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Kegiatan 1.

1. Topologi Jaringan

Yang akan dikonfigurasi fungsi NAT-nya adalah jaringan yang terhubung antara Router internet dan web server. Mekanismenya adalah membuat jaringan web server tersebut tidak dapat diketahui IP Privatnya, namun masih dapat diakses melalui jaringan diluar router internet melalui IP publik. Pembagian network ID adalah sebagai berikut :

- Koneksi Router lokal – Router Internet adalah 20.0.0.0
- Koneksi Router lokal – PC lokal adalah 30.0.0.0
- Koneksi Router Internet ke Web Server adalah 10.0.0.0
- IP NAT untuk private network 10.0.0.0, 10.0.0.2 (Web Server) ditranslasikan menjadi 50.0.0.1

Pengalamatan pada masing-masing Port menggunakan alamat IP statis dengan subnet /24 atau 255.255.255.0 .

2. Konfigurasi Router Internet

- konfigurasi IP untuk Serial 2/0 dan FastEthernet 0/0.

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int se2/0
Router(config-if)#ip address 20.0.0.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed
state to up

Router(config-if)#
```

Serial2/0

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.0.0.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#
```

FastEthernet0/0

- Mengaktifkan routing tabel agar router mengenali network 30.0.0.0

```
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 30.0.0.0 255.255.255.0 20.0.0.1
Router(config)#
```

- Mengaktifkan NAT Source Static untuk IP 10.0.0.2 (milik Web Server) pada jaringan 10.0.0.0 agar ditranslasikan menjadi 50.0.0.1 . Serta mengaktifkan NAT inside untuk port FastEthernet0/0 dan NAT outside untuk Serial2/0.

```
Router(config)#ip nat inside source static 10.0.0.2 50.0.0.1
Router(config)#int fa0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#int se2/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
```

3. Konfigurasi Router Lokal.

- Konfigurasi FastEthernet0/0 dengan memberi IP Address 30.0.0.1 subnet 255.255.255.0 kemudian mengaktifkan Port FastEthernet0/0 (**no shutdown**).

```
Router(config)#int fa0/0
Router(config-if)#ip address 30.0.0.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#
```

- Konfigurasi Serial2/0 dan memberi IP Address 20.0.0.1 255.255.255.0 kemudian mengaktifkan dengan perintah **no shutdown**. lalu mengaktifkan **Clock rate** 64000 dan **bandwidth** 64, proses ini masih dalam mode *Configuration Interface (Config-if)*.

```
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int se2/0
Router(config-if)#clock rate 64000
Router(config-if)#ip address 20.0.0.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#bandwidth 64
Router(config-if)#
```

- Memberikan table routing statis agar jaringan lokal dapat berhubungan dengan jaringan internet dan web server dengan perintah (ip route 50.0.0.0 255.255.255.0 20.0.0.2).

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 50.0.0.0 255.255.255.0 20.0.0.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

4. Uji coba koneksi dari PC lokal ke Web Server, untuk menguji apakah konfigurasi NAT berhasil atau tidak.
- Ping kealamat IP Private Web Server.

```
Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 30.0.0.1: Destination host unreachable.
Reply from 30.0.0.1: Destination host unreachable.
Reply from 30.0.0.1: Destination host unreachable.
Reply from 30.0.0.1: Destination host unreachable.

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Mengalami Unreachable atau tidak bisa menjangkau IP Address Private milik Web Server

- Ping kealamat IP Public Web Server.

```
C:\>ping 50.0.0.1

Pinging 50.0.0.1 with 32 bytes of data:

Reply from 50.0.0.1: bytes=32 time=52ms TTL=126
Reply from 50.0.0.1: bytes=32 time=12ms TTL=126
Reply from 50.0.0.1: bytes=32 time=13ms TTL=126
Reply from 50.0.0.1: bytes=32 time=5ms TTL=126

Ping statistics for 50.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 52ms, Average = 20ms

C:\>
```

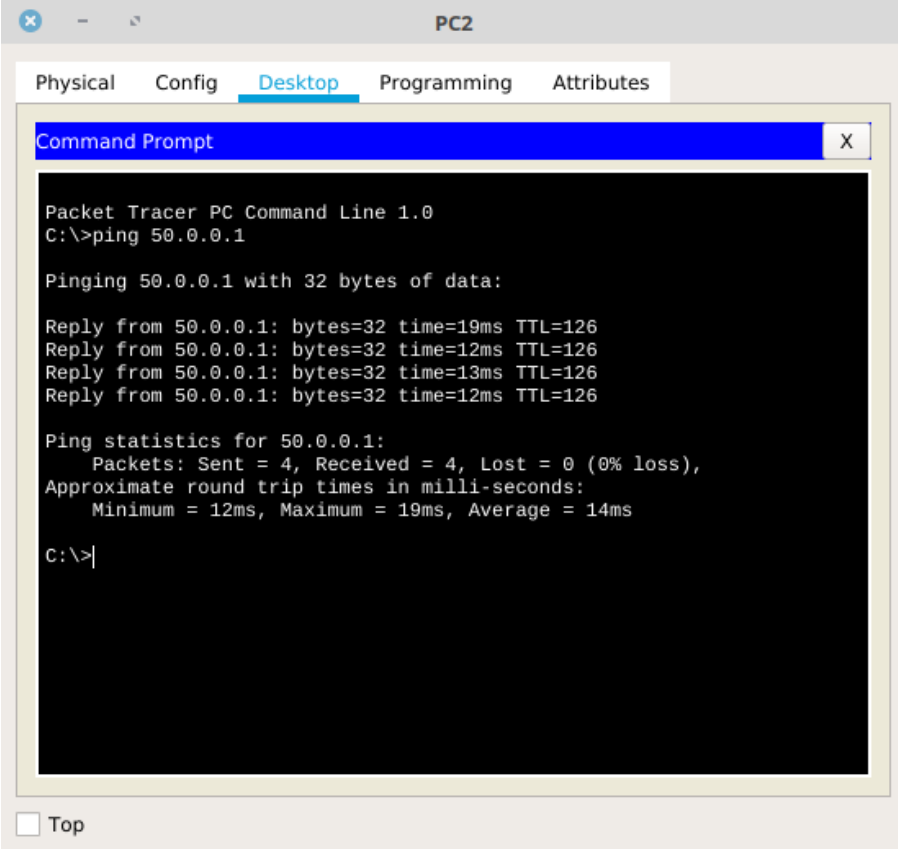
berhasil untuk mengakses IP Address Public milik Web Server

5. Mengembangkan Topologi diatas dengan menambahkan 1 PC pada Router Lokal. Konfigurasi PC tersebut supaya dapat terkoneksi dengan Server(10.0.0.2) melalui IP Public.
- Konfigurasi IP PC 2

The screenshot shows the configuration window for PC2 in Packet Tracer. The 'Desktop' tab is selected. Under the 'Config' section, 'Static' is chosen for IP configuration. The IP Address is set to 30.0.0.4, Subnet Mask to 255.255.255.0, Default Gateway to 30.0.0.1, and DNS Server to 0.0.0.0. The 'IPv6 Configuration' section shows 'Static' selected, with an IPv6 Address field, a Link Local Address of FE80::260:3EFF:FE08:7B72, and empty fields for IPv6 Gateway and IPv6 DNS Server. The '802.1X' section has 'Use 802.1X Security' unchecked and 'Authentication' set to MD5. A 'Top' button is at the bottom left.

mengkonfigurasi dengan memberikan IP Address 30.0.0.4 dan Default Gateway 30.0.0.1. Karena langkah sebelumnya sudah dilakukan Routing table pada Router sehingga PC 2 sudah bisa berkomunikasi dengan IP Public milik Server.

- Uji koneksi PC 2 Router lokal dengan Web Server



The screenshot shows a Packet Tracer PC2 Desktop window. The 'Desktop' tab is selected, displaying a 'Command Prompt' window. The command prompt shows the execution of the command 'ping 50.0.0.1'. The output indicates that the ping was successful, with 4 packets sent and 4 received, resulting in 0% loss. The approximate round trip times are: Minimum = 12ms, Maximum = 19ms, and Average = 14ms.

```
Packet Tracer PC Command Line 1.0
C:\>ping 50.0.0.1

Pinging 50.0.0.1 with 32 bytes of data:

Reply from 50.0.0.1: bytes=32 time=19ms TTL=126
Reply from 50.0.0.1: bytes=32 time=12ms TTL=126
Reply from 50.0.0.1: bytes=32 time=13ms TTL=126
Reply from 50.0.0.1: bytes=32 time=12ms TTL=126

Ping statistics for 50.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 19ms, Average = 14ms

C:\>|
```

Tugas

1. *Static Route* mendefinisikan alamat IP *hop router* berikutnya dan *interface* lokal yang digunakan untuk mem-forward paket ke tujuan tertentu(*hop router* berikutnya). Pada NAT juga dipetakan secara satu-satu sehingga dibutuhkan alamat *IP* private ke alamat *IP* public.