TAG VIDEO SYSTEMS

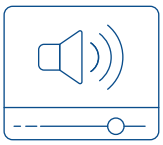
Content Matching

Driving Advanced Video Quality Applications

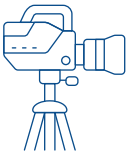
Latency | AV Alignment | Signal Feed Comparisons | Ad Insertion Validation | Root Cause Analysis

Capabilities

Identify Same Frame Across Different Resolutions, Bitrates, and Framerates



Detect Audio Drifting



Monitoring Live Streaming Applications

Technology Overview

Content Matching Technology is the most recent innovation from TAG Video Systems. This unique mechanism detects similar content across two different streams to ensure correct and uninterrupted delivery to the intended destination. This is done by creating a unique fingerprint for each video frame and audio envelope and matching them across the entire media distribution path against a user-defined reference point. This new technology dramatically reduces workflow complexity and eyes-on-glass and enables media companies to deliver quality content with fewer resources and more confidence.

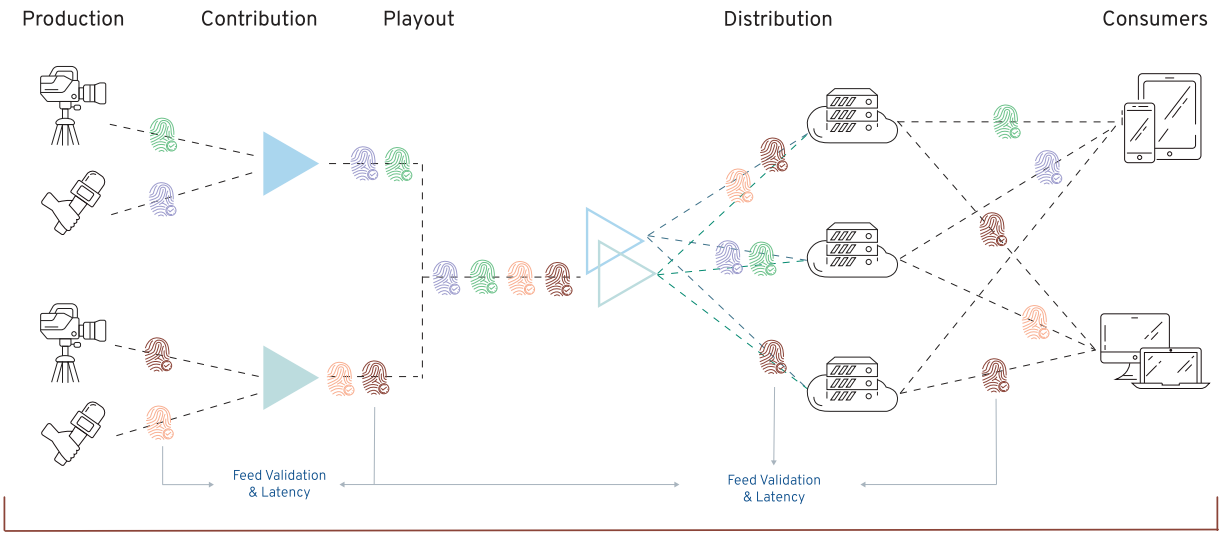
TAG's Content Matching enables identification and correlation of audio and video uniqueness accurately regardless of the resolution, bitrate, or framerate, thus enabling a match between any two or more points in the workflow. Even after the content has been processed and manipulated, TAG will still be able to identify the match and confirm that the content is identical, correct, and behaves as expected.

In addition, the new TAG technology allows users to get to the root cause of problems faster and troubleshoot more efficiently, even in the most complex, elaborate workflows. Based on a sophisticated realtime frame-to-frame correlation engine, the user will be notified when the first content mismatch occurs and combined with TAG's rich probing and monitoring, they can easily identify and resolve the source of the errors.

TAG's Content Matching enables, but is not limited to, the following highly requested media workflow applications:

- Frame-accurate latency measurement between any two or more points in the workflow
- Comparing quality and content accuracy across different feeds to compare distribution methods or alternative paths
- Confirm ad insertion to SCTE messages with frame accuracy to assure & protect revenue
- Measure, validate A/V alignment and audio channel drift at any point in the workflow

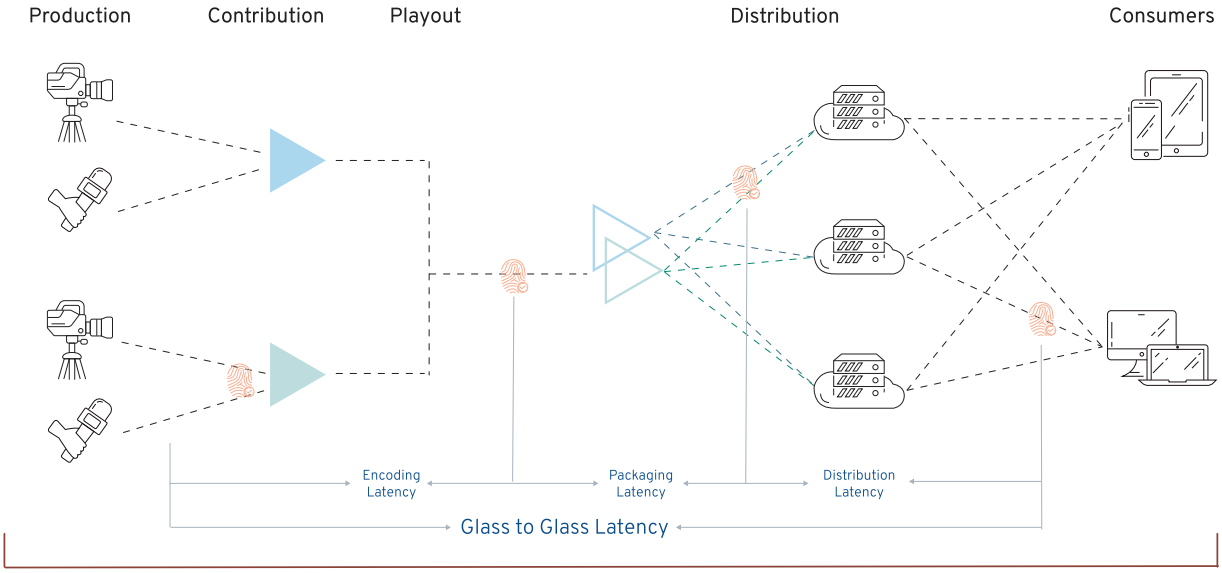
Overview



Compare feeds & measure latency between any two Workflow points
vendor, codec, resolution & frame rate agnostic

Enable real-time live-streaming measurements

Latency Measurement

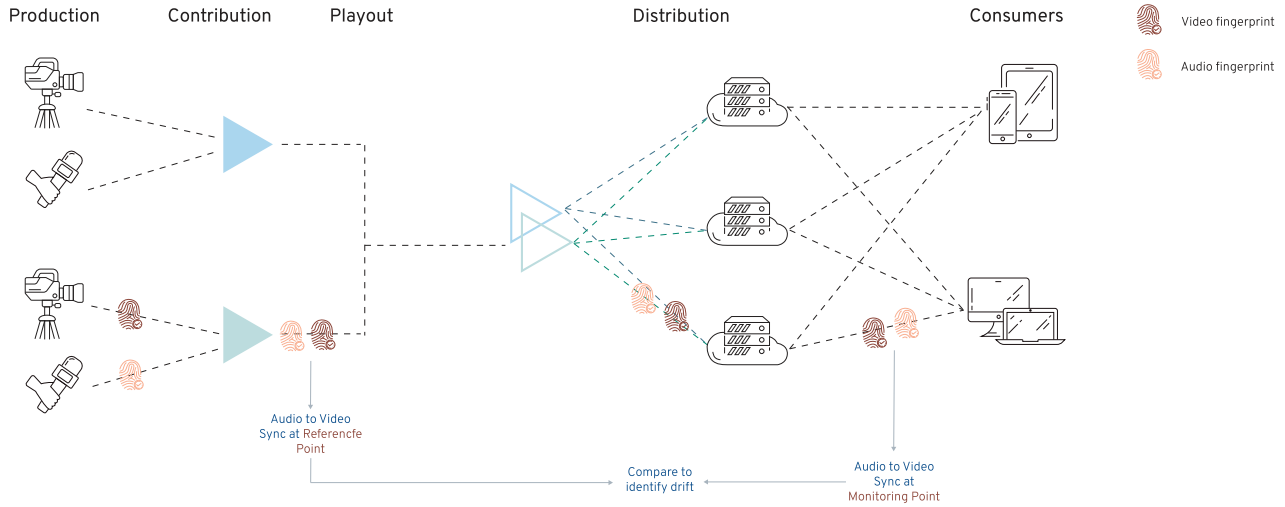


Measure latency between any two points in the delivery chain
vendor, codec, timestamp agnostic

Measure absolute latency at every point in the workflow in real time

- Synchronize all latent feeds across CDNs
- Monitor all points in Playout & Distribution
- Validate playout servers are frame-aligned
- Ensure delivery at every monitoring point
- Non-deterministic latency, especially rising levels, often indicate pending issues; (e.g., CDN load-balancing failures). Take corrective action before negative impacts on QoE

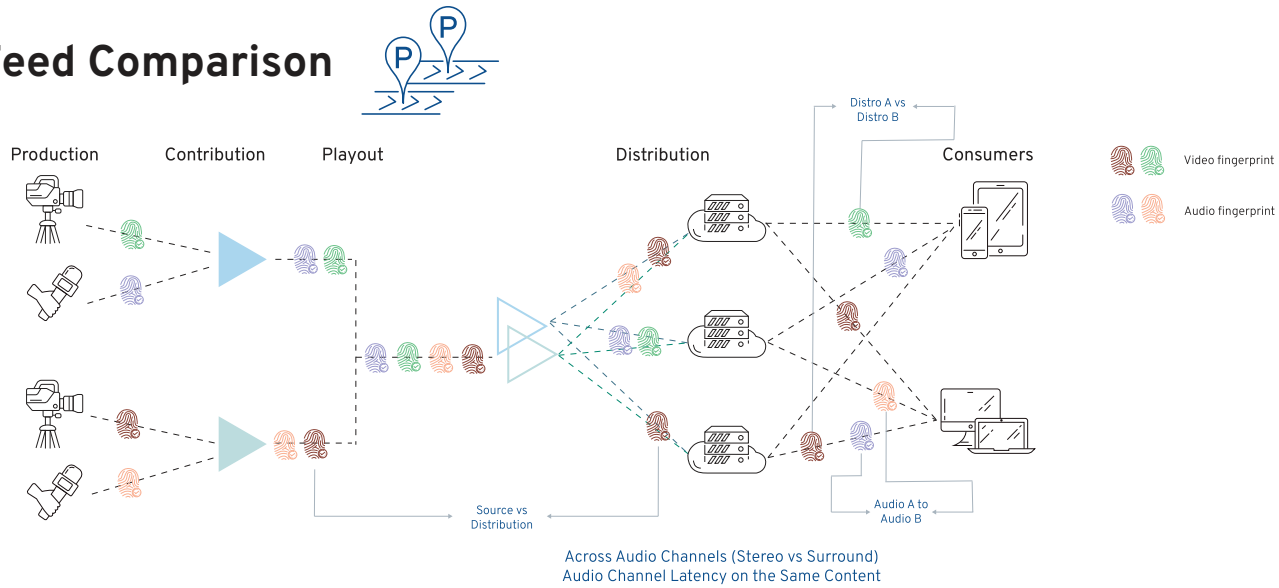
Lip-sync



Enhance the TAG MCM Multiviewer to become a "multi-listener" by validating multichannel and Atmos audio channel assignment. TAG matches all channels and identifies content mismatches at each monitoring point.

- Operators can only 'listen' to one program at a time. Audio meters only provide that a signal is present and nothing about quality, sound or source; even hard to identify channel mapping errors or in multi-language operations.
- Verifies the correct source at each point and eliminates need for test signals in paths for channel mapping validation.
- Lipsync issues can be identified anywhere in the signal path.

Feed Comparison

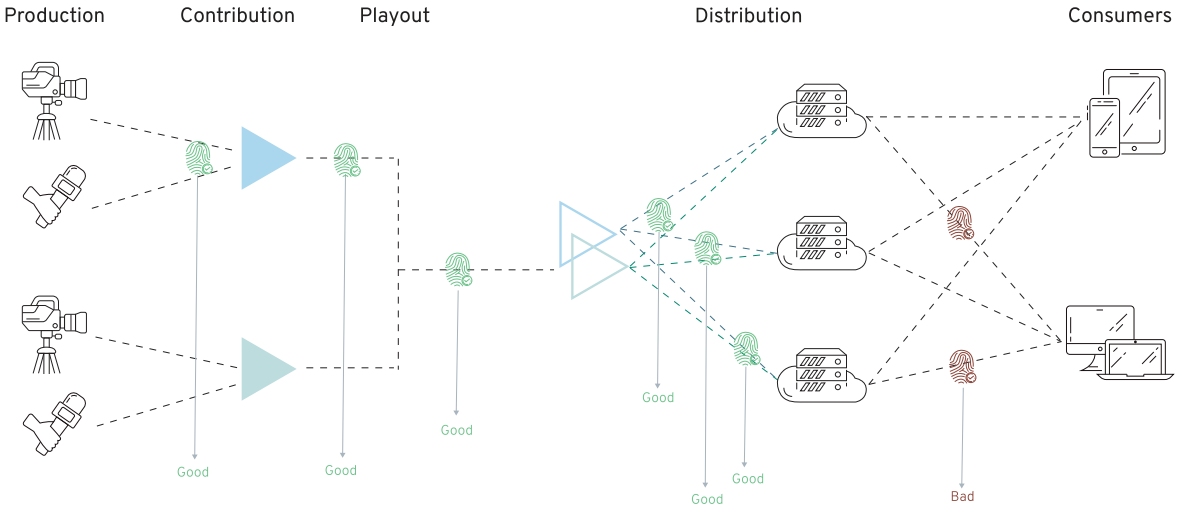


Verify large number of sources, such as knowing when each affiliate is carrying network programming, on a frame-by-frame basis

- Real-time confirmations of regional or specific blackouts and feed routing.
- Live signals can be sourced from many feeds. Verify which feeds are 'on-air' by affiliate.
- Downstream delivery chain can be rerouted for ad insertion, regionalization and content blackouts. Stations preempt network for local breaking news.

All these conditions can be monitored, logged or alarmed; nearly impossible to do without content matching services.

Root-Cause Analysis

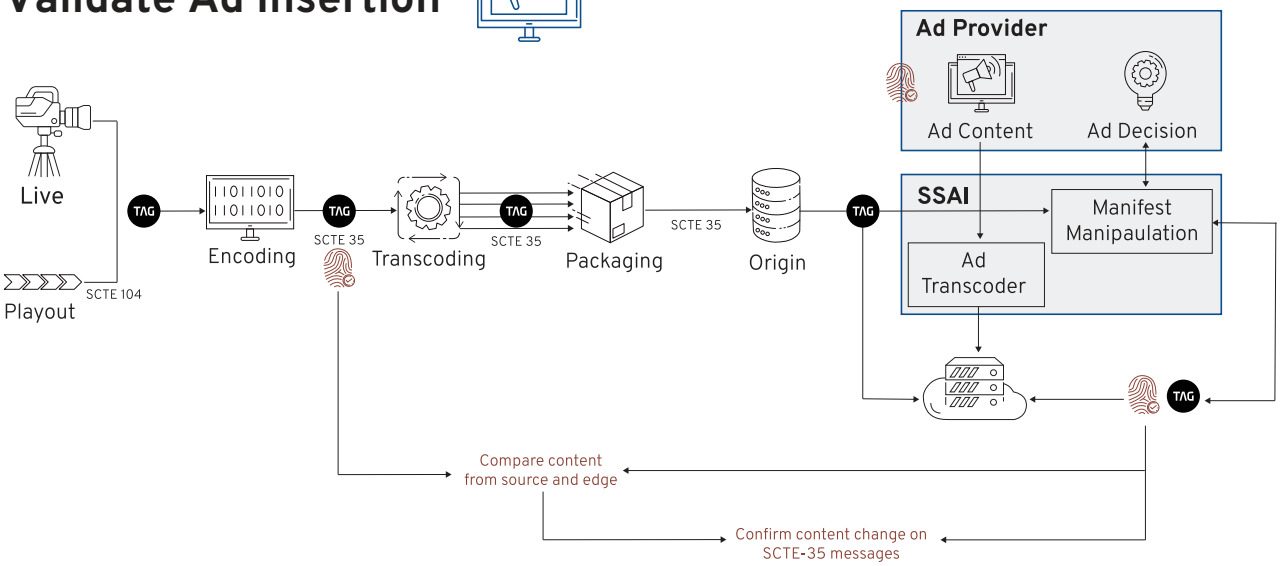


Compate content in different points to identify the origin of an issue

Identify root causes of signal errors

- Visualize root cause in penalty box on TAG multiviewers, log errors
- Supercharge TAG 'monitoring by exception' by assigning a single mosaic tile on monitor wall to represent downstream distribution monitoring points; introducing concepts of paths to penalty boxes [penalty paths], reducing tiles and decreasing complexity of operations and costs

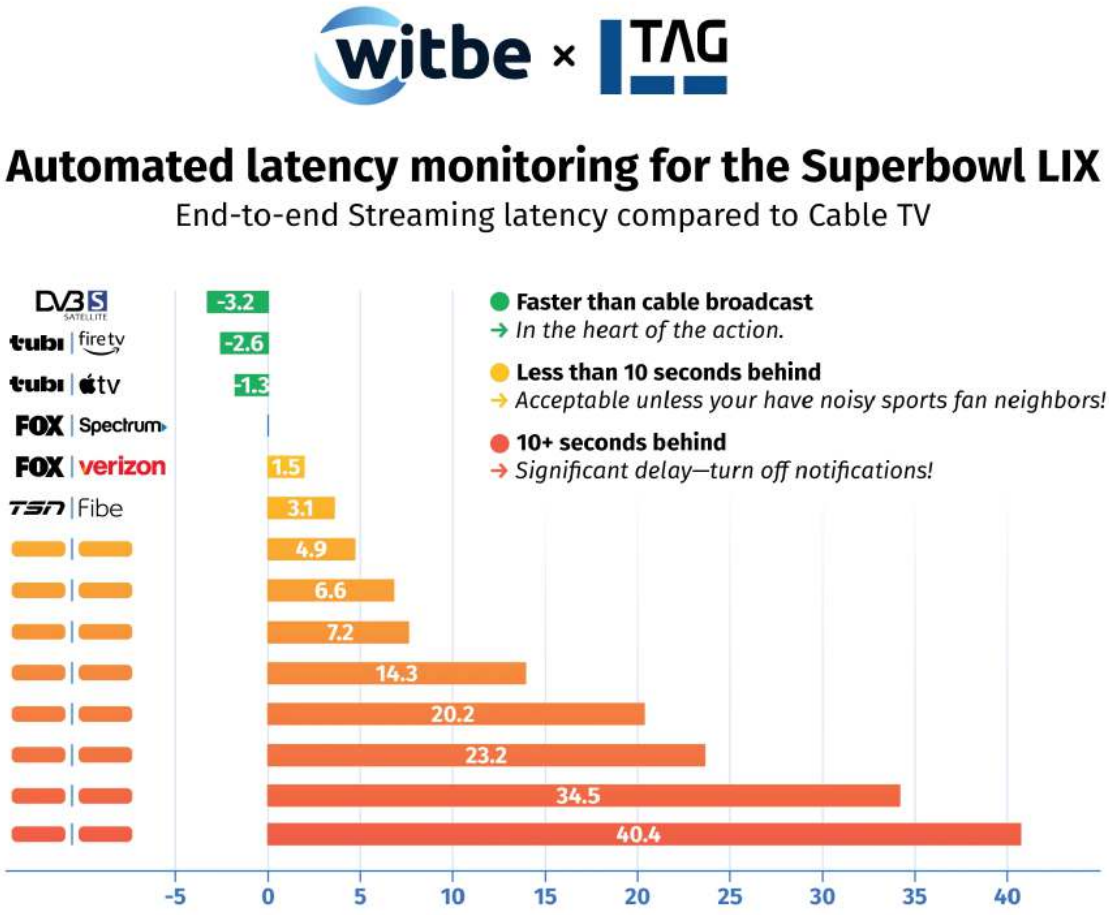
Validate Ad Insertion



Monitor ad insertions are at correct point in the programming based on SCTE triggers

- Identify when ad insertion fails; without the need for operators to monitor screens
- SCTE marker match and mismatch with frame-accuracy signal comparison
- TAG real-time monitoring and probing uncovers SCTE 35/104 faults that disrupt ad insertion
- Monitor all signal formats including contribution signals prior to origin server to validate SCTE marker sources
- Verify that correct ads are inserted, or utilization of your ad placement opportunity

Content Matching Case Study: TAG & Witbe, Superbowl LIX



Witbe's real device monitoring and TAG's Content Matching were combined to create a groundbreaking end-to-end video monitoring solution, enabling absolute latency mesurement from camera to user devices in real time during Superbowl LIX.

- Reduces workflow complexity and eyes-on-glass; controls operating costs
- Enables media companies to deliver quality content efficiently
- Identifies audio/video uniqueness regardless of resolution, bitrate, or framerate across multiple sources
- Matches processed and manipulated video/audio content
- Sophisticated real-time frame-to-frame correlation engine
- Notifies user of first content mismatch

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www.tagvs.com