The Importance of Network Time Synchronization for Enterprise Networks

- Is your time source accurate and precise?
- Is your time source secure?
- That is, is the time itself vulnerable or is the time source vulnerable?
- Is your time source reliable?

In many of today's networks, the network engineering answer to these questions is often, “I think so.” In truth, computer clocks are notorious for drifting. They are typically based on inexpensive oscillator circuits or battery backed quartz crystals that can easily drift seconds and minutes per day, accumulating significant errors over time.

Many organizations get “free time off the Internet” which, while free, poses serious risks in terms of time accuracy, reliability and network security. After all, it is not your clock, you have no idea if it is accurate or where it gets its time, it will not send an SNMP trap if the time is wrong, it is subject to packet manipulation and denial of service attacks on the open internet, you don’t know if it has been patched to keep it from being hacked, etc. Other than an IP address that responds to NTP time requests, and is easily known to every bad actor, you know very little about an internet time server.

Network operation and application that can rely on Accurate Time

Log File Time Accuracy, Auditing, and Monitoring

Directory Services Need Time Sync

Speed Network Fault Diagnosis and Recovery

Time Coordinated Scheduled Operations

Access Security and Authentication Need Sync

Real-World Time Values

Resolve Virtual Environment Timekeeping Challenges

Accurate Transaction Timestamps

The Answer: A Stratum 1 Network Time Server Inside Your Firewall

Accuracy and security is why many enterprise networks today rely on Stratum 1 network time servers located inside the firewall that acquire time from Global Navigation Satellite Systems (GNSS) and distribute it to clients over the network through the Network Time Protocol (NTP).

For reliability, these NTP servers also employ stable internal oscillators in case the server loses the satellite signal and goes into a holdover. Oscillator holdover accuracy varies based on the type of oscillator: from 400 microseconds over the first 24 hours of signal loss for a standard quartz oscillator to less than 1 microsecond for an inexpensive rubidium atomic oscillator.