Networking

Networking Fundamentals

1.6.3 - NTP

What is NTP and why is it so important?

Overview
The student will explain the use and purpose of network services

Grade Level(s)
10, 11, 12

Cyber Connections

- Threats & Vulnerabilities
- Networks & Internet
- Hardware & Software

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Teacher Notes:

CompTIA N10-008 Network+ Objectives

Objective 1.6

- Explain the use and purpose of network services
  - NTP
    - Stratum
    - Clients
    - Servers

NTP

Network Time Protocol

Network Time Protocol, or ***NTP***, has the important job of making sure all the clocks on the same network are synchronized. This is very important for devices that interact with each other for logging purposes, security reasons, and to verify tasks are in the correct order. For example, if a device was running 10 minutes behind a server, the device logs into the server and then 5 minutes later reports an error to the server. The network administrator is going to have a hard time figuring things out because the time stamps will show that the person did not log on to the network until 5 minutes after the reported problem. Also, if a task is supposed to occur right at a certain time, this can throw things off if a machine is not running off the same time as another machine, leading to problems. The NTP server makes sure all devices are running within milliseconds of each other to help avoid these errors.

NTP Terms

Stratum – A ***stratum*** is the level of accuracy of the clocks between systems. For example, the clocks on the computer systems of rockets being launched into space need to be more accurate than the clocks on a single-family home network. The difference of milliseconds could throw off a rockets path while the difference of milliseconds in a single-family home doesn't have any real consequences.

There are five different stratum levels, level 0 through 4, where 0 is the most accurate and level 4 is the least. Level 0 devices are completely accurate while level 4 might have differences up to 4 seconds in time.

Teacher Notes:

It's important to note that level 4 devices get their time from level 3 devices, level 3 gets theirs from level 2, and so on.

Clients – A ***client*** is any device on a network that gets the current timestamp from an NTP server. Typically, these clients, or hosts, will send a request to the NTP server around every 10 minutes to make sure their clocks are synced.

Servers – An ***NTP server*** is the server that clients can query for the current time on the network. NTP servers typically get their timestamp from a stratum 0 device to have as accurate of time as possible.