

Cloud Computing and Security

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Abstract: This document gives an insight into Cloud Computing giving an overview of key features as well as the detail study of exact working of Cloud computing. **Cloud Computing** lets you access all your application and documents from anywhere in the world, freeing you from the confines of the desktop thus making it easier for group members in different locations to collaborate. Certainly cloud computing can bring about strategic, transformational and even revolutionary benefits fundamental to future enterprise computing but it also offers immediate and pragmatic opportunities to improve efficiencies today while cost effectively and systematically setting the stage for the strategic change. As this technology makes the computing, sharing, networking easy and interesting, we should think about the security and privacy of information too. Thus the key points we are going to be discussed are what is cloud, what are its key features, current applications, future status and the security issues and the possible solutions.

Keywords: Cloud Computing, Service Layers, Implementation Types, Trends, Future of Computer, Security in Cloud Computing

I) INTRODUCTION

Cloud computing is a new field in Internet computing that provides novel perspectives in internetworking technologies and raises issues in the architecture, design, and implementation of existing networks and data centers. The relevant research has just recently gained momentum, and the space of potential ideas and solutions is still far from being widely explored.

Key features to be discussed:

- What is Cloud Computing?
- Cloud Service Layers
- Cloud Implementation Types
- Cloud Computing – Trend
- Cloud Computing -Tomorrow
- Security of data
- Pros and Cons

II) WHAT IS CLOUD COMPUTING: CURRENT STATUS

As more aspects of our work and life move online and the Web expands beyond a communication medium to become a platform for business and society, a new paradigm of large-scale distributed computing has emerged in our lives. In industry,

companies are devoting great resources to investing in cloud computing, either by building their own infrastructures or developing innovative cloud services.

Everything on the Clouds



Fig. 01 Current Status

Cloud computing is a new multidisciplinary research field, considered to be the evolution and convergence of several independent computing trends such as Internet delivery, “pay-as-you-go” utility computing, elasticity, virtualization, grid computing, distributed computing, storage, content outsourcing, security, and Web 2.0.

Cloud computing is the long dreamed vision of computing as a utility, where users can remotely store their data into the cloud so as to enjoy the on-demand high quality applications and services from a shared pool of configurable computing resources. By data outsourcing, users can be relieved from the burden of local data storage and maintenance. However, the fact that users no longer have physical possession of the possibly large size of outsourced data makes the data integrity protection in Cloud Computing a very challenging and potentially formidable task, especially for users with constrained computing resources and capabilities.

Common Attributes of Cloud Computing

- Pooled computing – advanced virtualization
- Delivered over the Network
- Flexible pricing – pay only for they use
- Provide resources as a service

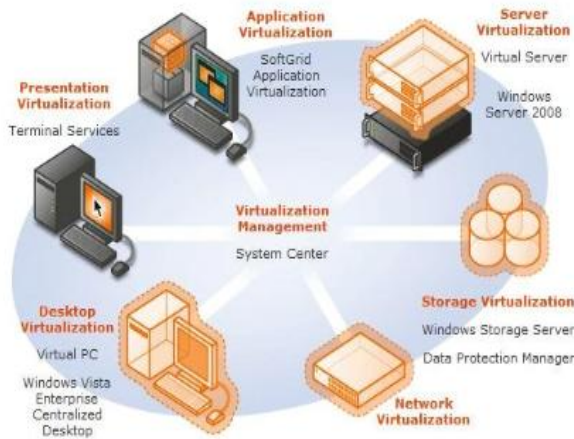


Fig 02 Pooled computing – advanced virtualization



Fig. 03 Delivered over the Network



Fig 04 Flexible pricing – pay only for they use



Fig 05 Provide resources as a service

III) CLOUD SERVICE LAYERS

Characteristics:-

- Software as a Service (SaaS)
 - Sometimes free; easy to use; good consumer adoption; proven business models
 - You can only use the application as far as what it is designed for
- Platform as a Service (PaaS)
 - Developers can upload a configured applications and it “runs” within the platform’s framework;
 - Restricted to the platform’s ability only; sometimes dependant on Cloud Infrastructure provider
- Infrastructure as a Service (IaaS)
 - Offers full control of a company’s infrastructure; not confined to applications or restrictive instances
 - Sometimes comes with a price premium; can be complex to build, manage and maintain

Cloud Service Layers Contains

SaaS:- Business Processes, Collaboration, Industry Applications

PaaS:- Middleware, Development Tooling, Database, Java Runtime, Web 2.0 Application Runtime

IaaS:-Server, Networking, Data Center Fabric, Storage, Shared Virtualized Dynamic Provisioning

- IT departments will shrink as users go directly to the cloud for IT resources
- Professional services will be bundled with commodity cloud services
- Cloud-computing resources will become more customizable
- Large enterprises will become part-time cloud-computing vendors
- Cloud computing will unleash innovation
- The browser will be all the desktop software you need

IV) CLOUD IMPLEMENTATION TYPES

Traditional Enterprise IT

- A) Private Cloud
- B) Public Cloud
- C) Hybrid Cloud

A) Private Cloud:-

- Owned and managed by the enterprise
- Limits access to enterprise and partner network
- Retains high degree of control, privacy and security
- Enables business to more easily customize service
- Accessed from "inside" the fire wall

B) Public Cloud

- Owned and managed by service provider
- Delivers select set business process, application or infrastructure services on a "pay per use" basis
- Highly standardized
- Limited customization options
- Accessed from "outside" the fire wall

c) Hybrid Cloud

A hybrid infrastructure takes advantage of both public and private clouds:

- Services provided over the Internet—the public cloud
- Services provided by the enterprise data center—the private cloud

V) CLOUD COMPUTING – TREND

- Large enterprises are building their own private clouds
- Cloud computing will shift the skills needed by IT workers

VI) CLOUD COMPUTING – TOMORROW



Fig 06 Cloud Computing Tomorrow

As per the Fig.06 now each and every field will connect to Cloud for globalization. Thus the cloud traffic and security of data and the cloud space cost will be the important issues to be think.

VII) CLOUD COMPUTING- SECURITY

Enabling public audit ability for cloud data storage security is of critical importance so that users can resort to an external audit party to check the integrity of outsourced data when needed. To securely introduce an effective third party auditor (TPA), the following two fundamental requirements have to be met: 1) TPA should be able to efficiently audit the cloud data storage without demanding the local copy of data, and introduce no additional on-line burden to the cloud user; 2) The third party auditing process should bring in no new vulnerabilities towards user data privacy. In this paper, we utilize and uniquely combine the public key based homomorphic authenticator with random masking to achieve the privacy-preserving public cloud data auditing system, which meets all above requirements. To support efficient handling of multiple auditing tasks, we

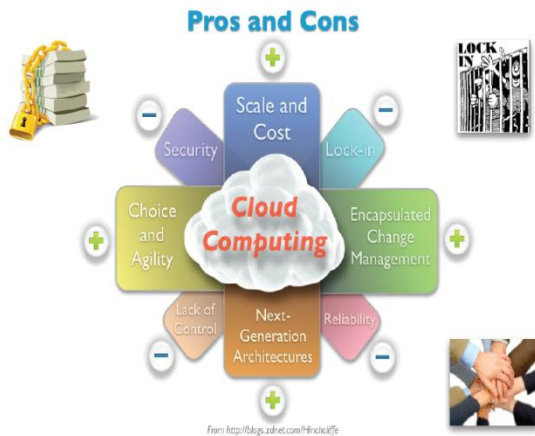
further explore the technique of bilinear aggregate signature to extend our main result into a multi-user setting, where TPA can perform multiple auditing tasks simultaneously. Extensive security and performance analysis shows the proposed schemes are provably secure and highly efficient.

The Privacy Manager is another solution for data security on clouds. The idea is that instead of being present unencrypted in the cloud, the user's private data is sent to the cloud in an encrypted form, and the processing is done on the encrypted data. The output of the processing is de-obfuscated by the privacy manager to reveal the correct result. The obfuscation method uses a key which is chosen by the user and not known by the privacy manager, but which is not communicated by the service provider. Thus the service provider is not able to de-obfuscate the user's data, and the un-obfuscated data is never present on the service provider's machines.

This reduces or even eliminates the risk of theft of the data from the cloud and unauthorized uses of the data. Moreover, the obfuscated data is not personally identifiable information, and so the un-obfuscated data. Where obfuscation is practical, the principle of data minimization gives a legal impetus to use it

VIII) PROS AND CONS

Thus as an overview we can conclude with various advantages and disadvantages of Cloud computing as shown in Fig. 07.



As the global use of Cloud Computing, It become beneficial for

- Easy and fast communication with proper scale and minimum cost.
- User can get the freedom and choice to select the architecture as well as software as per requirement in minimum cost.

- User can do encapsulated change in the space available and become a manager of his own space.
- User can reuse the space according to cost and requirement.
- Regular invention and problem facing in cloud computing will help to invent the next generation architecture.

As every coin has two sides disadvantages of cloud Computing are:

- Reliability:- As traffic increases and due to slow internet speed uploading on cloud becomes time consuming and irritable. This is decreasing the reliability.
- As the user unable to decrypt the encrypted data the information become locked in and require to resend.
- As traffic increases there is possibility of lack of control over the cloud account because user does not know where his data is stored and load on server from which service provider is giving that become hang.
- Without proper care and solutions like encryption, TPA, Privacy Manager there is lack of security for the VIP data on cloud.

IX) CONCLUSION

The key motive to publish this paper is to give a glimpse of understanding on cloud computing as a technology for a new era. Cloud computing offers real alternatives to IT departments for improved flexibility and lower cost. Markets are developing for the delivery of software applications, platforms, and infrastructure as a service to IT departments over the "cloud". These services are readily accessible on a pay-per-use basis and offer great alternatives to businesses that need the flexibility to rent infrastructure on a temporary basis or to reduce capital costs. Architects in larger enterprises find that it may still be more cost effective to provide the desired services in-house in the form of "private clouds" to cost and maximize compatibility with internal standards and regulations. If so, there are several options for future-state systems and technical architectures that architects should consider to find the right trade-off between cost and flexibility. Using an architectural framework will help architects evaluate these trade-offs within the context of the business architecture and design a system that accomplishes the business goal with maximum security.

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