Keys to Efficient Ad Management
In the New Television Marketplace

Expanded Workloads Mandate Solutions Grounded
In Automation and Comprehensive Quality Control

The emergence of many services that allow content owners to satisfy consumer demand for anytime, anywhere access to their programming is transforming how TV inventory is sold and, therefore, how ads are processed ... the case for a television ad management system that integrates and automates workflows with rigorous QC is clear.

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Introduction

As new trends in television advertising pose unprecedented challenges for operations teams responsible for successful ad management across the distribution ecosystem, there's never been a greater need for care in choosing the technical solutions that are essential to keeping pace.

Distribution outlets and device formats are proliferating. Cross-platform campaigns are becoming the new norm. And addressable advertising is gaining traction in legacy linear as well as VOD and OTT service monetization.

As a result, workloads associated with ad traffic management as well as the processes meant to ensure content is ad-ready are getting more complex with faster workflow turnarounds than ever before. Challenges vary in degree, but they are felt with growing intensity everywhere as TV networks, broadcast stations, multichannel video programming distributors (MVPDs), OTT services and mobile operators look to drive ad revenues to new heights.

Without toolsets optimized to handle those workloads, ad management teams face greater risks from glitches that can force reimbursements to advertisers for unmet contract commitments. This is especially the case when it comes to placing ads in OTT streams. The question is, where to find the right tools.

Buzz words touting AI-fueled automation, workflow integration, cloud-based execution, comprehensive quality control (QC) and other essential elements abound. But market-proven successes with solutions flying those hot-button banners are harder to come by.

Moreover, there are many crucial details below the buzz word radar that need to be but often aren't fully accounted for. For example, file-based ad management operations suited to current needs must be able to:

- Execute highly automated approaches to ingesting and cataloging ads in compatibility with all commonly used digital media delivery systems.

- Support the option to normalize portal access to ad assets across all workflows through reliance on the widely adopted Ad-ID system.

- Ensure dublists are configured to enable automated workflow responses to dublist actions.

- Facilitate management of ads designated for use in addressable campaigns, including placements with VOD content in accord with policies governing ad tracking in C3 and C7 windows.

- Automate ad normalization with re-timing to uniform length and consistency in use of slates, color bars and frames of black with no noticeable distortions in ad quality.

- Support expeditious manual review of completed workloads with portal-based assignment of any needed fixes to the appropriate operations staff.

- Perform whatever transcoding is required to tailor ads for delivery with content over targeted terrestrial broadcast, satellite, cable, IPTV, OTT and mobile outlets.

- Work in tandem with postproduction processes to ensure that programming ad breaks and the spot slots within those breaks are properly sized, segmented and marked.

- Support automatic injection of the Nielsen audio watermarks that facilitate ratings accuracy in the multiscreen environment.

All these requirements will be complicated by the addition of new TV display formats into the ad management workflows, starting with the rapidly expanding volume of programming formatted to UHD 4K and the nuances imposed by high dynamic range (HDR) and wide color gamut (WCG) technology.

Down the road operations teams will have to deal with advertising formatted for 8K and services delivering various iterations of mixed-reality content.

Critically, the ability to keep pace with work orders without compromising results requires incorporation of QC as an automated component of ad-related workflows end to end. This requires persistent real-time vigilance over everything essential to achieving desired results, including:

- Ad ingestion, metadata orchestration and all other traffic management processes;

- A/V quality, loudness balance, captioning, trim points and other asset parameters;

- Alignment of ads and targeted content with regard to SD/HD/UHD formatting, timing and placement cues.

Ad management teams should also have access to end-to-end ad performance analysis supported by QC components positioned downstream of their workflow outputs. This is essential to identifying errors and communicating alerts to distributor, CDN and other third-party operations teams that can implement remedies. In addition, an end-to-end QC system can be used to generate data for business purposes such as validation of viewership ratings, refining ad campaigns and more.

All of these requirements will be explored at length in the discussion that follows with the goal of offering guidance to ad management decision makers in their pursuit of optimal solutions. We begin with a holistic look at the ad management workloads today's TV advertising business is imposing on operations at networks, broadcast stations and their MVPD, OTT and mobile distribution affiliates.

This is followed by an in-depth exploration of the requirements that must be met by solutions designed to accommodate these workloads. At the end we'll point the reader to the field-proven solutions Telestream has developed to help maximize TV programming monetization through advertising in a transformed marketplace.

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Trends Driving Transformation of Television Ad Management

Ongoing Dominance of Advertising with Legacy TV Distribution

Advertisers are relying more than ever on TV programming to get their messages in front of viewers. But the emergence of a profusion of services that allow content owners to satisfy consumer demand for anytime, anywhere access to their programming is transforming how TV inventory is sold and, therefore, how ads are processed to fulfill purchase orders. These are early days in that transformation, but the scope of what lies ahead for the ad management workflow is not hard to discern.

Currently, the preponderance of TV ad buying continues to revolve around placements in programming delivered via legacy broadcast and MVPD (multichannel video programming distributors) platforms. Despite the falloff in pay TV subscriptions in recent years, the rate of spending on traditional TV advertising has held fairly steady.

For example, Magna, the research arm of the agency group IPG Mediabrands, projected traditional TV advertising would generate $175 billion globally in 2019, marking a 2% decline from 2018[i]. But this was attributed to the bump advertising got from cyclical events in 2018 like the U.S. election, the Winter Olympics and the FIFA World Cup.

Similarly, in the U.S. the total for 2018 came to $72.4 billion compared to an estimated $70.83 billion in 2019 and a projected $71.18 billion for 2020, according to eMarketer[ii]. These amounts include revenue garnered from viewing of ad-supported VOD content in the legacy MVPD space, which has benefitted from the surging popularity of on-demand viewing.

According to Statista, the number of cable VOD ad impressions in the U.S. grew five-fold from 2014 to 26 billion in 2018 with 2019 on track to match or slightly exceed the 2018 total[iii]. At an average cost-per-thousand (CPM) of $19.50, the VOD impression total represented revenues of $507 million in 2018.

The Growing Impact of Advertising with OTT-Delivered TV Programming

In contrast to the level pace of traditional TV advertising spend, the amount spent on ads in programming delivered over OTT outlets is surging rapidly in tandem with rising use of OTT services, which topped 30% household penetration in nine countries as of early 2018 (Figure 1). More recent figures for the U.S. showed OTT had reached 65% penetration of broadband households by the end of 2018[iv].

U.S.	59%	Japan	29%
Canada	51%	South Africa	22%
Norway	46%	Germany	19%
Sweden	45%	Mexico	19%
Finland	44%	Argentina	18%
Australia	36%	Brazil	17%
S. Korea	35%	Turkey	15%
U.K.	34%	France	14%
Denmark	33%	China	12%

Figure 1. OTT Video Penetration in Leading Countries Penetration of all Households Outset of 2018

Source: Strategy Analytics

While subscription revenue generated by SVOD and linear OTT services far outstrip ad revenue generated by AVOD services (which typically support linear as well as on-demand distribution), the AVOD sector is coming on strong. Following on the heels of AVOD pioneers like Hulu, Tubi and Pluto TV, the lineup of recently launched or announced services includes global offerings like NBCU's Peacock and AT&T's HBOMax as well as regional offerings like iflix in Asia and Rakuten TV and joyn in Europe.

These are welcome developments for TV advertisers, who, facing diminishing legacy TV audience counts, are feeling greater urgency than ever to reach OTT viewers. Comcast's advertising support firm FreeWheel, in a 2018 survey of more than 200 advertisers and agencies worldwide, found that 52% of agencies would be buying from online TV as well as traditional TV inventory in 2019 and 91% planned to do so by 2021[v].

The commitment to online advertising with TV programming is driven in part by a surge in the amount of inventory on live streamed programming, which resulted in a 100% increase in live ad views between Q1 2018 and Q1 2019[vi]. Notably, OTT viewing on connected TV (CTV) sets is playing a big role in this shift with one survey showing 78% of TV ad buyers were planning to purchase ads with programs streamed to CTV sets in 2019[vii].

The Role of Addressable Advertising in Legacy and OTT TV Services

In parallel with the shifts in traditional approaches to TV advertising ignited by the digital revolution, various approaches to addressable advertising, once limited to applications with traditional VOD services, are having an ever-increasing impact on ad management workloads. Advertisers are not only taking advantage of dynamic placement in the unicast streams delivered by OTT services; they're also exploiting addressability options in the legacy linear as well as VOD domains.

Whatever mode of delivery they're relying on to get their messages out, advertisers increasingly are not content with merely knowing how many people are seeing an ad. Accordingly, they're adopting audience-based buying strategies where the goal is to catch every eyeball that matters while minimizing spending on those that don't.

Researcher Rethink Research recently reported that spending on addressable advertising worldwide reached $15.6 billion in 2019 and projected it would top $85.5 billion by 2025, counting CTV and VOD as well as legacy linear TV advertising[viii]. This doesn't include the sums paid for targeted ad insertions in TV programming consumed on mobile devices or PCs, which gets lumped in with digital video advertising in general but is an important factor in preparing ads for TV programs viewed on those devices.

Assessing the Value of Addressability

The prospects for better results for advertising targeted to audience segments deemed most likely to have an interest in promoted products and services lead to much higher CPMs than advertisers are accustomed to paying for linear spot ads, starting at a premium of about 50% over linear and rising with increases in targeting granularity. The economic rationale is obvious.

If, for example, an advertiser pays, say, $32 CPM for a 30-second spot, which by one estimate is the average paid for national TV ads in upfront negotiations for the U.S. 2018-2019 broadcast season[ix], and the ad reaches one million viewers, total cost would be $32,000. But if only 20% of the audience falls within the targeted demographic, then the effective CPM (eCPM) paid for reaching that audience segment through the traditional mode comes out to five times the baseline CPM cost, or $160.

An addressable ad CPM priced at 50% more than the baseline $32 CPM in this example would be $48. Even at two to three times the baseline, which advertisers are frequently willing to pay, the addressable CPM is a bargain compared to the eCPM.

A survey of MVPDs, pure-play OTT providers, content owners and advertisers conducted by Kagan, a research unit of S&P Global Market Intelligence, found that 54% of responding advertisers expected to see an 11%-20% increase in return on advertising spending (ROAS) by moving to audience-based buying while 32% expect the increase to be in the 6-10% range[x].

Addressability with OTT-Delivered TV Programming

OTT delivery of TV programming is positioned to have the biggest impact in the shift to addressable advertising as distributors and content delivery network (CDN) operators implement support for dynamic placement with every adaptive bitrate (ABR) stream delivering linear and on-demand programming to end users. With these server-side DAI implementations available as an alternative to client-side modes that are insensitive to ad blocking, the industry is engaging in ever more collaborative activities aimed at putting addressability squarely in the advertising mainstream with OTT delivered content.

For example, in 2019 Project OAR (Open Addressable Ready) got underway as a path to developing an open standard for addressable advertising in the CTV space with backing from AMC Networks, AT&T's Xandr, CBS, NBCUniversal, Discovery, Disney's Media Networks, Hearst Television, Turner, FreeWheel and Vizio. Another initiative, On Addressability, involves leading U.S. cable companies' efforts to establish a data-driven, standards-based foundation for delivering the audiences advertisers are looking for.

The move to addressability online is growing rapidly. One survey of 300 U.S. advertisers found that 57% had made addressable buys with OTT delivery of TV programming in 2019[xi]. This represented 86% of those who said they bought TV ads on OTT services.

Addressability in Legacy TV Distribution

In the legacy TV domain, where addressable advertising has long been in play with DAI in programming accessed from MVPDs' free VOD catalogs, addressability is now playing an ever-larger role with spot placements in linear programming as well (Figure 2).

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Total U.S. Ad Spend	Addressable TV Ad Spend			Share of U.S. TV Advertisers Making Addressable Buys
2018	2016	2018	2020	
$70.83B	$1.6B	$2.1B	$3.3B	15%

Figure 2. Addressable Advertising in Traditional TV Distribution

Source: Video Advertising Bureau [xii]

Two approaches to audience-based ad sales with traditional linear TV are in play. One, which has been around for a long time, relies on access to demographically targeted ads stored in set-top boxes.

While underutilized in the U.S., this method has gained wider traction in Europe. For example, Sky's AdSmart STB insertion program has been in operation for over ten years, drawing more than 500 advertisers running in excess of 3,500 campaigns.[xiii]

U.S. MVPDs are well positioned to take advantage of the rising demand for addressable options from advertisers. By one estimate, as of mid-2016, 32% of U.S. pay TV households were equipped with STBs supporting addressable advertising with linear programming.[xiv]

The other component of addressability in the legacy linear TV domain has largely been a U.S. phenomenon. This entails an extension to traditional contextual advertising that doesn't require dynamic, on-the-fly insertion of ads into programs and so isn't accounted for in Figure 3.

Several leading TV programmers are acting through the recently created OpenAp Consortium to facilitate audience-buying efficiency by amassing inventory and audience data into cross-publisher marketplaces. This allows buyers to reach preferred audience segments in digital as well as legacy distribution environments without having to work with each network individually to find the right programming. [xv]

While the television industry refers to this as addressable advertising, the approach isn't included in most tabulations of addressable advertising spend. But it does underscore the momentum behind targeted audience buying. For the first time, individual networks are willing to lose potential ad buys for any given campaign to competitors on the assumption that programming spots deemed inappropriate for one campaign will be ideal for another.

New Types of Ads

Another new development impacting ad management is the emergence of new types of ads and new ways to generate sales of promoted products. For example, some OTT services have created opportunities for "pause ads," which can be inserted in unicast streams when the viewer hits the pause button.

Some content providers are offering opportunities to place scannable QR codes in TV ads that take viewers to advertiser websites to initiate purchases on their cell phones. And there are even vendors offering advertisers the technical means to replace objects in an OTT-delivered program sequence with computerized renditions of products that match viewers' data profiles.

The Emergence of Cross-Platform TV Ad Campaigns

With all these trends blurring the lines between the OTT and legacy TV advertising domains, the industry is pushing toward the unification of viewing metrics that will make the efficiencies envisioned for cross-platform campaign strategies a reality. This, too, is introducing changes in the cataloging of ad and metadata assets and how placement orders conveyed by sales teams are logged and tracked.

One step in this direction has been taken by agencies relying on Nielsen's Digital Ad Ratings (DAR) system for tabulation of OTT viewing on connected TVs, PCs and mobile devices. Nielsen reports that the top seven agency holding companies, representing close to 100 individual agencies worldwide, are now using DAR.[xvi]

In 2019 Nielsen moved to a more comprehensive approach to tracking cross-platform viewing by folding DAR into the Total Ad Ratings platform it has been using for several years to combine linear and VOD metrics. At the same time, ComScore was working with several major TV networks in a beta trial of its new cross-platform Campaign Ratings system.

Also in 2019, the standards-setting Media Rating Council issued the final version of its Cross-Media Audience Measurement Standards, which spell out the definition of viewable impressions in video content with attention to important rules related to things like barring viewership tabulations with invalid traffic, letting advertisers know how much of their commercials are viewed and whether the sound was turned on when ads played. The standard can be incorporated with some tweaking of existing cross-platform ratings systems, MRC says.

New TV Display Formats

Beyond the multiplicity of approaches to maximizing TV advertising reach and audience relevance, another complication impacting TV ad management has emerged with the arrival of 4K UHD and HDR with WCG. With the rapid increase in household penetration of HDR-capable 4K TV sets (Figure 3), the 4K content floodgates have opened, starting with widespread distribution in OTT services and now moving into the legacy TV domain.

	2017	2018	2019	2020	2021	2022
North America	16%	25%	35%	44%	52%	58%
Western Europe	10%	16%	23%	29%	35%	40%
China	13%	17%	22%	27%	33%	38%
Japan	5%	9%	14%	18%	24%	27%
Latin America	4%	8%	12%	17%	22%	26%
Eastern Europe	5%	8%	12%	16%	19%	23%
Middle East & Africa	3%	4%	5%	8%	10%	12%
Asia Pacific	2%	3%	4%	6%	8%	10%

Figure 3. Household Penetration 4K UHD TV Sets 2017-2022

Source: IHS Markit [xvii]

This introduces new complexities in asset preparation that go beyond formatting for the next level in pixel density, as was the case in the transition from SD to HD. Now there's also a need to ensure ads are in line with the luminance and color dynamic ranges employed with HDR-enhanced programming content.

The New Technical Challenges in TV Ad Management

All these developments add up to a major force for disruption to the traditional norms of managing ads and TV programs for contract fulfillment at television networks, broadcast stations and MVPD and virtual MVPD operations centers. While the technical challenges involving TV advertising with OTT delivery are greater than those found with legacy TV advertising, the trends in both arenas pose new issues for ad management teams.

Challenges in the Legacy Domain

Where legacy TV ad management is concerned, the packing of ever more 15- and 30-second spots into programming breaks raises the risks of errors related to timing miscues and formatting incompatibilities between ads and programming.

In the case of advertising with programming stored for traditional VOD access, ad management has been complicated by widespread use of Nielsen C3 and C7 metrics to tabulate viewership of ads in linear programming that has moved to VOD. Ads contracted for inclusion in either C3 or C7 measures can't be replaced until their windows expire, but, when they do, there's an opportunity to replace them with ads targeted to specific demographic groups.

When C3 or C7 isn't in play, avail inventory in VOD programming can be sold any time, which, again, increasingly involves addressable placements. Ad management teams must have fulfillment processes in place that are responsive to all these dynamics.

The advent of cloud-based DVR as a replacement or supplement to set-top DVR adds still another complication for MVPDs' ad management teams. Sellers of ad inventory are beginning to take advantage of cloud DVR, where the ad skipping that has been prevalent with traditional DVR usage is usually prevented.

In fact, MVPDs are finding that support for dynamic ad placements with cloud DVR has proven to be an impetus to programmers' willingness to license content for that service.[xviii] Fortunately for MVPDs, insofar as distribution of content to both VOD and cloud DVR users is unicast, the processes for managing ads in the legacy time-shift space can be applied with addressable advertising in OTT distribution.

Use of addressable advertising, whether applied in the legacy or OTT domains, introduces the need to accommodate management of multiple ads for targeted placements tied to a specific brand and contract. In the case of addressability with unicast OTT streams, all the management challenges for OTT-placed ads as discussed below are multiplied by the number of ads involved in a given campaign. Moreover, use of server-side DAI technology on a per-viewing session basis introduces a new point of potential inaccuracies in ad placement with addressability wherever it's applied.

The OTT-Related Challenges

The ad management challenges are greatest of all in the OTT space whether or not addressability is in play. As shown in Figure 4, ad management teams must accommodate ad formatting for distribution across multiple device categories, and, within the CTV and mobile categories especially, a constantly expanding variety of device formats.

	CTV		Mobile		Set-Top VOD		Desktop	
	U.S.	Europe	U.S.	Europe	U.S.	Europe	U.S.	Europe
Share of Ad Viewing	45%	28%	24%	39%	20%	7%	11%	25%
Y/Y Growth	+44%	+6%	+18%	+11%	-10%	+31%	-16%	+14%

Figure 4. 2019 TV Ad View Composition & Growth by Addressable Device

Source: FreeWheel Video Market Report

The scope of the challenges introduced by OTT TV advertising is reflected in the track record on ad performance, especially in mobile distribution, which falls far short of the long-established norms in legacy TV advertising. One recent report tracking in-stream OTT video advertising worldwide across all viewing platforms in Q4 2019 revealed that ads failed to play as intended at least once in 36.5% of the viewing sessions[xix]. Most of these failures involved long buffering delays but also included complete misses stemming from mismatches in formatting or errors in ad selection.

While ad placements with OTT delivery to CTVs mostly adhere to the avail parameters set for TV programs in legacy distribution, the mobile environment is completely different, with shorter and fewer avails requiring reformatting of ads or use of different ads for a given brand's messaging Moreover, there are variations in the ad formats stipulated by different OTT service apps and in the transcoding and packaging parameters that are unique to each of the major ABR streaming formats.

The fact that all programs become available for on-demand viewing in AVOD services introduces still more complexity for ad managers as ad run times expire and avails are resold. This brings into play considerations related to legacy VOD ad operations, as discussed above. And, as noted, things become even more complicated when addressability is in play.

Variations in TV Ad Management Scenarios

Telvision network, broadcast station and MVPD operations teams who implement a highly automated file-based ad management system suited to addressing the challenges posed by the developments discussed above will not only be able to execute current workloads more efficiently with reduced risk of failure. They will be well positioned to accommodate the technical adjustments that will be required in the future when new formats like 8K and various mixed-reality templates begin to impact their content portfolios, IP-based distribution becomes dominant and addressability in advertising becomes the norm.

Of course, complexities associated with TV ad management vary greatly depending on the number and types of distribution outlets that are targeted to receive the content carrying the ads, the degree of addressability, the role of VOD and other factors. But all providers of TV programming who rely on advertising are impacted to one degree or another.

As always, the primary concern for traffic management teams at individual broadcast stations is to prepare ads for insertion with locally produced, syndicated and national network programming scheduled for over-the-air broadcast and playout to MVPD affiliates. Here the new developments affecting workflows have to do with the emergence of 4K and the need to accommodate OTT distribution.

Broadcast stations are increasingly engaged with ad-supported OTT distributors who want to offer local broadcast content with their multichannel linear programming. And with ATSC 3.0 taking shape on the near horizon, many stations are contemplating leveraging the new platform to facilitate wider use of OTT distribution and, eventually, addressable DAI with their OTA services.

Things become more complex when ad management is performed at the station group level. This can involve executing local ad workloads for multiple stations on the group programming feed as well as for individual stations' local programming.

In the case of MVPDs, management of ads for placement in local avails has been complicated by the need to prepare ads for operators' multiscreen OTT services, which introduce multiple display formats and, in some cases, addressability with local ads.

At the national TV network level ad management teams must handle workloads tied to national ads targeted to their legacy broadcast and MVPD affiliates, a growing population of OTT affiliates and their own direct-to-consumer online operations. Often the workloads extend across multiple networks with diverse audiences, distributor affiliations and advertisers. They also want to gear ads to mobile users who view the networks' content with their subscriptions to OTT services.

Ad Management & QC Requirements for the New TV Marketplace

A file-based ad management system suited to meeting requirements in all these scenarios requires highly automated approaches to executing ad trafficking functions from ad ingestion to transcoding for placement in the playout files targeted to in-house and affiliated distribution platforms. Seamless execution of workflows requires integration with postproduction processes that can be applied to ensure all programming is prepared in alignment with all advertising requirements.

The system must employ comprehensive quality control (QC) over all ad management processes. And ad management teams should be able to rely on QC-enabled visibility into distribution beyond playout to ensure the contracted ad experience is delivered to every viewer. As discussed below, with implementation of ecosystem-wide QC, content providers will also be able to reap significant ancillary business benefits from the aggregated data.

Ad Management

The ad traffic management system should be composed of modular components that can be orchestrated to operate as a highly scalable software platform running with full redundancy on best-of-breed commodity servers. This enables flexible use of cloud resources in hybrid modes utilizing in-house and public facilities and allows the supplier to make the system components available with flexibly priced software-as-a-service (SaaS) subscriptions.

Operations teams should be able to implement rules that automate all ad management workflows, specifying how to identify, find, process and deliver ads with minimal manual intervention in response to each work order. Automation depends on advanced analytics that can instantly assess and adjust all the parameters that shape the workflow processes. And traffic system analytics should be able to deliver portal-accessible reports relevant to sales, playout and financial systems as a contribution to centralized management visibility into all aspects of the business.

Automated Ingestion Processes

The ingestion process begins with discovery and labeling of ad asset files entering catch servers for assignment into traffic management workflows.

This requires automated notification of incoming ads, metadata and trim points from national, regional and local sources enabled by integration with common digital media delivery services (Extreme Reach, Ad-stream, Comcast Technology Solutions (CTS), etc.) and third-party playout systems and by support for browser-based uploads of ad and metadata assets from local advertisers. At the same time, the system should provide support for converting ad assets delivered via tape for ingestion into the file-based system.

Managers overseeing the ingestion process should be able to execute portal-based commands directing separation of SD, HD and UHD assets, dublist analysis and reconciliation and the triggering of workloads from new orders described in the dublists. The system should support automated QC review of incoming assets, including metadata and trim points, to ensure everything is in order with every ad prior to entering the processing workflows.

A sophisticated approach to cataloging these assets is vital to streamlining their use throughout the ad lifecycles from the first insertion to the last. Along with maintaining compatibility with the metadata exchange formats used with Extreme Reach, Adstream, Comcast Technology Solutions (CTS), etc. and the other digital media delivery services, the traffic management system should support a cataloging workflow tied to Ad-ID specifications, which greatly facilitates automation of all trafficking operations.

Ad-ID is the widely adopted coded identifier standard supported through a joint venture controlled by the American Association of Advertising Agencies (4A's) and the Association of National Advertisers (ANA). By providing a secure, systematic web-based approach to coded identification of assets for use with all media platforms, Ad-ID streamlines the asset registration process across the entire supply chain, including advertisers, agencies and content providers.


Powered by Vantage

For ad traffic managers, the ability to apply the Ad-ID approach to categorizing assets for ready access at any time during an ad's designated lifespan eliminates manual processes that would otherwise have to be employed to find and aggregate assets for the initial and ensuing workflows. Leveraging portal access to the master catalog created for each ad, managers can automatically aggregate all the ad and metadata file identifiers into sub-catalogs or "binders" to support new workflows, whether for new work orders or for reviewing and approving completed work orders prior to authorizing distribution, as discussed below.

Automated Dublist Processing and Actions

The ability to automate fulfillment of work orders also requires a systematized, automated approach to parsing, ingesting and responding to incoming dublists from each affiliated distributor. Because there is no consistency in how dublists are formatted, the traffic management system should support creation of parsing patterns suited to each regularly used dublist scheme, thereby avoiding the need to manually create those patterns with each dublist action.

The automated traffic management system, regularly polling hot folders, is then able to parse new dublist files as they appear to identify the information that needs to be extracted for entry into the system's master dublist file and to trigger new workflows. The system should be able to automatically pass the extracted information, typically including the Ad-ID identifiers, media title and the ad's duration parameters, to the workflow, eliminating the need for manual intervention in the setup process.

Simultaneously, the dublist action should be able to automatically poll the relevant asset catalog to identify files that will be used in the workflow. The system should be able to immediately alert managers in instances when requested assets can't be found.
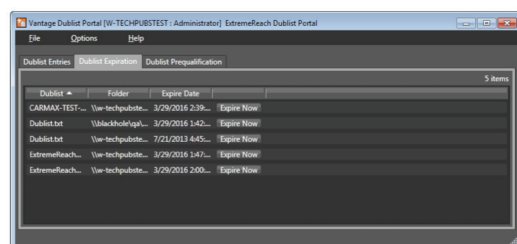
These processes are especially essential to dealing with a multiplicity of OTT distributors. Unlike the legacy TV advertising space, there is no consistency in how ads are formatted as to durations, usage action prompts and other features from one distributor to the next. An automated traffic management system that can locate and act on all the nuances associated with each distributor is essential to ensuring ads are delivered in the right format to each one.

High Volume Multi-Profile Transcoding and Other Media Processing Tasks

The ad management system should be able to rely on transcoding performed by a media processing platform that supports a wide range of capabilities suited to demanding requirements of TV operations. First and foremost, it must be able to transcode ads to satisfy formatting requirements across the wide range of legacy and OTT distribution outlets.

This requires support for any mix of MPEG-2, H.264 or HEVC/H.265 outputs at very high processing speeds and densities employing the latest advances in GPU (graphic processing unit) and CPU (central processing unit) technology. Other transcoding requirements include support for:

- De-interlacing of NTSC files to progressive mode.
- GOP (group of pictures) alignment to facilitate smooth output in the fragmented distribution process.
- Automatic loudness adjustments.

All of these processes should be aligned with the transcoding of primary programming content performed in postproduction to assure alignment on all points. Postproduction processing used with programming should be available for coordination with ad management workflows to execute adjustments in ad breaks and insertions of missing SCTE-35 ad markers in response to action triggers from QC processes, as discussed below.

A TV operations-caliber media processing platform must also execute processing and frame-accurate synchronization of ancillary feeds such as closed captioning, picture-in-picture display and foreign language subtitles. The platform has to be responsive to all the captioning formats commonly used by ad postproduction houses with the ability to convert them to formats used by affiliated distributors.

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For example, the transcoding platform processing an ad captioned in post using MPEG-2 A/53 user data needs to be able to output the captioning for use in OTT distribution. This can require conversion based on SMPTE 2052, WebVTT or SCC, depending on how captioning is formatted by the targeted online outlet.

Another important role for the media processing platform involves support for Nielsen's widely used watermarking system, which is employed to provide advertisers metrics accounting for where and when their ads are viewed across all devices.

Along with injecting the audio codes that are used to identify ads of participating advertisers, the processing platform must be able to pull information from the ingested ad asset metadata files to create and deliver metadata files containing all the data Nielsen stores on its servers to associate each detected watermark with the advertiser.

Once the media processing system is set up to look for the appropriate identifying data with each watermarking instance, it should be able to assemble and format the data to Nielsen's metadata specifications automatically. This requires rapid compilation of the relevant Ad-ID codes into the listings Nielsen uses to identify ad agencies, brand names, commercial types, intender users and other details associated with the marked ads.

Automating Ad Normalization with Re-Timing Option

The traffic management system also needs to support automated normalization of ads with no distortion to ensure precise uniformity in ad lengths with consistent use of slates, color bars and frames of black. Any segments with cadence must be identified and treated separately with reliance on the most appropriate processing mode.

The system must be able to automatically satisfy deinterlacing requirements. In cases where true interlace frames with no cadence require deinterlacing, the system must use a state-of-the-art motion-compensated deinterlacer. When ads are ingested that have been poorly deinterlaced at the source, the system must be able to restore them to the original pre-interlace 24p sequences.

Ad normalization must also deal with the fact that OTT and mobile distribution of content has introduced inconsistencies in ad placement parameters. If, with completion of the above processes, an ad with all components needs to be retimed to conform to the allocated spot length in a targeted slot, the system must be able to perform the re-timing adjustment automatically.

This requires use of comprehensive time-compression algorithms which, rather than throwing frames away, intelligently interpolate the desired ad time adjustments in close conformity with the video and quality parameters of the targeted program. Flawless performance requires that the timing tool perform a second pass to ensure any artifacts or errors introduced in the re-timing process are eliminated, thereby avoiding the need for manual review and editing.

Support for DAI

The ad management system must also be able to coordinate with processes in postproduction that are essential to preparing programs for dynamic ad placements during legacy VOD and on-demand OTT viewing sessions. This is complex work that requires comprehensive automation to facilitate assembly of audio, video, graphics and metadata components for content output that is fully provisioned for DAI,

Along with reliance on the SCTE 35 markers that ensure frame-accurate ad placements with postproduction of the programming, the system must be able to ensure metadata associated with content stored for VOD access limits insertions to ads that are compliant with the statutory and regulatory requirements that are relevant to any given viewing session.

It would also be helpful to have a system that works in close tandem with business needs. This can be done by ensuring targeted advertising campaigns remain responsive to audience demographics and by keeping inventory up to date with holidays, cross promotions and other events.
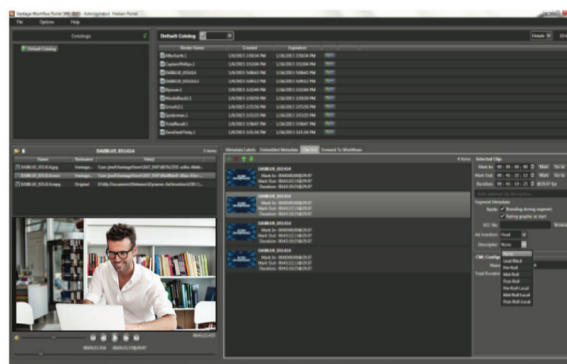
Vantage VOD DAI

Things become more complicated when DAI tied to on-demand and addressable placements during OTT distribution enters the picture. There is some risk that the in-band markers won't survive intact through the distributor's ABR transcoding process owing to the fact that SCTE-35 markers are not aligned with the ABR streaming segment boundaries.

While transcoders are designed to ensure a new ABR segment or "chunk" starts with instantiation of a new I-Frame when a marker is detected, this doesn't always work, depending on the quality of the transcoding system in use. There are also instances where differences in how SCTE-35 messages are interpreted require translations that can malfunction.

Program suppliers should be sure their OTT affiliates employ CableLabs' Event Signaling and Management API (ESAM), which ensures marker signal conditioning is executed with valid start/stop times and proper manifest conditioning occurs when server-side DAI is in use. Another fail-safe approach entails out-of-band packaging of the SCTE signaling in metadata files that affiliated OTT distributors can transmit directly to ad decisioning systems.

QC requirements

Comprehensive quality control grounded in advanced analytics is essential to ensuring work orders are executed without compromising results. Ad management teams relying on automated monitoring and data aggregation tools need to be able to trigger remedial action on their workflows with instant response to alerts. They also must have recourse to automated extensions of ad-related QC into program postproduction processes to ensure content is ready for designated ad placements and that ad and programming transcoding parameters are properly aligned.

Ad management teams also need to have access to monitoring, analysis and reporting capabilities that extend QC across the distribution ecosystem. While QC reviews of completed work orders might give the all clear for release into distribution, extended QC assurance is essential to knowing if ads are rendering as required on end users' screens and, if not, what is causing sub-par performance.

The QC measures can also be used to feed data into the analytical processes that are used to tabulate viewership, make adjustments in ad delivery, drive addressability and support other business interests not directly related to the accuracy and quality of ad placements. These contributions are important to assessing return on QC investments.

QC in Ad Trafficking

Looking first at operations on the ad trafficking side, QC analysis and execution is integral to ensuring acceptable results at all points in the workflows. As noted in the previous section, this starts with QC review at ingest to identify ad properties, detect quality discrepancies, identify trim points and verify that all requisite information is encapsulated in metadata files.

Also as noted, QC processes in transcoding should support loudness analysis and automatic correction in keeping with regulatory requirements such as the U.S. CALM Act. The QC processes must also ensure that ad durations have been configured for precise frame accuracy and that ad formats and quality parameters are compatible with targeted programming.

As a backup to automated QC processes, the ad trafficking system should provide managers the option to initiate expeditious manual review workflows by generating proxies of completed projects that provide portal-based exposure of all elements to editors. With ready access to all the identifiers in the binder associated with a given work order, editors can call up all components of the completed project to quickly ascertain conformity and execute corrections.

QC in Ad-Related Postproduction Processes

On the postproduction side, ad managers need support from QC tools that can automatically assess whether content is properly prepared for insertion. This requires verification that ad breaks are positioned frame accurately with durations as stipulated in inventory manifests and that they are marked for spot placements in conformity with SCTE 35 coding.

The QC process should also be able to ascertain whether the SCTE 104 messaging system used to signal the SCTE 35 codes is functioning properly. Any absence of 35 markers or inconsistencies in 104 messaging must be flagged by alerts that immediately trigger remedial action.

There also needs to be an automated communications link between programming postproduction QC and the transcoding platform used in ad management. This is essential to ensuring accurate SD/HD/UHD formatting and A/V quality alignments between ads and programming. Rigorous QC processes should also be applied at the point of playout to distributors to ensure that ads have been inserted into programming in compliance with all requirements.

QC in Distribution Networks

Access to means of monitoring performance and identifying trouble spots across the distribution ecosystem is not only vital to ensuring persistently successful fulfillment of contracts with advertisers. It's also essential to distinguishing problems that are occurring downstream from any that might be attributed to the ad management process.

Ad traffic managers and their colleagues on the business side need QC tools that can gather and analyze massive amounts of data in near real time from various points in the distribution networks. With analytics engines tuned to all areas of concern related to ad performance, the QC platform should be able to provide a comprehensive picture of what's happening with ad exposures in multicast and unicast distribution end to end.

The QC management system should be able to pinpoint exact causes for both existing and emergent problems with classification of their significance and elevation to actionable alerts based on priorities set by operators. The system should have the intelligence to orchestrate automated remedial action, including preventive action, wherever possible within the infrastructure under control of the primary distributor. And, when distribution affiliates and third parties are involved in the delivery chain, the system should be able to generate the alerts to relevant participants through standardized interfaces with those parties' QC systems.

QC Placement in All Distribution Scenarios

There are many places in the distribution chains that need to be monitored beyond initial playout. In all cases, these include the points of program injection into distributor workflows, the distributor outputs into OTA and network distribution and last-mile locations where probes have been positioned to simulate playback on viewer devices

At all points, the content flows must be scrutinized to ensure accuracy of ad placements with error-free transitions between spots in ad breaks. The QC system should be able to detect and report issues such as missing SCTE-35 markers, temporary loss of service, audio silence, discrepancies in violation of loudness rules, video freeze, tiling, macro blocking and pixilation.

Moreover, QC mechanisms should be able to look deeper into the content to assess A/V quality in accord with actual viewing experiences. This requires use of Perceptual Video Quality (PVQ) measures based on Mean Opinion Score algorithms that reflect actual responses of the human visual system.

Unique QC Requirements for OTT Distribution

In cases involving OTT distribution in the unmanaged network environment, there are many other issues that need to be considered when monitoring for sources of degradation in ad performance. For example, monitoring for placement accuracy should take into account the aforementioned use of I-Frames to demark segments for ads.

There's also a need to look for errors that can occur when ads are transcoded for dynamic insertion in already transcoded content streams. With 10 or more profiles in the typical ABR ladder, mismatches can result in ad profiles that are extremely out of sync with program profiles, as when a 480p version of an ad shows up on a 4K TV screen.

Whether DAI is performed at the point of origin in OTT distribution or farther downstream with server-side or client-side insertions, the monitoring process must be able to spot and identify causes for missed insertions, which can occur even when the SCTE signaling is present. This requires visibility into all the potential points of malfunction, including the DAI platform, manifest manipulation processes and ad servers.

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Sometimes these misses happen when everything seems to be working properly, as when an ad is rejected because it's been delivered in an old format like Flash that isn't compatible with the DAI process or the playback capabilities of the targeted client. These harder to explain reasons for failure must be understood as well.

Whatever the cause of failure, the system must be able to notify ad managers immediately. Delays equate to lost revenue and money wasted on costs attributable to server runtimes and other DAI processes involved in executing on a given ad buy.

There are also issues that can occur in the unmanaged network environment related to CDN performance. The use of probes positioned downstream of CDNs with the ability to generate the full range of results discussed above, including PVQ measures, is especially important to ensuring ad performance with OTT streamed video.

QC Metrics Applied to Business Applications

Business-related metrics drawn from QC monitoring tools that rely on industry standard Ad-ID codes to identify ads can be applied to a wide range of information needs in sales, ad planning and financial accounting. Of course, as noted above, all the technical data pertaining to execution and quality of ad placements is fundamental to validating contract fulfillment and rectifying issues that thwart fulfillment goals.

But there are many other uses of QC-generated data relating to viewership tabulations that can be leveraged for business purposes even when technical requirements have been met. In these cases the QC-generated data must be fed with various application-specific combinations of data emanating from other sources such as subscriber accounts, set-top boxes, ratings agencies and much else for analysis pertinent to specific business needs.

The ability to generate such information has become mission-critical in an era when advertisers have more choices than ever when it comes to getting their messages across to viewers. Most of all, sellers need to prove the relevance of their content to targeted consumer segments with traditional linear placements as well as more dynamic insertion scenarios by quickly exposing the results they're getting with buyers' ad placements.

Other examples of useful business applications for QC-generated data include:

- Verification that dynamically inserted addressable ads match up with designated audience profiles.

- Determination of whether too-frequent exposure of an ad in a given program is cause for a drop-in viewership.

- Validation that viewer ratings meant to account for exposures in on-demand sessions via C3, C7 or other measures are accurate.

- Analysis of whether those on-demand runtime extensions are producing better ROI than would be the case with addressable replacements.

- Assistance to campaign planners looking for immediate feedback on the impact of new advertising strategies.

- Analysis of whether newly installed ad decisioning systems, DAI platforms and other types of solutions are working as intended.

Solutions for Ad Management in the Multiscreen TV Era

Telestream is supplying TV networks, broadcast stations and MVPDs worldwide with the wide range of solutions that are essential to meeting all the requirements enumerated in the preceding discussion. Following is a brief listing of those solutions with links to their descriptions on Telestream's website.

Traffic Management

The capabilities required for traffic management as embodied in Telestream's Vantage Media Processing Platform include:

- TrafficManager, a system that minimizes manual intervention and the chances for error in all processes performed by the following components:
  - Flexible commercial ingest, providing a unified approach to ingesting ad and metadata assets from all sources with cataloging that can be based on the Ad-ID system or any of the other mainstream metadata exchange formats.
  - Automated dublist processing and actions, which supports automated management and response to ad work orders.

- The Vantage Tempo for Spots solution for automating ad normalization.

- High volume multi-profile transcoding provided by the Vantage Media Processing Platform with GPU acceleration for legacy and ABR profiles including 4K UHD.

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- Captioning and subtitling as part of the broad media processing capabilities of Vantage.

- Support for DAI that simplifies preparation of VOD assets for per-session placements.

Quality Control

Telestream has amassed the most extensive set of QC solutions available to cover every requirement for assuring adherence to TV ad specifications end to end, including:

- QC in ad trafficking, which makes use of the automated Vantage analytics system to generate actionable data with monitoring input from TrafficManager and the Vantage Media Processing Platform.

- QC in ad-related postproduction processes, enabling use of the functionalities provided by Telestream's Aurora and VidChecker modules for ad management applications.

- QC in distribution networks with SCTE Ad Insert Monitoring supported by Telestream's IQ portfolio to monitor the health of SCTE 35 and ABR Ad Insertion for linear and OTT workflows

- QC metrics for business needs using data generated by Telestream's IQ solutions for all the applications discussed in the previous section.

Cloud Support for Ad Management Processes

Telestream enables use of cloud resources to support all facets of traffic management as well as application of QC to distribution networks through these solutions:

- Vantage Cloud Port, a flexible hybrid cloud solution that allows customers to leverage leading public cloud systems, including AWS, Microsoft Azure and Google, to execute traffic management workflows with any combination of premises and cloud resources.

Conclusion

The case for a television ad management system that integrates and automates workflows with rigorous QC is clear. The forces behind this mandate and the capabilities intrinsic to fulfilling it can be summarized as follows:

- The proliferation of OTT services together with the enduring popularity of legacy broadcast and MVPD

TV distribution has opened an unprecedented range of monetization opportunities for the producers of ad-supported television programming and their affiliates.

- But all that opportunity has introduced a host of challenges for the ad management teams who must ensure ads are displayed as intended across all modes of linear and on-demand distribution to all classes of devices.

- The capabilities that must be incorporated into ad management processes adequate to current and future needs include:

  - Fully automated traffic management covering all workflows related to ad asset ingestion and cataloging; dublist processing and actions; transcoding; ad normalization, and support for dynamic advertising.

  - Comprehensive automated quality control over all internal processes related to traffic management and preparation of content for accurate ad placements

  - QC monitoring and analysis essential to ensuring distribution networks are delivering ads as intended.

Clearly, there's much to be considered as trafficking teams weigh the options available to them from suppliers. The good news is the requirements set forth here can be met through the many solutions Telestream is providing to customers worldwide.

Readers are encouraged to take a hard look at how they can put these solutions to work to ensure their ongoing success no matter where the market leads. Be sure to get in touch with our representatives if you want to find out more.

Footnotes

[i] Magna press release, _Magna Advertising Forecasts_, June 2019

[ii] Rapid TV News, _U.S. Advertisers Embrace Advanced Advertising Methods_, May 2019

[iii] Statista, _Number of Cable VOD Advertising Impressions in the U.S._, October 2019

[iv] Parks Associates, _Overall Rate of OTT Video Service Cancellation Steady at 18%_, September 2018

[v] FreeWheel, _Video Marketplace Report,_ Q4 2018

[vi] FreeWheel, _Video Marketplace Report_, Q1 2019

[vii] Advertiser Perceptions, _Connected TV Emerges as Advertising's Fastest-Growing Video Segment_, June 2018

[viii] Rethink Research, Addressable Advertising Boom across all Regions & Platforms, November 2019

[ix] Statista, _Broadcast TV Upfront Buys CPM 2008-2019_, August 2018

[x] Press release, _SpotX Releases Detailed Insights About State of Video Advertising on OTT,_ February 2018

[xi] Broadcasting&Cable, _Most Marketers Have Used Advanced TV_, January 2020

[xii] MediaPost, _Addressable TV Spending Growing to $3.4 Billion in 2020,_ March 2019

[xiii] Sky Media, _Sky AdSmart Boosts Viewing in Ad Breaks_, November 2015

[xiv] Ad Week, _Study Projects Addressable TV Advertising Will Double by 2018_, November 2016

[xv] Press release, _FOX, NBCUniversal and Viacom Unveil OpenAp 2.0_, April 2019

[xvi] Neilsen, _Q1 2018 Earnings Report,_ April 2018

[xvii] IHS Markit, _How to Delight Consumers in a Connected World,_ April 2019

[xviii] ScreenPlays, _"Cloud DVR Prospects Gain with New Options,"_ March 2015

[xix] Conviva, _State of Streaming Report,_ February 2020

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