Chapter 6

Chapter 6

Episode 6.01

Episode title: **Introduction to IP Addressing and Binary**

Objective: **1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes**

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Key Terms

- Dotted decimal notation
- Each octet is valued between 0 and 255
- Congratulations!
- 11000101 = 197
- 00001110 = 14
- 10101010 = 170

Key Terms

- 00000000 = 0
- 11111111 = 255
- Converting 171 from decimal to binary
- 171 in binary is 10101011
- Converting 224 from decimal to binary
- 224 in binary is 11100000
- Converting 95 from decimal to binary
- 95 in binary is 01011111

Quick Review

- Each computer on a TCP/IP network must have a unique IP address
- IPv4 addresses are written as four octets, such as 192.168.4.12
- Each octet represents a binary string; 192, for example is 11000000

Episode 6.02

Episode title: **Introduction to ARP**

Objective: **2.3 Given a scenario, configure and deploy common Ethernet switching features**

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Key Terms

- ARP (Address Resolution Protocol)
- ARP resolves MAC addresses from IP addresses

Quick Review

- ARP requests are broadcast over a network
- Type arp -a to see the ARP cache
- ARP is what a computer uses when it knows the IP address, but needs the MAC address
- ARP resolves IP addresses

Episode 6.03

Episode title: **Subnet Masks**

Objective: **1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes**

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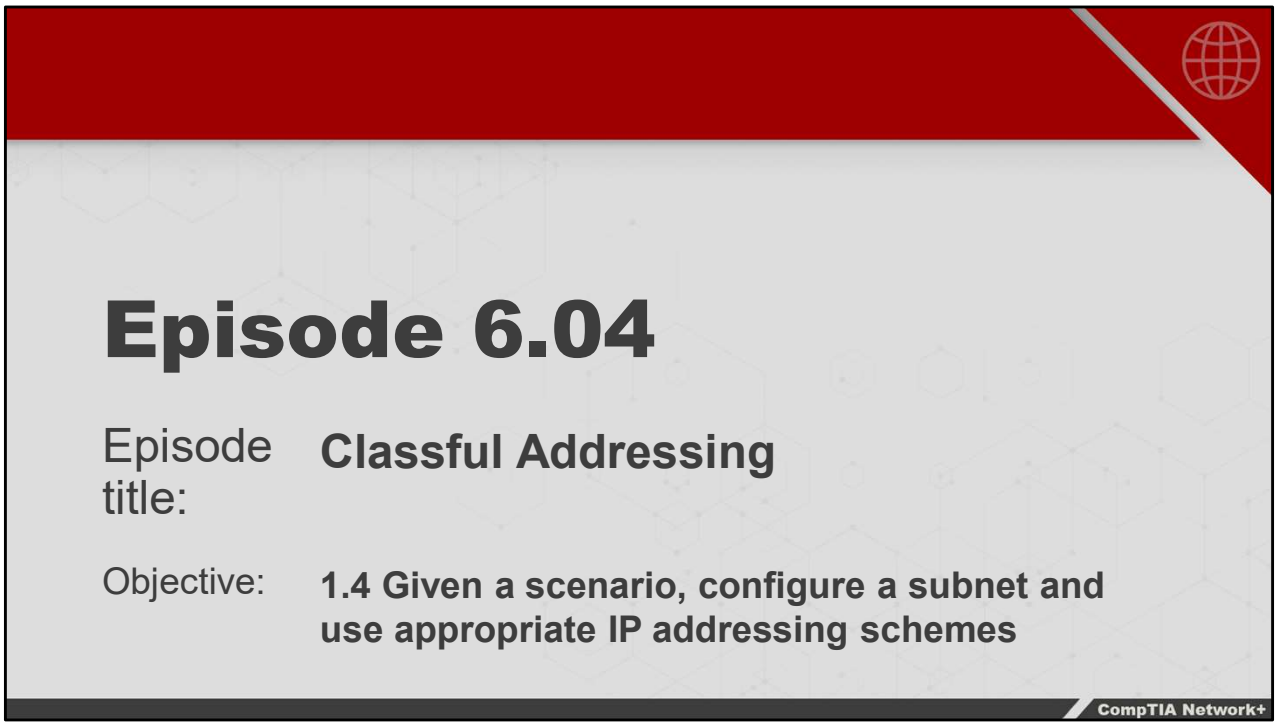
Key Terms

- Cannot use 0-255 for the Host ID
- The subnet mask is only used by the computer; it is never sent out
- 232.25.208.xxx/24
- The default gateway will figure out where to forward the message

Quick Review

- Each host needs a subnet mask
- The host uses the subnet mask to know if the destination is on the local network or a remote network
- Each host knows the default gateway so that it can forward traffic to remote networks


Episode 6.04
Episode title:
Classful Addressing
Objective:
1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes
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Key Terms

- Class licenses
- Class A 0-126 /8
- Class B 128-191 /16
- Class C 192-223 /24
- Subnetting divides network IDs into two or more networks
- Subnets don’t have to be on the dots

Quick Review

- Classful subnetting was the first effort to divide network IDs
- Class A, B, and C licenses
- Memorize the first octet to know your class licenses

Episode 6.05

Episode title: **Subnetting with CIDR**

Objective: **1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes**

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Key Terms

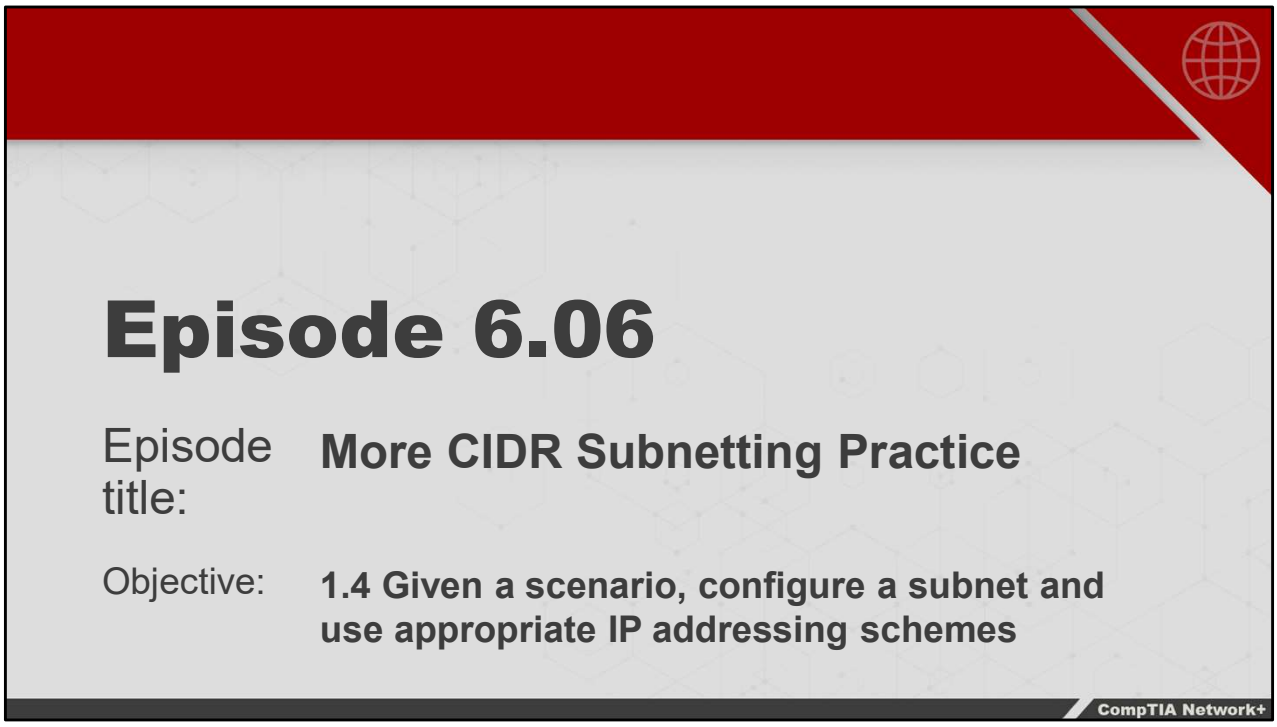
- Classless Inter-Domain Routing (CIDR)
- 160.25.208.1
- (281)-555-1212
- 2815551212
- 160.25.208.1
- 10100000000110011101000000000001
- 208.25.160.0 /24

Key Terms

- 208.25.160.0 /25
- 208.25.160.128 /25
- 2 subnets, 126 hosts per subnet
- 4 subnets, 62 hosts per subnet

Quick Review

- CIDR- Classless Inter-Domain Routing
- Subnet masks have all 1s on the left and all 0s on the right
- The more subnets you have the less hosts are available


Episode 6.06
Episode title:
More CIDR Subnetting Practice
Objective:
1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes
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Key Terms

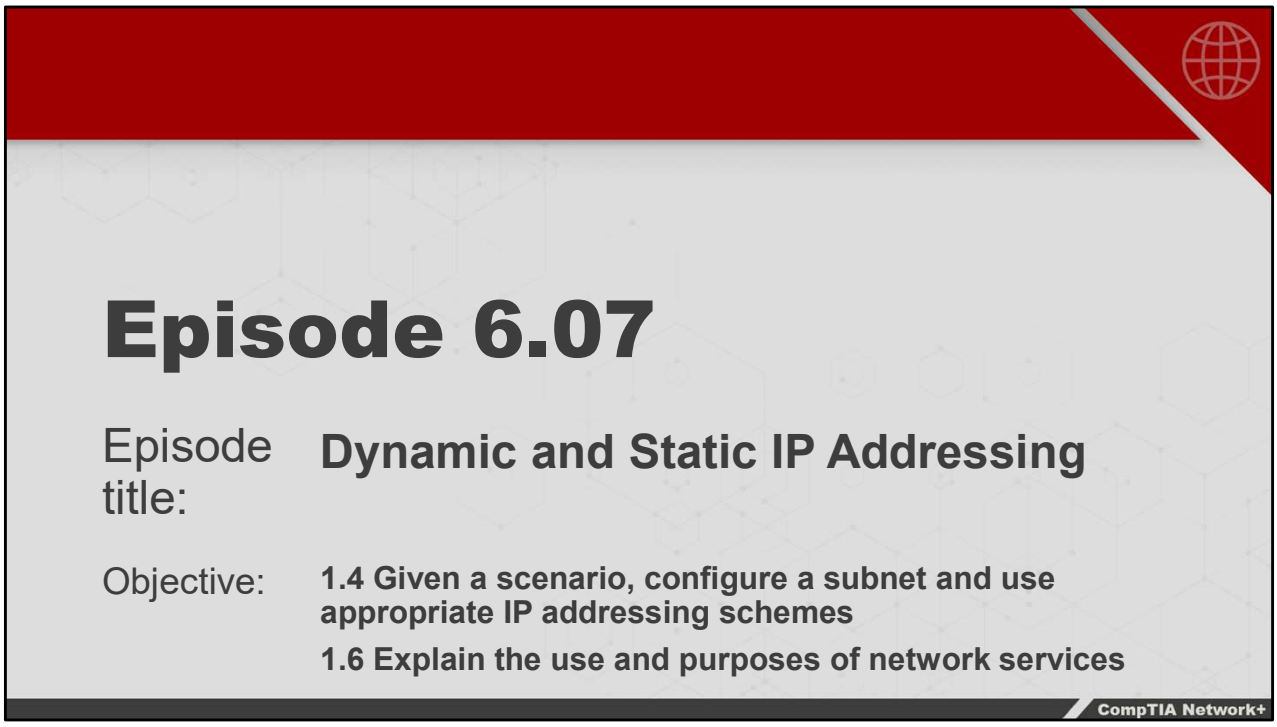
- Dynamic IP address
- Static IP address
- /24 = 254 hosts
- /24 = 254 hosts
- /25 = 126 hosts
- /26 = 62 hosts
- /27 = 30 hosts

Key Terms

- /28 = 14 hosts
- /29 = 6 hosts
- /30 = 2 hosts
- /31 = 0 hosts
- Subnet mask
- Network ID

Quick Review

- CIDR- Classless Inter-Domain Routing
- Subnet masks have all 1s on the left and all 0s on the right
- The more subnets you have the less hosts are available


Episode 6.07
Episode title:
Dynamic and Static IP Addressing
Objective:
1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes
1.6 Explain the use and purposes of network services
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Key Terms

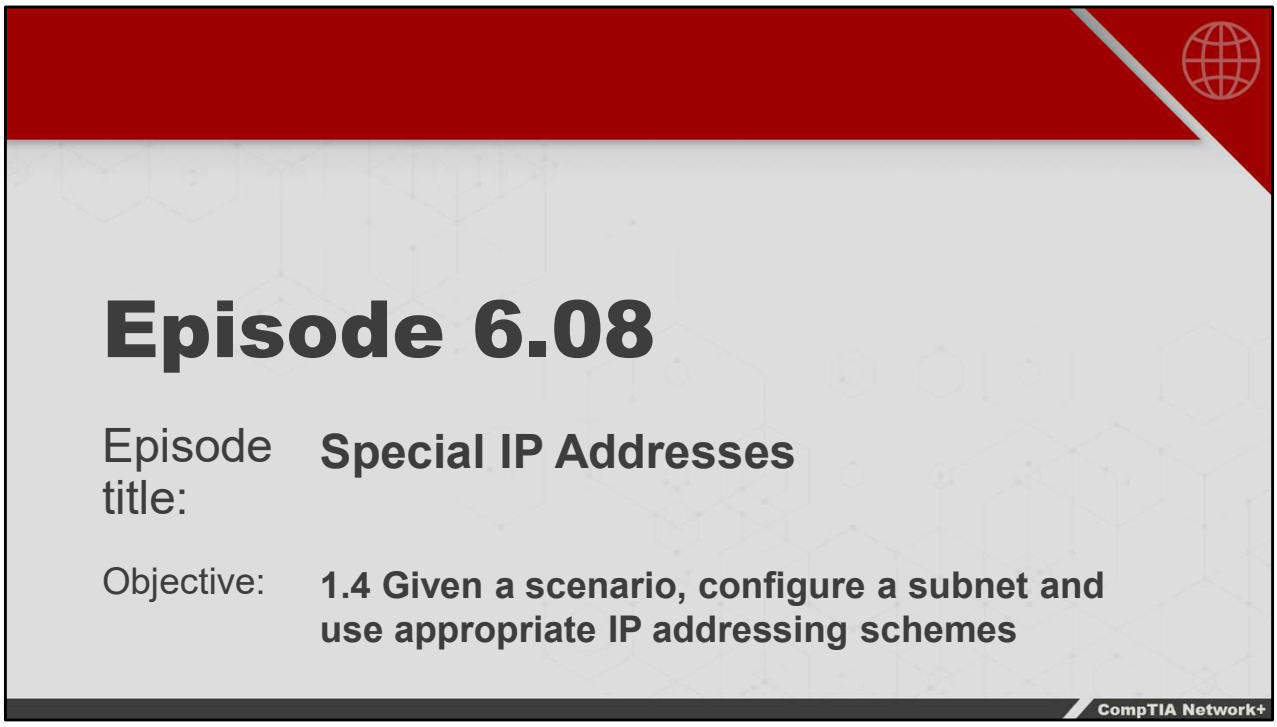
- Static (manual) assignment
- Dynamic (automatic) assignment
- Dynamic Host Configuration Protocol (DHCP)
- BOOTP in Linux
- Each broadcast domain must only have one DHCP server
- DHCP server must be run within the broadcast domain

Key Terms

- ipconfig
- ifconfig in Linux
- DHCP lease time
- DCHP pool/scope
- IP address reservation
- Exclusion ranges

Quick Review

- Each broadcast domain must have only one DHCP server
- The DHCP server must be run within the broadcast domain
- Every modern operating system comes with DHCP enabled by default
- The command to display network information is ipconfig in Windows/macOS and ifconfig in Linux


Episode 6.08
Episode title:
Special IP Addresses
Objective:
1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes
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Key Terms

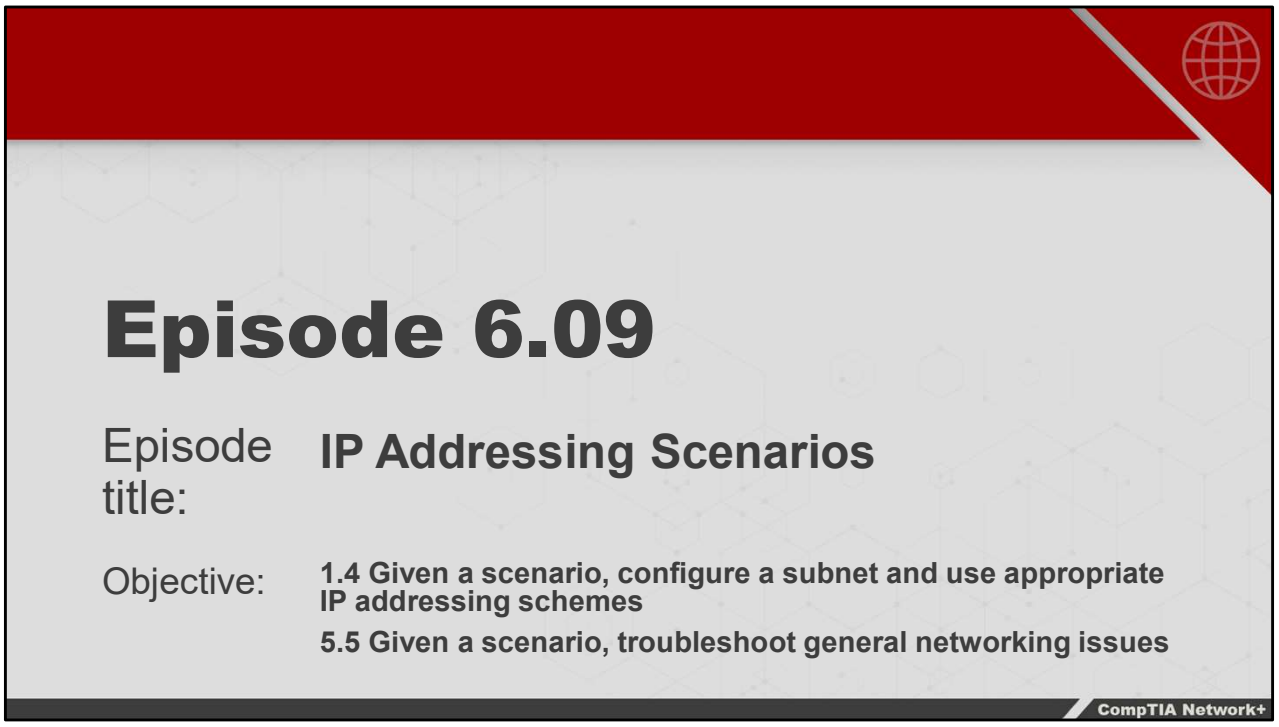
- 10.X.X.X
- 172.16.x.x - 172.31.x.x -> private IP address
- 192.168.x.x -> private IP address
- NAT device
- Loopback address
- Loopback adaptor
- IPv4 loopback - 127.0.0.1

Key Terms

- IPv6 loopback - ::1
- APIPA (Automatic Private IP Addressing)
- APIPA - 169.254.x.x

Quick Review

- Special internal IP addresses are: 10.x.x.x, 172.16.x.x - 172.31.x.x, and 192.168.x.x
- The loopback address for IPv4 is 127.0.0.1 and for IPv6 is ::1
- An APIPA address (169.254.x.x) indicates the DHCP server is down


Episode 6.09
Episode title:
IP Addressing Scenarios
Objective:
1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes
5.5 Given a scenario, troubleshoot general networking issues
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Key Terms

- Duplicate IP address
- ipconfig
- ifconfig
- Duplicate MAC address
- Incorrect gateway
- Incorrect netmask
- Expired IP address

Quick Review

- ipconfig (Windows) and ifconfig (Linux) display the IP address information
- Virtual machines can be a source of duplicate MAC address errors
- All the computers in one broadcast domain have the same subnet mask