_____

Security Issues of Virtualization Techniques & Challenges in the Cloud Computing Environments

Jemal Ayderus Sheik Omer

Departments of computer science and engineering
Punjabi university, Patiala (India)
Ayderus123@gmail.com

Abstraction: Cloud computing environment is a modern that is relating the present time developing and based on the current news information Technology methods that is increase application quality that obsolete be developed and to make better changesin terms of functioning, and able to an original resource management and collaborative execution approach. In the middle of part of cloud computing is virtualization which enables industry or products using machines or academic Information Technology resources into one side other side on demand allocation are always or changing energy or emotion. The resources having not the same kinds forms such as network, virtualization, server, storage capacity, application and client. This article attention is focused as on how virtualization helps to improve and upgrade adaptable of the resources in cloud computing environment. The act or processing of joining to, this paper gives particular facts and the review of source virtualization techniques, challenges and future research direction and instructions.

Keyterms: Challenges, Cloud Computing Environments, In The Virtualization.

_____*****_____

1. INTRODUCTION

Cloud computingenvironment to send a particular treats into a collaborative Information communication Technology environment, which is planned with the of that is used to measured amount of information's and remotely purveying and supply or provides scalable Information Technology resources for effective producingand efficient utilization using an international organization called as National Institutioning of Standards and the level of the quality and Technology that has been explained [1] in the Cloud computing which says that Cloud Computing is the reaction of storing in in regularly way and used computer data in multiple of servers that provides main in the computer networking can be accessed through in the internet for enabling allowing you to do on the demand network can be accessed to a shared small and rather than deep of configurational in cloud computing resources (egg., cloud computing, networking, servers, storage, processing, applications software's, and services) that is happening in a short amounts of time in the provisioned and the act or processing of supplying or providing something released with mineralization of the management and the effort work done providersand the interactional. Five important characteristics of the especially quality or trait that makes group of the cloud computingenvironments are listed by below of the NIST are on the demand self-service organizations in the broad network large from one side to another's in the accessing of the resource rapid elasticity capability of the and measured service. Cloud computing is refers to anytime and in anywhere can be able to reach into the application software's and data through internet using mobile signal that is moving place to other with in the uses of air signal that and computer systems devices. Traditional in a way of thinking into the computing resources are stored and put into a place where it is available in an individual device and accessed by an authenticated user. In Cloud computing, resource are stored in places that users can understand when they are using in and that is centralized manner and managements and accessed on demand .In recent years, in the mobile devices and subsequent coming after the mobile computing become an imperative component in cloud computing. Internet made the possibilities of accessing application software's and data from in the world in the time and any place to give especially treatments According to Juniper research [2], users and enterprise market for mobile cloud based or depends on the applications worth are expecting to increase to this years $10.4 billion by 2017. Jemal Ayderus omer has described to connected each and every devices on the centralized machine [3] describes that (Mobile Cloud Computing) as a new model for mobile applications where there are by the data processing and storage are going from any devices that are connected to the networks in the mobile devices to powerful and centralized cloud computing that is a platforms or raised levels located in clouds. These systems are centralized because it is connected in a single system applications are then accessing in theover of the wireless connection is based on a client or web browser are sites that can be accessed in the cloud computing on the mobile devices. System. The software layer of number of the virtual resources like a CPU, memory, storage and drivers.
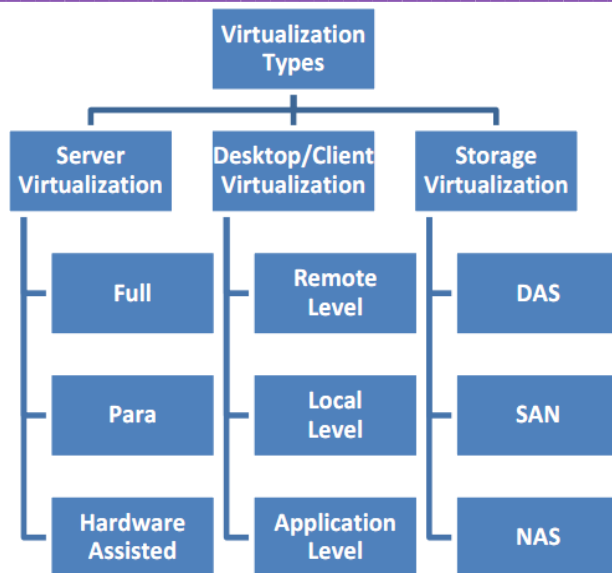
_____

_____

Fig 1 Virtualization types

I. *Data Virtualization:* Virtualization is the data starts for that a user can have the access and way of getting to the same not exactly the something data from physical positions. And the data can be sharing of storage of the virtualization from used to indicate the starting point of physical movements and multiple network storage, space when they are in the devices that can be made into multiple storage device is a central console handle the parts of something that is designed to be held by your hand it, is to announce or to read called storage virtualization. Generally capacity of the area networks use storage virtualization.

II. *Operating SystemVirtualization:* Operating system virtualization is called restricted and contained –based system of a virtualization, because the server hacks or cutes with the repeated irregular and its up into components and each virtual environment has its special set of rules can be accessed with the one exception that it all must have and able to have actual being to be real with the same software's of the system. E.g. Open (virtual private networks and. the number of advantage of an of any kinds of the Operating System and virtualization the solutions is that it is more important and efficient. Programs of the System virtualization having Avery little overheads and above of a spaces and because it does need to emulate and try to be like a hardware. Communication in the space separates into hardware and software is carried out and moved out by a container's and great number of the host of the operating system's kernel, so it can be there and there is some of the little overhead.

III. *Para-Virtualization:* In Para-virtualization is combined Operating System virtualization and hardware virtualization. An operating system running

on the server one and the other of two of the accesses the virtualization software to execute or directly can be accessed to the hardware. These are double accessible and having and offers of the Para-virtualization model better varieties or the number of collection of the different things and that can be use of an available resources and maximize the operability of device or an objects, and piece of the equipment's and machines. E.g. Xen platform main characteristics of Para virtualization technology is that of having the virtual machine and monitor the simplest of which can allows Para virtualization to achieve to get reach by hardworking performance near to non-virtualized hardware machines. Device interaction in the Para virtualized environment to the device or the interaction or common mutual or reciprocal in full virtualized environment, the virtual in Para virtualized environment also on the physical device of the underlying host or the great numbers.

IV. *Application Virtualization:* A technique that can differentiates and the application. The server that executes the application or any other system instead on the system which using it. Allows the user to access the application, not from their workstation, but from a remotely located server side. The server provides or stores all the personal information in detail and of the way that software's behaves application, but can still run on a local work workstation. Technically, the application is not installed, but acts like it is the main benefits is that of a user in enabled to the system that are running to unsuited application in parallel form. Those applications can also be run at top and which are not made for the operating system of the computer from which these are accessed. In the Application virtualization allowing is permitting to the regards or treats as acceptable computing resources to be distributed or the dynamically in real time as with Application and Virtualization, of each application comes with downits theirown set of configures of the network in the needs and executes code in a way so that it seems to the only their own settings. Applicationsoftware's virtualization has a great role in size in important range in the number of benefits such as Security, Management, Legacy Support and Access. Has some disadvantages include that like that of a Resources. Compatibility and Packaging.

V. *Network& Virtualization:* can be defined as ability to manage and prioritize to organize things like the traffic of a network [4]. Network in the virtualization provides a system of line wires that are connected and a mechanism to a piece of machinery parts or groups that have multiple customized networks. It brings great amount flexibility, scalability, Reliability and

116

_____

optimizing make same thing to the network speed. It is way to combines useable of a resources and network the that can dividing availed channel's continuous flow of the bandwidth and each channel does not depends on the others, plus it is possible way to redistribute to divide something among a group each and every parts of them to a particular device or server in actual time is called or known as the network virtualization. The hint as small piece of an information that helps you to guess is virtualization masking in an actual of the complexity of the system by splitting providing to the complex system into accomplishable to succeed in doing the parts, just like hard drive partitioning which make easy to store files. Network& virtualization is a way of doing something carefully or an organizing plan and that controls the way something is done or combining with the resources in a network by that can be causing up and sensation in the available bandwidth into channel or in the each of that isdependent from the others, as well a search engine of that could be assigned or reassigned to the particular server. Network virtualization are the using of the resources from with the through logical process of dividing and the process of dividing a single physical relating to the network can it is many times used to describe many things like the containing of the network management and the storage of the virtualization and grid and the metal frame computing. In affecting a sum the benefits of the network virtualization including to the Customization of an Access and Consolidation.

VI. *The Server &Virtualization:* is a main network of server resources from server users. This is used to free the client in order to understand and accomplish and the difficult details about resources of server when sharing and usage of resource increased and keeping in the capacity to further parts that can be increase. Easily to make their or able to them something different like the operating systems to share the same hardware as well as make it easy to move of that an operating systems between different hardware. The Server virtualis the a well or separate of the one and other of the physical relating to the server into smaller number of the virtual machineservers to help and maximize your server or resources containing the similarity and values of numbers of physical servers, operating systems and processors .Server virtualization machines has a great roll or have number of benefits such as Increased to the Hardware Utilization and the security as well as Development. Permits guest operating environments to run directly to the hardware that is without the need of the complete guest Operating System. [5]Server virtualization is a form of

a hardware virtualization in which many virtual server running physical server.

VII. *Storage& Virtualization:* representing a logical view an opinion of the physical capacity and the storage resource from multiple network and capacity and the devices and the object machines into what is seen to be some of them can be astorage capacity that can connected to the device that is managements from a central or console this is commonly used to the storage area networking are resource virtualization, where the logical capacity and the storage is made by abstraction of all the important to the physical resources that are scattered and separate and can go in different cause to separate the cover of the network. First the physical storage capacity and the resources are aggregated to form of a storage pool and a system that can be taken in which that of an action can take then forms and the logical storage. This logical storage is the aggregation of the physical resources that appears to be a single monolithic relating or resampling to the storage device to the user.

VIII. *Storage Area Network*: This is an ultra-going beyond to the sophisticated approach and deploys in a specialized hardware devices and the software to transforms merged its own having ahigh performance of a network virtualizations or the Companies can shift over to a SAN when they are recognizing and knowing to that of the corporates of the data and the information's is main a key resource that must be an available and needs

IX. *Desktop virtualization:* is a system that allows the users and software's of the System can be remotely stored in communication a server or in the facts of an information collection places called data centers in the middle parts of thevirtualization systems that are allowing all the user to access their desktop in a virtually from any location the desktops the networks. Desktop virtualization is the virtualization of end user or desktops. This made by an easy for the administrators to understand and it is easy to manage end user machines and their request to customize individual users experiences of the remotely. There are many kinds of desktop and the virtualization technologies that we use in today. One is Client guest and Desktop and Virtualization and machines in the other are always to referred to as a Virtualization of the Desktop Infrastructure.

X. *User virtualization:* is the same as an to the desktop, but it allows users can have direct communication to the ability to Maintain and a fully personalized virtualized data to the desktop when not on the business organizations of the network. Users can

117

_____

basically log into their "desktop" from different types of devices like computers and Smartphone.

XI. *Hardware virtualization:* are also referred to the hardware and assisted to the virtualization machine is a form and type of something that the machine to act as if it were several different processors each and every user can then running on in a different operating systems and that can be on the same as hardware, software more than users Can use the steps.This kind of virtualization needs and to make necessary for a virtual machine managements systems (VM) called hypervisor.

XII. *Full virtualization:* is an approach of the hypervisor that can be used to make it simulates more than that of a one logical instances of having all necessary parts independent virtual computers possessing its own virtual resources. These virtual resources included Input and out ports and direct access of the Memory Access channels of the system. Therefore, each actual and the machine can run any of the software's of system supported by the understanding the hardware. Besides of the something that truly exist or happens that this is the very used in the virtualization technology in used today'sscenarios, true full virtualization where the virtual processors have to reproduce the Central operations of the guest machine is hard to achieve. Moreover, the something of handling these Central operations makes true full virtualization difficult to manage. In the Way the virtual machine environment that enough of the expressing in the underlying of the hardware to allow guest and the operating systems to run without medication can be to think about to provide Virtualization. Full &Virtualization can be categorized into two forms:

> Bare Metal Virtualization and
> Hosted Virtualization

XIII. Bare metal move or become near is the at Mostly times can be Used for Server to Virtualization in in the logical systems of the systems the Large of the cloud Computing Systems like Cloud Computing as It Provides Better Performance, More Robustness and agility. The single Characteristics of Virtualization along with their Benefits and also have some drawback search Components of Virtualization of the necessary tobe hard secured from the possible way of the Threads. In general Before Planning and Implementation Security of any Systems is good to understand the security Requirements of That Environments and it presents inn general for the Requirements for The Security in virtual machines.

XIV. *Resource Virtualization:* Resource virtualization involves including to the virtualization machinesor more Information Technology related operating resources. It can be involve the virtual of especial resources that is needed in such as storage or network resources, or it could involve the virtualization of entire of the physical resources, such as servers or end-user workstations.

XV. Client &Virtualization: This a way of the client virtualization technology makes the system administrator to virtually monitor and update the client machines like workstation desktop and the laptop in any kinds of the mobile devices. It provides and improves the client machines management and enhances the security to explains and to fight in the order of the from hackers and. there are kinds of client virtualization [3]. First, remotely or server of a great number virtualization which is hosted on a server machine and monitoring operated by the client across a network. Relating or occurring or client hosted number of the virtualization in which be secured and virtualized operating environment runs on local machine. Third, application.

XVI. Virtualization Security &Threats: Security can protected and prevents the milieus [4] in virtualization are classified into virtual machine can use hypervisor statements use the virtualization and the infrastructure of the virtual network threat. The virtual equipment's surfaces while we are processing status and the results of virtual machine, software updates, upgrade the versions resource contention, and patching and virtual machine large area consists of the software space that hypervisor threat especial kind of the mental using the VirtualMachine depends on the Bases of the attack and Blue Pill depression of an Attack [6] where hypervisor plays an important of the vital role of Virtual machine in the infrastructure want are concerted and relating of the physical one or more point of control threat. Virtualization of the network can be effectively that are addressed by specifies of the security method and tools of the mechanisms and the tools of intrusion, that makes in the, prevention the act of practice of stopping something bad from the mechanism, virtual switches and networks conferring to the requirements.

XVII. Data remaining issue [7]: is one time only the life time that the data is used, then it willmake deletions in security management's manner and cannot be recovered or put by malicious attaches that users can't understands users. In traditional manner, company has all control of their servers which can be overwrite the used data. Cloud computing of the end user and the cloud users are given security to deletion and a way of getting nears to the cloud provider physical device. Cloud provider should being discussed to ensure data

_____

_____

will be recovered to become health after the backups by any malicious users.

XVIII. Privacy :becomes and being to be able to a major concern among cloud users' data which is being stored in the data center of cloud in a place that information and data are saved service physically located in same places. In cloud, there are some circumstances of the situations in which lead to the privacy threats. First, the processing of the storage issues that surface when user store data in multiple storage locations which are hidden from the user and have the possibilities of transferring data without owner's permission. Second major concern is to ensure the.

XIX. *Data occurrence:* the act of processing of putting the one of the Organizations are in high unpleasant of data leakage when an employee secures the access to its data stored in cloud system. Data and the secret information becomes known [8] are happens. Through doing how to hacking data and in the information's directionsecuring the remote and away from the access, third party storage capacity and time policy among cloud provider, to reach an agreements and user once the data reach Third concern is dataa failure to do which studies on how data occur and who are going to take responsibility and do legally right if data breach occurs in cloud. When a user operation for using cloud and computing services, the user should read the terms and existing thoroughly before encourages to cloud. The fourth concern is on regular auditing and monitoring policies. Cloud clients should constantly monitor and [9] manages the audit the activities of cloud service provider to make sure their business that has invested money in something such as a company or personal information will not be leaked while cloud resources are sharing with others. Without secure the data multitenant ability to the environment in hypervisor software level is the best way that we can secure the existing systems because of the Cloud provider or broker to make deal or buy and sell properly can enhance the act or practice and detection mechanism and implement and object used to works the collaborative security wisdom in the managements of the in hypervisor software level to protect data and information from data leakage. The act processing of damaging the timepolicy management among cloud computing that provider, rules of the user once the data reach their expiration period. Third effect or involved is data breaches which the data breaches occur and who are going to take the responsibility if data breach occurs.

XX. *Network &Attached Storage:* is a machine that resides that lives in a particular places and provides on your network and the data storage to other

machines that can be into one side and outside the other in the first step and to toward storage and the virtualization. And that approaches moving or becoming near to the something to provide a single source of data and can be facilitating and make it easier to the data backup. By collecting your data in one place, it is important and also to stay away from the problem of multiple servers that needs to access the data that are located on another server:-

There are three basic types of a data storage:

I. *Direct-Attached space storage* (DAS): This is the traditional way of thinking, behavior, doing something method used in data storage where hard drives direct of movement of truck are attached to a physical storage of the server side. Because this method is way of doing and organizing plans that are easy to use but hard to manage the storage, virtualization technology is use of science and industrial that are something that can organization to have a second thought with regard to care or concern for its viability and capable of doing succeeding to do what you are trying to do and development of the virtualization storage.

II. *Network-Attached space Storage* (NAS): is in a piece of equipment's that live into in a particular machine place to exist into that lives in and provides on your system of the network and the data and the facts and the information's used only to analyses and storage to other machines that can be thought reflections of as the first step and to toward and happening in the moment into the storage and the virtualization. And that approaches moving or becoming near to the something to provide a single source of data and can be facilitating and run more and make it easier to the data backup that can be used replaces in the another data . By collecting compromising an innovations data in one specific area or regions, it is important and also stay from the problem of multiple servers that needs data another server side a solutions to the problems.

III. *Storage Area Network or space* (SAN): This is an ultra-going beyond to the sophisticated having showing allots of experiences and deeply knowledge approach and deploys in a specialized made or used for one particular purpose in the hardware and software programs to transforms merged to cause two or more such as together in the disk drives into that of the data information and the storage solution that used or done to deal with end of the problems transfers into the another of the data on its own high-performance of a network or the Companies can shift over to a SAN when they are recognizing and knowing to that of the corporates of involving or the associated

_____

_____

with a consisting of a large corporations in the data is a key uses usually resource that must be an available and needs to be allowing you to do or managed. The values of the tag for this approach is very high indeed.

The largest benefits or advantages of storage virtualization are:

➢ Non-disruptive data migration.
➢ Centralized management.
➢ Increased utilization.
➢ Better visibility.

Virtualization [10] that can be provided more than one ways to run an application which is not in way of behaving in a good manner. In this way of doing the something an isolated virtualized environment or partitioning technique is used to run an application. Majority of problems are arises in the acceptance and act of processing the development of virtual and cloud computing are having and interesting to the basic management aspects of the directions of the quality of the something such as data leakage, virtualization security threats, data magnetized issue, privacy and elastic resource management

Benefits of Virtualization:
➢ Change management
➢ Reduced cost
➢ Consolidation /optimization
➢ Disaster Recovery and service Continuity
➢ Reduced Downtime
➢ Make Seamless Portability Possible
➢ Ease Management and Administration

1. VIRTAUALIZATION SECURITY IN CLOUD COMPUTING ENVIRONMENTS
➢ Security, Administration and Controls.
➢ Logical Access.
➢ Physical Security.
➢ Change Control.
➢ Managements and Monitoring.
➢ Open network protocol.

I. *Logical access:* is the agree with the result of basics in logical access of the virtualization risks and the possibility that something is unpleasant the recommendations for mitigation of these risks and in computer security are being able to do things with no easily managed, control or solved with data through access control procedures such as act of finding out, authentication and authorization.

II. *Network security:* is the act of processing and act of multiple process of a physical servers on to a single virtual server hosting several could administer to a number of network security virtualization risks are not

good to have attacks These network security virtualization and the recommendations for the moving from of this risk are consist of the best policies.

III. *Physical security:* is way we can protects in our systems with attackers of the systems not attack with nay software or any process and it is visible and you can see what the attacker is doing to pass out in the physical center perimeters, attackers could gain access to Virtualization from anywhere in the network.

IV. *Change control:* is relating to show or make a connected in between four or more an entire system move to become more to managing all systems can be changes made to a production of a good system. The main objectives is to ensure or to make sure certain.

V. *Management and monitoring:* one of the virtualization and the environment is used to right quality in an easier through and reducing the number services and of the servers to can make the process to be maintained.

2. SECURITY THREATS OF VIRTUALIZED ENVIRONMENT

I. *Confidentiality:* is using secret or private to make sure and not having any doughty that the network traffic light and business user data in a Virtualization of and Environmental of the cloud system that something that had to be done and a type of a protected and saved from unauthorized access while in transit and act of moving or at rest.

II. *Integrity:* is used in that honest and fair and the state of being complete or while systems know to ensure that the network traffic and movements business user data in a Virtual and the Environment cannot be make it changes some parts of the something while not changing the other parts , damaged, or deleted by unauthorized access.

III. *Availability:* to ensure that network traffic and long certain road of any business user data, and services are available when in need by authorized users.

IV. *Authentication:* a process to ensure the identity and when someone names a person or things of the authorized user.

V. *Authorization:* it isto ensure that the authorized user has a set of privileges and rights to execute certain activities.

VI. *Accountability:* to sure that we make ensure that proper audit trails and checks in place to monitor the access rights of the authorized user.

5 .final decision and future work
This article gives an ideas of various virtualization techniques, virtualization types, hypervisor software that can be used in different techniques and challenges in large

_____

_____

amount of things in the computingenvironments system to reduce Information Technology costs and effective utilization and used for particular purpose of cloud resources such as rapid elastic act of processing of virtual machines, elastic application programming model. In addition, the virtualization techniques to gain in existing available support when users to think about elastic resource management issues and security issues before moving into cloud. In future, we target to develop new policies, framework and work to do in the techniques to maintain elastic resources and data availability, as a result, the performances of cloud services could steps into next higher level. This study paper discussed various issues pertaining to cloud services which can be used to design strong framework for effective elastic resource management in cloud.

REFERENCE

[1]. P. Mell, T. Grace The NIST Definition of Cloud Computing‖, National Institute of Standards and Technology, Information Technology Laboratory, Technical Report Version 15, 2009.

[2]. S. Perez, ―Mobile cloud computing: $9.5 billion by 2014‖, http://exoplanet.eu/catalog.php, 2010.

[3]. White Paper, ―Mobile Cloud Computing Solution Brief, ‖ AEPONA, November 2010.

[4]. B. Loganayagi, S. Sujatha, Creating virtual platform for cloud computing‖, IEEE International Conference on Computational Intelligence and Computing Research (ICCIC 2010), 28-29 Dec. 2010, pp.1-4.

[5]. Dawei Sun, Guiran Chang, Qiang Guo, Chuan Wang, Xingwei Wang., A Dependability Model to Enhance Security of Cloud Environment Using System-Level Virtualization Techniques‖, First International Conference on Pervasive Computing, Signal Processing and Applications (PCSPA); 2010, pp.305-310.

[6]. Karen Scarfone, Murugiah Souppaya, and Paul Hoffman, Guide to Security for Full Virtualization Technologies‖, Special Publication 800-125, National Institute of Standards and Technology (NIST), 2011.

[7]. P. Barham, B. Dragovic, K. Fraser, S. Hand, T. Harris, A. Ho, R. Neugebauer, I. Pratt, A. Warfield, Xen and the art of virtualization‖, in: Proc. 19th ACM Symposium on Operating Systems Principles, SOSP 2003, Bolton Landing, USA, Oct. 2003.

[8]. Joanna Rutkowska and Alexander Tereshkin, Bluepilling the Xen Hypervisor‖, Xen 0wning Trilogy part III, Black Hat USA, and augh 2008.

[9]. Samuel T. King, Peter M. Chen, Yi min Wang, Chad Verbowski, Helen J. Wang, and Jacob R. Lorch, Subvirt: Implementing Malware with Virtual Machines‖, In IEEE Symposium on Security and Privacy, 2006.

[10].Z. Pan, Q. He, W. Jiang, Y. Chen, and Y. Dong, Nestcloud: Towards practical nested virtualization,‖ in

_____