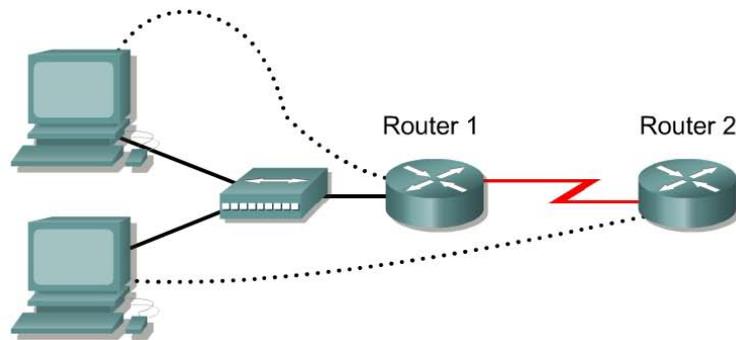
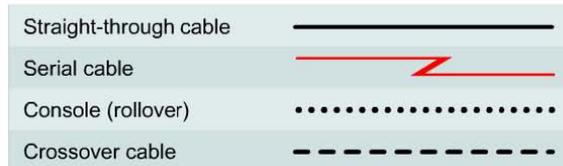


## LAB Configuring NAT



Router Designation	Router Name	FastEthernet 0 Address /Subnet Mask	Interface Type	Serial 0 Address /Subnet Mask	Loopback 0 Address / Subnet Mask	Enable Secret Password	Enable/VTY/Console Passwords
Router 1	Gateway	10.10.10.1/24	DTE	200.2.2.18/30	NA	class	cisco
Router 2	ISP	NA	DCE	200.2.2.17/30	172.16.1.1/32	class	cisco



### Objective

- Configure a router to use network address translation (NAT) to convert internal IP addresses, typically private addresses, into outside public addresses.
- Configure static IP mapping to allow outside access to an internal PC.

### Background/Preparation

An ISP has allocated a company the public classless interdomain routing (CIDR) IP address 199.99.9.32/27. This is equivalent to 30 public IP addresses. Since the company has an internal requirement for more than 30 addresses, the IT manager has decided to implement NAT. The addresses 199.99.9.33 – 199.99.9.39 for static allocation and 199.99.9.40 – 199.99.9.62 for dynamic allocation. Routing will be done between the ISP and the gateway router used by the company. A static route will be used between the ISP and gateway routers and a default route will be used between the gateway router and the ISP. The ISP connection to the Internet will be represented by a loopback address on the ISP router.

Cable a network similar to the one in the diagram above. Any router that meets the interface requirements displayed on the above diagram may be used.

### Step 1 Configure the routers

Configure all of the following according to the chart:

- The hostname
- The console password
- The virtual terminal password
- The enable secret password
- The interfaces

### Step 2 Save the configuration

Save the running configuration to the start-up configuration.

### Step 3 Configure the hosts with the proper IP address, subnet mask, and default gateway

Each workstation should be able to ping the attached router. If the ping was not successful, troubleshoot as necessary. Check and verify that the workstation has been assigned a specific IP address and default gateway.

### Step 4 Verify that the network is functioning

- From the attached hosts, ping the FastEthernet interface of the default gateway router.
- Was the ping from the first host successful? \_\_\_\_\_
- Was the ping from the second host successful? \_\_\_\_\_
- If the answer is no for either question, troubleshoot the router and host configurations to find the error. Ping again until they are both successful.

### Step 5 Create a static route

a. Create a static route from the ISP to the Gateway router. Addresses 199.99.9.32/27 have been allocated for Internet access outside of the company. Use the `ip route` command to create the static route.

```
ISP(config)#ip route 199.99.9.32 255.255.255.224 200.2.2.18
```

- Is the static route in the routing table? \_\_\_\_\_
- What command checks the routing table contents? \_\_\_\_\_
- If the route was not in the routing table, give one reason why this might be so?

### Step 6 Create a default route

a. From the Gateway router to the ISP router, create a static route to network 0.0.0.0 0.0.0.0, using the `ip route` command. This will forward any unknown destination address traffic to the ISP by setting a Gateway of Last Resort on the Gateway router.

```
Gateway(config)#ip route 0.0.0.0 0.0.0.0 200.2.2.17
```

b. Is the static route in the routing table? \_\_\_\_\_

c. Try to ping from one of the workstations to the ISP serial interface IP address.

d. Was the ping successful? \_\_\_\_\_

e. Why? \_\_\_\_\_

### Step 7 Define the pool of usable public IP addresses

To define the pool of public addresses, use the `ip nat pool` command:

```
Gateway(config)#ip nat pool public-access 199.99.9.40 199.99.9.62
netmask 255.255.255.224
```

Which public addresses are you allowed to use for dynamic allocation? \_\_\_\_\_

### Step 8 Define an access list that will match the inside private IP addresses

To define the access list to match the inside private addresses, use the `access list` command:

```
Gateway(config)#access-list 1 permit 10.10.10.0 0.0.0.255
```

Which private addresses are you allowed to use inside your private network? \_\_\_\_\_

### Step 9 Define the NAT translation from inside list to outside pool

To define the NAT translation, use the `ip nat inside source` command:

```
Gateway(config)#ip nat inside source list 1 pool public-access
```

### Step 10 Specify the interfaces

The active interfaces on the router need to be specified as either inside or outside interfaces with respect to NAT. To do this, use the `ip nat inside` or `ip nat outside` command:

```
Gateway(config)#interface fastethernet 0  
Gateway(config-if)#ip nat inside  
Gateway(config-if)#interface serial 0  
Gateway(config-if)#ip nat outside
```

Which interface did you choose to be inside, and why? \_\_\_\_\_

### Step 11 Testing the configuration

Configure one of the PCs on the LAN with the IP address 10.10.10.10/24 and a default gateway address of 10.10.10.1. From the PC, ping 172.16.1.1. If successful, look at the NAT translation on the Gateway router, using the command `show ip nat translations`.

- What is the translation of the inside local host addresses?  
\_\_\_\_\_ = \_\_\_\_\_  
\_\_\_\_\_ = \_\_\_\_\_
- The inside global address is assigned by? \_\_\_\_\_
- The inside local address is assigned by? \_\_\_\_\_

### Step 12 Configuring Static Mapping

Workstation #1, 10.10.10.10/24, will be designated as the public WWW server. Thus, it needs a permanent public IP address. This mapping is defined using a static NAT mapping.

Configure one of the PCs on the LAN with the IP address 10.10.10.10/24 and a default gateway address of 10.10.10.1. To configure a static IP NAT mapping, use the `ip nat inside source static` command at the privileged EXEC mode prompt:

```
Gateway(config)#ip nat inside source static 10.10.10.10 199.99.9.33
```

This permanently maps 199.99.9.33 to the inside address 10.10.10.10.

Look at the translation table:

```
Gateway#show ip nat translations
```

Does the mapping appear in the output of the `show` command? \_\_\_\_\_

### tep 12 Testing the configuration

- a. From the 10.10.10.10 workstation, verify it can ping 172.16.1.1
- b. Is the ping successful? \_\_\_\_\_
- c. Why? \_\_\_\_\_
  
- d. From the ISP router, ping the host with the static NAT translation by typing **ping 10.10.10.10**.
- e. What were the results of the ping, was it successful? \_\_\_\_\_
- f. Why? \_\_\_\_\_
- g. From the ISP router, ping 199.99.9.33. If successful, look at the NAT translation on the Gateway router, using the command `show ip nat translations`.
- h. What is the translation of the inside local host addresses?  
\_\_\_\_\_ = \_\_\_\_\_  
\_\_\_\_\_ = \_\_\_\_\_

**Note:** Erase the start-up configuration on all routers in this lab assignment before you log off and turn the routers off.

This sheet contains the basic configuration commands for the ISP and Gateway routers:

### ISP

```
Router#configure terminal
Router(config)#hostname ISP
ISP(config)#enable password cisco
ISP(config)#enable secret class
ISP(config)#line console 0
ISP(config-line)#password cisco
ISP(config-line)#login
ISP(config-line)#exit
ISP(config)#line vty 0 4
ISP(config-line)#password cisco
ISP(config-line)#login
ISP(config-line)#exit
ISP(config)#interface loopback 0
ISP(config-if)#ip add 172.16.1.1 255.255.255.255
ISP(config-if)#no shutdown
ISP(config-if)#exit
ISP(config)#interface serial 0
ISP(config-if)#ip add 200.2.2.17 255.255.255.252
ISP(config-if)#clock rate 64000
ISP(config)#ip route 199.99.9.32 255.255.255.224 200.2.2.18
ISP(config)#end
ISP#copy running-config startup-config
```

Destination filename [startup-config]?[Enter]

### Gateway

```
Router#configure terminal
Router(config)#hostname Gateway
Gateway(config)#enable password cisco
Gateway(config)#enable secret class
Gateway(config)#line console 0
Gateway(config-line)#password cisco
Gateway(config-line)#login
Gateway(config-line)#exit
Gateway(config)#line vty 0 4
Gateway(config-line)#password cisco
Gateway(config-line)#login
Gateway(config-line)#exit
Gateway(config)#fastethernet 0
Gateway(config-if)#ip add 10.10.10.1 255.255.255.0
Gateway(config-if)#no shutdown
Gateway(config-if)#exit
Gateway(config)#interface serial 0
Gateway(config-if)#ip add 200.2.2.18 255.255.255.252
Gateway(config-if)#no shutdown
```

```
Gateway(config)#ip route 0.0.0.0 0.0.0.0 200.2.2.17
```