



UNITED INTERNATIONAL UNIVERSITY

REPORT

Topic: Description of a network model
Course Name: Computer Networks Laboratory
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1. What you have implemented in packet tracer?

Answer: In Cisco Packet Tracer, I established a network topology consisting initially of 15 PCs, 10 routers, and 5 servers. To organize the network effectively, I interconnected 6 distinct routers with 6 separate switches. Each switch was then linked to 5 devices, comprising laptops, desktops, and servers, ensuring a well-structured network layout.

Following the network segmentation, I configured DHCP services to assign dynamic IP addresses to each router dynamically. This allowed the routers to obtain IP addresses automatically without manual configuration, facilitating seamless connectivity within the network.

Subsequently, I implemented dynamic routing using the Routing Information Protocol (RIP). This enabled routers in the network to automatically exchange routing information, optimizing routing decisions based on the network topology.

In addition, I configured static IP addresses explicitly for the servers. Assigning static IPs ensured that the servers maintained consistent and unchanging IP addresses, providing stability for services and applications hosted on these servers.

Lastly, Network Address Translation (NAT) was implemented to differentiate between the private and public segments of the network. NAT facilitated the translation of private IP addresses used within the internal network to public IP addresses, ensuring controlled access between the private and public network segments while preserving internal network privacy.

This comprehensive network setup encompassed efficient IP address management, dynamic routing for optimized traffic handling, and a combination of static IP assignments for servers and dynamic IP allocation for other network components through DHCP.

2. IOS commands that you had to use in order to set up the routers?

router-1 DHCP:

```
ip dhcp pool router1-dhcp
```

```
network 192.168.1.0 255.255.255.0
```

```
default-router 192.168.1.1
```

```
ip dhcp excluded-address 192.168.1.10 192.168.1.20
```

router-1 Configuration:

```
interface FastEthernet0/0
```

```
ip address 192.168.1.1 255.255.255.0
```

```
no shutdown
```

```
interface Serial2/0
```

```
ip address 200.100.1.1 255.255.255.0
```

```
no shutdown
```

```
interface Serial3/0
```

```
ip address 200.100.3.1 255.255.255.0
```

```
no shutdown
```

```
router-1 RIP:
```

```
router rip
```

```
version 2
```

```
network 192.168.1.0
```

```
network 200.100.1.0
```

```
network 200.100.3.0
```

```
router-1 NAT:
```

```
ip nat pool router1-nat 200.100.3.5 200.100.3.10 netmask 255.255.255.0
```

```
access-list 13 permit 192.168.1.0 0.0.0.255
```

```
ip nat inside source list 13 pool router1-nat
```

```
interface serial 2/0
```

```
ip nat outside
```

```
interface fastethernet 0/0
```

```
ip nat inside
```

```
router-2 DHCP:
```

```
ip dhcp pool router2-dhcp
```

```
network 192.168.2.0 255.255.255.0
```

```
default-router 192.168.2.1
```

```
ip dhcp excluded-address 192.168.2.10 192.168.2.20
```

router-2 Configure:

interface FastEthernet0/0

ip address 192.168.2.1 255.255.255.0

no shutdown

interface Serial2/0

ip address 200.100.1.2 255.255.255.0

no shutdown

interface Serial3/0

ip address 200.100.5.1 255.255.255.0

no shutdown

router-2 RIP:

router rip

version 2

network 192.168.2.0

network 200.100.1.0

network 200.100.5.0

router-2 NAT:

ip nat pool router2-nat 200.100.5.5 200.100.5.10 netmask 255.255.255.0

access-list 25 permit 192.168.2.0 0.0.0.255

ip nat inside source list 25 pool router2-nat

interface serial 3/0

ip nat outside

interface fastethernet 0/0

ip nat inside

router-3 DHCP:

ip dhcp pool router3-dhcp

```
network 192.168.3.0 255.255.255.0
```

```
default-router 192.168.3.1
```

```
ip dhcp excluded-address 192.168.3.10 192.168.3.20
```

router-3 Configuration:

```
interface FastEthernet0/0
```

```
ip address 192.168.4.1 255.255.255.0
```

```
no shutdown
```

```
interface Serial2/0
```

```
ip address 200.100.1.1 255.255.255.0
```

```
no shutdown
```

```
interface Serial3/0
```

```
ip address 200.100.3.1 255.255.255.0
```

```
no shutdown
```

router-3 RIP:

```
router rip
```

```
version 2
```

```
network 192.168.4.0
```

```
network 200.100.1.0
```

```
network 200.100.3.0
```

router-3 NAT:

```
ip nat pool router3-nat 200.100.6.5 200.100.6.10 netmask 255.255.255.0
```

```
access-list 36 permit 192.168.3.0 0.0.0.255
```

```
ip nat inside source list 36 pool router3-nat
```

```
interface serial 2/0
```

```
ip nat outside
```

```
interface fastethernet 0/0
```

```
ip nat inside
```

router-4 DHCP:

ip dhcp pool router4-dhcp

network 192.168.4.0 255.255.255.0

default-router 192.168.4.1

ip dhcp excluded-address 192.168.4.10 192.168.4.20

router-4 Configuration:

interface FastEthernet0/0

ip address 192.168.3.1 255.255.255.0

no shutdown

interface Serial2/0

ip address 200.100.6.1 255.255.255.0

no shutdown

interface Serial3/0

ip address 200.100.5.2 255.255.255.0

no shutdown

router-4 RIP:

router rip

version 2

network 192.168.3.0

network 200.100.6.0

network 200.100.5.0

router-4 NAT:

ip nat pool router4-nat 200.100.4.5 200.100.4.10 netmask 255.255.255.0

access-list 44 permit 192.168.4.0 0.0.0.255

ip nat inside source list 44 pool router4-nat

interface serial 2/0

ip nat outside

```
interface fastethernet 0/0
ip nat inside
```

```
router-5 DHCP:
ip dhcp pool router5-dhcp
network 192.168.5.0 255.255.255.0
default-router 192.168.5.1
ip dhcp excluded-address 192.168.5.10 192.168.5.20
```

```
router-5 Configuration:
interface FastEthernet0/0
ip address 192.168.5.1 255.255.255.0
no shutdown
interface Serial2/0
ip address 200.100.4.2 255.255.255.0
no shutdown
interface Serial3/0
ip address 200.100.2.1 255.255.255.0
no shutdown
```

```
router-5 RIP:
router rip
version 2
network 192.168.5.0
network 200.100.4.0
network 200.100.2.0
```

```
router-5 NAT:
ip nat pool router5-nat 200.100.5.5 200.100.5.10 netmask 255.255.255.0
access-list 52 permit 192.168.5.0 0.0.0.255
```

```
ip nat inside source list 52 pool router5-nat
interface serial 3/0
ip nat outside
interface fastethernet 0/0
ip nat inside
```

router-6 DHCP:

```
ip dhcp pool router6-dhcp
network 192.168.6.0 255.255.255.0
default-router 192.168.6.1
ip dhcp excluded-address 192.168.6.10 192.168.6.20
```

router-6 Configuration:

```
interface FastEthernet0/0
ip address 192.168.6.1 255.255.255.0
no shutdown
interface Serial2/0
ip address 200.100.6.2 255.255.255.0
no shutdown
interface Serial3/0
ip address 200.100.2.2 255.255.255.0
no shutdown
```

router-6 RIP:

```
router rip
version 2
network 192.168.6.0
network 200.100.6.0
network 200.100.2.0
```


router-6 NAT:

no need for nat because it is a server

3. Any challenges that you encountered while implementing the enterprise network?

When working with Cisco Packet Tracer, specific challenges might arise during the setup of a network:

1. Limited Feature Set: Cisco Packet Tracer have a limited set of features compared to actual physical hardware. Certain advanced functionalities or specific hardware capabilities might not be fully represented.
2. Simulated Environment: Packet Tracer provides a simulated environment. Occasionally, this simulation not completely mirror real-world behaviors or behave differently from actual Cisco devices, leading to unexpected results.
3. Resource Constraints: Packet Tracer have limitations in handling a large number of devices or complex network topologies due to resource constraints of the software, potentially impacting scalability testing.
4. Device Compatibility: The software does not support all types of devices or hardware models available in real Cisco networks. Compatibility issues or differences in functionality arise when designing specific configurations.
5. Software Bugs and Stability: Like any software, Packet Tracer have occasional bugs or stability issues that can cause unexpected behavior or crashes, impacting the design and simulation process.