Net.Time τ a PTP/NTP clock

For Telecom, Broadcast & Data centres

Net.Time τ is a network clock ideal for ensuring the delivery of quality time, phase and frequency suitable for telecom, financial, broadcast and data center applications. Net.Time accepts a wide variety of time references and provides the widest range of timing signals to facilitate network integration.

Practical timing

Net.Time τ can be configured as master, slave, and boundary clock, as well as redundant in/out clock references. Multiple options for input (GNSS, PTP, SyncE, NTP, ToD, PPS, T1/E1, MHz) and output (PTP, NTP, SyncE, ToD, PPS, T1/E1, MHz) references allow for many combinations, facilitating the translation of timing protocols to integrate new and legacy architectures of the industry.

Accurate and reliable

Net.Time τ represents the state of the art in timing, designed to provide the most accurate and secure synchronization networks for infrastructures used in telecom applications. Net.Time τ is fault-tolerant, has a built-in GNSS receiver, Rubidium oscillator, redundant power supply, and accepts a wide variety of time references that can be used as primary or backup signals, providing compatibility between timing signals for distribution via protocol translation in all directions. Accurate and reliable synchronization is an essential resource for maintaining stability and security in mobile telecommunications and other relevant industries such as finance, broadcasting, IoT, automation and air traffic control.

Smooth Migration

The industry as a whole is migrating from legacy timing architectures to PTP for clock distribution over the existing Ethernet/IP backhaul to meet the required accuracy levels, which are particularly important in these new scenarios.

Profile & Protocol Translator

When GNSS is not used, Net.Time is typically collocated at the edge of the transmission network to receive a reference such as PTP or NTP, then it filters the possible impairments, asymmetric delays, time errors, even drift if necessary, to discipline the internal oscillator, which could be Rubidium. Once locked, Net.Time delivers the synchronization signals to each client with the appropriate format and media, providing the highest level of accuracy. The leading technology of Net.Time makes it perfectly suited for the most demanding applications thanks to its stability speed, the flexibility to accept a wide variety of input/output signals, and the unique ability to translate any protocol and input profile to the selected output timing signal ready for distribution.

ALBEDO

Net.Time Tau

Applications

Net.Time T Grandmaster is designed to provide reliable time, phase and frequency to multiple PTP slaves thanks to its dual PTP ports and powerful FPGA-based PTP engine.

The device consists of a GPS receiver and a PTP/NTP packet engine to provide timing services over Ethernet to meet frequency, phase and time of day requirements. To ensure the protection of the installed base of SONET/SDH and other installations, many inputs can be used to discipline the oscillator, including PTP/NTP, MHz, BITS, PPS and ToD.

Net.Time T Grandmaster can be equipped with an OCXO or a Rubidium, which is the best option to achieve stability in holdover. PTP telecom profiles are used to configure the parameters that are critical for interoperability with the connected slaves.

Telecom

5G operators require accurate phase and timing in the wireless backhaul to increase handset density and reduce cell size. Timing is also required for spectrum reuse, handoff control, event logging, and many other new services that are driving mobile business.

PTP synchronization is a suitable solution for 5G wireless deployments because it can provide accurate time synchronization over Ethernet networks, which is important for many 5G applications. Some of the benefits of using PTP for 5G deployments include

1. **Precision**: PTP can synchronize clocks with a high degree of accuracy, which is essential for 5G applications such as network slicing and coordination of multiple network elements.
2. **Scalability**: PTP is designed to scale from small to large networks, making it a suitable solution for both small and large 5G deployments.
3. **Flexibility**: PTP supports multiple clock synchronization algorithms, making it a flexible solution that can adapt to the specific requirements of different 5G deployments.
4. **Interoperability**: PTP is a widely used and well-established standard that enables interoperability between different network elements and vendors.

However, it is not necessarily the best choice for every deployment, as other factors such as network size, complexity and the required level of accuracy and stability may influence the choice of time synchronization solution, then it is important that a clock such as Net.Time also provides NTP, 2Mb/s, BITS, which may be more appropriate in some cases..

Data Centers

PTP synchronization is a widely used solution for synchronizing clocks in data centers and other industrial and scientific applications. It provides accurate time synchronization over Ethernet networks, which is important for many applications.

However, PTP is not always the best solution for every data center, depending on the specific requirements and constraints of each installation. For example, if a data center needs to synchronize clocks over a large geographic area, Net.Time, which provides both PTP and NTP, may be more appropriate.

Ultimately, the best solution for data centers will depend on factors such as the size and complexity of the network, the level of accuracy and stability required, and, of course, the cost of implementation and maintenance.

Finance

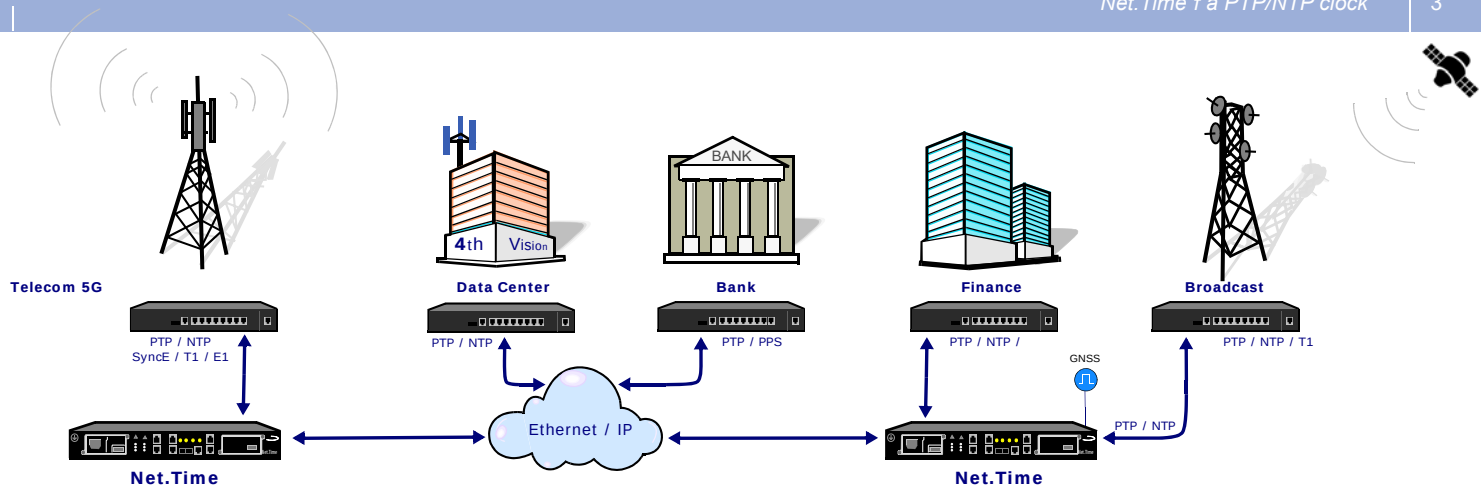
Banks, stock exchanges and other financial institutions are required by law to record transactions with a consistent and accurate time stamp, making PTP synchronization a suitable solution for these organizations, as accurate timing is fundamental to the applications they manage, such as high-frequency trading, audit and compliance, and clearing and settlement. Net.Time, disciplined in this context with GPS or PTP, meets the mandate of national regulators for highly accurate and traceable timing to confirm when any financial transaction occurs, including money transfers, currency exchange, credit card payments, stock market transactions that must be logged in a chronological manner. This is the case of ESMA (European Securities and Markets Authority) as accurate timing and traceability is essential to confirm when transactions occur (Directive MiFID 2, since 01/01/18).

Nevertheless, PTP is not a one-size-fits-all solution, and the best choice will depend on the specific requirements and constraints of the financial data center or bank. A solution that can simultaneously provide SyncE, NTP and PTP can influence the choice of time synchronization solution, including network size and complexity. In many cases, financial data centers require additional security features such as authentication and encryption to secure the time.

Broadcast

PTP is also used in some broadcast applications such as television and radio. Accurate time synchronization is important to ensure that audio and video streams are in sync and to avoid the lip-sync problem.

PTP provides a way to synchronize clocks over Ethernet networks, which is important in broadcast environments where multiple devices and equipment must be synchronized to ensure smooth and seamless operations, making Net.Time T a suitable solution for multi-site and multi-studio broadcast operations.



APPLICATIONS

- 5G Synchronization
- Wireless Edge clock
- Finance centers
- Data servers
- Broadcast operators
- NTP to PTP migration

BENEFITS

- Universal Protocol translator
- Universal Profile translator
- Network fault tolerant
- Hierarchical reference input
- Automatic Ref. switchover

KEY FEATURES

- Master / Slave / Boundary
- GNSS built-in 72 channels
- Rubidium / OCXO oscillator
- Telecom PTP profile
- Full NTP support
- Simultaneous PTP and NTP
- I/O: PTP, NTP, ToD, PPS, IRIG-B, SyncE, T1/E1, MHz
- SSH password and fully encrypted configuration
- Carrier-class: 2 x Vac / Vdc
- +65ºC fan-less operation
- 512 PTP unicast clients

About Net.Time

Net.Time uses the latest electronics components for efficient power consumption and uses a built in GNSS receiver to provide a good accuracy to its clients. Alternatively the satellite signal can be used as back-up and then select an alternative reference signal tor to discipline a Rubidium oscillator which is ideal for mission critical applications assuring an excellent time when locked but more particularly in hold-over mode.

I/O flexibility: PTP, NTP, ToD, SyncE, PPS, IRIG-B, 1/2/5/10 MHz, E1/T1

Net.Time is highly stable in any configuration: locked, hold-over even in free running mode thanks to its excellent oscillators and the advanced FPGA assistance that maintains control rooms and operation centrers in a good synchronisation state. Net.Time can be configured as Master or Slave clock depending on the application, whilst the Boundary clock configuration promotes GNSS as redundant source of timing and selects PTP as the time protocol reference over the IP network.

PTP domain

There is no question about the advantages of the PTP protocol because, among other things, it improves precision, flexibility and interoperation. However, nothing happens overnight, and its adoption in Airports, Substations, Base stations and Central Offices will be a gradual process where Net.Time can play an important role facilitating the transition integrating all the devices deployed through the great versatility of interfaces, protocols and profiles. All in the same unit, therefore Net.Time doesn't need protocol translators, profile converters, or Redbox to ensure the coexistence of legacy devices, using IRIG or T1 / E1, and new ones that already have PTP interfaces.

NTP Time Server

Net.Time can be configured as an NTP server for those enterprises willing to improve the quality of their internal processes where they should stop relying on external sources excessively fluctuating signals, or the poor quality of internal servers that always under risk of introducing errors in the synchronism signal. NTP and PTP can coexist so administrators do not need to choose which one to enable or the installation of a device for each protocol.

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Features	
GNSS	• GPS, GLONASS, BeiDou, Galileo, Navic support / Single and Multiple constellationover SMA • Single or multiple constellation selection • Fixed position mode for GNSS references • Automatic setting of UTC-to-TAI offset (leap sec. count) through GNSS • Automatic antenna detection and Cable delay compensation • Single-band and Multi-band support • Jamming and Spoofing detection and mitigation
Ethernet	• 2 x RJ-45: 10BASE-T, 100BASE-TX, 1000BASE-T • 2 x SFP: 100BASE-FX, 1000BASE-LX, 1000BASE-ZX, 1000BASE-BX • RJ-45 / SFP work in combo mode, only one of each pair is active
Reference inputs	• PTP over RJ-45 and SFP • 1.5 / 2.0 / 5 / 10 MHz and 1.5 / 2.0 Mb/s over RJ-48 • ToD over RJ-48 (ITU-T G.8271, China Mobile and NMEA) • 1 PPS over SMB (ITU-T G.8271) • IRIG-B00X, B15X, B22X over SMB (up to 25 Vpp with AC / DC coupling) • IRIG-B00X, B22X over RJ-48 (RS-422 / ITU-T V.11) • Custom delay compensation for phase and time inputs
Reference outputs	• PTP and NTP over RJ-45 and SFP • 1.5 / 2.0 / 5 / 10 MHz, 1.5 / 2.0 Mb/s over RJ-48 (square pulse 2.2 Vpp) • 2.048 Mb/s (ITU-T G.703), 1.544 Mb/s (ANSI T1.102) • 1.5 / 2.0 / 5 / 10 over SMB (square pulse, 2.2 Vpp) • ToD over RJ-48 (ITU-T G.8271 and NMEA) • PPS with custom period over SMB (ITU-T G.8271) • Custom delay compensation for phase and time outputs
PTP function	• Configurable as Grandmaster and Slave • Boundary operation mode • 512 unicast clients at 128 packets/sec
NTP function	• Up to 1000 transactions / sec. in two ports in server mode • NTP protocol versions: NTPv3 (RFC 1305), NTPv4 (RFC 5905) • SNTP protocol versions: SNTPv3 (RFC 1769)
SyncE function	• Synchronous Ethernet clock input or output from port B / output from port A. • RJ-45: 100BASE-TX, 1000BASE-T • SFP: 100BASE-FX, 1000BASE-SX / LX / ZX / BX • Generation, decoding, forwarding of ESMC
Clock Performance	• Default OCXO better than ±0.1 ppm • Optional Rubidium better than ±5.0 e-11 • Locking time: OCXO < 5 min, Ru < 4 hours Performance 24h • GNSS: OCXO ±45ns, Ru ±40ns • PPS/ToD: OCXO ±10ns, Ru ±10ns Hold-over • Rubidium: 100 ns @ 10h, 500 ns @ 24h, 1µs @ 48 hours • OCXO: 500 ns @ 2h, 1µs @ 4 h, 5µs @ 24 hours
Protocol Translator	• When the Protocol Translator function is enabled the B port becomes a PTP slave • A port remains operating as a NTP / SNTP / PTP master • PTP messages are forwarded / terminated as specified in IEEE 1588 • Ports A and B have independent PTP profiles

Platform	
Operation	• ETSI 1U rack mountable: Dimensions 44 mm x 228 mm x 435 mm (equivalent to 1U in 19" rack), weight: 1.9 kg / 4.2 lb • Fan-less operation, Temperature / Humidity range: -40 ~ +70°C temp. / 0 ~ 95% RH (non condensing) • MTBF: 150,000 hours (OCXO model), 140,000 hours (Rubidium model).
Power Supply	Factory configuration: AC, DC, AC/AC, AC/DC, DC/DC • AC: 100 ~ 240 VAC, 50- 60 Hz (IEC 60320 C13/C14) • DC: 18 ~ 75 VDC or 43 ~160 VDC (2-pin 5.1 mm) • AC/DC: 85 - 264 VAC and 100 - 370 VDC (2-pin 5.1 mm) • Power consumption: 10 W (OCXO model), 14 W (Rubidium model)
Management	• Graphical User Interface for configuration and monitoring based on web server • Local console by CLI (RJ-45) • SSH through management interface (RJ-45, 10/100BASE-T) • RFC 3164 Syslog event reporting (device role)
Certifications	• Electromagnetic compatibility: CISPR 22 / EN 55022, CISPR 24 / EN 55024, IEC 61000-3-2, IEC 61000-3-3, CFR 47 part 15 • Safety: IEC / EN 61850-3, IEC / EN 62368-1, UL 62368-1, CSA C22.2 No. 62368-1 • Environmental: IEC 61850-3 • Other: EN 63000 (RoHS), EN 303 413 V1.1.1 (RED)