

A Noval Approach towards Academic Data Sharing on Cloud Environment Using File Synchronization

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Abstract: Nowadays the use of cloud computing is increased rapidly. The Cloud computing is very much important in the data sharing application. Due to increased use of cloud platform the management of the file problem on the cloud is increased for every single day the data is uploaded on to the cloud. So increasing demand of computation on a processing of file transfer leads to develop a new kind of technology that provides services for the manageable way. This manageable way is achieved by using file synchronization techniques in the cloud environment. Cloud computing usually consists of front-end user devices and back-end cloud servers. This gives users to access a large volume of storage on the cloud. In this project, the user can upload a file from PC (and from mobile as well) on to the cloud storage. These files will be automatically synchronized on to the user's device. So, the user can be viewed the file from anywhere and on any device. In the existing system, we need to download files manually. This paradigm provides the user to synchronize data automatically between devices. Therefore, we are implementing this paradigm for windows platform only. Here we are demonstrating this concept by using simple assignment and notes sharing application between teachers and students.

Keywords: *Cloud Computing, File transfer, File synchronization.*

I. Introduction

The Web is a large source of information and knowledge, where about all solutions exist. In some times ago personal computers and workstations are played the important role in developing and utilize different applications and they consume local resources for computation. But due to rapidly changing technology introduces a new internet based computing strategies. If we describe a cloud computing system in simple words that are the internet based application platform that provides different services on a plug and plays basics. Now we start with a formal definition of cloud computing. According to National Institute of Standards and Technology

[9] appears to include key common elements widely used in the Cloud Computing community.

“Cloud computing is a model for enabling 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.” Cloud computing involves some key elements, that is required to understand first. A consumer with an immediate need at a particular time slot can advantage computing resources such as CPU, network storage, software and others in an automatic manner without interactions with providers of these resources. These computing resources are delivered over the network or the Internet and used by various client applications with

heterogeneous platforms such as mobile phones and personal computers.

Cloud service providers have the mechanism to pool the computer resources to serve the service to the multiple clients. Multiple tenancies or virtualization model are used to do it. Multi tenancy is the software architecture mechanism to serve the single instance of a program is run on the server and this instance is dynamically assigned or reassigned to multiple clients according to their demand. The motivation for setting up such a pool-based computing hypothesis lies between two important factors: economies of scale and concentration. The result of the pooled based model is that computing resources are made available to the customer are invisible to them. Pooled based model made limited resources available to many customers.

Providing and sharing notes and assignments in a class or within a department is one of the important tasks. Mostly notes are shared through some mobile application. These files take a lot of memory. Many times there is need of updating some points in notes. A solution to this will be cloud storage and synchronization tool. Cloud provides storage space where one can store and retrieve data. This saves system's storage space. With the synchronization tool, if there is any kind of change in a file it will be reflected on both server and clients' application. This paper aims on creating an application to develop a synchronization tool for file sharing application between teacher (Professor) and student.

Clouds, Grids, and Distributed Systems

Cloud Computing overlaps with many existing technologies, like Grid Computing, Utility Computing, Services Computing, and distributed computing. Cloud Computing not only overlaps with Grid Computing, it is really evolved out of Grid Computing and depend on Grid Computing as like it provide backbone and infrastructure support. The evolution has been a result of a shift in focus from an infrastructure that delivers storage and computes resources to one that is an economy based aiming to deliver more intellectual resources and services in the case of Clouds. As for Utility Computing, it is not a new model of computing infrastructure; it is a business model in which computing resources, such as computation and storage, are packaged as metered services similar to a physical public utility, such as electricity and other utility bills. Utility computing is typically implemented using other computing infrastructure with additional accounting and monitoring services. A Cloud infrastructure can be utilized internally by a company or exposed to the public as utility computing. [2]

The traditional model of software was the one-time payment for a license for unlimited use of it. This was the very costly to the customer, so the limited no. of a user have to access it. In a cloud based business model, a customer will pay on consumption basis like utility company bill payment. Utility company like electricity, water are charged on the consumption basis. This is on the scale of economies to get the price down for a user and made profit up for the provider. The former is charged based on per instance-hour consumed for each instance type and the latter is charged by per GB-Month of storage used. In addition, data transfer is charged by TB

/month data transfer. The business model for Grids is project-oriented in which the users or community represented by that proposal have a certain number of service units they can spend. This model has worked rather well for many Grids around the globe, giving institutions incentives to join various Grids for access to additional resources for all the users from the corresponding institution. There are also activities to build a Grid economy for a global Grid infrastructure that supports the trading, negotiation, provisioning, and allocation of resources based on the levels of services provided, risk and cost, and users' preferences; so far, resource exchange auctions, game theory based resource coordination, virtual currencies, resource brokers and intermediaries, and various other economic models have been proposed and applied in practice.

The critical role of Cloud Computing goes without saying, but the importance of Client Computing cannot be overlooked either for several reasons: 1) For security reasons, people might not be willing to run mission-critical applications on the Cloud and send sensitive data to the Cloud for processing and storage; 2) Users want to get their

things done even when the Internet and Cloud are down or the network communication is slow; 3) With the advances of Multicore technology, the coming decade will bring the possibilities of having a desktop supercomputer with 100s to 1000s of hardware threads/cores. Furthermore, many end-users will have various hardware-driven end-functionalities, such as visualization and multimedia playback, which will typically run locally. [2]

Data Synchronization:

A distinctly different (but related) concept is that of data synchronization. This refers to the need to keep multiple copies of a set of data coherent with one another. Data synchronization is the process of establishing consistency among data from a source to target data storage and vice versa, and the continuous harmonization of the data over time. Data synchronization technologies are designed to synchronize a single set of data between two or more devices, automatically copying changes back and forth. For example, a user's contact list on one mobile device can be synchronized with other mobile devices or computers. Data synchronization can be local synchronization where the device and computer are side-by-side and data are transferred or remote synchronization when a user is mobile and the data is synchronized over a mobile network. [3]

As seen in Fig.1, a remote database is free to exchange information with any other database. This type of solution is useful when a team of people is working in remote locations and do not have access to a central database. These workers often need to share information amongst each other, but since they do not have connectivity to the central database they need to share information through some sort of peer-to-peer network. Data synchronization is enabled through specialized software that tracks data versions as they are created and utilized. The process is implemented in distributed systems where data elements are routed between several computers or systems. Each computer may modify original data versions, depending on requirements. Data synchronization ensures that regardless of data modifications, all changes are merged with the original data source. Data synchronization is also used in data mirroring, where each data set is exactly replicated or synchronized within another device. [3]

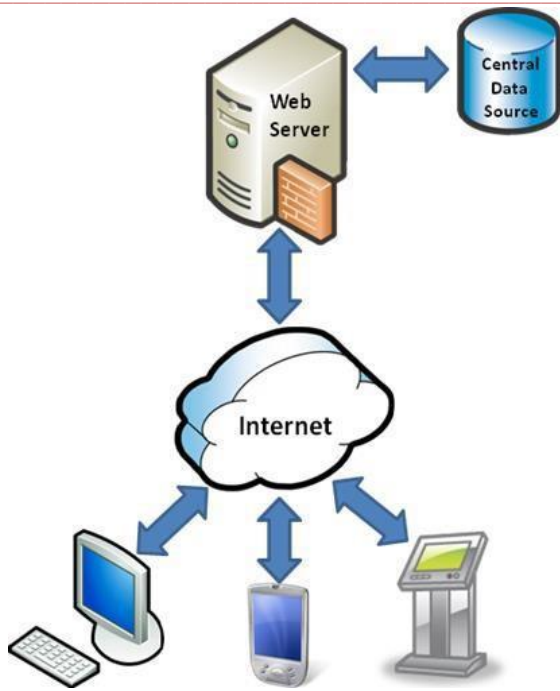


Fig 1: Data Synchronization

Data Synchronization Techniques:

The increasing decentralization of information raises the need to synchronize data across numerous devices and data storage locations. Synchronization processes comprise a source and destination entity and, based on data appearance, is categorized into unidirectional and bidirectional synchronization.

A. Unidirectional synchronization

Unidirectional synchronization replaces all content of the destination entity with data from the source entity.

B. Bi-directional synchronization

Bi-directional synchronization means two-way file synchronization merging data from source and destination entity

II. Proposed system

The aim of this project is to develop an efficient synchronization tool, which makes file sharing much easier in the cloud environment. There will be a single admin for multiple clients. The concept of synchronization will be shown with a simple assignment and notes sharing application which runs on the cloud. This concept will be useful for various such applications where file sharing and file up gradation is at the core. Though the idea can be implemented in various file formats, here this project will focus only on some specific file formats like document (.doc), PDF (.pdf), etc. The basic server application will be designed to serve synchronization facility.

The user should first login to the system. This paradigm is implemented in both desktop application and mobile so that whenever the user modifies the data, the change is updated in other devices. Whatever the user creates or updates will be synchronized automatically to other devices also.

The user interface is developed to give the user to access or modify data. This interface provides the user to upload a file present in the system. This interface is implemented in all the windows platforms so that whenever the file is modified or changed then it will be synchronized to other devices. These files are stored in a cloud database so that the user can access data from anywhere. [4]

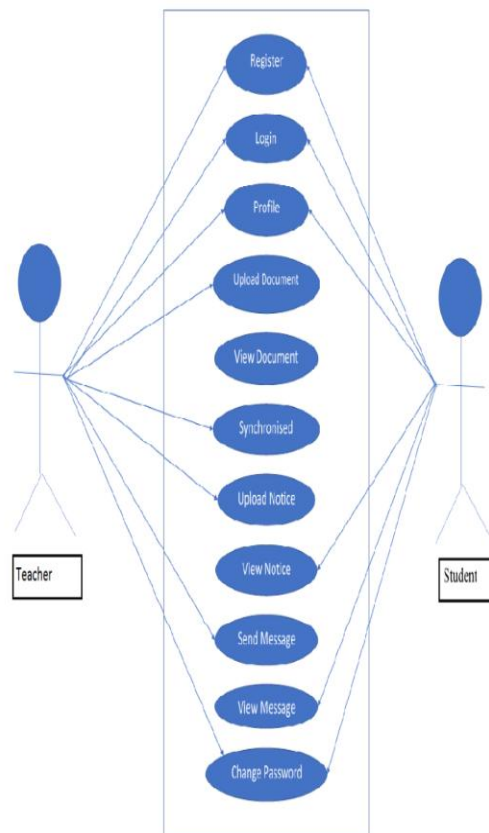


Fig 2: Use Case Diagram

The admin (Professor) is allowed to upload and to access his/her file from a cloud (virtual server). Once the authentication is valid, then admin is allowed to modify or change his data. Whenever the data is modified, the respective device will be synchronized automatically. The use case diagram is best describes the user interactions.

Advantages

1. Overcomes the complexity of redundant data.
2. For file synchronization no need to preserve file every time for the user on machine.

3. Users can also remotely access files stored on their PC from anywhere using a feature on cloud called "Fetch."

III. Future Scope

In future work the facility of video (lecture video), different images formats, and other application like social media application will be advancement in this system.

- On large scale, department level or college level the concept can be implemented.
- Email facility is available to user for latest notification.
- There, one needs to take care of file authentication, student verifications.
- The internet connection will not be necessary when file is synchronized.

IV. Conclusion

In this paper, we proposed a new synchronization tool that support file sharing system for data sharing on cloud. By introducing cloud environment for file sharing various synchronization techniques is used to maintain the consistency of file on cloud. For communication, the application interface is design that is admin (Professor) can upload and to access file from a cloud (server) through the application. Once the authentication is valid, then admin access the data at anytime and anywhere.

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