BÁO CÁO THỰC HÀNH

**Bài thực hành số 01: Routing Concepts and Static Routing**

**Môn học:** Quản trị mạng và hệ thống

**Lớp:** NT132.N21.MMCL

**THÀNH VIÊN THỰC HIỆN (Nhóm 02):**

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**ĐÁNH GIÁ KHÁC:**

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| Tổng thời gian thực hiện |  |
| Phân chia công việc |  |
| Ý kiến *(nếu có)*  + Khó khăn  + Đề xuất, kiến nghị |  |

Phần bên dưới của báo cáo này là báo cáo chi tiết của nhóm thực hiện

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# BÁO CÁO CHI TIẾT

## Router and routing concepts

### What is the role of routers, switches, hubs in a network system?

A router (Layer 3 of OSI) is a device that connects two or more networks together and directs traffic between them based on the destination address of the data packets. Routers are essential for connecting networks and enabling communication between devices in different network segments or locations.

A switch is a device that connects devices within a local area network (LAN) and allows them to communicate with each other. Unlike routers, switches operate at the data link layer (Layer 2) of the OSI model and use MAC addresses to direct traffic between devices. Switches provide a higher level of performance and security than hubs and are essential for creating and managing LANs.

A hub is a device that connects multiple devices together in a LAN and broadcasts data to all devices connected to it. Hubs operate at the physical layer (Layer 1) of the OSI model and do not provide any intelligence to manage or direct network traffic. Hubs are less common today due to their limitations in performance and security, and they have been largely replaced by switches.

### What is the static routing? Briefly describe the advantages and disadvantages of static routing:

Static routing is a method of configuring network routes by manually entering the paths that network traffic should take from one network to another. In static routing, the network administrator manually configures the routing table on each router or networking device to determine the best path for data to travel between networks.

Advantages:

* Simplicity: Static routing is simple to configure and requires no complex algorithms or protocols to determine the best path for data to travel.
* Predictability: Static routing provides a predictable path for data to travel, which can be beneficial in certain network environments where network traffic patterns are consistent and stable.
* Lower overhead: Static routing requires less overhead than dynamic routing protocols, as it does not require any ongoing communication between routers to update network topology information.

Disadvantages:

* Lack of flexibility: Static routing is not flexible and cannot adapt to changes in network topology, traffic patterns, or routing metrics
* Administrative overhead: In large networks, manually configuring the routing tables on each router can be time-consuming and prone to errors
* Limited scalability: Difficult to maintain and troubleshoot the network over time.

## Basic router configuration and static routing

### Topology

Diagram

Description automatically generated

Set password on R1

Text

Description automatically generated

Text, letter

Description automatically generated

Banner MOTD on R1

Text

Description automatically generated

Set password on R2

Text, letter

Description automatically generated

Banner MOTD



Assign IP address for R1

Text

Description automatically generated

Text, letter

Description automatically generated

Text, letter

Description automatically generated

Assign IP address for R2

Text

Description automatically generated

Text, letter

Description automatically generated

Text, letter

Description automatically generated

PC1:

Graphical user interface, text, application, email

Description automatically generated

PC2:

Graphical user interface, text, application

Description automatically generated

PC3:

Graphical user interface, text, application, email

Description automatically generated

Routing Table R1:

Text

Description automatically generated

Routing Table R2:

Text, letter

Description automatically generated

## Subnetting and static routing

### Subnetting the given network address and filling out the result to the Table 2. You need to briefly explain how to get these results.

From Figure 2:

- LAN31: 16000 hosts (2^14) => /18 subnet mask (255.255.192.0)

- LAN32: 8000 hosts (2^13) => /19 subnet mask (255.255.224.0)

- LAN11: 2000 hosts (2^11) => /21 subnet mask (255.255.248.0)

- LAN12: 4000 hosts (2^12) => /20 subnet mask (255.255.240.0)

- LAN21: 500 hosts (2^9) => /23 subnet mask (255.255.254.0)

- LAN22: 1000 hosts (2^10) hosts => /22 subnet mask (255.255.252.0)

- WAN12: 2 host => /30 subnet mask (255.255.255.252)

- WAN13: 2 hosts => /30 subnet mask (255.255.255.252)

- WAN23: 2 hosts => /30 subnet mask (255.255.255.252)

### Basic configure on router devices:

Map

Description automatically generated

HQ showrun

Text

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

Same for BR1, BR2

### Assign the IP address to routers’ interfaces. In each LAN zone, the first IP address of its subnet is reserved to router’s interface.

|  |  |  |  |
| --- | --- | --- | --- |
| SUBNET | NETWORK ADDRESS/CDIR | FIRST IP ADDRESS | BROADCAST ADDRESS |
| LAN11 | 172.18.240.0 | 172.18.240.1 | 172.18.247.255 |
| LAN12 | 172.18.224.0 | 172.18.224.1 | 172.18.239.255 |
| LAN21 | 172.18.252.0 | 172.18.252.1 | 172.18.253.255 |
| LAN22 | 172.18.248.0 | 172.18.248.1 | 172.18.251.255 |
| LAN31 | 172.18.128.0 | 172.18.128.1 | 172.18.191.255 |
| LAN32 | 172.18.192.0 | 172.18.192.1 | 172.18.223.255 |
| WAN12 | 172.18.254.8 | 172.18.254.9 | 172.18.254.11 |
| WAN13 | 172.18.254.0 | 172.18.254.1 | 172.18.254.3 |
| WAN32 | 172.18.254.4 | 172.18.254.5 | 172.18.254.7 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IP Address | Subnet Mask | Default Gateway |
| HQ | S0/0/0 | 172.18.254.1 | 255.255.255.252 |  |
| S0/0/1 | 172.18.254.5 | 255.255.255.252 |  |
| G0/0 | 172.18.128.1 | 255.255.192.0 |  |
| G0/1 | 172.18.192.1 | 255.255.224.0 |  |
| BR1 | S0/0/0 | 172.18.254.2 | 255.255.255.252 |  |
| S0/0/1 | 172.18.254.9 | 255.255.255.252 |  |
| G0/0 | 172.18.240.1 | 255.255.248.0 |  |
| G0/1 | 172.18.224.1 | 255.255.240.0 |  |
| BR2 | S0/0/0 | 172.18.254.10 | 255.255.255.252 |  |
| S0/0/1 | 172.18.254.6 | 255.255.255.252 |  |
| G0/0 | 172.18.252.1 | 255.255.254.0 |  |
| G0/1 | 172.18.248.1 | 255.255.252.0 |  |
| PC11  (LAN11) |  | 172.18.240.5  172.18.240.X | 255.255.0.0 | 172.18.240.1 |
| PC12  (LAN12) |  | 172.18.224.3  172.18.224.X | 255.255.0.0 | 172.18.224.1 |
| PC21  (LAN21) |  | 172.18.252.2  172.18.252.X | 255.255.0.0 | 172.18.252.1 |
| PC22  (LAN22) |  | 172.18.248.4  172.18.248.X | 255.255.0.0 | 172.18.248.1 |
| PC31  (LAN31) |  | 172.18.128.9  172.18.128.X | 255.255.0.0 | 172.18.128.1 |
| PC32  (LAN32) |  | 172.18.192.4  172.18.192.X | 255.255.0.0 | 172.18.192.1 |
| SERVER  (LAN31) |  | 172.18.128.13  172.18.128.X | 255.255.0.0 | 172.18.128.1 |

### All routers need to configure static routing. So that all devices can communicate with each other.

### Configure any redundancy routes to ensure the Router BR1 and BR2 can communicate with each other even if the direct link (link WAN12) fails.

HQ ip routing tale:

Text

Description automatically generated

BR1 ip routing table:

Text

Description automatically generated with medium confidence

BR2 ip routing table:

Text

Description automatically generated with low confidence

# TÀI LIỆU THAM KHẢO