

**НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ БІОРЕСУРСІВ І
ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ
ФАКУЛЬТЕТ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ**

Факультет інформаційних технологій

ЛАБОРАТОРНА РОБОТА №8

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Тема: налаштування статичних та динамічних трансляцій мережних адрес (nat)

Мета роботи: вивчити принципи налаштування статичних та динамічних трансляцій мережних адрес, застосувати отримані знання при виконанні практичних завдань.

Завдання:

Завдання 8.1. Статична трансляція адрес NAT.

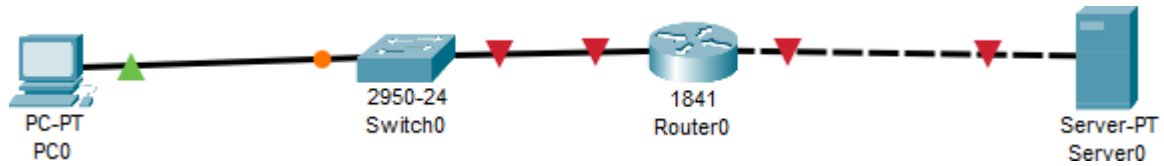
Завдання 8.2. Визначити можливість роботи схеми.

Завдання 8.3. Налаштування статичного NAT.

Завдання 8.4. Налаштування динамічного NAT.

Завдання 8.5. Налаштування PAT.

Завдання 8.1. Статична трансляція адрес NAT.



Default Gateway	20.20.20.20
IPv4 Address	20.20.20.21
Subnet Mask	255.255.255.0

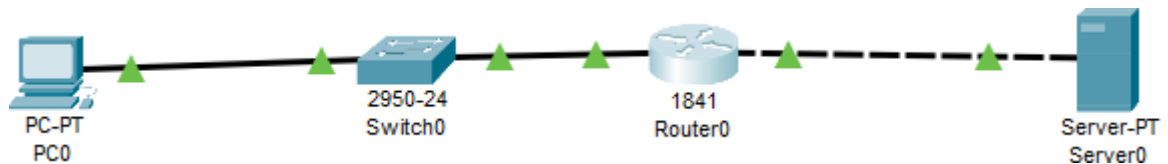
Server0

Default Gateway	10.10.10.2
IPv4 Address	10.10.10.1
Subnet Mask	255.255.255.0

PC0

```
Router(config)#int fa0/0
Router(config-if)#ip addr 10.10.10.2 255.255.255.0
Router(config)#int fa0/1
Router(config-if)#ip addr 20.20.20.20 255.255.255.0
```

Router0



```
Router(config)#ac
Router(config)#access-list 1 permit any
Router(config)#ip nat inside source list 1 int
Router(config)#ip nat inside source list 1 interface fa0/1 ove
Router(config)#ip nat inside source list 1 interface fa0/1 overload
```

Router0

```

Router(config)#int fa 0/0
Router(config-if)#ip nat inside
Router(config-if)#ip addr 10.10.10.1 255.0.0.0
Router(config-if)#ip nat inside
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int 0/1
      ^
% Invalid input detected at '^' marker.

Router(config)#ip addr 20.20.20.20 255.0.0.0
      ^
% Invalid input detected at '^' marker.

Router(config)#ip addr 20.20.20.20 255.0.0.0
      ^
% Invalid input detected at '^' marker.

Router(config)#int fa 0/1
Router(config-if)#ip addr 20.20.20.20 255.0.0.0
Router(config-if)#ip nat outside
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#ip nat inside source static 10.10.10.2 20.20.20.22
Router(config)#

```

Router0

```

C:\>ping 20.20.20.21

Pinging 20.20.20.21 with 32 bytes of data:

Reply from 20.20.20.21: bytes=32 time<1ms TTL=127
Reply from 20.20.20.21: bytes=32 time=1ms TTL=127
Reply from 20.20.20.21: bytes=32 time=1ms TTL=127
Reply from 20.20.20.21: bytes=32 time<1ms TTL=127

Ping statistics for 20.20.20.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

```

PC0

```

Router>en
Router#sh ip nat tra
Router#sh ip nat translations

```

Pro	Inside global	Inside local	Outside local	Outside global
icmp	20.20.20.20:5	10.10.10.1:5	20.20.20.21:5	20.20.20.21:5
icmp	20.20.20.20:6	10.10.10.1:6	20.20.20.21:6	20.20.20.21:6
icmp	20.20.20.20:7	10.10.10.1:7	20.20.20.21:7	20.20.20.21:7
icmp	20.20.20.20:8	10.10.10.1:8	20.20.20.21:8	20.20.20.21:8
---	20.20.20.22	10.10.10.2	---	---

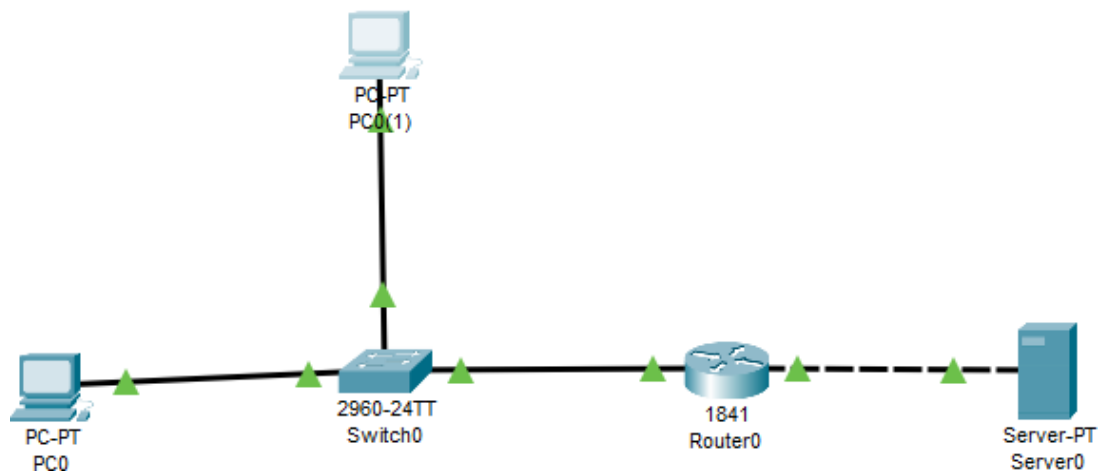
```

Router#wr mem
Building configuration...

```

Router0

Завдання 8.2. Визначити можливість роботи схеми.



```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 20.20.20.21

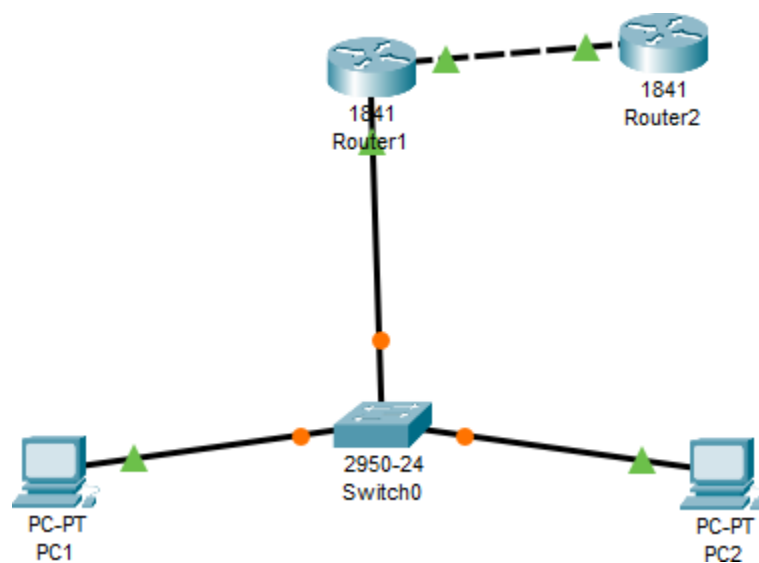
Pinging 20.20.20.21 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 20.20.20.21:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC1

Завдання 8.3. Налаштування статичного NAT.



```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 200.20.20.2
Router(config)#int fa 0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#int fa 0/1
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#ip nat inside source static 10.10.10.2 200.10.21.5
Router(config)#

```

Router1

```

C:\>ping 200.20.20.2

Pinging 200.20.20.2 with 32 bytes of data:

Reply from 200.20.20.2: bytes=32 time<1ms TTL=254
Reply from 200.20.20.2: bytes=32 time<1ms TTL=254
Reply from 200.20.20.2: bytes=32 time<1ms TTL=254
Reply from 200.20.20.2: bytes=32 time<1ms TTL=254

Ping statistics for 200.20.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

```

PC1

```

Router#ping 10.10.10.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.10.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Router#ping 200.20.20.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.20.20.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/8 ms

```

```

Router#sh ip nat translation
Pro  Inside global      Inside local      Outside local      Outside global
---  200.10.21.5           10.10.10.2        ---                ---

```

Router1

Завдання 8.4. Налаштування динамічного NAT.

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#acce
Router(config)#access-list 1 per
Router(config)#access-list 1 permit 10.10.10.0 0.0.0.255
Router(config)#ip nat pool wh
Router(config)#ip nat pool whi
Router(config)#ip nat pool white-
Router(config)#ip nat pool white-address 200.20.20.1 200.20.20.30 network
                                         ^
% Invalid input detected at '^' marker.

Router(config)# ip nat pool white-address 200.20.20.1 200.20.20.30 netmask
% Incomplete command.
Router(config)# ip nat pool white-address 200.20.20.1 200.20.20.30 netmask 255.255.255.0
Router(config)#ip nat inside source list 1 pool white-address
Router(config)# interface fastethernet 0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#int fa 0/1
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr mem
Building configuration...
[OK]
Router#

```

Router 1

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 200.20.20.2

Pinging 200.20.20.2 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 200.20.20.2: bytes=32 time<1ms TTL=254
Reply from 200.20.20.2: bytes=32 time=1ms TTL=254

Ping statistics for 200.20.20.2:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

```

PC1

```

Router#ping 10.10.10.0

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.10.0, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

Router#ping 200.20.20.0
^
% Invalid input detected at '^' marker.

Router#ping 200.20.20.0

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.20.20.0, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

Router#show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
---  200.10.21.5          10.10.10.2        ---                ---

Router#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: FastEthernet0/1
Inside Interfaces: FastEthernet0/0
Hits: 2 Misses: 14
Expired translations: 4
Dynamic mappings:
-- Inside Source
access-list 1 pool white-address refCount 0
 pool white-address: netmask 255.255.255.0
   start 200.20.20.1 end 200.20.20.30
   type generic, total addresses 30 , allocated 0 (0%), misses 0

```

Router1

Завдання 8.5. Налаштування PAT.

```

Router(config)#access-list 1 permit 10.10.10.0 0.0.0.255
Router(config)#ip nat inside s
Router(config)#ip nat inside source 1
Router(config)#ip nat inside source list 1 int fa 0/1 ov
Router(config)#ip nat inside source list 1 int fa 0/1 overload
Router(config)#int fa 0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#int fa 0/1
Router(config-if)#ip nat ou
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]

```

Router1


```

C:\>ping 200.20.20.2 with 32 bytes of data:

Reply from 200.20.20.2: bytes=32 time<1ms TTL=254
Reply from 200.20.20.2: bytes=32 time<1ms TTL=254
Reply from 200.20.20.2: bytes=32 time=1ms TTL=254
Reply from 200.20.20.2: bytes=32 time<1ms TTL=254

Ping statistics for 200.20.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>

```

PC1

```
Router#ping 10.10.10.0
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.10.10.0, timeout is 2 seconds:
```

```
.....
```

```
Success rate is 0 percent (0/5)
```

```
Router#ping 200.20.20.0
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 200.20.20.0, timeout is 2 seconds:
```

```
.....
```

```
Success rate is 0 percent (0/5)
```

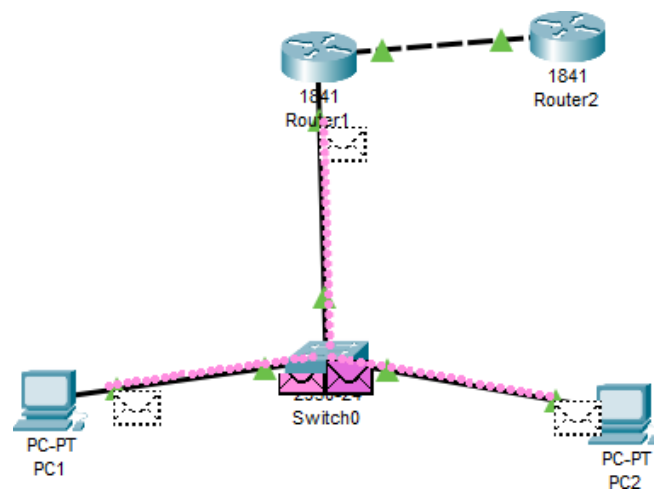
```
Router#sh ip nat translations
```

```

Pro  Inside global      Inside local      Outside local      Outside global
---  200.10.21.5          10.10.10.2        ---                ---

```

Router1



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC1	Router2	ICMP		0.000	N	0	(edit)	

Висновок

У ході цієї лабораторної роботи ми освоїли основи налаштування статичних та динамічних трансляцій мережних адрес (NAT) і застосували їх у практичних завданнях.