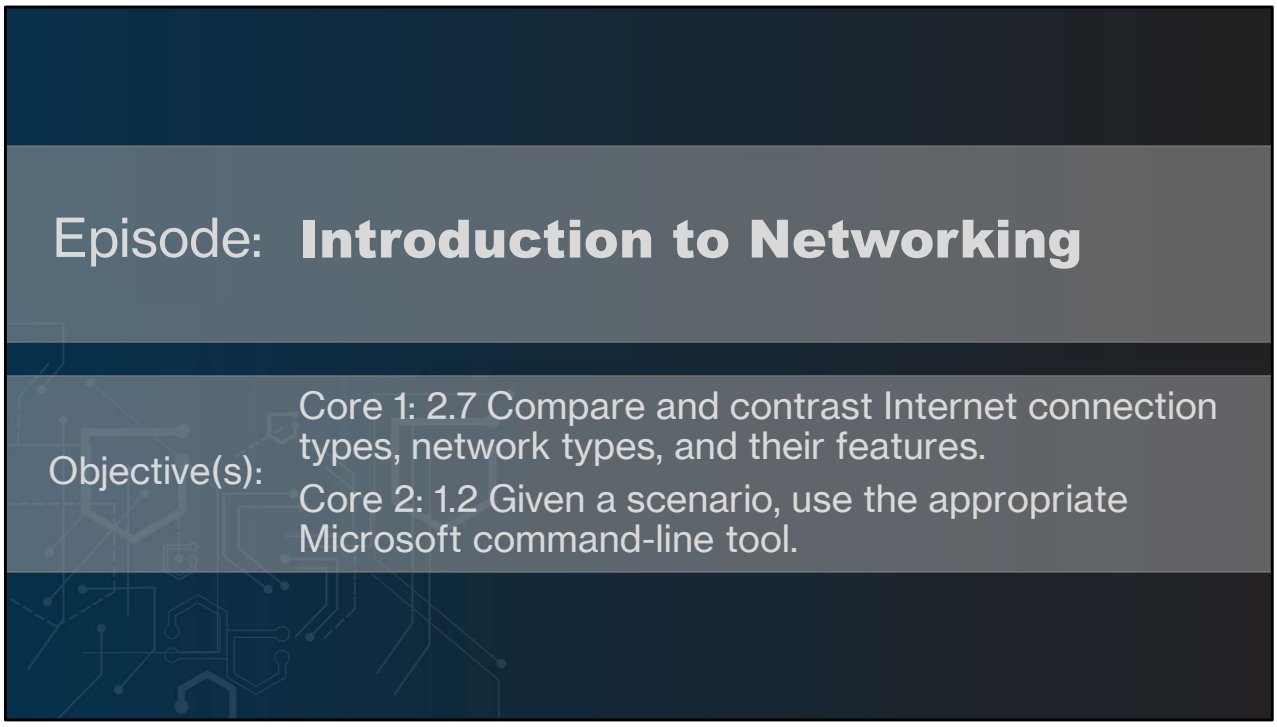
Chapter 18

Essentials of Networking

CompTIA A+ (220-110x)

Mike Meyers and Steve Nicholson

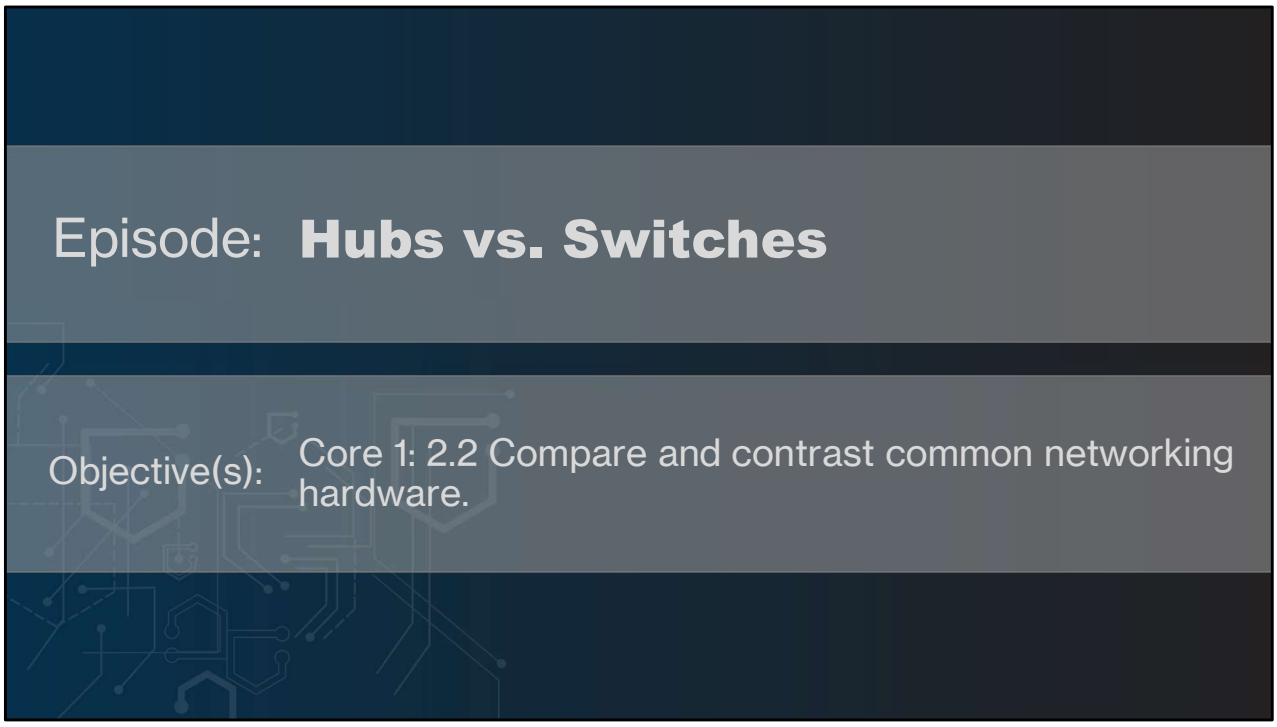

Episode: Introduction to Networking
Objective(s):
Core 1: 2.7 Compare and contrast Internet connection types, network types, and their features.
Core 2: 1.2 Given a scenario, use the appropriate Microsoft command-line tool.

Episode Description

You'll never understand the power of the Internet without first starting at the most basic form of networking: the Local Area Network (LAN). LANs use a central piece of hardware to interconnect individual devices, transferring data from one system to another in discrete frames.

Quick Review

- LAN computers connect with Ethernet
- Ethernet frames standardized as 1500 bytes
- A MAC address uniquely identifies a host on a LAN
- Use ipconfig (Windows) or ip (Linux) to view MAC



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Episode Description

The central box that connects devices on our LANs has gone through many advancements over the years. Whether hubs or switches, a good tech understands the function and features of these boxes in our LANs.

Quick Review

- Hubs repeat all traffic on LAN to all nodes
- Switches filter traffic based on MAC address
- Switches provide full bandwidth for all nodes

Episode: **Hexadecimal**

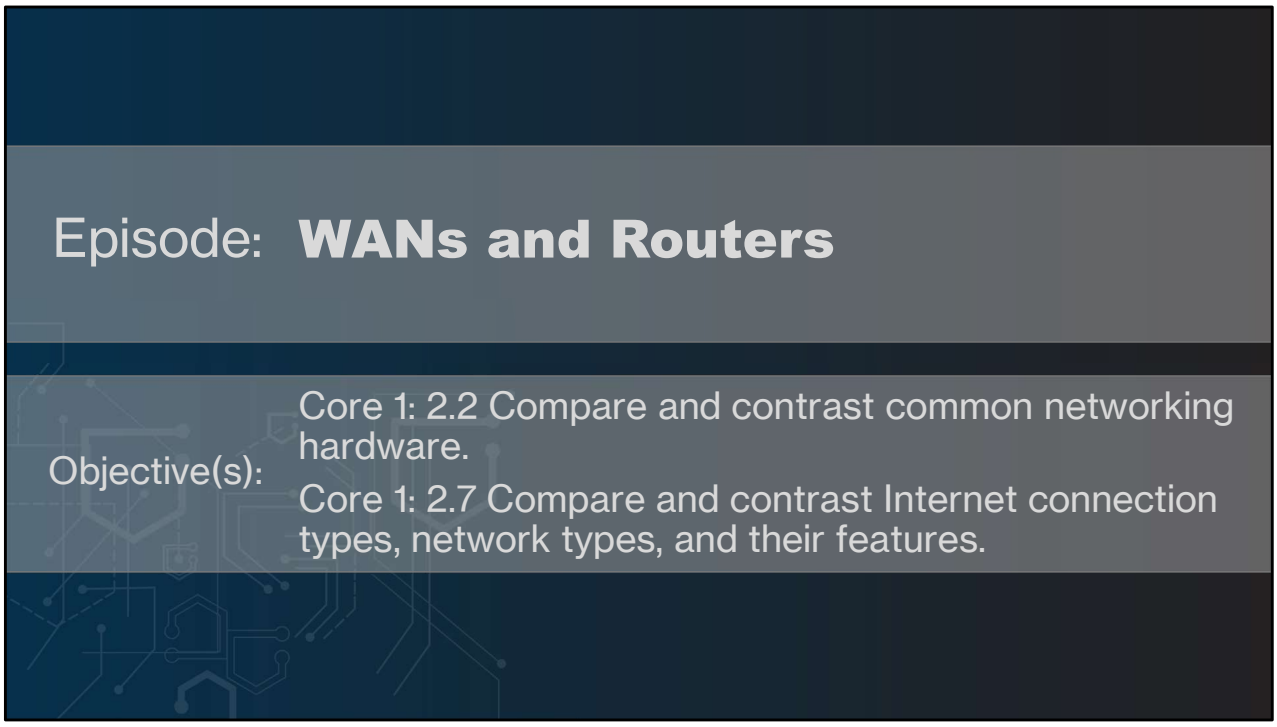
Objective(s): No exam-specific objectives.

Episode Description

Hexadecimal numbering uses a base-16 system that's very convenient for IT techs. It's important to look at a hex value and understand the equivalent binary value.

Quick Review

- Hexadecimal (base 16) enables discussion of long strings of 1s and 0s
- Each hex character represents 4 binary numbers (0000-1111)
- In hex, numbering goes 0-9, a-f, for 0-15



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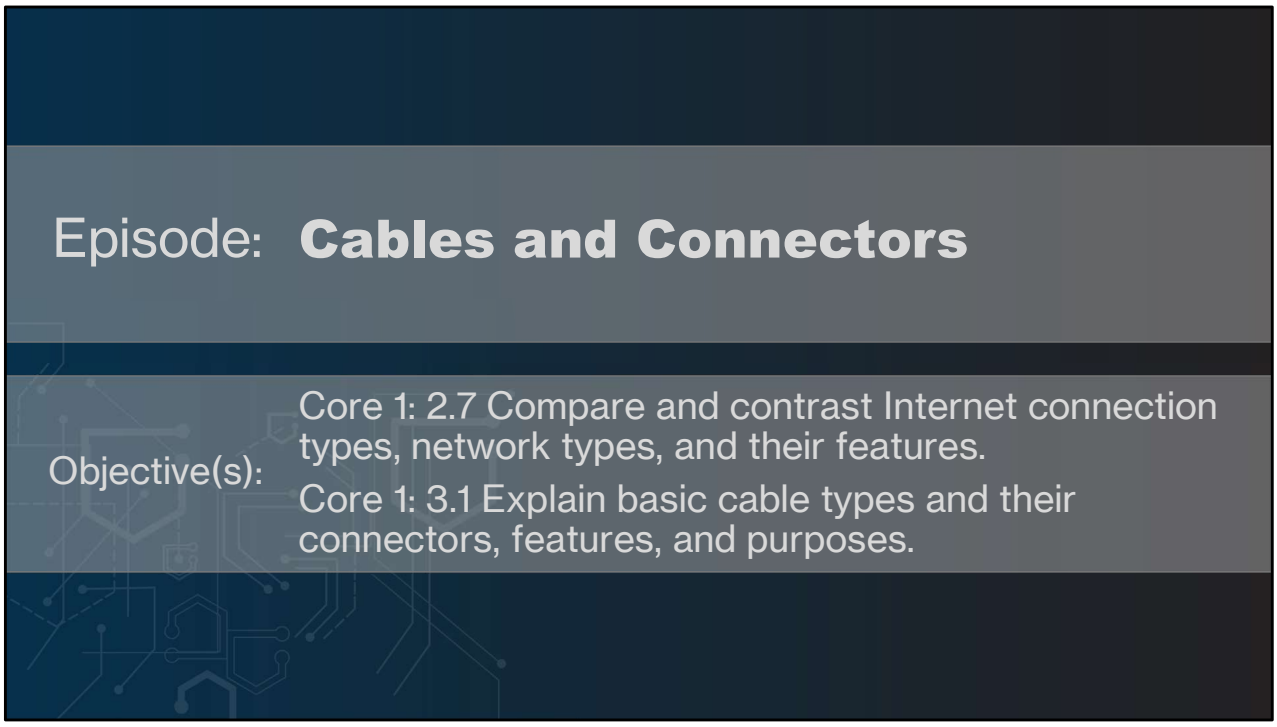
Episode Description

Networking uses many different types of cables such as coaxial, twisted pair, and even fiber-optic. These different cables use special connectors and a good tech should recognize the different cables and their connectors.

Quick Review

- Switches connect (up to 1024) computers in LAN
- Routers connect multiple LANs together in WAN
- Routers use logical addressing (IP addressing) to determine local vs. remote traffic

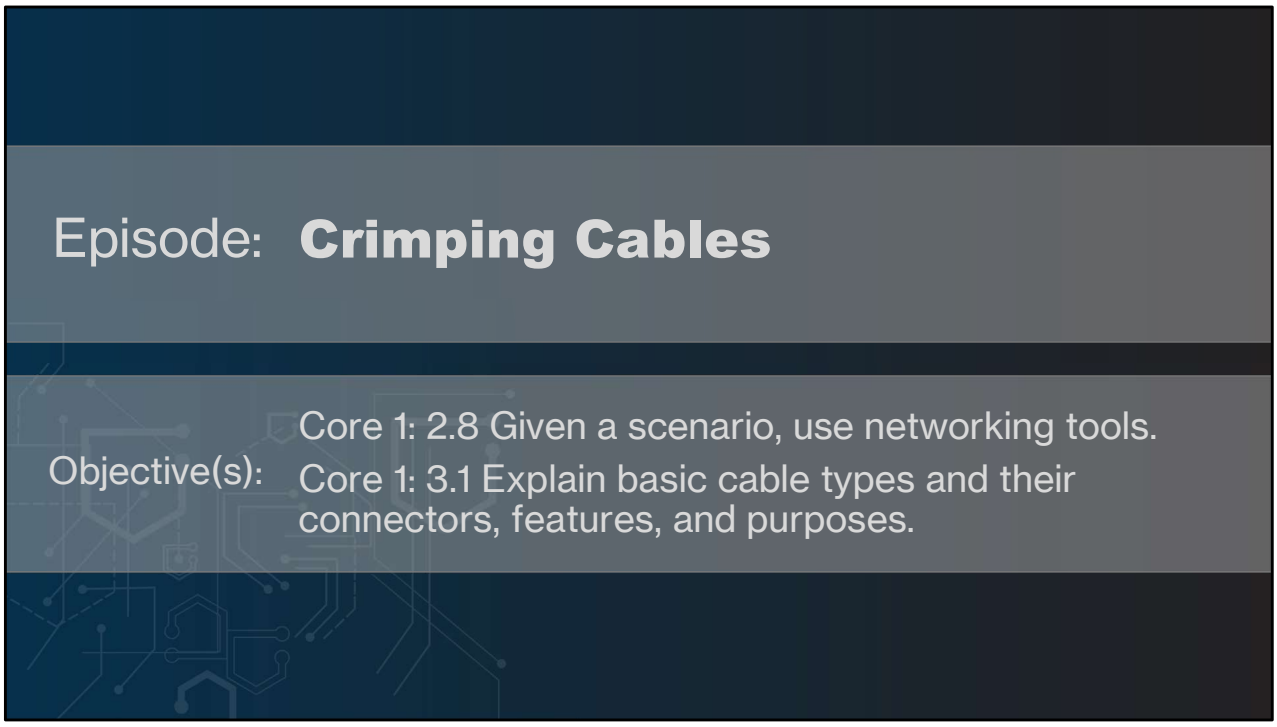

Episode: Cables and Connectors
Objective(s):
Core 1: 2.7 Compare and contrast Internet connection types, network types, and their features.
Core 1: 3.1 Explain basic cable types and their connectors, features, and purposes.

Episode Description

Networking uses many different types of cables such as coaxial, twisted pair, and even fiber-optic. These different cables use special connectors and a good tech should recognize the different cables and their connectors.

Quick Review

- Coaxial cables use RG ratings and F-type connectors
- Most networks use twisted pair cabling
- Fiber optic cables use light, rather than electrical pulses
- Twisted pair cabling have different category (Cat) ratings


Episode: Crimping Cables
Objective(s):
Core 1: 2.8 Given a scenario, use networking tools.
Core 1: 3.1 Explain basic cable types and their connectors, features, and purposes.

Episode Description

CompTIA doesn't expect you to prove you can crimp your own cables, but it does expect you to understand the crimping process. Additionally, you must know EIA standards for crimping cables.

Quick Review

- Use a crimping tool to attach UTP cable to crimp (like RJ-45)
- Two standards: T568A and T568B
- Straight-through cable has same standard on each end
- Crossover cable has different standards on each end

Episode: **Structured Cabling**

Objective(s):

Core 1: 2.2 Compare and contrast common networking hardware.

Core 1: 2.8 Given a scenario, use networking tools.

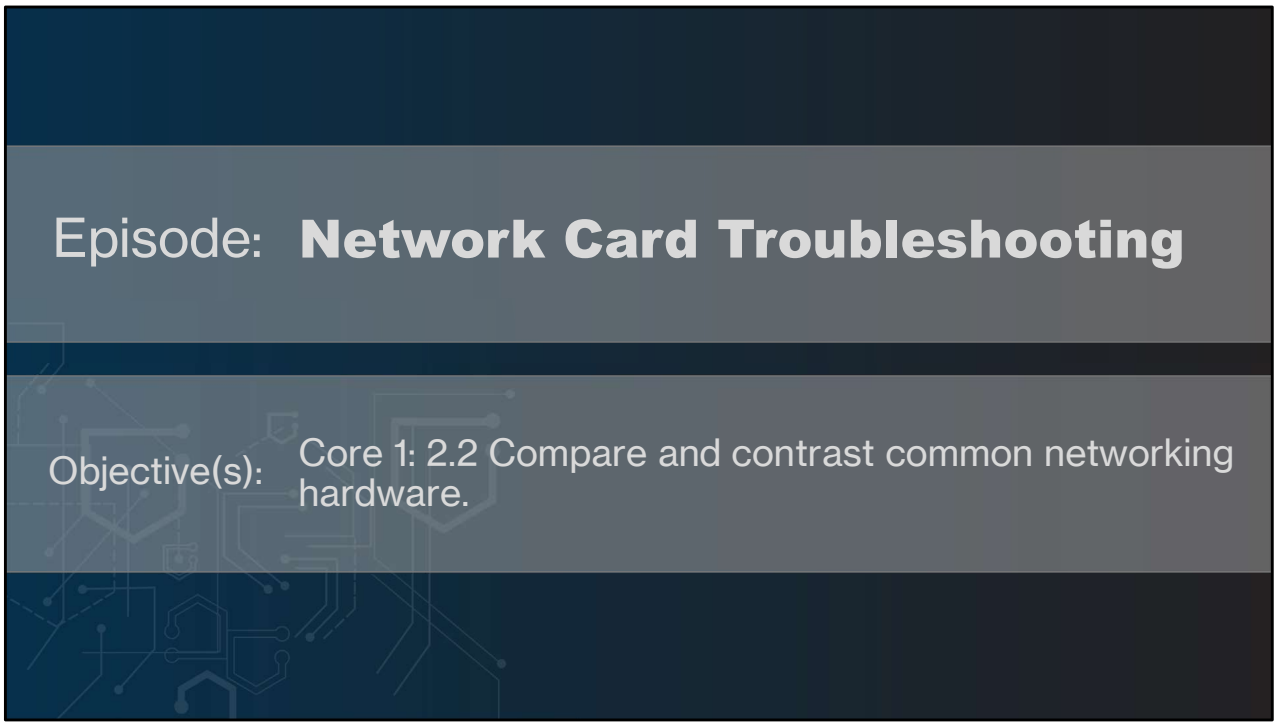
Core 1: 3.1 Explain basic cable types and their connectors, features, and purposes.

Episode Description

Structured cabling is the process of installing and organizing cable systems to ensure long term, reliable connections. While CompTIA doesn't want you to be a cable installer, a good tech understands structured cabling and can work with installers.

Quick Review

- Horizontal runs from wall outlet to patch panel through walls/ceilings
- Use punchdown tool to connect cable to patch panel
- Use tone generator/tone probe to locate cables
- Use TDR for testing runs


Episode: Network Card Troubleshooting
Objective(s): Core 1: 2.2 Compare and contrast common networking hardware.

Episode Description

Network hardware failures are often challenging to diagnose and repair. Good techs know a few simple tools and procedures to get networks back up and running quickly.

Quick Review

- Use Device Manager > NIC Properties for information/configuration
- Change duplex and wake-on LAN settings there
- Link lights show connectivity, activity, and (sometimes) speed