Cisco Nexus GM Time Synchronization NIC

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Dual port IEEE PTP GM Time Synchronization solution

High-performance GPS-based PTP GM in a half-height NIC form factor

The Cisco Nexus® Cisco Nexus GM Time Synchronization NIC is a unique grandmaster solution. It packages an entire GPS-based Precision Time Protocol (PTP) grandmaster into a tiny, half-height, half-length network-card form factor. This allows users to save on rack space without compromising on features. The onboard GPS receiver provides time synchronization to a UTC of 60ns. The adapter also provides PPS and 10MHz output and can be used to synchronize the host-system clock to the GPS reference.

High-stability holdover

An onboard high-stability oscillator results in a holdover of better than 15us over 24 hours.

During times when GPS reception has failed, the Cisco Nexus GM Time Synchronization NIC will automatically revert to using its onboard high-precision OCXO oscillator as a holdover time reference until the GPS lock is restored. For applications demanding exceptional holdover accuracy, a miniature atomic clock upgrade is also available.

Simple yet powerful

The software included runs on your host, allowing the GM to run as an "appliance."

The Cisco Nexus GM Time Synchronization NIC is bundled with open-source configuration and management software. The included software runs on any Linux host. This allows users to set the operating conditions for the Cisco Nexus NIC GM; the adapter can also be used to show running status information (for example, the number of connected slaves, the GPS lock, the number of satellites in view, etc.).

Despite using host-based configuration tools, the Cisco Nexus GM Time Synchronization NIC handles all PTP operations internally. This eliminates any need for the host at runtime. The Cisco Nexus GM Time Synchronization NIC will power-up and immediately begin serving time using the last saved configuration, even if the host operating system fails to start. This ensures always on operation, even under host-failure conditions.

GPS-locked packet capture and timestamping

Built-in timestamping records frame arrivals, using a GPS-disciplined clock, to a granularity of 4ns.

These timestamps are available through a direct access API (libexanic), through a transparent TCP/UDP acceleration library (exasock), and to the kernel. Standard utilities such as tcpdump can make use of these hardware timestamps. You can also acquire our open-source high rate capture application called Exact Capture for demanding capture requirements.

Figure 1.
Cisco Nexus GM Time Synchronization NIC

IEEE 1588v2 GM

- 2x SFP+ ports
- Hardware accelerated PTP Grandmaster (Port 0 only)
- Each port configurable to 10G, 1G or 100M
- IPv4 and PTP Ethertype operation
- Unicast and multicast operation
- Up to 128 unicast slaves
- Telecom profile
- Default profile

GNSS receiver

- GPS, GLONASS, QZSS, and BeiDou
- 72 channels
- Internal timesync accuracy: 30ns RMS
- Receiver sensitivity: 167dBm
- Active antenna support (3.3V)
- Cold-start acquisition <30s
- Tunable antenna delay

High-precision oscillator

OCXO:

- 24 hour holdover, <15us
- 0.2ppb temperature stability
- Allen variance: 1×10^{-11}

AUX INPUT/OUTPUT

- 1 PPS @ 3.3V
- 10MHz @ 3.3V
- Can be configured for PPS in

General

Form factor:

- Low-profile PCI Express Card
- 150x68mm (5.91x2.67in)

Environmental:

- Operating temperature: 0 °C to 55 °C
- Storage temperature: -40 °C to 70 °C
- Operating Relative Humidity: 5% to 90% (non-condensing)
- Storage Relative Humidity: 5% to 95% (non-condensing)

Connectors:

- 2x SFP+
- SMA for GPS Antenna Connector
- SMA for PPS in/out

Data rates:

- 10GbE, 1GbE, 100M Fast Ethernet

Supported media:

- Fiber (10GBASE-SR, 10GBASE-LR, 1000BASE-SX), SFP+ Direct Attach

Host interface:

- PCIe x8 Gen 3 @ 8.0 GT/s per lane

Operating systems:

- Linux x86_64 (all distributions)

Timestamping

Timestamp resolution:

- 4 ns

Timestamp availability:

- All received frames, most recent transmitted frame

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Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

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Printed in USA

C78-743824-02   07/21