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Project 3: Network Switching Security

**Abstract**

The internet since its conception has always been a dangerous place with many different viruses, malware, and other harmful pieces of software. Because of this it is paramount that devices evolve overtime to increase security measures put in place to precent such dangers from affected end users. Within a network there are many different obstacles that internet traffic must go through before it reaches its end destination. One of the obstacles that traffic must pass through are network switches. If these are implemented within a network like everything else that is connected it is also at risk of being attacked by various methods that can cause attackers to collect data from a network by the traffic coming to and from the network switch. The network switch isn’t an essential part of a network, but it is a useful item to implement within a network because it allows for the expansion of a LAN (Local Area Network) using ethernet connections connecting edge devices together on the network.

**Introduction**

Security has always been an important factor in our everyday lives whether it be security systems for our houses and businesses or physical security guards guarding different places. However, as we continue to produce more advanced technologies our need for increased security measures begin to go from physical people and sensors fully electronic securities. Places that would benefit this the most would be within computer networks. With the architecture of computer networks becoming more complex using items like network switches, wireless access points, firewalls, and many others. Security must be implemented within a part of the network to ensure there is safe end to end browsing as well as secure connections for each device that is connected to the network. One piece of hardware that is often an important addition to a network is the switch. This is important because it expands the network and delivers packets to their proper destination. Because it is so important it is paramount that each network switch that will have high amounts of traffic going to and from it be secured with different security measures for in the event of an attack taking place on that piece of hardware within the network.

**Background**

Computer networks have always been something that attackers try to gain access to in order to steal personal information or even attempt to personate your online persona and impersonating the target. Network switches are common targets when it comes to network attacks. This is because they are often seen as central points of a computer network since it links together multiple devices through ethernet connections. There are many attacks that target network switches and all of them allow the attacker to obtain information on the traffic that flows to and from the piece of hardware using its ports. The different attacks that occur on computer network switches are ARP Spoofing, MAC Flooding, DHCP Server Spoofing, MAC Spoofing, and VLAN Spoofing. Each of these attacks are dangerous to computer networks because most of them give attackers network access allowing them to become a man in the middle. Due to there being so many attacks security implementations within switches must keep increasing in strength in order to defend from such attacks taking place and succeeding.

**What are Network Switches**

Diagram

Description automatically generatedNetwork switches are not entirely necessary to have implemented in a network. However, they are very useful when they are implemented within a network. Switches can expand networks in many ways. There are different types of topologies in which switches can be implemented onto a network with. One of which is called the star topology (figure 1) which is when the network switch is the central hub for all the devices connected to it using ethernet connections making it produce a star like pattern. This kind of network layout is one of the most popular as it is the easiest type of network setup with a switch to implement.

Figure Star Topology

**How Network Switches Interact in a Network**

**Different Attacks on Network Switches**

**How to Prevent Attacks on Network Switches**

**Conclusion**