Chapter 11: Network Address Translation for IPv4

Routing And Switching

Cisco Networking Academy

Do buttons on 10.1.1.2
Chapter 11

11.0 Introduction
11.1 NAT Operation
11.2 Configuring NAT
11.3 Troubleshooting NAT
11.4 Summary
Chapter 11: Objectives

- Describe NAT characteristics
- Describe the benefits and drawbacks of NAT
- Configure static NAT using the CLI
- Configure dynamic NAT using the CLI
- Configure PAT using the CLI
- Configure port forwarding using the CLI
- Configure NAT-PT (v6 to v4)
- Use show commands to verify NAT operation
NAT Characteristics

IPv4 Private Address Space

- The IPv4 address space is not big enough to uniquely address all the devices that need to be connected to the Internet
- Network private addresses are described in RFC 1918 and are designed to be used within an organization or site only
- Private addresses are not routed by Internet routers while public addresses are
- Private addresses can alleviate IPv4 scarcity but since they aren’t routed by Internet devices, they need to be translated first.
- NAT is process used to perform such translation
NAT Characteristics

IPv4 Private Address Space

Private Internet addresses are defined in RFC 1918:

<table>
<thead>
<tr>
<th>Class</th>
<th>RFC 1918 Internal Address Range</th>
<th>CIDR Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10.0.0.0 - 10.255.255.255</td>
<td>10.0.0.0/8</td>
</tr>
<tr>
<td>B</td>
<td>172.16.0.0 - 172.31.255.255</td>
<td>172.16.0.0/12</td>
</tr>
<tr>
<td>C</td>
<td>192.168.0.0 - 192.168.255.255</td>
<td>192.168.0.0/16</td>
</tr>
</tbody>
</table>

Do buttons on 11.1.1.1
NAT Characteristics

What is NAT?

- NAT is a process used to translate network addresses.
- NAT’s primary use is to conserve public IPv4 addresses.
- Usually implemented at border network devices such as firewalls or routers.
- This allows the networks to use private addresses internally, only translating to public addresses when needed.
- Devices within the organization can be assigned private addresses and operate with locally unique addresses.
- When traffic must be sent/received to/from other organizations or the Internet, the border router translates the addresses to a public and globally unique address.
NAT Characteristics

What is NAT?

- **Stub Network**: Only one exit point to the Internet
- **NAT-enabled border router**

![Diagram of NAT](image)

Private Address Space:
- 192.168.10.0/24
- 192.168.11.0/24

Public Address Space:
- 209.165.201.1

Router R2:
- 10.1.1.0/30

PC1 and PC2:
- 192.168.10.10
- 192.168.11.10

Networks:
- 11.1.1.2
NAT Characteristics

NAT Terminology

- In NAT terminology, inside network is the set of devices using private addresses. Outside networks are all other networks.

- NAT includes 4 types of addresses:
  - Inside local address
  - Inside global address
  - Outside local address
  - Outside global address
NAT Characteristics

NAT Terminology

- The terms, inside and outside, are combined with the terms local and global to refer to specific addresses
  - Inside local address
  - Inside global address
  - Outside global address
  - Outside local address

11.1.1.3

Explain each:
- Private Address
- Public Destination address
- Packets private address is replaced with this address
- Destination address on the internet
NAT Characteristics
How NAT Works

Explain the 4 address types

<table>
<thead>
<tr>
<th>Inside Local</th>
<th>Outside Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.10</td>
<td>209.165.201.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inside Local</th>
<th>Outside Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.10</td>
<td>209.165.201.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inside Global</th>
<th>Outside Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>209.165.200.226</td>
<td>209.165.201.1</td>
</tr>
</tbody>
</table>

11.1.1.4
NAT Characteristics

How NAT Works

Do animation on 11.1.1.5
NAT Characteristics

11.1.1.6 Activity - Identify the NAT Terminology

PC1 is communicating with the Web Server through a NAT-enabled router (R1). Drag each type of NAT address to its corresponding field in the topology.

Inside Local    Outside Local
Inside Global    Outside Global

Do activity on 11.1.1.6
Types Of NAT

Static NAT

- Static NAT uses a one-to-one mapping of local and global addresses

- These mappings are configured by the network administrator and remain constant

- Static NAT is particularly useful when servers hosted in the inside network must be accessible from the outside network

- A network administrator can SSH to a server in the inside network by pointing his SSH client to the proper inside global address

11.1.2.1
**Types Of NAT**

**Static NAT**

<table>
<thead>
<tr>
<th>Inside Local Address</th>
<th>Inside Global Address - Addresses reachable via R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.10</td>
<td>209.165.200.226</td>
</tr>
<tr>
<td>192.168.10.11</td>
<td>209.165.200.227</td>
</tr>
<tr>
<td>192.168.10.12</td>
<td>209.165.200.228</td>
</tr>
</tbody>
</table>

Static NAT Translation

Inside

- Svr1
  - 192.168.10.10
- PC2
  - 192.168.10.11
- PC3
  - 192.168.10.12

Outside

- PC4
  - `ssh 209.165.200.226`
- R2
- Internet

11.1.2.1
Types Of NAT

Dynamic NAT

- Dynamic NAT uses a pool of public addresses and assigns them on a first-come, first-served basis.

- When an inside device requests access to an outside network, dynamic NAT assigns an available public IPv4 address from the pool.

- Dynamic NAT requires that enough public addresses are available to satisfy the total number of simultaneous user sessions.

11.1.2.2
Types Of NAT

Dynamic NAT

### IPv4 NAT Pool

<table>
<thead>
<tr>
<th>Inside Local Address</th>
<th>Inside Global Address Pool - Addresses reachable via R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.12</td>
<td>209.165.200.226</td>
</tr>
<tr>
<td>Available</td>
<td>209.165.200.227</td>
</tr>
<tr>
<td>Available</td>
<td>209.165.200.228</td>
</tr>
<tr>
<td>Available</td>
<td>209.165.200.229</td>
</tr>
<tr>
<td>Available</td>
<td>209.165.200.230</td>
</tr>
</tbody>
</table>

---

Dynamic NAT Translation

- Svr1 (192.168.10.10)
- PC2 (192.168.10.11)
- PC3 (192.168.10.12)
- Internet
- R2

IPv4 Address: 11.1.2.2
Types Of NAT

Port Address Translation NAT (PAT)

- PAT maps multiple private IPv4 addresses to a single public IPv4 address or a few addresses
- PAT uses the pair source port and source IP address to keep track of what traffic belongs to what internal client
- PAT is also known as NAT overload
- By also using the port number, PAT is able to forward the response packets to the correct internal device
- The PAT process also validates that the incoming packets were requested, thus adding a degree of security to the session
Types Of NAT

PAT Process

Do animation on 11.1.2.3
PAT

Next Available Port

Next Available Port

Inside

192.168.10.10

Svr1

192.168.10.11

PC1

192.168.10.12

PC2

Outside

Internet

NAT Table with Overload

<table>
<thead>
<tr>
<th>Inside Global IP Address</th>
<th>Inside Local IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>209.165.200.226:1444</td>
<td>192.168.10.11:1444</td>
</tr>
</tbody>
</table>

Do animation on 11.1.2.4
Types Of NAT

Comparing NAT and PAT

- NAT translates IPv4 addresses on a 1:1 basis between private IPv4 addresses and public IPv4 addresses.

- PAT modifies both the address and the port number.

- NAT forwards incoming packets to their inside destination by referring to the incoming source IPv4 address given by the host on the public network.

- With PAT, there is generally only one or a very few publicly exposed IPv4 addresses.

- PAT is also able to translate protocols that don’t use port numbers such as ICMP. Each one of these protocols are supported differently by PAT.
Benefits of NAT

- Conserves the legally registered addressing scheme
- Increases the flexibility of connections to the public network
- Provides consistency for internal network addressing schemes
- Provides network security
### Benefits Of NAT

Disadvantages of NAT

<table>
<thead>
<tr>
<th>Disadvantages of NAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Performance is degraded</td>
</tr>
<tr>
<td>• End-to-end functionality is degraded</td>
</tr>
<tr>
<td>• End-to-end IP traceability is lost</td>
</tr>
<tr>
<td>• Tunneling is more complicated</td>
</tr>
<tr>
<td>• Initiating TCP connections can be disrupted</td>
</tr>
</tbody>
</table>
Configuring Static NAT

There are two basic tasks when configuring static NAT translations:

- Create the mapping between the inside local and outside local addresses
- Define which interface belong to the inside network and which belong to the outside network

Do buttons on 11.2.1.1
Students do button 4 for practice
Configuring Static NAT

Example Static NAT Configuration

```
192.168.10.254
```

Establishes static translation between an inside local address and an inside global address.

```
R2(config)# ip nat inside source static 192.168.10.254 209.165.201.5
```

```
R2(config)# interface Serial0/0/0
R2(config-if)# ip address 10.1.1.2 255.255.255.252
Identifies interface serial 0/0/0 as an inside NAT interface.
R2(config-if)# ip nat inside
R2(config-if)# exit
```

```
R2(config)# interface Serial0/1/0
R2(config-if)# ip address 209.165.200.225 255.255.255.252
Identifies interface serial 0/1/0 as the outside NAT interface.
R2(config-if)# ip nat outside
```
Configuring Static NAT

Analyzing Static NAT

**NAT Table**

<table>
<thead>
<tr>
<th>Inside Local Address</th>
<th>Inside Global Address</th>
<th>Outside Global Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.254</td>
<td>209.165.201.5</td>
<td>209.165.200.254</td>
</tr>
</tbody>
</table>
Configuring Static NAT

Verifying Static NAT

The static translation is always present in the NAT table.

R2# show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.165.201.5 192.168.10.254 --- ---
R2#

The static translation during an active session.

R2# show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.165.201.5 192.168.10.254 209.165.200.254 209.165.200.254
R2#
Configuring Static NAT
Verifying Static NAT

R2# clear ip nat statistics

R2# show ip nat statistics
Total active translations: 1 (1 static, 0 dynamic; 0 extended)
Peak translations: 0
Outside interfaces:
  Serial0/0/1
Inside interfaces:
  Serial0/0/0
Hits: 0 Misses: 0
<output omitted>

Client PC establishes a session with the web server

R2# show ip nat statistics
Total active translations: 1 (1 static, 0 dynamic; 0 extended)
Peak translations: 2, occurred 00:00:14 ago
Outside interfaces:
  Serial0/1/0
Inside interfaces:
  Serial0/0/0
Hits: 5 Misses: 0
<output omitted>
Configuring Dynamic NAT

Dynamic NAT Operation

- The pool of public IPv4 addresses (inside global address pool) is available to any device on the inside network on a first-come first-served basis

- With dynamic NAT, a single inside address is translated to a single outside address

- The pool must be large enough to accommodate all inside devices

- A device won’t be able to communicate to any external networks if no addresses are available in the pool
## Configuring Dynamic NAT

### Dynamic NAT Configuration Steps

| Step 1         | Define a pool of global addresses to be used for translation.  
                 | `ip nat pool name start-ip end-ip`  
                 | `{`  
                 | `netmask netmask | prefix-length prefix-length`  
                 | `}`  
|----------------|------------------------------------------------------------------|
| Step 2         | Define a standard access list permitting the addresses that should be translated.  
                 | `access-list access-list-number permit`  
                 | `source [source-wildcard]`  
|----------------|------------------------------------------------------------------|
| Step 3         | Establish dynamic source translation, specifying the access list and pool defined in prior steps.  
                 | `ip nat inside source list access-list-number pool name`  
|----------------|------------------------------------------------------------------|
| Step 4         | Identify the inside interface.  
                 | `interface type number`  
                 | `ip nat inside`  
|----------------|------------------------------------------------------------------|
| Step 5         | Identify the outside interface.  
                 | `interface type number`  
                 | `ip nat outside`  

**Note:**

Do buttons on 11.2.2.2.  
Students do button 4 for practice.
Configuring Dynamic NAT

Analyzing Dynamic NAT

Dynamic NAT Process

IPv4 NAT Pool

<table>
<thead>
<tr>
<th>Inside Local Address</th>
<th>Inside Global Address Pool</th>
<th>Outside Global Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.10</td>
<td>209.165.200.226</td>
<td>209.165.200.254</td>
</tr>
<tr>
<td>192.168.11.10</td>
<td>209.165.200.227</td>
<td>209.165.200.254</td>
</tr>
</tbody>
</table>

Do buttons on 11.1.2.3
Configuring Dynamic NAT

Analyzing Dynamic NAT

Dynamic NAT Process

IPv4 NAT Pool

<table>
<thead>
<tr>
<th>Inside Local Address</th>
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<th>Outside Global Address</th>
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<tbody>
<tr>
<td>192.168.10.10</td>
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<td>209.165.200.254</td>
</tr>
<tr>
<td>192.168.11.10</td>
<td>209.165.200.227</td>
<td>209.165.200.254</td>
</tr>
</tbody>
</table>
Configuring Dynamic NAT

Verifying Dynamic NAT

Verifying Dynamic NAT with show ip nat translations

```
R2# show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.165.200.226 192.168.10.10 --- ---
--- 209.165.200.227 192.168.11.10 --- ---
R2#
```

```
R2# show ip nat translations verbose
Pro Inside global Inside local Outside local Outside global
--- 209.165.200.226 192.168.10.10 --- ---
create 00:17:25, use 00:01:54 timeout:86400000, left
23:58:05, Map-Id(In): 1,
  flags:
none, use_count: 0, entry-id: 32, lc_entries: 0
--- 209.165.200.227 192.168.11.10 --- ---
create 00:17:22, use 00:01:51 timeout:86400000, left
23:58:08, Map-Id(In): 1,
  flags:
none, use_count: 0, entry-id: 34, lc_entries: 0
R2#
```
Configuring Dynamic NAT

Verifying Dynamic NAT

Verifying Dynamic NAT with show ip nat statistics

R2# clear ip nat statistics

PC1 and PC2 establish sessions with the server

R2# show ip nat statistics
Total active translations: 2 (0 static, 2 dynamic; 0 extended)
Peak translations: 6, occurred 00:27:07 ago
Outside interfaces:
  Serial0/0/1
Inside interfaces:
  Serial0/1/0
Hits: 24  Misses: 0
CEF Translated packets: 24, CEF Punted packets: 0
Expired translations: 4
Dynamic mappings:
 -- Inside Source
  [Id: 1] access-list 1 pool NAT-POOL1 refcount 2
    pool NAT-POOL1: netmask 255.255.255.224
    start 209.165.200.226 end 209.165.200.240
    type generic, total addresses 15, allocated 2 (13%), misses 0

Total doors: 0
Appl doors: 0
Normal doors: 0
Queued Packets: 0
R2#
Configuring Port Address Translation (PAT)

Configuring PAT: Address Pool

Example PAT with Address Pool

11.2.3.1

Do buttons on 11.2.3.1
Students do button 3 for practice

Define a pool of public IPv4 addresses under the pool name NAT-POOL2.
R2(config)# ip nat pool NAT-POOL2 209.165.200.226
209.165.200.240 netmask 255.255.255.224
Define which addresses are eligible to be translated.
R2(config)# access-list 1 permit 192.168.0.0 0.0.255.255
Bind NAT-POOL2 with ACL 1.
R2(config)# ip nat inside source list 1 pool NAT-POOL2
overload

Identify interface serial 0/0/0 as an inside NAT interface.
R2(config)# interface Serial0/0/0
R2(config-if)# ip nat inside

Identify interface serial 0/1/0 as the outside NAT interface.
R2(config)# interface Serial0/1/0
R2(config-if)# ip nat outside
## Configuring Port Address Translation (PAT)
### Configuring PAT: Single Address

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Define a standard access list permitting the addresses that should be translated.</td>
<td><code>access-list access-list-number permit source[source-wildcard]</code></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Establish dynamic source translation, specifying the ACL, exit interface and overload options.</td>
<td><code>ip nat inside source list access-list-number interface type number overload</code></td>
</tr>
</tbody>
</table>
| **Step 3** | Identify the inside interface. | `interface type number
ip nat inside` |
| **Step 4** | Identify the outside interface. | `interface type number
ip nat outside` |

---

Do buttons on 11.2.3.2
Students do button 3 for practice

11.2.3.2
Configuring Port Address Translation (PAT)

Analyzing PAT

PAT Analysis from PCs to Servers

PC1 to Svr1

1

SA 192.168.10.10
SP 1444
DA 209.165.201.1
DP 80

2

SA 209.165.200.225
SP 1444
DA 209.165.201.1
DP 80

3

SA 209.165.200.225
SP 1445
DA 209.165.202.129
DP 80

PC2 to Svr2

R2

NAT Table

<table>
<thead>
<tr>
<th>Inside Local Address</th>
<th>Inside Global Address</th>
<th>Outside Global Address</th>
<th>Outside Local Address</th>
</tr>
</thead>
</table>

Do buttons on 11.2.3.3
Configuring Port Address Translation (PAT)

Analyzing PAT

PAT Analysis from Servers to PCs

NAT Table

<table>
<thead>
<tr>
<th>Inside Local Address</th>
<th>Inside Global Address</th>
<th>Outside Global Address</th>
<th>Outside Local Address</th>
</tr>
</thead>
</table>
Verifying Port Address Translation (PAT)

### Verifying PAT Translations

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Inside global</th>
<th>Inside local</th>
<th>Outside local</th>
<th>Outside global</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcp</td>
<td>209.165.200.226:51839</td>
<td>192.168.10.10:51839</td>
<td>209.165.201.1:80</td>
<td>209.165.201.1:80</td>
</tr>
</tbody>
</table>

---

**Do buttons on 11.2.3.4**
Configuring Port Address Translation (PAT)

11.2.3.5 Activity - Identify the Address Information at Each Hop

Activity - Identify Address Information at Each Hop

PC1 is communicating with the Web Server through a NAT-enabled router (R1). Follow this communication one hop at a time to determine how the source address (SA), destination address (DA), and port number changes along the way. Select Button 2 now to get started.
Port Forwarding

Port forwarding is the act of forwarding a network port from one network node to another.

A packet sent to the public IP address and port of a router can be forwarded to a private IP address and port in inside network.

This is helpful in situations where servers have private addresses, not reachable from the outside networks.
Port Forwarding

SOHO Example

Port Forwarding on a SOHO Router

209.165.200.225/28

192.168.1.254

192.168.1.254:80

209.165.200.225:80

http://209.165.200.225

Security
View and change router settings

Application name
External Port
Internal Port
Protocol
Device IP#

Web Server
80
80
TCP
192.168.1.254

11.2.4.2
Port Forwarding

Configuring Port Forwarding with IOS

- In IOS, Port forwarding is essentially a static NAT translation with a specified TCP or UDP port number.

```
R2(config)# ip nat inside source static tcp 192.168.10.254 80 209.165.200.225 8080

Identifies interface serial 0/0/0 as an inside NAT interface.
R2(config)# interface Serial0/0/0
R2(config-if)# ip nat inside

Identifies interface serial 0/1/0 as the outside NAT interface.
R2(config)# interface Serial0/1/0
R2(config-if)# ip nat outside
```

Do buttons on 11.2.4.3
Configuring NAT and IPv6

NAT for IPv6?

- NAT is a workaround for IPv4 address scarcity
- IPv6 with a 128-bit address provides 340 undecillion addresses
- Address space is not an issue for IPv6
- IPv6 makes IPv4 public-private NAT unnecessary by design
- However, IPv6 does implement a form of private addresses and it is implemented differently than they are for IPv4
Configuring NAT and IPv6

IPv6 Unique Local Addresses

- IPv6 unique local addresses (ULA) is designed to allows IPv6 communications within a local site.
- ULA is not meant to provide additional IPv6 address space.
- ULA have the prefix FC00::/7, which results in a first hextet range of FC00 to FDFF.
- Unique local addresses are defined in RFC 4193.
- ULAs is also known as local IPv6 addresses (not to be confused with IPv6 link-local addresses).
Configuring NAT and IPv6

NAT For IPv6

- IPv6 also uses NAT but in a much different context
- In IPv6, NAT is used to provide transparent communication between IPv6 and IPv4
- NAT64 is not intended to be a permanent solution. It is meant to be a transition mechanism
- Network Address Translation-Protocol Translation (NAT-PT) was another NAT based transition mechanism for IPv6 but is now deprecated by IETF
- NAT64 is now recommended
Configuring NAT and IPv6

NAT For IPv6
Configuring NAT and IPv6

Troubleshooting NAT: Show commands

```
R2# clear ip nat statistics
R2# clear ip nat translation *
R2#

Host 192.168.10.10 telnets to server at 209.165.201.1

R2# show ip nat statistics
Total active translations: 1 (0 static, 1 dynamic; 1 extended)
Peak translations: 1, occurred 00:00:09 ago
Outside interfaces:
  Serial0/0/1
Inside interfaces:
  Serial0/0/0
Hits: 31  Misses: 0
CEF Translated packets: 31, CEF Punted packets: 0
Expired translations: 0
Dynamic mappings:
  -- Inside Source
  [Id: 5] access-list 1 pool NAT-POOL2 refcount 1
    pool NAT-POOL2: netmask 255.255.255.224
    start 209.165.200.226 end 209.165.200.240
    type generic, total addresses 15, allocated 1 (6%), misses 0
  <output omitted>
R2# show ip nat translations
Pro Inside global Inside local Outside local Outside global

11.3.1.1
```

Do buttons on 11.3.1.1
Configuring NAT and IPv6

Troubleshooting NAT: Debug command

```
R2# debug ip nat
IP NAT debugging is on
R2#
*Feb 15 20:01:311.670: NAT*: s=192.168.10.10->209.165.200.226, d=209.165.201.1 [2817]
*Feb 15 20:01:311.682: NAT*: s=209.165.201.1, d=209.165.200.226->192.168.10.10 [4180]
*Feb 15 20:01:311.698: NAT*: s=192.168.10.10->209.165.200.226, d=209.165.201.1 [2818]
*Feb 15 20:01:311.702: NAT*: s=192.168.10.10->209.165.200.226, d=209.165.201.1 [2819]
*Feb 15 20:01:311.710: NAT*: s=192.168.10.10->209.165.200.226, d=209.165.201.1 [2820]
*Feb 15 20:01:311.710: NAT*: s=209.165.201.1, d=209.165.200.226->192.168.10.10 [4181]
*Feb 15 20:01:311.726: NAT*: s=192.168.10.10->209.165.200.226, d=209.165.201.1 [2821]
*Feb 15 20:01:311.734: NAT*: s=192.168.10.10->209.165.200.226, d=209.165.201.1 [2822]
output omitted
```
Configuring NAT and IPv6

Troubleshooting NAT: Debug command

11.3.1.3

1. Do buttons on 11.3.1.3

```bash
R2# show ip nat translations
R2#
```
Chapter 11: Summary

- This chapter has outlined how NAT is used to help alleviate the depletion of IPv4 address space.
- NAT conserves public address space and saves considerable administrative overhead in managing adds, moves, and changes.
- This chapter discussed NAT for IPv4, including:
  - NAT characteristics, terminology and general operations
  - The different types of NAT including static NAT, dynamic NAT, and NAT with overloading
  - The benefits and disadvantages of NAT
Chapter 11: Summary (cont)

- The configuration, verification and analysis of static NAT, dynamic NAT, and NAT with overloading
- How port forwarding can be used to access an internal devices from the Internet
- Troubleshooting NAT using `show` and `debug` commands
- How NAT for IPv6 is used to translate between IPv6 addresses and IPv4 addresses