IP Address Planning for Secure Enterprise Networks

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Introduction

Internet Protocol (IP) Addressing is a technique used by engineers to develop and distribute IPs among the devices of a company. It shows the way IPs shall be assigned to all internet devices. However, the case of uSoft.com requires IPs for its headquarters and the two branches. USoft.com requires a total of 150 IP addresses for all its devices. It is noted that the company requires 100 IP addresses for its headquarters, 30 for Branch A, and 20 for Branch B. The newly assigned IPv4 network is 203.2.XY.0, and the IPv6 network is 2001:1234: ABCD: XY00:: /64.

IPv4 Addressing Plan

The IP address 203.2.XY.0 is a class C network address, and therefore, the Network Address of uSoft.com shall be 203.2.67.0/24. The Network address will be the unique identifier of the network across the network. According to Mason (2014, p. 23), the network address is assigned to each device for easy identification and, therefore, facilitates the connection and communication of devices. The Broadcast address is 203.2.67.255, the network to be used is Subnet Mask: 255.255.255.0, and the default gateway address shall be 203.2.67.1. The IP subnet address for the network infrastructure shall be 255.255.255.0/24, and the IP address is 203.2.67.0.

Based on the calculation of subnet and IP network addresses to be deployed by the company at headquarters, Branch A, and Branch B, the company's headquarters shall have about 124 usable IP addresses. These IPs shall be assigned to all devices, computers, servers, IP phones and printers as well. The IP Addresses shall range from 203.2.67.1 – 203.2.67.126. It is also important to note that the Broadcast of the Headquarters shall be 203.2.67.127. The default Gateway of uSoft.com shall be 203.2.67.1, which shall be used across the network for all devices using IPv4.

Since branch A has 30 devices to be assigned to the network, it shall have about 32 usable IP addresses, and the IP Address shall range from 203.2.67.129 to 203.2.67.159. Therefore, there shall be about 32 IP addresses assigned at company branch A. The Network IP address or subnet address for branch A is 203.2.67.128. The default gateway shall be 203.2.67.1, which is similar to what will be assigned at the headquarters. The subnet mask to be assigned is 255.255.255.0, and the broadcast IP

shall be 203.2.67.160.

Branch B shall have a default gateway of 203.2.67.1 and 32 usable IP addresses as well. The IP address for the branch shall range from 203.2.67.162 to 203.2.67.194, and therefore, the broadcast address shall also be 203.2.67.195. It is the broadcast address to be assigned to all devices on the network (Elkins, 2015, p. 23).

As stated by Elkins (2015, p. 15), the default gateway for a particular network shall be similar to all connections between different subnets. It is important to note that Network 203.2.67.0/24 has 254 usable IP addresses, which shall be assigned across the company network. The headquarters shall have usable IP addresses of about 126, and these can be assigned to any devices on the network.

An IPv6 address plan for the LAN

The IPv6 shall have a subnet address of 2001:1234: abcd: 6700, which shall be used across the network. However, the network range shall be 2001:1234: abcd: 6700:: – 2001:1234:abcd:6700:ffff: ffff: ffff: ffff. These usable IP addresses shall be assigned to the network devices at the headquarters. The network address, therefore, shall be 2001:1234: abcd: 6700 to be used by the company across the networks. However, the headquarters where there are 100 devices to be networked and interconnected shall use any IP address, and the first 100 shall be assigned to the devices (Mason, 2014, p. 23). The IPv6 does not use or apply to subnet, and therefore, IP addresses shall be assigned ranging from 2001:1234: abcd: 6700: – 2001:1234: abcd: 6700: ffff: ffff: ffff: ffff (Mukherjee, 2014, p. 2).

However, the default gateway that shall be used in the network is 2001:1234: abcd: 6700, which shall be assigned to all devices so that they can connect and communicate. The IP address which shall be assigned to all devices, including servers, computers, printers and other devices being used by the company, shall be generated based on the range 2001:1234: abcd: 6700:: – 2001:1234:abcd:6700:ffff: ffff: ffff: ffff. The IPv6 network address provided by the company, 2001:1234:ABCD: 6700::/64, has one subnet mask, and therefore, the network shall have one subnet mask, one default gateway for the company, and the broadcast shall be uncast, which is the 1d9f:9b9a:7204:918c: ab58:d74:b33c:4132 (CISCO, 2015).

It is possible that IPv6 is only assigned for global or internet purposes, and the assignment shall be done on the router to make sure that devices can connect with branches and offices as well. In IPv6, the first segment of the address is assigned locally, and therefore, 2001:1234:abcd shall be assigned as the network address for the devices.

It should be noted that IPv6 operates differently from IPv4, and the way network addresses are assigned to devices is different as well. Therefore, the entire uSoft.com company shall have several IP addresses for IPv4, which are divided or arranged based on the subnet. The IPv4 network addressing is planned to have four subnets, and in each subnet, a subnet mask and broadcast address are

applied to ensure communication is established among the devices.

Bibliography

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