telchemy
Actively managing multimedia®

VQmon®

SA

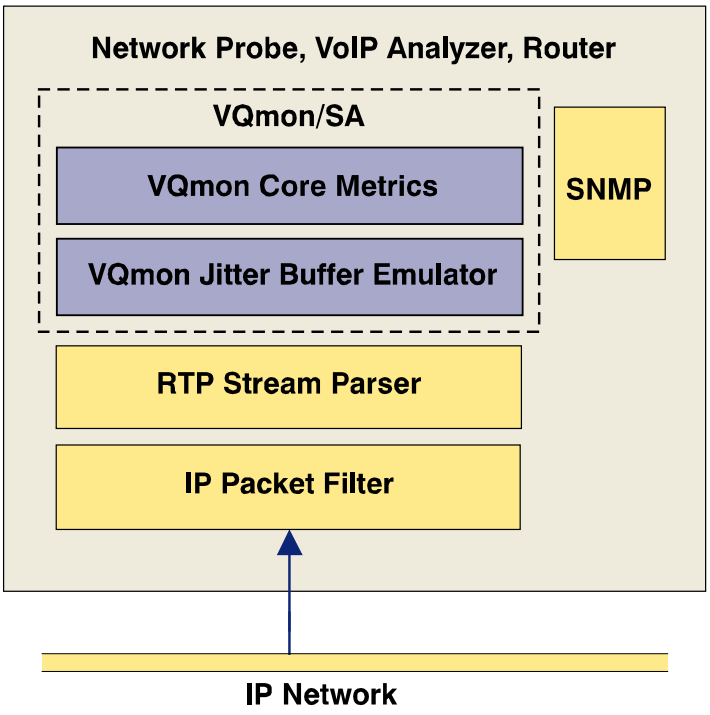
VQmon® is the leading Voice over IP Performance Management Technology used in IP phones, gateways, probes, analyzers, switches, and routers to provide real-time monitoring of service quality. VQmon is the first technology to detect and measure transient IP problems and to assess their effect on perceptual quality.

VQmon/SA is used in mid-stream routers and switches and in VoIP test equipment, e.g., probes and analyzers, to support both non-intrusive monitoring of live calls and active test calls for on-demand troubleshooting.

VQmon/SA supports:

- Listening and conversational quality metrics
- MOS scores and R factors
- Detailed packet/RTP statistics
- Jitter buffer emulation
- RTCP XR encode/decode with dynamic calibration

Functional Diagram of VQmon/SA

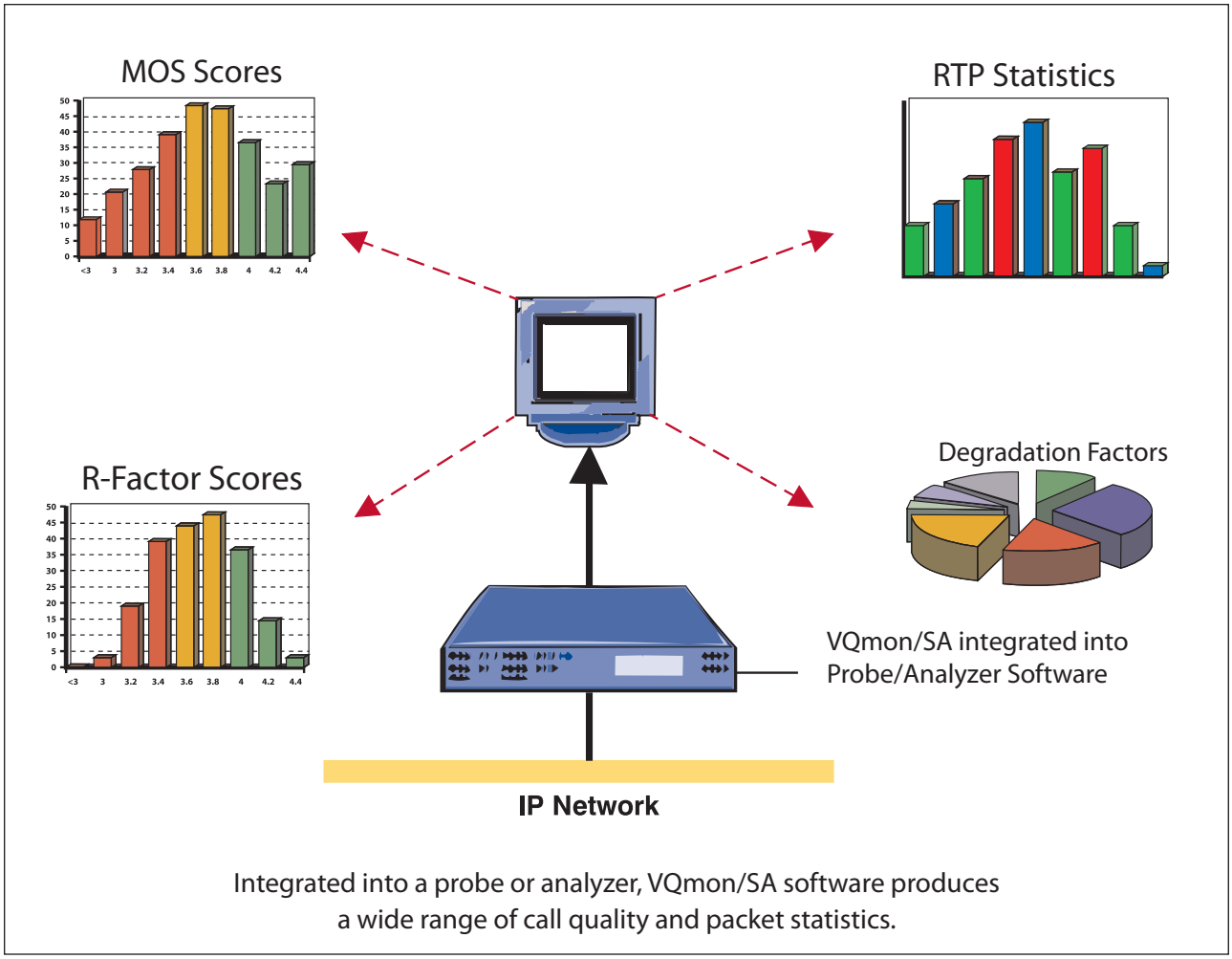


The **VQmon Jitter Buffer Emulator (JBE)** inspects every RTP packet header, estimating delay variation and emulating the behavior of a fixed or adaptive jitter buffer to determine which packets are lost or discarded. A 4-state Markov Model measures the distribution of the lost and discarded packets.

The **VQmon Core Metrics Module** uses packet metrics obtained from the JBE together with signal, noise, echo, and delay information from RTCP XR to calculate a rich set of metrics and diagnostic information. This module is run whenever detailed call quality metrics are needed.

VQmon/SA supports **real-time thresholding** and generates internal callbacks if call quality remains below threshold for a specified period. It interprets **RTCP XR (RFC 3611) payloads** and can also generate them to support RTCP XR spoofing. It supports **dynamic calibration** via RTCP XR metrics, allowing mid-stream probes and analyzers to automatically synchronize configuration with IP endpoints.

Fast, efficient, and highly portable, VQmon/SA is fully compatible with VQmon/EP and a wide range of embedded software probes, helping to minimize implementation time and cost.



Integrated into a probe or analyzer, VQmon/SA software produces a wide range of call quality and packet statistics.

Technical Specifications

- Call quality analysis using optimized ITU-T G.107
- Measures perceptual effects of burst packet loss and recency using ETSI TS 101 329-5 Annex E Extensions
- Supports Japanese TTC JJ201.01 VoIP monitoring requirements
- Produces and interprets RTCP XR (RFC3611) VoIP metrics payloads

Call Quality Metrics

- Listening and conversational quality MOS scores with ACR, ITU and TTC scalings – MOS-LQ, MOS-CQ
- Listening and conversational quality R-factors – R-LQ, R-CQ
- Estimated PESQ scores – MOS-PQ
- Separate R-factors for burst and gap conditions – R-Burst, R-Gap

IP/RTP Metrics

- Packet loss rate, packet discard rate, burst length/density, gap length/density

Jitter Buffer Metrics

- Early packets, late packets, discards, resynchronization events, jitter buffer delay, jitter envelope, etc.

Degradation Factors

- Percentage degradation due to loss, jitter, codec, delay, signal level, noise level, echo, recency

Codecs Supported

- G.711, G723.1, G.726, G.728, G.729/A, GSM, FR, EFR, etc.

Implementation Requirements

- Software Language – ANSI C
- Code size – Approximately 50 kilobytes
- API – VQmon/SA API
- OS/RTOS – Minimal OS dependency
- Processor – Generic 32-bit integer processor
- CPU load – Approximately 0.01 MIPS per active call, at 1% packet loss rate
- RAM – Approximately 1000 bytes per active call

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