

freeCodeCamp (🔥)



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Security devices.

Introduction to network devices II.

– Intrusion prevention system (IPS).

- » An IPS is an active system designed stop a breach or attack from succeeding in damaging the network.
 - Usually designed to perform an action or set of actions to stop the malicious activity.
 - Will inform a network administrator through the use of log files, SMS, and/or email notification.
- » All traffic on the network segment flows through the IPS to either enter or leave the segment.
- Like the IDS, all traffic is evaluated against a set of standards.
- » The best placement on the network is between a router (with a firewall) and the destination network segment.
- » It is programmed to make an active response to the situation.
 - Block the offending IP address.
 - Close down the vulnerable interface.
 - Terminate the network session.
 - Redirect the attack.
 - Plus more.



Network access services.

Networking services and applications.

– Network interface controller (NIC).

- » It can also be called a **network interface card**.
- » The NIC is how a device connects to a network.
- » It works at two layers of the OSI model.
 - At Layer 2 (the data link layer), it provides the functional means of network communication by determining which networking protocols will be used (e.g., Ethernet and Point-to-Point Protocol). It also provides the local network node address through its burned in physical MAC address.
 - At Layer 1 (the physical layer), it determines how the network data traffic will be converted a bit at a time into an electrical signal that can traverse the network media being used.
- » Most modern computers come with at least one built in Ethernet NIC.
- » Routers and other network devices may use separate modules that can be inserted into the device to provide the proper NIC for the type of media they are connecting to and the networking protocol that is being used.



Components and processes of DHCP.

DHCP in the network.

Leases.

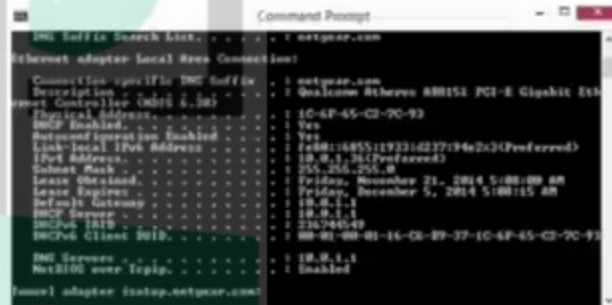
- Configuration parameters are only good for a specified amount of time.
- Leases are configured by the administrator.

Options.

- Default gateway location.
- DNS server addresses (there can be more than one).
- Time server addresses.
- Many additional options.

Preferred IP configuration.

- A PC can have a preferred IP address.
- The administrator can configure the DHCP server to either honor the preference or ignore it.



```
Command Prompt
C:\> ipconfig /all

Ethernet adapter Local Area Connection:

   Connection-specific DNS Suffix . . . . . : netgear.com
   Description . . . . .                   : Realtek PCIe GbE Family Controller
   Physical Address. . . . .                : 8C:8E:8E:8E:8E:8E
   DHCP Enabled. . . . .                   : Yes
   Autoconfiguration Enabled . . . . .     : Yes
   Link-local IPv6 Address . . . . .       : fe80::5855:1923:4237:94e2%3(Preferred)
   IPv4 Address. . . . .                    : 192.168.1.101(Preferred)
   Subnet Mask . . . . .                   : 255.255.255.0
   Lease Obtained. . . . .                 : Friday, November 21, 2014 5:00:00 AM
   Lease Expires . . . . .                  : Friday, December 5, 2014 5:00:15 AM
   Default Gateway . . . . .                : 192.168.1.1
   DHCPv6 IAID . . . . .                    : 234744549
   DHCPv6 Client ID . . . . .               : 08-81-90-81-16-08-37-10-6F-65-C2-7C-93

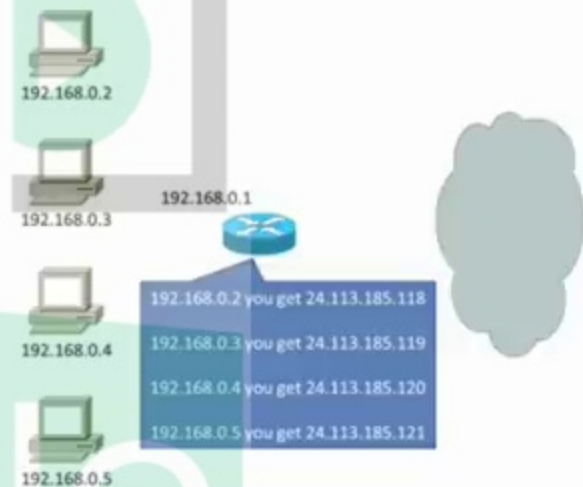
DNS Servers . . . . .                      : 192.168.1.1
NetBIOS over Tcpip. . . . .                 : Enabled
```

How network address translation works.

Introducing network address translation.

– The two categories of NAT.

- ▶ **Static NAT (SNAT):** each private IP address is assigned to a specific routable public IP address. This relationship is kept and maintained by the NAT enabled router.
 - When a device needs access outside of the local network, the router translates the local IP address to the assigned public IP address. When the response comes back, the router will translate the public IP address back into the local one.
 - SNAT is not flexible and leads to scalability issues. An individual routable IP address must be kept for every device that requires to access outside of the local network.
- ▶ **Dynamic NAT (DNAT):** the NAT enabled router dynamically assigns a routable IP address to devices from a pool of available public IP addresses.
 - When a device needs access outside of the local network, the router performs the NAT function, only the public IP address comes from a re-useable pool of public IP addresses.
 - As initially designed, DNAT was more flexible than SNAT, but still led to some scalability issues. As more network traffic requires access to remote networks, the pool of available public IP addresses needs to increase or outside access cannot be achieved.





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