

**VQmon®** is the leading Voice over IP and IPTV 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-VM 2.2 provides non-intrusive real-time monitoring for RTP and MPEG2-TS based video streams, supporting IPTV and IP Videoconferencing applications.** This enables IP set top boxes, probes, analyzers and routers to obtain video performance metrics for reporting, on-demand active troubleshooting or active control.

#### VQmon/SA-VM supports

- Monitoring of RTP and MPEG2-TS video streams
- IPTV, Videoconferencing and Streaming Video
- Telchemy's **TVQM™** Video Quality metrics
- Video MOS, Audio MOS, Audio-Video MOS
- TR 101 290 and I, B, P frame statistics
- Automatic detection of GoP structure and other key video stream parameters

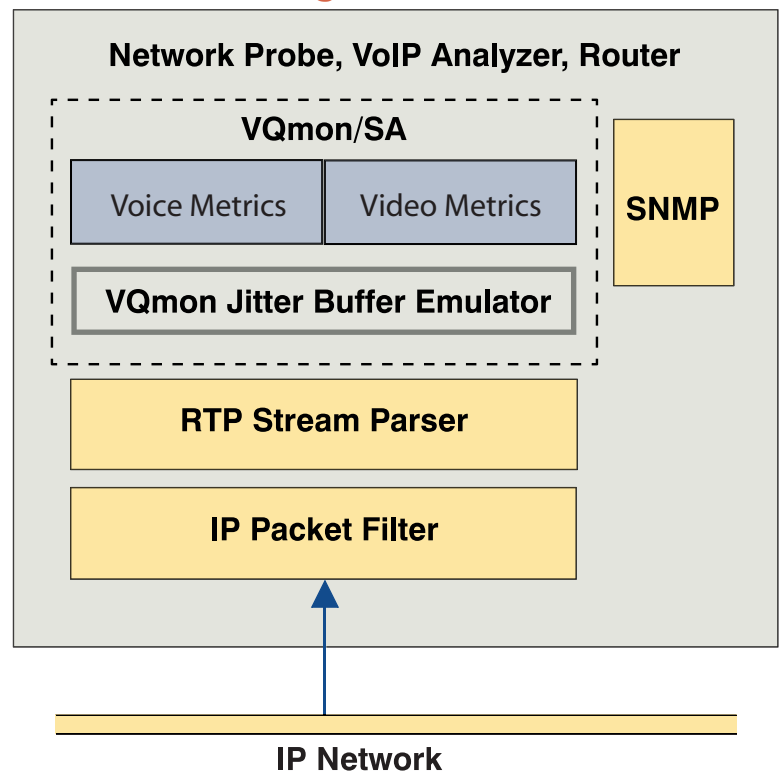
The **VQmon Jitter Buffer Emulator (JBE)** inspects every MPEG-TS or RTP packet header, estimating delay variation and emulating the behavior of a fixed or adaptive jitter buffer to determine which packets are lost or discarded. A 4-state Markov Model measures the distribution of the lost and discarded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

The **VQmon/SA-VM Core Metrics Module** uses packet metrics obtained from the Jitter Buffer Emulator, together with video codec and rate information obtained from the packet stream to calculate a rich set of metrics, performance and diagnostic information. This module is run whenever detailed video quality metrics are needed.

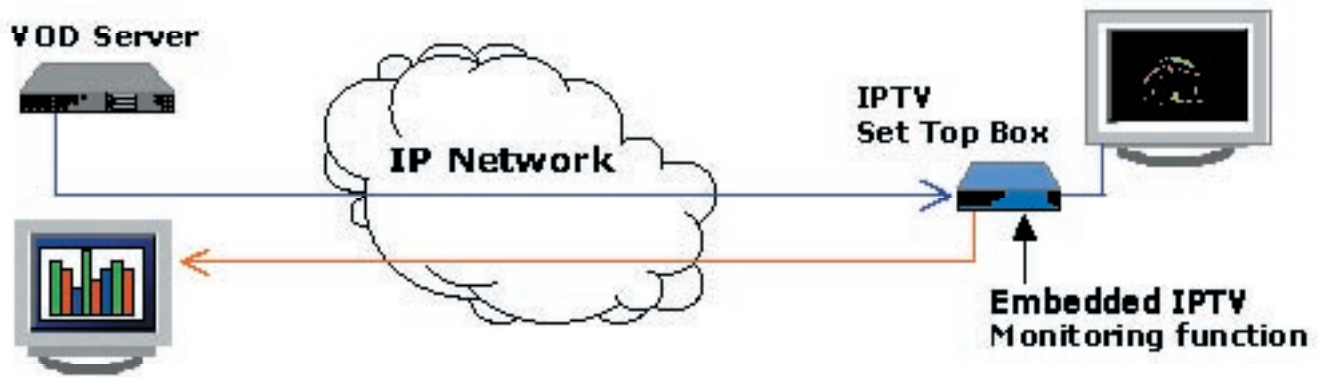
VQmon/SA-VM supports a wide variety of video codecs, producing Telchemy's TVQM - comprehensive video quality metrics - with Transmission Quality, Video Stream and Perceptual Video Quality metrics. VQmon/SA-VM also provides an FEC effectiveness metric, which supports what-if analysis of the effects of Forward Error Correction.

VQmon/SA-VM is **fast, efficient and highly portable** as well as **fully compatible** with Telchemy's **VQmon** product family.

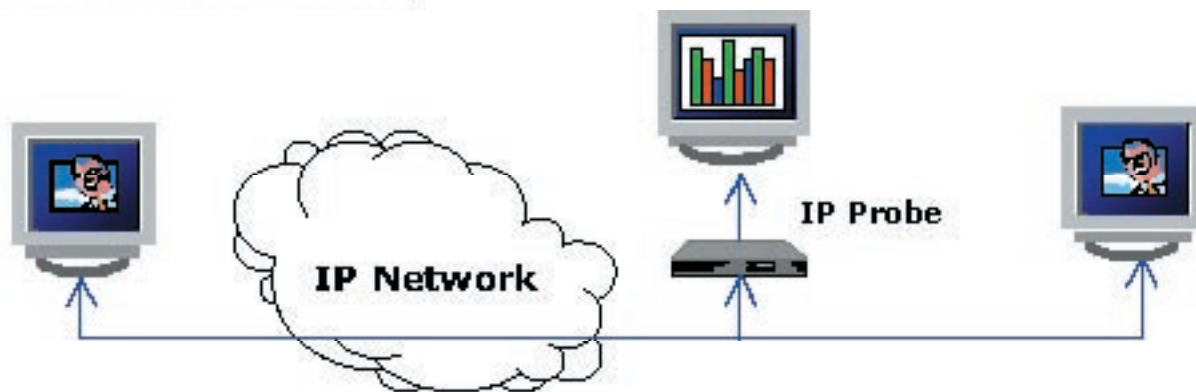
### Functional Diagram of VQmon/SA-VM



## IPTV Service



## Videoconferencing



### Technical Specifications

- Video quality analysis, producing TVQM video metrics
- Video metrics incorporate effects of time varying impairments

### TVQM Perceptual Quality Metrics

- Video MOS-V, Audio MOS-A and Multimedia MOS-AV
- Video Transmission Quality - VSTQ
- Separate metrics for burst and gap conditions – VSPQ-Burst/Gap

### TVQM Video Stream Metrics

- Good and Impaired I, B,P frame counts
- Good, lost, discarded I, B, P frame packets
- Automatic detection of GoP structure and other key video stream attributes
- Image size, bit rate, codec type

### TVQM Transport Metrics

- Packet loss rate, Packet discard rate, Burst/ Gap loss rates
- Packet delay variation/ jitter
- FEC Effectiveness

- TR 101 290 Decodability Metrics (subset)
- TR 101 290 Continuous Monitoring Metrics (subset)

### Degradation Factors

- Percentage degradation due to loss, jitter, codec, delay

### CODECs Supported

- MPEG1, MPEG2, MPEG4, MJPEG, H.261, H.263, H.263+. H.264, VC1 video codecs over RTP or MPEG2-Transport

### Implementation Requirements

- Software Language – ANSI C
- Code size – Approximately 50 kilobytes
- API – VQmon/SA-VM API
- OS/RTOS – Minimal OS dependency
- Processor – Generic 32 bit integer processor
- CPU load – Approximately 0.1 MIPS per active call
- RAM – Approximately 1000 bytes per active call
- IPV4 and IPV6 supported

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**Email** sales@telchemy.com  
info@telchemy.com  
**Phone** 1-866-TELCHEMY  
1-678-387-3000  
**Fax** 1-678-387-3008  
**Website** www.telchemy.com

**Telchemy, Incorporated**  
2905 Premiere Parkway  
Suite 280  
Duluth, GA 30097  
USA

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