iab. TECH LAB

Ad Format Guidelines for Digital Video and CTV

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Please email support@iabtechlab.com with feedback or questions. This document is available online at https://iabtechlab.com/dv-ctv-ad-format-guidelines

Introduction

With the surge of growth in Connected Television (CTV) in recent years, the IAB Tech Lab offers this 2022 update of the Digital In-Stream Video and CTV Ad Formats guidelines to account for the growing use of CTV products as part of the video ad landscape.

The specifications outlined in this document have been updated to support the growth of CTV in the digital video marketplace, as well as the advances of new technologies that have emerged. With cross-screen ad execution in mind, provisions have been made for various file types and video qualities. This improves the "intelligent" selection of vendor-served ads and server-side ad insertion (SSAI) practices. Supporting the need for high-quality video files is also a key focus to this update.

Key updates include:

- Overview of the challenges and opportunities in CTV, including limited interaction controls (TV remote, game controller)
- Higher resolution guidelines for 4K and 21:9 widescreen
- Description of picture-in-picture ad format (classified as a type of nonlinear ad)
- Added notes for peak audio levels and tolerance for bitrates slightly off from recommendations
- Added format for long "infomercial"

About the IAB Tech Lab

The IAB Technology Laboratory is a nonprofit research and development consortium charged with producing and helping companies implement global industry technical standards and solutions. The goal of the Tech Lab is to reduce friction associated with the digital advertising and marketing supply chain while contributing to the safe growth of an industry.

The IAB Tech Lab spearheads the development of technical standards, creates and maintains a code library to assist in rapid, cost-effective implementation of IAB standards, and establishes a test platform for companies to evaluate the compatibility of their technology solutions with IAB standards, which for 18 years have been the foundation for interoperability and profitable growth in the digital advertising supply chain.

Further details about the IAB Technology Lab can be found at:
http://www.iab.com/organizations/iab-tech-lab/

This document has been developed by a subgroup of the Digital Video and CTV Technical Working Groups.

IAB Tech Lab Lead:
Katie Stroud, Sr. Product Manager, Ad Experiences

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Summary

Originally intended to establish a baseline for in-stream video ad formats and creative submission requirements, the 2008 Guidelines helped digital video establish a foothold in the marketplace. In an update in 2015, consideration was given to the increasing need for high-quality video, especially as high definition screens of all sizes and capabilities enter the marketplace.

But today's marketplace has become more complex and diverse as CTV entered the scene. Inventory opportunities are expanding as a result of the growing number of screens, devices, video ad tech platforms, and of course the explosion of available content.

This 2022 update accommodates high-quality video needs for cross-screen video advertising in mobile, desktop, and connected TV (CTV). File submission recommendations detail "ready-to-serve" files for streaming, progressive download, and adaptive bitrate streaming formats. Providing the high quality source, or mezzanine file is also vital in CTV so that the publisher may transcode the file best suited to the environment into which it will serve.

Adhering to and promoting these guidelines for in-stream video and CTV ad file submission will help streamline ad development and placement operations while providing the best experience possible in the user's device for the bandwidth available.

Audience

Publishers should use these guidelines as a resource for providing creative submission requirements for video ads.

Video Ad developers should use this document as a reference for baseline ad development specifications.

Creative agencies, studios and video ad technologists, as well as video ad-serving partners should use this document as a reference for digital video ad specifications.

Resources

In order to improve the interconnectivity of the digital video marketplace, the IAB has published technical specifications, metric definitions, and best practices developed by members with industry expertise.

- **VAST:** The Video Ad Serving Template is an XML response framework that enables a consistent delivery format for ads across streaming video platforms.
- **SIMID:** The Safe Interactive Media Interface Definition replaces the Video Player Ad Interface Definition (VPAID). SIMID simplifies interactivity by removing the measurement and verification capabilities that are better handled by other standards. See IAB Tech Lab's Open Measurement suite of tools for handling measurement.
- **VMAP:** the Video Multi-Ad Playlist is an XML response framework that defines where to place ads within the video content.
- **Digital Video Ad Metric Definitions:** an industry-defined list of metrics used in linear and nonlinear in-stream video ads.
- **Digital Video Ad Format Guidelines:** (this document) is an industry-defined list of streaming video creative submission specifications.
- **Digital Video Best Practices:** a guide for using IAB digital video specifications and guidelines in digital video advertising.
- **DAA Interest-Based Advertising (IBA) notice for digital video:** Guidelines for implementing the AdChoices program within in-stream ads that are placed using interest-based criteria.

Environments: Mobile, Desktop, CTV

Today's digital video content is consumed across a multitude of screens. From small high-density smartphones to a variety of digital tables, across desktop and laptop to internet-connected TVs. The concept of TV from just 10 years ago has changed from broadcast and broadband to a collection of subscription "channels." As the lines blur between TV and hand-held devices, video ads can be designed to span all screens with some caveats to be aware of.

Desktop

Advertising in digital video started in desktop environments. The technical foundations for how we advertise on video platforms was established online and was modeled after the standing tradition of commercials we were accustomed to in broadcast TV. Eventually the experience took on a life of its own with the capabilities that a connected environment offered. Advertisers could place an image overlay that would invite interaction. They could include companion ads that display on the webpage where the video player was implemented. Users could skip ads they weren't interested in, helping publishers narrow down audience interests for advertiser. With a stable internet connection, advertisers came to expect rich metrics in digital video. However, as even desktop computers became more compact and mobile, digital advertising platforms had to account for new challenges in mobile.

Mobile

Video in a mobile environment came with new challenges: smaller screens and, at first, lower resolutions. Publishers and ad tech vendors had to account for device operating systems, connection options, real-time shifts in bandwidth capabilities, and execution platform (native video player or web-app player). The requirements for ad creative targeted to mobile had very different requirements, and new opportunities. Advertisers could make use of geo-location and they could get creative with mobile gestures, like swiping and shaking. They could even implement ad creative in mobile that offered an augmented reality experience.

Today, digital video in mobile is still different, but as all computing devices become more mobile, the lines between desktop and mobile begin to blur, at least in terms of certain ad formats and quality experiences.

Connected TV

With the rich metrics offered in digital video, the medium grew. Eventually, broadcast and cable TV began to move online, drawn by the metrics and large audiences. With the advent of connected TVs, digital video was brought back to the living room, blurring the lines between CTV and desktop video.

At the advent of CTV, common web technologies like HTML and JavaScript were not typically available. However, many streaming services have adapted to support ad campaigns that serve cross-screen: in web, mobile, and now CTV. Even so, CTV is still limited when it comes to interactivity.

Clicks and Interactive Formats

One of the biggest issues on CTV is lack of user engagement and interactions. The nature of TV watching has traditionally been about relaxing to a favorite show or movie in the context of the family room or bedroom. This mode of entertainment hasn't offered much interaction in the past, but these traditions are changing. People are interacting with content on their TVs more, using a remote or game controller, and in some cases, their smartphones.

Today, some options for CTV engagement are:

- QR codes that create shoppable ads
- 'Click' with remote to select which ad to play
- Signal engagement with options to skip the intro, and ad, or advance to the next episode
- Use remote to 'Explore more'

Many streaming services and 3rd party platforms offer these engagement options using different standards. For interactive formats that use traditional standards for interaction, such as the Safe Interactive Media Interface Definition (SIMID), adoption started out slow. A replacement for VPAID, SIMID is expected to gain traction in CTV as updates to the API incorporate more support for CTV interactive ad campaigns.

Many of IAB Tech Lab's digital video and measurement solutions are being modified to accommodate CTV. We have published a comprehensive guide organized by use cases, such as targeting and brand safety, to help you navigate the available technologies. Check it out at:

https://iabtechlab.github.io/programmatic-guides/pg-video/index.html

While cable and simulcast formats are out of scope, this update was designed to address all other IP-connected TV, mobile, and desktop environments.

Digital Video In-Stream and Out-Stream

The Digital Video In-Stream Ad Format Guidelines are designed to address in-stream ads, meaning that ads are streamed as part of a video that plays in a player. Out-stream video ads are ads in video format but served alone for display, usually on a webpage.

Out-Stream Video Ads

Out-stream video ads are usually served alone with their own player in a display placement. Various terms have been used to define out-stream, including:

- In-banner video
- In-page video
- Rich media (banner with video)
- Video interstitial
- Incentivized video
- In-feed video

These different forms of out-stream video ads may be served into a display ad placement that may or may not use a player to receive and execute the ad. They are not the focus of the page and not rendered in a video player app or connected TV as part of a video experience.

Out-stream video ads are out of scope for this document.

Digital Video In-Stream Ads

Digital Video in-stream ads are served into and executed within a player. The audience is shown an ad in the context of streaming content in an environment where video or in-app streaming content is the focus of their visit. While previous guidelines offered a recommended minimum size for in-stream video, large sizes may host in-display video while smaller sizes have been known to host truly in-stream video. Buyers and sellers should consider whether a minimum player size is relevant to in-stream ad placement and place buys accordingly.

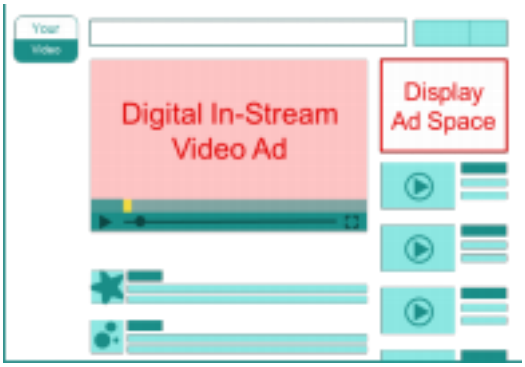
The IAB defines digital video in-stream ads as linear or non-linear ad formats served into a video player:

> "*before, during, and after a variety of content including, but not limited to, streaming video, animation, gaming, and music video content in a player environment. This definition includes Digital Video Ads that appear in live, archived, and downloadable streaming content.*"

While mobile video ads were defined after this definition was conceived, the definition for mobile pre-roll video ads align with the digital video in-stream ad definition.

The distinction between video in-stream and display video ads becomes critically important when looking at digital video in programmatic systems. If in-display video is classified as an in-stream ad, it may not serve properly. It may also cause performance issues for the video publisher and disrupt the viewer experience.

Another important distinction is that in-stream ads are not always in video format. Image overlays or rich media may be served to a streaming environment and executed using an API such as VPAID.



The image above illustrates in-stream ad space along with display ad space. Videos may play in the display ad space, but these videos are classified as display video.

Guidelines in this document were designed to address digital video in-stream ads. The following technical distinction between in-stream and out-stream must be followed to help correctly identify in-stream ads.

- To be considered In-Stream (pre-roll, mid-roll, and post-roll), video placements/impressions must be set to “sound on” by default at start.
    - “Sound On” by default must be signaled in OpenRTB v2.5 and above within the field for Playback Method (Section 5.10). Values of 1, 3, 4, and 5 all qualify.

- All impressions with Default Sound Off (Playback Method of 2, 6, or null) must signal, in OpenRTB v2.5 and above, an out-stream Placement of type of 2, 3, 4, or 5 (section 5.9).
    - Additional signals such as Player Size, Placement Type, Linearity, etc. can be used to differentiate between these various out-stream placements.

Digital Video Ad Formats Overview

We break digital video ads down into two different formats: linear and nonlinear. Either format may include a “companion” ad that displays outside the player, less common in mobile and CTV while fairly typical in web.

Linear video ads are video formatted ads, that interrupt streaming video content much like a TV commercial. They can play before (pre-roll), during (mid-roll), or after (post-roll) the streaming content. Linear ad formats can be accompanied by a companion ad, or they can include an interactive component.

Nonlinear video ads are typically served on top of (overlay) the video content. Traditionally, these ads are simple images but increasingly, especially in CTV, they can be a video or animated media. The ad runs concurrently with the streaming content so the user sees the ad while also viewing the content without interruption. Ideally, the nonlinear video ad is small enough to allow a relatively unobstructed view of the content.

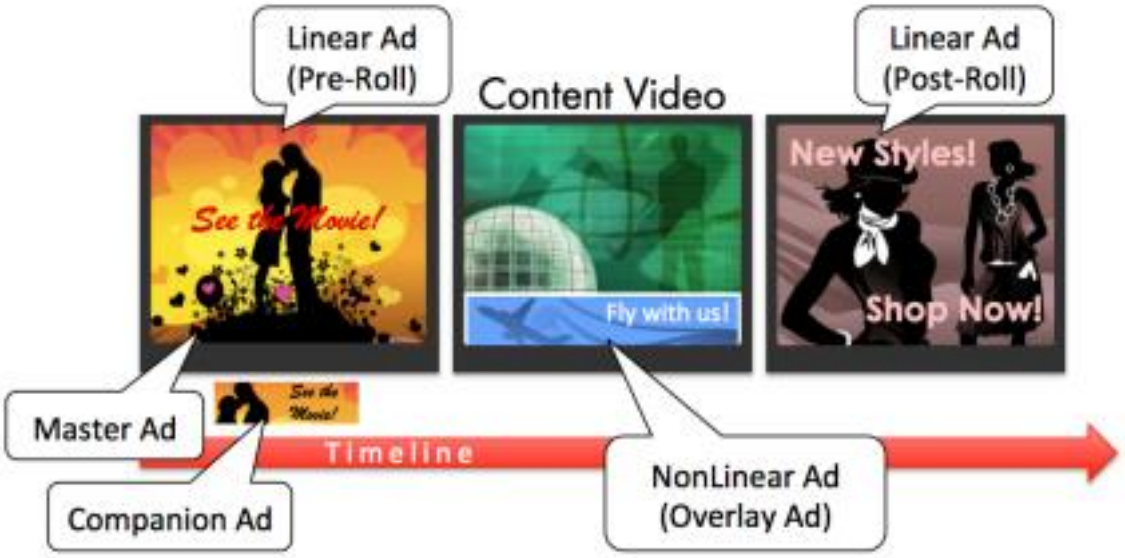
Nonlinear video ads can be delivered as text, static images, interactive rich media, or as video overlays. Typically, a nonlinear video ad developer can take advantage of the medium and use the small overlay as an invitation for consumers to further engage with a more robust set of interactions. As with Linear ads, nonlinear ads can be served with companion ads where applicable.

Picture-In-Picture ads are a type of nonlinear video overlay used in CTV that allows the user to watch a video in a small window, while navigating between various apps or viewing content. An example is the ‘Double Box’ format, where a split screen allows both an advertisement and content to be played simultaneously.

Companion ads are ads that are served along with linear or nonlinear ads in the form of text, static image display ads, rich media, or skins that wrap around the video experience. These ads come in a number of sizes and shapes and typically run alongside, or surrounding, the video player. The primary purpose of the companion ad is to offer sustained visibility of the sponsor throughout the streaming video experience. Digital video companion ads are always served with a master ad, which is either the linear or nonlinear ad. Companion ads, that are not served as end cards, are not available on CTV.

Recently, there has been an increase in newer formats that allow minimal disruption to content. Unlike linear ads, these formats do not interrupt content, allowing for a more seamless user experience.

The following image illustrates where these ads might fit along the timeline of the streaming video content.



Video Ad Formats and Submission Guidelines

The ad formats for digital video in-stream consists of two general classifications: linear and nonlinear. Either ad may be served with a companion banner that displays outside the video player to enhance the advertiser's message. Both may be interactive and even change from one ad type to the other upon viewer interaction.

These video formats are further described in the following sections.

Linear Ad Format Guidelines

Linear ads are typically in video format that interrupt streaming video content. They can play before (pre-roll), in the middle of (mid-roll), or after (post-roll) the streaming content. In its most basic format, the linear ad plays for a prescribed amount of time before it ends and the player resumes regular operation.

Linear ads may also be interactive. An interactive linear ad plays for a prescribed minimum length of time (usually length of video creative), inviting the viewer to interact. If the viewer engages, ad duration may continue indefinitely until the viewer activates a close control. The extended version of the ad may include video, animation, or images. It may also shift to a nonlinear format where rich engagement opportunities can be made available.

Both linear and interactive linear ads may be served with companion ads

The following linear ad format guidelines outline the minimum considerations for linear ad development. Publishers may offer other ad formats and specifications that extend these recommendations. Please check with publisher for specific requirements.

Linear Ad Property	Guidelines
Insertion Point	Pre-roll, mid-roll, post-roll
Maximum ad display duration *Duration should be exact, but the transcoding process may produce slight variations within no more than 1 second.*	Ad duration should be one of the following: ● 6 seconds ● 15 seconds ● 30 seconds Interactive ads should be 15-30 seconds for the compulsory portion of the ad, but may continue indefinitely upon viewer interaction. Other durations commonly accepted: ● Short-form creative (aka “bumper”, 3-10 seconds in length) ● 60 second spots (ran sparingly and usually as post-roll or during extended mid-roll ad slots)
Long “info-mercial” ad	Duration can range from 1-5 minutes, or longer depending on placement, skip options, and objective. Considerations for info-mercial ads: ● Skip option recommended (check with publisher) ● Controls for ffw, rw, pause, etc. recommended, especially if skip option omitted (check with publisher on technical feasibility)
Engagement Event	Both the video window and companion ad may offer interaction controls with links to advertiser site. For interactive ads, engagement controls may extend ad duration, initiate interactive ad, or take user to advertiser’s site. Technology: check with publisher, ad serving platform on tech used to manage interactions. ● Mobile: click might be a gesture such as a swipe ● CTV: click happens with remote or game system controller. Check with publisher on limited “clickability.”

Linear Ad Property	Guidelines
Controls	Options for player controls to be available during ad play should be negotiated prior to campaign start (for example: no fast forward during ad play). If the ad is skippable, skip controls and time delay should be negotiated prior to campaign start. For interactive ads, call to action should be clearly labeled. Viewer-initiated portion must provide a close control to allow the viewer to exit at any time. If the extended portion of the ad includes any expandable media, a collapse button must also be provided. Check with the publisher on the technological handling of these controls.
Dimensions	Preferred aspect ratio is 16:9 (formatted for HD screens) but a ratio of 4:3 may be accepted Ultra-wide aspect ratio 21:9 is less common but may increase as more TVs and monitors of this size enter the market. Viewer-initiated portion may fill video viewing pane or may extend beyond viewing pane if publisher allows.

Linear Ad File Submission Guidelines

The following guidelines facilitate ad portability and development for linear ad creative files. Beginning with VAST 4.0, support was added for multiple "ready-to-serve" files along with a "mezzanine" source file. Ready-to-serve files can be, for example, three independent files with separate quality specifications for progressive download, or as a single adaptive streaming file using three specified quality levels.

Details on the file submission guidelines in the following sections are designed as a starting point to improve cross-industry workflows. However, quality specifications may differ from publisher to publisher. Be sure to check with publishers on specific submission requirements for ad creative.

Encoding Ready-to-Serve Files

Offering three ready-to-serve video files at varying bitrates for linear ads gives the player some flexibility for serving the best ad for the viewer's environment. Appropriate bitrates depend on the resolution of the environment where the video ad plays. In general, the higher the resolution for the ad play environment, the higher the bitrate should be for quality playback.

Using a video bits per pixel (VBPP) calculation, you can calculate the target bit rate (bits per second) for the given screen width and height where the video ad will play. For the H.264 codec, a good rule of thumb is to use a VBPP within the range of .05 to 0.1; however, a video file with more movement (such as a sports ad) may require a higher VBPP and therefore a higher target bitrate.

Target Bitrates

The following formula can be used to calculate the appropriate bitrate for a particular resolution:

Target bitrate (bits per second) = width x height x frame rate x VBPP

Creative bitrate may exceed the specified ranges depending on the content of the ad and publisher requirements. A file will end up being approximately 1.5 MB per 15 seconds at 1000 kbps bitrate, but this may vary depending on ad content.

Note: Check with the publisher on tolerance levels. Tolerance should be allowed for Audio (AAC) bitrate to allow for variances in encoder rate control and measurement. For example, measured bitrates of 95.5KHz should be within tolerable levels when the target rate is 96kbps, though the publisher will have to make that call.

When you submit a video ad for linear placement, you should provide three ready-to-serve versions at quality levels for high, medium, and low as indicated in the following table (along with a mezzanine file described in the next section). These files can be compiled into an adaptive streaming file or referenced from an interactive file such as SIMID. Additional files may be included in addition to these recommendations to support other file formats such as WebM and VP8.

General Video Settings

Video Setting	Specification
Progressive Download Format	MPEG-4 (MP4) for progressive download. Produce high, medium and low versions of each asset, allowing the publisher or player to select the appropriate version for the environment. When encoding an MP4 for progressive streaming, use the "web-optimized" setting. This improves streaming performance by placing the MOOV atom at the start of the file.
Adaptive Streaming Format	HLS (M3U8) or MPEG-DASH for adaptive bitrate streaming. Use the high, medium, and low file recommendations in this table to create the adaptive bitrate file fragments. For more information on HTTP Live Streaming (HLS), visit Apple's resource page: https://developer.apple.com/streaming/
Video Codec	H.264
Aspect Ratio	When creating content, a 16:9 aspect ratio is preferred. Only use a 4:3 aspect ratio when the source material is 4:3. As more ultrawide screens enter the market, a 21:9 aspect ratio may be accepted. Avoid mixing aspect ratios and provide aspect ratios that match the environment where ads will be served. Avoid horizontal letter-boxing, vertical pillar-boxing, and anamorphic scaling (skewing/stretching). Modern video players are capable of adapting.

Ready-To-Serve Video Ads

While the mezzanine file is used for encoding video to fit programming needs, the encoding process takes time. Providing at least three smaller files that are ready to serve in appropriate resolutions for the playback environment enables the ad to serve while the mezzanine is prepared for custom environments.

Resolution	Low resolution	Medium resolution (Standard Definition)	High resolution (High Definition)
Square aspect ratio	360p or less Typical resolution: 360x360	Greater than 360p and up to 576p Typical resolutions: ● 480x480 (ATSC) ● 576x576	Greater than 576p and up to 1080p Typical resolutions are: ● 720x720 for 720p ● 1080x1080 for 1080p
21:9 Wide screen	360p or less Typical resolution: 840x360	Greater than 360p and up to 576p Typical resolutions: ● 1120x480 (ATSC) ● 1344x576	Greater than 576p and up to 1080p Typical resolutions are: ● 1280x720 for 720p ● 1920x1080 for 1080p ● 4096x2160 (DCI 4K)
16:9 Aspect Ratio	360p or less Typical resolution: 640x360	Greater than 360p and up to 576p ● Typical resolutions are: 854x480 (ATSC) ● 1024x576 for (PAL)	Greater than 576p and up to 1080p* Typical resolutions are: ● 1280x720 for 720p ● 1920x1080 for 1080p ● 3840x2160 (4K)
4:3 Aspect Ratio	480p or less Typical resolution: • 640x480	Greater than 480p and up to 576p Typical resolution • 640x480 (ATSC) • 768×576 (PAL)	Not applicable
Video Target Bitrate *See bitrate formula earlier in section*	500-700 kbps	700-1500 kbps	1500-2500 kbps for 720p 2500-3500 kbps for 1080p
Video Target Bitrate for CTV	Not applicable	Not applicable	CTV vendors can ask for much higher bitrates (on the order of 15k to 30k). Check with publishers on what their ask is.
H.264 Profile/Level	Baseline profile, level 3.0	Baseline profile, level 3.0	High profile, level 3.1 (720p) High profile, level 4.0 (1080p)

Video Frame Rate	Maintain the frame rate of the original content unless a publisher has a particular limitation. Avoid frame rate conversion, transrating, telecine, and 3:2 pulldown wherever possible. The source frame rate for progressive content is likely to be one of the following: • 29.970 fps for NTSC countries, commonly referred to as 30 fps • 25 fps for PAL countries • 23.976 fps for film-look content, commonly referred to as 24 fps
Video Color Space	4:2:0 YUV Chroma Subsampling
Video Interlacing	Progressive scanning, (non-interlaced). No intra-field motion (blended frames) or interlacing
Leaders (Slate)	No leaders or slate (blank screen) before or after ad content
Audio Codec	AAC-LC or HE-AACv1
Audio Bitrate	128-192 kbps for AAC-LC 64-128 kbps for HE-AACv1
Audio Channel	2 channel stereo mix In CTV, surround sound channeling may be used but check with publisher on whether it can be handled and consider what to do in environments where not available.
Audio Sample Rate	44.1 kHz or 48 kHz as per source material
Audio Levels	-24 LKFS (+/- 2.0 dB) in the US as per ATSC A/85 -23 LUFS (+/- 1.0) in the EU as per EBU R128 Note: Peak levels should not exceed -6 db true peak

The Mezzanine File

With CTV in the mix for digital video, higher quality video files are necessary for displaying on ultra high definition (UHD) TVs. These large screens come with 4K and 8K resolutions and the streaming services need video ads that match the quality of the content being served.

The mezzanine file is a raw source file of the highest possible quality. The file is too big to serve to most device environments, but contains the quality necessary to encode the appropriate versions for different environments, which may be on desktop, in mobile, or at the highest quality in CTV. For server-side ad insertion (SSAI) platforms commonly used for dynamic ad placement in CTV, the mezzanine file is vital to producing the best quality video codec.

Video and audio specifications for the mezzanine file are defined in the following two tables.

Video Setting	Specification	Notes
Bit Rate	50Mbps VBR or 15-30 CBR	50 Mb for original source (preferred)
Aspect Ratio	16:9 (HD) or 4:3 (SD)	16:9 is preferred "letter-boxing" (black bars) should be avoided
Resolution (1x1 pixels)	For aspect ratio 16:9 • HD = 1920x1080 or 1280x720 For aspect ratio 4:3 • HD = 1440x1080	No burned in pillar boxing or letterboxing Future support for 4k
Color Space	4:2:0 or 4:2:2 YUV	
Frame rate	Depending on region, use one of the following frame rates: • PAL (25 fps) • 24p (23.98 fps) • NTSC Video (29.97 fps)	Native frame rate preferred
Codec	• MPEG2, H.264/AAC • H.264 or Apple ProRes • H.265 /HEVC	Apple ProRes preferred but may exceed file size threshold for some vendors HEVC may not yet be widely accepted
Format	• .mov • .mp4	
Scan type	Progressive	No intra-field motion (blended frames)
Leaders (slate)	Video creative should be submitted without leaders (slate) before ad content.	
Configuration	• Picture to Picture (P2P) • No slate • No countdown leader • No bars • No tone	

Video Setting	Specification	Notes
Audio Format	AAC	PCM is allowed for the mezzanine file but should not be used in any transcoded files used to serve the ad. Check with publisher on tolerance levels.
Audio Bitrate	192 kbps (AAC)	
Audio Channel	2 channel stereo mix L&R	5.1 Dolby audio configuration may be added (see EMA Mezzanine File Creation and Specification pg. 13) http://www.entmerch.org/digitalema/committeescouncils/ema-mezzanine-file-specific.pdf
Audio Sample rate	48kHz	
Audio Levels	DB - 12 (average)	

Linear Ad File Format Recommendations

In the interest of reducing ad development and delivery overhead, recommendations for file formats should help linear ads scale across screens for desktop, mobile, and beyond.

Cross-Screen Portability with MP4

The file submission guidelines in this document recommend using an MPEG-4 (MP4) format with H.264 codec because this file format is more widely supported across devices. Using a Baseline profile for the H.264 codec ensures that the file will play on devices and bandwidths that range from a cellular connection on a mobile screen to connected TVs with high-speed cable connection. AAC audio is recommended because most players support AAC audio encoding.

While the MP4/H.264 file format is recommended, other formats, such as WebM and VP8, may be submitted in addition to the minimum recommendations outlined in the section on ready-to-serve files.

Event Tracking: SIMID

Event tracking can be more successful across platforms where SIMID is leveraged for interactions. SIMID is IAB Tech lab's Safe Interactive Media Interface Definition, an SDK that enables the player and ad to communicate the execution of ad interactions. As a replacement for VPAID, which handled both measurement and interactions, SIMID simplifies interaction management by handing off measurement to IAB Tech Lab's Open Measurement initiatives. As SIMID undergoes updates to support CTV, wider adoption will help streamline and standardize

interaction management and tracking in CTV.

Video Streaming Protocols

Connectivity in today's devices can change during the course of ad playback. Formatting files for adaptive bitrate enables a smoother viewer experience. M3U8 is a file format for a multimedia playlist. Common streaming protocols include HTTP Live Streaming (HLS) in the US and MPEG-DASH in the EU. These protocols work by fragmenting a video into several short segments (2-5 seconds) at different bitrates and indexed in a playlist file. The playlist file most commonly used and increasingly required by many video publishers is M3U8. For the best compatibility across multiple device types and bandwidth, the fragmented files used in an adaptive streaming protocol should follow the guidelines for ready-to-serve files.

Placing the MOOV Atom

Digital media may contain a number of different data objects, called atoms, in their files. The movie atom (MOOV atom) contains data necessary for video execution and should be placed at the front of the media file in order to be executed correctly. In some cases, the video won't even play if the MOOV atom isn't placed at the front of the file. Video encoding software usually places the MOOV atom correctly if you select options that optimize the video for web, but you should check with your encoding software to find out how to manually check for MOOV atom placement.

Nonlinear Ad Format and Submission Guidelines

Nonlinear ads are also known as overlays and are images or rich media that covers a small portion of the content video while the video is playing. In CTV, a non-linear video ad, commonly referred to as picture-in-picture (PIP), uses a video overlay to show a small video ad on half the screen or over content in a designated corner (usually lower right, but this varies). PIP can also shrink the content video to a corner or up to half the screen while an ad or branded skin fills the larger screen.

A key characteristic of the nonlinear ad is that the ad is watched at the same time that the content plays. If a viewer decides to engage, the ad may pause or hide the video content and play an extended portion of the ad in a linear or interactive format. An expanded ad may offer an animated sequence or further engagement opportunities like a mini game, subscription invitation, an interactive map or other application, social sharing, or QR code to engage the viewer on their phone.

The viewer may engage with the expanded portion of a nonlinear ad indefinitely until the user activates a close or collapse control. If the viewer does not engage, the ad may disappear, collapse to a minimized reminder button or a "leave-behind" companion ad, or it may be persistent for entire content play. Some nonlinear ads can be served over linear video ads as well, depending on publisher specifications.

The following nonlinear ad format guidelines outline the minimum considerations for nonlinear ad development. Publishers may offer other formats and specifications that extend these recommendations. Please check with publisher for specific requirements.

Nonlinear Property	Specification
Insertion Point	During video play
Maximum ad display duration	Ad duration may be one of the following: • 5-15 seconds • Persistent
Engagement Event	Interaction with overlay expands to auto-initiated video, interactive ad, or redicts user to advertiser's site.
Controls	Persistent close control in upper right corner of the ad unit should allow viewer to exit at any time. Call to action should be clearly labeled. If the extended portion of the ad includes any expandable media, a collapse control must be provided.
Label	Ad unit should be identified as an "Advertisement" with a label that is inside the ad frame or next to the ad.
Dimensions	Initial ad dimensions may be one of: • 300x50 • 450x50 The overlay ad should not be more than 1/5 of the height of the player. For animated overlay ad units, publishers may allow an extra 20 additional vertical pixels (beyond the 1/5 limit) that can be used sparingly by the advertisers to enhance the ad message, such as for drop shadows, flying sparks, etc. For picture-in-picture, check with publisher for specifications.
Placement	Common placement is anchored to the bottom of the player, but may be anchored to either side or the top of the player at the publisher's discretion.
Maximum file size	100k for initial portion of the ad; viewer-initiated portion may be any size
Opacity	Text and image – 100% opaque; background – 70% maximum
Audio	No audio allowed in overlay invitation unit; audio in viewer-initiated portion of the ad should be host-initiated

Video Companion Ad Guidelines

Both linear and nonlinear ads have the option to be served with a companion ad. Companion ads are display ads in the form of text, static image, rich media, or skins that wrap around the video experience. Companion ads come in a number of sizes and may require some coordination for appropriate placement. The primary purpose for the companion ad is to offer sustained visibility of the sponsor throughout the streaming video experience and to leave behind a reminder after the linear or nonlinear component has been completed.

The following companion ad format guidelines outline the minimum considerations for companion ad development. Publishers may offer other formats and specifications that extend these recommendations. Please check with publisher for specific requirements.

Property	Specification
Content	Since companion ads are displayed with video content and ads, companions should not contain any video or audio.
Dimensions	Companion ad dimensions should fit publisher display placement dimensions, but common sizes offered are: • 300x250 • 468x60 • 300x100 • 728x90 • 300x60
File Size	200 kb for most ads but check IAB Creative Display Guidelines for appropriate file size
Audio	No audio allowed in companion ad unit.

Audio Guidelines

A sudden spike in volume during ad playback can interfere with the user experience and negatively affect users' perception of brands. Broadcast networks are required to adhere to the Commercial Advertisement Loudness Mitigation (CALM) act. While this legislation does not yet apply to digital video online, video publishers are likely to protect their brand by setting practices in place to ensure normalized volume across content and ads. Ad agencies can aid the industry in this effort by normalizing ad volume levels to avoid any spikes within the ad.

Some publishers and their SSAI partners won't allow an ad to play until they've ensured that the ad's volume has been normalized. As a best practice, peak levels should not exceed -6 db true peak.

Ad Delivery Notes

The mechanism for ad delivery is out of scope for this document but should be a consideration in the development process. When the ad will be served using an ad server, the most widely accepted delivery mechanism in digital video is the IAB Video Ad Serving Template (VAST). Not as widely adopted in CTV, VAST implementations for CTV support are expected to increase as programmatic buys and cross-screen campaigns continue to grow.

VAST provides details about the ad to the video player in a way that enables ad portability and consistent tracking from system to system. In version 4.x, a single VAST tag identifies all four file versions outlined in this document necessary for smooth ad playback experience. It also enables the delivery of other ad components such as companion ads, ad pods, back-up images, and any interactive elements, including tracking elements that help measure impressions.

In addition to VAST, the IAB offers Safe Interactive Media Interface Definition (SIMID). Wrapping an interactive ad in SIMID enables safe and transparent interaction between the ad and the player.

For more dynamic ad portability, verify whether the publishers you work with accept VAST and that your ad server can serve your ads using VAST. When using SIMID for interactive ads, verify which publishers can accept SIMID. In addition to verifying VAST and SIMID support, request publisher requirements that are as specific as possible.

Appendix A: Glossary

Ad pod: a group of ads that play in sequence during a commercial break during long-form video content. Specifically, using IAB VAST, an ad pod is a group of sequential ads that can be served in one VAST tag.

Adaptive streaming video: a method of serving a streaming video using a playlist file to contain the video file in several short segments of data encoded at different bitrates for each segment. The video player or other client selects the appropriate segment to play at each interval to match the bandwidth available at each segment.

Bumper Ad: usually refers to a linear video ad with clickable call-to-action; format is usually shorter than full linear ads (i.e. 3-10 seconds) and call-to-action usually can load another video or can bring up a new site while pausing the content.

CALM Act: an acronym for Commercial Advertisement Loudness Mitigation. Congress directed the FCC to develop rules that require commercials to have the same average volume as the programs they accompany in broadcast television and pay TV providers. While not yet applicable to digital online video, publishers and advertisers should comply with these rules as much as possible in order to encourage growth of television programming online. Visit https://www.fcc.gov/encyclopedia/loud-commercials for more information.

Clickthrough: the action of following a hyperlink within an advertisement or editorial content to another Web site or another page or frame within the Web site.

Codec: software that encodes and decodes a digital data stream

Color depth: the number of bits used for each color component of a single pixel.

Color space: a color model that appropriates CMYK colors (used in print) using RGB colors (rendered on a computer monitor). The YIQ color space has been used historically in NTSC analog television and takes human perception into account. It also corresponds closely to the YUV scheme used in PAL. The recommendation put forth in these guidelines for color space is YUV.

Companion Ad: both linear and non-linear video ad products have the option of pairing their core video ad product with what is commonly referred to as companion ads. Commonly text, display ads, rich media, or skins that wrap around the video experience, can run alongside either or both the video or ad content. The primary purpose of the companion ad product is to offer sustained visibility of the sponsor throughout the video content experience. Companion ads may offer clickthrough interactivity and rich media experiences such as expansion of the ad for further engagement opportunities.

CTV: Connected TV. A smart TV that has an internet connection. A TV with an over-the-top (OTT) box that provides an internet connection for the TV also falls under CTV, though the

configuration is different because the TV itself may not be capable of directly connecting to the internet.

Display video: includes in-banner and in-page video ads that fill display ad space and are independent of any video content. Videos that play within a display banner ad or within a display ad placement are considered a property of rich media ads.

Event Trackers: primarily used for clickthrough tracking, but also for companion ad interactions and video session tracking where available.

HLS: an acronym for HTTP Live Streaming is an HTTP-based media streaming communications protocol implemented by Apple Inc. It works by breaking the overall stream into a sequence of small HTTP-based file downloads, each download loading one short chunk of an overall potentially unbounded transport stream. As the stream is played, the client may select from a number of different alternate streams containing the same material encoded at a variety of data rates, allowing the streaming session to adapt to the available data rate. See http://en.wikipedia.org/wiki/HTTP_Live_Streaming for more information.

Incentivized Ads: Ads are opt-in where users are invited to watch a video and earn a reward. The reward is a digital currency or feature that adds value to the user experience.

In-banner video ad: an ad creative in video format that displays as part of or in place of a display (banner) ad.

Incentivized ads: Ads are opt-in where users are invited to watch a video and earn a reward. The reward is a digital currency or feature that adds value to the user experience.

In-feed video ad: a video ad that displays as part of a social feed positioned in place of a post (but clearly labeled as an ad).

In-page video ad: an ad creative in video format that displays within an HTML page just as a display ad (banner) would.

In-Stream Video Ads: played before, during or after the streaming content that the consumer has requested. This format is frequently used to monetize the content that the publisher is delivering. In-Stream ads can accompany short or long form streaming content and are executed in a player environment.

In-Text Video Ads: delivered from highlighted words and phrases within the text of web content. The ads are user activated and delivered only when a user chooses to move their mouse over a relevant word or phrase.

Invitation Unit: a smallish still or animated graphic often overlaid directly onto video content. Typically used as a less-intrusive initial call-to-action. Normally when a viewer clicks or interacts with the invitation graphic, they expand into the ad's full expression, which might be a simple auto-play video or an interactive experience; also commonly referred to as an Overlay Ad.

Key frame: in animation and film production, key frames are used to mark the beginning of a smooth transition. Key frames can be variable, defined by the animation, but placing key frames at regular intervals improves video quality and simplifies transcoding the file to other formats. The recommendation for key frame intervals in this document is one every second.

Linear Video Ads: the ad is experienced in-sequence as part of the linear timeline of the content; the ad can be presented before, in the middle of, or after the video content is viewed. One of the key characteristics of a linear video ad is that the video interrupts the content in full view of the player environment. Users must wait for the ad to play until a skip or close control is made available before they can return to the streaming content.

Long-form video: online video content that is 10 minutes or more in duration.

M3U8: the Unicode version of an M3U file format that contains a multimedia playlist. In adaptive streaming, this file is used to contain the small segments of a video file with each segment encoded at different bitrates. The player or other client selects the appropriate segment to play at each interval depending on the bandwidth available during each segment.

Master ad: in the case where a video ad includes companion banners and/or extended interactive components that initiate upon viewer interaction, the master ad is the initial ad used to get viewer attention.

Metadata: data that is associated with the asset; used to facilitate the understanding, use and management of the asset. Metadata may include standards for business-critical data such as advertiser name, eCPM goal, format, and version information. VAST 4.0 strongly emphasizes the use of unique identifiers encoded in the creative to provide a holistic reporting of that creative distributed across various media and will bring consistency and alignment to TV and Online TV workflows. A common registry for asset IDs in the US is Ad ID.org, but there are several standardized systems globally.

Mid-roll: a linear video ad spot that appears during a break within the duration of the video content.

Movie (MOOV) atom: a video data object in a media file used to execute the video. The movie atom should be placed at the beginning of a video file to ensure proper execution.

MPEG-4 (MP4): a digital multimedia format used to store video and audio, but may also include features such as subtitles, chapter details, and other data related to the video or audio file. The filename extension for MPEG-4 files is .mp4.

Mezzanine: in video production, the mezzanine file is the high quality source file from which other versions at different quality levels can be transcoded.

Nonlinear Video Ad: also known as an overlay, the nonlinear video ad is an image or animation that plays on top of and concurrently with the video content. A nonlinear ad may invite the viewer to further engage the ad. If the viewer engages, the nonlinear ad may pause the content video and provide an interactive experience or play a linear component of the ad.

Nonlinear video ads can be delivered as text, graphical banners or buttons, or as video overlays.

NTSC: named after the National Television System Committee, NTSC is the analog television system used in the Americas (except for parts of South America, which uses PAL).

Overlay Ad: See nonlinear video ad.

PAL: an acronym for Phase Alternating Line, which is a color encoding system used in analog television in much of the world including Europe, Australia, Southern and Eastern Asia, and parts of Africa and South America.

Playlist: a list of discrete videos (sometimes referred to as “segments” or “clips”) presented alongside a video player that affords easy navigation from clip to clip (clicking on a thumbnail in the playlist will start the playback of the respective clip). The playlist can be programmed as a “loop-list” where clips play in sequential order, often with linear ads between the clips.

Post-roll: a linear video ad spot that appears after the video content completes.

Pre-roll: a linear video ad spot that appears before the video content plays.

Quartile Reporting: video ad metrics that identify when a linear video ad has played up to first quartile (25%), midpoint (50%), and (75%).

Rich Media: advertisements with which viewers can interact (as opposed to solely animation) in a web-page format. They may appear in ad formats such as banners and buttons, as well as transitionals (interstitials) and various over-the-page units such as floating ads, page take-overs, and tear-backs. Video that plays as part of a banner or in display ad space is considered rich media. A nonlinear video ad may also include interactive rich media components upon user interaction.

Syndicated Video: content sourced from a professional third party. Examples may include syndicated television shows, news footage, etc., and distributed through a multitude of outlets observing strict ownership rights.

User-Generated Content (Video): video content created by the public at large, generally not professionally edited, and directly uploaded to a site.

VAST: the IAB’s Video Ad Serving Template, an XML schema for providing ad file and metadata to a video player.

Video bits per pixel (VBPP): the average number of bits of information stored in a video for each pixel. The amount of bits of information per pixel in a video calculated as (bits per second)/(framerate x resolution)

Video interstitial: a display video ad that displays in between the transition from one HTML or

app view to another.

VOD: "Video on Demand" allows users to select and watch video content over a network; usually refers to services offered by cable companies through set-top boxes.

VP8: a video file format that Google acquired with the acquisition of On2 Technologies.

VPAID: the IAB's Video Player-Ad Interface Definition, a protocol that enables an ad creative overlay to interact with a VPAID-compliant player.

WebM: a royalty-free file format that can be used in the HTML5 video tag, as an alternative to MP4.