

## Introduction

Network planning requires that certain requirements must be considered so as to design a network that meets the current and future needs of any organization. These requirements include; what the users need to access and how, what resources are installed on the network, the physical layout of the location as well as other requirements such as data security. This scenario consists the implementation plan of a head office for an organization with a user capacity of 12 in a 200m \* 200m office layout.

### User Requirements.

Users in this network need to access the storage server as well as use the web server for internal communication. Therefore, they require an intranet to be designed in such a way that it is accessible as long as one is connected to the network.

### Security Requirements.

The network should be divided into 3 segments that help achieve data security. There is also need to ensure that internet connection is secured through the use of a NAT proxy server which makes the internal network not visible to the outside world in an open manner.

### Network Requirements

The network is determined by the number of devices that are required to be connected as well as the expected traffic. This scenario requires that the network covers an area of 200m \* 200m. This will determine the distance of cable connectors. There is also the need to provide wireless access to the network as well as provide for any future growth in the organization.

### Proposed Network architecture.

I propose the implementation of a two-tier network where the access layer terminates at the core layer as opposed to a three- tier network that consists of access layer, distribution layer and core network. This is informed by two factors: the amount of traffic is less since the number of users are few and the cost of a two tier is cheaper and is more cost effective given the number of users in the network.

The specific network design principles are as below.

- Each segment is assigned a different network address as below.

VLAN 1 - 192.168.1.0/24

VLAN 2 - 192.168.2.0/24

VLAN 3 - 192.168.3.0/24

Servers. - 192.168.4.0/24

- A router will be placed on the core network that will do both inter-vlan routing as well as provide access to the internet.

Device	Interface	IP address	Mask	Gateway
SEG1 PC1	Ethernet Port	192.168.1.10	255.255.255.0	192.168.1.1
SEG1 PC2	Ethernet Port	192.168.1.11	255.255.255.0	192.168.1.1
SEG1 PC3	Ethernet Port	192.168.1.12	255.255.255.0	192.168.1.1
SEG1 Laptop		192.168.1.13	255.255.255.0	192.168.1.5
SEG1 Server	Ethernet Port	192.168.1.2	255.255.255.0	192.168.1.1
SEG2 PC1	Ethernet Port	192.168.1.11	255.255.255.0	192.168.2.1
SEG2 PC2	Ethernet Port	192.168.1.12	255.255.255.0	192.168.2.1
SEG2 PC3	Ethernet Port	192.168.1.13	255.255.255.0	192.168.2.1
SEG2 Laptop		192.168.2.13	255.255.255.0	192.168.2.5
SEG2 Server	Ethernet Port	192.168.2.2	255.255.255.0	192.168.2.1
SEG3 PC1	Ethernet Port	192.168.3.10	255.255.255.0	192.168.3.1
SEG3 PC2	Ethernet Port	192.168.3.11	255.255.255.0	192.168.3.1
SEG3 PC3	Ethernet Port	192.168.3.12	255.255.255.0	192.168.3.1
SEG3 Laptop		192.168.3.13	255.255.255.0	192.168.3.5
SEG3 Server	Ethernet Port	192.168.3.2	255.255.255.0	192.168.3.1
SEG1 Wireless Router	Ethernet Port	192.168.1.5	255.255.255.0	192.168.1.1
SEG2 Wireless Router	Ethernet Port	192.168.2.5	255.255.255.0	192.168.2.1
SEG3 Wireless Router	Ethernet Port	192.168.3.5	255.255.255.0	192.168.3.1
WEB SERVER	Ethernet Port	192.168.4.10	255.255.255.0	192.168.4.1
Router	G0/0	192.168.1.1	255.255.255.0	
Router	G0/1.20	192.168.2.1	255.255.255.0	
Router	G0/1.30	192.168.3.1	255.255.255.0	
Router	Serial 0/0/0	198.24.1.1	255.255.255.252	
ISP ROUTER	Serial 0/0/0	198.24.1.2	255.255.255.252	

### Features Implemented.

- VLAN configurations for 3 segments. VLAN SEG 1 on switch 1 and VLAN SEG2& SEG3 on Switch 2.
- Router on a stick configuration- Inter VLAN Routing
- EIGRP Protocol
- BGP Protocol
- Redistribution
- Port Security
- IP NAT
- Wireless Access points assigned different channels