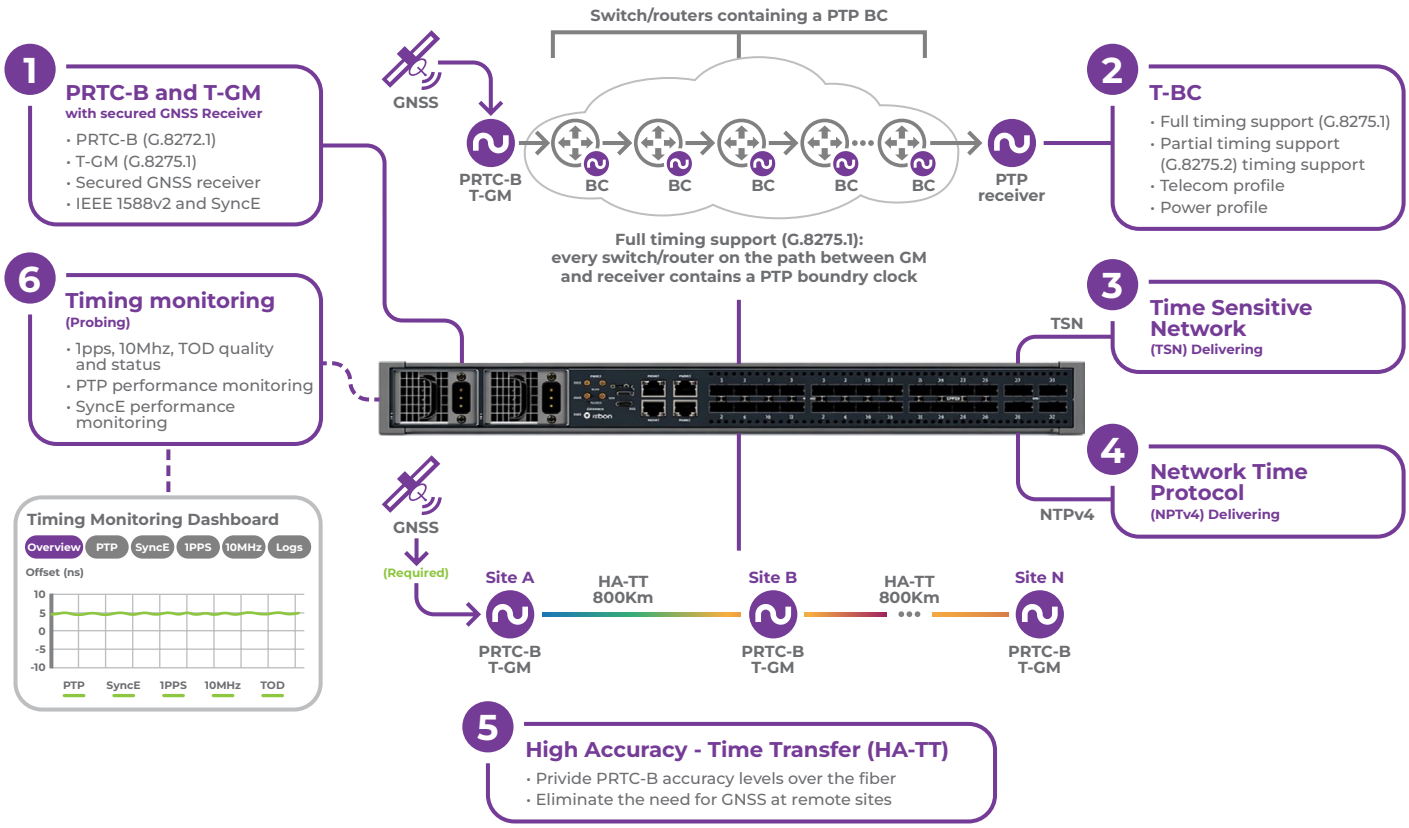
# Timing & Synchronization

From Multi-Box Complexity to an All-in-One Platform

## Ribbon's Solution Overview

Modern mission-critical networks depend on precise timing and synchronization to support time-sensitive services, TDM migration, utility substation applications and deterministic packet services. Ribbon simplifies this with an integrated, end-to-end timing architecture that combines frequency, phase and time distribution in a single operational platform.




**From a Multi-Box Timing Architecture to an All-in-One Platform**

## The Challenge

Legacy timing architectures often depend on multiple standalone devices, external master clocks and GNSS receivers at many locations. This increases operational complexity, cost, rack space and power consumption, while also creating exposure to GNSS loss, jamming or spoofing. In mixed networks, operators must also support TDM clock recovery, SyncE frequency distribution, IEEE 1588v2 PTP phase and time synchronization, telecom and power utility profiles, and accurate visibility of timing quality across the network.

## The Solution

Ribbon integrates PRTC-B, telecom grandmaster, boundary clock, transparent clock, SyncE, TSN, NTPv4, HA-TT, GNSS input and real-time monitoring capabilities into one unified platform.

The solution supports multiple timing interfaces, including BITS, 10 MHz, 1PPS, Time of Day and integrated GNSS, while enabling SyncE for high-accuracy frequency synchronization and IEEE 1588v2 PTP for phase and time distribution. It supports full timing and partial timing telecom profiles through G.8275.1 and G.8275.2, as well as utility-focused power profiles including IEC/IEEE 61850-9-3 and IEEE C37.238. Telecom and power profile interworking enables timing to be distributed from the WAN into substation or mission-critical environments. For deterministic services, TSN helps provide predictable behavior, while NTPv4 supports IT synchronization and HA-TT extends accurate timing over fibre. Integrated timing visibility and quality monitoring help operators understand timing source status, support failover decisions and reduce the need for GNSS at every site.

## Key Benefits

By consolidating timing and synchronization functions into one platform, Ribbons solution improves accuracy, resilience and visibility and helps operators reduce operational complexity, cost, rack space and power consumption. The solution supports the transition from legacy SDH/SONET and TDM services to packet-based infrastructure, helps utilities distribute timing across mixed telecom and power environments, and reduces dependency on GNSS receivers at every site. This makes it easier to design robust timing architectures for modern networks where accurate synchronization underpins reliable operations, deterministic service performance and mission-critical continuity at scale.

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