

# The Problems in Cloud Computing Security and Its Solutions

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**Abstract.** Cloud computing is a new computing model, in which large-scale Internet computing resources are effectively integrated and computing resources are provided as a service to users. Cloud computing effectively separates the virtual services from the actual resources. With the promotion of cloud computing applications and research, the security of cloud computing has become one of the core problems. There is a great deal of interaction between the cloud computing platform and users which brings a security threat of user data transmission and storage. The paper has a deep research in the threat of cloud computing safety, proposes a safety system solution for user security issues of data transmission and storage in cloud computing system, builds a cloud computing experiment system, deals with the design and implementation of cloud computing security module.

## 1 Introduction

Cloud computing is a new kind of calculation model, it will be interconnected large-scale computing resources for effective integration, and the computing resources in the form of services provided to the user. Users can access the virtual at any time according to the demand of computer and storage system, and does not need to consider the underlying implementation and management of complex, greatly reduces the user's implementation difficulty with the hardware investment. And, through the service integration and virtual resources, cloud computing effectively separates the physical resources and virtual services, improves the utilization of resources, reduces the service cost, and effectively blocks a single resource error problem.

The emergence of cloud computing can reduce the cost of user's computer. Cloud computing allows users to experience a higher performance and unlimited storage capacity. Using cloud computing, the user does not have to worry about whether to create documents on the user's machine with other users of the application or operating system compatibility. When everyone shares data or applications in the cloud, the format of incompatible problems no longer exist. Because of cloud computing with high availability the advantages of small, easy extensibility and service cost, so IT won the majority of IT enterprise users.

However, cloud computing security issues are worthy of attention. Google in March 2009 a large number of users in the event of leaked documents. In February 2009 and July, Amazon's simple storage service (Simple Storage Service, S3) "twice. As a result, dependent on the single network storage service website was paralyzed, and so on.

Therefore, cloud computing security has become a cloud to deploy application must solve the problem. Information security in cloud computing security is still not very good solved one problem. Both in the public cloud computing environments and in a private cloud environment, security issues are needed to overcome and solve problems.

This paper is divided into different sections. Section 2 sketches the cloud computing technology. The cloud computing information security problems are illustrated in Section 3. Section 4 we discuss Cloud computing information security solutions. Lastly, conclusions are described in Section 5.

## 2 Cloud Computing Technology

Cloud computing is a kind of internet-based computing. In cloud computing, storage and computing will no longer be running on the local computer or server. It is running in a wide range

of meter distribution on the Internet a counting machine. Cloud computing is the name of a solution, and it is not a new technology. Computing can be viewed as the fusion of five calculations. These five include distributed computing, virtualization,, grid computing, the load balance and parallel computing products.

### 2.1 The Framework of Cloud Computing.

After years of evolution, cloud computing, from the architecture, can be divided into the following three layers. IaaS, infrastructure as a service, is the concept of deployment on infrastructure platform virtualization technology enables the infrastructure such as integration, improve the utilization rate. PaaS, platform as a service, is to implement the concept of the unity of the platform level service, in a cloud computing platform level providing enterprise development operation interface and the environment, for enterprises to realize the self service. SaaS, software as a service, is to provide a unified service interface to the user, such as by multi-user architecture, use the browser or other client services to go out.

### 2.2 The Characteristics of Cloud Computing.

Dynamic extensibility: computing system can pass the real-time monitoring. System only needs to do the registration on infrastructure in the cloud computing system. Program can immediately insert into the cloud computing service on the allocation of resources, and implement conveniently the extended. High reliability and fault tolerance: cloud computing system is a highly cluster system. It can easily implement essential disaster backup function, high reliability and fault tolerance. Cost-effective: it is an important function of the cloud computing system. That can greatly improve the utilization rate of foundation platform and all the equipment can be use all services. Service encapsulation: cloud computing systems are foreign encapsulation shield. And users don't need to know the specific deployment services. Cloud computing system will automatically allocate dynamic unity.

### 2.3 The Target of Cloud Computing.

Cloud computing from the application point of view can be divided into the private cloud, public and hybrid cloud. Private cloud is deployed within the enterprise cloud computing platform, aims to integrate their internal IT resources of cloud computing system. Public cloud refers to deployment in a public computing platform. It goes through the cloud computing service charge operation system. The hybrid cloud is refers to the cloud computing platform, is both of fusion. The goal of cloud computing is resources integration and service. Cloud computing's vision is to make IT become a common cheap public resources, such as power companies to provide electricity, water companies provide tap water, let IT resources and services become anyone can easily enjoy the public resources.

## **3 The cloud computing information security problems**

At present, the development of cloud computing facing many key issues, security problem is one of the most key factors. With the popularity of cloud computing, the importance of the safety problems appear gradually rising trend and it has become an important factor of restricting its development.

### 3.1 The international studies of cloud computing safety.

Gartner2009 years of survey, more than 70% of the respondents CTO finds the primary reason, recently the users don't adopt cloud computing. The reason is that users deeply think about the data security and privacy concerns. Frank Gens, the senior vice President and the major international data analyst IDC, deliver the fact in his analysis report. The fact is that cloud computing services is still in the early stage of development, and for cloud computing service providers, there is no doubt that there are many problems need to be solved.

### 3.2 The concreteness of the cloud computing security issues.

Security mainly includes two aspects: first one is to protect the private information will not be leaked, avoid causing unnecessary loss. Second one is to ensure accurate access to the information as needed. So we have to ensure that the user of the data transmission of safety and security of data

storage. In cloud computing mode, faced with several problems: one is how to ensure that the user's data strictly in the process of network transmission encryption without stolen. The second is how to ensure that cloud computing service providers to get data without the user secret data leaking out. Third is stored in a cloud computing service providers, and how to ensure access to users through strict limits of authority is a legitimate access to data, and to ensure that the user at any time can secure access to your own data.

#### 4 Cloud computing information security solutions

The three quarters above has been about cloud computing security system for detailed analysis. The section will be a key part of system implementation. This system USES visual Studio c # code 2008.System is composed of six modules. The article in view of the management server and the cloud resource server do detailed two modules, and where necessary given the source code.

##### 4.1 Manage server.

The module distribution is the main purpose of cloud computing resources server to client to use. Specific Manage server is the module mainly. The function of the Main is the main, used to start listening to the client's request, is the first cloud computing resources to find the server information and sent to the client. The following is the main code:

```

Keyvaluepair<string, bool > firstFreeServer =; new Keyvalue<string, bool> ();
Foreach ( var server in Servers)
{
    if (server.Value == true)
    {
        firstFreeServer= server ;
        break;
    }
}
Return firstFreeServer;
Keyvaluepair ns = StartListening(100,"126.0.0.0");
Keyvaluepair<string,bool> server = Find first server();
Byte[] bytes = Encoding. Unicode.Getbytes(server. key);
Servers.Add("126.0.0.0:15", true);
Servers.Add("126.0.0.0:16", true);
// adding two servers to the list.
/ set the TepListener on port;
IPAddress localAddr = IPAddress.; Parse(localAddr);

// toplistener server = top listener (prot);
Toplistener toplistener serverlistener= new ();

// Start listening for client request.
toplistener serverlistener.start.();

Console. Write ("waiting for a connection...");
// perform a blocking call to accept request.
// you could also user server. Accept socket()here.
Topclient client =tcp listener server listener. accept tcp client();
Console. Write line (" connected.");
// get a stream object for reading and writing
Return client. Set ();

```

##### 4.2 Resources server module.

The module of the main functions is implemented by the Server class. The Server class has six main members of the field, one attribute and four methods. As the data encryption key is produced

by the client, and in the asymmetric encryption key transmission process. So the user data in both network traffic and stored in the database are safe. Through the system test and verification showing, it is that the system as the cloud computing system is safe.

In the paper, we use the server class to save randomly generated by the resource server private key in asymmetric keys. The following is the part of main code:

```

Public statics string publickey
{
    get
    {
        If (publickey == null)
        {
public = generatekey (out privatekey);
        }
        Return publickey;
    }
}
while ( true)
{
    try
    {
        mr = startlistening (16, " 126.0.0.0");
        run();
    }
catch (exception ie)
{
Console writeline (" socket exception:{ }" , ie);
}
finally
{
// stop listening for new clients.
Serverlistener.stop();
}
}
// running the function of the RUN
Post publickeyclient();
Byte[] encrypted symkey= receive bytes (nmm) ;
Sym key = decrydata with key(encrypted syem key, privat key);

```

## 5 Conclusions

Firstly the existing research deeply on the cloud computing system structure analysis. The article summarized most cloud computing system framework model. Design based on this model, it is implemented in this paper the cloud computing system. In this paper, the various modules of the cloud computing security system use c# language to achieve. We set the Visual Studio and.net Framework. On the basis of this, cloud computing security system will be more stable and efficient operation, at the same time, this also is conducive to the code of the system maintenance work.

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