

NTP and PTP (IEEE 1588) A Brief Comparison

In general:

PTP = IEEE 1588 (various flavors & profiles exist)

▶ NTP used for 'application level' synchronization

- Coarse level granularity
- Requirement for synchronization guarantee does not exist
- Example: time-stamping error log files

▶ PTP used for precision synchronization

- Mission critical applications
- Dedicated hardware to minimize on-path issues
- High end algorithms and 'secret sauce' to eliminate network & equipment jitter

Similarities between PTP & NTP



- ▶ Both are time transfer protocols that operate 'in band' (with traffic) over Ethernet networks
- ▶ Both encapsulate time in NTP or PTP packets
- ▶ Both operate in Master / slave (or server-client) mode

NTP & PTP compared



Criteria	NTP	PTP (IEEE 1588)
Peak time transfer error	> 1ms (10^{-3} s)	> 100 ns (10^{-7} s)
Primary error source	Routers	Routers, switches, port contention, o/s stack delay, network etc.
Implementation	Hardware or software servers; software clients	Hardware masters; hardware or software clients (slaves)
Mode of operation	Clients pull time from server	Masters push time to slaves (clients)
On path support	Non existent and not possible	Not required, but possible through transparent clocks and boundary clocks (enhances performance)
Relative cost of solution	Inexpensive	More expensive (higher precision solutions cost more)
Metrics, monitoring & management	Exists, but minimal	Extensive in band metrics for monitoring and management