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AN EFFICIENT METHOD FOR STORING THE SHARED IT RESOURCES IN MULITITENANT CLOUDS

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Abstract:

Cloud Computing is the most trending Information Technology computational model. This environment is enabled with an Internet to provide computing resources comprised of software, servers, Storages and applications that can be accessed by any type of client. Cloud computing is the fundamental model to provide the services like Infrastructure as a Service, Platform as a Service and Software as a Service. Majority of these services are offered based on pay per use lease style investment with very low or no startup costs to purchase all hardware or software components. The feature provides economic benefits to both users and service providers since it reduces the management cost and thus lowers the subscription price. Many users are, however, reluctant to subscribe to cloud computing services due to security concerns. To enable deployment of cloud computing, we need to advance new techniques like secure multi-tenancy, resource isolation need to be advanced further.

Keywords: Cloud Computing, Multi-tenancy, Security, Virtualization, Resource Isolation.

1. INTRODUCTION

Cloud Computing is defined as "It is a model, where the software and hardware resources of a data centre is shared using virtualization technology, which also provides on demand, instant and elastic services to its users and resources offered on lease style. Cloud computing is a ubiquitous model to implement acceptable, available network access to a shared pool of self-configurable computing resources that can be fast provided and released with very low administrative support or service provider interaction. In addition, the platform provides on demand services that are always on anywhere, anytime and at any place. The development of cyber societies and online transactions imposes continuously expanding IT budgets on organizations.

To handle this, organizations are redesigning their procurement and management strategies for IT infrastructure. Cloud computing services become their candidate solutions since they provide economic benefits; they reduce hardware and software expenses while cancelling out related maintenance and upgrade costs. They offer on-demand, flexible access to appropriate amounts of computation, memory, and storage resources. The advantage is brought by their multitenant feature, which enables an IT asset to host multiple tenants. It also provides elasticity in upgrading or degrading the resources. Cloud computing is mostly adopted because of elasticity and platform independency. With the benefits of Cloud Computing come along challenges to the model; one of the most challenging of these aspects is security. Information Security

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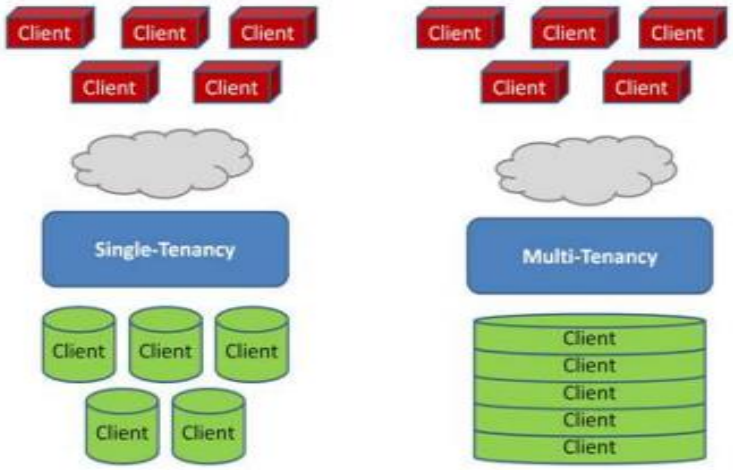

Fig.1. General Structure

provides security for the information and information systems from insecure access, use, disclosure, disruption, modification, inspection, recording or destruction. Based on a study for the Cloud Security Alliance (CSA), there are seven top threats that organizations will face in adopting Cloud Computing. These are Abuse and Nefarious Use of Cloud Computing, Insecure Application Programming Interfaces (API), Malicious Insiders, Shared Technology Vulnerabilities, Data Loss/Leakage, Account, Service and Traffic Hijacking and Unknown Risk Profile. Multi-Tenancy is recognized as one of the unique implications of security and privacy in Cloud computing.

2. RELATED WORK

Multi-Tenancy has been identified as a security issue in Cloud Computing by several researchers such as who conducted a study conducted on security challenges in service delivery models in Clouds and stated that Multi-Tenancy is a major Cloud Computing characteristic that may lead to confidentiality violation. Also identifies Multi-Tenancy as a major threat to both confidentiality and privacy when talking about Cloud Computing security. Intel IT Centre generated a document of best practices on building secure Clouds; yet clearly highlights Multi-Tenancy and shared technology issues as security challenges for a Cloud environment. In several areas were identified as danger in Clouds; under data governance the writer highlighted that Multi-Tenancy arrangements in Clouds are raising questions about data segregation. While NIST developed a report titled "Guidelines on Security and Privacy in Public Cloud Computing"; they identify Multi-Tenancy as of the security and privacy downsides in the Cloud.

In a totally different approach interviewed five leading scientists from the cloud community, Raghu Rama krishnan the Chief Scientist for Search and Cloud Platforms at Yahoo! was one of them, where his response to the question of "On a related note, for a graduate student starting a PhD, what would you say are the key fundamental challenges of cloud computing that should be addressed by new research in the field?" included Multi-Tenancy as a fundamental challenge of Cloud Computing. Again raised questions in how

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Cloud Computing affecting security, privacy and trust; where he identifies Multi-Tenancy as one of the security issues.

3. PROPOSED SYSTEM

The Main requirement of multi-tenancy is that the software provider gets many requests from customers with the customized needs. If a software product is implemented according to each customer needs separately and delivered, then the implementation takes more time to complete. The software cannot be maintained easily if there are different implementations of the product. The provider needs to spend more money to satisfy different customers. Here multi-tenancy comes into existence to provide solution for all the problems faced by provider to satisfy different customer with different needs. Multi-Tenancy allows single software to be served between the multiple customers by using customized settings option. The needs of each customer are stored in custom settings. The software provider serves the same product by implementing it seeing the customized requirements of each customer and makes it available only to the specific customer respectively. The tenants who share the software product cannot see each other's implementation of product. There is no contact between each customer's sharing the same software. The software provider must be in contact with multiple customers to satisfy them.

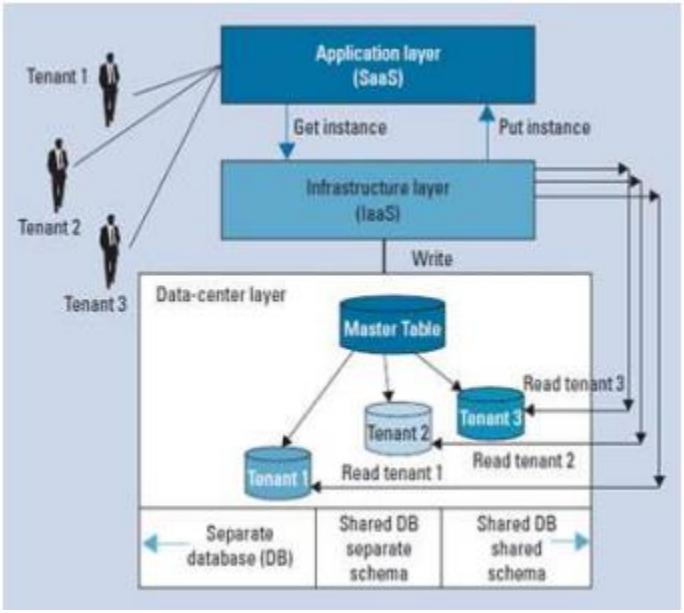

Fig.2.Proposed system

Multi-Tenancy means sharing the application software between multiple users who have different needs. Allocating single instance of an application software i.e., cloud to multiple users is called as multi- tenancy. Each user is called as tenant. The users who need similar type of resources are allocated a single instance of cloud, so that the cost is shared between the users to make the access of instance of cloud computing cost effective. Multi-Tenancy allows users to easily access, maintain, configure and manipulate the data stored in single database running on the same operating system. The data storage mechanism remains same for all

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users who share the similar hardware and software resources. In multitenant architecture, user cannot share or see each other's data, here the security and privacy is provided. The tenants can like the full stream of services that are commonly used from the cloud services from the hardware infrastructure and going all the way up to the user interface based on the degree of multitenancy offered by the cloud. Cloud computing multi-tenancy is used for most if not all Software as a Service (SaaS) applications, because compute resources are scalable and allocation of these resources is defined by actual usage. There are different types of SaaS services that the clients can access by using internet, from low internet bases applications to a very big software applications that contains a very high security requirements depends on the type of information stored on the software vendors infrastructure outside the corporate network.

4. ANALYSIS

Software as a Service provides a software model to deliver software based applications to provide remote access to the customers. In the cloud multitenancy is an important feature to provide SaaS services with different tenants simultaneously with a single application instance on the top of the shared infrastructure. Now a day's SaaS applications are build with centralization through a single instance with multitenant architecture to provide a advance rich experience with compared to on-premise models.

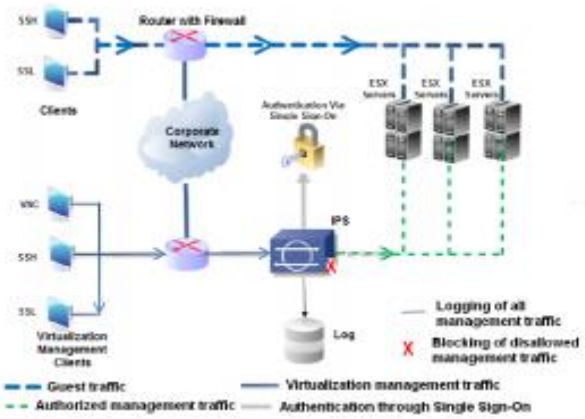

Fig.3.Cloud structure

Advantage of multi-tenancy are operational costs are reduced by dividing hardware, software resources among the different tenants are shared, simplifying the maintenance and management effort. All of these advantages of multi-tenancy effect in reducing the application costs to provide maximum benefits to small and medium organizations. Multi-tenancy Service Requirements for Cloud Services Providers are tenant data isolation, tenant workspace isolation, Isolation of tenant execution, Tenant-aware security, monitoring, management, reporting and self service administration, Isolation of tenant customizations and extensions to business logic, tenant-aware version control.

CONCLUSION

Examples of this kind of customer-facing multitenant application are media content providers like Netflix, Spotify, and Xbox LIVE. Other examples of easily partition able applications are customer-facing,

Internet-scale applications, or Internet of Things (IoT) applications in which each customer or device can serve as a partition. Partition boundaries can separate users and devices. All applications cannot be partitioned along a single property such as tenant, customer, user or device. A complex enterprise resource planning (ERP) application, for example, has products, orders, and customers. It usually has a complex schema with thousands of highly interconnected tables. No single partition strategy can apply to all tables and work across an application.

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