

Security and Privacy issues in Cloud Computing and Providing Platform for E-learning

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Abstract

Cloud computing is a type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications. The goal of the cloud computing is to apply traditional supercomputing or high performance computing power. To do this cloud computing uses network of large group of servers typically running low cost consumer-pc technology with specialized connections to spread data processing among them. Applications and databases are moved to large centralized data centres called cloud. Due to resource virtualization, global replication and migration, the physical absence of data and machine in the cloud, the stored data in the cloud and the computation results may not be well managed and fully trusted by the cloud users. The emphasis till date has been on storage security rather than taking into account the computation security with it. Cloud Computing has several major issues and concerns, such as data security, trust, expectations, regulations, and performance issues. In this paper we have examined the major security issues affecting the cloud systems and the solutions available. This paper also enhances light and benefits on using cloud computing as E-learning. Some of the softwares like the Moodle and the Blackboard are been the biggest applications today in the E-Learning process. Our group is also working on building a cloud oriented software for the E-learning process.

Keywords: Cloud Computing, E-Learning, Secure Computation, Secure Storage, Secure Computation.

1. Introduction

The recent development of cloud computing has shown its potential to shape the current way that IT hardware is designed and purchased. Among numerous benefits, cloud computing offers customers a more flexible way to obtain computation and storage resources on demand. A significant gap remains between vendors' claims and users' views of the cloud's security, privacy and transparency. The cloud industry's response has been: Clouds are more secure than whatever you're using now .

Issues such as security, privacy and availability are among the topmost concerns in organizations' cloud adoption. One of the largest disadvantages of cloud computing revolves around security and confidentiality. While cloud computing in recent years has energized the information systems professional community, it has now embarked on information systems research arena as a prevalent topic for integrated information and systems. While cloud computing is the current wave in computing, there are many concerns about its security and the trust by its users[1,2]. The paper also throws the light on the coding part of the software which we are building for the E-Learning process.

2. Security and Privacy Issues

Security and privacy issues in cloud computing has received extensive attentions recently. Generally speaking, the research work on cloud computing almost falls into the two cases: cloud storage security and cloud computation security[3]. Data management, data privacy and security are concerns for every cloud user, and the cloud provider too and with more companies looking into cloud computing understanding security issues is very important. If hackers break into the online servers and steal the data there is no way for retrieving the data. Because the data is present on the cloud. The general way of relation of cloud security with various factors are as shown in Fig1. Different from the traditional computing model in which users have full control of data storage and computation, cloud computing entails that the managements of physical data and machines are delegated to the cloud service providers while the users only retain some control over the virtual machines. We further classify cloud computing security into two major classes: Cloud Storage Security and Cloud Computation Security,[3] where the former is referred to ensuring the integrity of outsourced data stored at untrustworthy cloud servers while the latter refers to checking the correctness of the outsourced computation performed by untrustworthy cloud servers. For sake of saving computation resources, the cloud servers may not perform the necessary computations but claim to have done so. Additionally, the centralized architectures emphasize the fact that the cloud servers can represent a single point of failure, as proven by the recent meltdown of Google's Gmail systems. Even from the point of accountability, some secure computation mechanisms should be in place to meet the needs of deciding whether the cloud servers or the users should be responsible for it once there is any problem taking place.



Fig. 1: Cloud Security dependence on various factors.

Generally, due to the limitation of the computation and communication resources, the cloud users cannot afford the cost

incurred by result auditing or verification.[3] One promising approach to prevent the cloud users from incurring expensive verification costs is to introduce a trusted auditor who conducts cloud auditing on behalf of the users.

2.1 Cloud Computing hosting

The general way of hosting the cloud computing these days is as shown in fig2.[5] Cloud resources are usually not only shared by multiple users but are also dynamically reallocated per demand. This can work for allocating resources to users. For example, a cloud computer facility that serves European users during European business hours with a specific application (e.g., email) may reallocate the same resources to serve North American users during North America's business hours with a different application (e.g., a web server). This approach should maximize the use of computing powers thus reducing environmental damage as well since less power, air conditioning, rackspace, etc. is required for a variety of functions.



Fig. 2: Cloud Computing Hosting.

3. Cloud Computing for E-learning

One of the most interesting applications of cloud computing is educational cloud.[4] The educational cloud computing can focus the power of thousands of computers on one problem, allowing researchers search and find models and make discoveries faster than ever. The universities can also open their technology infrastructures to private, public sectors for research advancements. The efficiencies of cloud computing can help universities keep pace with ever-growing resource requirements and energy costs. Students expect their personal mobile devices to connect to campus services for education. Faculty members are asking for efficient access and flexibility when integrating technology into their classes.[4] Researchers want instant access to high performance computing services, without them responsibility of managing a large server and storage farm. The role of cloud computing at university education should not be underestimated as it can provide important gains in offering direct access to a wide range of different academic resources, research applications and educational tools. Usually, E-learning systems are developed as distributed applications, but not limited to. The architecture of an e-learning system, developed as a distributed application, includes a client application, an application server and a database server (see Figure 3), beside the hardware to support it (client computer, communication infrastructure and servers).The general model of a E-Learning system is as shown in fig3.

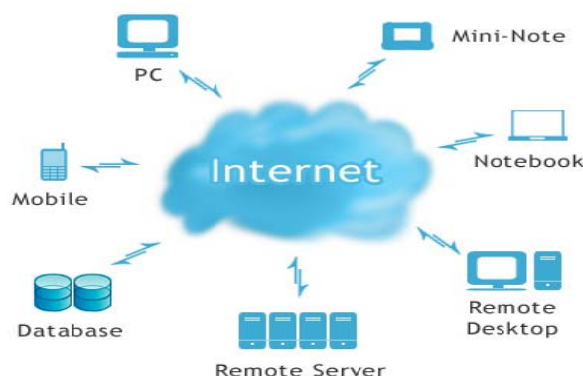


Fig. 3: Model of an E-Learning System.

Various educational software's providing cloud computing platform are being in use today like the BlackBoard and the Moodle. Our group is also working on an E-learning software that would enhance the E-Learning system to a rather greater extent. We are in our coding process which is likely to finish soon. A little glance of the coding of our software is a shown.

```
// Get the file service
FileService fileService = FileServiceFactory.getFileService();
GSFileOptionsBuilder optionsBuilder = new GSFileOptionsBuilder()
```

```

        .setBucket("Cloud")
        .setKey("1234567")
        .setAcl("public-read")
        .setMimeType("text/html");//.setUserMetadata("date-created", "092011", "owner",
"Usman");
        AppEngineFile                writableFile                =
fileService.createNewGSFile(optionsBuilder.build());
        boolean lockForWrite = true;
        FileWriteChannel writeChannel = fileService.openWriteChannel(writableFile,
lockForWrite);
        PrintWriter out = new PrintWriter(Channels.newWriter(writeChannel, "UTF8"));
        out.println("Data is being stored");
        Glance of coding of our software.

```

4. Conclusions

Cloud computing as an exciting development is a well alternative in the area of education sector these days. Students and administrative personnel have the opportunity to quickly and economically access various application platforms and resources through the web pages on-demand. This automatically reduces the cost of organizational expenses and offers more powerful functional capabilities. There will be an online survey to collect the required data for the use of cloud computing in the universities and other governmental or private institutions in the region. Cloud based education will help the students, staff, Trainers, Institutions and also the learners to a very high extent and mainly students from rural parts of the world will get an opportunity to get the knowledge shared by the professor on other part of the world. Even governments can take initiatives to implement this system in schools and colleges in future and we believe that this will happen soon. Also the security issues need to be taken into consideration while considering the cloud computation and putting it into emphasis.

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