

INTERNET BASED E-LEARNING VIA CLOUD COMPUTING

¹Mudit Khetan, ²Dr. Vinod K. Gupta

¹Research Scholar, Jagannath University, Jaipur, (India)

²Research Supervisor, Jagannath University, Jaipur, (India)

ABSTRACT

E-learning is the new means which has the potential to support the traditional education system. Now a day's e-learning is very popular and adopted by every organization. Along with the recent development of the technologies, every organization has the opportunity to improve the quality and efficiency of learning. In this paper we are providing an architecture through which we can take the advantage of internet based learning and provide the online materials in the form of audio, video and files. This paper describes the importance of internet based learning via cloud computing.

Keywords: *E-Learning, Cloud, Online Portals, Saas.*

I INTRODUCTION

Many researchers find many definition of E-learning much more than what they expected because now a days e-learning is becoming very interesting to many. We also find the specific definition of e-learning. According to us e-learning are the new multimedia technology and the internet, with the help of which we can provide the learning elements (Online portals, test and assessments, lecture notes in the form of video, doc and ppt etc.) and the on demand software to access those resources. E-learning is the way where each and every person can share their knowledge with any one on any time.

We are not arguing that audio tape, video tape or the satellite TV is the part of e-learning or not, rather we are interested in that how we can provide the good quality material via the internet which is cost effective to the universities. The thing on which we are arguing is that: does the e-learning will aim to replace traditional e-learning education system?

The e-learning is not aimed to replace the traditional learning education system such as classroom learning. But via e-learning we can create a learning environment where technologies can be used to deliver the combined range of the teaching techniques and does maximizes the participation in the learning process. The learning process is changing day by day. We have witnessed in the recent years why e-learning is not so much popular. It's all due to the lack of knowledge of implementation of e-learning in technical staff, Lack of resources, Uncertainty of cost for the institution and learner and lack of stakeholder's participation in the e-learning process.

The purpose of presenting this paper is to present an architecture that may enable existing and new e-learning systems in universities using the latest advancements in cloud computing. The main characteristics of this proposal are based on three premises:

1. To avoid the hardware and software faults.
2. To provide the resources available on demand and their efficient utilization.
3. To provide the learning objects on demand.

Cloud computing is typically divided into three levels of service offerings: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a service (IaaS).

The top layer, i.e. SaaS, is a model of software deployment whereby a provider licenses an application to customers for use as a service on demand. SaaS software vendors may host the application on their own web servers or download the application to the consumer device, disabling it after use or after the “on-demand” contract expires.

The middle layer, or PaaS, is the encapsulation of a development environment abstraction and the packaging of a payload of services. PaaS offerings can provide for every phase of software development and testing, or they can be specialized around a particular area, such as content management.

IaaS is at the lowest layer and is a means of delivering basic storage and compute capabilities as standardized services over the network. Servers, storage systems, switches, routers, and other systems are pooled (through virtualization technology, for example) to handle specific types of workloads from batch processing to server/storage augmentation during peak loads.

This paper structure is as follows:

Section 2 contains the importance of cloud computing in the e-learning process section 3 contains the architecture of e-learning process via cloud computing section 4 contains our work. Section 5 contains the conclusion and future work. Section 6 contains the references.

II IMPORTANCE OF CLOUD COMPUTING

- **Cost** is greatly reduced and capital expenditure is converted to operational expenditure. This lowers barriers to entry, as infrastructure is typically provided by a third-party and does not need to be purchased for one-time or infrequent intensive computing tasks. Pricing on a utility computing basis is fine-grained with usage-based options and minimal or no IT skills are required for implementation.
- **Device and location independence** enable users to access systems using a web browser regardless of their location or what device they are using, e.g., PC, mobile. As infrastructure is off-site (typically provided by a third-party) and accessed via the Internet the users can connect from anywhere.
- **Multi-tenancy** enables sharing of resources and costs among a large pool of users, allowing for:
 - **Centralization** of infrastructure in areas with lower costs (such as real estate, electricity, etc.)
 - **Peak-load capacity** increases (users need not engineer for highest possible load-levels)
 - **Utilization and efficiency** improvements for systems that are often only 10-20% utilized.
- **Reliability** improves through the use of multiple redundant sites, which makes it suitable for business continuity and disaster recovery. Nonetheless, most major cloud computing services have suffered outages and IT and business managers are able to do little when they are affected.

- **Scalability** via dynamic ("on-demand") provisioning of resources on a fine-grained, self-service basis near real-time, without users having to engineer for peak loads. Performance is monitored and consistent and loosely-coupled architectures are constructed using web services as the system interface.
- **Security** typically improves due to centralization of data, increased security-focused resources, etc., but raises concerns about loss of control over certain sensitive data. Security is often as good as or better than traditional systems, in part because providers are able to devote resources to solving security issues that many customers cannot afford. Providers typically log accesses, but accessing the audit logs themselves can be difficult or impossible.
- **Sustainability** comes about through improved resource utilization, more efficient systems, and carbon neutrality. Nonetheless, computers and associated infrastructure are major consumers of energy.

III ARCHITECTURE OF E-LEARNING VIA CLOUD COMPUTING

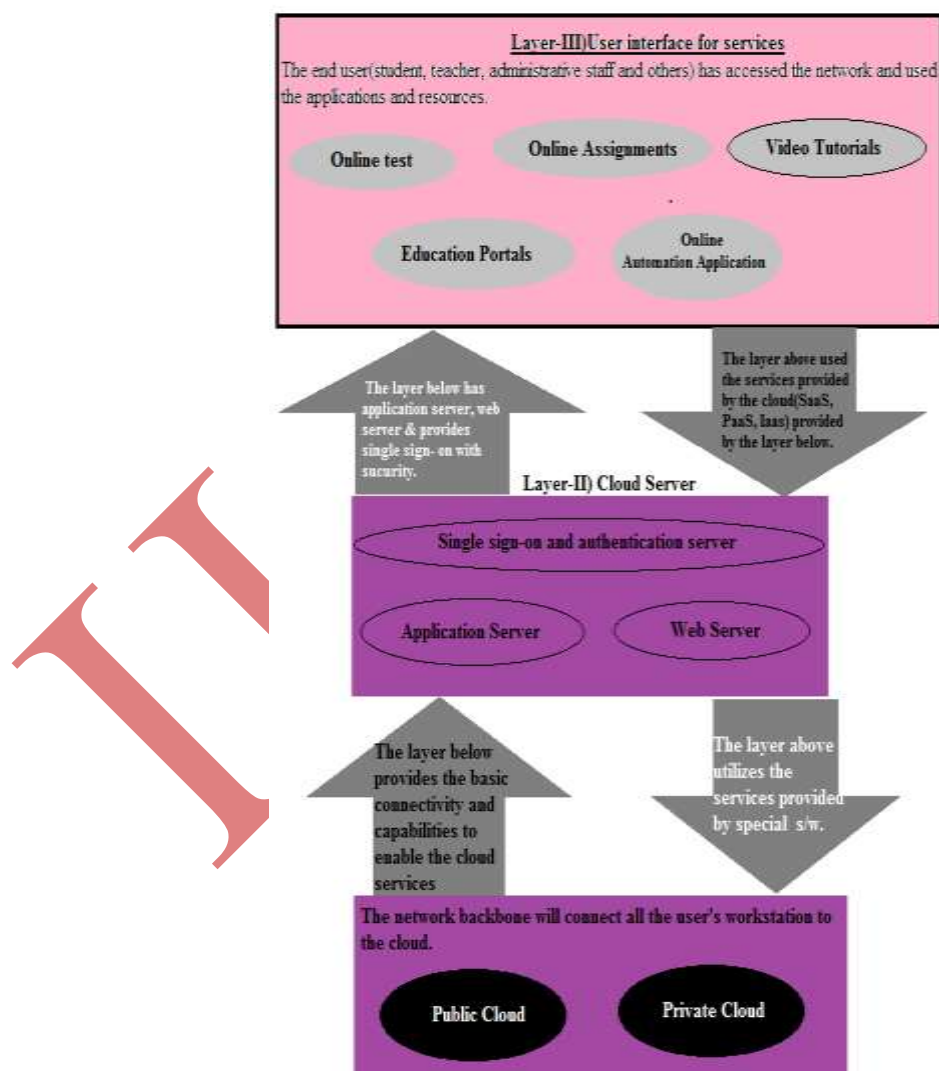


Figure 1: Architecture of E-Learning Using Cloud Computing.

The above architecture contains the three layers:

1. User interface layer.
2. Cloud layer.
3. Hardware Layer.

User interface layer

The user interface layer will provide all the functionalities that can be used by the different stakeholders (includes teacher, student, administrative staff and others). In this layer we have provided the different learning objects (Like online test and assessments, online assignments, video tutorials, lecture notes, education portals and many more) which can be used by different users via the internet.

Cloud layer

The Servers are special cloud-enabled software that will provide the uninterrupted connectivity to the user across the cloud. Each of these servers will have special collaboration software to help access resources from each other. This layer contains three servers (single sign-on authentication server, web server and application server). the main work of authentication server is to verify whether the user is valid or not or whether the user name and password provided by the user is correct or not. The user can only access those services or resources, if he/she is legitimate user. Before using the resources, user needs to fill the registration form. The purpose of the application server is to provide the environment where stakeholder/end user can execute their applications in an efficient manner. It doesn't matter that the particular software is available on the user machine or not. The main purpose of the web server is to deliver the learning elements on the user machine that can be accessed through the internet.

Hardware layer

The network backbone will connect all the work station to the cloud. Here we are using two types of cloud public cloud and private cloud. With the help of private cloud user can access or open the application only its own machine and with the help of public cloud he/she can share that application to every one.

IV OUR WORK

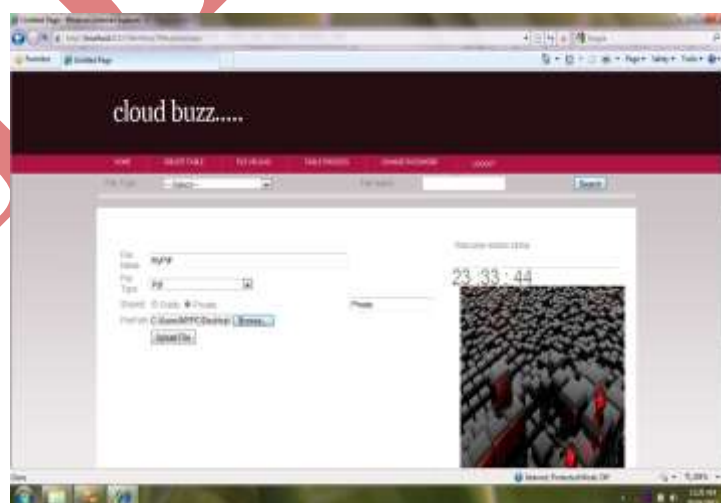


Figure 2: FileUpload.aspx.cs

```
using System.Web.UI.WebControls.WebParts;
using Microsoft.Office;
using Microsoft.Office.Core;
using System.Runtime.InteropServices;
using Microsoft.Office.Interop.Word;
using Microsoft.Office.Interop.Excel;
using Microsoft.Office.Interop.PowerPoint;
public partial class Default9 : System.Web.UI.Page
{
    Microsoft.Office.Interop.Word.ApplicationClass objWord = new
    Microsoft.Office.Interop.Word.ApplicationClass();
    Microsoft.Office.Interop.Excel.Application objExcel = new Microsoft.Office.Interop.Excel.Application();
    Microsoft.Office.Interop.PowerPoint.ApplicationClass objPP = new
    Microsoft.Office.Interop.PowerPoint.ApplicationClass(); // Microsoft.Office.Interop.Word.Document oDoc =
    null;
    Microsoft.Office.Interop.Excel.Workbook xls = null;
    // Microsoft.Office.Interop.PowerPoint.Presentation pptPresentation = null;
    string strPathToUpload;
    //Path to upload files "Uploaded"
    string strPathToConvert;
    //Path to convert uploaded files and save
    object fltDocFormat = 10;
    //For filtered HTML Output
    object missing = System.Reflection.Missing.Value;
    //Is just to keep the parameters which are passed as a object reference, these are seems to be optional parameters
    object readOnly = false;
    object isVisible = false;
    //The process has to be in invisible mode
    protected void Button1_Click(object sender, EventArgs e)
    {
        if (!(fUpload.HasFile))
        {
            lbl.Text = "Please choose file to upload";
        }
        else
        {
            try
            {
                //Excel code
                object trueObject = true;
```

```
objExcel.Visible = false;
objExcel.DisplayAlerts = false;
//To check the file extension if it is word document or something else
string strFileName = fUpload.FileName;
string[] strSep = fUpload.FileName.Split('.');
int arrLength = strSep.Length - 1;
string strExt = strSep[arrLength].ToString().ToUpper();
//Save the uploaded file to the folder
strPathToUpload = Server.MapPath("Uploaded");
//Map-path to the folder where html to be saved
strPathToConvert = Server.MapPath("Html");
object FileName = strPathToUpload + "\\" + fUpload.FileName;
object FileToSave = strPathToConvert + "\\" + fUpload.FileName + ".html";
string FileName1 = strPathToUpload + "\\" + fUpload.FileName;
string FileToSave1 = strPathToConvert + "\\" + fUpload.FileName + ".html";
if (strExt.ToUpper().Equals("DOCX") || strExt.ToUpper().Equals("DOC"))
{
    fUpload.SaveAs(strPathToUpload + "\\" + fUpload.FileName);
    // lbl.Text = "File uploaded successfully";
    //open the file internally in word. In the method all the parameters should be passed by object reference
    objWord.Documents.Open(ref FileName, ref readOnly, ref missing, ref missing, ref missing, ref missing, ref
    missing, ref missing, ref missing, ref missing, ref isVisible, ref missing, ref missing, ref missing, ref
    missing);
    //Do the background activity
    objWord.Visible = false;
    Microsoft.Office.Interop.Word.Document oDoc = objWord.ActiveDocument;
    oDoc.SaveAs(ref FileToSave, ref fltDocFormat, ref missing, ref missing, ref missing, ref missing, ref missing,
    ref missing, ref missing, ref missing, ref missing, ref missing, ref missing, ref missing, ref missing);
    string FilePath = "~/Uploaded/" + fUpload.FileName;
    string FileHtmlPath = "~/Html/" + fUpload.FileName + ".html";
    Magic.Allper("Insert Into FileUpload values('" + TextBox1.Text + "','" + FilePath + "','" + FileHtmlPath + "','"
    + DropDownList1.Text + "','" + TextBox2.Text + "','" + Session["UserId"].ToString() + "')");
    MessageBox.Show("File Upload Succesfully", Page);
    // lbl.Text = fUpload.FileName + " converted to HTML successfully";
}
else
if (strExt.ToUpper().Equals("XLSX") || strExt.ToUpper().Equals("XLS"))
{
    fUpload.SaveAs(strPathToUpload + "\\" + fUpload.FileName);
    objExcel.Visible = true;
```

```
object missing1 = Type.Missing;
xls = objExcel.Workbooks.Open(FileName1, missing1, trueObject, missing1, missing1, missing1, missing1,
missing1, missing1, missing1, missing1, missing1, missing1, missing1, missing1);
object format = Microsoft.Office.Interop.Excel.XlFileFormat.xlHtml;
System.Collections.IEnumerator wsEnumerator = objExcel.ActiveWorkbook.Worksheets.GetEnumerator();
int i = 1;
while (wsEnumerator.MoveNext())
{
Microsoft.Office.Interop.Excel.Worksheet wsCurrent =
(Microsoft.Office.Interop.Excel.Worksheet)wsEnumerator.Current;
wsCurrent.SaveAs(FileToSave1, format, missing1, missing1, missing1,missing1, missing1, missing1, missing1,
missing1);
++i;
}
string FilePath = "~/Uploaded/" + fUpload.FileName;
string FileHtmlPath = "~/Html/" + fUpload.FileName + ".html";
Magic.Allper("Insert Into FileUpload values('" + TextBox1.Text + "','" + FilePath + "','" + FileHtmlPath + "','" +
DropDownList1.Text + "','" + TextBox2.Text + "','" + Session["UserId"].ToString() + "')");
MessageBox.ShowMessage("File Upload Succesfully", Page);
}
else
if (strExt.ToUpper().Equals("PPTX") || strExt.ToUpper().Equals("PPT"))
{
fUpload.SaveAs(strPathToUpload + "\\" + fUpload.FileName);
// lbl.Text = "File uploaded successfully";
Presentation pptPresentation = objPP.Presentations.Open(FileName1, MsoTriState.msoFalse,
MsoTriState.msoFalse, MsoTriState.msoFalse);
pptPresentation.SaveAs(FileToSave1,PpSaveAsFileType.ppSaveAsHTML, MsoTriState.msoFalse);
string FilePath = "~/Uploaded/" + fUpload.FileName;
string FileHtmlPath = "~/Html/" + fUpload.FileName + ".html";
Magic.Allper("Insert Into FileUpload values('" + TextBox1.Text + "','" + FilePath + "','" + FileHtmlPath + "','" +
DropDownList1.Text + "','" + TextBox2.Text + "','" + Session["UserId"].ToString() + "')");
MessageBox.ShowMessage("File Upload Succesfully", Page);
// lbl.Text = fUpload.FileName + " converted to HTML successfully";
}
else if (strExt.ToUpper().Equals("PDF"))
{
string FilePath = "~/Uploaded/" + fUpload.FileName;
fUpload.SaveAs(Server.MapPath("~/Uploaded/" + fUpload.FileName));
// string FileHtmlPath = "~/Html/" + fUpload.FileName + ".html";
```

```
Magic.Allper("Insert Into FileUpload values('" + TextBox1.Text + "','" + FilePath + "','" +
DropDownList1.Text + "','" + TextBox2.Text + "','" + Session["UserId"].ToString() + "')");
MessageBox.ShowMessage("File Upload Succesfully", Page);
}
else if (strExt.ToUpper().Equals("TXT"))
{
string FilePath = "~/Uploaded/" + fUpload.FileName;
fUpload.SaveAs(Server.MapPath("~/Uploaded/" + fUpload.FileName));
// string FileHtmlPath = "~/Html/" + fUpload.FileName + ".html";
Magic.Allper("Insert Into FileUpload values('" + TextBox1.Text + "','" + FilePath + "','" +
DropDownList1.Text + "','" + TextBox2.Text + "','" + Session["UserId"].ToString() + "')");
MessageBox.ShowMessage("File Upload Succesfully", Page);
}
else if (strExt.ToUpper().Equals("RTF"))
{
string FilePath = "~/Uploaded/" + fUpload.FileName;
fUpload.SaveAs(Server.MapPath("~/Uploaded/" + fUpload.FileName));
// string FileHtmlPath = "~/Html/" + fUpload.FileName + ".html";
Magic.Allper("Insert Into FileUpload values('" + TextBox1.Text + "','" + FilePath + "','" +
DropDownList1.Text + "','" + TextBox2.Text + "','" + Session["UserId"].ToString() + "')");
MessageBox.ShowMessage("File Upload Succesfully", Page);
}
else
{
lbl.Text = "Invalid file selected!";
}
objWord.Quit(ref missing, ref missing, ref missing);
objExcel.Quit();
objPP.Quit();
}
catch (Exception ex)
{
Response.Write(ex.Message);
}
}
}
protected void RadioButton1_CheckedChanged(object sender, EventArgs e)
{
TextBox2.Text = "Public";
}
```

```
protected void RadioButton2_CheckedChanged(object sender, EventArgs e)
{
    TextBox2.Text = "Private";
}
}
```

V CONCLUSION AND FUTURE WORK

The above architecture is describing the benefits of e-learning over the traditional education system. The e-learning is very popular now a day and many IT organizations are using the services of cloud computing to more efficiently utilize the services on internet. We are now developing this architecture for our institute. We are providing all the beneficial materials to the students which help them to understand the topics very well. This also improves the interaction between the student and teacher. Now a day the licensed software is very costlier to buy. So for that we are providing the internet based service to open or to share the file or any learning material remotely. In future we are also try to providing the concept of video conferencing, mailing and chatting through which user can interact with each other and with teachers and enhanced their knowledge in more efficient manner.

REFERENCES

- [1] Loma Uden and Ernesto Damiani, "The future of Elearning: E-learning education, Proceedings of the first IEEE International Conference on Digital Educations and Technologies", Cairns, Australia, 2007, pp. 113-117.
- [2] Vanessa Chang and Christian Guetl, "E-Learning Education (ELES)-A Holistic Approach for the Development of more Effective Learning Environment for Small-and-Medium Sized Enterprises", Proceedings of the first IEEE International Conference on Digital Educations and Technologies, Cairns, Australia, 2007, pp. 420-425.
- [3] Brodo, J. A. (2002), "Today's Education of e-learning", Vice President, Marketing.
- [4] Aaron Weiss (2007), Computing in the Clouds, NetWorker, Dec. 2007, 11(4):16-25.
- [5] Rajkumar Buyya, Chee Shin Yeo, and Srikumar Venugopal, "Market-Oriented Cloud Computing: Vision, Hype, and Reality for Delivering IT Services as Computing Utilities", Proceedings of the 10th IEEE International Conference on High Performance Computing and Communications, Dalian, China, 2008, pp.5-13.
- [6] S.T.A. Pickett and M.L. Cadenasso, "the Education as a Multidimensional Concept: Meaning, Model, and Metaphor Educations", Educations Journal, Springer, New York, 2002, 5, pp. 1-10.
- [7] M. Tim Jones, Cloud computing with Linux, 10 Sep, 2008. <http://www.ibm.com/developerworks/library/I-cloudcomputing/>.
- [8] Greg Boss, Padma Malladi, Dennis Quan, Linda Legregni and Harold Hall, "Cloud Computing". <http://www.ibm.com/developerworks/websphere/zones/hipod>
- [9] Gerhard Wurzinger, V. Chang, et al. "Towards greater Flexibility in the Learning Education - Promises and Obstacles of Service Composition for Learning Environments", Australia.

- [10] Giitl, C. and V. Chang. "*E-Learning Education (ELES) - A Holistic approach for the Development of more Effective Learning Environment for Small-to-Medium Sized Enterprises (SMEs)*", Australia.
- [11] Pickett, S. T. A. and I. M. Grov. "*Urban educations: What would Tansley do?*" 20 January 2009, Springer.
- [12] Jax, K. "*Can We Define Educations? On the Corifusion between Definition and Description of Ecological Concepts*", 2 October, 2007, GermanY.Springerhttp://www.springeriink.com/contentl?Author=Kurt+Jax
- [13] Thomas. P. Y. "*Cloud computing: A potential paradigm for PractiSing the scholarship of teaching and learning*", University of Botswana.
- [14] A1-Zoube, M., S. A. EI-Seoud, et al. "*Cloud Computing Based ELearning System*". "*International Journal of Distance Education Technologies (UDET)*", 2010, S (2).
- [15] T. E. "*Effective Use of Cloud Computing In Educational Institutions*". January 5, 2010, Turkey, from Elsevier Ltd.
- [16] M. S. "*Integrating Web 2.0 in e-Learning environments: a sociotechnical approach*", "*International Journal of Knowledge and Learning*", 2007, 3(6).
- [17] <http://en.wikipedia.org>.Cloud computing.
- [18] ScIater, N. "*Web 2.0, Personal Learning Environments, and the Future of Learning Management Systems*",
- [19] Turner, N. "*Cloud Computing: A Brief Summary*". September 2009: Lucid Communications Limited.