Networking Project 2 - SOHO

The project statement.

A close-up of a document

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Basic hardware architecture representation

A computer network diagram with many wires

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Configuring the Network

**Subnetting**

Base network id given by the service provider is 192.168.1.0

We have 3 departments so we require 3 subnets. The formula for identifying subnets is as follows

* 2^n = 3

The standard subnet mask for a class c address is 255.255.255.0. This in binary form is written as

* 11111111.11111111.11111111.00000000

As per the above formula, 2 to the power of some number [n] is 3. Mathematically we won’t get n as to be a whole number. Therefore for we will take the value of n to be such that 2^n is either greater than or equal to 3

Therefore n = 2 and 2^n = 4. We have a total of 4 subnets.

Here n is the number of bits borrowed from the host portion of the class C subnet mask and the new subnet mask becomes:

* 11111111.11111111.11111111.11000000

This in decimal form is 255.255.255.192

Since the subnet mask ends in 192 the block size for each subnet is 64. The range of subnets are:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Subnet1** | **Subnet2** | **Subnet3** |
| **Network ID** | 192.168.1.0 | 192.168.1.64 | 192.168.1.128 |
| **Broadcast ID** | 192.168.1.63 | 192.168.1.127 | 192.168.1.191 |
| **Host Range** | 1 to 62 | 65 to 126 | 129 to 190 |

* Broadcast ID is the Last IP address in the range depending on the block size.

**VLAN Configuration**

* VLAN configuration is performed in the switch.
* Interface connecting the switch to the router should be a trunk interface
* en [enable the switch]
* Config t [enter configuration mode]
* Int range fa0/2-4 [configure the same parameter for the range of interfaces specified]
* switchport mode access [change the range of interfaces to access mode]
* switchport access vlan 1
* Repeat the above 3 steps for the other interface ranges 5-7 {VLAN 2} and 8-10 {VLAN 3}
* Do wr
* Exit
* Do sh start

**WAP Configuration**

Go to the settings of each WAP and configure the SSID (name of the wireless network) and the encryption (AES) and Security (WPA2-PSK)

**Configuring the Router**

* En
* Config t
* Int gig0/0
* No shutdown
* Exit
* **InterVLAN Routing**

From a single physical interface (gig0/0) we will create multiple virtual sub interfaces and assign each of them an IP address that will act as the default gateway for the VLANS.

* Int gig0/0.4 [create a sub interface]
* Encapsulation dot1Q 4 [4 is the VLAN number]
* Ip address 192.168.1.1 255.255.255.192 [assigning the default gate way for the vlan Sub-intip]
* Repeat the above steps for the other 2 VLANs
* **Configure DHCP server on the router**
* Service dhcp [enables dhcp service on the router]
* We need to create IP address pools for each VLAN
* ip dhcp pool Admin-Dept
* network 192.168.1.0 255.255.255.192
* default-router 192.168.1.1
* dns-server 192.168.1.1
* domain-name Admin.com
* Repeat the above steps for the other departments to set up DHCP on the VLANS

**Final Configuration steps**

* Enable DHCP on the end devices (PC, laptop, printers ….)
* Connect the laptop to the WAP
* Check the IP address for all end devices and verify that they were assigned dynamically.
* Test the communication between the networks by pinging them amongst themselves.

Final Network Topology

A computer screen shot of a computer network

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