

HD CONTENT MONITORING AND LOGGING COMES OF AGE

White Paper - By Gary Learner

The ability to monitor and log aired video content has long been a critical requirement for broadcasters to ensure the integrity of their on-air product, but it has taken on even more important and complex dimensions as high-definition (HD) television transforms operations. In this article, we will explore the emerging world of HD broadcast monitoring, including the options available to broadcasters and what to look for when evaluating HD monitoring systems.

Monitoring systems play a vital role in broadcasting operations by providing a continuous log of as-aired programming and an efficient means of searching for, retrieving, viewing, analyzing, and exporting the archived video. Applications range from validating as-run material for advertisers and troubleshooting transmission errors to providing documentation of compliance with federally mandated regulations such as closed captioning. In particular, the regulatory-legal realm has helped to move monitoring systems beyond the “nice to have” category to business-critical, especially in recent years as the burden of proof has shifted from complainants to broadcasters to demonstrate that a certain video segment has not violated any communications laws. Now, all stations are mandated to provide proof of broadcast, of sufficient quality to be acceptable in court, for use in the event a complaint is filed against a station.

Downconversion Drawbacks

As broadcasters scramble to meet viewers’ growing demand for HD programming and be among the first in their markets to deliver content in the new format, the need for monitoring and logging is no less critical. However, most monitoring systems available today are unable to accept an HD signal, which leaves these broadcasters with few other options. One technique is to use downconversion equipment to transcode the HD signal back to standard definition, which can then be accepted by a conventional monitoring system – but this solution has serious drawbacks.

First, most native HD signals contain metadata that cannot be downconverted without an additional investment in expensive equipment. As compared to standard definition, HD is more than simply an increase in the number of pixels or visual resolution. Embedded in the stream are audio channels, closed caption/teletext messages, and other metadata defining the stream. Any time such a signal is downconverted, there is a strong chance that the ancillary channels will be lost. In addition, HD signals contain audio recorded in Dolby 5.1 or 7.1, to provide up to eight audio channels for surround-sound home theatre systems. Since SD content is recorded in stereo, the audio for a downconverted HD signal is compressed from eight channels to only two. Since it is impossible to determine which audio channel created the original signal, detail is lost and troubleshooting audio errors becomes much more difficult.

Once the signal is downconverted, how does the operator record and analyze the HD video feed? One method is by using low-end recoding technologies such as the digital video recorder (DVR). However, this kind of equipment is typically employed in consumer environments for unscheduled playback, and as such was never intended for use in professional broadcast logging and monitoring. Another option is a video analyzer that looks at the headers in video packet data to detect the result of impairment and

data corruption that can occur in the new digital HD video environment. While they do not require downconverted video, these systems are very expensive and are not intended to produce a continuous recording record over periods of 30 days or more.

Given the shortcomings of these options, many stations fall back on the old-school method of simply taping every broadcast for manual review later. Setting aside the real concerns of inefficiency (it is not practical to dedicate hours of an operator's time to manually reviewing videotapes) and inaccuracy (no human operator, no matter how thorough or observant, is capable of catching every fault), tape-based monitoring simply has no place in today's increasingly file-based, digital broadcasting operations.

Monitoring Becomes a Strategic Asset

Proper HD broadcast monitoring requires analyzing the intended signal before any conversion is performed, since there are several handoffs and insertions in the delivery chain in which the signal can suffer possible errors or data loss. Employing a broadcast monitoring solution that looks directly at the native HD signal gives broadcasters the ability to verify and troubleshoot when and where data corruption occurs in the transport chain. This eliminates uncertainties in locating stream transport issues and builds confidence that the errors observed are genuine and not artifacts of any downconversion process.

These requirements, coupled with the ever-growing presence of digital, file-based technologies in the production workflow, are driving the emergence of a new class of solutions designed specifically for HD signal logging and monitoring. These systems accept signals from any HD-SDI interface with embedded audio, and they are optimized for HD's 16:9 aspect ratio – enabling stations to perform quality checks on audio and video and confirm the presence of closed captions. As the competitive marketplace for HD broadcasting heats up, the new monitoring systems give stations a powerful advantage by enabling them to evaluate their broadcasts and compare content and ratings to the HD offerings of competing stations.

Building a Monitoring Infrastructure

The most advanced monitoring systems should provide both standard- and high-definition inputs to facilitate capture of video from any source, including remote broadcasting sites (Figure 1).

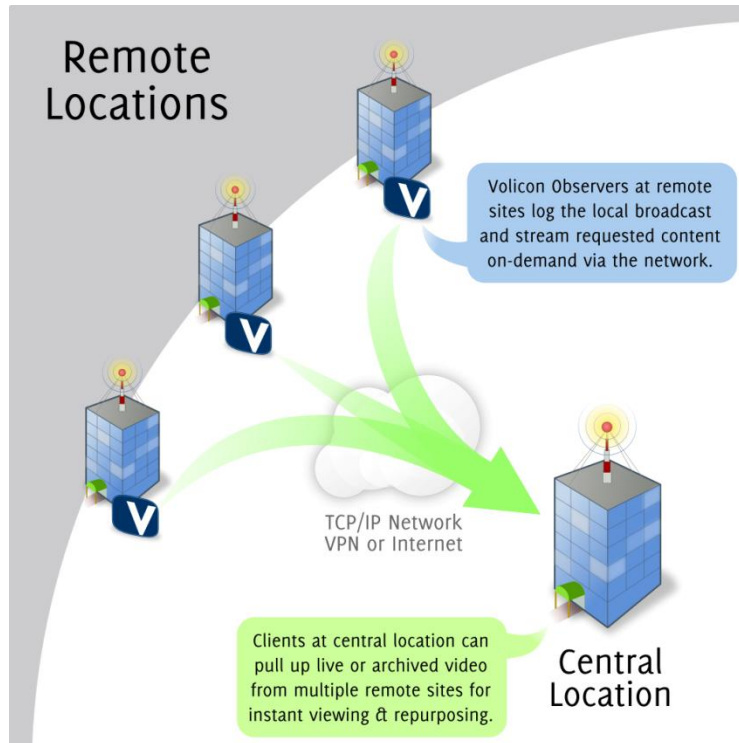


Figure 1.

In the ideal production environment, HD monitoring systems should be installed at multiple points in the broadcast stream, at multiple production stages – for instance, at the points in which audio or closed captions are added. In this manner, they enable engineers to pinpoint the stages at which errors begin to appear as new components are introduced. In evaluating monitoring systems, broadcasters should look for solutions that operate as passive components; in other words, they work outside of the main broadcast chain so as not to interfere or interrupt the production workflow. Figure 2 shows how such a monitoring system would fit in a typical broadcast operation.

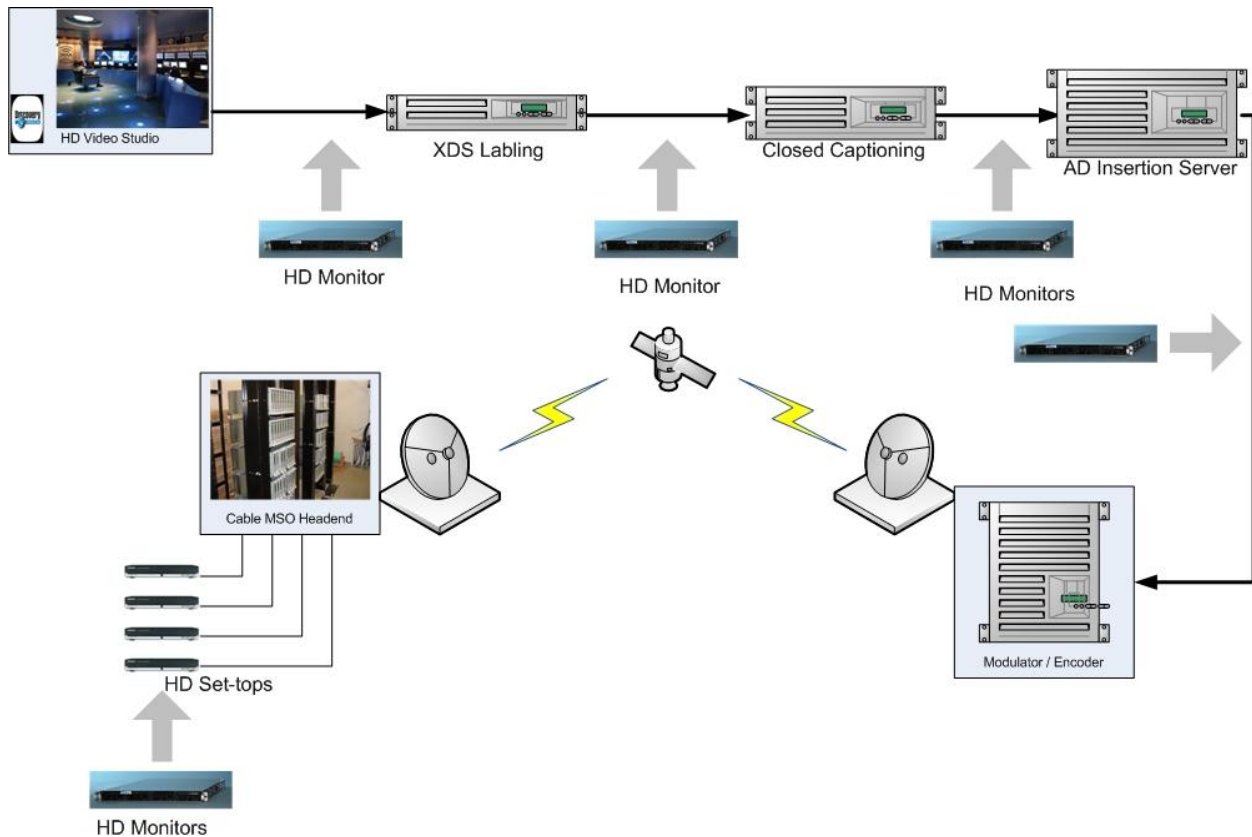


Figure 2.

To provide maximum benefit, an HD monitoring system should provide all of the capabilities of its state-of-the-art counterpart for SD video and facilitate video distribution throughout the entire organization without saturating network resources. The system should utilize advanced storage technology such as RAID-5 and should enable storage of content from two to four channels, for at least 30 days.

Typical network bandwidth makes it difficult to monitor several feeds at once or to monitor one feed from a remote client such as a Web browser, and the considerable bandwidth consumed by HD (almost 1.5 Gigbits per second) necessitates the use of robust compression techniques to fit the confidence monitor into the available provisioned network. Therefore, the ideal monitoring system has a built-in compression scheme that does not compromise the overall video by adding its own artifacts.

Empowering Users Throughout the Enterprise

The system should be easily extended to large numbers of users over the station's existing IP network, giving them 24/7 access to live and archived HD content from their desktop PCs using a standard Web browser. Users should be able to record, store, search, retrieve, and view HD material in real time, from multiple channels and from any desktop within the broadcasting facility. The system should provide an interface and responsive, VCR-like controls that make monitoring of multiple channels easy and

intuitive. Users should be able to go from half-speed to 10x viewing in either direction with a mouse click, and the system should include configurable alarms for monitoring video quality and providing early detection of audio and video problems.

Scheduling Flexibility

HD monitoring systems should allow users the option of capturing continuous video feeds, or configuring the system to record only high-relevance footage to maximize video storage capacity. One way to provide this is by interfacing with well-known calendaring tools and electronic program guides (EPGs) to give the user the flexibility to select relevant video feeds either by specific dates and times or by programs of interest. Coupled with a tunable video delivery appliance, the system could provide access to a broader range of channels than what is available through the physical number of feeds supported by the monitoring and recording server.

For example, sports broadcasts represent a predominant form of content for high-definition video. An intelligent scheduling system would interface with the database of an electronic program guide (EPG), enabling the user to see and select those sports programs deemed critical for monitoring and delivery, such as the Super Bowl with its premium-priced advertising (Figure 3).

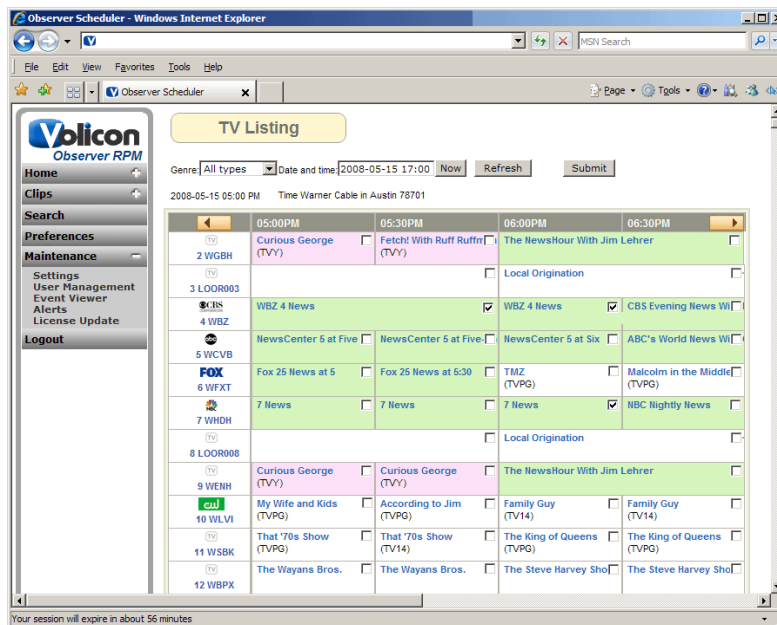


Figure 3.

Finally, advanced HD monitoring systems provide convenient pathways for dissemination of captured assets to other distribution channels. Sharable clip lists (Figure 4) allow users to collaborate and view specific video without using additional storage. Assets can be easily exported and repurposed, and both footage and textual data can be saved to files for outside use.

Clip List

Search Clips

Name or description: Time range: Contains video

From: To:

| <input type="checkbox"/> | ID | Trk | Created by | Name | Description | Created | Modified | <input type="checkbox"/> Delete | Edit | Mail |
|--------------------------|-------|-----|------------|------------|--|------------|------------|---------------------------------|------|------|
| <input type="checkbox"/> | 20784 | 2 | DemoEH1 | weather | Market comparison | 2008-06-09 | 2008-06-09 | <input type="checkbox"/> | | |
| <input type="checkbox"/> | 20783 | 1 | DemoEH1 | Station Id | Station ID / Commercial | 2008-06-09 | 2008-06-09 | <input type="checkbox"/> | | |
| <input type="checkbox"/> | 20781 | 4 | DemoEH1 | AD Verify | Advertisement verification | 2008-06-09 | 2008-06-09 | <input type="checkbox"/> | | |
| <input type="checkbox"/> | 20780 | 4 | DemoEH1 | NBC News | Political coverage | 2008-06-09 | 2008-06-09 | <input type="checkbox"/> | | |
| <input type="checkbox"/> | 20774 | 1 | DemoEH1 | Mariska | Clip of Mariska interview for repurposing a... | 2008-06-09 | 2008-06-09 | <input type="checkbox"/> | | |
| <input type="checkbox"/> | 20773 | 1 | DemoEH1 | Promo spot | Greatest American Dog | 2008-06-09 | 2008-06-09 | <input type="checkbox"/> | | |

1-6 of 6 found

Export as task file Marked items: 0

Note: Any new search does not reset marked items list.

Figure 4.

Building on the Benefits

With all of these capabilities in place, an HD monitoring system can provide numerous benefits to a broadcasting organization. With both SD and HD video footage from multiple channels at their fingertips, users can perform side-by-side comparisons of their own assets or competitor offerings from a single unified interface. The broadcaster’s research team benefits from viewer approval ratings displayed in synchronization with the video on the same screen, providing insights into the competition and the market. Active monitoring of closed captions provides notifications of specific subject mentions via email, including transcripts and thumbnail “storyboards.” Users may also query the closed caption database like a search engine, converting video assets into minable, textual databases.

Although they are just beginning to emerge, video monitoring systems that accept HD inputs will become a requirement in the production environment as stations continue to adapt their operations to HD broadcasting. Whether a station is broadcasting in SD or HD, its ability to monitor and archive aired content will continue to play a critical role in meeting the demands of internal and external clients such as advertisers, viewers, and government agencies.

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