# Lab 3 - Router Configuration and Static Routes (to be submitted as part of practical CA) – T00194823 (Router Concepts and Protocols)

## Topology Diagram

## Introduction:

## Before you use packet tracer you must first complete the table below

## This activity focuses on subnetting skills, basic device configurations and static routing. Once you have configured all devices, you will test for end to end connectivity and examine your configuration.

## Addressing Table

| **Device** | **Interface** | **IP Address** | **Subnet Mask** | **PC** |
| --- | --- | --- | --- | --- |
| HQ | Fa0/0 | 192.168.0.129 | 255.255.255.224 | PC13: 192.168.0.158 |
| Fa0/1 | 192.168.0.161 | 255.255.255.224 | PC14: 192.168.0.190 |
| S0/0/0 | 10.0.0.1 | 255.255.255.252 |  |
| S0/0/1 | 10.0.0.5 | 255.255.255.252 |  |
| S0/1/0 | 10.0.0.9 | 255.255.255.252 |  |
| S0/1/1 | 209.165.201.1 | 255.255.255.252 |  |
| B1 | Eth1/0 | 192.168.1.1 | 255.255.255.192 | PC1: 192.168.1.62 |
| Eth1/1 | 192.168.1.65 | 255.255.255.192 | PC2: 192.168.1.126 |
| Eth1/2 | 192.168.1.129 | 255.255.255.192 | PC3: 192.168.1.190 |
| Eth1/3 | 192.168.1.193 | 255.255.255.192 | PC4: 192.168.1.254 |
| S0/0/0 | 10.0.0.2 | 255.255.255.252 |  |
| B2 | Eth1/0 | 172.16.0.1 | 255.255.252.0 | PC5: 172.16.3.254 |
| Eth1/1 | 172.16.4.1 | 255.255.252.0 | PC6: 172.16.7.254 |
| Eth1/2 | 172.16.8.1 | 255.255.252.0 | PC7: 172.16.11.254 |
| Eth1/3 | 172.16.12.1 | 255.255.252.0 | PC8: 172.16.15.254 |
| S0/0/0 | 10.0.0.6 | 255.255.255.252 |  |
| B3 | Eth1/0 | 172.20.0.1 | 255.255.224.0 | PC9: 172.20.31.254 |
| Eth1/1 | 172.20.32.1 | 255.255.224.0 | PC10: 172.20.63.254 |
| Eth1/2 | 172.20.64.1 | 255.255.224.0 | PC11: 172.20.95.254 |
| Eth1/3 | 172.20.96.1 | 255.255.224.0 | PC12: 172.20.127.254 |
| S0/0/0 | 10.0.0.10 | 255.255.255.252 |  |
| ISP | S0/0/0 | 209.165.201.2 | 255.255.255.252 |  |
| Fa0/0 | 209.165.200.225 | 255.255.255.252 |  |
| Web Server | NIC | 209.165.200.226 | 255.255.255.252 |  |

## The IP address to be used for each PC/Web Server is the last available IP address on its particular LAN. Each PC’s default gateway is the IP address of the router interface its switch is connected to.

## Objectives

* Design and document an addressing scheme based on requirements. Minimise address wastage.

Step 1: Design an addressing scheme.

* The HQ, B1, B2, and B3 routers each have an address space as shown in the diagram. Subnet the address space based on the host requirements.
* For each address space, assign subnet zero to the Eth1/0 LAN, subnet 1 to the Eth1/1, and so on.

Step 2: Document the addressing scheme.

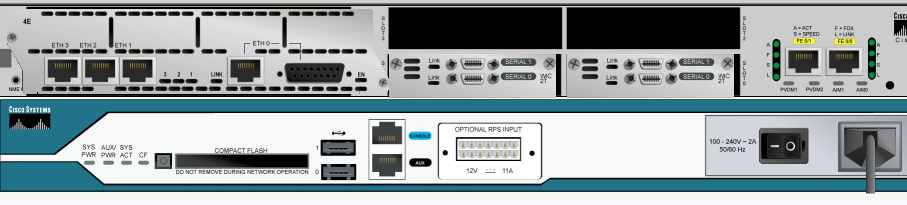
* Document the IP addresses and subnet masks in the table provided. Assign the first IP address of each LAN to the router interface and the last available IP address on each LAN to the attached PC/Web Server.
* For all the WAN links, assign the first IP address to HQ and the last available IP address to the other router.
* For the link between the ISP router and the Web Server assign the first available address to the router and the last available address to the server.

Step 3: User Profile and saving the Packet Tracer file.

* Copy and paste the two files Lab 3 Packet Tracer Skills Challenge CA.pka. and Lab 3 Routing - Instructions.docx to either the desktop or to your own X drive folder.
* Open the packet tracer file (insure Packet Tracer ver 6.0.1 is installed on your machine). When the User Profile window pops up enter your name and e-mail address and click OK.
* Save the PT file with your own name included in the title – eg. Lab 3 JoeBloggs.pka. Do the same for the Word document in which you have completed the addressing table – you will email me both of these files when you have completed the exercise.
* Email to: fergus.mclysaght@ittralee.ie

**Router and Switch Selection**

* All routers are 2811 routers. For all 5 routers add a WIC-2T module for the necessary Serial ports.
* For routers B1, B2 and B3 add a NM-4E module to provide 4 additional Ethernet ports. These are the only Ethernet ports that are to be used on these routers. Look at the topology diagram to see the correct ports to assign to a specific LAN or WAN.
* To minimise ‘clutter’ in your workspace – go to the Options/Preferences menu in Packet Tracer and check the ‘Hide Device Label’



NM-4E

WIC-2T

WIC-2T

Apply a basic configuration.

Using your notes, configure the routers with basic configurations including

* Addressing.
* Hostnames.
* Disable DNS lookup.
* Passwords - use **cisco** as the console password and **cisco** as the ‘enable’ secret password on all routers.
* Use 64000 as the clock rate on all WAN links. The HQ router is the DCE for all WAN links.

Configure static and default routing

Configure static and default routing using the exit interface argument.

* HQ should have three static routes and one default route to the ISP.
* B1, B2, and B3 should have one default route to HQ.
* ISP should have seven static routes. This will include the three WAN links between HQ and the branch routers B1, B2, and B3 and four links to the summarised LANs on routers B1, B2, B3 and HQ.
* Use the EXIT INTERFACE for static entries and not the NEXT HOP ADDRESS.

Test connectivity and examine the configuration.

* You should now have end-to-end connectivity. Use ping to test connectivity across the network. Each router should be able to ping all other router interfaces and the Web Server. All PC’s should be able to ping each other.
* Troubleshoot until pings are successful. **Submit final packet tracer file by e-mail for marking.**

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