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Passing the Baton - Programmatic TV Advertising as a Relay Race:

A Diagnostic Review of Data, Measurement and Operations in the Programmatic TV Supply Chain

April 2025

About CIMM

The Coalition for Innovative Media Measurement (CIMM) is a nonpartisan, pan-industry coalition of companies focused on cultivating and supporting improvements, best practices, and innovations in measurement and currency; data collaboration and enablement; and the use of new metrics and approaches to understanding the value of media. CIMM embraces the entire media and advertising ecosystem and prioritizes effective collaboration to deliver meaningful change.

As part of our program, CIMM commissions papers, think pieces, and perspectives from industry analysts, experts, and thought leaders to provide insights—and occasionally, provocative perspectives—on issues of critical interest to our members. CIMM is delighted to present this paper, a diagnostic overview of the programmatic TV ecosystem, written by industry expert Emily Palmer. It is CIMM's first formal foray into programmatic, and therefore aims to take stock of the broad landscape, exploring key players, trends and challenges. The report leans heavily on the views of scores of industry experts, including those who participate in the CIMM Programmatic TV Working Group, a volunteer assemblage of experts who meet monthly to discuss industry issues. We deeply thank all of these industry practitioners who have been kind to share their time and insights.
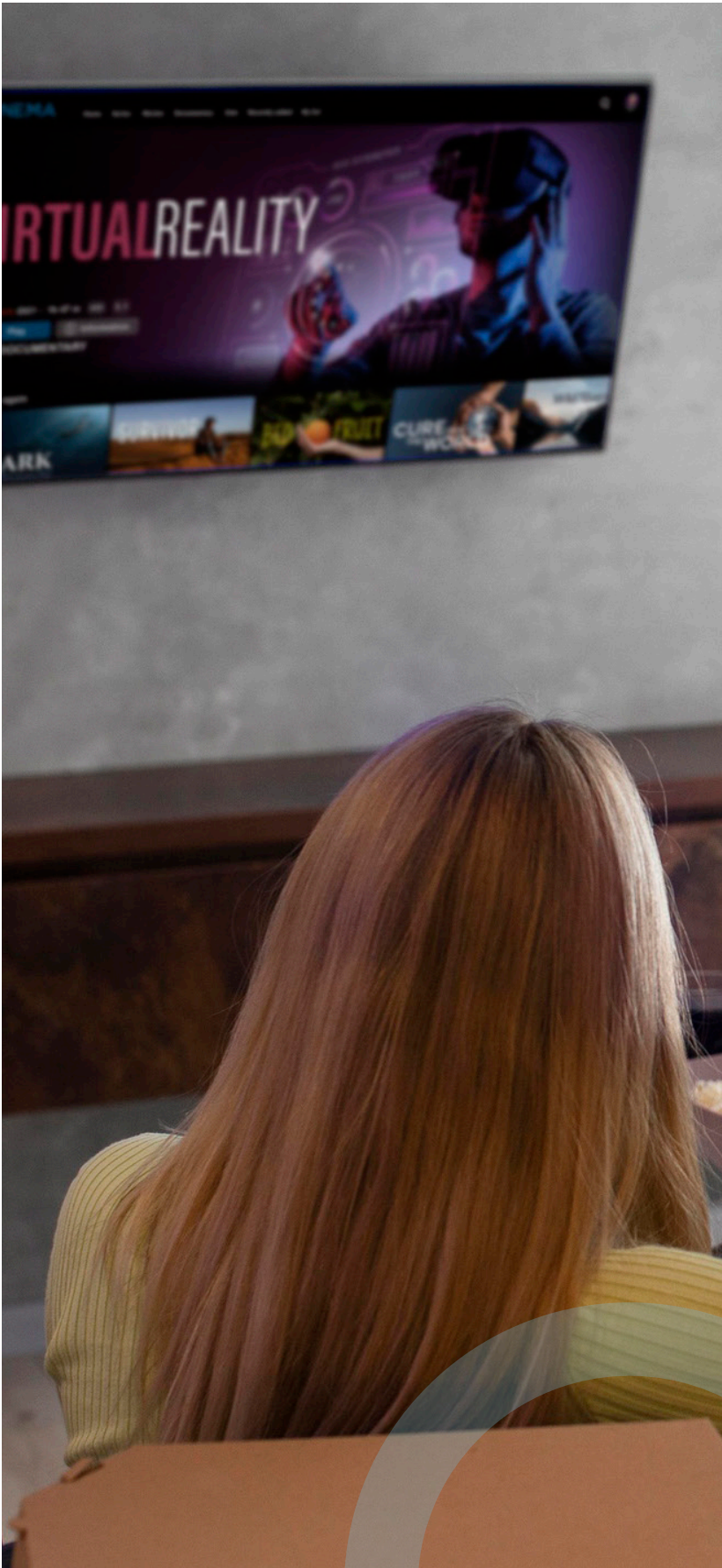
This diagnostic report explores industry perspectives on the state of the market. It examines what is currently in place and what is still a work in progress, with a focus on measurement, metadata and transparency. It also highlights various opportunities for improvement, and we hope to use this study as a catalyst for industry collaborations to support the growth and development of the programmatic TV ecosystem.

About the Author

Emily Palmer has run an independent consultancy, Emily Ad Woman, since 2018, originally in London and now in Portland, Oregon. Before consulting, she worked at adtech companies such as OpenX and publishers including Reuters. With this background, she thrives on helping publishers and adtech companies in the US and Europe, as well as conducting research and thought leadership projects on subjects including addressability and measurement. Emily is Chairwoman of The Women in Programmatic Network, which has a worldwide member base of more than 2,500 women. She also serves as an Advisor in Residence for The Project X Initiative, a thought leadership and advisory collective, and as the Programmatic Working Group chair for CIMM.
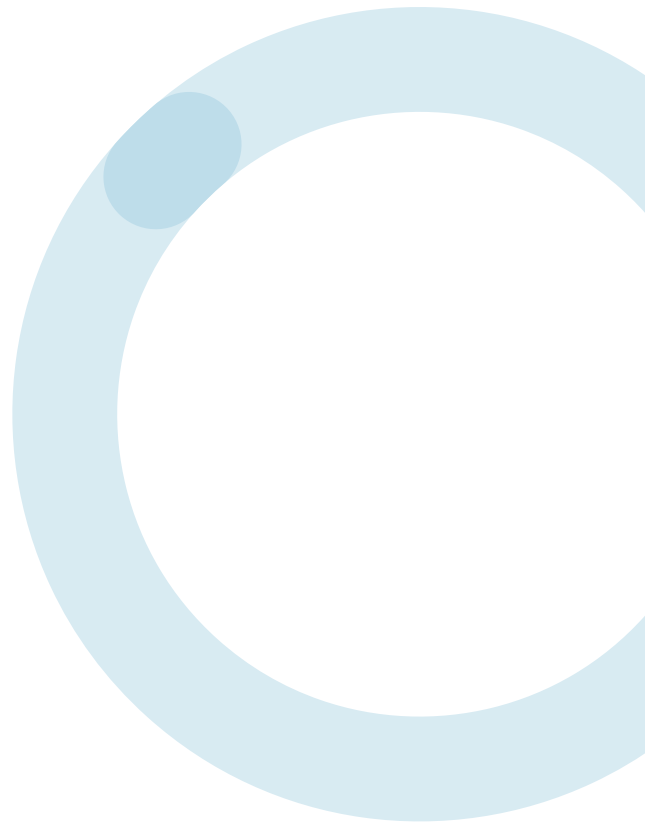
Research Objectives and Approach

This diagnostic study explores industry perspectives on the current state of measurement, metrics, and data across the programmatic TV ecosystem. It is based on an extensive program of in-depth research interviews with a wide-ranging cross-section of industry participants, including two executive roundtable discussions. Research and interviews took place throughout 2024, promising attribution only with explicit permission. Quotations used in this report have been lightly edited for style and brevity.

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1. Executive Summary

Dramatic change to the world of television advertising has been inevitable for some time given the scale and pace of growth of digital advertising, which has been enabled by the development of cross-publisher, automated, data-driven, and efficient programmatic ad buying platforms. Indeed, programmatic ad buying platforms for TV have existed for about a decade, but advertiser investment has accelerated in recent years as connected television (CTV) and streaming viewing have grown. Now, about 75% of connected TV transactions are programmatic.[1] For many TV ad buyers, programmatic has become the preferred channel for sales and execution.

However, many industry participants believe that the programmatic TV ecosystem is facing significant growing pains, as core stakeholders—advertisers, agencies, publishers, TV platforms, programmatic intermediaries—confront a range of commercial, technical, and legal challenges. Fragmentation makes it difficult for ad buyers to assess media value, manage frequency capping, and measure activity holistically across a wide variety of platforms, channels, services, and devices. Meanwhile, media owners must increasingly manage multiple sales channels, balancing carriage agreements, buyer demands and their own commercial interests. Intermediaries, such as adtech platforms, struggle to effectively pass data across multiple parties and synchronize metadata classifications.

Amidst the complexity, at its broadest level, the programmatic TV advertising system resembles a relay race, with winning dependent on numerous runners flawlessly passing the baton while moving at top speed—a contest that can be fraught with risk, stumbles and mistakes.

We have identified the five most pressing challenges currently facing the industry:

1. **Transparency**—Buyers, sellers, and vendors all crave transparency in various areas ranging from metadata to fees.

1   Interactive Advertising Bureau, 2024 Digital Video Ad Spend & Strategy Report (July 16, 2024)

1. Executive Summary

2. **Standardization**—Inconsistent prevalence, formatting, and usefulness of content metadata is a major obstacle for anyone trying to leverage metadata for targeting and measurement.

3. **Interoperability**—Having various platforms interface with each other and seamlessly pass data between them remains an elusive goal.

4. **Operational processes**—Too much manual work is required to troubleshoot the passing of data, reconcile datasets, and understand what the inventory is or how it is being purchased.

5. **Education**—Widespread misunderstandings and poor communication create significant friction across the ecosystem.

Transparency

Opinions vary on how much transparency should be expected between buyers and sellers, for both commercial and legal reasons.

Sellers accustomed to upfronts and having complete control over targeting their inventory are grappling with how much optionality to offer buyers. There are concerns over "cherry-picking" of valuable inventory and how to manage increasingly complex sales channels. Legally, sellers must uphold carriage agreements and comply with evolving data protection laws.

In addition, sellers want to know how their inventory is being assessed in terms of brand safety, buying decisions, and pricing. Some want more data—especially advertiser URLs and creative ad IDs—to be included in bid responses, for clarity on which advertiser and creative is running. This can be helpful in managing brand suitability, competitive separation, frequency capping, and viewer experience.

Buyers, meanwhile, want maximum transparency on the inventory they are buying. In a biddable environment, this depends on the metadata being passed from the seller through the programmatic pipes, which can provide clarity for valuation, brand suitability, and campaign operations, especially around frequency capping and measurement.

Standardization

Lack of standardization is impeding the further development of programmatic TV advertising. Content metadata is especially disjointed in terms of prevalence and standardization. Genre, the most popular content attribute, is underused or misused and doesn't pass through the chain in a standardized fashion. Buyers want consistency in targeting and reporting—but with disparate classifications, naming conventions and prevalence of the optional data field in the bidstream, they cannot holistically manage media buying and optimization, let alone receive a normalized post-campaign reporting view.

Although everyone we interviewed was aware of the IAB Tech Lab Content Taxonomy, other taxonomies and content IDs are also in play. Many metadata signals flow through the latest IAB Tech Lab standards for real-time bidding, OpenRTB 2.x. However, availability of the full array of OpenRTB 2.x fields varies by adtech platform, as does the taxonomy. Many platforms do not support the latest standards, to the detriment of customers and the industry at large.

Interoperability

Interoperability between adtech platforms and measurement vendors has been a significant gap in the programmatic ecosystem, but we are seeing a growing number of integrations between measurement companies, demand side platforms, supply side platforms, original equipment manufacturers, and more.

An important aspect of interoperability is ID resolution, whereby different stakeholders resolve datasets through ID graphs using linkages. In programmatic TV, IP address is the most common linkage; however, due to increased data regulation and tech platform decisions trending toward protection of user privacy, it is at risk of broad deprecation as an advertising signal. Moreover, it is innately unstable and can be misrepresentative. Alternative linkages such as email address are problematic as well.

Operational Processes

Even with the best-laid plans, integrations and standards can fail in the face of inconsistent application. Currently, humans are still inputting data and making decisions, so inconsistent use of frameworks means data isn't getting through the entire chain and thus isn't useful in measurement. Platform support (e.g., automation and guardrails in platform UIs), education, and improved operational processes will help the industry utilize the standards available.

Education

Despite commercial, legal, technical, and operational hurdles, our wide-ranging interviews reveal that the general sentiment in the industry is a desire for greater collaboration. Given the multiple protocols, guidelines, and updates to master, this points to a need for better communication between supply chain participants, joint commitment to minimum metadata standards, and for tech partners to make it easier for parties to pass in and get out what they need. The existing IAB Tech Lab standards are designed to bring harmony to the programmatic TV ecosystem by addressing industry needs from a technical perspective—but just because it's built doesn't guarantee adoption.

2. Operational Hurdles & Supply Paths

Processes and measurement standards in traditional television were built over the course of decades. The digital camp, however, has seen their shiny new programmatic TV ecosystem morph over the last decade into a bloated supply chain with an abundance of opacity. This unfortunate situation gave rise to a running joke that "programmatic" should be called "problematic" (or even "programanual"!) because its complexities cause an excessive amount of manual work.

Relay Race Barriers

We will begin with two illustrative examples of how measurement missteps and metadata misalignment in programmatic operations create fragility. The metaphor of a relay race is useful in that everyone is moving very fast, and success (or failure) depends on multiple successful hand-offs of the baton.

2. Operational Hurdles & Supply Paths

Figure 1: Measurement Relay, Example #1

Relay Race Runners	Actions of Each Stakeholder (eg 'Runners')
Buyers	• Negotiated Private Marketplace Programmatic (PMP) deals with multiple TV sellers. • Communicated and deployed their third-party measurement pixel for reach, frequency and cross-channel conversion. • Communicated and deployed their preferred universal user ID. • However, agency didn't include a creative AD-ID code because it is not an embedded part of their process, which can lead to undercounting exposures, ad collision and frequency capping issues across the media plan.
Measurement Providers	• Works with the advertiser across all advertising activity, appropriately placing their pixels in the creative assets. • Integrations completed with the selected adtech platforms. • Reliant on receiving adequate and consistent signals from the buyers and sellers, in order to measure the campaign.
AdTech Platforms	• For third-party measurement: the ad server, SSP and DSP pipes are ready to enable the third-party measurement pixels on the programmatic deals. • For universal user IDs - SSPs have already tested the buyer's preferred universal ID vendor with each publisher on the media plan. • For universal user IDs - DSPs have already tested universal ID integrations with each SSP. • For creative IDs: they support facilitation, but don't require input of these IDs in their platforms.
Sellers	• Each seller activates the deals with the agreed targeting in place, within the selected platforms. • For third-party measurement: to help facilitate the advertiser's measurement activity, publishers need to make it easy and simple to tag or pass campaign exposure data that includes demographic signals as well as content signals like Genre when possible. • For universal user IDs: some of the sellers experience a lack of bid responses, and after much troubleshooting with the platforms, it is determined that the agreed upon universal ID wasn't passed or received as expected; the buyer didn't see the users they were watching for in the bid requests. This could be avoided if the SSP had tested every combination of SSP x DSP x publisher. • For creative IDs: the sellers aren't able to determine who the advertiser is or exactly which creative(s) are coming through, because the buyer didn't pass through a creative AD-ID code. The seller feels in the dark and they are unable to help to frequency cap or make optimization suggestions.

2. Operational Hurdles & Supply Paths

Here, the oversight by buyers of not including one simple piece of information, Advertising Digital Identification (AD-ID) code, corrupts the downstream operational steps, reducing the ability to frequency cap and optimize. And without thorough testing of universal user IDs, the buyer's desired inventory can appear scarce—although it isn't—and the sellers will consequently lose revenue.

Figure 2: Content Metadata Relay, Example #2

Relay Race Runners	Actions of Each Stakeholder (eg 'Runners')
Sellers	• Multiple programmatic TV sellers agreed PMP deals with the buyer. • All agreed to pass Genre in the bid request, as the buyer said they wanted to target cooking content. • Publisher A passed a Gracenote ID to represent their cooking content. • Publisher B passed a Genre from the IAB Tech Lab Content Taxonomy labelled "Cooking". • Publisher C also used the IAB Tech Lab Content Taxonomy, however choosing to pass the "Food" label instead of "Cooking". • Genre can be input freeform or passed from a CMS, meaning it may not line up with what the buyer is seeing across the media plan.
Measurement Providers	• A single content taxonomy adopted across buyers, sellers and adtech platforms and passed to each and every partner would greatly improve measurement, because the measurement vendors experience the same challenges as buyers and sellers when ingesting different genres across platforms and partners.
AdTech Platforms	• Ad server sent the Genre exactly as received from the publisher/publisher's CMS. • The SSP can either pass it exactly as-is, or their team may try to normalize the data to make it more standardized within their platform. • The DSP might not recognize this data as standardized, but offers it to the agency if they want to try to clean it up.
Buyers	• Agency looks at data and thinks 'data dump' and is then tasked with trying to marry up the genre across dozens or hundreds of media partners.

2. Operational Hurdles & Supply Paths

Here, content classification differences between publishers create significant downstream misalignment, further exacerbated by adtech platforms' ability to crosswalk the data. This leads to operational burden as well as lost targeting and measurement opportunities.

Multiple taxonomies and naming conventions, along with data not being passed through the chain as expected, cause a lot of hidden work and cost behind the scenes. Stakeholders are compelled to clean up and normalize the data—a burden at every step, impacting publishers, supply side platforms (SSPs), demand side platforms (DSPs), measurement partners, and agencies.

These two examples have set the scene of an evolving programmatic TV industry hampered by various embedded operational hurdles. A deeper look into the supply path that a programmatic ad travels to match with publisher inventory will further illustrate the operational complexity in this ecosystem.

Supply Paths

A supply path is the route an advertiser takes to buy inventory programmatically from a publisher. There are many possible paths, and a buyer often does not have complete visibility on what they are buying or how they can value, target, and measure it.

Programmatic TV's fragmented supply paths pose challenges in fully leveraging and maintaining data signals throughout the chain. The complexity adds substantial risk and manual labor to ensure data is received and campaigns are delivered. This is especially an issue with biddable buys, in which data signals and content transparency vary wildly and buyers might accidentally bid against themselves. It is also one of the reasons why supply path optimization (SPO) is getting so much attention.

Meanwhile, inventory curation is growing, adding still more paths, resellers, and arbiters of quality. According to Jounce Media, 30 SSPs (on average) are authorized to sell any given CTV platform's inventory as of 2024, double the number from the previous year.[2] MiQ found up to 114 different supply paths to a TV app, with a price variation up to 250% due to factors including distribution rights, app bundling, resellers, and third-party-deal libraries.[3]

Previously in programmatic TV advertising, the typical purchase flow required that the buyer use their ad server and DSP, the seller use their ad server and SSP, and both make the exchange in the middle (shown in green in the diagram below). But now, even disregarding the potential for multiple resellers and curators, the supply path is variable.

In one scenario, the publisher makes inventory available in a DSP (purple below; e.g., Yahoo Backstage), disintermediating the SSP. In another, the advertiser buys directly from an SSP (blue; e.g., Magnite Clearline), disintermediating the DSP. Or, in a newer scenario, the buyer and seller conduct a programmatic guaranteed (PG) deal by having their ad servers communicate directly (orange; e.g., Innovid Harmony).

2   AdExchanger.com, SSPs Are Taking Over The CTV Market, and Buyers Are Paying The Price (June 20, 2024)

3   MiQ, State of the Programmatic CTV Landscape (Spring 2024)

2. Operational Hurdles & Supply Paths

Figure 3: The Programmatic TV Ecosystem
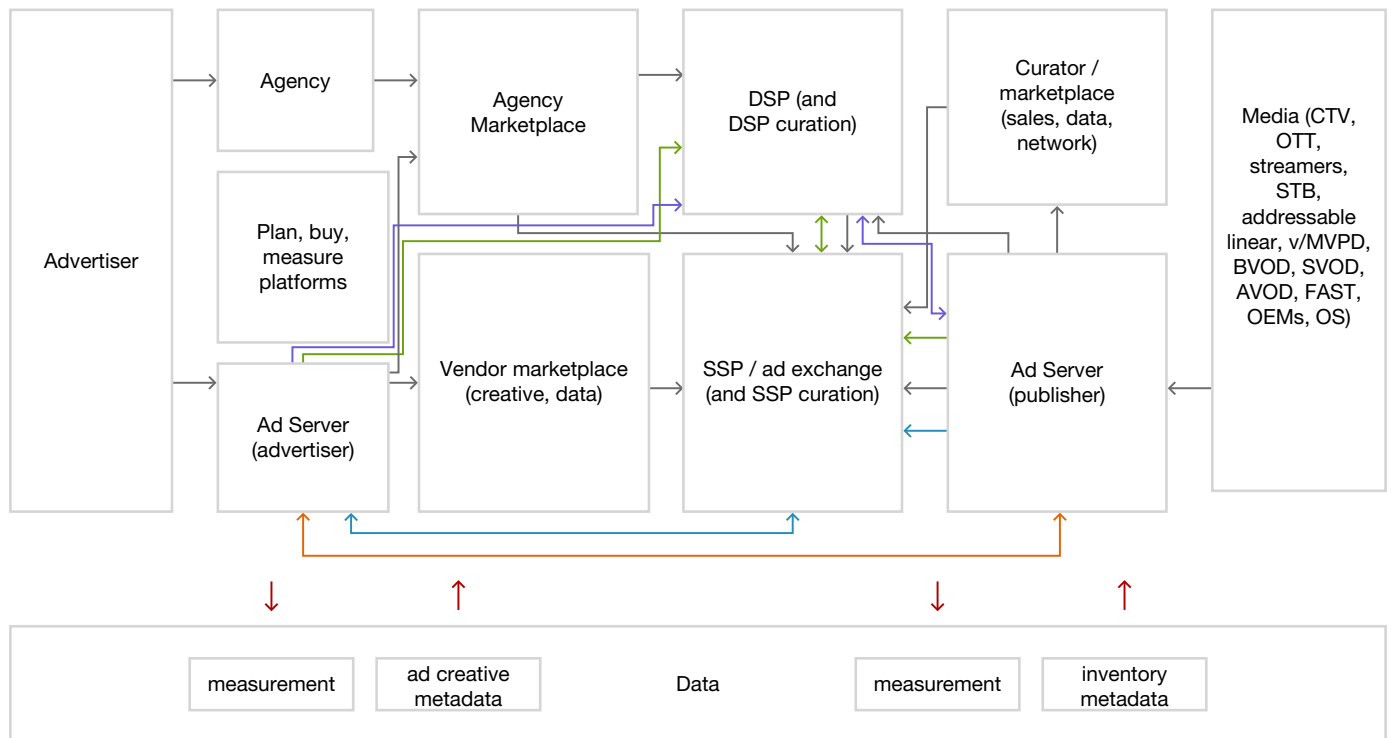
KEY

Buyer –> creative ad server –> DSP <–> Ad Exchange / SSP <– inventory ad server **<– Publisher**

Buyer –> creative ad server –> DSP <–> inventory ad server **<– Publisher**

Buyer –> creative ad server <–> SSP <– inventory ad server **<– Publisher**

Buyer –> creative ad server <–> inventory ad server **<– Publisher**

Dark gray arrows represent various directions of travel of ads and ad requests.

Red arrows represent the general direction of travel of data

2. Operational Hurdles & Supply Paths

The above paths depict scenarios in which buyers and sellers can negotiate directly, from targeting to pricing. That is the much-touted solution to ensure getting what you pay for—i.e., buy directly from trusted publishers, or as close to the source as makes sense for your situation.

Figure 4. Types of Programmatic Trading

Fixed Price	Variable Price (Biddable)
Programmatic guaranteed (PG) is similar to an insertion order, with fixed pricing and guaranteed inventory.	Private marketplace (PMP) buys are **deal-based**, with a floor price and agreed targeting set on the publisher side. Buyers set bid ceilings and can employ additional targeting at their end.
Preferred deals are non-reserved, but with negotiated terms including a fixed CPM and priority access.	Open marketplace (OMP) buys are **non-deal based**, with buyers and sellers setting various rules for automation.
Fixed price buys are **deal-based**.	

Deal-based buying underlies the majority of programmatic TV advertising. Innovid shared that 50% of CTV impressions activated through its buy-side ad server were bought programmatically, of which 80% were deal-based vs 20% open marketplace (OMP), and 40% of the programmatic impressions were guaranteed deals vs 60% biddable.[4]

Currently in programmatic linear advertising (e.g., cable and satellite TV providers' programmatic capabilities), supply paths are generally direct and deals are predominantly PG, though private marketplace (PMP) deals do exist. It is unlikely that many intermediaries will resell this inventory in the near term, due to the heavy transcoding and creative workflow process required.

With so many supply paths, deal types, price variations, disparate data, and other tangles, it's no wonder buyers are seeking more simplicity and transparency. In a nutshell, the more complexity in the chain, the more opportunity for opacity and issues with metadata and measurement, resulting in harder-to-value inventory.

Supply Path Optimization

SPO is intended to help advertisers take the most efficient and transparent route to the desired publisher inventory by eliminating intermediaries that don't add value and transacting directly with inventory owners whenever possible. SPO delivers various benefits:

- More control, transparency and ability to value the quality of the inventory

- Reduced fraud, removing unknown parties and obfuscation

- Lower and more transparent fees, with fewer mouths to feed in the supply chain

- Better data management and measurement, with fewer intermediaries so data can be passed efficiently and safely

- Reduced emissions, with fewer server calls, reducing the carbon footprint of each transaction

Buyers and sellers are now scrutinizing the value that intermediaries bring to their business. Ramsey McGrory, CDO at Mediaocean, noted, *"I try to not use the term 'adtech tax' because it's obviously pejorative. The reality is that the digital supply chain is far more complex and requires more capabilities. This complexity is an opportunity for companies helping advertisers execute … That's the role of agencies and often other tech-enabled providers."*

Esra Bacher, CTV Lead in Agency Exchange Partnerships at Google, pointed to another reason to reconsider jumping to conclusions about programmatic fees, saying of traditional linear TV buys: *"Typically any additional targeting like geo, day part, [or] device would come at a premium price when bought directly via an insertion order, whereas most of these identifiers are passed in the bidstream when bought programmatically at no cost. The true value of buying CTV programmatically shouldn't be measured by CPM comparisons like direct versus programmatic, but rather [by] focusing on KPIs such as cost per incremental household, reach and interaction with the ad, especially as more interactive ad units are being introduced."*

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4   Innovid, Video Recap: Connected Vision 2024 (May 3, 2024)

2. Operational Hurdles & Supply Paths

Curation

Although SPO is driving disintermediation, inventory curation continues to grow in popularity, in some cases putting a layer between buyer and seller. There are many flavors of curation that package quality, scale, and ease of buying inventory in a valuable way. Agencies, DSPs, SSPs, data vendors, and other third parties are curating with either PMPs or open-market rules.

TV by OpenX, for example, cuts out resellers and focuses exclusively on what it classifies as premium CTV inventory for biddable programmatic. It strips out non-TV content such as fireplace apps, gaming, user-generated content (UGC), over-the-top (OTT), and mobile to ensure a premium ad experience for buyers.[5]

Agencies are self-curating and typically manage the entire supply chain. For example, Havas Media Network's Meaningful Marketplace (MMP) applies its own standards and vetting. Greg Langer, VP of Programmatic Supply at Havas Media Network, explains: *"We want more control over the inventory. It's proven to have less fraud [and] more efficient CPMs without sacrificing scale or performance."* To be more clear with clients about inventory quality and price, MMP requires transparency from SSPs on take rate.

The various forms of curation include auction packages, which focus on making the open marketplace more performant and saving time for media buyers while still being transparent for full reporting; for example, PubMatic's High-Attention Auction Packages in collaboration with Adelaide.[6] One route is for buyers to perform their own OMP curation; for example, using Magnite's Custom Auction Packages[7] to overlay an advertiser's first-party data. Another type of curation is deal libraries, which are collections of deal IDs intended to do the legwork of quality, targeting, scale, and so forth to make buyers' jobs easier. Two examples announced in 2024 are IRIS TV's contextual CTV deal library[8,9] and OpenX's Cookieless Deal Library.[10]

Not all curation and SPO is free. DSPs, SSPs and other intermediaries expect to be compensated, whether by increased market share, additional revenue share, or membership fees. Some SSPs impose fees higher than open-market rates for auction packages, curated deals, and SPO programs. Publishers may pay a monthly fee for special access to agencies and advertisers, opportunities to co-sell campaigns with the buy side and influence product roadmaps, and early access to products.[11]

Valuing Inventory

How can inventory be valued, when so much of it can be purchased through dozens of supply paths, bundled in black boxes, or categorized in such a way that buyers are comparing apples to hedgehogs? The complexity of the programmatic TV ecosystem makes valuing inventory challenging, to say the least, especially in regard to these six factors:

1. Third-party arbiters
2. Bundle IDs
3. Format Differentiation
4. Frequency
5. Supply and demand
6. Content quality

Third-party Arbiters

These days, it seems everyone is making proclamations of inventory value, or lack thereof. With so much SPO and curation geared toward managing the quality of the environment, controversy has arisen around who can reliably label inventory as "premium" at one end of the spectrum and "made for advertising/arbitrage" (MFA) at the other. A few leading arbiters of inventory quality are discussed below.

5 OpenX, OpenX Announces TV by OpenX, the Programmatic Industry's First Initiative to Unlock the Full Potential of Biddable CTV (November 16, 2023)

6 PubMatic, Connect with PubMatic's Auction Packages (accessed February 2025)

7 Magnite website (accessed February 2025)

8 TVREV, Streamlining Contextual Targeting: Richie Hyden Explains How IRIS TV's CTV Deal Library Is Changing the Game (March 12, 2024)

9 Team IRIS TV, Introducing the IRIS-Enabled Contextual CTV Deal Library (February 27, 2024)

10 OpenX, OpenX Announces Programmatic's First Supply-Side Cookieless Deal Library to Simplify Buyers' Transition to Cookieless Targeting (February 1, 2024)

11 AdWeek, SSPs Shake Up Fee Structures for Publishers, Offering Differentiated Access (July 26, 2024)

2. Operational Hurdles & Supply Paths

Solutions from The Trade Desk (TTD) have received mixed reviews. Its *TV Quality Index* (TVQI), released June 2023, is a metric based on addressable signals for audience control and content quality, for buyers focused on quality at scale in CTV.[12] Publishers that receive low TVQI scores are not fans, for obvious reasons, but even those deemed high-quality can have complaints, such as ad load not being factored in because some sellers intentionally keep ad load low for a better user experience.

TTD's *Sellers and Publishers 500+*, released June 2024, is a list of premium publishers and placements across the "open internet" (i.e., non-walled gardens), including CTV.[13] To make the cut, publishers are evaluated on attributes like viewability, supply paths, decisioning control, scale, and ad load.

Adalytics, an independent tech firm, helps buyers understand inventory's quality and legitimacy, mainly through log-level reporting analysis, and has made headlines with exposés about brand advertiser campaigns placed in unsavory environments.

Jounce Media offers services and data that help buyers with SPO and avoiding inventory it has labeled as MFA. The company provides independent evaluation of authorization, directness, and quality for all supply chains throughout the web, mobile apps, and CTV. Buy-side partners such as GroupM's Responsible Investment Framework have used Jounce ratings in their efforts to combat MFA inventory.[14]

Pixalate puts out a *Publisher Trust Index* for CTV apps[15] and a *Made for Advertising (MFA) Benchmark Report for Connected TV (CTV) Apps.*[16] It estimates that annual programmatic ad spend for CTV MFA apps is almost $150MM.

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12 The Trade Desk, The power of quality reach: maximizing the impact of your Connected TV advertising with the TV Quality Index (June 6, 2023)

13 The Trade Desk, The next level of inventory targeting: Sellers and Publishers 500+ (June 5, 2024)

14 GroupM, GroupM Introduces New Protections Against Made for Advertising Domains (August 21, 2023)

15 Pixalate, Publisher Trust Index: Quality Publisher Rankings for the Programmatic Supply Chain (last updated January 2025)

16 Pixalate, Pixalate Publishes October 2023 Global Benchmark Report for Made-For-Advertising (MFA) Connected TV Apps (December 27, 2023)

2. Operational Hurdles & Supply Paths

Bundle IDs

The packaging of bundle IDs (a term from the mobile app world) is contentious in terms of transparency and pricing in premium trading environments. A bundle ID is traditionally meant to represent a single app, but sellers can package multiple CTV apps into one bundle ID via a PMP deal.

This can bring a level of opacity that frustrates buyers and even some publishers. Because buyers can't see the mix of inventory they're getting, some may be top quality and some may be "junk bond" quality. One seller said, *"I think there's an opportunity for the industry to move to a more transparent realm—to remove the junk, make sure everything's AAA rated. But buyers have to understand that that also comes with a little bit of pricing. They can't want $8, $10, $12 CTV inventory and all this transparency; it's got to be one or the other."*

Bundle IDs pose an additional problem: Pixalate's mapping report highlighted that ad fraudsters can exploit the lack of syntax standardization in bundle IDs.[17]

Format Differentiation

With instream ad inventory that surrounds professional content attracting more demand than there is supply, outstream and in-banner video ad formats proliferated over the years; however, these were often mislabeled or commingled with higher-value instream inventory. In 2023, IAB Tech Lab provided an updated field in OpenRTB 2.x, video.plcmt, which redefines classifications to better differentiate between instream and non-instream inventory—and enable buyers to more accurately value different inventory pools.[18]

Most large SSPs have now rolled out video.plcmt, with publishers required to use the new designations in their bid requests. According to one interviewee, some DSPs strictly enforce proper use of this field, but a notable number of others do not.

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17 Pixalate, Pixalate's Q1 2024 Global CTV Bundle ID Mapping Reports for Roku, Amazon Fire TV, Apple TV, Samsung TV: 4 Sling TV App Store IDs Map to 1869 Bundle IDs Across the Open Programmatic Ad Supply Chain (June 7, 2024)

18 IAB Tech Lab, March 2023 Update To OpenRTB Is Now Ready For Implementation! (March 2023)

2. Operational Hurdles & Supply Paths

Buyers should confirm with their partners and verification vendors, and do their own spot checking as well, to ensure they aren't paying instream premium rates for non-instream inventory.

YouTube video inventory falls under the latest definition of instream. But in the case of Google's Performance Max (PMax), that inventory is blended through automatic optimizations with other Google channels and formats (search, display, video) on and off Google properties via YouTube's Search Partner Network. PMax's recent makeovers provide more transparency and control: as of March 2024, PMax buyers can get impression-level reporting and apply their account-level brand safety preferences to Search Partner Network inventory; as of July 2024, they can control and report on which YouTube videos their ads run.

Frequency

Frequency matters more in TV than in display advertising because there are fewer sources of supply. Ad overload can backfire through consumer annoyance. Larry Allen, VP Global Strategy at FreeWheel, explained, *"In television, if you have a frequency of 50 with a single household in a short duration of time, that's a really bad negative effect … for the advertiser, but also for whoever's delivering those ads."*

Although publishers can control how they package their inventory and negotiate pricing, frequency capping is elusive. Ramsey McGrory, CDO at Mediaocean, said: *"Buyers have a POV on inventory quality, which is informed by frequency. Sellers often have more insight on users (e.g., because of registration data), but they don't have the same view on frequency and can't control global frequency for a buyer. Controlling global frequency becomes more challenging in light of cookie deprecation. A key benefit of third-party ad serving or a DSP is to measure and manage frequency."*

Supply and Demand

The realities of supply and demand will always influence the valuation of inventory. Ad spend increased in 2024, with one winner being subscription OTT video—47.3% growth projected by eMarketer[19]—but a glut of new streaming inventory also hit the market in the form of free ad-supported streaming TV (FAST) services and Amazon Prime's ad-supported tier. This impacted pricing, as seen in Netflix downgrading its costs per mille (CPMs) to better compete with Amazon.[20]

And if an individual streamer or other supplier can't provide the level of scale a buyer seeks, that will also impact how the inventory is valued and prioritized. This is one of several reasons some sellers avoid sharing granular data in a biddable environment, which runs the risk of refining targeting to the point of diminishing scalability.

Content Quality

Another area to which buyers assign value is content quality. Although quality can be subjective, various objective attributes can be sought and used to suit this purpose. Benjamin Vandegrift, VP of Measurement Solutions and Innovation at the Video Advertising Bureau (VAB), pointed out, *"If somebody is interested in something that's professionally produced, a metric or a piece of metadata such as 'SAG-AFTRA Talent' [could be an indicator that content is] premium or professionally produced."* Other objective attributes that can help in assigning value include media rating, screen size, and duration.

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19 eMarketer, US digital advertising spend forecast (Nov 2024)

20 Wall Street Journal, Amazon Has Upended the Streaming Ad Market, and Netflix Is Paying the Price (June 14, 2024)

3. Addressability

Convoluted operational hurdles and supply paths make programmatic TV advertising more opaque than necessary, in turn making it difficult for buyers to target media spend effectively. We will explore the role of addressability by looking at ambiguity in today's identity landscape and then reviewing current interoperability approaches, spanning identity resolution (particularly via leveraging IP address), data integrations, data onboarding, and clean rooms.

Identity Ambiguity

Industry metrics sometimes conflate users, subscribers, and households, especially when it comes to TV and streaming subscriptions. The negative consequences are significant, given how crucial identity resolution is in programmatic TV and how much it depends on accurately mapping users to device and app ownership.

First, it's vital to point out that household-level identity is important in TV advertising wherever shared devices, whether CTV or set-top box (STB), are involved. Many identity graphs resolve households to users, enabling personalized targeting and messaging as well as advertising related to shared decisions at the household level—facilitating measurement across both. The wide range of ID types in a typical household is illustrated below.

Figure 5. IDs in the Household

Household ID
Ties users together via signals including IP address, home address, and subscription

User IDs
Incl HEMs, universal IDs, cookies (where available in browser)

Device IDs
Shared devices in blue

App IDs

User 1
Subscriber ID 1

User 2
Subscriber ID 2

Mobile 1 → Mobile 1 App IDs
Tablet / Mobile 2 → Mobile 2 App IDs
CTV → CTV App IDs
STB → Console App IDs
Gaming Console → Desktop App IDs
Laptop → Mobile 3 App IDs
Mobile 3

3. Addressability

Identity cuts across the following types of identifiers (IDs):

- **Household**—one or more people with shared and individual devices (the big screen in the living room is the main shared device), most often identified through physical home address and Internet Protocol (IP) address.

- **Subscriber**—an account holder for any given service, from multichannel video programming distributor (MVPD) to pureplay streaming service. There is typically only one subscriber per household per service, with the subscriptions shared by multiple users across multiple devices.

- **User**—an individual person, who tends to have individual devices and email addresses alongside the big screen and shared subscriptions. User ID subtypes include universal IDs and app user IDs; see below. Most user IDs attempt to deduplicate identity to map a user as closely as possible to a single person across devices.

- **Device**—a view screen, including those traditionally shared in a household, such as TVs in shared spaces, and those typically used individually, such as smartphones or laptops.

- **App**—a CTV, console, mobile, or even desktop app ID associated with a specific app from an app store. Along with other identifiers, app IDs help paint a picture of the consumer environment and identity.

All of these components play a role in identity, but if targeting is done at the DSP level and the DSP doesn't receive or use these signals, it cannot differentiate between subscriber, user, and household. For example, a buyer may end up conflating or reducing a subscriber's value by focusing on other signals, such as identifier for advertising (IFA) or IP address.

Meanwhile, measurement companies are measuring at the person level but must understand the household and cross-device mapping to provide incremental reach and co-viewing numbers. Marketers and publishers often have their own identity spines while also tapping into third-party graphs to make their data interoperable and actionable. With the growth of incrementality and co-viewing measurement, as well as the many types of IDs that can enable targeting and measurement, it's no wonder that the industry needs ID graphs, ID resolution services, and more interoperability.

> *How do I give you one reach number across all these devices? The answer is: people have to be the common denominator.*
>
> *–Melinda Gladnick, VP, Product Management, Comscore*

Interoperability

Without a cross-platform, cross-publisher view of identity, advertisers struggle with fragmentation. This leads to difficulty in finding scale for the target audience, managing frequency capping across the media buy, optimizing campaigns, and achieving holistic measurement. Robust interoperability helps overcome these hurdles, enabling stakeholders to send each other signals in order to manage it all—and at the center of interoperability is identity resolution.

Identity Resolution

Identity resolution entails resolving (or syncing) multiple IDs, whether at the individual or household level, via an ID graph. To perform a match, the partners use linkages, or match keys, to tie their IDs together, often aided by algorithms and probabilistic techniques to link disparate datasets. Examples of linkages are hashed email address (HEM), postal address, cookie, device ID, and IP address.

But even when deterministic linkages such as HEM and postal address are used, accuracy can be middling. According to a study by CIMM and Truthset, HEM-to-postal-address linkage accuracy varies widely across vendors, from 32% to 69%.[21]

Some sellers match first-party data with advertisers, using a "crosswalk partner" like Blockgraph or LiveRamp to onboard audiences (onboarding is discussed below). For example, an MVPD can resolve its subscriber ID with the advertiser's desired audience, then pre-target that audience in a programmatic deal without sending a user ID in the bid request.

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21 CIMM and Truthset, Truthset Household Identity Accuracy Project (October 1, 2023)

3. Addressability

Meanwhile, there is a lot of focus on universal IDs, which can be used across the programmatic ecosystem and in the bidstream. Universal IDs originated as replacements for third-party cookies in browser environments and for mobile ad IDs (MAIDs) in apps. Now, most major universal ID providers have built support for CTV apps, enabling cross-device targeting and measurement.

Universal IDs that encourage maximum interoperability across ID providers, adtech platforms, and media channels are getting the most traction. The Trade Desk (TTD) and LiveRamp are two of the companies leading super-interoperability in the crowded universal ID space, effectively casting a web of connectivity across the ecosystem.

The Trade Desk

Unified ID 2.0 (UID2) is a deterministic universal ID created by TTD as an open-source project, based on encrypted email and phone number data. TTD currently manages it but intends to pass the reins to an independent administrator. European Unified ID (EUID) is essentially the European version, built with more stringent UK and EU privacy laws in mind; namely, the General Data Protection Regulation (GDPR), which requires users to opt in.

TTD's Identity Alliance combines TTD's ID graph partners (including LiveRamp, Tapad, TTD-owned Adbrain, emetriq, and ID5) with UID2 and EUID in a single graph, promising better frequency management, more accurate measurement, and improved attribution across devices.[22] The diagram below illustrates how multiple ID graphs with partial information on households, users, and other IDs are stronger together through the sum of their parts.

Figure 6. Multiple ID Graphs per Household

Vendor A
Vendor B
Vendor C
Household
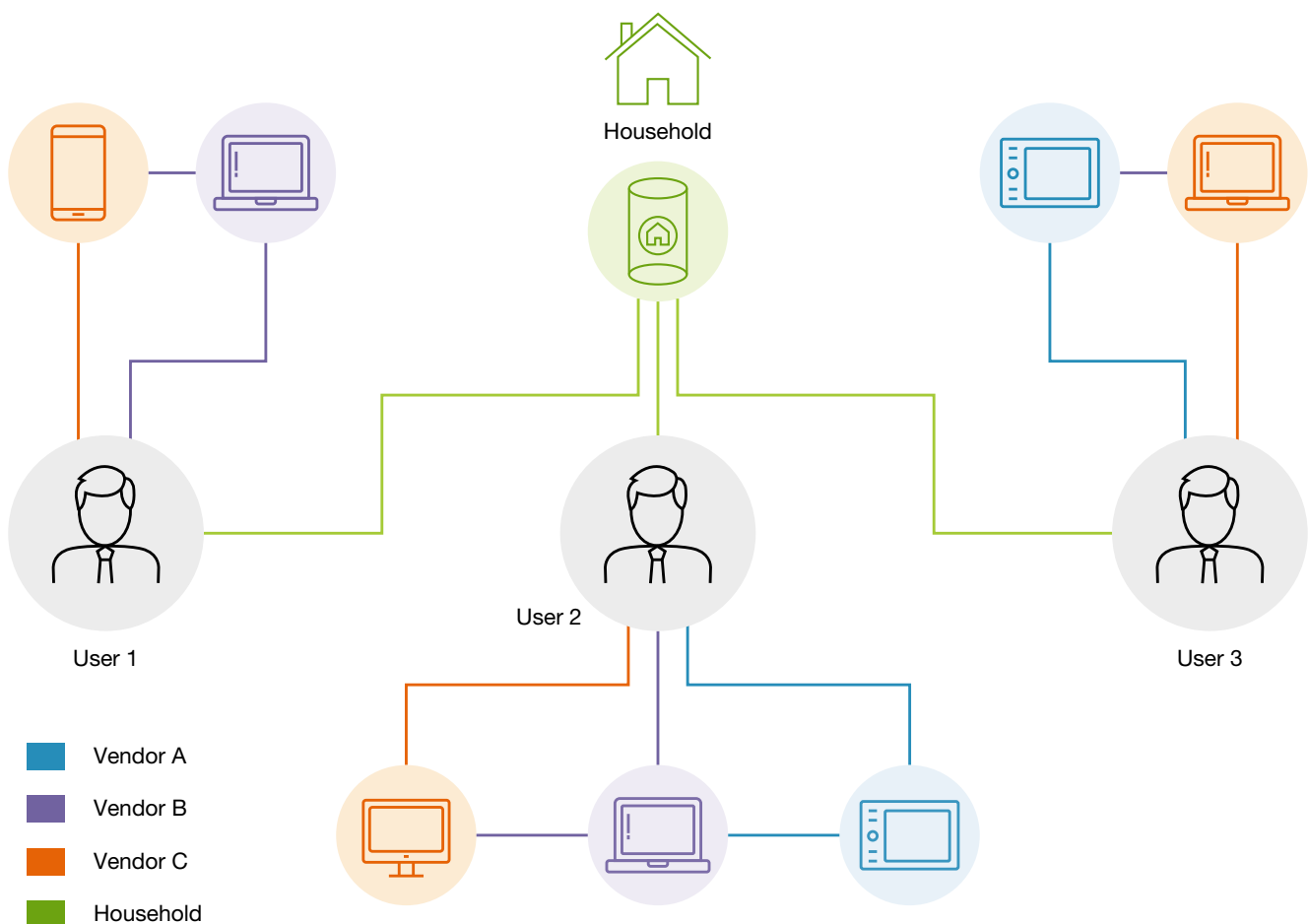
Source: TTD Partner Portal

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22 TTD Partner Portal, Cross-Device Targeting (accessed February 2025)

3. Addressability

LiveRamp

RampID is LiveRamp's deterministic universal ID, based on logged-in data collected through its Authenticated Traffic Solution (ATS). Alongside TTD, LiveRamp has long offered one of the most interoperable identity solutions, having participated in Digitrust and the Advertising ID Consortium (both now out of commission). Given that shared history, the two companies were obvious partners in UID2 and EUID.

Additional examples of RampID integrations with other ID solutions include Lotame and Yahoo, announced at the end of 2021 and October 2023, respectively. Lotame Panorama ID is now an interoperable solution with RampID for Lotame customers.[23] And with the Yahoo partnership, *"publishers using LiveRamp's Authenticated Traffic Solution (ATS) will now be able to take advantage of a cookieless identity solution, Yahoo ConnectID, and unlock additional addressable demand. Further, brands that leverage the Yahoo DSP can achieve greater reach through Yahoo ConnectID, which benefits from RampID and the expanded scale of LiveRamp's Authenticated Traffic Solution."*[24]

Cross-industry efforts to increase interoperability will lead to more multi-ID partnerships and integrations. There are a plethora of universal IDs to choose from; see Appendix 2 for examples. See CIMM's October 2024 research study, "Identity Resolution for Advanced TV and Video Advertising (with ThinkMedium)" for further exploration of identity resolution.

IP Address

As a very prominent identity signal, IP address plays a central role in addressability for programmatic TV, cross-channel activity, and ID resolution. As the most widely used match key value for cross-device graphs, it is woven into the fabric of identity throughout the digital advertising ecosystem; this includes user- and household-level mapping from CTV to mobile to browsers and beyond.

23 Lotame, LiveRamp and Lotame Announce Expanded Identity Partnership (December 7, 2021; updated September 15, 2023)

24 Yahoo, LiveRamp and Yahoo Partner to Scale Addressability Across the Ad Ecosystem (October 16, 2023)

3. Addressability

> *If everything were easy … every single impression would have an IP address behind it and that way you could simply match the IP. That'd be great, but that's not the case.*
>
> *–Kyle Turner, Director of Product Strategy, Philo*

But just because IP address is one of the most useful signals doesn't mean it's always available or reliable. Depending on IP address as a prolific match key poses four significant challenges:

1. Regulation
2. User privacy controls
3. Reliability
4. Evolving browser policies

Regulation

Data regulation around the globe poses a threat to the use of IP address in identity, as a slew of privacy laws classify IP address as personal data.

Several resources map out various regulatory frameworks related to privacy. Sourcepoint has compiled a document (updated July 2024) comparing every US state's current or upcoming data privacy laws.[25] While the Sourcepoint document is focused on sensitive personal data, it also includes 'precise geolocation' which is one to watch, even if every state doesn't explicitly classify all IP addresses as personal data. An example where IP address is explicitly defined as sensitive personal data is in Washington State's 'My Health, My Data Act', which states, *""Personal information" includes, but is not limited to, data associated with a persistent unique identifier, such as a cookie ID, an IP address, a device identifier, or any other form of persistent unique identifier."*[26]

A [tool] on privacy legislation across the globe (updated January 2025) from the International Association of Privacy Professionals (IAPP) estimates that 144 countries, representing 82% of the world's population, are covered by some form of national data privacy regulation[27]—though not all of these laws are as stringent as the GDPR or the California Consumer Privacy Act (CCPA; see Appendix 3). DLA Piper, a global law firm, offers a great [tool] to compare the world's regulatory regimes in heat map form.

User Privacy Controls

User privacy controls—or a lack thereof—also complicate IP-based identity resolution. It is difficult, if not impossible, for people to control who tracks them via IP address on their TVs, creating privacy liability. *"The elephant in the room … is that IP addresses are terrible for apportioning consent and allowing consumers to opt out of tracking,"* said one data expert. Although IP address is used extensively for CTV at the household level, this expert noted that *"Households don't give consent; individuals do."*

In addition, not every stakeholder in the chain has an equal ability to capture IP address at a deterministic device level, or to solicit consent to go with it; for instance, original equipment manufacturers (OEMs) are at a big advantage versus FAST streamers.

Reliability

IP addresses are not entirely stable or reliable. Internet service providers (ISPs) rotate dynamic IP addresses at varying frequencies in homes, whereas many businesses have static IP addresses. One study found that the average retention period of an IP address is just over 9 days.[28] People also travel, go to work, and so forth, and thus may use multiple addresses.

Other factors that make IP address only semi-reliable include virtual private network (VPN) use and vulnerability to fraud. Fraud is more prevalent with server-side ad insertion (SSAI) generally, and a 2024 report from Pixalate found 140% higher rates of invalid traffic (IVT), including ad fraud, when SSAI is used for CTV programmatic TV advertising.[29] The inability to track individual IP addresses gives scammers a chance to mimic proxy servers, leading to spoofing and fake apps.[30]

25 Sourcepoint, Comparing U.S. state privacy laws: personal sensitive data definitions and processing (July 1, 2024)

26 Washington My Health My Data Act (accessed February 2025)

27 IAPP, Data protection and privacy laws now in effect in 144 countries (January 28, 2025)

28 Vikas Mishra et al., WWW '20: Proceedings of The Web Conference 2020, Don't Count Me Out: On the Relevance of IP Addresses in the Tracking Ecosystem (April 20, 2020)

29 Pixalate, Q2 2024 Server-Side Ad Insertion (SSAI) Benchmark Report (July 2024)

30 Madhive, Server-side ad insertion: FAQs you need to know (November 11, 2022)

3. Addressability

Much fraud can be avoided by having partners pass additional signals to each other and using Ads.cert; see Appendix 1 for more detail.

Evolving Browser Policies

A final issue with leaning on IP address for ID resolution is emerging browser policy. Google Chrome's IP Protection is a Privacy Sandbox proposal currently under public discussion. If approved, it would prohibit sharing a user's real IP address with third parties, in order to limit cross-site identification and fingerprinting; instead, it would use a privacy proxy—formerly called Near-Path NAT (Network Address Translator) for a connection.[31] Other browsers (Safari, Firefox) already block IP address sharing across websites, similarly to how they block third-party cookies by default.

Despite the challenges above, losing IP address as a signal isn't seen as an imminent threat by most of the industry stakeholders we asked. This may be due to the interpretation of current laws, or perhaps some companies are waiting for more explicit regulation and/or fines regarding IP addresses. A comprehensive federal law could bring further restriction, though most of our participants predict that US-wide data regulation is several years out. Moreover, a number of solutions already exist in the market, including leveraging email and other deterministic signals, greater data collaboration, aggregated location reporting, and other emerging IP address replacements.

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31 Google, IP Protection (November 14, 2024)

3. Addressability

I would not expect anybody to turn down IP-related revenue. But yes, I do think it's risky. ... I talk to customers a lot around solutions that rely on IPs, and we're collectively trying to move away from them. … IDs that are email-based or even just datasets that are built around emails can work and can be sustainable ... Almost all of the IDs I'm aware of that are based on emails, though, are intended to use the emails as a kernel and then model out the rest … Every graphing model is … based on lots of things usually, but IP is almost always core. I haven't yet heard of graphs that are successfully built without IP. The question is, can we build graphs without using IP at all that are truly scaled?

–Adtech executive

One answer could be data collaboration. Companies can build identity solutions without IP address, typically relying on deterministic signals like a login. An example framework is LiveRamp's ATS, which allows publishers to generate durable first-party IDs across all environments; these can be tied back to measurement with advertisers and to consent. Additional potential options cited by interviewees include universal IDs, Google PAIR, and in-house agency solutions.

Another alternative to IP address is to leverage aggregated location reporting. This approach anonymizes and aggregates ad delivery data at the city, state, or country level. YouTube, for example, has switched fully from IP address to anonymized geolocation data for targeting and reporting.[32]

Data Integrations

In addition to collaboration among identity solutions, data integrations between measurement vendors and adtech platforms are becoming more common. With brands keen on holistic measurement across traditional and programmatic TV, the adtech ecosystem is lighting up with integrations.

Measurement integrations in programmatic environments kicked off in 2022 and continue to progress, as shown in this selection of prominent examples:

- In 2022, TTD announced[33] a partnership with iSpot enabling advertisers to measure incremental audience delivery across TTD CTV inventory vs linear, plus metrics including frequency and overlap; outcome metrics were added to the list in 2024.

- In 2022, Magnite announced[34] it had certified Comscore, iSpot, Nielsen, Innovid, and VideoAmp across its CTV inventory to simplify measurement and transparency.

- In 2024, Yahoo DSP announced[35] integrations with Comscore, iSpot.tv, and VideoAmp, adding to Yahoo's existing support for Samba TV. DSPs are increasingly integrating multiple measurement providers into their platforms, in order to allow brands to consolidate around fewer DSPs.[36]

- In 2024, Roku and iSpot announced a partnership, with Roku providing authenticated audience data and iSpot providing third-party measurement for direct and programmatic advertisers. As an OEM, OS, and streamer, Roku has a very large data footprint, allowing brands to de-duplicate audiences across linear channels and streaming services.[37]

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32 AdExchanger, The Marketer's Guide To IP Addresses In Connected TV (September 5, 2023)

33 The Current, Here's What iSpot TV's integration with The Trade Desk means for TV advertisers (March 16, 2022)

34 Magnite, Magnite Expands Measurement and Attribution Program to Bring Currency Optionality to Programmatic CTV (June 16, 2022)

35 Yahoo, Yahoo Further Expands Its CTV Measurement Suite with Comscore, iSpot, and Samba TV (June 25, 2024)

36 Digiday, Future of TV Briefing: Why Yahoo's DSP adding CTV support for Nielsen rivals matters to the future of measurement (June 12, 2024)

37 Roku, Roku and iSpot Announce Streaming Audience Measurement Partnership (April 30, 2024)

3. Addressability

A better-connected ecosystem inevitably leads to stronger addressability, optimization, and measurement. That includes facilitating interoperability with a variety of stakeholders beyond measurement providers and identity vendors.

> *As programmatic continues to grow, brands are not only demanding third-party measurement from these buying platforms, but the DSPs themselves need to understand performance, so they can both optimize their own media and prove the value of their offerings to customers.*
>
> *–Emily Wood, iSpot*

Data Onboarding

For many businesses, data onboarding is a crucial step toward interoperability. This is a way for marketers and publishers to bring their offline datasets online: essentially, uploading a database of addresses, phone numbers, and/or email addresses to a vendor's platform, where the data is matched to pseudonymized online IDs (e.g., hashed email addresses).

From walled gardens that enable marketers of all sizes to upload customer databases for use in advertising on their platforms, to full-fat data onboarding solutions, this practice helps marketers see their customers across connected devices. After onboarding data through an interoperable partner, marketers and publishers can analyze and target customer cohorts across programmatic platforms and collaborate with partners.

Data Collaboration & Clean Rooms

It is common for data onboarding platforms to offer data clean rooms, which can enable data collaboration. Ranging from media owners and walled gardens to generalist and collaboration solutions, clean rooms come in different forms. Their core feature is to enable partners to match data without directly sharing data assets; indeed, a clean room is used to interrogate datasets at arm's length and find overlap of specific, agreed-upon records. With privacy and data protection (for consumers and for the companies that own the data), it could be assumed that this matching is a privacy-compliant exercise—however, the data must be clean going into the clean room, with appropriate permissions and legality for use as intended.

Clean room services managed by the tech giants—Amazon Marketing Cloud, Google's Ads Data Hub, Meta Advanced Analytics—are best known for enabling marketers to perform targeting and attribution on their first-party data. With Google, for example, a marketer can gain insights by using BigQuery and Ads Data Hub to understand how exposure to YouTube and activity across the Google ecosystem is part of the journey to purchase, via customer data reported in aggregate rather than at the individual consumer level.

Some media companies outside of the tech giants can be walled gardens as well, especially when they build their own adtech like Disney and Netflix have; however, the focus is on interoperability. Disney has leaned heavily into the clean room space since 2021, providing multiple solutions that enable partners to collaborate on data, such as integrations with AWS and Google Cloud. It has also worked with Habu to build Disney Portal, a templated process for buyers and sellers to share sensitive data and a step on the way to creating a self-service clean room.[38]

Netflix's effort is more recent. In August 2024, the company announced integrations with Snowflake, InfoSum, and LiveRamp, designed to help advertisers assess audience overlap, reach and frequency metrics, and last-touch attribution.[39]

The term "data collaboration" is typically used when partners are on a fairly equal footing and can design data matching programs together. They may both use general data platforms like Snowflake and layer on collaboration software like Habu.

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38 Disney Advertising, Disney Expands Award-Winning Clean Room Technology, Giving Access to More Cloud Service Providers (January 10, 2024)

39 Netflix, Netflix Closes Successful Upfront and Expands Advertiser Capabilities (August 20, 2024)

3. Addressability

Here are a few additional examples of clean rooms:

- OpenAP (the advanced TV platform and identity spine owned by Paramount, NBCUniversal, Fox, and Warner Bros Discovery) launched OpenAP Data Hub with Snowflake's backing in 2022. Described as *"TV's cross-platform and cross-publisher clean room solution,"*[40] OpenAP Data Hub helps marketers bring their data to match and action with publishers and platforms. One partner, Interpublic Group's Magna, is matching audiences of Axciom (owned by IPG) with the hub to reach, analyze, and measure outcomes across all video endpoints.[41]

- InfoSum and WPP's Choreograph umbrella deal, announced in August 2024, is part of a holistic offering to help clients leverage data technology. The overall goal is to give GroupM clients access to clean room technology, matching their first-party data with data from Choreograph's AmeriLink database.[42]

- Blockgraph's (owned by Charter Communications, Comcast NBCUniversal, and Paramount) Identity Operating System (IDoS), uses blockchain technology to validate and publish data across 130M+ households for converged TV. Partners can match their encrypted, assigned Blockgraph ID at the household level, then activate through their planning systems, ad servers, and measurement platforms.

Clean rooms can be a critical tool for major brands, enabling advertisers to marry disparate data from major broadcasters and walled gardens on their media plans, as well as overlay it with the brand's own first-party data. However, clean rooms aren't always worth the effort and cost, and some marketers don't have enough first-party data to participate (the amount of data necessary varies by market and use case). One agency contact pointed out that heavily leveraging clean rooms is far from clients' standard practice.

See CIMM's 2024 report, The Future of Clean Rooms and Data Collaboration, for a deeper look into this topic.

Metadata and Content Classification

Metadata in OpenRTB 2.x

The OpenRTB protocol, developed by IAB Tech Lab, standardizes how programmatic ad buyers and sellers communicate. Metadata informs buying, selling, and measurement with numerous signals that describe the inventory, the creative, deal parameters, and more.

Although OpenRTB protocol can be used across all programmatic deal types, PG deals tend to have less metadata passed, as targeting and pacing are managed on the publisher end and buyers are expected to provide near-100% bid response rate. (Note: not all adtech platforms use OpenRTB to transact PG deals.)

> *For biddable, private marketplace deals, we see a greater need for a data-rich bidstream. Buyers can optimize in real time using this metadata, and the inclusion or exclusion of certain objects can have a significant impact on revenue and fill rates. Buying against a designated deal ID, while also incorporating granular metadata via the bidstream, enables buyers to clearly understand the inventory they are purchasing and its source.*
>
> *–Alex Strickland, Senior Director, Strategic Relationships, FreeWheel*

It is very rare that the full array of potential metadata is included in OpenRTB 2.x bid requests. An executive from an SSP described the reality: *"I would guess the percent of requests that include some kind of signal is between 30% and 50% coming into the SSP. Beyond that, a lot of publishers take advantage of SSP obfuscation tools. It's also tricky to report on because sending at least one signal is different from sending ten signals consistently. So, I'd say the 30% to 50% is at least one signal, while sending all of the signals that a buyer could possibly want is less than 1%; it's a continuum."*

Opportunity exists within that range of signals. *"Freewheel has been very focused on auditing the bidstream for our partners, working directly at the ad server and player levels to refine and strengthen signals*

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40 OpenAP, OpenAP Announces Investment from Snowflake Ventures to Accelerate Development of the OpenAP Data Hub (October 17, 2022)

41 Variety, Interpublic Group, OpenAP Strike Data Pact to Help Advertisers Reach New Audiences (December 12, 2023)

42 Digiday, InfoSum and WPP's Choreograph strike an umbrella clean-room data partnership (August 28, 2024)

across their entire footprint—focusing on critical signals like bundle, app, site, and content objects," said Alex Strickland, Senior Director of Strategic Relationships at Freewheel. *"Inventory curation has become a key component in upfront negotiations, with publishers actively enhancing their metadata to flag unique packages for buyers via the bidstream. Whether their goal is to enable audience scale across a large pool of inventory or to respect complex carriage and distribution data rights, we're seeing both publishers and advertisers embrace the power of the bidstream. [However], a less transparent request doesn't necessarily prohibit programmatic monetization. The minimum requirements for basic programmatic transactions remain relatively simple—typically just a bundle ID and an IP address."*

IP address is arguably the most common piece of optional metadata in the bidstream, and major buyers and platforms expect it. According to Larry Allen, VP Global Strategy at FreeWheel, *"If a seller isn't willing to pass at least a truncated IP address, they struggle to receive spend. Buyers are looking for client-side IPs to aid in anti-fraud validation, geo targeting, and frequency capping. And this insistence can lead to frustration with programmatic linear sellers, who either don't have an IP address or they have a server-side IP address, the latter of which shows up as broad swaths of households sharing a single IP address— when a DSP receives this simultaneous spike of traffic, their algorithms are not used to dealing with that much traffic and may consider it fraud, or the QPS limit will be triggered and impact fill rates."*

See Appendix 1 for a short guide to metadata objects in the OpenRTB specs.

3. Addressability

Content Metadata

Although video content tends to have adequate metadata, it is not always sent through the programmatic pipes to generate value. Genre is the most prominent content metadata, but its usage is inconsistent: some content has multiple genres assigned whereas some has none.

Gracenote (Nielsen's content metadata business unit), being a relatively new entrant in the programmatic space, was interested in the visibility of content attributes in the bidstream, so they analyzed 6.8 billion publisher-supplied video bid requests and saw an average of at least 1.6 genres present for each piece of CTV content, with more than 50% having 2 or more genres. They also analyzed 21.4 billion video bid requests shared by an SSP partner, which showed that only 32% included a genre attribute.[43]

Genre is highly in demand from buyers and is an attribute that many publishers are happy to provide, because they don't face the same legal hurdles as with show-level data. (See Appendix 3 for an overview of the **Video Privacy Protection Act (VPPA)**.) But inconsistencies in the application of genre standards seem to frustrate everyone. One industry expert shared, *"Some people are more on board with using standard taxonomies than others; others think it's completely up to the media owner. I would say that if you're a publisher, why not do both? I think they should, as a foundation, start off with the IAB Content Taxonomy."* Some publishers use additional content classifications alongside the IAB Tech Lab standard to offer targeting optionality and ensure their inventory has adequate signal for the buyer.

Both media owners and third-party classification services assign genre to content. For media owners, there are three main routes:

1. **Internal**—A publisher's classifications are often set within its content management system (CMS). Its editors may prefer particular categories, whereas ad ops and sales might add others into their team's data platforms.

2. **IAB Tech Lab Content Taxonomy**—Version 3.1 is current at the time of publication.

3. **Ad servers**—Ad server integrations and mappings help publishers integrate content metadata within their own ad server. Examples:

   ○ Google Ad Manager (GAM) enables publishers to map proprietary classifications to the IAB Tech Lab Content Taxonomy.

   ○ FreeWheel's TV Platform ingests content data into its publisher accounts based on robust integrations with content management systems.

Third parties also classify genre within content. Contextual vendors and some adtech platforms have technology that scans and analyzes content, assigning genre, sentiment, and brand safety. Here are several examples:

• TTD offers its own standard and custom contextual categories alongside data vendors' and marketers' own ability to create custom targeting.

• Gracenote entered the programmatic ecosystem in July 2024 using the same taxonomy and content IDs across linear and advanced TV.[44]

• IRIS.TV ingests data from partners such as GumGum and Wurl, converting the contextual data into IRIS IDs, which are then passed in the bid request.

• Proximic by Comscore includes categorization for the IAB Tech Lab Content Taxonomy, brand safety and suitability, and ID-free interest and purchase intent audiences.

These solutions need alignment at a foundational level. Even when a publisher uses a buyer-requested contextual tool, misalignment can still occur. Tim Ware, VP at Future Today Marketplace, said that publishers are uncertain of which content signals are properly received: for example, *"Is 'food and drink' going to be the first genre or a sub-genre, and is the bidder effectively able to capture that and spend against signals that align with campaign objectives? We have been encouraged by the initial performance of services such as IRIS, Proximic, and Audigent, who utilize contextual signals to generate first-party addressable audience targets for brands to more effectively utilize content signals passed within the CTV bidstream."*

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43 Gracenote, Content IDs are the key to unlocking value in programmatic TV advertising (September 25, 2024)

44 Gracenote, Gracenote teams with major connected TV (CTV) players to optimize contextual ad targeting (July 2024)

3. Addressability

As another publisher put it, *"We're kind of struggling with [taxonomy standardization]. Google has a particular genre taxonomy that they use, there's the IAB Taxonomy, and The Trade Desk … There's not one alignment."*

It's not simply up to the publishers to settle on a single source of truth, because buyers ask for different contextual vendors. A seller shared a similar perspective, *"The adoption and who we work with is always shifting. I mean you have IRIS and Gracenote—just looking at genre, you have multiple players … So while I have confidence in the tools that exist today and will exist, it does not change the fact that fragmentation leaves plenty of difficulty in everyone aligning on exactly what we need … to be consistent across our parties."*

Adding to these misalignments, a number of DSPs are still using IAB Tech Lab Content Taxonomy 1.0, which is deprecated—the continued use of 1.0 is detrimental to handling sensitive content categories correctly, as well as aligning with what sellers are sending. Sellers should encourage the buy side to upgrade and use version 3.1.

Most of the time, publishers take cues from the buyer holding the purse strings. They are asked to use the buyer's preferred SSPs, universal IDs, and contextual providers, leading to a lot of effort, conflicting sources of truth, and frustration.

Despite consistency in how they send their supply, one publisher said, *"It's one of the challenges buyers always complain about with PG and PMP, and the fact that they are getting different identifiers, different genre[s], different data on the back end … We try to keep it holistic, but every single buyer probably complains about this very*

thing. That's why you have things like Dentsu only trying to work with PubMatic, or GroupM focused with Springserve and Spotx and Magnite. I think there's an attempt by the buy side ... and even the DSPs, to try to get everything to go through one supply path."*

Buyers can feel as though they're running in circles when attempting to sort out the disparate data. One agency exec painted a picture: *"I want to pull a report from a DSP; I want that to be uniform in aggregate [but] there's no uniformity across the industry that says 'Paramount and Hulu input your data this way.' At the same time we [ask] 'do we go to the SSP and are they allowed to clean this up?'"* The exec went on to say that the SSPs do not think they should change publishers' data in the bid requests. Ultimately, the agency must talk with the networks, which tell the agency exec, *"'We have no incentive to hire people to map everything for you, because we also don't want you cherry picking this.'"*

Can't AI solve content metadata misalignment by matching disparate taxonomies? While it could be possible technically, there are multiple layers involved. Getting everyone to use the latest version of the IAB Tech Lab Content Taxonomy and passing standardized values is one thing; the manner in which content is determined to fit into a classification is another— publishers know their content and want flexibility. Then there are other taxonomies and classification systems, some of which use content IDs rather than text values. Normalizing classifications into a single standard isn't in the commercial interest of vendors that sell proprietary content classification solutions. With all of these factors, we won't see a silver bullet anytime soon.

4. Measurement

Holistic measurement across programmatic TV environments is far from straightforward. The hurdles include multiple devices per household, identifying individuals within that household, data silos across walled gardens, inconsistent signals from partners, and evolving supply paths. Buyers must cobble together disparate systems, methodologies, and datasets to measure activity—which underlines the importance of interoperability and standardization. This chapter will explore programmatic measurement challenges by looking at key metrics, data flow, and in-flight optimization.

Key Metrics

As with traditional TV ad measurement, reach and frequency are central to programmatic TV, but with important nuances. The figure below lays out key metrics to capture.

Figure 7. Key Metrics in Programmatic TV Advertising

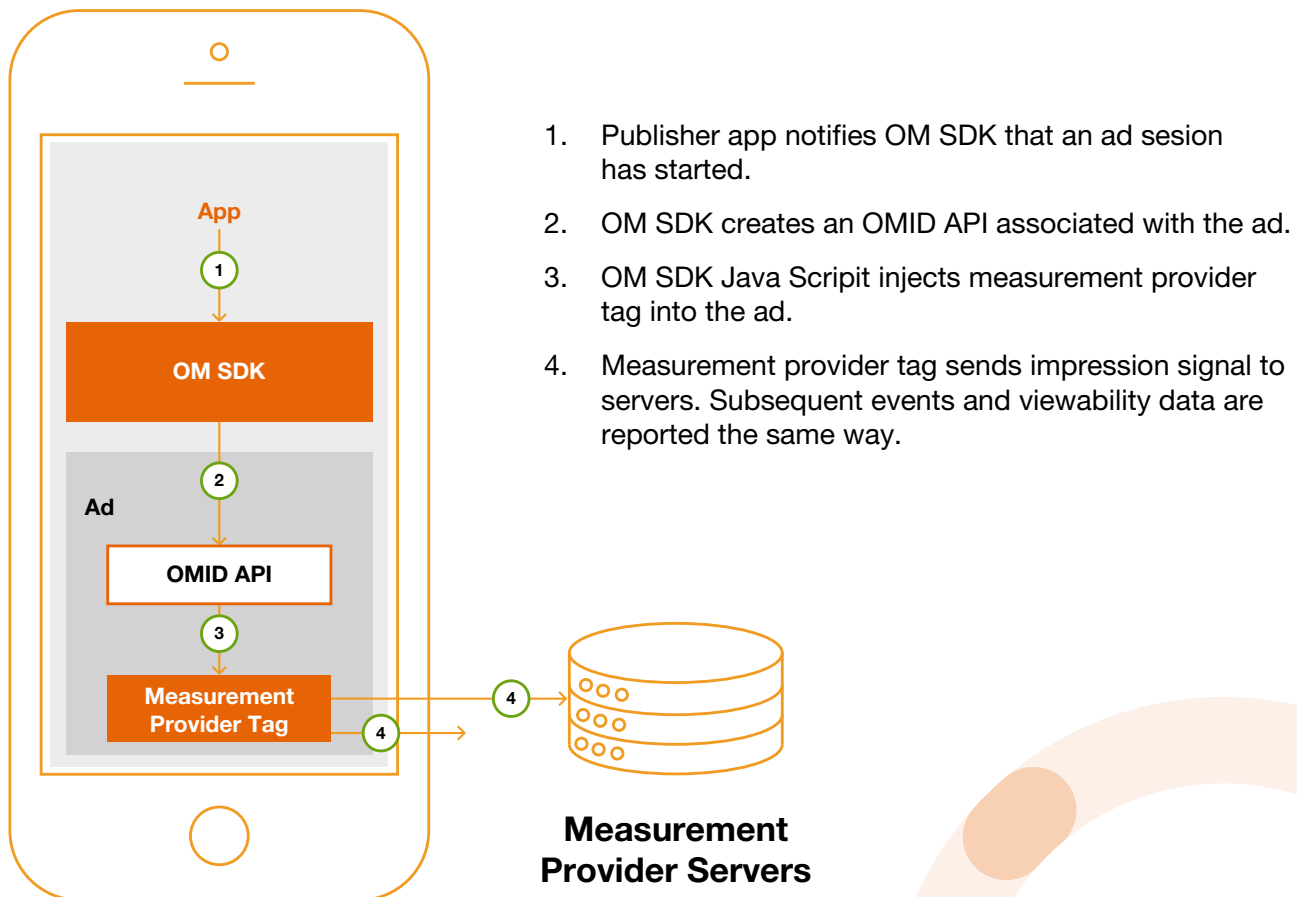|	
Delivery	• Reach, incremental reach over linear, and in-demo delivery for advanced audiences • Frequency and incremental frequency over linear • Impressions - programmatic advertising's currency
Hygiene	• Viewability and verification • Brand safety and suitability • Compliance - including user consent or opt-out; LDA (legal drinking age) • Attention - Vendors like TVision provide attention metrics with combined panel + eye tracking; they also integrate with the major measurement providers, including iSpot and VideoAMP.
Performance	• Completed views and VTR (view through rate) • Engagement - on CTV that can be via QR codes, voice engagement and other direct interactions, for example on home screen and pause ads • Conversions and incremental conversions (controlled vs exposed) • Attention can also be considered performance data.
Outcomes	• Business outcomes - activity that can be correlated with a marketer's 1st party data directly or by working with partners to marry campaigns to performance such as purchases (for example Attain) • Attribution - correlating ads with internet/mobile outcomes such as website visits, app downloads, engagements, or online sales; or attribution to offline outcomes such as footfall attribution (for example via Azira and PlaceIQ) • ROAS (return on ad spend)

4. Measurement

Measurement Data Flow

For a programmatic TV campaign, measurement data flow starts with third-party measurement vendors working with programmatic platforms via measurement pixels (or 'tags'), server-to-server connections, or log files—or a combination. With growing integrations between measurement vendors and platforms, many of these partnerships are switching to tagless setups, however one measurement company indicated they still see the majority of ads measured with tags.

When using log files or server-to-server methods, agencies/clients work to match the measurement company's schema, then send daily files that contain information like time stamp, publisher, IP address, MAID, genre, and campaign ID. This process typically requires engineering effort on both sides and has costs to set up and maintain, although it saves time downstream by reducing effort for tagging.

In tag-based setups, the pixels fire when ads are served, sending data to the measurement provider's server, which they surface in their platform for clients. For viewability and verification measurement in video on any device, pixel tagging can be implemented via IAB Tech Lab's Open Measurement Software Development Kit (OM SDK). OM SDK has supported CTV since 2022, and in 2024 expanded to include LG and Samsung.

OM SDK enables publishers to install one SDK rather than several for multiple viewability and verification vendors. Sites and apps send measurement signals to the Open Measurement Interface Definition (OMID) application programming interface (API), and measurement vendors place tags that collect the signals. The following figure captures this flow.

Figure 8. OM SDK Flow

1. Publisher app notifies OM SDK that an ad sesion has started.

2. OM SDK creates an OMID API associated with the ad.

3. OM SDK Java Scripit injects measurement provider tag into the ad.

4. Measurement provider tag sends impression signal to servers. Subsequent events and viewability data are reported the same way.

Source: IAB Tech Lab, OpenMeasurement SDK: Capabilities & Limitations

4. Measurement

Measuring programmatic activity within CTV environments has its own nuances. IAB's Project Crosswalk 2.0: Connected TV Compliance in a New Privacy Law Era offers robust guidance on privacy, consent, audience creation, and ad measurement. An illustrative measurement scenario for a CTV programmatic direct deal is shown below.

Figure 9. CTV Programmatic Direct Deal Measurement
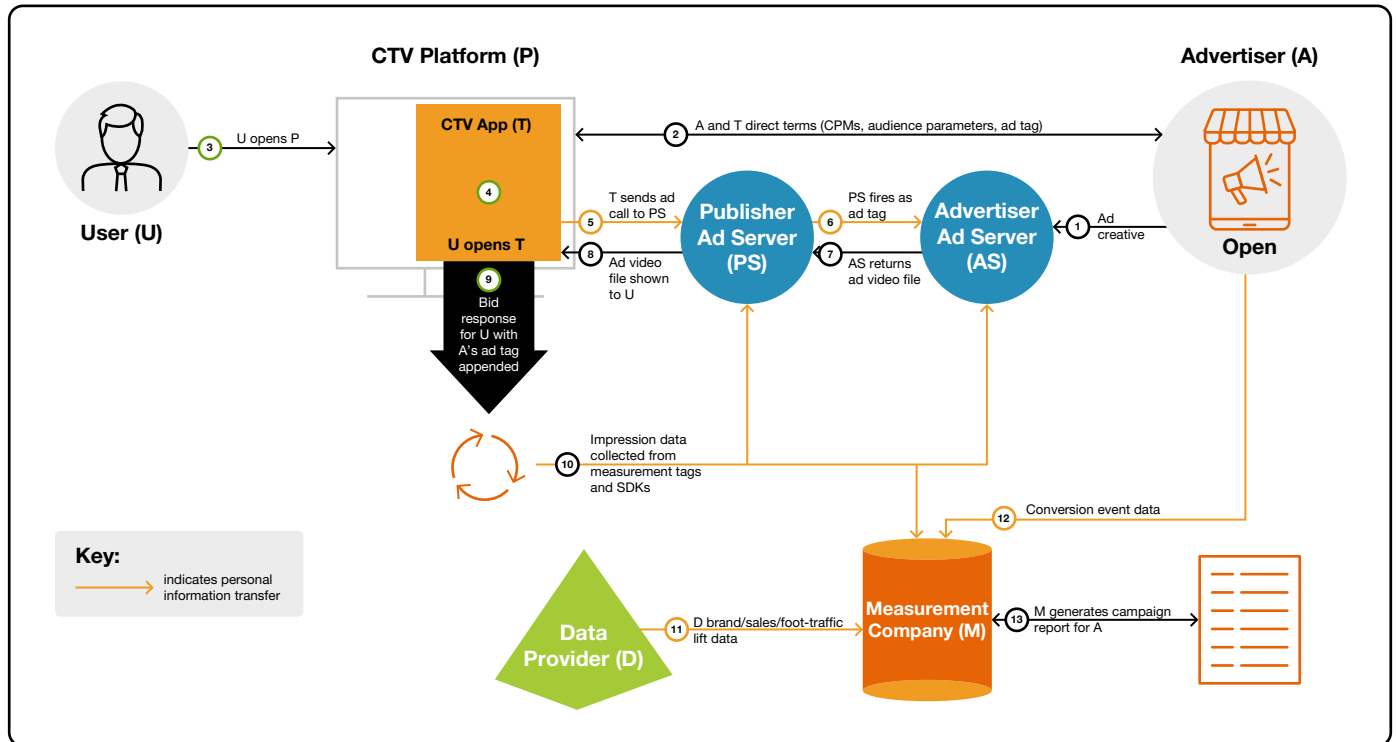
Source: IAB, Project Crosswalk 2.0

In-flight Optimization

Anything that can be targeted in the bidstream can be reported on, but not everything that can be reported on is available pre-bid for targeting and real-time optimization. Post-impression reporting is often more transparent than what is available in the bidstream, because buyers can receive more granular reporting—such as show-level data—on where their ads ran.

Both scenarios allow for in-flight optimization:

1. Pre-bid, impression-level, and ID-level targeting and measurement

2. Post-impression, in-aggregate measurement

Not all sellers are comfortable sending granular data pre-bid, especially when tied to a user ID (see Appendix 3 for key privacy regulations).

5. Stakeholder Issues

Buyers, sellers, and intermediaries in programmatic TV have innately different goals, though everyone we spoke with was sensitive to their counterparts' needs. Interviewees, including vendors, shared practical issues they encounter that run the gamut of commercial, technical/operational, and legal areas—spheres detailed throughout this report. This section will examine these challenges through the lens of each stakeholder group.

Buyers

Key goals among agencies and brand advertisers are understanding and controlling what they are buying, managing frequency, and achieving consistent cross-buy measurement.

Transparency and Control

Buyers need to be able to execute on their agreed-upon deals, report, and optimize. The more signals they receive, the better they can control inventory quality and brand suitability, mitigate fraud, and optimize mid-campaign. However, buyers suffer from lack of transparency and control in at least three broad areas:

1. When buying biddable programmatic TV, PMP is the best of both worlds. A private marketplace is safer than the open market, plus buyers have more control than when publishers manage an IO or PG buy. One interviewee observed that in general, buyers and adtech platforms seek PMP deals, whereas broadcasters push for PG deals that allow them to retain more control over their inventory.

2. Bid duplication is a well-known challenge for buyers, driving up CPMs and increasing levels of adspend with services. For example, if a buyer wants to allocate 15% of their budget to a streaming service, bid duplication could cause considerable over-indexing spend to that service, as DSPs overestimate the audience share. Buyers and adtech platforms have begun building tools to de-duplicate bid requests, but sending duplicate requests isn't illegal—it's widely perceived as a deliberate strategy. It's also worth noting that all sides of the market can "game the system" by using processes like bid shading or bid caching.

3. Show-level data is an oft-cited request but is a complicated area due to the Video Privacy Protection Act (VPPA; see Appendix 3). Beyond the legalities, cherry-picking—whereby advertisers only target particular shows—is a common concern

for publishers. However, Greg Langer, VP of Programmatic Supply at Havas Media Network, said he has rarely had a client instruct to *"only optimize towards specific shows. They have their 'Do Not Air' list from their linear side, but they just want to know where they're running."* Another agency executive said, *"It's imperative to have transparency on the type of content running in the bid stream, in order to know where a brand's ads are running and gain meaningful insights that can inform media buys."*

Frequency Capping

Frequency capping in programmatic TV advertising is complicated, especially due to ad pod management. Although buyers in a biddable environment can use universal IDs to help manage frequency on their end to an extent, they should also provide creative metadata to publishers to enlist their help in implementing frequency caps.

There is a new framework to help: ad creative metadata can be passed to publishers via the UniversalAdId element in OpenRTB, through IAB Tech Lab's new Ad Creative ID Framework (ACIF). In the US, AD-ID is the registry for creative assets, and AD-ID codes are already being used in traditional TV and digitally with Video Ad Serving Template (VAST). Therefore, when buyers pass an AD-ID for programmatic buys, they help to enable frequency capping in programmatic TV, as well as work to bridge traditional linear and programmatic TV.

Consistent Cross-Buy Measurement

The ability to measure consistently across a media plan is the Holy Grail for buyers. Progress in this area includes third-party measurement providers increasingly integrating with programmatic platforms, IAB Tech Lab standards getting greater uptake, and 'gates' being added to portions of the Big Tech 'walled gardens'.

Here are examples involving YouTube and Netflix:

- Google provides an overview of the third-party measurement vendors enabled to connect with YouTube—but only via integrations, not third-party pixels. One example is their VideoAmp integration, enabling measurement of reach and frequency.[45] Following the YouTube TrueView scandal in 2023,[46] Google enabled more transparency for PMax.[47] Advertisers can now see video-level reporting on where their ads appeared and can also use third-party brand safety vendors.

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45   VideoAmp, VideoAmp to Measure Deduplicated YouTube Reach and Frequency (May 17, 2023)

46   AdExchanger, How The YouTube Scandal Exposes A Double Measurement Failure (July 21, 2023)

47   AdWeek, Google Gives Buyers More Transparency and Controls for Performance Max (July 31, 2024)

- Despite being a walled garden, Netflix partners with a slate of third-party measurement and verification vendors.[48] Advertisers can now measure Netflix through Nielsen ONE, Kantar, EDO, NCSolutions, Affinity Solutions, and Lucid by Cint, and verify impression delivery via data services from Innovid and Google Campaign Manager. And programmatic buyers can now use Integral Ad Science and DoubleVerify to verify ad viewability and validate traffic for Netflix campaigns.[49]

Sellers

Sellers must balance conflicting forces, weighing buyers' requests—especially for more transparency and control—against their own aims: to adhere to carriage agreements and data laws, and to fully manage sales channels. Moreover, they desire more transparency from buyers, for both commercial clarity and operational efficacy.

Seller Transparency Sought

Sellers want clarity on how their metadata is received and used by buyers. Some of our seller interviewees reported operating in the dark, uncertain of whether their metadata is helpful or even readable. Ideally, buyers would communicate which inventory, content, and audience segments are performing best, so sellers could help ensure the strongest campaign performance.

Sellers also want transparency on the brand and creative for operational purposes, including help with placement and frequency management, as well as to provide viewers—and thereby the brand—with a positive experience. As discussed earlier in the section on frequency capping, using ACIF will deliver more transparency.

Sellers use multiple sell-side platforms and data vendors to appease buyers and win budgets. With so many combinations of platform and data integrations, supply

48   AdExchanger, Netflix Announces New Ad Measurement Options Ahead Of The Upfronts (April 19, 2024)

49   AdExchanger, Netflix Sees 150% Jump in Upfront Ad Sales This Year (August 20, 2024)

paths, taxonomy variations, and publishers' nuances in categorizing content, there is clearly too much room for error and misinterpretation, even if sellers want to comply with standards.

Because nothing comes back in the bid response to confirm or deny that their signals are being received and used by the buyer, sellers must manually check with partners to ensure data is being received correctly in various systems. In the publisher ad server, publishers have control over content labels—but by the time the metadata arrives in the next system, such as an SSP, the signals are often lost.

Tim Ware, VP at Future Today Marketplace, noted, *"We know our CMS is going to pass content genre consistently, and if content signals are not passed properly, it would be great to understand why. Conversely, it would be great if publishers could have insight into how contextual transparency may be driving more transactions and revenue. At this stage, some buy-side platforms provide Inventory Quality scores; however, it remains unclear how that may be generating greater programmatic spend/fill rates or limiting it."*

Universal IDs bring a similar story, as sellers must deploy a number of identity solutions/universal IDs to help buyers address and measure audiences. Every new solution and combination of adtech connections requires testing and troubleshooting. If these deployments aren't handheld through to launch and beyond, revenue is at risk from campaigns not being able to target and deliver.

Seller Transparency Provided

The level of transparency that sellers generally offer is determined by factors including carriage agreements, inventory commoditization, and revenue upside potential.

Carriage agreements are foundational to what publishers and content distributors can share about their inventory—and are particularly tricky in a programmatic advertising environment. Alex Strickland, Senior Director of Strategic Relationships at Freewheel, explains: *"Carriage and distribution agreements have inherently evolved with the growth of programmatic advertising. Legacy linear agreements primarily focused on sales rights for traditional media, essentially determining how many ad minutes per hour were available to each party. In many cases, digital platforms inherited these terms, restricting distributor sales rights to their local markets. With the rise of programmatic, these agreements are no*

longer solely focused on dividing media, but also on data rights—specifically, what can be shared in the bidstream. Special attention must be given to the convergence of the OpenRTB framework and the publisher's policies on which specific data they want shared. The more transparent the bidstream, the more insight and control shift to the buyer. As a result, publishers want to ensure that there is a fair value exchange for this transparency, making it a key point in the negotiation process."

Although pre-bid show-level transparency may be in breach of contract, sellers might be able to guarantee to serve ads within an "allow list." A couple of sellers pointed out that they realize some buyers use approximations to attempt show-level targeting, for example by combining the channel or app with timestamp. Regardless, it is fairly common for post-impression/post-campaign reporting to provide show-level granularity in aggregate, so buyers can see where their ads ran and sellers won't get into hot water.

Sellers may not want their best inventory cherry-picked, as that makes it more difficult to sell the remainder. With complex reseller agreements and sales channels, publishers also need to ensure consistency in their offering, plus the ability to offer audiences at scale.

Would more transparent, standardized metadata lead to higher CPMs and more revenue? The juice may be worth the squeeze for some publishers; but for others, too much transparency and standardization can lead to commoditization.

On commoditization, one streaming TV measurement executive said, *"Standardization makes a 25 year old planner's job really nice and easy … They want to be able to go in, click a few things. It spits out a plan; it's based on cost per conversion or it's based on reach, and that's it."* He emphasized that it is a different animal to *"build a brand through an immersive television experience versus retargeting somebody on a mobile device [to] convert."*

Another publisher said, *"We've asked the question: 'We'll give you all this data tomorrow; what are you gonna do with it?' And we've seen challenges around answering that question. We have been very focused on providing this information via clean rooms rather than through OpenRTB … If it's being used for a particular reason, to ultimately drive results, we're happy with that. I just think it's not at a point where this is really being used in any meaningful way, that I see."*

5. Stakeholder Issues

Challenger publishers often try to be more transparent. One adtech executive said, *"Quite a few CTV publishers … are sharing a lot more data signals about the content/meta-data in the bidstream programmatically. Nevertheless, since the market is still dominated by the notion of upfronts, buyers/agencies are prioritizing their upfront publishers. So, sharing more data in the bidstream doesn't translate immediately into more spend."*

Sellers Running Different Races
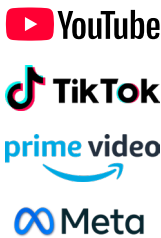
Although a variety of sellers struggle with the challenges discussed above, they also face specific issues within different publisher segments. Newer market entrants on the publisher side are disrupting and crowding the landscape with different economic models, while stalwart programmers reckon with high content overhead and complex carriage agreements. Programmers, streamers, distributors, OEMs, and OSs face a swath of commercial, operational, and technical hurdles. Big Tech walled gardens seem impervious to most of the problems that others typically face, but they are confronting sizable regulatory and legal challenges.

5. Stakeholder Issues

Figure 10. Publisher Positioning within Programmatic TV Advertising

Industry Segment	Examples	Challenges	Advantages
Programmers	NBCUniversal, Paramount+, WARNER BROS. DISCOVERY	• Concern over commoditization of inventory. • Legal exposure if share show-level data tied to individuals. • Relationships with multiple distributors add complexity.	• Often considered must-buys on media plans, due to quality and scale. • Rich content metadata, at the source.
MVPDs	COMCAST, dish, DIRECTV	• Carriage agreements typically prohibit full transparency with buyers. • Must adhere to FCC standards and policies that vMVPDs and pureplay streamers don't.	• Strong deterministic data (address, email) • Ability to curate around content from the pubs and audience from their 1pd.
vMVPDs	fubo, tubi, hulu, philo	• Also must uphold carriage agreements. • FAST players often don't have as much logged in user data. • They aren't shoe-ins for media plans and don't get as much visibility from buyers into how their inventory is assessed and data used.	• New business models enable more pricing flexibility. • While still cognizant of carrige agreements and legal issues, they are typically more transparent with data.
Streamers	Disney+, NETFLIX	• Calls from the industry to standardize or join the JIC. • For Netflix, being new to the ad market has come with teething pains such as establishing pricing.	• Premium and large enough to not expose data or standardize. • Logged in user data and deep contextual data at the source.

5. Stakeholder Issues

Industry Segment	Examples	Challenges	Advantages
OEMs	VIZIO SAMSUNG LG	• Sometimes considered less premium inventory, some are bolstering their content offering to raise their premium status.	• Valuable, unique data sets, given their position as the hardware, including ACR and consented IP address. • Some run their own OS, adding additional layer of data and control.
OSs	VIDAA ROKU android	• Fragmented market adds to complexity for advertisers.	• Authenticated users and ability to garner data consent. • Unique inventory on home page.
Big Tech	YouTube TikTok prime video Meta	• Access to too much data, the pervasiveness of their tracking pixels and targeting has opened legal issues. • Anticompetitive suits (and in TikTok's case, pressure against US operations ownership by a foreign adversary) are taking some wind out of their sails.	• Enormous market share. • Logged in users in their own gardens and some off-property.

5. Stakeholder Issues

Intermediaries

It is in the interest of adtech companies to support their customers—and despite some industry rhetoric to the contrary, adtech interviewees we spoke to believe that more transparency is a win for their clients, themselves, and the industry at large. Regarding opacity in the bidstream, one DSP executive put it bluntly: *"I think at this stage, it's unacceptable to obscure the content around, or context of, programmatic inventory at all."*

An SSP executive concurred: *"Privacy is being used as kind of an excuse not to give full transparency, especially relating to the content and metadata, but I think it is mainly the commercial pressures that traditional linear publishers are having. The current market dynamics force them to package client-perceived high value content with low value content to keep CPMs intact, which is fair from their perspective if you consider how much less ad opportunities they have to monetize on CTV vs linear."*

When it comes to the technical capabilities of adtech companies, the major SSPs have upgraded systems and/or made acquisitions to better facilitate CTV selling; for example, Magnite acquired SpotX and SpringServe in 2021.[50] Most adtech companies have skin in the CTV and streaming game and are putting effort into supporting this burgeoning channel. But even though major platforms support OpenRTB and other key standards, not all video players and publishers use the most recent version of VAST—meanwhile, not all DSPs use the latest IAB Tech Lab Content Taxonomy. See Appendix 1 for details on these.

Another complication is the fact that campaigns are set up in multiple systems, even by the same party. Buyers, for example, often enter campaign details in both their ad server and their DSP. *"There are opportunities to streamline the workflow for certain programmatic buys by removing unnecessary friction points—and as an ad server, we've been able to help realize that,"* said Zvika Netter, CEO and Founder at Innovid. *"We launched Harmony Direct earlier this year, which removes additional technology 'hops,' fees, and energy waste from guaranteed, non-biddable CTV media. It streamlines that workflow to its purest form."*

Programmatic buying is clearly more complex than direct across open, hedged, and walled gardens, though each offers a different level of user-level reporting and verification. "Agencies are of two minds regarding CTV," said Ramsey

McGrory, CDO at Mediaocean. *"Direct investment teams want the low-cost, direct relationships and simplified activation for CTV. Programmatic teams want more CTV inventory pushed by publishers into programmatic to take advantage of programmatic activation. We believe both are viable and we expect the two processes to converge."* All large agencies use Mediaocean's Prisma application for direct contracting. The company recently announced an integration with Magnite[51] to enable programmatic activation—an example of an interoperability effort that can facilitate supply path optimization (SPO). Investing further in SPO, Mediaocean purchased Innovid, completing its acquisition in February 2025[52].

Supply Side Platforms

SSPs face their own unique hurdles: they receive data from publishers and data vendors in varied formats and must orchestrate the signals, in line with the needs of their constituents. Erika Loberg, Senior Director of Advanced TV at OpenX, explained: *"As an SSP, we sit with a lot of publishers, and we see all the thousands of different taxonomies that they pass. Matching those in the middle so that they're something universal that the DSP can ingest is a lot of legwork, but it also provides a lot of value. The work we've done to standardize what we see allows both the publisher to monetize and the DSP to recognize the thousands of different values passed through."*

Unfortunately, after all that work, oftentimes *"the necessary information is being passed by the SSP, but the DSP doesn't have the capability to read it, or the libraries are not matching up,"* agreed another SSP exec. Mismatched data formats are common.

> *The configuration of data is customized; it reflects the platform that's sending it, which might be different from the source configuration. As data moves through the supply chain, certain details are changed or moved to meet each platform's specific set-up.*
>
> *–Ad product expert*

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50 Magnite, Magnite Acquires SpringServe, A Leader In CTV Ad Serving Technology (July 1, 2021)

51 Mediaocean, Mediaocean and Magnite Strike Exclusive Partnership to Automate Media Planning, Execution, and Reconciliation in Streaming TV (March 14, 2024)

52 Advanced Television, Mediaocean closes Innovid acquisition (February 13, 2025)

5. Stakeholder Issues

Syncing audiences and IDs entails similarly extensive manual effort. Some SSPs have had to invest in proprietary cross-device graphs to maximize interoperability, transacting on their own identifier to have a single source of truth in their platform. In the case of OpenX, Nick Cuniffe, VP of Product for CTV, said the company's graph has access to 250 different data and identity providers so the platform can pass qualified audience-based impressions. These audiences can be built on the buyer, seller, or DSP's ID of choice.

Demand Side Platforms and Agencies

DSPs also receive data in varied formats from a number of sources, which can create another level of chaos. As the metadata relay race progresses from publisher to SSP to DSP to agency, the propensity for data synchronization to fail is high. The DSPs and agencies aren't getting as much data as they'd like, and when they do, it often doesn't match up.

Unsurprisingly, agency buyers are frustrated that content metadata frequently comes through in difficult, even unusable, formats. Greg Langer, VP of Programmatic

Supply at Havas Media Network, summarizes: *"The goal is to have the most direct path to supply, but that's always easier said than done. … No matter what buying platform or what SSP we're using, the challenge is that when it gets into the DSP, it's not standardized for any partner—and so now the DSP is sitting on all this data and they're saying, '... We have 80-85% of it, but it's not standardized. It's just a data dump and it looks disgusting; we'll give it to you, but you're not going to be able to read it; we struggle to read it.'"*

Before agencies and DSPs receive metadata, there are other factors at play that create issues around full transparency and consistent metadata. Prasad Joglekar, CEO and founder of Deben, a media planning software company, encapsulates some of this complexity: *"Buyers want maximum transparency from sellers, but that's not always possible because of business models. Sling and Fubo have different data and impression volumes than NBCU, for example. To get uniform data like genre from Sling, it needs to be passed from all content sources— NBCU, WBD, and others—which is rarely the case. So, the baseline for transparency can end up being quite low."*

6. Industry Priorities Going Forward

Transforming the programmatic TV ecosystem to achieve easier operating processes, optimal measurement and greater transparency will require commitment from all parties. The industry won't improve while operating in silos; the change needed must come from all stakeholders, especially in terms of standardization and education. This is underpinned by buy-in at both company and individual levels, from ensuring interoperability, product functionality to support standards, and practitioners understanding their role in helping drive operational efficacy.

How can programmatic TV stakeholders level-up the workings of this ecosystem? Is there a strong case for formal collaborative projects across the industry? Are education and greater professional development sufficient to drive standardized use of the latest IAB Tech Lab specs and taxonomies, and to encourage adtech platforms to fully support the latest versions?

Answering these questions and building an industry-wide action plan is beyond the purview of our diagnostic study. However, we will highlight several areas of opportunity where our interviews show there is already a level of consensus: namely, widespread interest in a more universal embrace of existing standards, the development of industry-wide best practices, and greater investment in education and collaboration by companies and individuals.

Fully Embrace Existing Standards

As detailed in this report, the programmatic TV industry is challenged by a variety of coordination and standardization problems—but a set of standards does exist. Industry participants should redouble their efforts to comply with these standards and make full use of the tools already offered by buying and selling platforms. Several possible paths to improvement stand out, as follows.

Buyers and sellers should require adtech partners to share and continually update current specs supported in their platforms,

6. Industry Priorities Going Forward

and prioritize any testing that is needed. Buyers and sellers should also deploy buying/selling/operational processes to ensure clear communication, including the expected OpenRTB attributes and precise content metadata needed for a buy. To that end, IAB Tech Lab suggests using an integration checklist, especially to ensure coverage of any desired "recommended" attributes, which aren't required in the bidstream.

Adtech Platforms should support all possible metadata fields, pre-bid, so clients and partners can transact at the level of transparency that suits them. Post-impression, adtech platforms should ensure log-level data is made available to customers to provide full transparency. Additionally, they should eradicate mislabeling and improve operational quality assurance. Here are several examples:

- Ad servers, SSPs, and DSPs should implement consistent metadata fields aligned with OpenRTB, and ensure other platforms are receiving the data in the expected, standardized format.

- Publisher ad servers and SSPs may be best placed to map multiple taxonomies and make the mapping tables available to partners, including publishers and DSPs.

- Adtech companies should build platform features and QA strategies that prevent common metadata format variations; for example, if the OpenRTB object value is freeform, build a mechanism to guide customers on the best ways to frame their entries.

- Adtech companies should work with app stores on a solution for app names to be received correctly and avoid mislabeling a programmer's app as that of a content distributor.

Buyers, sellers, and adtech platforms should support the latest IAB Tech Lab specs, such as OpenRTB 2.x, VAST 4.0, and Content Taxonomy 3.1, and ensure they keep pace with updates. They should guide and encourage clients and partners to do the same, to further disseminate the use of these standards. When the burden of timely upgrades is too great, companies should communicate other options and support, such as checking for backward compatibility on desired functions. In addition, all parties should leverage creative IDs consistently, utilizing ACIF and UniversalAdId for better campaign control (frequency capping, competitive separation, etc.) and measurement. Every stakeholder group should harness ad creative metadata with the following recommendations:[53]

- **Agencies**—When creating AD-ID codes, do it for all ads and put the codes in your VAST or watermark.

- **Publishers**—Do not accept ads without the ACIF-approved AD-ID code; utilize the AD-ID validation API to ensure the codes you receive are valid.

- **Adtech Platforms**—Ensure creative asset AD-ID codes are enabled to go through your system, and support VAST 4.0.

Define and Commit to Best Practices

Beyond more widespread adoption of existing standards, the development of additional best practices and scoring methodologies would be tremendously beneficial. Ideally, a consortium of industry participants would workshop standardization issues and set industry-level guidelines for metadata and transparency to foster efficiency in trading, targeting, and measurement. Such a collaborative initiative could establish agreements on the following:

- **Minimum levels of metadata for programmatic transactions**—A clear grading system could be developed, such as A, B, C; with A being the highest level of transparency and C providing the minimum metadata in the bid request based on agreed best practices.

- **Scoring methodology fostering a fact-based view of content quality**—An example is adding another layer on top of the OpenRTB "production qualities" content object: a content quality score of 1 could be SAG-produced long-form content; a score of 2 could be reality TV; a score of 3, influencer or UGC; and so forth.

- **A "Commitment Program" to encourage acceptance and uptake**—Rather than formal certification, this could be more like a code or initiative that stakeholders can sign on to as a form of public accountability.

Invest in Education, Communication, and Collaboration

All stakeholders should increase their investment in educating their teams and level-up their commitment to industry collaboration to improve the ecosystem.

Encourage Participation with Trade Organizations

Trade organizations work to educate the industry through events, webinars, and research studies for business and technical stakeholders; they also provide materials to help companies educate internally. Entities including CIMM, IAB and IAB Tech Lab, the Joint Industry Committee (JIC), the Media Rating Council (MRC), and the Video Advertising Bureau (VAB) provide such support

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53 Nada Bradbury, Chief Executive Officer, AD-ID

6. Industry Priorities Going Forward

by facilitating ongoing forums and fostering dialogue among stakeholders, including major CTV providers, specifically to address standardization gaps.

Some trade organizations already have working groups that can serve as forums for industry collaboration (membership is typically required): for example, IAB Tech Lab's Taxonomy Working Group and CIMM's Programmatic Working Group. See Appendix 1 for more detail on these organizations and their efforts to drive standardization.

Lean into Development of Industry Guidelines

Opportunities to participate include responding when IAB Tech Lab publishes potential changes for public comment, and taking part in its Specification Adoption Program. Neither of those examples requires IAB or IAB Tech Lab membership.

TV companies, in particular, can make an extra effort to involve their executives with a TV-focused background—not only digital natives—in the events, working groups, and research discussed above. Broadcaster and MVPD executives, for example, have a deep understanding of TV policy nuances that are not being sufficiently considered for programmatic standardization.

Dedicate Effort to Education

All companies can incorporate these efforts in the course of normal ad-buying and delivery operations:

- Educate clients and partners on industry standards and norms, and how to work with you to uphold them. Include a process for handling non-standard or ambiguous requests.

- Ensure partners are clear on which standards and specs you support. Make partner/client uptake as easy as possible.

- Ask partners to support the standards and specs you would like to use. Maintain a continuous feedback loop with partners, clients, and trade orgs.

6. Industry Priorities Going Forward

What Individuals Can Do

Every individual working in the programmatic TV ecosystem has a role to play. By advocating and participating in improvements across industry, company, and individual levels, stakeholders can help develop a more collaborative environment that prioritizes standardization, transparency, operational efficiency, and media efficacy.

Get Involved

Opportunities exist internally and externally. Your company may already have internal working groups or projects to improve metadata standardization, transparency, or other addressability and measurement initiatives. If not, start one. If your company is a member of any trade organizations, find out what kind of involvement is possible. Your company may be underrepresented; many large companies aren't as involved as they could be, despite being paying members.

Learn and Teach

If you have identified knowledge gaps or aren't operating off of the latest industry intel, seek out opportunities to go deep or unfiltered, such as CIMM's Deep Dive Seminars and behind-closed-doors round tables. If you are seen as a go-to person or a "metadata whisperer," consider how you might be able to share your knowledge in a way that betters your company or even the industry as a whole.

Improve Process and Communication Strategy

Review your company's internal processes and product design to support industry standards and reduce operational burdens such as manually normalizing metadata. Refine, document, and promote best practices for colleagues and clients to ensure everyone operates under a more uniform approach. Advocate for using more metadata fields to encourage transparency and efficacy.

7. Appendices

Appendix 1: Industry Efforts and Standards

Standardization is vital for increased efficiency across the programmatic TV industry, but it takes effort and must pay off for stakeholders investing operational and technical resources. *"They need that specific benefit written out, [otherwise] that's where a lot of great projects go to die,"* said Benjamin Vandegrift, VP of Measurement Solutions and Innovations at VAB.

> *The challenge of standardization is that everyone agrees, but no one wants to do it.*
>
> *–Sable Mi, former VP of Analytics, Epsilon*

The key organizations described below are laying paths for various industry stakeholders to move in the same direction.

The **Coalition for Innovative Media Measurement (CIMM)**, part of the Advertising Research Foundation (ARF), conducts numerous studies and research programs. CIMM's working groups identify research

priorities, develop projects, and serve as knowledge-sharing communities. The diagnostic study detailed in this report was initiated by the CIMM Programmatic Working Group.

The **Interactive Advertising Bureau (IAB)** and **IAB Tech Lab** publish many guidelines and standards relevant to measurement, transparency, data, and privacy. Here is a curated list:

- Several features in the OpenRTB 2.x standards (version 2.6 onward) were created with CTV real-time bidding in mind, including support for ad pod bidding and additional metadata objects to more accurately describe inventory. Although version 3.0 was released in 2017, IAB Tech Lab has continued updating 2.x due to popular demand and simplicity in rollout.

  - The OpenRTB 2.x specs can be daunting to a non-technical stakeholder, so it may be easiest to start with this PDF. A number of charts outline "objects" (a format used in sending data), explained in this helpful article.

  - As shown in the chart below, some attributes are required, others recommended, and others entirely optional. When marked "required," the transaction will not work if the data is not passed properly. When marked "recommended," it is customary to send.

Figure 11. OpenRTB 2.6 Specs

	Attribute	Type	Description
Examples of required attributes. Grouped at the tops of tables for convenience.	id	string; required	...
	imp	object array; required	...
Examples of recommended attributes. Grouped after required attributes.	site	object; recommended	...
	app	object; recommended	...
Examples of optional attributes, with and without defaults. Attributes are assumed optional unless explicitly qualified as required or recommended.	test	integer; default 0	...
	at	integer; default 2	...
	tmax	integer	...
	wseat	string array	...

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○ Objects range from information about bid request and response, to regulatory signals (laws supported; see Appendix 3), to inventory (device, content, user). OpenRTB essentially runs off of metadata: adtech vendors bring the pipes and OpenRTB brings standards for passing metadata through all the objects.

○ In the specs, none of the attributes in "3.2.16 Object: Content" are marked as required or recommended. This partial snapshot includes the attribute "genre" with the type "string" (meaning words). Strings are freeform fields, providing flexibility but also leaving room for error or misalignment. IAB Tech Lab is working on a fixed genre field for future updates.

Figure 12. OpenRTB 2.6 Specs—3.2.16 Object: Content

Attribute	Type	Description
id	string	ID uniquely identifying the content.
episode	integer	Episode number.
title	string	Content title. *Video Examples:* "Search Committee" (television), "A New Hope" (movie), or "Endgame" (made for web). *Non-Video Example:* "Why an Antarctic Glacier is Melting So Quickly" (Time magazine article).
series	string	Content series. *Video Examples:* "The Office" (television), "Star Wars" (movie), or "Arby 'N' The Chief" (made for web). *Non-Video Example:* "Ecocentric" (Time Magazine blog).
season	string	Content season (e.g., "Season 3").
artist	string	Artist credited with the content.
genre	string	Genre that best describes the content (e.g., rock, pop, etc).

○ Companion specifications

• Advertising Common Object Model (AdCOM)—a model that defines common objects and values used across IAB Tech Lab specs, and houses all enumerated lists used by OpenRTB 2.x. Anywhere "list" appears, that's AdCOM. Looking again at 3.2.16 Object: Content, an example of AdCOM's use is under the cattax attribute, where a seller can point to a particular IAB Tech Lab Content Taxonomy, such as 3.1, and the rows within it to signify the desired categories.

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Figure 13. OpenRTB 2.6 Specs—3.2.16 Object: Content

| Attribute	Type	Description
isrc	string	International Standard Recording Code conforming to ISO-3901.
producer	object	Details about the content Produced (Section 3.2.17).
url	string	URL of the content, for buy-side contextualization or review.
cattax	integer; default 1	The taxonomy in use. Refer to list List: Category Taxonomies in AdCOM 1.0 for values.
cat	string array	Array of IAB content categories that describe the content. The taxonomy to be used is defined by the cattax field. If no cattax field is supplied IAB Content Category Taxonomy 1.0 is assumed.

- • Ad Management API—an application programming interface that facilitates creative review between bidders and exchanges.

- OpenDirect is an API specification that supports programmatic guaranteed (PG) deals; however, not all platforms use it to facilitate PG deals. Buyers access premium supply through their DSP (with 100% response requirement), and publishers provide a standardized way for their inventory to be reserved. This spec supports planning, negotiating, buying, activating, and reporting across platforms.

- Taxonomies

  - ○ Content Taxonomy—for contextual targeting and brand safety/suitability.

  - ○ Audience Taxonomy—for standard nomenclature in audience data: demographic, intent, and interest; part of IAB Tech Lab's Data Transparency Standard, better known as its "nutrition label"; related to Seller Defined Audiences (SDA), part of Project Rearc (see below).

  - ○ Ad Product Taxonomy—for describing the advertised product or service, giving publishers visibility on the categories of ads serving on their properties.

- OTT/CTV Store Assigned App Identification guidelines

- Identifier for Advertising (IFA) on OTT platforms (including CTV) guidelines

- • App-ads.txt specification is about supply chain validation, in terms of specifying authorized digital sellers. This already widely used tool should be adopted universally.

- Ads.cert is a powerful fraud-mitigation tool, complementary to ads.txt and app-ads.txt. It is underused but highly recommended due to its mechanisms to limit fraud exposure: buyers and sellers cryptographically attest who they are speaking to programmatically.

- Advanced TV Standards, part of the Advanced TV Initiative for Addressable TV

  - ○ Digital Video and CTV Ad Format Guidelines— specs for linear and nonlinear, high-res and wide-screen CTV sizes, etc. March 2023 updates provided a more precise definition for "instream" through the video.plcmt attribute and introduced new video placement types like "Accompanying Content."

  - ○ Secure Interaction Media Interface Definition (SIMID)—for devices that support HTML and JavaScript only. *"SIMID is part of a broader effort to replace the older VPAID standard (more details in this IAB Tech Lab blog post). While Open Measurement replaces the use case of verification and measurement, SIMID replaces the use case of interactive streaming media ads, the original intended purpose of the VPAID standard. SIMID provides a path for VPAID deprecation and allows the industry to move to more secure and transparent standards."*

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- Video Ad Serving Template (VAST)—for structuring ad tags that serve ads to video players. VAST 4.3 and its addendums include better support for CTV and attribution reporting.

  - VAST CTV Addendum—published July 2024, backports critical features from VAST 4.x to earlier versions (2.x and 3.x).

- Common Ad Transport Standard (CATS)— *"Defining an ad request standard that can be used for both RTB and non-RTB use cases, while building on top of existing specifications like AdCOM";* it covers scenarios that OpenRTB and VAST do not.

- Ad Creative ID Framework (ACIF)—used to standardize and validate registered ad creative IDs, and to maintain the ID through the ad supply chain.

- ACIF with UniversalAdId enables persistent creative identifiers across digital and linear channels; supporting ACIF is important for better transparency, competitive separation, and frequency capping.

- In the US, AD-ID is working to launch support for OpenRTB, in addition to its long-standing support for VAST and linear TV; using consistent ad creative metadata will help bring it all together across TV and video.

- The VAST 4.x spec shows how to implement the UniversalAdId element. See also the VAST Addendum for CTV 2024, which includes backward compatibility by way of extensions and instructions for each version of VAST—to be actioned by adtech platforms as well as any buy-side software and interfaces that generate tags.

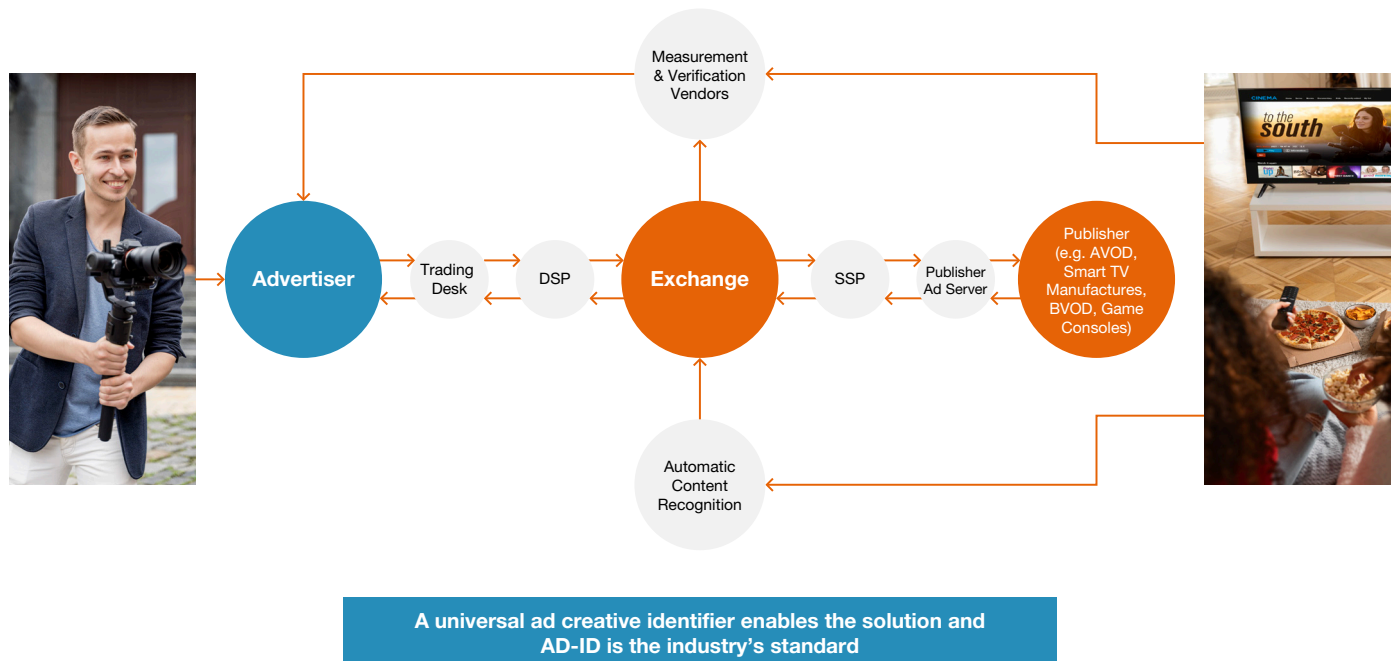**Figure 14. AD-ID Overview**

How AD-ID Works
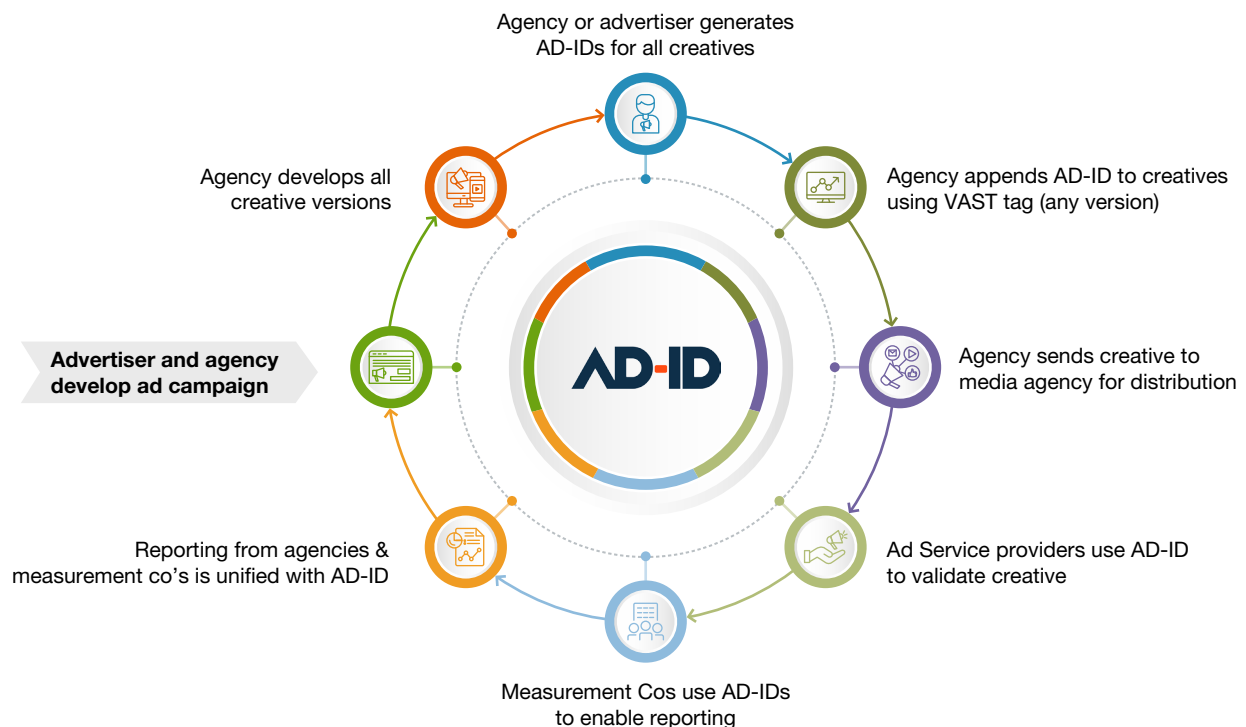
Source: AD-ID 2024

Figure 15. AD-ID Impact

Can a cross-platform creative asset be tracked when linear uses AD-ID and online and CTV use a combination of .xml, pixel tags, watermarks, ISCI and proprietary identifies?

A universal ad creative identifier enables the solution and AD-ID is the industry's standard

Source: AD-ID 2024

- Privacy-focused guidelines

  - [Privacy Taxonomy](#)—announced September 2024, developed under IAB Tech Lab's Privacy Implementation and Accountability Task Force.

  - [Project Rearc](#)—a task force to "rearchitect" digital advertising to respect privacy while preserving addressability. Key solutions are:

    - [Global Privacy Platform (GPP)](#)—supports privacy strings for the IAB Europe Transparency and Consent Framework (TCF), IAB Canada TCF, the MSPA's US National string, and US state-specific privacy strings.

    - [Privacy Enhancing Technologies (PETs)](#) Initiative—a working group focused on the PETs methodologies and standards that enable multi-party data collaboration without sharing data.

    - [Seller Defined Audiences (SDA)](#)—an addressability spec for publishers to safeguard first-party data while offering advertisers standardized, scalable cohorts.

  - [Project Crosswalk 2.0](#)—an IAB Legal Affairs Council working group providing guidance on addressability, privacy, and accountability.

  - [IAB Diligence Platform](#)—launched August 2024, powered by [SafeGuard Privacy.](#)

  - [Guide to Navigating COPPA](#)—recommendations for compliance with the Children's Online Privacy Protection Act (COPPA) by the IAB Data Benchmarks and Activation Committee and the COPPA Working Group.

  - [VPPA Litigation Preparation and Defense Toolkit](#)—published April 2024, an IAB white paper on the Video Privacy Protection Act (VPPA).

- Measurement-specific guidelines

  - [Measurement Map for Video](#)—a detailed graphical overview of types of data involved in measurement, who owns it, and where it flows.

  - [Open Measurement Software Development Kit (OM SDK)](#)—facilitates standardized third-party viewability and verification measurement for video, regardless of device or app.

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- Attention Measurement Toolkit—a set of resources published in August 2024, designed by IAB's Attention Task Force; in September 2024, news broke of upcoming certification plans in conjunction with the MRC in 2025.

The **Joint Industry Committee (JIC)** is a US nonprofit formed in 2023 to pave the way for multiple currencies in the US. It launched with high-profile founding members Fox, NBCUniversal, Paramount, TelevisaUnivision, Warner Bros. Discovery, OpenAP, and VAB, later adding agency buyers and additional sellers. In 2024, JIC introduced its own currency certification, focusing on transactional readiness; this complements MRC accreditation.

The **Media Rating Council (MRC)** focuses on ensuring efficacy and improving the quality of measurement services and data source products. Earning MRC accreditation is the industry's ultimate stamp of standardization; companies are put through rigorous audits and must requalify regularly. Note: some players in the ecosystem may claim to follow MRC guidelines, but that is different from being accredited.

Project Open. Addressable. Ready. (OAR) was a consortium formed in 2019, now decommissioned. Led by Vizio, it gained early traction with members including Disney, Fox, NBCU, Paramount (then ViacomCBS), and Warner Bros Discovery (then WarnerMedia). For about three years, the group worked toward the common goal of bringing a standardized, scalable solution to addressable linear TV, with a focus on OEMs. Reasons for OAR's dissolution included the pandemic, which slowed progress; the group may have best been viewed as a hedge while CTV was nascent; and ultimately, the OEMs built up their own competing revenue-generating products.

The **Video Advertising Bureau (VAB)** is an insights- and advocacy-based organization focused on bringing about a more innovative and transparent marketplace for video and TV. Benjamin Vandegrift, VP of Measurement Solutions at VAB, shared an example of current efforts: *"As proponents of innovation, the VAB is working with our members and the industry at large to explore new types of metrics that may leverage AI and machine learning in order to take multiple sets of data points to create a new type of quality metric."*

Appendix 2: Universal IDs

A plethora of universal IDs are available for use in the programmatic TV ecosystem. Below is a short list of key identifiers plus a handful of industry solutions. Note that the term "universal ID" is often used aspirationally; no single universal ID is used by all stakeholders.

Furthermore, as discussed herein, interoperability between data vendors is becoming more prominent.

Industry-led Solutions

- Identifier for Advertising (IFA)—IAB Tech Lab's unique identifier for OTT advertising.

- Extended Identifier (EID)—an OpenRTB object that allows for multiple IDs from a single source or technology provider, designed to enhance transparency and improve understanding of ID provenance. It can help alleviate uncertainty around ID bridging.

- First-party identifier frameworks that also have a place in the standardization realm:

  - Seller-defined Audience (SDA)—part of IAB Tech Lab's Project Rearc, allowing sellers to create audience definitions that buyers can understand, enhancing targeting capabilities.

  - Prebid SharedID—enables publishers to pass the user ID stored in their first-party domain to chosen partners through Prebid's User ID Module.

Company-led Solutions

- Unified ID 2.0 (UID2)—an open-source ID framework based on user authentication, usable across devices and in both app and browser environments. Created and operated by The Trade Desk, it is earmarked to eventually receive a new administrator.

- LiveRamp's Ramp ID and Authenticated Traffic Solution (ATS)—Ramp ID offers a persistent identifier for people across devices and environments, and ATS resolves/matches authenticated users to a Ramp ID.

- OpenID—OpenAP's cross-platform ID for video, with a focus on converged TV.

- Blockgraph ID—Blockgraph's cross-device ID, with a focus on converged TV.

- ConnectID—Yahoo's cross-device ID.

- ID5 ID—ID5's cross-device ID.

- Panorama ID—Lotame's cross-device ID.

- COREID—Epsilon's cross-device ID.

- IIQ ID—Intent IQ's cross-device ID.

- Living Unit ID (LUID)—Experian's ID for its identity graph linking offline and online data.

Appendix 3: Key Privacy Regulations in the US

The evolving landscape of privacy regulation, FTC crackdowns, and ongoing lawsuits impacts the broader tech, media, and marketing space as it pertains to programmatic TV dynamics. Most legal issues in this data realm are related to protecting the individual. *"Personal information and personal data are defined broadly by state privacy laws, and although specific facts may vary, the general rule is that even information like an IP address, device ID, and hashed/encrypted unique user IDs are considered personal information under state privacy law,"* according to IAB's Project Crosswalk 2.0.

People have rights pertaining to their personal information, whether under the California Consumer Privacy Act (CCPA), the Video Privacy Protection Act (VPPA) in the US (see below), the General Data Protection Regulation (GDPR) in Europe, or any number of other regulations across the US and around the world.

Some laws also explicitly cover household-level identification. For example, CCPA defines personal information as data that *"identifies, relates to, describes, is reasonably capable of being associated with, or could reasonably be linked, directly or indirectly, with a particular consumer or household."* Similarly, the Oregon Consumer Privacy Act (OCPA) states, *"Personal data is any information that can be linked to an individual. Personal data also includes any information that can be linked to an individual's device or a household device (like a cell phone or a smart appliance)."*

In abiding by these laws, stakeholders must honor opt-outs. But even if an OEM or MVPD upholds a user's consent choices, buyers might apply targeting that the seller doesn't know about.

Key US laws that impact programmatic TV advertising are detailed below.

The **Video Privacy Protection Act (VPPA)** of 1988 prohibits *"the disclosure of video rental records containing personally identifiable information."* It has emerged in recent years as a force to be reckoned with in CTV, streaming, and OLV, as it relates to the sharing of video content metadata that divulges specific content a user has viewed. In a nutshell, VPPA considers privacy to be at risk when identity signals such as IP address and show-level data are combined.

"When you're buying in linear TV, you're buying a spot that is tethered to content. Streaming is addressable, so you are now sharing user level information. So that is the reason why it's not as simple to just be able to pass

everything in the bidstream. There are actual concerns around that, and our company is extremely cognizant of that," said a publisher.

Lawsuits are abundant. For example, a class action lawsuit against Vizio in 2018 was based on sharing ACR data without user permission. An AdExchanger article that elaborates on that lawsuit serves as a cautionary tale.

VPPA class action lawsuits are likely to increase, according to Polsinelli, a law firm: *"One of the first heavily publicized cases in this new wave [2022-2023] of VPPA cases was against the Boston Globe in early 2022. The lawsuit alleged the Boston Globe's integration of the Meta pixel tracking functionality onto sections of their website which were only available to Boston Globe subscribers violated the VPPA to the extent that tracking included tracking integrated video views on the website. In the year following the filing of the Boston Globe lawsuit, over 100 class actions were brought against online news outlets, streaming services retailers and others, almost all of which were based on use of the Meta pixel on those websites."*

Class action lawsuits indeed continued into 2024; for example, against Univision in March. Others initially filed in 2023 went through motions to dismiss but were confirmed to proceed in 2024, including one against Tubi in February and another against Fubo in June.

Many VPPA lawsuits are dismissed, often because of ambiguous definitions, but some do proceed. Husch Blackwell, another law firm, says on its blog: *"Where the defendant directly rents or sells video content or access to such content, courts will typically find the defendant is a video tape service provider and the plaintiff [meets] the 'consumer' definition. Where the defendant's core business is unrelated to video services, however, and the video contents at issue are merely marketing for that other core business, courts are likely to find the parties do not meet the VPPA's definitions of 'provider' and 'consumer.'"*

In April 2024, IAB published the *VPPA Litigation Preparation and Defense Toolkit*, a recommended read. Here are a few key highlights:

- *"A video tape service provider is 'any person, engaged in the business… of rental, sale, or delivery of prerecorded video cassette tapes or similar audio visual materials.' This definition has been interpreted expansively by the courts to include OTT apps consumers use for streaming, as well as publisher apps with video content … Livestreaming of video content that is not pre-recorded has been held not to give rise to VPPA liability."*

- Matters of concern include third-party cookies, pixels, and software development kits (SDKs), which provide methods for partners to collect data on the content and user behavior on their site or app. These should be used with great care, as a number of lawsuits are based on data being furnished through these routes to social media platforms, adtech vendors, and the like.

- Recommendations address the crux of publisher concerns, concluding that it is OK to share genre and analytics unrelated to content but not to share video title, description, subject matter, or ACR data.

The original **Children's Online Privacy Protection Act (COPPA 1.0)** of 1998 only protects children up to the age of 13. Since late 2023, the FTC has worked to further strengthen COPPA. As AOL wrote in July 2024: *"The Children and Teens' Online Privacy Protection Act, known as 'COPPA 2.0,' has bipartisan support in both houses of Congress. The bill would expand the law to cover those up to age 16, close loopholes allowing platforms to ignore the presence of underage users, ban targeted advertising to children and teens, and make it easier for them or their parents to delete their data."* COPPA 2.0 passed in the Senate in July 2024, however it didn't pass in the House by the time the 118th Congress adjourned in January 2025; it has since been reintroduced in the 119th Congress in March 2025.

Tech giants are being hit with fines and lawsuits over COPPA. The FTC has levied very large fines on TikTok and Google/YouTube and has designs on more controls to protect children on Meta/Facebook platforms. The FTC's COPPA FAQ is clear that IP address and other identifiers constitute private information: *"The Rule defines 'personal information' to include persistent identifiers, such as a customer number held in a cookie, an IP address, a processor or device serial number, or a unique device identifier that can be used to recognize a user over time and across different websites or online services."*

The **Health Insurance Portability and Accountability Act (HIPAA)** of 1996 is enforced by the US Department of Health and Human Services (HHS) Office of Civil Rights (OCR). This federal regulation is germane to the programmatic TV industry, given its scale of pharmaceutical advertising. Indeed, *"CTV's share of impressions among pharma advertisers has grown 36% since 2019,"* according to a 2024 Medical Marketing + Media article.

HIPAA has implications related to identity, tracking, and data sharing. Here are several key takeaways:

- Data partnerships require extra diligence. Businesses that aren't already HIPAA-regulated and are considering working with protected health information (PHI) may need to sign a business associate agreement (BAA).

- Explicit consent is required, as noted on the HHS website: *"The HIPAA Privacy Rule gives individuals important controls over whether and how their protected health information is used and disclosed for marketing purposes. With limited exceptions, the Rule requires an individual's written authorization before a use or disclosure of his or her protected health information can be made for marketing."* This is clarified in the March 2024 OCR bulletin: *"Website banners that ask users to accept or reject a website's use of tracking technologies, such as cookies, do not constitute a valid HIPAA authorization."*

- Deterministic one-to-one targeting using PHI quickly gets into the danger zone. Probabilistic audience targeting, when done correctly, is better. Contextual targeting is the safest way to be compliant, by not relying on personal health information to target.

- The aforementioned OCR bulletin includes important warnings related to the presence of third-party tracking technologies for browsers vs apps and in authenticated vs unauthenticated environments. It identifies IP address, device ID, cookies, pixels, etc. as tracking signals or IDs tied to PHI. It also clarifies that not all websites with health information and tracking IP addresses are in violation; read with care. That is the crux of HIPAA: *"Thus, regulated entities that are considering the use of online tracking technologies should consider whether any PHI will be transmitted to a tracking technology vendor and take appropriate steps consistent with the HIPAA Rules."*

OCR's bulletin may have been posted in part due to concerns over a Meta Pixel scandal in the healthcare industry in 2022. This led to several lawsuits against Meta and the healthcare providers involved, including cases that leaned on medical privacy issues outside of HIPAA.

Appendix 4: Helpful Resources

- Prebid: Prebid Video Ads resource center

- Index Exchange: Streaming TV Video Series

- tvScientific: CTV Glossary

- Madhive: CTV Measurement: 8 CTV Metrics Linear Advertisers Love

- FreeWheel: Guide to Programmatic Metadata

- Ad Tech Explained: deep-dive article Content Metadata for Programmatic Video Advertising Explained

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- CIMM: The Future of Clean Rooms and Data Collaboration

- Lotame: Back to Basics: What Is Data Onboarding in the Omnichannel Era?

- CIMM and Go Addressable: Guidelines for Planning & Buying Addressable TV Advertising

- truth{set} Household Identity Accuracy Project: full report behind CIMM member login, and blog post

- Vikas Mishra et al. The Web Conference 2020, April 2020, Taipei, Taiwan, Don't count me out: On the relevance of IP addresses in the tracking ecosystem.

- International Association of Privacy Professionals: Global Privacy Law and DPA Directory

- DLA Piper: tool to compare data regulation around the world

- Sourcepoint: document summarizing sensitive personal data regulation by US state

Appendix 5: Terminology

Advertising-related Terms

Programmatic TV is not confined to a single platform or inventory type. Instead, it is a sales and execution channel for TV and video advertising, leveraging data, automation, and core programmatic protocols and standards to streamline ad buying and delivery and to support interoperability across multiple ecosystem participants.

At its core, it is a data-driven, automated method of purchasing and delivering TV inventory, widely claimed to offer greater flexibility and efficiency.

Programmatic TV encompasses a wide range of (ad-served) channels and formats and various trading models: non-biddable (guaranteed, preferred) and biddable (private marketplace, open marketplace).

Transparency in programmatic advertising refers to the level of clarity stakeholders have around what is being bought and sold, where ads are running, and how commercial deals are structured.

Metadata is data about data.

Ad environment metadata is structured information describing the inventory being sold and is passed by sellers to buyers. Generally, the more metadata is passed, the greater the buyer's understanding of targeting, brand suitability, and value, as well as opportunities for more robust measurement and in-flight optimization. Metadata is passed in the bid request using the OpenRTB protocol, currently in version 2.x.

Here are several examples of environment metadata attributes:

- Device: devicetype: Connected TV

- Device: ipv6 : 2001:db8:f::/48—IP address, either "ipv6" for IPv6 or "ip" for IPv4; often truncated.

- App: name: Hulu

- App: bundle: 123456—strings of characters that identify individual apps, typically pulled in automatically from the app stores. Publishers have a level of control in PMP environments where bundle IDs can be manually created, and they can also work with adtech partners (DSP, SSP, verification companies) to ensure their content is accurately represented in the bidstream—e.g., to avoid mislabeling a programmer's app as that of a content distributor.

- Content metadata: information describing content, such as genre, rating, and duration.

- Content: network: NBCUniversal

- Content: series: *The Office*—example of show-level data, along with season and episode

- Content: genre: comedy—see IAB Tech Lab's Content Taxonomy; other taxonomies are also in use in some parts of the programmatic ecosystem.

Ad creative metadata plays an increasingly important role in the converged TV marketplace. Advertisers use Advertising Digital Identification (AD-ID) in the US for identification of assets across TV buys to enable accurate measurement. AD-ID, founded by the American Association of Advertising Agencies (4As) and the Association of National Advertisers (ANA), existed for more than 20 years for linear TV, then launched with VAST support in 2012, and now supports OpenRTB with the launch of IAB Tech Lab's Ad Creative ID Framework (ACIF).

IAB Tech Lab facilitates AD-ID via the UniversalAdId element in VAST 4.x, with backward compatibility for VAST 2.0 (based on support within each adtech platform), which is predominantly used by publishers. This enables advertisers to pass information about the ad creative through the ecosystem to validate the advertiser and unique asset. It also enables functions including competitive separation, frequency capping, optimization, and cross-channel measurement.

Examples of the metadata housed in AD-IDs that can be passed from advertisers to signify a unique creative asset include brand, product, ad title, media type, length/size, and agency. See Appendix 1 for more details on metadata standards.

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TV and Video Terms

- Connected television (CTV)—any device that streams content from the internet onto a TV screen; includes smart TVs, stand-alone streaming devices (sticks, boxes), and gaming consoles.

- Over-the-top (OTT)—the method of streaming content over the internet across any device.

- Online video (OLV)—includes instream and outstream ad formats run in desktop and mobile environments, both browsers and apps. Most OLV shares certain ad delivery fundamentals (e.g., VAST, OpenRTB) with programmatic TV.

- Social video—video shared on social platforms; a different beast not covered in depth herein, as it presents a different set of challenges (re: walled gardens).

- Streaming—video (or audio) content delivery over the internet on any device; includes "pureplay" streamers, broadcaster's streaming services, and various subcategories, e.g.:

  ○ Video on demand (VOD)—ad- or subscription-supported, or a combination.

  ○ Free ad-supported streaming television (FAST)—live/scheduled and on-demand.

- Digital video—a catch-all term including all of the above, used by IAB for any video that is not traditional linear TV.

- Programmer (also called broadcaster or TV network)—the entity in charge of programming the content to be aired/made available to viewers.

- Multichannel video programming distributor (MVPD)—including cable and satellite TV providers; they package multiple TV channels for consumers.

  ○ Virtual MVPD (vMVPD)—content delivered over the internet that doesn't require a set-top box (STB) or satellite dish.

- Advanced TV—all nontraditional TV; this tends to be used as an umbrella term for addressable TV, CTV, OTT, etc. but is not synonymous with each of those terms, and all advanced TV isn't programmatic.

Measurement-related Terms

- Impressions—the number of views received by an advertisement, the key metric on which digital display and video is transacted.

- Cost per mille (CPM)—cost per thousand impressions, the currency of programmatic TV advertising.

- Currency—the financial unit transacted against in TV advertising, e.g., gross rating points (GRPs), the currency in traditional TV advertising; if a measurement provider isn't Media Rating Council (MRC)–accredited for TV currency, it is considered an "alternative currency."

- Reach—the number of unique viewers exposed to an ad. Interestingly, the definition of this basic term is debated, as some say it conflates households, devices, and people.

- Frequency—the number of times a viewer is reached by a particular advertisement.

- Big data—large datasets automatically generated by viewing behavior, most prominently Return-path data from cable and satellite set-tops and ACR data from smart TVs.

- Converged TV—the combination of linear TV, connected TV, and digital video.

- Incrementality—incremental reach of programmatic vs traditional linear TV (as related to our discussion); can also refer to incremental conversions (controlled vs exposed).

- Performance—the main performance metrics in programmatic TV:

  ○ View-through rate (VTR) or video completion rate (VCR)

  ○ Watch time

  ○ Cost per completed view (CPCV)

  ○ View-through conversions (VTC)

  ○ Return on ad spend (ROAS)

- Viewability—automatic content recognition (ACR) data that confirms ads were displayed on a TV that was turned on.

- Attention—viewer engagement with an ad: how (active, passive) and how long, quantified through eye tracking and predictive modeling.

- Video Ad Serving Template (VAST)—holds the creative instructions and is a type of tag to serve and measure ads in video players, including CTV.