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Study of Firewall

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Abstract: Several kinds of network devices like Firewalls are used to protect an institutional network against malicious attacks from the public Internet. This document enumerates and illustrates a selected set of grid scenarios that encounter some issues when dealing with firewall types of devices. The knowledge and experience gathered through these use-cases is utilized to classify the issues into homogeneous categories that can be used by grid application developers and management personnel as guidance. These categories will be used to propose new or recommend existing.

Keywords: Firewall, Security in internet, types of firewall.

I. INTRODUCTION

A firewall is a system designed to prevent unauthorized access to or private networks. Firewall can be implement in both hardware and software, or a combination of both. Firewall is frequently used to prevent unauthorized internet uses from acceding private networks connected to intenet, especially internets.

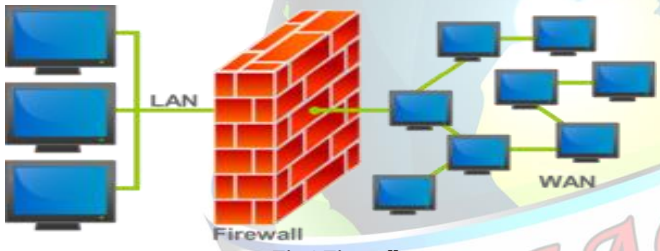

Fig 1 Firewall

All messages entering or leaving the internet passes through the firewall, which examines each message and blocks those do not meet the specified security criteria.

Firewall is a device router or computer software install between the internal network of an organization and the rest of the internet. it is designed forwards some packets and filters others. It is software and hardware based network security system that controls the incoming and outgoing network traffic based on applied role set. A firewall establishes a barrier between a trusted secure network and another network (the internet) that is not assume to be secure and trusted.

In a broader sense a firewall is the implementation of an institution's security policy concerning traffic exchange between different security domains. It is not only a black box or a single hardware component. It can be much more. It is the set of all rules to be enforced for secure communication. It is the way to check the compliance with these rules and it is the whole collection of software and hardware used to implement this mission.

II. TYPES OF FIREWALL

A. *Packet filter firewall*

It was developed in 1988 at AT&T Bell laboratories. Packet filter act by inspecting the "packets" which represent of basic units of data transfer between computers on the internet. If a packet matches the packet filters set fo rules the filter will drop (silently discard) the packet or reject it(discard it and send "error responces" to the sources).

There are three ways in which a packet filter can be configured, once the set of filtering rules has been defined. In the first method, the filter accepts only those packets that it is certain are safe, droping all others. This is the most secure mode but it can cause convenience if legitimate packets are inadvertently dropped. in the second method, the filter drops only the packet that is certain are unsafe, accepting all others. This mode is the least secure but it cause less inconvenience, particularily in casual web browsing .in the third method if the filter incounters a packet for which its rules do not provide instructions, that packet can be quarantined, or the user can be specificially queried concerning what should be done with it.this can be inconvenient if it causes numerous dialog boxes to appear, for example,during web browsing. packet filter is fairly effective and transparent to users, but it is difficult to configure.in addition it is susceptible to ip spoofing
Examples: Cisco & other routers, Karlbridge, Unix hosts, steelhead.

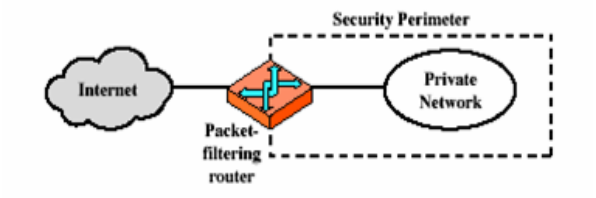

Fig 2 Packet filter firewall

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B. Statefull firewall

From 1989-90 three colleagues from AT&T bell laboratories developed the 2nd generation of the firewall. It maintains the records of all connections passing through the firewall. A set of static rules in such a firewall, the state of a connection can in itself be one of the criteria. A statefull firewall is a firewall that keeps the track of the state of the network connections (such as TCP streams, UDP connection) travelling across it. The firewall is programmed to distinguished legitimate packets of different types of connections. Only packets matching a known active connection will be allot by the firewall; other will be rejected.

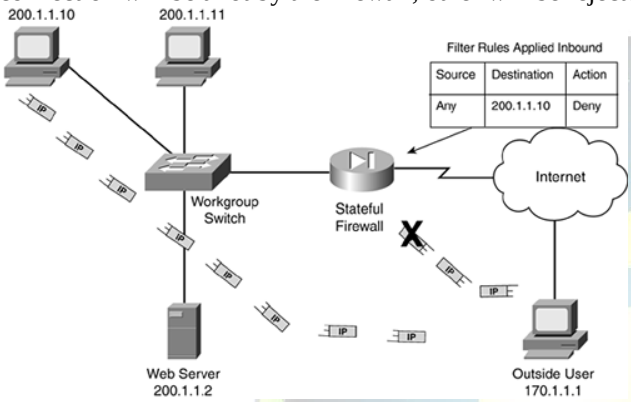

Fig 3 Statefull Firewall

Statefull inspection also referred to as dynamic packet filtering, is a security features often included in business networks. It monitors incoming and outgoing packets overtime as well as the state of connection and stored the data in dynamic state tables. This commulative data is evaluated ,so that filtering decisions would not only be based on administrator-define rules, but also on context that has been built by previous connections as well as previous packets belonging to the same connection.

Examples: Firewall One, ON Technologies, SeattleLabs, ipfilter

C. Proxy firewall :-

It was developed in 1991. In this type of firewall the remote host or network can interact only with the proxy services. The proxy services hide the internal host and services. This creates a connection between the client and the proxy server and one between the proxy server and destination. Proxy firewall is an automatic proxy server that will simply and easily manage proxy connections for you. Proxy server does all of the work. When using proxy firewall there is no need for you to configure your internet programs to use a proxy.

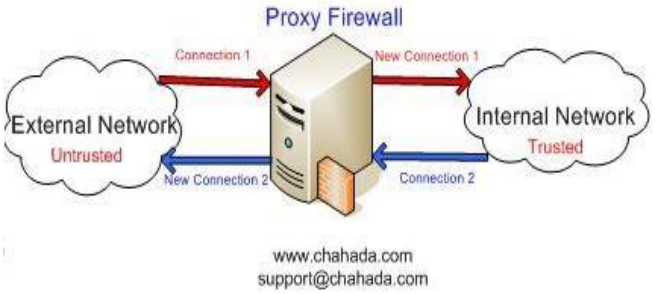

Fig 4 Proxy Firewall

Proxy firewall is also known as application gateway. An application gateway is an application program that runs on a firewall system between two networks. when a client program establishes a connection two or destination service, it connect to an application gateway or proxy. The client then negotiates with the proxy server in order to communicate with the destination service. In effect the proxy establishes the connection with the destination behind the firewall and acts the behalf of the client, hiding and protecting individual computers on the network behind the firewall.

A proxy server is a type of gateway that hides the true network address of the computer connecting through it. a proxy server connects to the internet, make the request for pages , connections to servers it, etc. ,and receives the data on behalf of the computer behind it. the firewalling capabilities lie in the fact that a proxy can be configured to only allow certain types of traffic (e.g. HTTP files, or web pages) through. A proxy server has the potential drawback of slowing network performance, since it has to actively analyze and manipulate traffic passing through it.

Types: circuit level proxy, application proxy, store and forward proxy.

Examples: Socks, Cycom Labyrinth, TIS Gauntlet and FWTK, Raptor, Secure Computing

III. NEED OF FIREWALL

When you leave your home or car for a period of a time, do you lock your doors? Offcourse doing so gives you a sense of security. Your property won't be an easy mark for thieves. The same is necessary for your computer; your internet connection leaves you vulnerable to hackers who want to access your financial and personal information, some hackers may be after your high speed connection so that they can send a malicious viruses and worms, blackening your reputation. Other intruders have the power to destroy your operating system on a whim. How can you lock that computer door but steel have the freedom to do your business online?

A solid firewall will help you stop intruders from accessing your system. You keep your internet link to the outside world but the outside world cant view you unless you want them to.

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IV. TYPES OF ATTACKS

Some of the most common methods to attack or view computer data include:-

A. IP-spoofing

This form of attack occurs when someone outside your network spoofs (fools) your computer into recognizing the intruder as a trusted sources either a trusted sources (by using an ip address that is within the range of ip address in your network) or a trusted external ip address that your system recognize .this is like a stranger knowing on your door,claiming to be your ling lost uncle joe. An ip address is like the computers name, giving a computer a specific identity that other computers came to recognize.

Ip sppofing only works when a hacker learns your ip address .the hacker then modifies the packet headers on his communication to your computer. A packet header is present in any transfer of computer data and is similar to a routing number on a check. The header guides the packet of data on its journey just as a routing number guides a check.

B. Network Packet Sniffers

Windows network technology sends network packets as unprotected clear text, inadvertenly allowing anyone to pick packets up en route for a closer look, even though some packets sniffers are legitimate (for network management)others are used to steal your information while in transit. This method is a hacker favourite because it is easier to pulloff, harder to get caught.

C. Men In The Middle Attack

This type of an attack occurs when someone accesses information between two individuals without one detecting the infilitrators presence .if both parties are using a public key system tosend data,the men in the middle can intercept the public key,use it to decipher,the message copy it, then record the data again to continue sending it on its way..

D. Distribution Of Sensitive Internal Information To External Sources:-

This form of an attack could involve a disgruntled employee or someone who has or once had access to sensitive corporate information, the individual could place the sensitive data on an external computer (such as an external ftp server or share a drive on a network)so others can have full access ..

E. Password Attacks

Passwords are the most vulnerable to attack, once someone has to access to a users password, the attacker will then have the key to personal information. There are several ways an attacker can steal passwords. The most common are

Password guessing: This technique is often ineffective because it takes a long time to guess someone's password even if the password is a common one. Attackers can enter either guess manually or electronically.

Brute force logon: This technique is essentially the same as password guessing however, the attackers tries to quickly gain access to a users username and password by using guessing tools to automate the process.

Password cracking: This technique is ,or effective than the previous techniques password cracking software obtains the password file in the windows through an elevated level of access .then uses a tool like PWDUMP to view the password data you have saved a file.

V. CONCLUSION

Firewall helps in protecting an individual, an organisation which is connected to the vast internet.The type of firewall can be chosen depending on the requirements.

In this research paper we have discussed various types of firewalls and attacks.

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