



Network Probes

Robust Passive and Active Monitoring of the Triple Play Experience

BENEFITS

- Evaluate QoS and QoE from Customers' Viewpoint
- Monitor Content and Network Impairments
- Analyze Source Video Quality
- Real-time Monitoring and Predictive / Trend Analysis Feature Sets
- Scales to Test Entire Enterprise
- Easy to Deploy and Integrate with Installed OSS

Symmetricom's network probes help operators gain a complete view of real-time end-to-end network performance. These high-performance hardware probes collect, analyze, aggregate, and report statistics for video and audio quality, customer flow simulations and traffic flow.

In combination with Symmetricom's software agents and centralized NOC software, the network probes are part of a total solution to monitor and analyze quality of service on virtually any network, media, topology, and service all the way from the headend office to the customer premises equipment.

QUALITY CORE VALUES

While some QoS solutions bolt on support for advanced services like IP video or wireless, Symmetricom embeds core features like deep packet inspection and precision hardware timing into its architecture to enable critical triple play KPIs. The IP timing leader for 30+ years, Symmetricom closely knits its timing expertise with its V-FACTOR® product to evaluate Quality of Service (QoS) and Quality of Experience (QoE) from the customers' viewpoint. A componentized web-based architecture leverages these core values across networks of any size or configuration.

A COMPREHENSIVE VIEW

Symmetricom network probes support all relevant Internet Engineering Task Force (IETF) performance standards on both IPv4 and IPv6 networks including ITU Y.1540/1541, RFC 2330, as well as unicast and multicast-based RTP/RTCP applications like VoIP and TVoIP. Dynamic Host Configuration Protocol (DHCP) is supported for easy deployment and Secure Shell (SSH) is included for security.

CAPABILITIES:

End-to-end monitoring: Probes positioned throughout the network (including customer premises) can isolate and assess trouble spots

V-FACTOR enabled: Symmetricom delivers the only product that objectively indicates network performance from the end-user perspective

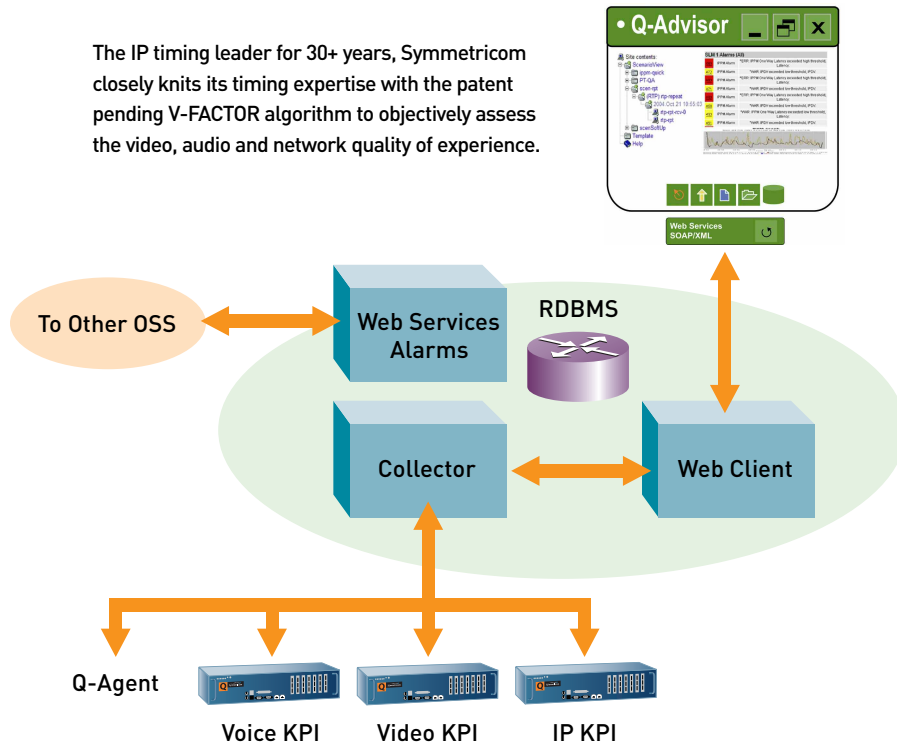
Passive monitoring two ways: Probes can send a "join" to a channel, connect to it, and assess its performance. They can also look at all packets on a segment and sniff out video packets for deep inspection

Active monitoring: Probes can generate simulated end-user traffic and assess the network's ability to support a variety of services including video IP, VoIP, VPNs, SMS, SIP and HTTP.



For detailed technical information about Symmetricom's Network Probes, please contact us via our Web site: <http://qoe.symmetricom.com/company/contact.asp>

The IP timing leader for 30+ years, Symmetricom closely knits its timing expertise with the patent pending V-FACTOR algorithm to objectively assess the video, audio and network quality of experience.



FOUR PRICE/PERFORMANCE OPTIONS

Symmetricom's network probes are available in four price/performance models: Q-101, Q-200, Q-301, and Q-400. Operators have the flexibility to apply the level of monitoring and processing power appropriate to different parts of the network. Deployments can also scale since a single instance of the NOC software solution can control and monitor up to 250 probes.

Q-400: Ideal for IPTV and VoIP applications and deployable across backbones or large PoPs, Q-400 monitors up to 400 SD or up to 1.2 Gbps of HD H.264 IPTV streams and up to 10,000 VoIP streams in parallel in full passive mode. It supports unicast/multicast

in full passive mode, MPEG2TS for any MPEG2 or H264 IPTV stream, and audio and video scoring. It supports 10/100/1000 UTP, Gig Fiber SX and LX, and 10Gbps Fiber.

Q-301: Ideal for backbones or large PoPs, the Q-301 offers a high level of test capacity and functionality. It supports 10/100/1000 UTP and SX and LX fiber ports.

Q-200: A highly flexible medium-performance probe, the Q-200 is designed to deliver performance visibility of premium services on live IP networks. It offers configurable test capacities of 10/100/1000 UTP and SX ports. Use it for distributed monitoring of backbones as a complement to Q-301 or Q-400.

Q-101: The base-level performance probe, the Q-101 is ideal for core IP performance metrics (IPPM) monitoring with a gigabit UTP test port.

V-FACTOR — A SYMMETRICOM FIRST Models Q-400, Q-301 and Q-200 support V-FACTOR — Symmetricom's patent pending, innovative product for measuring the quality of experience of video/audio applications like IPTV, MPEG-2 and MPEG-4 (H.264 PART 10). Traditional measurements like MDI (Media Delivery Index) only look at network performance indicators such as jitter and packet loss. In addition to those, Symmetricom also applies special processing to other — content oriented — metrics that may not reflect network performance but do reflect the quality of content play-out for the consumer.

V-FACTOR provides a quality of experience (QoE) measurement that accurately portrays how well your service is performing from the customers' point of view. Only Symmetricom offers this advantage for preventing customer complaints and churn while reducing truck rolls and service costs.

SYMMETRICOM TIMING

Highly accurate time synchronization is critical to advanced network-based applications. Symmetricom — a world leader in time and frequency synchronization technology — offers a patented method to synchronize probes using Coordinated Universal Time (UTC). In addition, all network probes come equipped with a highly accurate TcVcXO oscillator. Models Q-200 and Q-301 also have a GPS synchronization module — to enable very precise measurements of key quality metrics such as one-way packet delay variation (PDV) and latency.

IP Data	Voice Over IP	IPTV
<p>One-Way Performance Latency, jitter, loss Per RFC2330, ITU-T Y.1541</p> <p>Quality of Service Differentiated Services Virtual LAN</p> <p>Virtual Private Networks Full-mesh availability and performance</p> <p>Network ICMP Unicast Multicast</p> <p>Monitoring ICMP Router Status</p>	<p>VoIP Monitoring and Testing SIP Call Setup and tear down between probes with RTP generation</p> <p>RTP generation between probes</p> <p>Passive monitoring of RTP streams</p> <p>Measurement of: following metrics for each RTP stream: Latency, packet loss, jitter, R-factor per ITU-T G.107 E-model, Mean Opinion Score (MOS)</p> <p>Support for most popular codecs</p> <p>Call Records with Quality Scores</p>	<p>Video/Audio QoE (V-FACTOR/MOS) MPEG2 H.264 (SD and HD)</p> <p>Network Parameters Latency, loss episode, loss episode length, jitter, sequence, packet counts</p> <p>Content Parameters ETSI TR101290 Priority One and Two Clear and encrypted channels support (DRM) Compression ratio, image entropy — quantizer scale</p> <p>Screen size (horizontal, vertical), aspect ratio-profile/level</p> <p>Video Frame Counts (frame rate, instantaneous bandwidth, I, B, P frames and slices)</p>

CONTACT SYMMETRICOM

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