Network Address Translation

Example Topology

<table>
<thead>
<tr>
<th>Interface</th>
<th>Address Details</th>
<th>NAT Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FastEthernet0</td>
<td>10.0.0.1/16</td>
<td>NAT Inside</td>
</tr>
<tr>
<td>FastEthernet1</td>
<td>174.143.212.1/22</td>
<td>NAT Outside</td>
</tr>
</tbody>
</table>

NAT Boundary Configuration

interface FastEthernet0
ip address 10.0.0.1 255.255.0.0
ip nat inside
interface FastEthernet1
ip address 174.143.212.1 255.255.252.0
ip nat outside

Static Source Translation

interface FastEthernet0
ip address 10.0.0.1 255.255.0.0
ip nat inside
interface FastEthernet1
ip address 174.143.212.1 255.255.252.0
ip nat outside

One line per static translation
ip nat inside source static 10.0.0.19 192.0.2.1
ip nat inside source static 10.0.1.47 192.0.2.2
ip nat outside source static 174.143.212.133 10.0.0.47
ip nat outside source static 174.143.213.240 10.0.2.181

Dynamic Source Translation

! Create an access list to match inside local addresses
access-list 10 permit 10.0.0.0 0.0.255.255
!
! Create NAT pool of inside global addresses
ip nat pool MyPool 192.0.2.1 192.0.2.254 prefix-length 24
!
! Combine them with a translation rule
ip nat inside source list 10 pool MyPool
!
! Dynamic translations can be combined with static entries
ip nat inside source static 10.0.0.42 192.0.2.42

Port Address Translation (PAT)

! Static layer four port translations
ip nat inside source static tcp 10.0.0.3 8000 192.0.2.1 80
ip nat inside source static udp 10.0.0.14 53 192.0.2.2 53
ip nat outside source static tcp 174.143.212.4 23 10.0.0.8 23
!
! Dynamic port translation with a pool
ip nat inside source list 11 pool MyPool overload
!
! Dynamic translation with interface overloading
ip nat inside source list 11 interface FastEthernet1 overload

Inside Destination Translation

! Create a rotary NAT pool
ip nat pool LoadBalServers 10.0.99.200 10.0.99.203 prefix-length 24 type rotary
!
! Enable load balancing across inside hosts for incoming traffic
ip nat inside destination list 12 pool LoadBalServers

Address Classification

<table>
<thead>
<tr>
<th>Location</th>
<th>Inside Local</th>
<th>Inside Global</th>
<th>Outside Local</th>
<th>Outside Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perspective</td>
<td>Local</td>
<td>Global</td>
<td>Local</td>
<td>Global</td>
</tr>
</tbody>
</table>

Terminology

NAT Pool
A pool of IP addresses to be used as inside global or outside local addresses in translations

Port Address Translation (PAT)
An extension to NAT that translates information at layer four and above, such as TCP and UDP port numbers; dynamic PAT configurations include the overload keyword

Extendable Translation
The extendable keyword must be appended when multiple overlapping static translations are configured

Special NAT Pool Types

- **Rotary** Used for load balancing
- **Match-Host** Preserves the host portion of the address after translation

Troubleshooting

show ip nat translations [verbose]
show ip nat statistics
clear ip nat translations

NAT Translations Tuning

ip nat translation tcp-timeout <seconds>
ip nat translation udp-timeout <seconds>
ip nat translation max-entries <number>

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Inside Local
An actual address assigned to an inside host

Inside Global
An inside address seen from the outside

Outside Local
An outside address seen from the inside

Outside Global
An actual address assigned to an outside host