Inspector® LAB

Optimizing Video Compression to Balance Network Capacity & Perceptual Quality

Today's viewers demand more content and expect high quality playback wherever they are, on many different devices. At the same time, Video providers (VPs) face limited network capacity and the emergence of new standards such as UHD/4K and High Dynamic Range (HDR). In response, VPs are being challenged to re-evaluate their content preparation and encoding technologies and workflows. These challenges include the greater use of adaptive bitrate (ABR) streaming, the shift to the HEVC codec for bandwidth, storage, and cost savings, and a complete re-architecting of the content workflow to address both linear and OTT needs through combinations of physical and virtual/cloud based assets. VPs need a way to efficiently evaluate those products and technologies, optimize their configurations, and effectively manage them in their live networks. Their video content must be tuned for visual quality, network bandwidth, and cost. These tasks are complex, time-consuming and expensive without a way to quickly measure the quality/bandwidth tradeoff.

IneoQuest's Inspector LAB was designed as a standalone test tool that provides deep QoE and QoS measurements and analytics in real-time on live/linear video streams. It includes an IneoQuest-developed video quality scoring technology that effectively grades video streams in real time.

This non-reference quality scoring model, iQ-MOS, allows streams being processed for multi-screen delivery to be graded "on-the-fly," enabling encoder/transcoder users to immediately see the impact of changes they make to any of the dozen or more settings that can be used to tune the output. Comparisons between virtual or appliance-based encoder/transcoder solutions from the same or different vendors is now easily accomplished in real time, opening the door to testing against a much broader spectrum of content types than was previously feasible. In addition, encoder users and compressionists can quickly optimize their encoder settings to find the "sweet spot" between size reduction/cost savings and quality/viewer satisfaction.

The Inspector family also simplifies your ability to transition between the lab and production network environments, and vice-versa, which is critical for identifying encoder configuration issues, and issue recreation in the lab. By collecting 24/7/365 metrics on your production network using Inspector LIVE, and performing discrete lab testing and issue recreation with Inspector LAB in an offline environment, you will have a consistent set of metrics and capabilities, forming a solid test and deployment framework.

Inspector LAB easily pays for itself many times over by quickly revealing CDN cost savings opportunities, reducing encoder configuration time, and reducing issue replication and troubleshooting time.
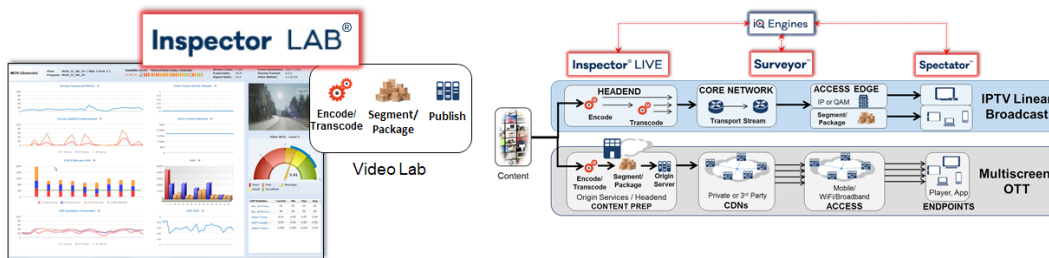
"Reliable non-reference quality scoring is the 'holy grail' of the video content preparation community. This technology, integrated in IneoQuest's Inspector LAB product, can significantly reduce the time it takes to evaluate, select and configure encoders and opens the door to real-time quality grading in live networks."

– Jan Ozer, compressionist, streamingmedia.com contributing editor, and founder of streaminglearningcenter.com.

KEY BENEFITS

- Optimize the content quality/bandwidth tradeoff for efficient viewer engagement
- Reduce CDN delivery costs
- Accelerate encoder evaluation and comparison
- Verify regulatory compliance
- Simplify issue identification and resolution
- Leverage common lab and real-time production metrics to simplify issue resolution

KEY FEATURES

- iQ-MOS: Non-reference perceptual quality scoring of live/linear streams, with alignment to detailed video analytics
- Real-time program metrics on all video frames down to the block level, correlated with network transport stream metrics
- Real-time multi-channel comparison of key video metrics, including bits per pixel
- Intuitive and flexible Graphical Interfaces enable quick drilldown on areas of interest
- Correlated workflows to minimize the clicks from trouble awareness to root cause
- Simultaneous QoS and QoE monitoring and analysis
- per-second thumbnail capture for all programs around I-Frames
- Configurable video capture of analysis events before, during and after issues occur
- Full I, P and B frame decode for comprehensive video QoE measurements and iQ-MOS metrics
- Patented MDI metrics per RFC 4445
- Comprehensive reports of video quality results
- Long-term storage of thumbnails and performance data
- ABR Encoder Boundary Point decode and IDR Alignment visualization and alarming
- Audio loudness monitoring/reporting (ITU BS.1770)
- Closed caption monitoring, alarming and reporting

TECHNICAL SPECIFICATIONS

- Dual 1 Gbps input ports
- Scales up to 50 programs
- Resolution support up to UHD levels
- Video Codecs: MPEG-1, MPEG-2, AVC/H.264, HEVC/H.265
- AVC/H.264 4:2:0 8-bit, 4:2:2 10-bit
- HEVC/H.265 Main 8-bit, Main10 8 & 10-bit
- MPEG2 TS SI/PSI/PSIP
- iQ-MOS non-reference real-time QoS + QoE Scoring
- Audio Codecs: MPEG-1, MPEG-2, AC3, E-AC3, AAC
- Audio Loudness (BS-1770-1 and BS-1770-3)
- CALM Act compliance verification
- RFC 4445 Media Delivery Index (MDI)
- TR 101-290, Priorities 1, 2 and 3
- SCTE 168-6 2010 Errored Seconds, Availability
- IE11 and FF24 and later support

TYPICAL USE CASES

- Evaluation of encoder/transcoder video quality performance
- Evaluation of encoder/transcoder network performance
- Tuning of encoder/transcoder parameters
- Pre- and post-encoder quality comparisons
- Evaluation of ABR Encoder Boundary Point alignment
- Simultaneous capture of live video streams before, during and after a video quality impairment
- Real time and offline visual verification of video quality via video streaming capability
- Regulatory compliance monitoring (CALM Act, closed captioning)
- SI/PSI/PSIP monitoring, evaluation and alarming

FOCUS USE CASE: CDN DELIVERY COST REDUCTION

CDNs charge by the number of bits they deliver for you. If you can provide sufficient quality to your viewers with fewer bits, you will save money. However, it has historically been very difficult to determine the impact of configuration changes for bitrate reduction on quality, because there has not been a real-time non-reference perceptual quality measurement like iQ-MOS. And with Adaptive bitrate, each program may have 8 or more bitrate versions, or "renditions", making this a daunting task. Inspector LAB allows you to evaluate - in real time - the impact of bitrate reduction on the iQ-MOS score, which is a predictor of viewer quality perception. By setting your iQ-MOS score to a minimum threshold per rendition, and configuring your encoder to minimize the bitrate for each rendition without crossing that threshold, you can reduce the overall delivery bandwidth required – and begin saving money right away.
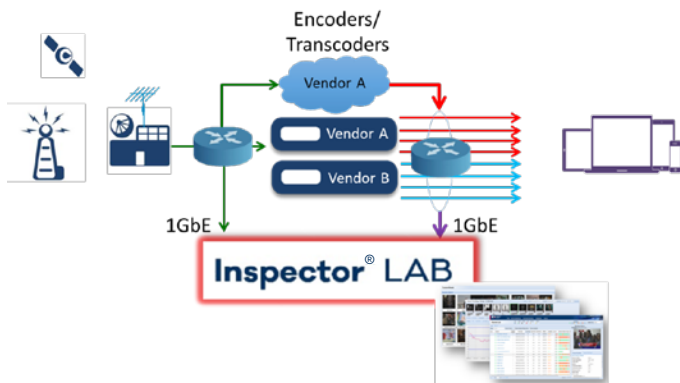
FOCUS USE CASE: ENCODER EVALUATION

You may be evaluating new encoder products for your video workflow, and considering appliances, cloud based, or a hybrid solution. These encoders offer a comprehensive array of controls, with manufacturer-defined pre-configured settings, or "presets". You need to understand how each of these settings and presets behaves for various kinds of content (sports, drama, news, etc.). What is the bandwidth and quality impact? Do the encoders provide smooth or bursty output which can affect the downstream network? Does overloading affect all programs, or only the ones which contributed to the overload condition? With Inspector LAB, you can discover these answers in real time, as you make the adjustments. You can can also perform long-term comparisons, and drill down on point issues.

Immediately observe the impact of encoder settings on:

- Video MOS, Temporal Motion, Spatial Compression, GOP Quantizer Parameter, Scene Change Complexity

- I, B and P frame compression

- GOP length and structure

- MPEG-2, H.264 frame structure

- Errored Seconds

- Program Availability

- Bit Rate (audio and video)

- Frame Rate

- Network packet transport – Smooth? Bursty? In between?

- Cross stream impact and loading comparison on the same encoder

Inspector LAB gives you the visibility you need to succeed in today's rapidly evolving video landscape.

Inspector LAB is an element of the **IneoQuest® FoQus™** Platform, the industry's premier portfolio of complementary video quality assurance solutions which combine to deliver the actionable insights video businesses need to understand their viewers' experience, increase viewer satisfaction and decrease customer churn.

The platform is built on **multiple data acquisition elements** which collect real-time metrics from specific critical points in the video distribution chain—from content preparation, through network delivery, to device playback. This data is then collected, correlated and processed by IneoQuest's powerful **iQ Engines**, to provide an immediate and accurate view into the performance of – and demand for - your video content and services.

A true synthesis of network operational and audience behavioral intelligence.

And because every video business is different, the platform provides a set of targeted FoQus solutions that address the specific needs of your business and type of content. So whether you're a broadcaster, content owner, network operator or enterprise – or provide critical video delivery services and infrastructure – the IneoQuest FoQus Platform has solutions that give you unparalleled visibility into the health of your video business.