly constructive for both the faculty members and the students of any educational institutes. The lesson

plan documents are maintained efficaciously with a new emerging technology such as google apis. A Google cloud application has been developed for the lesson plan maintenance and retrieval purposes.

EXISTING SYSTEM

Higher education institutions in India are not on par with their counterparts in the developed world. More than 50% of the institutions in the developing countries are following traditional approach of managing information system with stand alone computer systems and store data in different departmental systems due to lack of infrastructure[3]. This is sadly the case in addition to the presence of well qualified teachers and state-of-the-art facilities. Studies have shown that this could be largely attributed to the absence of information to the managers of education in India. Curriculum, Instruction and Assessment is a major support component in Education Developmental Transformation (EDT)[4]. Also, universities and colleges are huge consumers of paper. In tune with the global trend of organizations reducing their environmental footprints, higher education institution in India have to employ paperless management systems. Universities and colleges have to take the lead in steering Indian organizations to a more responsible future. Present information needs are largely handled by file systems, Excel sheets and paper records. Clerical staffs laboriously maintain paper records of every member of faculty and student. Some institutions query their databases to obtain just satisfactory results. Universities spend a lot of money on paper and storing paper records. In addition, paper records are prone to damages. Backups on paper are costly and environmentally imprudent.

PROPOSED SYSTEM

SYSTEM SPECIFICATION

Google has introduced a product called "Google drive" which act as a storage resource where any kind of stuffs such as documents, pdf files, images, audios and videos can be stored and accessed in an efficient way. Google drive and Gmail offer free storage space to store the files, email messages and photos, with the ability to access them from any device, anywhere. It provides 15 GB of storage space and a pop up box will appear in Google drive by indicating the utilized storage. If storage limit exceeds all the files will be accessible except new uploads in the free storage limit. So there is no need to agonize about hardware if it is a damaged one. There is an assortment of purchase plans in Google for storage purposes provided billing will be enabled according to the purchase plans. The files can be accessed from Google drive by any devices and there is no need of email attachments instead we can share the files or folders by any devices. In Order to access all the google applications, the user can visit drive.google.com.

Google Apps Script is a JavaScript cloud scripting language that provides easy ways to automate tasks across Google products and third party services and build web applications. Javascript is a scripting language which is used in the cloud to manage all these Google API's. The developers can use the script editor tool and the scripts can be executed directly from the script editor. Any number of javascript function in the script editor can be created and executed by clicking the run button.

Google spreadsheets service is used to create, access and modify Google sheet files. Google spreadsheets can be used for the user level purposes and this can be treated as a centralized view where anyone can access the documents any time. Google Apps script is used here to define the behaviour of spreadsheet for storing and reading a data from a google spreadsheet using javascript objects. Google Cloud SQL is a service that allows us to create, configure, and use relational databases in the Google's cloud. It is a fully-managed service that maintains, manages, and administers our databases, allowing us to focus on the applications and services. By offering the capabilities of a familiar MySQL database, the service enables to easily move your data, applications, and services in and out of the cloud. This enables high data portability and achieves faster time-to-market because we can quickly leverage our existing database.

This paper has implemented three approaches such as Document submission, Format verification and Technical Verification

to validate the lesson plan documents for each course. In document submission system, the lesson plan documents are submitted for each course. The system will ensure the authentication before submitting the documents. Because of this, there is no chance of unauthorized access and also uploading irrelevant documents are prevented.

Format verification system is implemented to validate the document format in an appropriate document structure. Once the documents are validated and processed through format verification system, the document will be moved to the next status for technical verification. In case of technical verification system, the lesson plan documents are verified technically by the expert and approve the document to the access level. All the three categories are implemented by two systems namely LPSS and LVSS in the following proposed architecture.

DESIGN OF USER INTERFACE

The user interface is designed for submission panel, format verification panel, technical verification panel. All these panels are designed and the respective panel will be displayed on the web page according to the user identity. If a user is a submitter then submission panel will be automatically fetched and it will be displayed on the browser. The system will recognize which user is accessing the application according to the user's email id. Submission system panel will be expanded if the user still has rights to submit the documents with a provided document constraints. If the document limit is exceeded, the user cannot able to upload further documents. In the same web page, submission panel alone is expanded and other panels such as format verification and technical verification are visible but with hidden widgets. Though those panels appears in the web page, it cannot be accessed except if user has privilege to access those stuffs.

The format verification panel will be expanded for the concerned user where the submitted documents are fetched and it is displayed in the list. Now this panel will be displayed where the user will access the documents and verify the formats. The other panels will be visible with disabled widgets.

The technical verification panel will be enabled for the concerned user where the formatted documents are fetched and it is displayed in the list.The user will now evaluate the documents technically and approves the document.

Thus in a same web page all the divisions are visible but can be accessible if the user has privileges to do so.
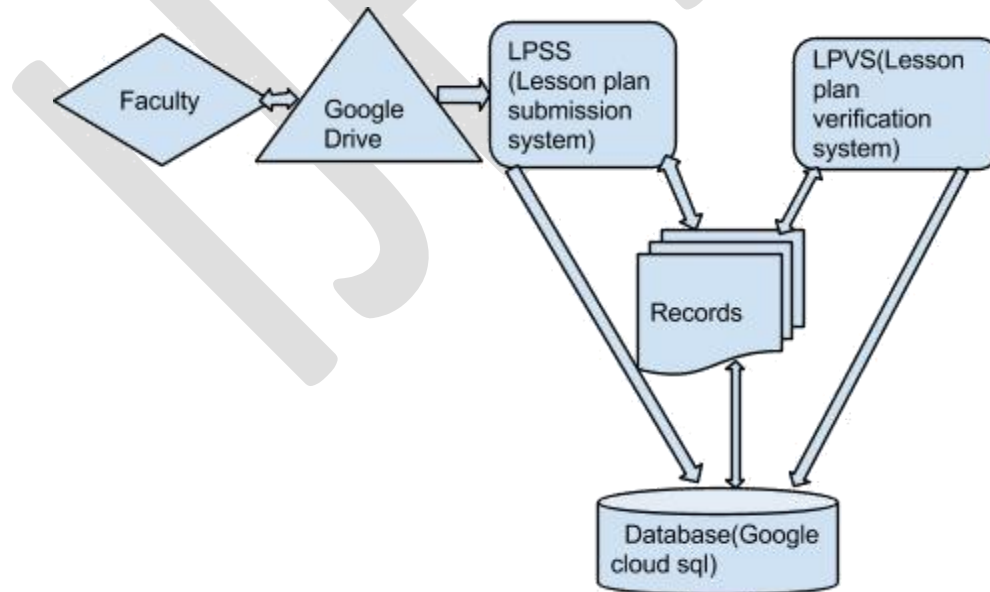
PROPOSED ARCHITECTURE

Fig: Online Lesson Plan Management (OLPM) System Architecture

IMPLEMENTATION

The main components in this architecture are LPSS (Lesson plan submission system), LPVS(Lesson plan verification system), Database (Google cloud SQL) and records.

The LPSS is designed to submit the documents by the faculty members according to the document pattern. In this system, the documents must be submitted for the verification. Once the document is uploaded on the Google drive, the privilege will be given to the Verification members and LPVS will be followed. Data Warehouse is maintained using Google Cloud SQL which contains the link of the document and be useful for the other members to view and gain information about the document.

The LPVS is designed to verify the documents for both format verification and technical verification according to the document pattern. In this system, the documents are listed with the status value as SUBMITTED and hence the user who has a privilege can accept the document or reject the document according to the document pattern and its technical stuffs. If the document is not according to the document pattern, then the format verifier will reject the document with the status value of RE-SUBMIT, else the document is verified by reflecting the status value as F-VERIFIED (FORMAT VERIFICATION). Once the document format is verified, the documents are moved to the next status for technical verification. The documents are technically verified by the subject expert. The documents with the status value as F-VERIFIED are listed in the users panel and the documents are verified technically by updating the status value as T-VERIFIED. If the document is not technically qualified, then the document is rejected with the status value as RE-SUBMIT. The rejected documents will be reflected in the submitter panel and so, the submitter should re-consider the rejected document for the further corrections and should resubmit the rejected document.

In the database, user id (who may be the submitter or format verifier or technical verifier), courseid, document links with the status values are stored which can be accessed and manipulated efficiently. Both, LPSS and LVSS are interacting with the database for the every updations in the documents. So in this regard, there is no chance of uploading a technical less or format less document since it is validated by the experts. Thus, we access the 100% worthy lesson plan document.

Finally the records are displayed in google spreadsheets as document links which is used to access the documents in a centralized way. In this system, a separate spreadsheet is created for each and every courses and all the courses spreadsheets are mapped to the respective programmes. We can access the spreadsheets by using spreadsheet keys. Thus, the system follows multi-level indexing where the list of programmes are displayed as an index and in turn the courses can be selected accordingly by selecting any of the programmes. The status value of every document is reflected in the own course spreadsheet by retrieving the status value from the database. All the users who want to view the document can visit the record index to know the status of the documents and last updated time. The records are kept at the user view level where the document retrieval is not accessed continuously from the database. To reduce the continuous database access, the spreadsheets are triggered and so the updated documents are reflected in the view level. Finally the documents are accessed by anyone. The record keeps on retrieving the data from the Google cloud SQL. If there is any updations in the document, that will be reflected in the own course spreadsheet.

A google site is created as an user interface to incorporate all LPSS(Lesson plan management system), LPVS(Lesson plan verification system) and the records. Also, to view the documents we can create link of the master record sheet to access the respective documents, thus anyone who has authority to access the site can view the master spreadsheet. Thus we can achieve centralized access for any document in the cloud.

How this framework differ from other older approaches:

The proposed system will help the faculty members of higher educational institute by providing right information at right time on any device securely. All the lesson plan documents pertaining to the institute will be stored in the cloud.
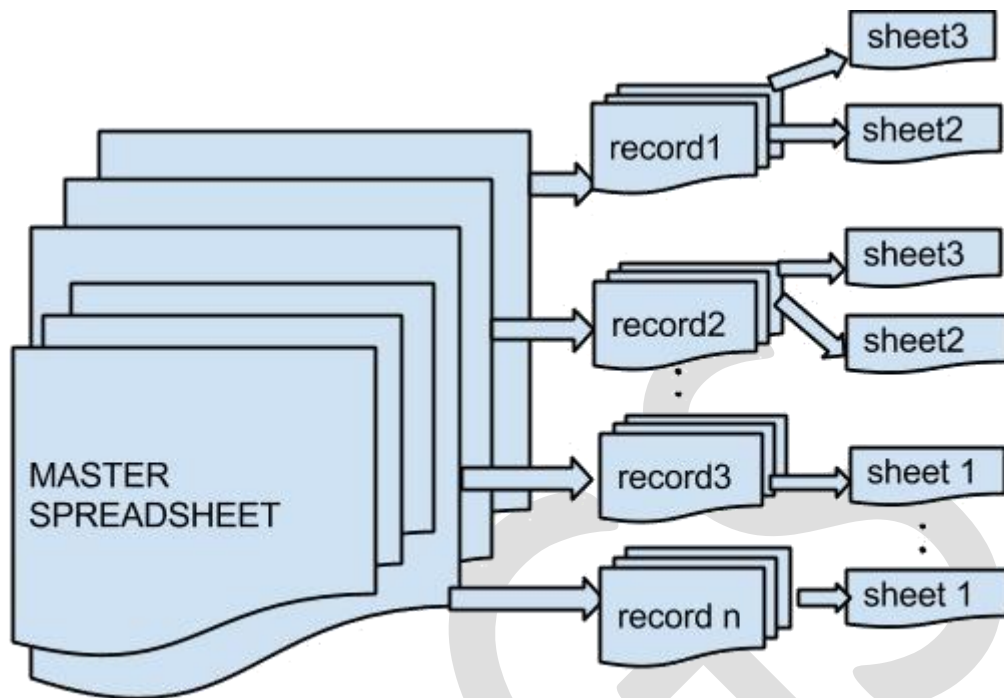
Fig.2 Architecture for Multi level indexing using google spreadsheet

ADVANTAGES:

The proposed system will yield various advantages such as adhering to healthy ecosystem which leads a paperless world, reduces manpower resources for collecting the documents and provides the centralized access for all the document at anytime, documents can be accessed anywhere, anytime and by any device, searching and retrieval of the documents is easier and faster compared to manual searching of the document or files, data can be used over lifetime , it effectively reduces deforestation, server is capable of handling 1000s of requests at a time without any application crashes. The query performance will be better when compared to other conventional systems. There is no chance of server crash due to the mirroring storage technology, the documents are distributed to the servers located in various places in the world. Even though the mirroring technology enables increases memory usage, various algorithms and compression techniques are implemented to overcome the disadvantages of the mirroring technology. Ultimately the system remains fault tolerant and provides 24x7 support for incoming requests. In addition, this approach promises to provide highly secured documents that give an extensible LP management and scalability, easy and faster retrieval of the documents anytime with way in using any devices.

CONCLUSIONS AND FUTURE WORK:

With the vast and rapidly growing technology "Cloud Computing" which is a new evolving research field since the entire world is moving towards cloud, that attracts the attention of an astonishingly diverse set of software developers or researchers from various related fields. This article has introduced the concept of how to utilize the Google APIs in an efficient way since it is a global cloud service provider. So that we can achieve high energy efficiency in the cloud and can adhere to a paperless world for all our data retrieval purposes. It gives a substantial impact to the entire world economy if it is implemented in all major business areas. The proposed approach will emerge and has the potential to become a very popular in near times. We believe our work is highly valuable and interesting for further research in cloud applications. In our future work, we will integrate the Online Lesson Plan Management

(OLMP) System in mobile phones so that the managed materials are still easier to access.

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