Monitor your entire network with rich graphs and an easy-to-use web-based interface. Sentry® is a comprehensive video and audio quality monitoring solution for advanced video networks. It enables video service providers to deliver services with optimum quality while reducing operational expenditures.

**Key features**
- Audio and video Quality of Experience (QoE) scoring system
- Audio silence and audio-level issue detection
- Detect frozen video, tiling/macroblocking
- Perceptual video quality (eMOS)
- Live thumbnails and Thumbnail Wall
- User-triggered & alert-triggered stream captures
- Error second and program availability reporting
- Stream to view
- Historical reporting and graphing
- Transport Stream and Program Group bandwidth graphing
- Carousel monitoring (SA-BFS, DSM-CC, tru2way™)
- 24/7 real-time QoE monitoring of entire channel lineup
- Detect intermittent problems
- Alert notification and historical reporting

**Applications**
- Audio and video Quality of Experience (QoE) scoring system
- IP network impairment analysis
- Alert filtering and resolution tracking
- 10 GbE network monitoring
- Carousel monitoring (SA-BFS, DSM-CC, tru2way™)
- Digital program insertion monitoring
- EBIF monitoring
- Program statistics and availability reporting
- Dual GigE input support for monitoring primary and redundant video feeds

**Video quality monitoring**
Sentry identifies anomalies in the network at the IP and MPEG layers as well as in Quality of Experience (QoE), identifying issues including frozen video, tiling/macroblocking, and audio disruptions or audio-level issues, which represent the bulk of trouble calls from subscribers.

In addition, Sentry includes a video artifact measurement and detection capability. This makes Sentry the only solution that detects video and audio errors in digital programs while generating metrics that correlate to Mean Opinion Scores (MOS).

The multithreshold-based alerting capability enables a flexible alert configuration. Sentry uses this approach for alerting because it is effective in detecting problems in their developing stages before the subscriber experience is impacted. This capability, combined with detailed root-cause troubleshooting information appended in the actual alert, allows engineers to resolve problems quickly and often before subscribers experience any quality deterioration or outage.

Detection and alerting of a subscriber-impacting issue is only part of the monitoring functions of Sentry. Analysis tools coupled with historical data give service providers the ability to resolve complex and intermittent problems quickly. Advanced reporting capabilities give operators the ability to generate reports that quickly identify the top offending programs or locations. Trending reports quantify improvements made over time. Lastly, reports can be automatically generated and forwarded by e-mail for an accurate and timely assessment of the quality of every program.
Sentry can be deployed throughout your network, but it is most cost effective at your master and secondary headends where digital content is first acquired and where it undergoes the most manipulation before it is sent to hub sites and the customer premises.
Software options

Ad insertion (DPI)

Today, an average of 2% of digital advertisements fail to air or air incorrectly due to scheduling, insertion, and other errors. In addition, advertisements often suffer the same audio and video quality issues that plague regular programming. As a result, monitoring and auditing capabilities are critical to successful ad delivery.

The Sentry suite of products provides the most complete digital ad insertion monitoring solution by combining real-time monitoring and alerting with historical auditing across the entire channel lineup in all advertising zones. The Sentry product line delivers extensive data including historical thumbnails which improve digital ad insertion on any platform, allowing engineering teams to ensure proper function of insertion technology by identifying and correcting system errors when they occur.

In addition, the ad insertion verification capability allows ad sales groups to provide higher levels of customer service, resulting in greater revenue potential. Using the web-based interface you can monitor digital ad insertion across your entire network. By strategically placing Sentry, Sentry Assure, or Sentry Verify in each of your ad zones, you can monitor and be alerted on all insertion opportunities network-wide, as well as issues that arise from problems.

Perceptual video quality (eMOS)

Sentry's Quality of Experience (QoE) monitoring solution has been expanded to include Perceptual Video Quality or effective MOS (eMOS). The PVQ feature ranks picture quality in real time from 0 to 5 (5 being the best) on both SD and HD programs (MPEG2 and H.264), so service providers can understand how video compression artifacts such as blocking video are affecting the viewer’s experience with the picture.

These problems are extremely difficult to detect and are becoming a critical issue to monitor as video content continues to grow while bandwidth is becoming more limited than ever. Sentry’s eMOS is the industry’s first and only highly scalable “non-reference” perceptual quality score that correlates closely with the Tektronix POA - the industry standard for picture quality test and measurement, used by leading encoder manufacturers worldwide.

Sentry accurately detects video artifacts and scores them as PVQ (or eMOS), which ranks video quality in a similar way as a Mean Opinion Score (MOS). eMOS can be used, in the case when there are no technical “errors” in the transport stream, to measure perceptual video quality in the compressed domain. Sentry’s PVQ scoring provides the minimum, maximum, and average PVQ scores and is sensitive to certain artifacts caused by over-compression that specifically affect chroma detail.

Perceptual Video Quality (eMOS) Measurement.

Carousels tru2way™ / OCAP/MHP / DSM-CC

The OCAP Monitor is a tool for monitoring tru2way™/OCAP carousels. Digital set-top boxes receive continuous delivery of applications and data from the headend or uplink center. These data and applications are critical for normal set-top box function and service delivery.

With the advent of tru2way™ (OCAP) and other carousels, multichannel service providers are introducing a vast array of complex, interactive services to their subscriber base. Monitoring the carousel activity is essential to ensuring the quality and consistency of experience for subscribers.

Sentry supplies detailed reports of carousel performance and activity based on their real-time behavior and data output. Service providers are able to identify the root cause of errors and make necessary changes to eliminate issues and guarantee rapid application deployment. The reports show detailed source and file structures and carousel changes in real time while observing streaming metrics such as cycle time, bandwidth utilization, and stream packet continuity. Real-time alerting notifies users of critical situations, enabling them to resolve issues such as outages, cycle-time fluctuations, and unauthorized changes.
Monitoring tru2way™/OCAP Carousels.

EBIF monitoring

Interactive applications and associated advertising allow you to deliver enhanced capabilities to your subscribers and monetize advanced digital services in a broad range of digital set-top boxes. eTV content consisting of the applications and metadata is, however, prone to errors during transport, rate-shaping, and muxing. Old video-over-IP metrics such as MDI and Continuity Counter (CC) errors are incapable of detecting any content errors, especially with eTV.

The EBIF/eTV monitoring solution breaks down and reports on eTV application data and critical signaling information, so service providers can be assured they are delivering the best possible quality of experience for their subscribers. In addition, a 60-day application-level historical report (available by service and by location) provides critical trending information about eTV delivery. Tailored alerting and dashboards provide proactive eTV monitoring and fast troubleshooting.

SA-BFS monitoring

Sentry is designed to identify and monitor data carousels within the transport, which enables it to keep detailed information about the real-time and historical status of the Scientific-Atlanta Broadcast Files System (BFS). Similar to the way other application carousels (tru2way, DSM-CC, etc) are monitored, Sentry is able to provide critical information about the status of BFS carousels. Multichannel service providers can set alerts to be notified of bit rate errors, file changes, file cycle times, and if files are missing.

Monitoring EBIF/eTV.
Specifications

All specifications apply to all models unless noted otherwise.

General characteristics

<table>
<thead>
<tr>
<th>Browser support</th>
<th>Firefox, Safari, and Internet Explorer</th>
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<tbody>
<tr>
<td>MPEG/IP input port</td>
<td>VNM-SGE and VNM-SASI 1000BASE-T Ethernet interface</td>
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<tr>
<td></td>
<td>VNM-SXG 10GBASE-(LR or SR) interface</td>
</tr>
<tr>
<td>Management port</td>
<td>1000BASE-T Ethernet interface</td>
</tr>
</tbody>
</table>

Supported protocols

<table>
<thead>
<tr>
<th>Video</th>
<th>MPEG-2, H.264, VC-1</th>
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<tbody>
<tr>
<td>Audio</td>
<td>Dolby AC-3 (5.1 Surround)</td>
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<tr>
<td></td>
<td>MPEG-1 Layer II (Mono, Stereo)</td>
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<td></td>
<td>AAC, HE-AAC, and HE-AAC v2</td>
</tr>
<tr>
<td>Carousel</td>
<td>tru2way™, BFS MHP / DSM-CC</td>
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<tr>
<td>Program insertion</td>
<td>SCTE-35 (local ads)</td>
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<tr>
<td>Misc. support</td>
<td>HD/SD programs, SPTS or MPTS, multicast (IGMP v3) and unicast</td>
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<tr>
<td></td>
<td>MPEG-PSI, DVB-SI, ATSC-PSIP table support</td>
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<tr>
<td></td>
<td>SNMP trap and MIB support</td>
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</tbody>
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Physical characteristics

| Dimensions | Height 50.8 mm (2 in.) |
|           | Width 432 mm (17 in.) |
|           | Depth 381 mm (15 in.) |
| Weight (net) | 9.2 kg (20.2 lb.) |
| Power supply | 100-240 V AC, 50-60 Hz |

Environmental characteristics

| Max storage temperature | 70 °C |
| Max operating temperature | 35 °C |
| Max humidity | 85% |
Ordering information

**Models**

- **VNM-SGE**  
  Sentry Video Quality Monitor, includes QoE monitoring module and IP multicast input
- **VNM-SASI**  
  Sentry Video Quality Monitor, includes ASI input
- **VNM-SXG**  
  Sentry Video Quality Monitor with 10 GbE interface

**Instrument options**

**VNM-SGE**

- **Opt. 50S**  
  Throughput of 50 Mb/s
- **Opt. 100S**  
  Throughput of 100 Mb/s
- **Opt. 213S**  
  Throughput of 213 Mb/s
- **Opt. 300S**  
  Throughput of 300 Mb/s
- **Opt. 400S**  
  Throughput of 400 Mb/s
- **Opt. 700S**  
  Throughput of 700 Mb/s
- **Opt. LR**  
  Line rate throughput
- **Opt. 2MP**  
  Second MPEG input
- **Opt. 1500S**  
  Throughput of 1.5 Gbps (Requires Opt. 2MP)
- **Opt. 2000S**  
  Throughput of 2 Gbps (Requires Opt. 2MP)
- **Opt. DCU-BFS**  
  Monitoring support for SA Broadcast File System
- **Opt. DCU-OCAP**  
  Monitoring support for tru2way (OCAP), MHP, and DSM-CC in-band carousels
- **Opt. EBIF**  
  Monitoring support for EBIF
- **Opt. DPI**  
  Digital Program Insertion Monitoring
- **Opt. PVQ**  
  Perceptual Video Quality (eMOS)
- **Opt. PVQ H264**  
  Perceptual Video Quality (eMOS) for H.264 video

**VNM-SASI**

- **Opt. 50S**  
  Throughput of 50 Mb/s
- **Opt. 100S**  
  Throughput of 100 Mb/s
- **Opt. 213S**  
  Throughput of 213 Mb/s
- **Opt. 300S**  
  Throughput of 300 Mb/s
- **Opt. 700S**  
  Throughput of 700 Mb/s
- **Opt. 852S**  
  Throughput of 852 Mb/s
- **Opt. S1PS**  
  Single ASI port; compatible only with 213 Mb/s capacity
- **Opt. S4PS**  
  4-port ASI input
- **Opt. DCU-BFS**  
  Monitoring support for SA Broadcast File System
Opt. DCU-OCAP  Monitoring support for tru2way (OCAP), MHP, and DSM-CC in-band carousels
Opt. EBIF  Monitoring support for EBIF
Opt. DPI  Digital Program Insertion Monitoring
Opt. PVQ  Perceptual Video Quality (eMOS)
Opt. PVQ H264  Perceptual Video Quality (eMOS) for H.264 video

VNM-SXG
Opt. LR  Single-mode, one-channel SFP
Opt. SR  Multi-mode, one-channel SFP
Opt. DCU-BFS  Monitoring support for SA Broadcast File System
Opt. DCU-OCAP  Monitoring support for tru2way (OCAP), MHP, and DSM-CC in-band carousels
Opt. EBIF  Monitoring support for EBIF
Opt. DPI  Digital Program Insertion Monitoring
Opt. PVQ  Perceptual Video Quality (eMOS)

Power plug options
Opt. A0  North America power plug (115 V, 60 Hz)
Opt. A1  Universal Euro power plug (220 V, 50 Hz)
Opt. A2  United Kingdom power plug (240 V, 50 Hz)
Opt. A3  Australia power plug (240 V, 50 Hz)
Opt. A4  North America power plug (240 V, 50 Hz)
Opt. A5  Switzerland power plug (220 V, 50 Hz)
Opt. A6  Japan power plug (100 V, 110/120 V, 60 Hz)
Opt. A10  China power plug (50 Hz)
Opt. A11  India power plug (50 Hz)
Opt. A12  Brazil power plug (60 Hz)
Opt. A99  No power cord

Service options
VNM-SUP  One-year service support
VNM-SUP-REN  Renewal of one-year product support

Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.