

A Modern, Software-based Solution for Accurate Time Sync & Infrastructure Monitoring

Deploy in Minutes. Sync Anywhere. Gain Visibility Across Systems.

Tick Tock is inspired by the Huygens system devised at Stanford University, and has been further designed and developed as an enterprise solution for ultra-accurate time sync and infrastructure performance monitoring. It's tested and deployed in many environments. The sync accuracy can be as low as **5 - 10 ns** when using hardware timestamps, and 100s of ns - 5 μ s when using software timestamps. This is typically one or more orders of magnitude higher than PTP/NTP solutions.

Features and Capabilities

High Accuracy. Work with a Variety of Clocks

- For electronic trading: nanosecond-level accuracy using NIC hardware timestamps.
- For enterprise apps: microsecond-level accuracy using host and VM software timestamps

High Performance, Scalable, & Resilient

- Support 1,000 nodes per reference clock and can scale up to 10s of 1,000s of nodes in a single installation.
- Built-in redundancy and auto-failover. Works well even under high network and CPU loads

Easy to Deploy and Manage

- Deploy in minutes with modern NICs and OSES
- Built for on-prem, cloud and hybrid environments

Unparalleled Visibility and Insights

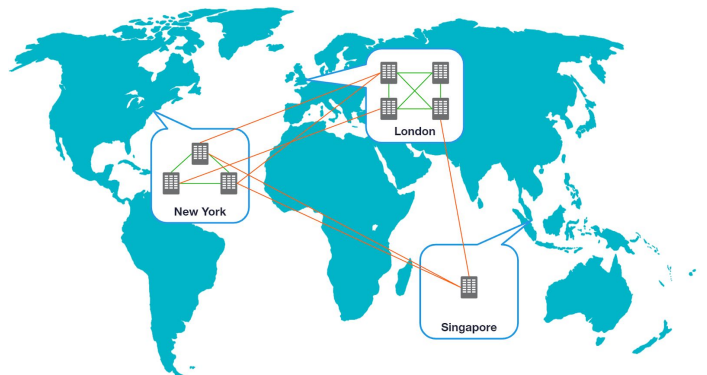
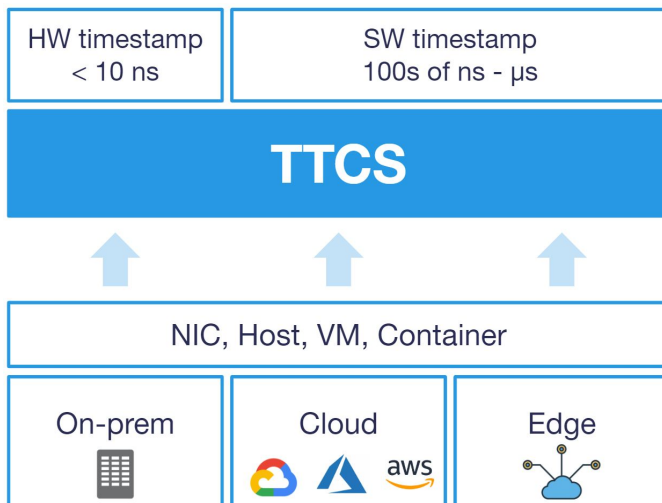
- Monitor and visualize clock sync performance. Correlate with network measurements to pinpoint and fix issues.
- Identify and analyze network path asymmetry and path delay changes.

Flexible Use Cases

- Observation mode: record and log corrections. An independent tool to monitor PTP/NTP performance.
- Correction mode: discipline NIC clock and optionally sync host clock.

Support Single Site & Multi-site

- Sync clocks in a single site to a local reference clock.
- Sync clocks across many sites in a region or globally.



Clock Performance and Infrastructure Monitoring Dashboards

*Example Run in Microsoft Azure : 200 nodes with software timestamp as input

Cluster-wide Metrics and Analysis



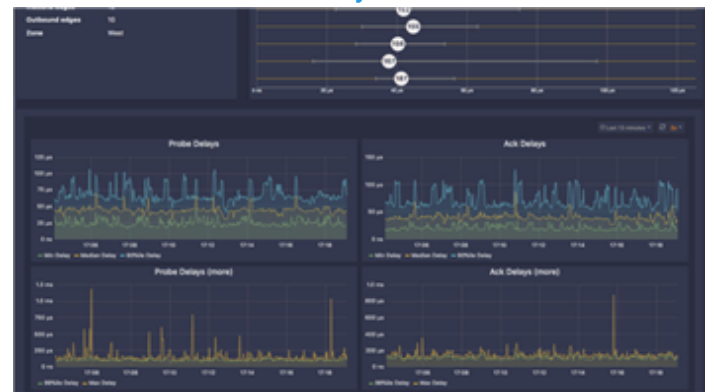
Individual Clock Performance



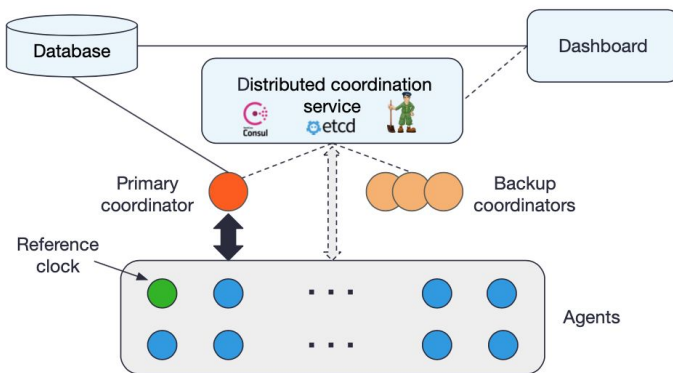
Realtime Cluster-wide Clock Offset Metrics



Network Connectivity and Measurements



How It Works



Agents: A network of nodes to be synchronized. Each node runs a Tick Tock agent and send/receive probe packets.

Coordinator: Orchestrates the synchronization process and informs the agents of time corrections with respect to the reference clock.

Reference Clock: Can work with any source of time, GPS, atomic clock, PTP grandmaster, etc.

Auto-failover: On failure, it automatically elects a new primary from the pool of backups and notify all agents.

Learn More

Exploiting a Neural Network Effect for Scalable, Fine-grained Clock
<https://www.usenix.org/system/files/conference/nsdi18/nsdi18-geng.pdf>

Time Split to the Nanosecond is Precisely What Wall Street Wants
<https://www.nytimes.com/2018/06/29/technology/computer-networks-speed-nasdaq.html>

Please contact hello@ticktocknetworks.com for demo and trial of Tick Tock software

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The New York Times