cPacket cTap Latency Probe

Intelligent Passive Probe for Latency and Jitter Monitoring, and Micro-Burst Measurement

Passive Inline Deployment

Real-time Monitoring of 10G Networks

Flexible User Defined Application Profiles

Complete Packet Inspection of Every Bit in Every Packet and Flow

Accurate Timestamp at PHY Interface

GPS Clock Synchronization

Integrated Micro-burst Analysis

Low latency networks for high speed distributed trading applications have become a competitive advantage for financial institutions with algorithmic trading platforms, because any delays can impact profits. Given that network latency and jitter can drown out the sophistication of high frequency trading algorithms, these performance metrics need to be monitored with the same diligence that traders monitor changing market prices, correlations, and trends. If network latency and jitter are not monitored adequately, random variability is concealed and the trading systems are exposed to latency arbitrage and hostile manipulations.

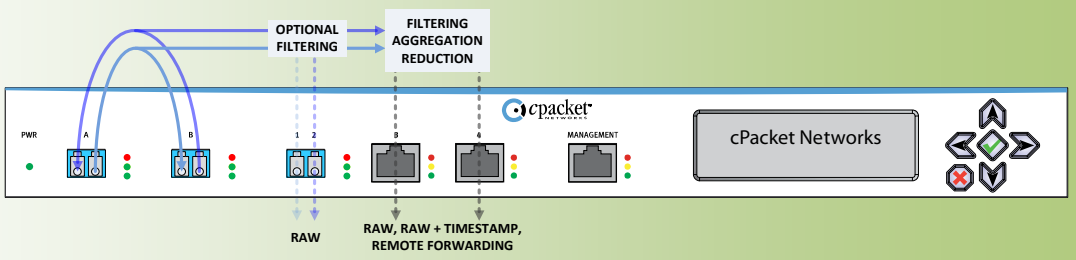
Latency requirements for applications, such as high frequency trading, derivative pricing, and latency arbitrage, are dramatically stricter than for traditional web applications. While traditional applications like VoIP, web browsing, and network gaming can tolerate more than 100 milliseconds of one-way packet latency, algorithmic trading is sensitive to milliseconds, microseconds, or less. High frequency trading has created a seismic shift of more than three orders of magnitude in latency requirements; however existing tools cannot scale to effectively measure one-way and hop-to-hop latency at the required granularity. Existing tools are prone to inherent measurement error of tens or hundreds of microseconds or more, which is introduced by switch mirror ports and traffic aggregation devices. They also lack effective clock synchronization that leads to inherent clock skew error between observation points. Moreover, existing measurement solutions exhaustively capture all the packets at multiple locations, thus creating data duplicates and limiting scalability.

cPacket's latency and jitter measurement relies on passive intelligent distributed probes, which are deployed transparently - like inline taps - providing deterministic accuracy with no impact on network performance. The probes perform real time complete packet inspection of every bit in every packet and every flow; they can extract on-the-fly relevant events from high speed traffic according to both the packets' header and payload information and attach a deterministically accurate time stamp, which is derived directly from the PHY chip interface. The probes include integrated analysis of micro-bursts and spikes. cPacket latency monitoring probes support accurate clock synchronization via an interface to a highly accurate pulse-per-second GPS feed. The probes also support synchronization over standard network protocols like PTP and NTP.

Time stamped events from multiple probes are preprocessed by the probe and forwarded to a central dashboard, where they are correlated to produce reports, graphs, and history archives. The latency information is also correlated with additional performance metrics such as throughput, TCP window size, packets size distribution, QoS classes, and application behavior. Reports can be accessed from a web browser and data can be imported into a spreadsheet or databases from CSV files.

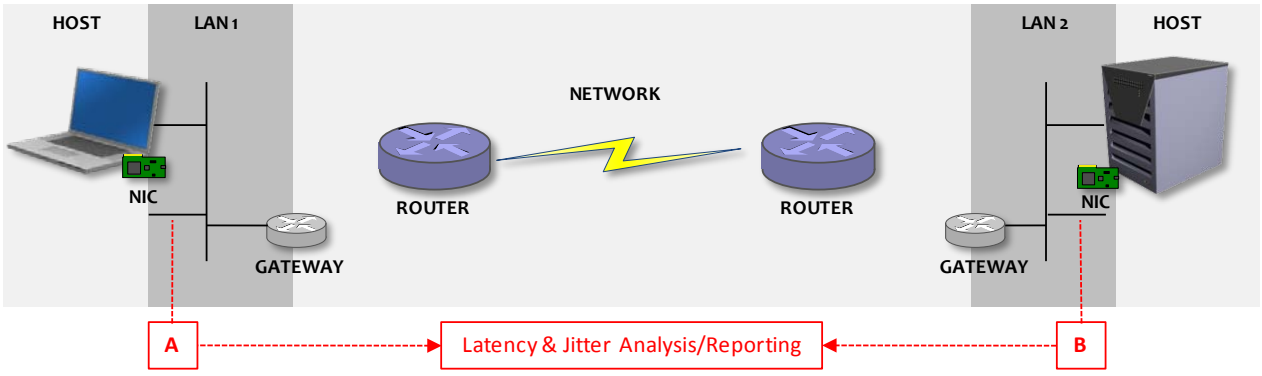
cPacket's high speed intelligent probes support simple deployment, accurate analysis, and ease of use. Distributed probes enable one-way and hop-to-hop analysis of latency and jitter. Round trip analysis, however, requires only a single probe. cPacket's monitoring solutions enable real time monitoring, drill down, and troubleshooting of latency and performance issues.

IF YOU CANNOT MEASURE NETWORK LATENCY, YOU CANNOT CONTROL AND IMPROVE IT

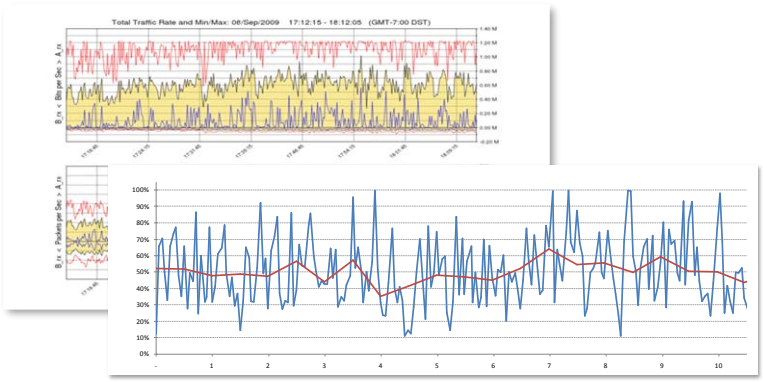


Use Case	Scenario
Passive inline deployment	No impact on network performance. Passes all traffic when power is turned off without packet loss.
Granular Performance Monitoring	Detailed visibility into critical high-speed links, breakdown of throughput and packet rate per second for both built-in and user-defined profiles, according to protocol header fields and payload patterns.
Behavioral Health Indicators	Real time monitoring of detailed health indicators of the network and applications behavior by observing critical ratios between specific event types and deviations from acceptable thresholds.
Micro burst and spike measurement	Integrated HW measurement of micro-bursts, directly at the PHY interface, provides accurate microsecond analysis without the inherent errors introduced by mirror ports and aggregation devices.
Selective filtering and drill down based on headers and payload	Drill down on specific traffic with selective filtering of only relevant traffic to enable root cause analysis. Interactive elimination. Browser remote access to specific packet traces in pcap format.
Time stamp, splicing, tunneling, and remote forwarding	Analysis of specific events and application traffic profiles. Forwarding packets with the actual time-stamp at the PHY to remote destinations for analysis by Wireshark or other tools. Optional splicing.
Clock synchronization interfaces (GPS)	Hardware interface for accurate GPS pulse-per-second synchronization (PPS). Also, supports network synchronization over standard PTP or NTP protocols. Attach sub-microsecond accurate timestamps.
Correlation and Visualization	Multiple distributed cTaps probes can feed information to a central dashboard. cPacket provides software utilities for aggregation, correlation, and visualization of information from multiple cTaps.

Distributed Deployment



Visualize Latency, Jitter, Micro-bursts



Specifications

Interfaces	2 x 10G data, 2 x 10G selective mirroring, 2 x 1G selective mirroring, 1 management, GPS synchronization interface
Power	60W
Dimensions (H x W x D)	1.7" x 15.3" x 13.1"
Weight	9 lbs
Operating Requirements	0 to 40° C, 32 to 104° F
Certifications	FCC Class A, EN 55022 Class A

cpacket NETWORKS

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