

File-based QC – Delivering Content with Confidence

- **Bibhas Kumar Samanta, Product Specialist, Interra Systems**

QC for analog or baseband content was straightforward. The number of checks was limited to a few, such as Signal level and Color Gamut. Deploying and configuring the WFM, Oscilloscope, or just reviewing the content on SDI playout took care of most of the content quality.

With new file based workflows, there is still inertia about QC of digital content. As long as a digital file plays in test systems, it is generally accepted as ready for playout or distribution. However, an experienced broadcaster or service provider may expect digital assets to meet three main criteria:

- Asset is free from video and audio quality error
- Asset plays out in a playout server or teleport correctly and is not rejected by it
- Asset meets the regulatory compliance that is mandatory in the distribution geography

File-based workflows enable much more flexibility to transform and transfer media content. The flexibility comes with the emergence of many digital media standards, ease of editing, ease of content localization for diverse regions, and ease of multi-platform delivery. On the flip side, the flexibility also increases the potential for introducing content quality issues, such as Blockiness, Video Dropout, Pixelation, Freeze, etc. It is relatively easy to detect these perceivable issues in a few hours of content using manual QC. However, with large volume of multi-format content, detecting issues, logging and reporting defects is a difficult process. In addition, handling multiple closed captions, detecting clipping, and checking mute/loudness in 8-16 channel audio is almost impossible.

With the advances in automated file-based QC solutions, most quality issues in content can be automatically detected at the exact time code with detailed description of violations and with options to view thumbnails, audio/video timeline, and content layout. Enterprise class QC solutions not only accurately detect content quality issues, they offer advanced reporting mechanism that make content analysis very efficient. QC operators and managers can add comments, ignore errors, play the clips from original video, and even output video to SDI monitor so as to simulate the broadcast environment. Moreover, with the automated QC, broadcast and playout can ensure that all the content providers meet the facility-specific checks for content quality.

While the quality of the video and audio actually translates to better QoE for target customers, the playout server or teleport operators are usually least bothered about video/audio quality. They are more concerned with conformance issues, which include non-compliance to codec standards, time code problems, closed caption or ancillary data issues, and violation of playout specifications.

The playout formats and specification can vary widely between vendors. For VOD, IPTV and terrestrial broadcasting, Transport streams can have multiple programs, audio (usually in multi-language), closed caption, and other data. Here, the important QC check is not only make sure that the Transport stream has the correct video and audio formats depending on playout specification, but also that elementary videos meet the conformance standards. Conformance to standards cannot be confirmed by just playing the video in a video player. Most video players may not be able to detect missing/corrupted macroblocks and other non-conformance issues. Maximum bit rate is an important check for Transport playout to make sure that set top boxes are not affected by buffer

overflow causing disruption of video decoding at the customer end. Other checks include, average bit rate, percentage of NULL packets, PCR inaccuracy, program count, and audio PID to language mapping. Playout services may also require compliances to CableLab, ARIB standards, or TR101290 checks.

MXF based workflow is probably the most common as majority of the popular broadcasting formats such as IMX, XDCAM HD, and AVC-Intra are based on MXF. By design MXF can contain large metadata at the container level. This metadata can be extracted, updated, and used by third party tools. In addition, a lot of time code related data, such as start time code, duration, system time code is also stored at the container level. Violations in MXF files include invalid KLV data, missing or jump in time code, corrupt macroblocks in elementary video, and incorrect header/footer partitions. To add to that, different specification of MXF such as RDD9 for XDCAM HD, AS02/AS03/AS11 compliance, or Digital Cinema Package (DCP) compliance are often a must for acceptable delivery of MXF based content.

Closed Caption standards and methods can vary widely depending on the geography. While ANZ has adopted OP42 and OP47 as the standard, the caption data can be in other formats such as Divicom 608, SCTE-20, inside WSS or as part of DVB Subtitles or Teletext. For closed caption, the major challenge is not only to ensure that the correct subtitle language is embedded, but to make sure that the subtitle is in the specified line number and that there is no dropout or invalid caption data in the content. Meeting regulatory compliance in a particular region is also very critical for broadcasters. Some of the common regulatory compliances include Loudness standards (EBU R128, ITU BS1770, US CALM), SMPTE-2052 for closed caption, and checks for Photo Epileptic Video .

With their obvious advantages in enhancing QC efficiency, file-based QC is an important component of workflows in broadcast and cable delivery. Accuracy of error detection, coverage of formats and checks, enterprise scalability, ease of integration with infrastructure technology, verification efficiency, and proactive customer support from the QC vendor are some of the factors that will help ensure that file-based QC is at the top of the mind when broadcast and playout 'think' content quality.

Interra's Baton is an enterprise class, file-based QC solution that has been adopted by leading broadcasters, post production, telemedia, and satellite companies worldwide for its comprehensive quality checks, enterprise scalability, and verification efficiency.