


Scaling IP Addresses

CCNA4 Module 1 Review



1.1.2 Introducing NAT and PAT

- **Inside local address** – The IP address assigned to a host on the inside network.
 - The address is usually not an IP address assigned by the Network Information Center (NIC) or service provider.
 - This address is likely to be an RFC 1918 private address.
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1.1.3 Major NAT and PAT features

- Overloading, or Port Address Translation (PAT), maps multiple private IP addresses to a single public IP address.
 - Multiple addresses can be mapped to a single address because each private address is tracked by a port number.
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1.1.3 Major NAT and PAT features

- The main difference between NAT and PAT is that PAT uses unique port numbers to distinguish between translations.
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1.1.6 Troubleshooting NAT and PAT configuration

- To allow a privately addressed client to communicate with a web server place NAT and PAT on the nearest router.
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1.1.7 Issues with NAT

- Cisco IOS NAT supports the following traffic types:
 - ICMP
 - File Transfer Protocol (FTP), including PORT and PASV commands
 - NetBIOS over TCP/IP, datagram, name, and session services
 - RealNetworks' RealAudio
 - White Pines' CUSeeMe
 - Xing Technologies' StreamWorks
 - DNS "A" and "PTR" queries
 - H.323/Microsoft NetMeeting, IOS versions 12.0(1)/12.0(1)T and later
 - VDOnet's VDOLive, IOS versions 11.3(4)11.3(4)T and later
 - VXtreme's Web Theater, IOS versions 11.3(4)11.3(4)T and later
 - IP Multicast, IOS version 12.0(1)T with source address translation only
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1.2.1 Introducing DHCP

- Easy IP leases configurations for 24 hours by default.
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1.2.2 BOOTP and DHCP differences

- ❑ BOOTP does not dynamically allocate IP addresses to a host.
 - ❑ DHCP provides the mechanism for a client to gather other IP configuration parameters, such as WINS and domain name.
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1.2.3 Major DHCP features

- Some of the configuration parameters available are listed in IETF RFC 1533:
 - Subnet mask
 - Router
 - Domain Name
 - Domain Name Server(s)
 - WINS Server(s)
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1.2.4 DHCP Operation

- ❑ The client locates a DHCP server by sending a broadcast called a DHCPDISCOVER.
 - ❑ If the client finds the offer agreeable, it will send another broadcast, a DHCPREQUEST, specifically requesting those particular IP parameters.
 - ❑ If the client detects that the address is already in use on the local segment it will send a DHCPDECLINE message and the process starts again.
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1.2.4 DHCP Operation

- The server will issue an ICMP echo request, or will ping, to a pool address before sending the DHCPOFFER to a client.
 - Although configurable, the default number of pings used to check for a potential IP address conflict is two.
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1.2.4 DHCP Operation

- The DHCPOFFER is a proposed configuration that may include IP address, DNS server address, and lease time.
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1.2.7 Troubleshooting DHCP

- To troubleshoot the operation of the DHCP server, the command **debug ip dhcp server events** can be used.
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1.2.8 DHCP Relay

- ❑ DHCP clients use IP broadcasts to find the DHCP server on the segment.
 - ❑ What happens when the server and the client are not on the same segment and are separated by a router?
 - ❑ Routers do not forward these broadcasts.
 - ❑ When possible, administrators should use the **ip helper-address** command to relay broadcast requests for these key UDP services.
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1.1.4 Configuring NAT and PAT

- To implement PAT on a router:
 - Access-list *number* permit *ip address netmask*
 - ip nat inside source list *number* interface *number* overload
 - ip NAT outside
 - ip NAT inside

Define a standard access list permitting those addresses that are to be translated.

```
Router (config) #access-list  
access-list-number permit  
source [source-wildcard]
```