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SYSTEM TO DETECT DOS ATTACK USING NICE IN VM

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ABSTRACT

Cloud computing is getting popular now a days. Use of cloud is increase daily. As in the cloud environment resources such as OS virtual machines, software are shared by billions of users of the cloud. The virtual machines resides on the cloud are more vulnerable to the denial of service attack. If this machines are connected to more achiness then it becomes more dangerous as it harms all cloud network. In the cloud especially infrastructure as a service the detection of denial of service attack is more challenging task. This is due to cloud users can install vulnerable software on the virtual machines. In this paper we have proposed multiphase vulnerability detection in the cloud environment. We have proposed an open flow network program NICE to detect and mitigate the attacks on the virtual machines. NICE is built on the scenario attack graph based model. We have proposed a novel approach to mitigate the attacks in the cloud environment by selecting different countermeasure depending upon the percentages of vulnerability of the virtual machines. Now a days IDS is used to detect the attack in the network by many organizations. In the proposed system we focuses on the distributed denial of service attack in the cloud.

Keywords: *Cloud computing, Ccenario attack graph, Correlation, Network analyzer, Intrusion, zombies.*

I. INTRODUCTION

Large amount of research and studies have shown that cloud computing is vulnerable to the attacks. Cloud consist of large number of resources by millions of users. Now a days cloud computing is at the top of the security thread. Cloud have services like infrastructure as a service, platform as a service where user can deploy their software on the cloud virtually. We can see that the number of are moving towards a cloud but the main problem they are facing is of security. The cloud resources are used by attacker to deploy the vulnerable attacks on the shared virtual machines. In the existing system data is stored on the central server and server admin have full control over the data management. In the cloud resources are shared by millions of the user and user can install any software on the shared virtual machines and this leads to the violation of the cloud security The main challenging issue in the cloud is to identify the cloud attack and find the solution to mitigate this attack. Attackers are using large shared infrastructure to deploy the attack. The cloud users are sharing the resources such as hub, switches, operating systems, virtual machines. All of this shared things are attract to the attackers to compromise the virtual machines. In [2] author addressed the business continuity and service availability from service outage is also main concern in the cloud computing. In the [1] authors have explains the cloud computing systems and its architecture. The cloud resources are transfer to the economical mode and its nothing but economical mode of denial of service. This system identifies that the request is generated by normal user or it get generated by bot itself. In this paper we have proposed a novel network detection and countermeasure selection procedure. Figure 1. Shows the NICE architecture. The NICE includes an attack graph correlation intrusion detection system. NICE introduces the attack graph analytical process to incorporate the intrusion detection process. Generally NICE include two main phases one is install light weight mirroring based intrusion detection agent at the virtual machines to scans the traffic to the virtual machines and provide the information to the attack analyser. Then according to the severity of the attack NICE decide whether to put the virtual machine in inspection or not. Once the virtual machines put in the inspection phase deep packet is applied and network reconfiguration is done. NICE improve the current intrusion detection or prevention method by introducing programmable or reconfigurable intrusion detection system by using software switching system [5]. The all information about VM is stored in the scenario attack graph (SAG) and according to all information in the SAG nice decide the appropriate action about the VM. NICE not needed to block the traffic of the virtual machine which is in suspicious mode. NICE incorporates the software switching technique for the virtual machine in the suspicious stage. The rest of paper is arranged as follows. Section II present the existing work done for the network intrusion detection in the cloud environment. In Section III we have described our proposed system, the proposed security measurement, mitigation, and countermeasures. Section IV explains NICE in terms of network performance and security. Finally, Section V concludes this paper.

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II. PROPOSED SYSTEM

In the proposed system we have utilize the scenario attack graph to model the thread and vulnerability detection in the virtual network. NICE is based on the reconfigurable network to minimize the vulnerability in the virtual machines.

Threat Model:

In our proposed method we have consider attacker may be located inside or outside of the network. In the proposed system the main aim of proposed NICE is find out vulnerable virtual machine and compromise that machine as a zombie. We have introduces new software model which can resilient the zombie attack. In our method we are using clouds infrastructure as a service to deploy the nice agent. The proposed system predict the attacks on the virtual machines and mitigate the attack independently on the operating system. We have assumption that user can install any of the operating system he wants.

Attack Graph model:

Attack graph is a tool to detect the all possible multithread multi-host attacks. In the attack graph each node explains precondition or consequence. As the attack graph provide all detailed information about the exploited vulnerabilities due to this we can get whole picture of the security threads of the system. The attack graph helps to take the appropriate decision for the countermeasure selection according to the current network security and can be mitigate the attack. According to the attack graph we can take appropriate decision about the vulnerable virtual machine.

Definition 1. Scenario Attack Graph:

Scenario attack graph is a tuple S= (V, E) where

V= union of set of vertices Nc, Nd,Nr. ,where Nc is exploit node, Nd is result of the exploit,and Nr is initial step of the attack.

E=E is union of Epre and Epost this are the directed edges.

Algorithm 1 (Alert Correlation) :

Require: alert ac, SAG, ACG

1: **if** (ac is a new alert) **then**
2: create node ac
3: n1 ← vc ∈ map(ac)
4: **for all** n2 ∈ parent(n1) **do**
5: create edge (n2.alert, ac)
6: **for all** si having a **do**
7: **if** a is last element In si **then**
8: append ac to the si
9: **else**
10: *create path Si+1 = {subset(Si, a), ac}*
11: ***end if***
12: ***end for***

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13: add ac to n1.alert

***14:** end for*

***15:** end if*

16:** return **S

VM profiliing:

The VM profiling model of NICE consist of all detailed information about all virtual machines, incoming traffic toward the virtual machine, we can make analysis of the vulnerability in the virtual machine. According to the vulnerabilities in the virtual machines we have three states in the virtual machines.

1. Stable: The VM will be in stable state if and only if there is not present any vulnerability on the virtual machine.
2. Vulnerable: It is the state of vulnerable machine which may have one or more vulnerability on it but not get exploited.
3. Exploited: It is the state of virtual machine which at least one vulnerabilities is get exploited and machine is get compromised.
4. Zombie: VM totally under control of Zombie.

III. NICE SYSTEM DESIGN

NICE system consist of VM profiling, network analyser, network controller, NICE agent Reconfigurable network. The figure 1 shows the system architecture of the proposed NICE model. This figure shows the nice system in cloud cluster. In the proposed system we have installed NICE at the host machine.

Network Analyzer:

The following figure shows the working of NA. The main function of the network analyser is to collect the all information from the NICE agent, virtual machine profiling, and maintain the scenario attack graph and attack correlation graph. According to the vulnerability of the virtual machine network analyser decide or select the countermeasure and forward this message to the network controller. Network analyser will decide is alert send by the nice agent is new or old if the alert is old then it make new entries in the virtual machine table and if the alert is old then network analyser update attack correlation graph and scenario attack graph. The following figure shows the working of attack analyser. The network analyser collect the information from different parts operate the network controller. The following figure shows the working of network analyser. It is present at the network side. The use of attack correlation is to detect the denial of service attack on the virtual machine. After selecting appropriate countermeasure it will forward the message to the network controller. of the system and maintain two graph and it will

Network Controller:

The second main part of the proposed system is network controller. The network controller acts as an assistant for network analyser. Network controller perform the countermeasure selected by the network analyser. The main function of the network controller is reconfigure the network and manage the processes running on the virtual machine.

The attack analyser maintain the graph by using

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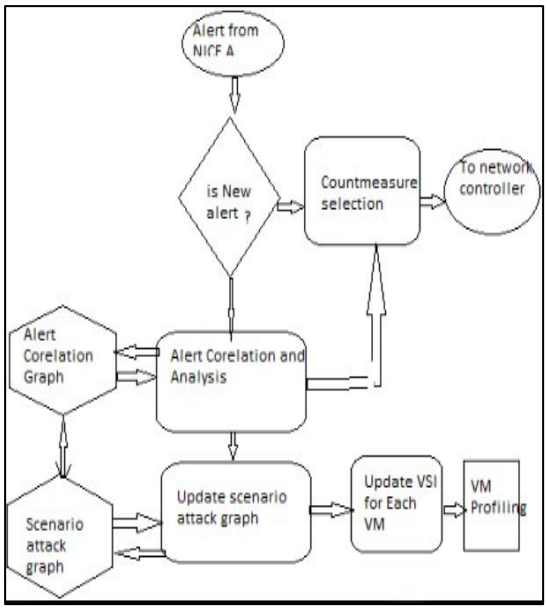

Figure 3. Working of Network Analyser

IV. EXPEREMENTAL RESULT

For the system set up we have consider two clouds one is private cloud and another one is private cloud. The cloud server1 and cloud server 2 are connected to each other by external firewall. If any vulnerability detect in the virtual machine then nice agent send alert message to the analyzer. The efficiency and correction in the attack detection and mitigation in the NICE is more as compare to the existing system.

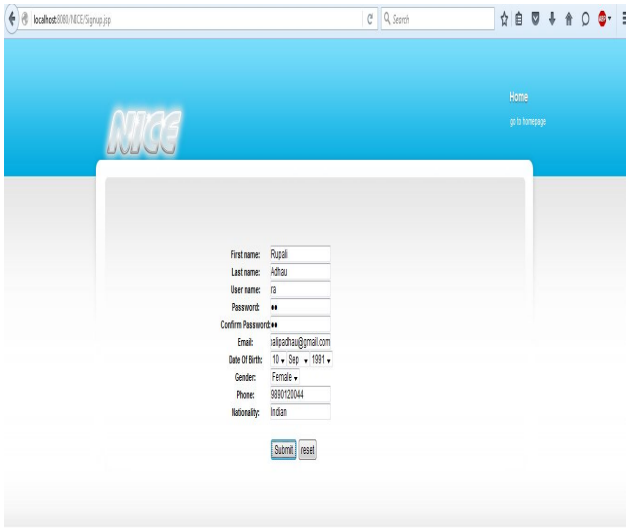

Fig. 4. User Registration

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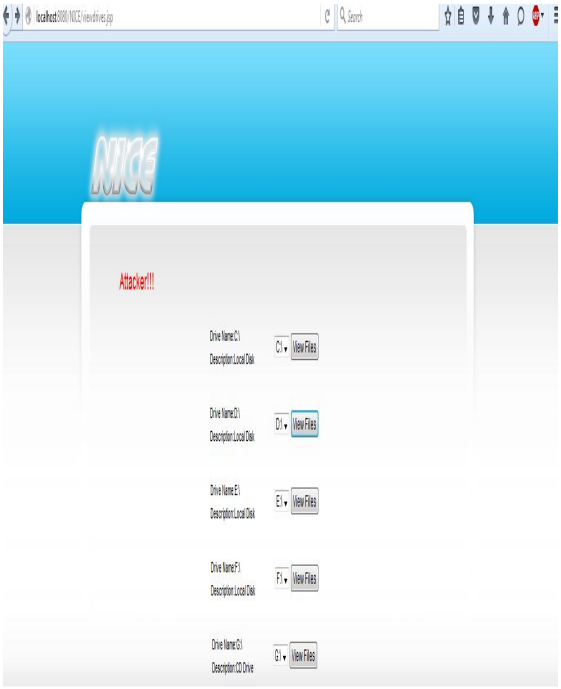

Fig 5 User Request

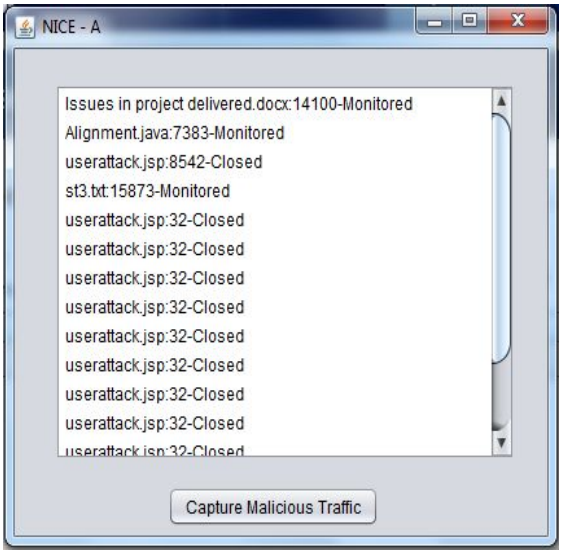

Fig 6 NICE Attack

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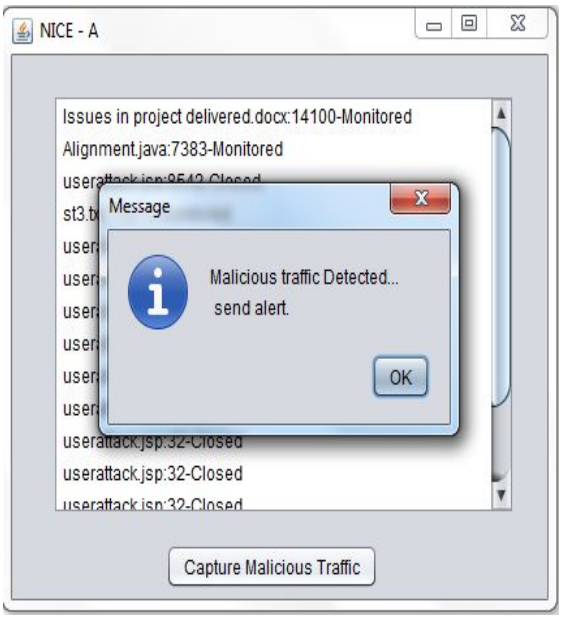

Fig. 7 Alert Sent

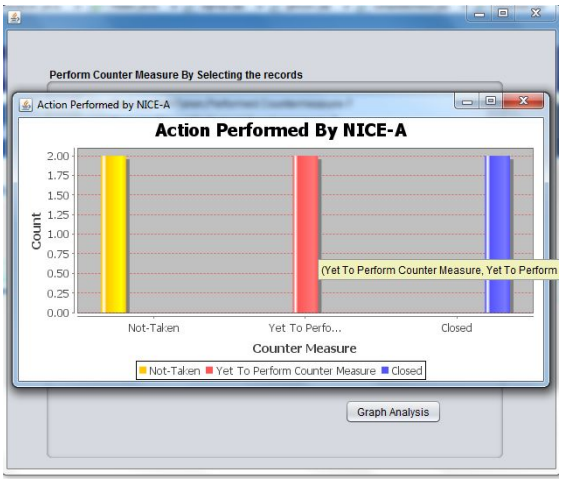

Fig. 8 NICE agent Work Done

V. CONCLUSION

In the proposed system we have proposed a novel method to detect and mitigate the attacks in the cloud virtual environments. NICE uses the attack graph model to find and mitigate the attacks on the virtual machine. The NICE also introduces a programmable network model which helps to mitigate the attacks on the virtual machines. We have used host based approach to mitigate and to provide security to the whole cloud system. The proposed system can mitigate the attacks on the virtual machines. NICE investigate the counter zombie attack in the network ids. The proposed system perform better because we have deploy the NICE on the host Machine.

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