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CCNA: NAT CHEAT SHEET

Key Characteristics

Standard: RFC 3022

Short term solution to overcome the address requirement to connect with internet

Enables an organization to use Private Addressing Scheme (defined in RFC 1918) and still connect to the internet

Private Address Space

Private IP addressing is defined in RFC 1918 according which the following IP address blocks can be used within an organization for private use:
1.   10.0.0.0 / 8
2.   172.16.0.0 / 12
3.   192.168.0.0 / 16

NAT Address Types

Inside Local Address: the IP Address assigned to the host on the inside network. This address is usually from the RFC 1918 Private address space.

Inside Global Address: It is the IP address of an inside host (or a group of hosts) as it appears to the outside network. It is usually an address that is globally routable.

Outside Local Address: the IP address assigned to an outside host as it appears to the inside network. The address is allocated from an address space routable on inside network

Outside Global Address: the IP address of an outside host assigned by the owner/administrator of the host. Allocated from a globally routable address space

## Types of NAT

There are 3 types:
1.   Static NAT
A single local IP address is mapped to single global IP address. Also called one-to-one NAT

2.   Dynamic NAT
A pool of global addresses is used to translate local IP addresses. Each inside host is assigned a global address for the duration of the session. If the session is timed-out, the specific IP address is available to use for other inside hosts

3.   Port Address Translation
Also called overloading NAT. If a large number of host need to access the internet, then static and dynamic NAT are not feasible solutions as a large number of public IP addresses will be required. PAT actually translates multiple local addresses to a single global address using different ports.
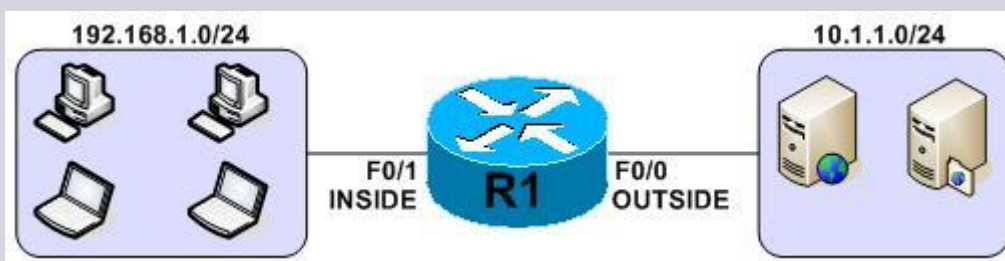
Configuration Example: Static NAT

Router R1:
interface fastethernet0/1
 ip address 192.168.1.1 255.255.255.0
 ip nat inside
 !
interface fastethernet0/0
 ip address 10.1.1.1 255.255.255.0
 ip nat outside
 !
ip nat inside source static 192.168.1.10 172.16.1.1

```
R1#sh ip nat translation
Pro Inside global    Inside local    Outside local    Outside global
--- 172.16.1.1       192.168.1.10    ---              ---
```

Configuration Example: Dynamic NAT

Router R1:
```
interface fastethernet0/1
 ip address 192.168.1.1 255.255.255.0
 ip nat inside
!
interface fastethernet0/0
 ip address 10.1.1.1 255.255.255.0
 ip nat outside
!
ip access-list standard INSIDE-HOSTS
 permit 192.168.1.0 0.0.0.255
!
ip nat pool NAT-POOL 155.1.1.1 155.1.1.254 netmask 255.255.255.0
!
ip nat inside source list INSIDE-HOSTS pool NAT-POOL
```

```
R1#sh ip nat translation
Pro Inside global    Inside local    Outside local    Outside global
--- 155.1.1.1        192.168.1.1     ---              ---
--- 155.1.1.2        192.168.1.2     ---              ---
--- 155.1.1.3        192.168.1.3     ---              ---
```

Configuration Example: Port Address Translation

Router R1:
```
interface fastethernet0/1
 ip address 192.168.1.1 255.255.255.0
 ip nat inside
!
interface fastethernet0/0
 ip address 10.1.1.1 255.255.255.0
 ip nat outside
!
ip access-list standard INSIDE-HOSTS
 permit 192.168.1.0 0.0.0.255
!
ip nat inside source list INSIDE-HOSTS interface fastethernet0/0 overload
```

```
R2#sh ip nat translation
Pro        Inside global        Inside local         Outside local        Outside global
icmp       10.1.1.1:5           192.168.1.1          10.1.1.3:5           10.3.3.3:5
icmp       10.1.1.1:6           192.168.1.2          10.1.1.4:6           10.3.3.4:6
tcp        10.1.1.1:41683       192.168.1.3:41683    10.1.1.3:23          10.3.3.3:23
tcp        10.1.1.1:51780       192.168.1.3:51780    10.3.1.4:80          10.3.3.4:80
```

Troubleshooting Command

1.   show ip nat translation
2.   show ip nat translation verbose
3.   debug ip nat [detailed]