IT Fundamentals

Unit - Networking

Lesson 2.7.2 - Basic Network Concepts

IT Fundamentals Objectives (FC0-U61)

Objective 2.7 - Explain basic network concepts.

- Device addresses
  - IP address
  - MAC address
- Basic protocols
  - HTTP/S
  - POP3
  - IMAP
  - SMTP

Grade Level(s)

8, 9

Cyber Connections

- **Networks & Internet**

This content is based upon work supported by the US Department of Homeland Security's Cybersecurity & Infrastructure Security Agency under the Cybersecurity Education Training and Assistance Program (CETAP).

Teacher Notes:

Basic Network Concepts

Where you are and what you are

Two very common "addresses" used to discuss computers are their ***MAC address*** and ***IP address***. A media access control address (MAC) is a unique identifier for network interfaces. MAC addresses are commonly used in IEEE 802 networking technologies, including Ethernet, Wi-Fi, and Bluetooth. An Internet Protocol (IP) address is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication. If there is any confusion between the two, a MAC Address is used to ensure the ***physical address*** of computer, while IP address are used to uniquely identify the ***network connection*** with that device take part in a network. A MAC address is typically six sets of two digits or characters separated by colons such as 4A:4D:4A:51:4A:42. An IP address is four numerals separated by periods such as 127.0.0.1.

What's the Protocol?

When configuring home email through, for example, Microsoft Outlook, there are multiple protocols (standards) for sending and receiving email. The CompTIA IT Fundamentals exam includes the ***Post Office Protocol 3*** (POP3), ***Internet Mail Access Protocol*** (IMAP), and ***Simple Mail Transfer Protocol*** (SMTP). The technical differences are not important for the exam but it is important to know that POP3 and IMAP *receive* email and SMTP *sends* email.

Another important protocol(s) is used for recognizing secure websites. The ***Hypertext Transfer Protocol*** (HTTP) is an extremely fast protocol used for network file transfers on the world wide web environment. It uses port 80. ***HTTPS*** (HTTP over Secure Sockets Layer) is a secure form of HTTP used for Internet business transactions or whenever a secure connection is necessary. It uses port 443.

Finally, ***DNS*** (domain name service/server) is a TCP/IP name resolution system that translates a host name into an IP address. For example, www.TommyJohnJoeJon.com may resolve (translate) to 127.0.0.1.