Chapter 7

Routing

Episode 7.01

Episode title: **Introducing Routers**

Objective:

2.1 Compare and contrast various devices, their features, and their appropriate placement on the network

2.2 Compare and contrast routing technologies and bandwidth management concepts

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S0

Key Terms

- Router - A box that connects Network IDs
- Routers interconnect network IDs
- Routing table
- Default route
- Upstream router
- Gateway routers

Slide 3

S0 For some reason the first 3 slides were missing when I initially opened this in Production Slides_Edited, but I copied them from Paul's edits. SM
Shannon, 2021-12-10T23:17:42.282

Quick Review

- Routers only care about destinations
- Routers can use any network medium
- All routers have a routing table


Episode 7.02
Episode title:
Understanding Ports
Objective:
1.5 Explain common ports and protocols, their application, and encrypted alternatives
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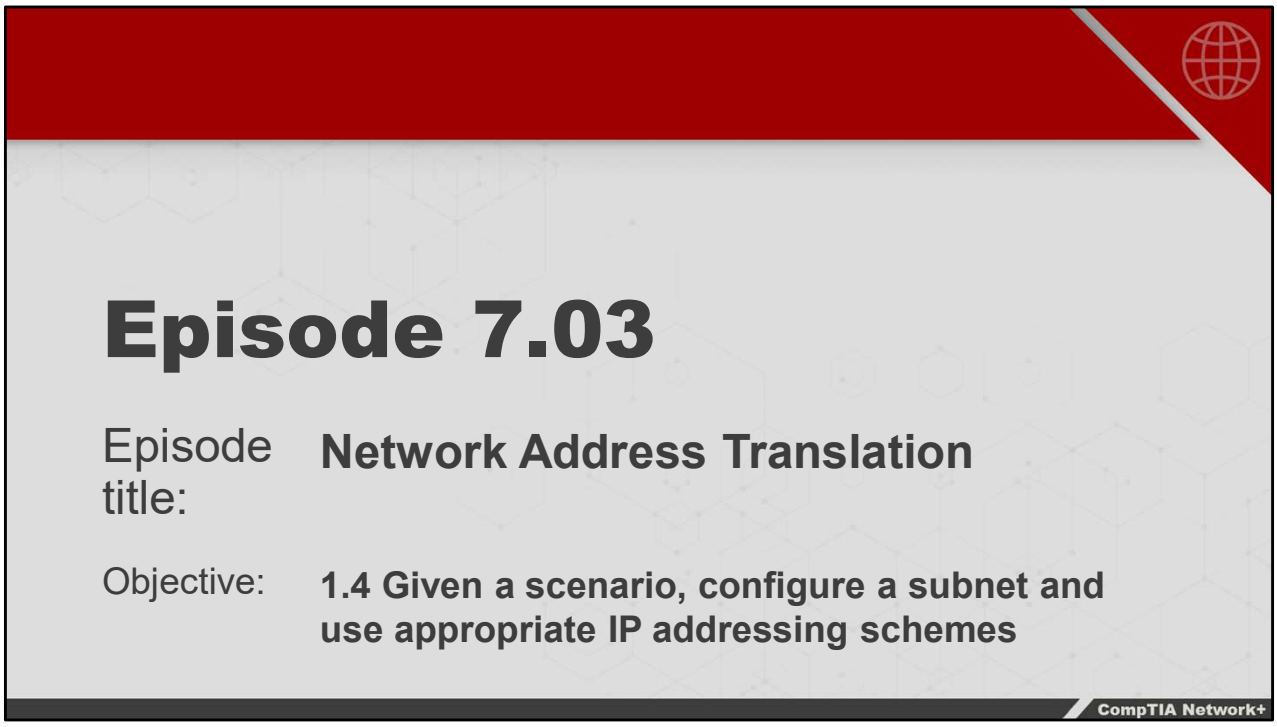
Key Terms

- Port number
- Port numbers 0 to 1023 are called well known ports
- Your computer generates the ephemeral port

Quick Review

- Every TCP packet has two port numbers
- Well known port numbers run from 0 to 1023
- Clients generate ephemeral numbers that are always between 1024 and 65535


Episode 7.03
Episode title:
Network Address Translation
Objective:
1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes
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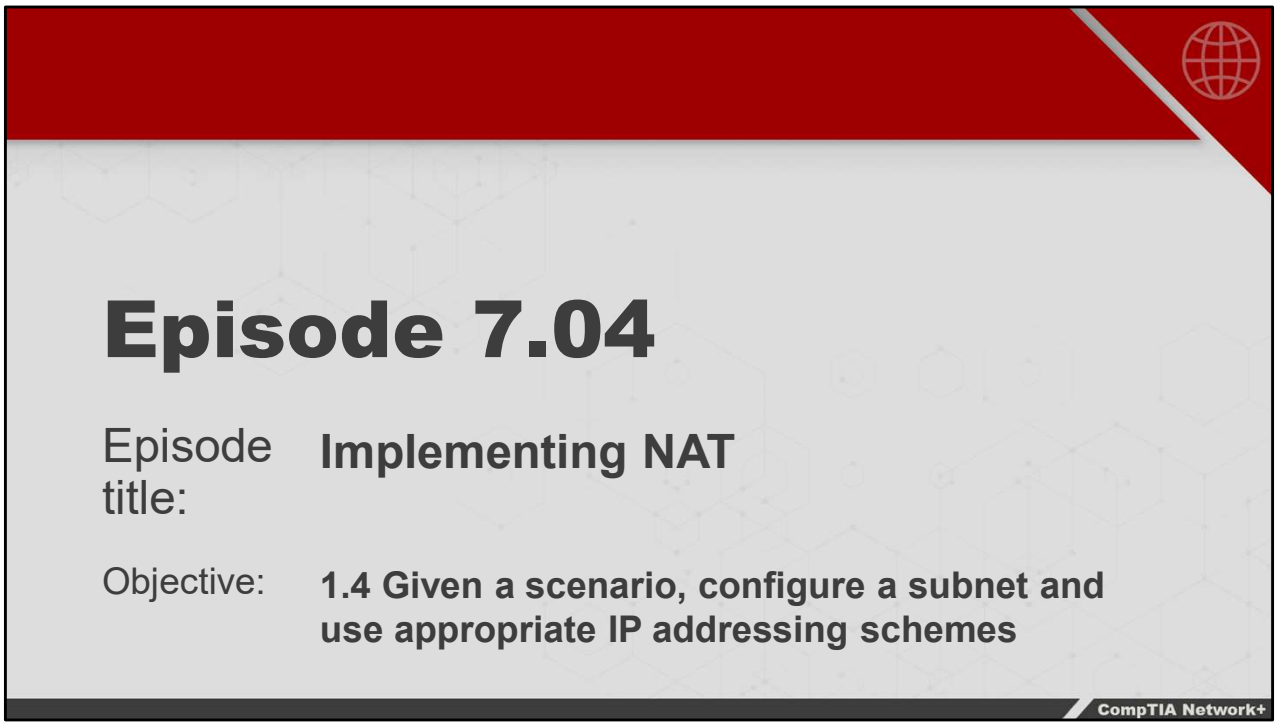
Key Terms

- Network Address Translation (NAT)
- Static NAT (SNAT)
- Dynamic NAT (DNAT)
- Port Address Translation (PAT)

Quick Review

- PAT translates internal IP addresses to an Internet address and tracks the packets
- SNAT sends specific traffic to one internal IP address
- DNAT has a limited pool of Internet addresses to give to a number of internal devices


Episode 7.04
Episode title:
Implementing NAT
Objective:
1.4 Given a scenario, configure a subnet and use appropriate IP addressing schemes
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Key Terms

- No Key Terms for this episode

Quick Review

- SOHO routers ship with NAT enabled
- NAT on a SOHO router can be disabled from the router's configuration page
- Some older routers call this setting gateway/router mode

Episode 7.05

Episode title: **Forwarding Ports**

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

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Key Terms

- Port forwarding
- Port range forwarding
- Port triggering
- FTP: Port 20, 21-
- SOHO DMZ

Quick Review

- Port forwarding allows external devices to have internal communication through a router
- Port triggering will open an alternative assigned port when the initial port is contacted (e.g., FTP)
- Enabling DMZ when setting up port forwarding places that device outside the protection of that router


Episode 7.06
Episode title:
Tour of a SOHO Router
Objective:
2.1 Compare and contrast various devices, their features, and their appropriate placement on the network
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Key Terms

- Default IP address

Quick Review

- All home routers have a default IP address, username, and password
- Almost all home routers are DHCP servers
- Router WAN connections are commonly DHCP clients by default


Episode 7.07
Episode title:
SOHO vs. Enterprise
Objective:
2.1 Compare and contrast various devices, their features, and their appropriate placement on the network
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Key Terms

- SOHO router
- Enterprise router
- 100X bandwidth
- IOS interface

Quick Review

- SOHO routers are for small groups (5-6 devices) and can have built-in capability for switches, firewalls, and WAPs
- Enterprise routers have expanded connection capability to other devices (i.e., routers, switches, and WAPs)
- SOHO routers often have Web-based interfaces; enterprise routers typically have their own OS interface

Episode 7.08

Episode title: **Static Routes**

Objective:

2.2 Compare and contrast routing technologies and bandwidth management concepts

5.3 Given a scenario, use the appropriate network software tools and commands

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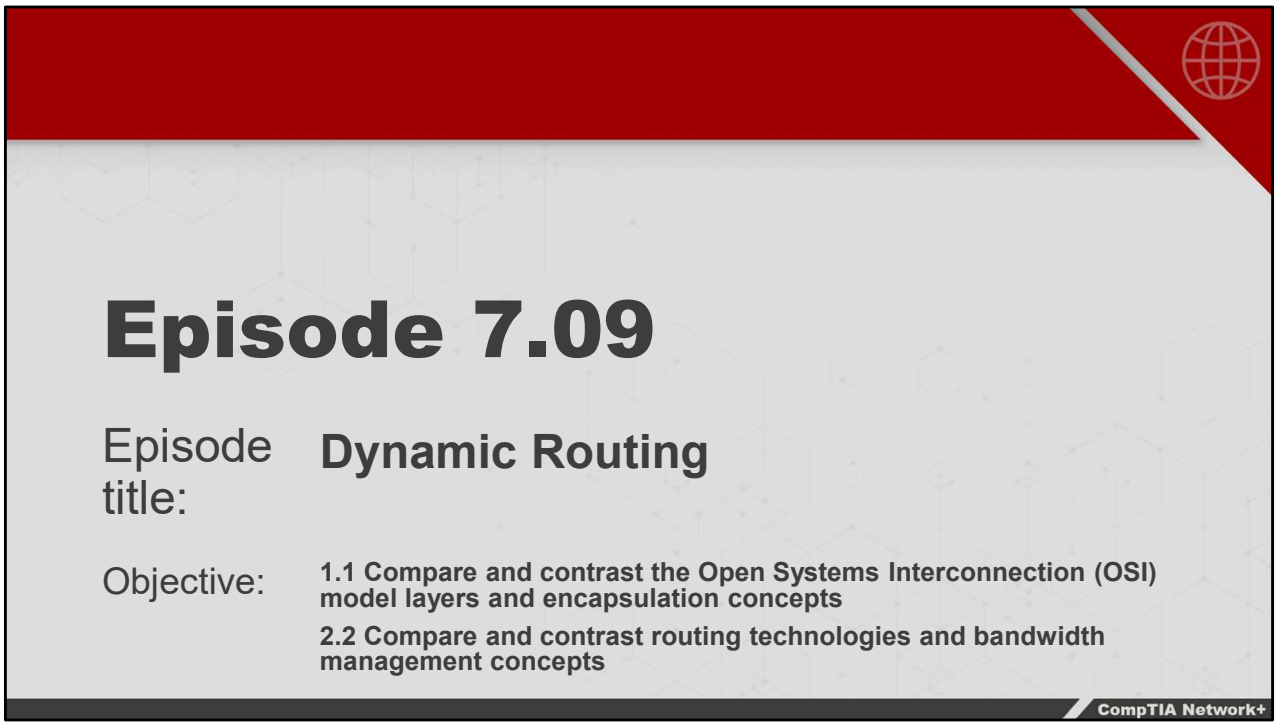
Key Terms

- Routing tables
- Loopback
- Multicast is a class D IP address
- netstat -r = routeprint
- Private "intranet" route

Quick Review

- A static route is a fixed route that is manually configured and persistent
- Use route print or netstat -r to display current known routes from the routing table
- Routing tables contain address information for destination, subnet mask, gateway, and NIC


Episode 7.09
Episode title:
Dynamic Routing
Objective:
1.1 Compare and contrast the Open Systems Interconnection (OSI) model layers and encapsulation concepts
2.2 Compare and contrast routing technologies and bandwidth management concepts
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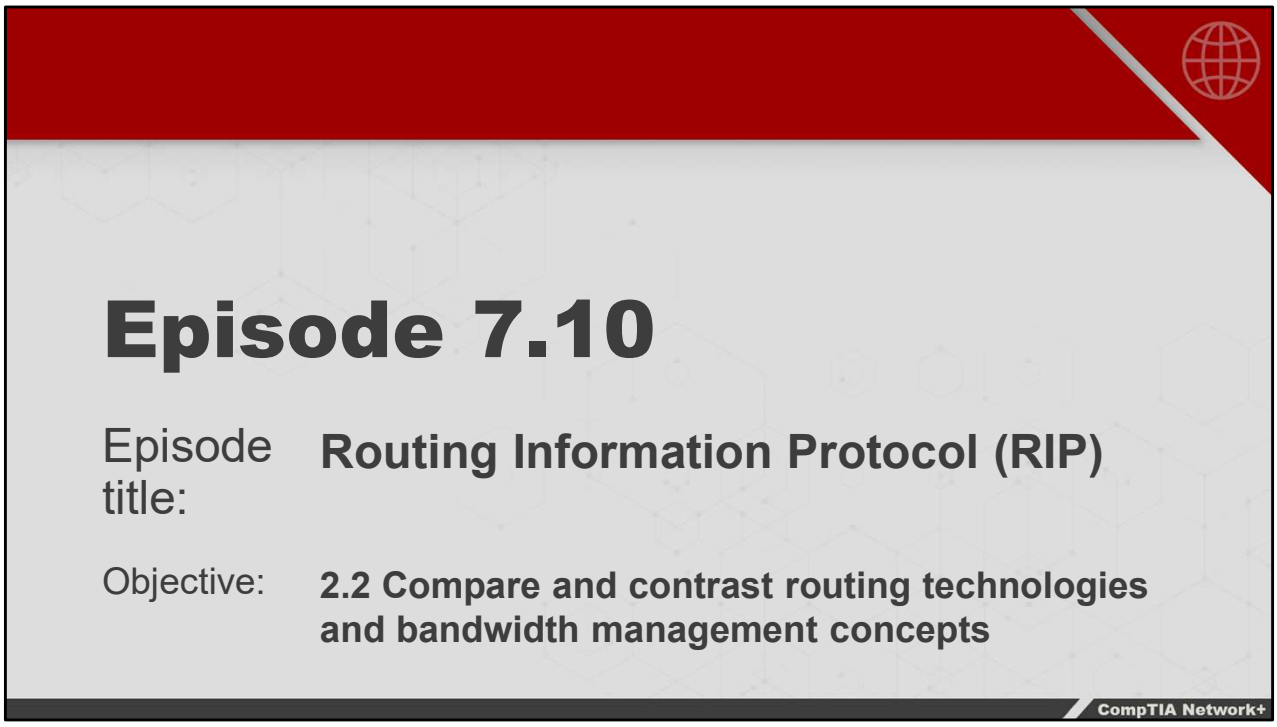
Key Terms

- Dynamic routing
- Convergence is where all router tables reflect all routes
- Hop count
- Maximum transmission unit (MTU)
- Bandwidth
- Cost
- Latency
- Distance vector and link state
- Distance vector uses hop count
- Link state uses advertising
- Dynamic routing protocols are either IGP or EGP
- MTU
- Border Gateway Protocol (BGP)
- MTU

Quick Review

- Dynamic routing protocols use metrics to determine routes and are either distance vector or link state
- Dynamic routing protocols are either IGP (Interior Gateway Protocol) or EGP (Exterior Gateway Protocol)
- BGP is the EGP protocol used for Inter-Autonomous System routing


Episode 7.10
Episode title:
Routing Information Protocol (RIP)
Objective:
2.2 Compare and contrast routing technologies and bandwidth management concepts
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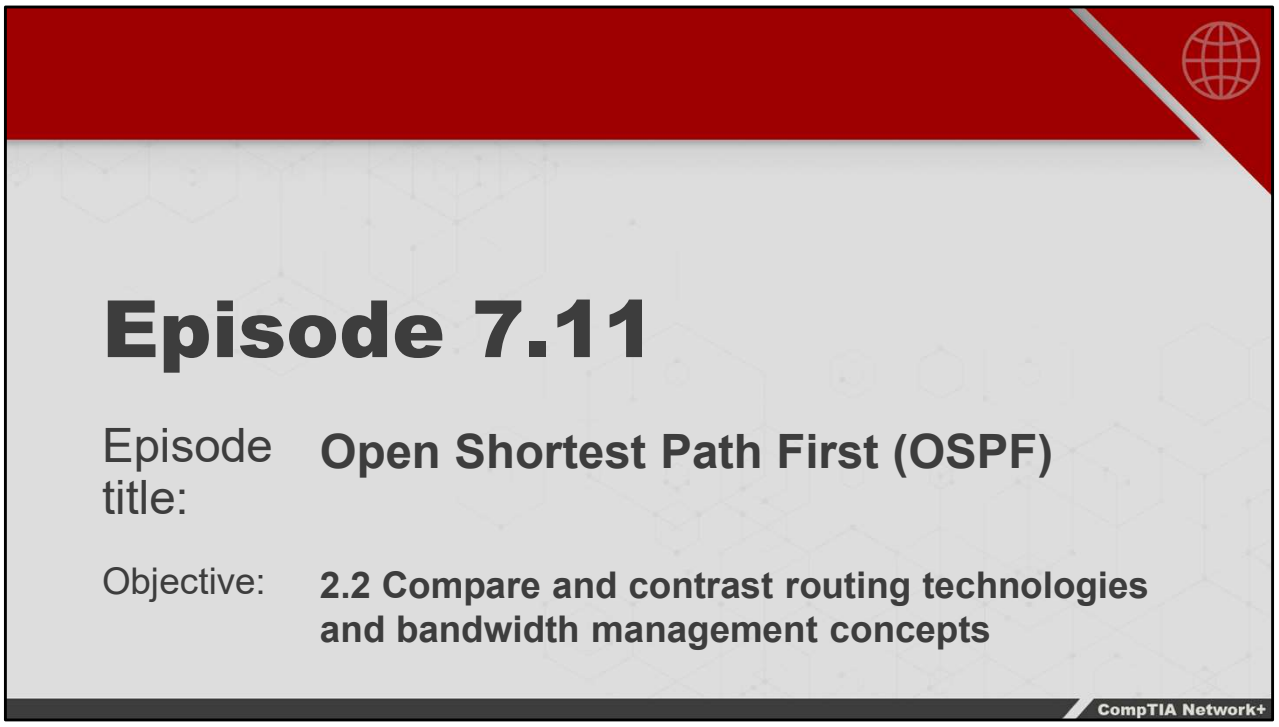
Key Terms

- No Key Terms for this episode

Quick Review

- RIP is a distance vector protocol that uses hop count to determine routes
- RIP1 used only classful networks
- RIP's maximum hop count is 15


Episode 7.11
Episode title:
Open Shortest Path First (OSPF)
Objective:
2.2 Compare and contrast routing technologies and bandwidth management concepts
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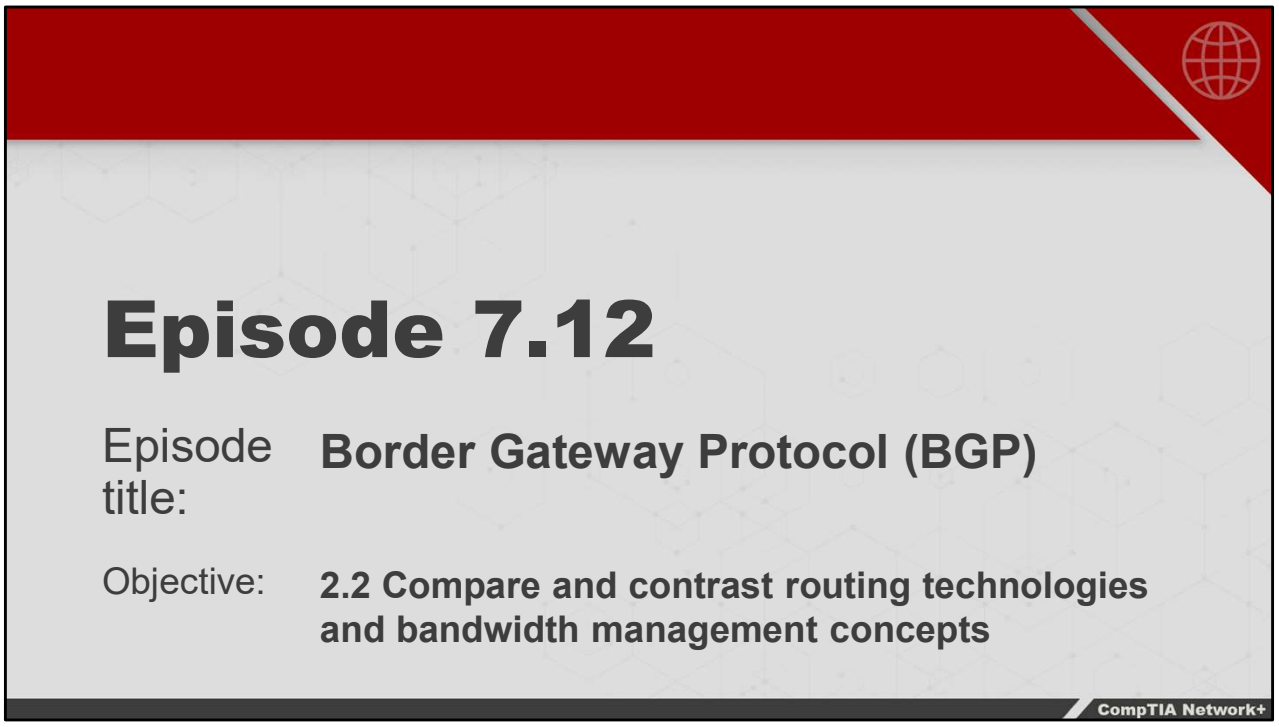
Key Terms

- Area ID

Quick Review

- OSPF is a link state protocol
- OSPF uses Area IDs
- OSPF converges very quickly


Episode 7.12
Episode title:
Border Gateway Protocol (BGP)
Objective:
2.2 Compare and contrast routing technologies and bandwidth management concepts
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Key Terms

- Border Gateway Protocol (BGP)

Quick Review

- BGP is a hybrid protocol
- BGP is the primary protocol for the Internet
- BGP is based around the concept of autonomous systems