Introducing Proxy Cloud Storage Using IIS in University and Utilization of its Resources in Academic Institutions

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Abstract – Education today is becoming completely associated with the Information Technology on the content delivery, communication and collaboration. The need for servers, storage and soft-wares are highly demanding in the universities, colleges and schools. In this paper, the main aim is to initiate a project, designing and setting up a private proxy cloud infrastructure for University's academic environment. The project idea is to provide data storage on the cloud related to teachers and students like hand-outs, e-books, reference e-books, study material, videos and related stuff. The idea also encompasses data upload and download on the proxy cloud storage. These storage drives can also facilitate the Registrar office, Academic Vice-president Office, Deans, Heads of departments and Examination cell authorities to upload the current notices and recent updates for student. The Proxy cloud storage (Drive) is designed by using Internet Information Services (IIS); it is used within Intranet by LAN connection and also by Wi-Fi.

Index Terms – Internet Information Service, Proxy Cloud, LocalHost, IDE.

1. INTRODUCTION

Cloud computing is a computing environment, where resources such as computing power, storage, network and software are abstracted and provided as services on the internet in a remotely accessible fashion. To achieve human goals one of the prerequisite is education. From various researches it is clear that the human welfare developments are associated with Information and Communication Technologies commonly known as ICT.

A relevant education is more important today than ever, because today's Networked World demands a workforce that understands how to use technology as a tool to increase productivity and creativity. With the demand for the needs of infrastructure, software and platform the need for a technology is required by the institution. Proxy Cloud computing is a model for enabling convenient, on-demand network access.

1.1 Software as a service (SaaS):

It is a model of Software deployment whereby according to the demand of the customer a provider provides licensed application for the specified time.

1.2 Platform as a service (PaaS):

Generates all facilities required to support the complete cycle of construction and delivery of web-based applications wholly available in Internet with built in services so there is no need of downloading software or special installations by developers.

1.3 Infrastructure as a Service (IaaS):

It provides resources, such as servers, connections, storage and other necessary tools to construct an application design according to the need of organizations, making it quick, easy and economically viable. Cloud computing is mainly classified into three types based on the deployment model: Public cloud, Private cloud and Hybrid cloud. If the services are provided over the internet then it is public cloud or external cloud and if it is provided within an organization through intranet then it is named as private cloud or internal cloud and Hybrid cloud is an internal/external cloud which allows a public cloud to interact with the clients but keep their data secured within a private cloud [2].

In this work we propose and discuss the design and Implementation of cloud service in college .We have seen implementation of cloud on larger scales in companies like Amazon etc, but not for college level. We are going to design a cloud setup for institution like college where request patterns and infrastructure are quite different from commercial settings. The college can benefit significantly

from private cloud infrastructure to service its various branches, research, and teaching requirements.

In this paper, an overview of Cloud Technology has been provided. The remainder of the paper is organized as follows: Section 2 discusses salient design features of University Proxy Cloud setup, its architecture and also mentions the problem statement and advantage of IIS. Section 3 described about prerequisite for setting up Proxy Cloud.

This section have the following content, Website designing, Implementing the web page in LocalHost, Creating Database for proxy cloud, Developing an IIS & Creating a Local IIS Web Site in Visual Studio. In Section 4 describes Expected Output & some sample screen shot for clear idea. In section 5, concludes the total work done in this paper and we explain about the further possible developments using proxy cloud.

2. SILENT DESIGN FEATURES OF UNIVERSITY PROXY CLOUD SETUP

University consists of various Colleges like College of Engineering and Technology, College of Computing and Informatics, and College of Natural and Computational Sciences etc. In each department the lecturer needs to deliver hand-outs, e-books, reference e-books, study material, videos and related stuff to the students manually. Some students may receive the material or may not. Thus by setting up the cloud there will be no need of doing so.

All the study material related to each subject can be uploaded which will be stored on cloud server. The designed cloud storage can be logged in by students by using their ID & password of their particular department, so that they can download their video or hand outs or text book according their knowledge, thus Can reduce the money spends on paper, print out cost, can manage the time easily. The student expectation is to view the information in his desktop, laptop, PDA, Tablets and even in Mobile Phones.

2.1 Problem statement

- Based on the study material, University is facing a lot of challenges to their management of students, classes and Teaching faculties where there is a lot of collaboration between them.

- Deploying applications and web based student services at rapidly accelerating rate without increase in the budget of software and hardware.

- Reducing the capital expenditure and operational expenditure while maintaining the highest level of security and privacy.

- Competing among other universities, many of which attempt to differentiate them in the market based on the services that they offer to students.

- Security is a special issue for institutions of higher education where students and Teaching members of the staff who are pursuing research. A secure and reliable networking infrastructure is therefore the flat out requester.
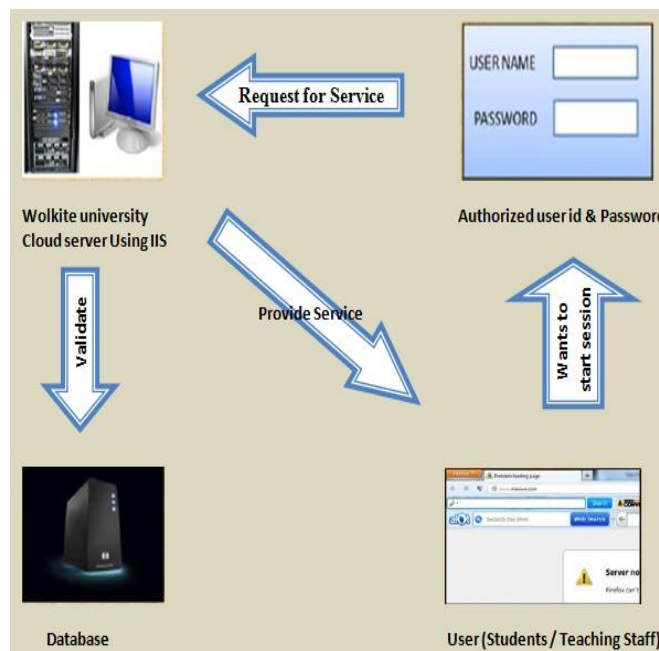

Fig 1: Over-view of the Research Idea

2.2 Advantages of IIS Applications

Building a server-side Internet application in Microsoft Visual Studio gives you several advantages over other methods of Internet development, including:

- Reduced cost of deployment per user. End users of an IIS application can run the application using only a browser; no special software needs to be installed on their computers for the application to work.

- You can use IIS to test the Web project. If the computer is configured to permit other users to connect to it, the Web project is available to those users.

- Access to a broad audience. IIS applications work with a wide variety of browsers and operating systems, so it can easily reach a wide audience.

- An object model that gives you direct access to the resources of the Internet Information Server. The Active Server Pages framework provides an object model that allows you to directly manipulate the objects at the core of IIS. This allows you to retrieve information from a browser, send information to it,

and perform complex operations on the contents of a Web page.

- Reusable components. Once you have created a web-class, you can easily access it in another web-class using IIS.

- Separation of code and HTML. Unlike scripting, the code is not embedded in the HTML document, so you can separate the process of designing the application's user interface from writing, testing, and debugging its code.

- In Microsoft Visual studio Internet application development, the process of designing your user interface is separated from the process of developing and coding your application.

2.3 Benefits for building a private cloud for university purpose

Build a private cloud environment using IIS to refurbish the university department study material and video tutorial information. Achieved improved system while reducing the costs required revamping the existing systems. Reduce the complexity of the students in searching the study material like hand-outs, e-books, reference e-books, study material, videos and related stuff.

Financial estimate on paper Consumption:

On an Average, it's approximate calculation for consuming of A4 paper in our campus:

For example a particular staff taking a subject for 1st year in Information Technology.

- ✓ Number of Students - 40

- ✓ Total number of Section – 3

- ✓ Total number of students – 40 * 3 = 120

- ✓ Number of units – 6 (approximately)

- ✓ Number of pages per Unit – 10 (approximately)

- ✓ Paper usage for 6 units – 6 * 10 = 60 (for one student)

- ✓ Total paper usage for one subject = 120 * 60 = 7200 paper per subject

- ✓ For 6 subjects = 6 * 7200 = 43,200 paper.

The A4 paper consumption for 1st year information technology per semester is 43,200 (approximately). Nearly 'n' number of section available in our University.

Total number of A4 sheet Consumption = 43,200 * n (approximately). Consumption of Printing materials and usage of Printers can be minimized.

Based on the following proposed project, it can be eliminated. Through this project, whenever a student from any department request for a particular study material or videos, he has to login using his/her id Allocated to him/her. If he/her is a valid user then the request is forwarded to the Cloud server .The cloud server with the help of database server validates the user and provides services.

The users of the proxy cloud storage drive are as follows:

Teaching Staff

- Have rights to upload data like Hand notes, Text book & reference material.

- Have rights to upload tutorial videos.

- Have rights to modify the uploaded data.

- User name as Employee ID.

- Password will be user defined.

Admin-cell authorities

- Can upload notices about Examination.

- Can upload various Examination Results.

Student

- User name as Student ID and password-user defined.

- Have only access to the particular department to read and download data.

- Can download Tutorial Videos

- Can view currently uploaded notice.

- User Interface Prototyping

2.3 User Interface prototyping:

User interface (UI) prototyping is an iterative development technique in which users are actively involved in the mocking-up of the UI for a system. UI prototypes have many purposes.

- As an analysis artifact that enables you to explore the problem space with your stakeholders.

- As a design artifact that enables you to explore the solution space of your system.

- A potential foundation from which to continue developing the system (if you intend to throw the prototype away and start over from scratch then you

don't need to invest the time writing quality code for your prototype)
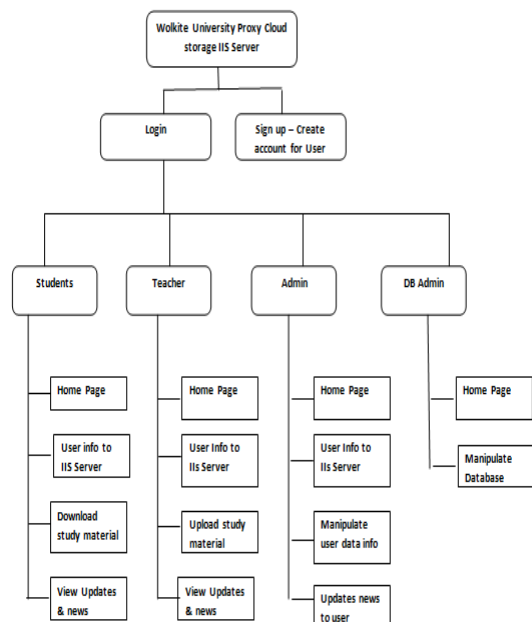
Prototyping Diagram:

Figure 2 Prototyping Diagram for Proposed idea

3.   PREREQUISITE FOR SETTING UP PROXY CLOUD

There are five packages required for the installation of Proxy cloud.

3.1 Website designing in visual studio 2010:

The front end of the proposed project is to build a webpage for accessing the cloud storage. The web page is planned to build using HTML language. First Open Visual Studio 2010 then click Click on New project Link on start page, Select Asp.net Web Application in the template window following that enter the name of project then Click on ok button. Now open Solution Explorer of your project, Right click on project, the pop window will open then Drag cursor on to add menu, the submenu of add menu will open, click on NewItem or Go to Add->NewItem. The AddNew Item Window will open, Select WebService and Rename WebService1.asmx to MyWebService.asmx, then click on ok button. The MyWebService.asmx file will appear in the solution explorer, open MyWebService.asmx file.

3.2 Implementing the web page in LocalHost:

The webpage is implemented in LocalHost using Microsoft Visual studio. Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. Visual Studio supports different programming languages and allows

the code editor and debugger to support (to varying degrees) nearly any programming language. I preferred C# (via Visual C#) for coding the proposed project.

3.3 Creating Database for proxy cloud

Cloud storage should be created for maintaining the data that are going to be upload / download by teaching faculty / students. Also the login authentication. In Microsoft Visual Studio 2010 and click on the New Project, After clicking it, the below screen will show. Now, choose the language and the project type and then give this project a name and click OK. In our project I am using Visual Basic language and project type is Windows Form Application. It will create a new project for you, where we are gonna add the database. To create a database go to the Solution Explorer now right click on your name and then click on Add and finally click on New Item. After clicking on New Item, a list of items will open. Now from these select the Service Based Database. Give it a name and then click on Add. That's now open up a data source wizard.Now our database has been created which you can also see in the solution explorer but rite now its empty, so now in the next step we are gonna add a table in our database. Now, double click on the database which will open up Server Explorer, now in the Server Explorer, right click on the Tables and then Add New Table.

3.4 Developing an IIS:

An IIS (Internet Information Server) application is a Visual Basic application that lives on a Web server and responds to requests from the browser. An IIS application uses HTML to present its user interface and uses compiled Visual Basic code to process requests and respond to events in the browser.

3.4.1 Access Control in IIS 6.0

You can control which users and computers can access your Web server and its resources. There are two main types of access control: NTFS permissions, which are controlled by the operating system, and Web site permissions, which are controlled by IIS. You can also use IP address restrictions to limit access by specific computers. To help secure your Web server, you should use a defense-in-depth strategy that combines suitable authentication methods with tools such as firewalls and the appropriate NTFS permissions and Web site permissions. IIS built-in accounts and features, such as URL authorization, help you control access to resources on multiple levels, from entire Web and FTP sites to individual files or specific URLs.

- **Securing your files with NTFS.**

When you use the NTFS file system, you can limit access to your Web server's files and directories. You can configure the file and directory permissions that set the access level assigned to a particular user account or user group. For example, you can configure your Web server to enable a

specific user to view and execute a file, while excluding all other users from accessing that file.

- **Securing your site with Web site permissions.**

Web permissions, unlike NTFS permissions, apply to all users accessing your Web sites. NTFS permissions apply only to a specific user or group of users with a valid Windows account. NTFS controls access to physical directories on your server, whereas Web permissions control access to virtual directories on your Web site.

- **Securing your site with IP address restrictions.**

With IP address restrictions, you can configure your Web server to assign or deny specific computers, groups of computers, or domains access to Web sites, directories, or files. For example, if your intranet server is connected to the Internet, you can prevent Internet users from accessing your Web server by assigning access only to members of your intranet, and explicitly denying access to outside users.

3.4.2   How Access Control Works in IIS

Access control involves both user rights and permissions. *User rights* are rights that allow a user to perform specific actions on a computer or network. *Permissions* are rules that are associated with an object, such as a file or folder, to regulate which accounts can gain access to that object. After you configure your Windows file system and Web server security features, when a user attempts to access your Web server, the server carries out several access-control processes to identify the user and determine the allowed level of access.

The Microsoft Internet Information Server is designed to deliver high speed and secure information publishing, while also serving as a platform for developers and independent software vendors to extend the Internet's standard communication capabilities.
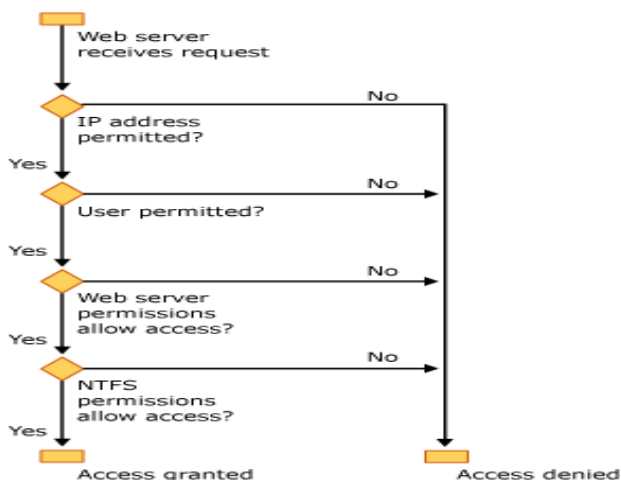

Figure 3 Access-Control Process

The following steps outline the access-control process:

1. The client requests a resource on the server.

2. The IP address of the client is checked against any IP address restrictions in IIS. If the IP address is denied access, the request fails, and a 403 Access Forbidden message is returned to the user.

3. The server, if configured to require it, requests authentication information from the client. The browser either prompts the user for a user name and password or offers this information automatically.

4. IIS checks whether the user has a valid Windows user account. If the user does not, the request fails, and a 401 Access is denied message is returned to the user.

5. IIS checks whether the user has Web permissions for the requested resource. If the user does not, then the request fails, and a 403 Access Forbidden message is returned to the user.

6. Any security modules, such as ASP.NET impersonation, are added.

7. IIS checks the NTFS permissions on static files, ASP, and Common CGI files for the resource. If the user does not have NTFS permissions for the resource, then the request fails, and a 401 Access is denied message is returned to the user.

8. If the user has NTFS permissions, the request is fulfilled.

3.5 Creating a Local IIS Web Site in Visual Studio

Here you will work with two Web site projects that run under a locally installed copy of IIS. One of the projects is physically located under the root folder of IIS (typically C:\Inetpub\wwwroot). A second project is located in a convenient folder on the hard disk but is available to IIS by using a virtual directory. You can use IIS to test the Web project. If the computer is configured to permit other users to connect to it, the Web project is available to those users.

Tasks illustrated in this phase document include the following:

- Studying about IIS server

- Creating a Web project and page under the IIS root.

- Creating a Web project that uses an IIS virtual root.

- Using IIS to run a Web page.

- Working with IIS in Solution Explorer.

4. RESULTS AND DISCUSSIONS

Efficient and effective data transfer and information usage for students and academic members of the teaching staff with least cost (Paper less). The Cloud Storage using IIS for university can manage some of these issues. Students will have access documents like hand-outs, e-books, reference e-books, study material, videos and related stuff anytime, anywhere connected to intranet either with the help of LAN connection or Wi-Fi connection by the suggested proxy cloud structure.

4.1 Preliminary Results Sample screen shot for the upcoming proposed idea

4.1.1 Staff Registration

In staff registration link it contains Staff Name, Staff ID (Primary & Unique Key), Password for login, Date of Birth, Mobile number, Email ID, Department in which the staff working. In staff registration each staff can do their registration to their particular department, so that they can upload the date only to their particular subject which they have allotted.

4.1.2 Students Registration

In Student registration link it contains Student Name, Registration number (Primary & Unique Key), Date of Birth, Mobile number, Department in which the students joined. In student registration we are not going to give password for them. They can login with the help of Registration number & Date of Birth. Because students are often have problem with forgetting password.

4.1.3 Students Login

The Students can login with the help of their Registration number & Date of Birth.

4.1.4 List of college depends on University

In this Page you can see the list of College available College of Computing & Informatics, College of Engineering & Technology, College of Natural & Computational Science, College of Medicine & Health Science, College of Business & Economics, College of Agriculture, College of Social Science & Humanities.

4.1.5 Staff Uploading study material / Video tutorial Page

This Screen shot shows welcome page for Staff. In the department column they can select the specific department and type the subject name and chapter name. The staff can upload the Study material either Book or Video in their specific format. The staff can mention the Subject name & Chapter / Unit Name. They can upload by clicking browse button.

4.1.6   Students Download study material Page

This is the screen shot where the students can download the study material whether Book or hand out or video tutorial based upon the unit wise for each subject. In the top right, it will show the welcome name for students who logged in. Video material and study material are displayed separately. Logout icon is there for signing out from the current user.

5.   CONCLUSION

Thus setting up proxy cloud storage taking teaching learning material related to teaching staff and students like hand-outs, e-books, reference e-books, study material, videos tutorial and related stuff to the next level of technology using proxy cloud storage with Internet Information Server. This techniques will leads to Efficient and effective data transfer and information usage for students and academic members of the teaching staff with least cost.

ACKNOWLEDGMENT

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