



CONVERGENT TV MEASUREMENT GUIDE

Understanding Innovation in Video
Measurement

Coalition for Innovative Media Measurement (CIMM)

www.cimm-us.org

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Introduction to the Guide



CIMM's Convergent TV Measurement Guide is intended to provide a broad overview of the offerings and methodologies provided by many of the leading TV measurement providers operating in the US market. It is based on an extensive, six-month process of engagement with the industry and peer review by a wide range of leading industry stakeholders. It represents the most comprehensive review of existing measurement solutions available in the market today, providing a detailed overview of eight measurement providers in the Measurement Providers Profile section, unpacking the data and methodologies used to create their respective solutions.

We hope this Guide will help industry participants to understand the changes facing the television ecosystem and the business needs of marketers, ad buyers and ad sellers that are driving new measurement solutions.

In preparing this Guide, we found that the gap between television and digital advertising is narrower than it's ever been, thanks to measurement innovation by the leading measurement providers profiled here. Measurement innovation enables television, a historically upper funnel sales channel, to compete more effectively with digital media and other lower funnel sales channels. Measurement innovation enables television to prove itself in an increasingly convergent digital ad ecosystem.

Measurement providers are embracing the need for radical transformation, to address the desire of marketers for speed, audience-based targeting, granular insights, and more precise performance measurements. Marketers value objective, third party measurement to negotiate pricing of ads inventory, to reach audiences relevant to their brands, to continuously optimize TV ad investments, and to continuously measure performance across platforms. Measurement providers are powering linear TV and streaming ad investments with advanced measurement solutions to accelerate revenue growth for both brands and publishers.

We believe the guide presents a positive, insightful overview of a fast-changing, competitive marketplace. It is, perhaps inevitably, long and detailed – measurement is complex and often challenging, and the guide reflects this.

The Coalition of Innovative Media Measurement (CIMM) wishes to express its sincere thanks to the participating measurement providers and our team of expert reviewers. Without the detailed responses to CIMM's request for information by measurement providers, and their willingness to explain and share, this Guide would not be possible. Without the feedback from our expert reviewers, this Guide would not be possible.

Caveats and Qualifications

A Brief Note on Our Approach

The Guide was prepared through a process of extensive engagement with the profiled measurement providers and peer review by seasoned industry experts. All providers were given various opportunities to review and sign-off their own profiles. The profiles have not been subject to independent audits.

One of the objectives of the Guide was to provide a (blinded) comparison of actual ad campaign or content audience estimates, so that users of the Guide can better understand the range of reporting differences across providers. However, it was not possible to provide ad campaign delivery comparisons, because measurement providers measure ad campaigns for different brands at different times so “apples-to-apples” comparisons are not possible.

Regarding content measurement comparisons, not all providers measure content, and not all providers who measure content permitted their examples to be included. Across campaign measurement examples, there were differences in reporting granularity. Across content measurement examples, the measurements were directionally similar but substantially different on an absolute basis. There is more detail about these findings in Chapter IV: Measurement Today: What We Discovered.

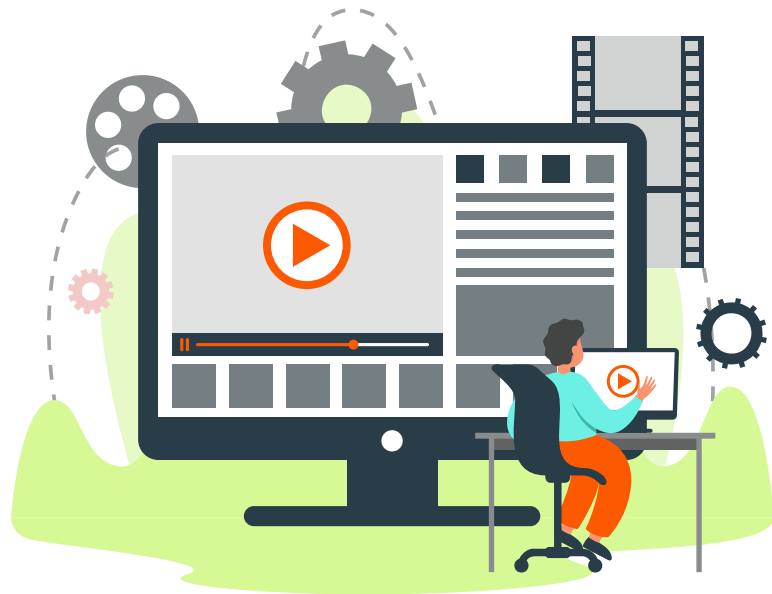
We include lists of questions that marketers should ask measurement providers as they evaluate their services. Leading measurement providers are individually profiled in this Guide to highlight their capabilities and methodologies. The Appendix is designed to help with acronyms and definitions.



A Snapshot in Time

Inevitably, the guide represents a snapshot in time. Measurement providers are continually improving and innovating their services. Users of measurement services should connect directly with the providers to ensure they have the latest updates to data, methodologies, and features of each service. This Guide represents measurement provider capabilities as of December 31, 2022.

Foreword



Clay Christensen's *The Innovator's Dilemma* created a breakthrough in understanding innovation, how innovators disrupt market leaders and how market leaders successfully innovate. Success happens when disruptive technologies are applied in novel ways to offer new markets products with superior performance. While the new markets may be smaller and lower-margin at first, innovations eventually enter larger and higher-margin markets of the market leaders, disrupting them.

The compelling analysis in this book is playing out today in the video measurement space. The disruptive technologies are digital and data at scale. The superior performance attributes are many, including unprecedented audience insights, faster, more accurate decision-making, faster, more flexible media performance measurement, and the promise of lower operating costs. Per the Christensen playbook, measurement innovations were first adopted largely on the buy-side, a smaller market for market leaders. Now as we read the measurement initiative announcements by virtually all major publishers, we see the innovations entering the larger and higher margin sell-side marketplace, disrupting the industry.

Innovation is hard work, but at the same time has the force of inevitability. I hope this *Convergent TV Measurement Guide* provides an appreciation of new entrants and market leaders alike, and what it takes to innovate. Many thanks to Helen Katz at Publicis, Bharad Ramesh and Yee Pang at GroupM and Paul Donato at ARF for their thoughtful insights and careful review of this Guide. A sincere thank you as well to the participating measurement providers. Without the detailed responses by measurement providers, and their willingness to explain and share, this Guide would not be possible. Thank you to Jon Watts at CIMM for his leadership and foresight. Jon has a keen understanding of our industry and how to steward meaningful change. Without Jon's leadership, this Guide would not have been possible.

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Accelerating Growth
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Evolution of an Industry

Our definition of television has expanded dramatically, beyond linear TV to “Convergent Video,” which includes television in more forms, including connected TV, advanced TV, digital video, dynamically inserted video advertising,

addressable advertising, ‘over-the-top’, streaming and more. Marketers demand new measurement solutions addressing Convergent TV to bridge the gap between digital and television advertising. Television traditionally offers impacts including engagement, attention, and persuasiveness of sight-sound-and-motion advertising. Digital advertising offers the promise of granular insights, advanced targeting, and rapid optimization. How do we get the best of digital and TV from our investment in television advertising?

Moreover, there has been a tectonic shift in brand ad spending. Marketers have made an unmistakable shift from ad spend that builds “upper funnel” impacts such as brand awareness, likeability, and consideration to spend that builds “lower funnel” impacts to generate sales closer to the consumer’s exposure to the ad. This shift makes video measurement innovation even more critical for historically upper funnel channels like linear TV and streaming because marketers are holding all channels accountable to measurable business results.

Lower Funnel Ad Investment in Upper Funnel Channels

“Upper funnel” and “lower funnel” refers to where the consumer is in their purchase journey. In the upper funnel, marketers build brand awareness, likability, and consideration, so that when a consumer is in the lower funnel -- ready to purchase -- they’re more likely to choose the brand.

Marketers understand that to influence the consumer’s decision at the point of purchase requires marketing at the beginning, middle and end of their brand journey. Investment in upper funnel marketing channels is essential to brand health and revenue, and even accelerates lower funnel channel performance. However, marketers are holding all channels accountable to their business results regardless of their place in the funnel. Channels without adequate measurement are losing investment.

Marketers also know that few marketing channels are as effective in telling the brand story as sight-sound-and motion video advertising. Video advertising can create virtual memories of brand experiences that persuade the consumer at the point of sale. Marketers know that video advertising can be superior at engaging the consumer with a persuasive message that can carry through the consumer journey to the point of purchase, achieving sales objectives but also building brand equity with long-term benefits.

Understanding the contribution of upper funnel marketing channels in the consumer journey presents a measurement challenge for marketers. Measurement is where “lower funnel” marketing channels, including search and display advertising, have a competitive advantage. This is because the relationship between an ad exposure or search activity and the consumer’s subsequent action, such as a website visit, store visit or online purchase, can be directly observed.

Where spend-to-revenue events cannot be directly observed, intermediary metrics such as ad impressions are used to guide attribution.

Upper funnel channels, such as linear TV and streaming, may not have as clear spend-to-revenue visibility. The ad exposure might occur on one platform – such as a TV set – and the consumer behavior may happen on a different platform – such as mobile or desktop computer. The impact of the ad impressions builds over time, so the ad exposure may happen many weeks before the revenue event and there may be many marketing touchpoints reaching the consumer in-between.

The providers profiled in this Guide have stepped up to the challenge of creating measurement for visibility in these channels, including linear television, connected TV and streaming. They do so using data, ad tech, human ingenuity, and a good deal of math.





Understanding Media Currency

What is media “currency”? Simply put, media currency is the metric that ad buyers and ad sellers agree to use to negotiate advertising price and volume. Just as countries select and value their individual currencies on which transactions occur, so do media buyers and

sellers agree on what they will use as the ‘standard’. However, currency is not synonymous with measurement. That is, the currency does not have to provide the actual count of ad exposure or the true count of content viewing. The currency also does not necessarily have to measure performance, that is, whether the ad was effective or efficient, nor is it required to help marketers find audiences that are the most relevant to the brand. Instead, currency is simply the agreed-upon metric in the pricing negotiation.

The Currency Upgrade

Many of the providers in this Guide started their measurement journey to measure ad campaign performance, to connect TV viewing with advanced audiences and to provide more accurate cross-platform, cross-channel measures of ad campaign delivery. The question today is: can these new measurement solutions also be used as currency to negotiate ad pricing and volume, in addition to measuring performance, targeting audiences, and measuring cross-channel ad campaign reach?

As currency, metrics should provide a standardized measure of value that is the same over time and that is relatively predictable to support planning. A currency metric must be stable, reliable, and consistent so that a transaction made in one time period can be evaluated on the same basis in a different time period. Currency answers questions such as: If I bought X, did the publisher deliver X? Did X cost more or less than the prior period? How do the metrics track compared to what I previously used as currency? Moreover, the methodology to get to currency measurement is complex and must be understood and transparent to users.

Metrics

Marketers utilize various metrics to measure the effectiveness and efficiency of video advertising.

ROAS

Marketers love Return On Ad Spend (ROAS), and for good reason. ROAS is a measure that shows how much revenue was earned for every dollar invested in advertising in each channel. ROAS is widely used by marketers to measure ad investment effectiveness and efficiency using multi-touch attribution or market mix modeling.

ROAS is not currency, however. ROAS contains revenue information that is proprietary to the marketer and therefore not usually available for ad buyers and ad sellers to use as currency. In addition, most attribution and modeling are also proprietary to the measurement provider.

Ad Impressions

Because ROAS is typically proprietary, ad buyers and sellers tend to use metrics that measure the efficiency of audience delivery as currency instead. Ad impressions and cost-per-thousand impressions (CPM) are commonly used currency metrics today.

Legacy currency metrics tended to be channel-specific. For example, linear TV used average audience and cost-per-rating point (CPP) have been used as currency metrics for decades.

However, the ascendancy of digital media caused channels like TV to standardize on currency metrics that enable more effective comparisons across digital and TV platforms: impressions and CPM.

There is a healthy debate in the media industry about the definition of an ad impression. A digital display ad that appears on the webpage for a fraction of a second is not equivalent to a television advertisement that the consumer could watch for 30 seconds. Both could be counted as one impression, even though they aren't identical. Measurement providers can have a different number of seconds before a video advertisement is counted, or they can leave that decision up to the marketer. Organizations such as the Media Rating Council (MRC) and Interactive Advertising Bureau (IAB) have developed guidelines to set standards in this area.

Unduplicated Reach and Frequency

Many of the measurement providers in this Guide were founded to solve the increasingly difficult challenge of measuring the unique reach of an ad campaign across multiple media platforms. Before that, cross-platform reach was largely estimated using mathematical techniques such as fusion or random duplication calculations. Measurement providers invested in the ad tech required to match very large television datasets with census-level digital data to directly observe cross-platform reach instead of estimating it through modeling.

Although ad impressions are the currency metric for ad buyer-seller negotiations, that solves only part of the media puzzle. Marketers demand reach (the unique, unduplicated number or percent of people or households exposed to the ad) and frequency (among those exposed to an ad, the average number of times a person or household was exposed) metrics to understand ad exposure by consumers as individuals and how much ad exposure is too little, too much or just enough.

Measuring Outcomes

Measurement providers in this Guide looked to large viewing datasets to develop more effective, granular measurements of the impact of advertising. Prior to the availability of very large television datasets, the impact of television advertising was measured using surveys and econometric modeling, which time-aligns ad delivery with brand sales to statistically measure cause and effect relationships. Unfortunately, it could take months or years to have enough data for reliable measurements, and the results produced only very broad, very blunt overall effectiveness measures.

The availability of large TV datasets enabled television viewing households to be matched to behavioral data such as website visits, store visits and purchase, which help provide more granular, network, program, and audience-specific measures of impact to measure and optimize ad spending across channels.

The measurement providers in this Guide have developed attribution and sales effects measurements to help marketers understand the impact of television and digital advertising. They enable data access through a dashboard, and/or direct data feeds and integrations with third-party software. Some are making the data available in a raw, un-tabulated form in data clean rooms for marketers to do their own analytics.

Advanced Targeting

One of the key benefits of measurement innovation is advanced targeting. This enables the marketer to go beyond the legacy demographics such as age and gender that have been traditionally used to buy linear TV and use audiences that are more relevant to the specific brand, such as past purchasers, purchase intenders, store visitors and category purchasers. Targeting that uses advanced audiences helps marketers reach consumers for whom the brand is more relevant, or those who are in-market and more likely to purchase.

Optimization

Another key benefit of measurement innovation is improved optimization. This is where marketers test, learn and optimize, finding channels predicted to over-perform, measuring performance, and then moving dollars from under-performing to over-performing channels. Measurement providers profiled in this Guide offer more frequent reporting so that decisions about channels and spend can be made in-flight. Instead of a brand lift and reach and frequency 'report card' only at the end of a marketer's campaign, measurement providers can make updates throughout. More frequent reporting is a significant benefit and puts upper funnel marketing on a more level-playing field with lower funnel channels.

Ads vs Content for Measurement

The Promise of Ads for Measurement

Marketers increasingly plan, optimize and measure based on ad campaign delivery metrics. The marketer typically has full access to ad delivery data across their marketing channels. Ad campaign delivery measurement is usually the only way marketers can obtain a comprehensive measure of the brand's ad exposure and ad performance on a cross-platform and cross-channel basis. The digital data are available quickly, often immediately or overnight. In addition, questions about the ads themselves are the most important ones for marketers. Where the ad was delivered (what content), is usually a secondary consideration.

Using ads exposure for measurement holds great promise for the media industry, and measurement providers in this Guide have built services to deliver on that promise. Ad-based measurement could be more effective if there were greater collaboration across marketers to share measurements, with the expectation that brand identity would be masked. Collaboration would help overcome challenges of visibility, transparency, and lack of industry benchmarks.

Visibility. Ads measurement on platforms other than linear TV is proprietary to the marketer, so one marketer's performance can't be used by other marketers for analysis and learning. This is less of a problem for marketers that have a large roster of brands or for marketers that make very large video ad investments. It is more of a challenge for marketers with fewer brands and lower levels of video ad investment. It's challenging to use ad campaign measurements as the basis to negotiate advertising pricing if marketers do not have visibility into all publisher ad inventory available to buy.

Benchmarks. Except for linear TV, marketers can only measure channels that they buy with sufficient ad volume. Optimization is a continuous exercise in trial and error where marketers reduce investment in underperforming channels and make investment in new and over-performing channels. The process can be inefficient, with marketers discovering which channels are performing through trial-and-error. You can't measure what you don't buy and there are undoubtedly strong investment opportunities that marketers and their media agencies simply can't identify until inventory is purchased and runs.

Transparency. CIMM's Getting Attribution Right study¹ found significant differences in attribution results for linear TV across attribution providers. The paper concluded that the issues were the result of input data and methodology. The study highlighted the importance of transparency in data and methods that are relevant to the currency measurement ecosystem (and an important goal of this paper).

Another level of transparency includes content identification. Ads measurement does not always provide visibility into the content in which the ad runs. Content and context are important to the effectiveness of advertising with research demonstrating that content that drives audience engagement also drives greater attention and sales effects due to advertising². In addition, marketers have brand safety concerns, and understanding content is important to exclude advertising from content that doesn't align with values such as diversity, equity, and inclusion.

Advantages of Content Measurement

Content measurement (and ads measurement that is grounded in content measurement) provides estimates of audience size and composition by publisher, network, title, and station for media planning applications. This helps buyers understand which content is likely to have the most effective ad inventory for the brand and enables publishers to make more effective programming decisions. If content is reported on a syndicated basis, where publishers are all reported at the same time and with the same metrics, this can provide a common basis for negotiation across the entire portfolio of content choices.

Moreover, content measurement enables marketers to identify advertising opportunities in advance, prior to making their actual ad investments. Content measurement can help marketers identify contextual opportunities and programming with large enough audiences to create cultural touchpoints for their brands and increase engagement and effectiveness.

Unfortunately, syndicated content measurement is generally available only for linear TV and not available, or available with only limited measurement, for streaming or digital platforms. Streaming content measurement is typically on a case-by-case basis and is often dependent upon the permission of the streaming app owner. Some providers report streaming when it's consumed using Over-The-Top (OTT) devices such as Roku, Amazon Fire, Apple TV, Chromecast, but not from apps that are pre-installed on the Smart TV set.

Additionally, most streaming content measurement is only for programs that originate on linear TV. The linear title on streaming might be measured for only a short time after the title ran on linear TV. On mobile and desktop devices, streaming app consumption requires permission (and SDK integration) by the streaming app owner. Like CTV, measurement of streaming content on mobile and desktop devices is limited.

¹ Coalition for Innovative Media Measurement (CIMM) Getting Attribution Right: An Exploration and Best Practices for Television Data Inputs in Attribution Modeling, September 2020.

² Unveiling the ARF Context Effects Models and ROI, Audience Measurement Conference 2017, Tue-Bacon/Stipp (thearf-org-unified-admin.s3.amazonaws.com)



Looking Under the Hood

The measurement providers in this Guide have made rapid advances in technology, data, and methodology to make advanced video measurement a reality.

Common Ingredients

There are common ingredients across measurement providers, but a deeper look under the hood shows that the specifics of each ingredient and how they are deployed vary greatly. At a high level, there are common ingredients across the providers:

- Large, multi-million data footprints, including MVPD Set Top Box (STB) and/or Smart TV Automated Content Recognition (ACR) data to measure linear TV and CTV.
- Census-level data capture of CTV, digital and addressable ad impressions.
- Robust ad tech stack and ad tech partnerships that enable measurement of cross-platform ads performance, reduce complexity of implementation, and preserve consumer privacy.
- Robust methodologies to measure viewing holistically across the national U.S. population.

Data at Scale

Convergent TV measurement starts with data at scale. Data at scale is essential for TV to compete with digital advertising on an audience targeting and performance measurement basis. For the purposes of this Guide, Linear TV means video and advertising on a television set that is delivered via MVPD or OTA and that is consumed as-scheduled by the programming provider or on a time-shifted basis (DVR and VOD). Streaming refers to video and advertising consumption on a Smart TV set that is delivered via streaming app or OTT device.

Linear TV consumption data has these main sources:

- Set top box devices (STBs) commonly used by households to access subscription services from MVPDs, including cable, satellite, and telecom programming distributors
- Automated Content Recognition (ACR) technology that is embedded in “Smart TVs,” which are TV sets with an Internet connection
- Opt-in consumer research panels
- Program schedules and meta data that are matched to the underlying viewership data to indicate the content consumed
- Log file records of ads served to the consumer’s TV, used primarily to measure addressable advertising by MVPDs

Measurement providers use one or all of the above data sources. Recently, the ANA and WFA recommended a combined ACR/STB ‘big data’ and consumer panel approach for measurement.

“TV Big Data” Advantages

The availability of millions of STB and ACR devices has dramatically improved the measurability and targetability of television. Sample sizes are in the millions from each measurement provider, enabling granular measurements of even narrow consumer targets and lightly viewed content. The data can be matched to databases containing consumer

purchase behavior, interests, and other characteristics to define target audiences, as well as sales, location, and website visitation data. This data matching yields insights about video advertising effectiveness, efficiency, and performance.

“TV Big Data” Challenges

Not all homes in the U.S. have TV sets that produce STB or ACR data, so the datasets that measurement providers license for use are not inherently representative of the total U.S. population. Not all television sets in the household are measured, especially in ACR datasets. STB and ACR data detect device tune-in, which does not tell us who and how many people are viewing.

The ARF DASH study estimates that twelve percent of U.S. households consume linear TV over-the-air (OTA) using an antenna or similar device. These households are therefore excluded from MVPD STB data. The DASH study estimates that 13 million U.S. households do not have broadband internet at home. These households are excluded from Smart TV ACR data which require a broadband internet service. There are sub-populations in the U.S. where these conditions are more likely to be present. These groups are under-represented or not represented in STB and /or ACR data.

Accurate assignment of demographics and other consumer attributes is also a challenge when using STB and ACR data. Most consumer attribute data is assigned to viewing records using one or more match processes. The basis for the match can introduce inaccuracy (e.g.: the accuracy of the device graph information). The attribute data itself may be inaccurate or not timely.

Consumer Research Panels

For the purposes of this report, consumer research panels are defined as fully consented groupings of consumers who have opted-in to longitudinal, electronic measurement of their video consumption. Many of the measurement providers in this Guide use, or are in the process of using, consumer

research panels to calibrate and/or validate STB and ACR TV datasets, but not for stand-alone measurements.

Consumer research panels can be a valuable as a source for insights, validation, and calibration of other datasets. Using panels, TV viewing measurement is typically at the persons and household level, instead of household-only measurement. Attempt can be made to recruit to include all segments of the population, including those that could be missing or under-represented in STB and ACR data, such as OTA households and non-broadband households. Panel data is based on opt-in from the consumer. Reporting the measurements does not require the permission of the publisher or advertiser.

A significant challenge in using consumer research panels is the relatively small sample size, which limits their effectiveness in applications such as “stand-alone” measurement, targeting and outcomes measurement. Panels can be subject to non-response and other biases, where some segments of the population don’t participate or don’t participate at the same level as other segments of the population and are therefore under-represented or not represented in the measurements.

It’s worth noting that not all measurement providers use consumer research panels, and if they use them, they are used for a range of purposes. Many measurement providers use

panels as a source of calibration, to account for missing or under-represented consumers and to better reflect total consumption of video. However, not all measurement providers believe that a panel is, or even can be, a “source of truth” for measurement.

Survey-based data, such as the ARF DASH study, have emerged as important sources of universe estimates and consumer behaviors that relate to streaming and MVPD subscriptions. These data can enable measurement providers to adjust their data to better reflect the streaming and linear TV universe.

Ad logs for addressable MVPD advertising

Addressable advertising via an MVPD are ads delivered to the TV set based on the characteristics of the household. While all digital, streaming and CTV advertising is natively addressable, local, and national cable television advertising is typically delivered to all households within the MVPD footprint. Addressable advertising started in MVPD VOD and has expanded using Linear TV ad overlays, to show an addressable ad instead of the linear ad.

To include addressable advertising via MVPDs on a ‘census’ measurement basis, MVPDs typically provide ad logs to the measurement providers.

³ For definitions including MVPD and STB, please see the Appendix.

⁴ For definitions including ACR and CTV, please see the Appendix.

⁵ Association of National Advertisers www.ana.net and World Federation of Advertisers Cross-Media Measurement - World Federation of Advertisers (wfanet.org)

⁶ Advertising Research Foundation (ARF) Universe Study of Device and Account Sharing (DASH)





Measurement Today: What We Discovered

One of the original objectives of the Guide was to provide a (blinded) comparison of actual ad campaign delivery and/or content measurements across providers so that users could better understand the range of reporting differences.

“Apples-to-apples” (same brand / same time period / same creative) ad campaign delivery comparisons were not possible, because measurement providers measure different brands at different times. It was possible, however, to see differences in the level of granularity reported, as well as the metrics used, and the platforms reported.

Comparison of Ad Campaign Delivery Metrics Across Providers

All providers report the key impressions, reach and frequency metrics at the household-level for ad campaigns. There are differences in the extent to which cumulative reach across time is reported. These differences also included the extent to which providers report “unique” reach, which is the incremental reach delivered by, for example, a network, time period or ad unit, that is not also delivered by another network, time period or ad unit in the campaign. Not all providers report persons. Not all providers report “legacy” television metrics GRP and Average Audience.

- Ad impressions (000)
- Unduplicated reach (000)
- Cumulative unduplicated reach (ex: by day, week, month, campaign period)
- Unique reach (i.e., incremental reach for the network, time period, ad unit, etc.)
- Unduplicated reach as percent of universe
- Average frequency
- Frequency distribution
- GRP
- Average Audience
- Households and/or Persons
- Time period/dayparts
- Audiences
- Households and/or Persons demographics
- TV viewer segments
- Day, day of week, week, month, and total campaign period

Comparison of Content Measurement Across Providers

Each measurement provider received a list of specific airings of video programs from CIMM and were asked to provide measurements for each airing. The objective was to enable “apples-to-apples” comparisons of measurements across providers. However, it’s important to note that not all providers measure content. Marketers and ad agencies lean heavily into ad campaign delivery measurement, so the priority for almost all measurement providers has been innovation in ad campaign measurement with a secondary focus on content measurement. Unfortunately, not all providers who measure content permitted their examples to be included in this Guide. To provide value to readers, we elected to evaluate what was provided but not publish the actual measurement examples due to the limitations above.

Many of the measurement providers profiled in this Guide start with a similar measurement framework, including millions of measured TV households, millions or billions of digital ad exposure observations, a device graph and sources of demographics and audiences. However, these similarities mask significant methodological differences that are described in the Measurement Provider Profiles section of this Guide.

When comparing content measurement examples, we found that the measurements were directionally similar but substantially different on an absolute basis. In other words, the differences in viewing within each measurement provider’s dataset fell in expected patterns of larger and smaller audience sizes. However, in terms of absolute, numerical counts of audience size across providers,

Ad Campaign Delivery Breakouts

There are a wide range of dimensions used to break-out different insights in reports across measurement providers. No surprise, all providers report dimensions such as creative, programs/titles where available, ad lengths and a dimension of time. However, there are significant differences across measurement providers. The measurement provider may not be able to or have agreements in place that are necessary to collect ad impressions from specific sources/sellers. There are differences in geographic reporting, coverage of devices and platforms and the extent to which “Only-Only-Both” measurements are reported.

Here are common breakouts used in ad campaign delivery reports:


- Device (TV, CTV, mobile, desktop)
- Platform (AVOD, SVOD, Linear TV, FAST, etc.)
- “Only-Only-Both” (such as Linear TV Only, Digital Only, Both TV and Digital)
- Geography
- Inventory type (Linear TV, addressable, programmatic, direct)
- Inventory source/seller
- Programs/titles
- Creatives
- Ad lengths

there were significant differences across the providers, and the magnitude of differences was high, even double, or triple or more.

These size of the differences in reported audience estimates are difficult to explain. However, there are critical methodological differences across measurement providers that are likely the source of differences that include:

- The size and representativeness of the TV data footprint
- The size and representativeness of the matched data containing both digital and TV consumption that are typically the basis for de-duplicating viewing
- Whether viewing from all TV sets in the household is included and, if missing, how the missing TV set viewing is accounted for
- Whether viewing from other devices, such as mobile and desktop, is included
- The extent to which OTA, non-broadband, and households with ethnic or other characteristics are included and, if missing or under-represented, how the household types are accounted for
- The accuracy of the definition of a household, and how stable it is over time
- The accuracy of the match between digital and TV devices in the household
- The accuracy of the match between sources of demographics or audience data and the devices in the household
- Whether ad exposure is the basis for content measurement or whether content consumption is measured independently of ads
- The accuracy of the ad exposure and/or content detection technology
- The method used to extrapolate to the full U.S. population
- The accuracy of demographic and audience data
- The method to estimate persons and/or co-viewing
- The accuracy of TV ad schedules
- Whether the provider reports pre-telecast program titles, i.e., the schedule that is planned to run and subject to change, such as live sports), or as-run program titles (i.e., the actual programs and times)
- The sources of digital ad exposure data
- Other differences that are included but not limited to those described in this Guide.

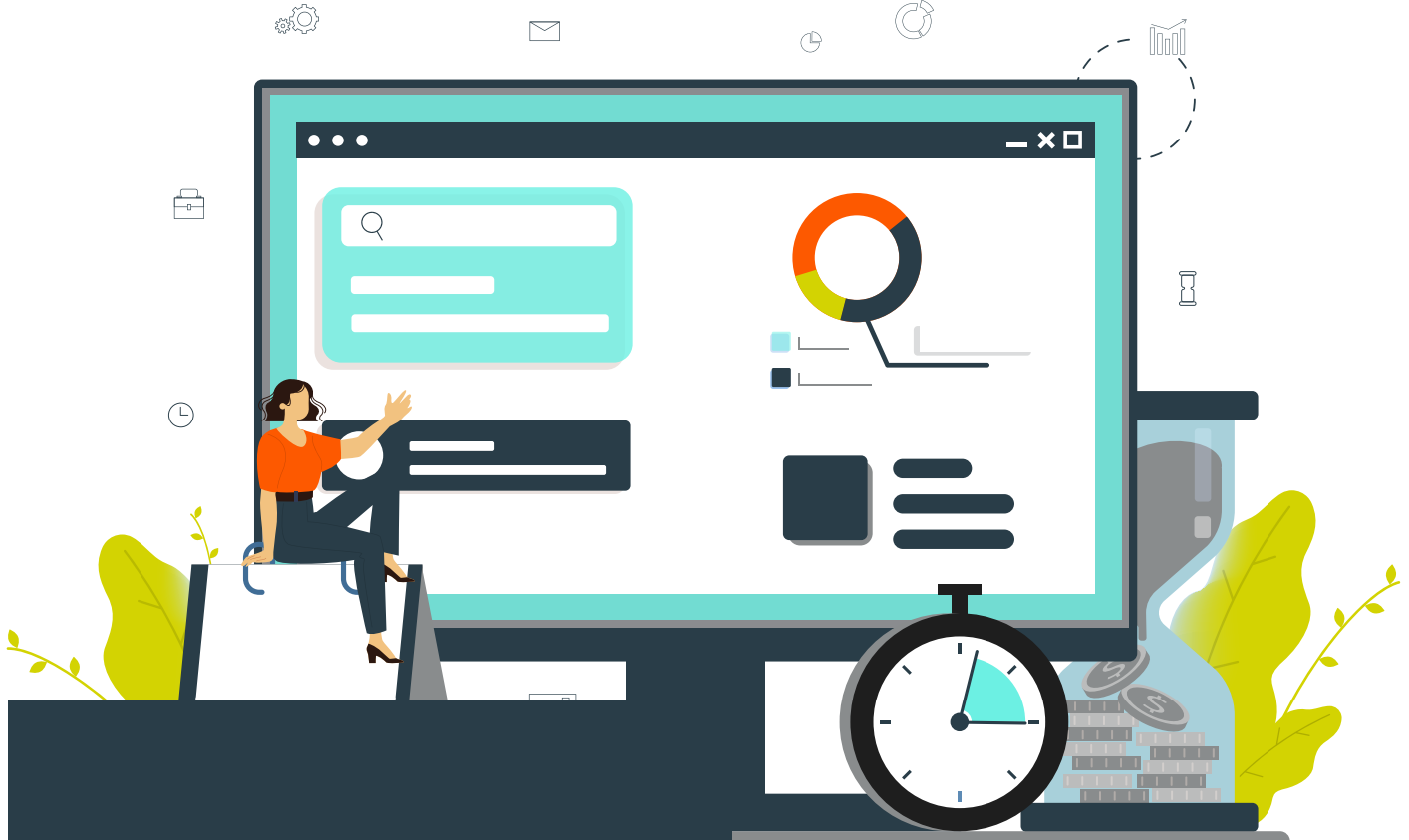




Measurement Provider Profiles

The eight industry-leading measurement providers profiled in this section of the Guide are powering linear TV and streaming ad investments with objective, third-party measurement to measure audiences and performance and accelerate revenue growth for both brands and publishers.

Below is a detailed profile of the eight measurement providers, unpacking the data and methodologies used to create their respective solutions.



Profiles of Measurement Providers

1. 605

605 Company Statement

605 is an independent TV viewership, measurement, and attribution company. We have one of the largest and richest nationally representative multi-source

viewership datasets in the industry, providing the scale needed for innovative linear TV and cross-platform solutions that quantify media investment strategies. They are unique in that their multi-source viewership data set is matchable, deterministic, and reported at the aggregated household level while leveraging census-based methods in a privacy compliant manner.

605's products include 605 DR1VE, 605 PLATFORM, and 605 IMP4CT: planning, measurement, and attribution products, respectively. These self-service products offer powerful insights as well as audience-level reporting across linear TV, DVR, and VOD. Through 605's custom solutions, the systems are also capable of providing Cross-platform studies by ingesting the exposure files provided by clients (i.e., digital, addressable, CTV, etc.).

605's measurement reporting delivers efficiency metrics such as reach, frequency, average audience, index, unique reach, ad completion rate, and more. These efficiency metrics and reports fuel planning insights, inform

in-flight campaign optimizations and provide analytics solutions.

605's attribution reports provide effectiveness metrics that help quantify the outcomes driven by ad campaigns. These reports include metrics such as sales lift, visits, transactions, website conversions and more that tie campaign exposure to an outcome. They can also utilize survey data, clients' first-party data and/or website pixel data for more bespoke, multi-dimension attribution solutions.

605's methodology is built on modern architecture that enables 100% deterministic matching rights for advanced insights. At a high level, household-level TV viewership data, ad source data, and programming data is received on a nightly basis. Utilizing the 34 million household data footprint along with ID resolution partners, 605 can deterministically match exposure data across channels for measurement and attribution. 605 is then able to attribute performance to cross-channel screens and content to outcomes by utilizing their proprietary weighting methodology that projects all viewership to be nationally representative.

605 is dedicated to independence, scientific rigor, and results across all deliverables. With a growing business, 605 aims to provide solutions for all industries, serving both buy- and sell-side with transparent data and processes.

What 605 measures (high-level description)

605 provides measurement and attribution for linear TV and cross platform ad campaigns. 605 measures linear TV viewership, content and ads data using 34 million U.S. households sourced from Smart TV (ACR) and MVPD (STB) households. 605 can connect to and ingest OTT and/or digital data from clients/partners. 605 has existing data connections with most major addressable providers and can ingest exposure logs directly from addressable providers. If the addressable partner is not able to provide ad exposure data for all exposed

households, 605 can project the known exposures to represent the wider exposed audience in final reporting.

First-party outcome data is sent directly to 605 from their clients. Third-party data is either sourced directly from existing 605 partnerships or from a third-party data provider specified by the client. 605 has an always-on data feed of PlacelQ mobile location data, received on a nightly basis. Sales data is sourced directly from clients or from Catalina/Affinity, and Automotive data is sourced from Polk. For web pixel solutions, 605 works with Experian or LiveRamp to have the data sent into their environment on a nightly basis. This data is confidential and used in client-specific instances only; the data is not publicly available for use through our products.

All incoming data is passed through Experian, who serves as 605's data spine, to resolve the IDs and match to a 605 household ID.

605 Methodology

Data footprint

605's data is based on a combination of licensed STB data and ACR Vizio smart TV data covering 34 million viewership households. 605 reports that on average, 18 million of the total 34 million households qualify for reporting in a 30-day period.

Ad impressions

605 utilizes Hive as its ad occurrence source data. To qualify for an ad exposure, the viewer has to be exposed to the ad for three seconds or more. Note that this is a parameter that can be adjusted by the client, as the threshold for viewing can be as small as 1 second or as large as the client would like.

Digital ad impressions are captured via a pixel tag installed by publishers. The data is then sent to 605 as this enables all impressions to be captured and utilized for measurement or attribution. Clients can also share ad-as-run / exposure files with us throughout the campaign or at the end for measurement and attribution.

Competitive ad exposure

605 reports competitive ad exposure across linear TV channels. 605 does not report competitive digital ad exposure data.

Content viewing

605 utilizes Gracenote for linear TV program schedules and for programming metadata. The program schedule data is matched to linear TV viewership consumption to assign program titles and network/station level.

As a managed service, 605 can provide clients with cross platform content viewership consumption and behaviors, as well as audience-level content breakouts across network, series, platform, daypart and more.

Persons and Households

All 605 data is measured at the household-level. 605 deterministically matches each viewing home to its Experian household to attach demographic characteristics. They then balance the data using U.S. Census American Community Survey (ACS) and ARF DASH Survey, projecting to U.S. TV households.

Cross-platform unduplicated reach

605's cross platform measurement methodologies allow measurement of ad exposure on individual and overlapping platforms. This is achieved by matching of

linear TV and cross platform data to the 605 identity spine at the household level and using cross platform weighting methodologies. 605 is also able to ingest impression logs (with relevant identifiers) and/or place a pixel on media/websites for cross screen tracking and measurement.

Deduplication is performed using both deterministic and modeling techniques. Deterministically, 605 leverages the Experian identity spine to identify multiple sources of data for the same household. Additionally, they utilize specially designed cross-platform weighting methodologies to assess and report reach for Only/Only/Both platform combinations.

Device Graph

Experian serves as 605's identity spine, however, 605 is partner-agnostic and can work with any partner dataset that is able to be matched through an ID resolution and data safe haven provider. 605 also works with device graph partners (Experian/LiveRamp) for digital tracking through pixels and can resolve raw event level log files.

Roadmap: 605 is evaluating opportunities to work with Blockgraph as an identity operating system for converged TV.

Universe Estimates

605 uses the U.S. Census American Community Survey and ARF's DASH study as the sources of U.S. population estimates.



Weighting

605 weights the data to 120 million U.S. TV households; households are projected using a combination of survey and U.S. Census data. 605 applies household weights to balance, adjust, and project the viewership data to correct for biases in the raw data and to ensure that published metrics mirror the overall population as closely as possible.

The result resembles the demographic and viewership profile of the U.S. TV household population as a whole. To achieve this, 605 uses ranking weighting to calculate a weight for every qualified home. These weights aim to represent a similar segment of unmeasured households among US TV households.

Demographics and Audiences

605 uses Experian as the source of Demographic data.

For advanced audiences, 605 has a “Target Builder” feature in the product that enables users to create custom targets that can include viewership behaviors, demographics and psychographic attributes, purchase habits, lifestyle and more. The viewership attributes can be based on national ads, national networks and series, dayparts, time of day, and, if viewed live or time-shifted, on DVRs or VOD.

Clients can also send 605 their first party data / audience segments to be uploaded into the product for use or utilize 605’s third party data partners such as Polk, Catalina, PlacelQ for syndicated and custom segment creation.

Integrations

605 is integrated with OpenAP, which enables clients to upload ad impressions without a pixel tag or log files. Integrations are also underway with Xandr buying systems and Conviva.

605’s integration with Conviva will provide digital streaming data from approved programmers. The collaboration leverages Conviva’s streaming events and 605’s linear

and time-shifted advertising and content data to de-duplicate content and ad consumption.

605 can connect / ingest any other OTT and/or digital data at any cadence from client/partners (given that supplementary exposure files are provided and keyed on a matchable ID that can be linked to a 605 ID via a third-party matching partner).

Roadmap 605 continuously reviews additional sources of data and sees the ability to add incremental capabilities through collaboration, incremental data licensing and/or planning partnerships currently under negotiation.

Accreditation

605 is not currently seeking Media Rating Council (MRC) accreditation.

Mobile and Desktop devices

Ad exposure on mobile and desktop devices is dependent upon a publisher or advertiser pixel tag.

Dealing with measurement challenges: 605

Non-broadband households

Non-broadband households are included in the STB viewership data that is the basis for 605 measurements.

Over-the-air only (OTA) households

605 does not collect viewing from homes without MVPD or broadband service. 605 weighting methodology considers factors to predict a home’s viewing behavior, including a home’s dominant video input type of Cable/Satellite/Telco, OTA, or CTV/Other.

Households with multiple TV sets

605 has households with multiple TV sets from both MVPD/STB households and Smart TV/ACR households. 605 uses weighting to project the data to account for multiple TV sets per

household. When multiple data sources report viewing for the same device, 605 only includes the measurement from one provider.

Roadmap: Inclusion of incremental tuning events for devices reported by two data providers.

Hispanic households

605 uses Experian as the source of demographics, including identification of Hispanic households. 605 uses weighting to represent Hispanic households.

Privacy

605 receives privacy-compliant household data and does not receive nor have access to PII information. 605 relies on Experian crosswalks where all PII is stripped, and all of the data is matched on Experian IDs. These Experian IDs are then matched back to persistent 605 HH IDs before being sent into the 605 environment for use.

Deprecation of Digital IDs

605 reports that they use commercially available, industry leading third-party identity resolution partners that provide privacy compliant, identity resolution, data transfer and crosswalk solutions. This allows 605 to connect and transfer data between partners. 605 does not independently resolve IDs or cookies.

Streaming Apps

605 does not measure content viewed in streaming apps, except for recent broadcast content that is identified by VIZIO/Inscope.

Roadmap: 605's integration with Conviva will provide digital streaming data from approved programmers. The collaboration leverages Conviva's streaming events and 605's linear and time-shifted advertising and content data.

“Walled Gardens”

605 does not include aggregated ad impressions measurements from platforms such as Google and Facebook.

Invalid Traffic (IVT)

605 does not use an IVT solution to screen digital ad impressions, however, 605 can integrate third-party ad fraud solutions if provided by the client.

Time-shifted Viewing

605 includes time-shifted VOD and DVR measurements. MVPD STB data partners identify DVR and VOD viewing in their datasets.

Local measurement

Local measurement / attribution is scoped through 605's Managed Services for feasibility. Since all of 605's reporting is reported at the aggregate household viewership level, 605 ties local viewership to Markets of interest and project the analysis to be nationally representative.

605 Roadmap

One of 605's core values is the ability to be data agnostic and allow partners to bring their own data for measurement and attribution, including linear, digital, and addressable sources. 605 is continuously vetting new partners and technologies (i.e., data clean rooms, sandbox environments, connected portals) for integration and will continue to do so in the future to ensure that we will be able to deliver on those core values. 605 currently supports campaign measurement and attribution for industry linear addressable initiatives such as Go Addressable and Project OAR and can bring this data together with linear and OTT.





2. Comscore

Comscore Company Statement

Comscore is a trusted partner for planning, transacting, and evaluating media across platforms. With the most comprehensive data assets across digital, linear TV, Connected TV (CTV) and theatrical viewership, we are a powerful third-party source for reliable deduplicated measurement of cross-platform audiences. Today, our product offerings are both platform-specific (TV, digital, CTV) and cross-platform.

An example of our cross-platform products is Comscore Campaign Ratings (CCR), a cross-platform measurement solution providing advertisers with a complete view of their video investment across screens for an accurate understanding of true reach and frequency. CCR allows advertisers to measure deduplicated reach, UVs, and frequency across all screens – linear, CTV, CTV, desktop, and mobile. CCR also accounts for co-viewing on TV and CTV platforms, provides demographic distribution and person-level insights for each platform and overall campaign.

An example of our platform-specific measurement is Comscore TV. Below are a few key points that differentiate Comscore TV from our competitors.

We have one methodology covering local and national measurement. Put simply, we measure consumption at the zip-code level

across all 210 local markets, and our national measurement numbers are the sum total of local market measurement. This is important for a lot of reasons – it means that we’re providing an accurate representation of content and ad consumption whether you’re looking at the local or national level. It also means that clients can evaluate the delivery of national campaigns at the local/zip code level with the same accuracy as they can at the national level. We are the only measurement provider in the market who can say this.

Scale – Comscore brings scale to our measurement from sourcing data via a variety of methods. We integrate directly with publishers to observe their video and web visitation events to form our digital census network. This digital census network collects more than 50 billion digital events per day, including 21 million mobile digital events per day. Those publisher integrations are further augmented by passive data collection from devices. We collect set-top box data from 35 million households. We collect Smart TV data from 13 million TV sets. Finally, Comscore collects information from panels, including digital consumption data from our one-million-person opt-in panel (which covers desktop/laptop usage, tablets, and mobile devices) and our Total Home Panel.

This scale improves the accuracy of our measurement data, so our clients can be confident that they know how many people their content or campaigns reach. Additionally, the collection of digital data unrelated to TV measurement helps us improve the quality

of our TV measurement data by informing processes like our device graph.

We've been delivering currency-grade measurement both nationally and locally for over a decade. That experience means that we know where currency data needs to reside, and as a result our data is deeply integrated with third-party processors (e.g., Media Ocean), sell side exchanges (e.g., OpenAP), SQAD, audit firms, rep firms, etc.

What Comscore measures (high-level description)

Comscore measures content consumption and ad campaign delivery and outcomes for linear TV, CTV and digital platforms using advanced audiences. Measurement is for each delivery platform individually (linear TV/CTV, mobile, desktop) and on a cross-platform basis. Comscore provides measurement on a national basis and across 210 local markets.

Comscore linear TV measurement is based on viewing from 35 million MVPD homes from Comcast, Charter/Spectrum, Cox, Dish, AT&T U-verse and DIRECTV. DVR is captured from Dish, Comcast, and DIRECTV households. VOD is captured from 55 million households crossing additional MVPDs. Comscore measures CTV linear TV and time-shifted consumption from 13 million households, for both reporting and calibration. In some cases, Comscore provides streaming app content measurement.

For ads campaign reporting, these data are combined with digital ad impressions from ad server integrations, pixel tags and publisher-provided ad logs from CTV, mobile and desktop devices.

Comscore uses a blind-to-Comscore third-party match process with Experian to match demographics to MVPD STB households. Comscore uses various matching providers to onboard advanced first party and third-party audiences and digital ad impressions data. Data are weighted to the total U.S. household and persons populations and total ad impressions universe.

Comscore measures duplication within platform by observing it in multiple "single source" datasets. These observations provide training data into Comscore's de-duplication algorithms; the estimates are then applied to the weighted linear TV content measurements and linear TV and digital ad measurements.

Comscore fields online surveys (250,000 completes) in 210 local markets to collect information on TV viewing differences according to mode of consumption (cable, satellite, OTA, streaming, etc.), number of subscribers and types of services, including information about corresponding demographic breakouts. These data are used to weight and adjust the linear TV measurements.

Comscore uses Smart TV data to observe overlap between CTV households and digital ad impressions, as well as calibration of methodology such as to correctly assign viewing duration where the MVPD STB is on but the television set is off.

Initial estimates from Comscore TV reporting are available in 48 hours. Reports and data are available through a dashboard, data feeds and BI/API integrations and in ad buyer and ad seller systems, including MediaOcean, WideOrbit, FreeWheel and HudsonMX. Initial estimates from Comscore TV reporting are available in a 48-hour basis. Comscore content measurement is available on a syndicated basis. Cross-platform ads campaign delivery measurement is available on a proprietary basis.

Comscore Methodology

Data footprint

Comscore linear TV measurement is based on a footprint of 35 million MVPD STB homes from Comcast, Charter/Spectrum, Cox, Dish, AT&T U-verse and DIRECTV. DVR is captured from Dish, Comcast, and DIRECTV households. VOD is captured from 55 million households crossing many additional MVPDs. Comscore measures CTV linear TV and time-shifted consumption from 13 million households. Comscore claims that all 35 million MVPD

households are based upon a qualifier of reporting in the last five weeks.

Comscore maintains a 26,000 person U.S. mobile panel of which 24,000 qualify for reporting in a 30-day period. Comscore maintains a 320,000 person US desktop panel of which 238,500 qualify for reporting in a 30-day period.

Comscore maintains a “Total Home Panel” of over 7,000 recruited, opted-in households in which a meter is installed in the household’s internet router. This meter observes desktop/laptop, mobile device, and connected TV traffic that passes through the home router.

Comscore conducts surveys in 210 local markets (250,000 completes) to capture information about viewing consumption and services. Comscore established an STB Laboratory to test and validate data from MVPD STB, CTV streaming devices and Smart TVs.

Ad impressions

For linear TV ad impressions, Comscore matches Kinetiq ad occurrence / ad schedule data using timestamps to the MVPD STB linear TV (including DVR and MVPD VOD) consumption data. Addressable MVPD ad impressions are captured via MVPD-provided ad logs. Digital ad impressions are captured via ad server integrations or pixel tags, which enables a census of digital ad impressions to be captured.

Ad campaign delivery measurements include unduplicated reach, frequency, impressions, and other metrics. Comscore reports ad campaign delivery for persons and households. Persons are assigned to linear TV and digital data using the methodology described in the Persons and Households section of this document.

TV ads measurement covers national U.S. ads and local affiliate ads. A TV ad impression is defined as viewing for 5 seconds or more.

Ad exposure measurement on mobile and desktop devices is dependent upon a publisher pixel tag or publisher/brand-provided ad log files. Comscore measures streaming app consumption on CTV, mobile or desktop devices with permission of the streaming app owner where the app owner integrates Comscore SDK (software development kit).

Roadmap: Comscore has existing campaign measurement solutions for “Programmer Addressable” / ”National Addressable”, which measure a total campaign, including MVPD-inserted addressable advertising within a programmer’s national ad campaign.

Content consumption

Comscore sources linear TV program schedule data from Red Bee Media (formerly FYI). The program schedule data is matched to linear TV and DVR events based on timestamp to assign program titles and network/station. Metadata is also provided by Red Bee Media.

Comscore reports linear TV consumption and (separately) reports streaming consumption based on permission from streaming app owners. Comscore claims to report streaming content consumption, including program titles data, for 8 of the 29 streaming sources/apps on the CIMM streaming app list.

Competitive data

For linear ad campaigns, Comscore provides competitive information on ad campaign delivery. For digital ad campaigns, Comscore does not report competitive ad schedules or ad campaign delivery. For digital ad campaigns, measurement is proprietary to the client.



Persons and Households

Comscore measures persons and households in ads measurement and households in content measurement. For persons measurement, a 20 million household subset of STB households are matched to deterministic persons rosters. Persons are probabilistically assigned to the household for ad campaign delivery measurement using the personification methodologies below.

1. Household viewing rosters containing demographics are created for more than 20 million Comscore STB households via blind matches with third-party partners. The viewing behavior in different types of households (that is, households with different numbers of people of various demographics) is used to tease out the person-level behavior signals embedded in these household-level observations. An innovative data science algorithm then calculates viewing propensities for different person-level demographics.
2. These propensities are then applied to the full viewing data set using demographics and content metadata (such as network, genre, actual and/or 'like' telecasts).
3. The resulting persons viewing is projected / weighted to the total U.S. population.

For cross-platform measurement, Comscore assigns age and gender demographics to desktop and mobile ad impressions. These demographics are probabilistically determined at the cookie/unique ID level based on observed visitation behavior, using these data assets:

1. Impression-Level census data, which collects cookie/unique ID information for impressions tracked and served on a given campaign.
2. Comscore's desktop panel, measuring demographics of a site's visitors to infer demography of cookies/unique IDs visiting the sites.
3. Third-party demographic data, which includes cookie/unique ID-level data from several partners.

These three inputs, along with an understanding of the demographic distribution of internet users at large, are considered using a Bayesian framework to determine the probability that each cookie and unique ID belongs to a specific age and gender.

Cross-platform unduplicated reach

Comscore utilizes multiple "single-source" datasets to observe overlap between platforms. These observations are used to create training sets for Comscore's de-duplication algorithms. The data points from the single-source cross-platform datasets are stitched together across platforms via Comscore's proprietary device graph algorithms. The resulting dataset is used to calculate unduplicated, cross-platform content consumption and ads reach and frequency measurements. The observed measurements are an input into de-duplication algorithms, which are applied to the total TV viewing and census digital measurements for the U.S. population.

For example, linear TV and digital duplication is observed from TV households where Internet devices are metered, where exposure to both platforms is captured. The data from this single source dataset is used to estimate TV-digital overlap.

Comscore uses statistical techniques such as Bayesian updating of independence-assumption priors, maximum-likelihood estimation, and other techniques as appropriate.

Identity / Device Graph

Comscore has its own proprietary, patented device graph and partners with Experian, LiveRamp and OpenID as matching services to link additional data to Comscore's device graph.

To match MVPD STB data to demographics, advanced audiences, and digital ad impressions data, Comscore uses a blind, deterministic, third-party match process. Comscore does not have access to personally identifiable information (PII) for this process.

Universe Estimates

Comscore uses data from the following sources to generate TV Household Universe Estimates: S&P Global, US Census Population Data, Comscore's proprietary Local Market TV Survey, Devonshire Ltd., and Comscore's proprietary National Enumeration Survey.

Comscore defines a TV household as a home with at least one working TV capable of delivering video using an antenna, a satellite receiver or a cable/fiber connection or set-top box.

Weighting

Comscore households are weighted to match the Comscore universe estimates on dimensions that include viewing behavior, device characteristics, age, gender, geography, demography, ethnicity, and other dimensions.

Comscore adjusts measurements to account for viewing differences between reporting households from Comscore MVPD partners and non-reporting households such that measurements are representative of reporting and non-reporting households. Comscore estimates the differences between its distribution of reporting households versus the television universe in each of Comscore's 210 local markets using the Comscore Local Market Surveys. Comscore's audience measurement methodologies use this information to calibrate the data Comscore receives from reporting households when estimating the audience viewing of non-reporting households.

Roadmap: Comscore's future cross-platform methodology creates a synthetic single-source panel, representing all persons and households in the U.S. The methodology assigns digital and linear TV consumption (ads and content) to pre-defined, person and household "units" in the population (300 million persons and 120 million households). As digital events are received, they are allocated to the persons and household units according to behaviors and demographic distributions observed in Comscore digital panels. Similarly, TV events observed from STB and Smart TV data sets are projected to the full population and then assigned into

the same person and household units, using observed overlaps from the Total Home Panel. Comscore intends to address deprecation of digital identifiers by introducing probabilistic cross-platform measurements into its current deterministic methodology.

Demographics and Advanced Audiences

Comscore's primary source of demographics and household characteristics is from Experian. Comscore supports consumer data from IHS Markit ("Polk") for automotive, L2 for political, IRI for consumer-packaged goods, PlacelQ for consumer visitation to physical locations, Experian's VantageScore for creditworthiness, AmeriLINK for consumer shopping habits and more.

Comscore also has the capacity to support matched first-party data. Additionally, Comscore has incorporated the Comscore Plan Metrix survey and its behavioral taxonomy, for both local and national TV.

Integrations

Comscore measurement is accessed via an online portal/dashboard, data feeds, BI and API integrations.

Comscore is an approved measurement company in OpenAP's XPM framework. Comscore is integrated with the OpenID to enable the activation of advanced audiences. Comscore is also integrated with publisher ad sales systems and agency planning/buying systems, including MediaOcean, WideOrbit, FreeWheel and HudsonMX.

Accreditation

Comscore recently underwent a Media Rating Council (MRC) accreditation audit for their Comscore TV product. The scope of the audit included selected reports within Comscore TV user interface for both National and Local measurement and included the age and gender demographics. The initial phase of the MRC audit was completed at the beginning of Q4 2022, which is now being followed by additional remediation work and additional auditing of

their new vMVPD reporting strata in the first half of 2023.

Dealing with measurement challenges: Comscore

Non-broadband households

Comscore's STB data includes broadband and non-broadband households. Comscore receives data from different collection methods (IP, telephone, etc.) and include all such households in our measurement frame.

Over-the-air only (OTA) households

Comscore uses data from its Local Market Consumer Surveys to project OTA only viewing on a station-by-station basis. The adjustments account for households with access only to broadcast TV stations in the market and households that view broadcast stations in different proportions than MVPD households.

Comscore Local Market Consumer Surveys are fielded across all 210 markets and reported quarterly to collect information on TV viewing differences according to mode of consumption (cable, satellite, OTA, streaming, etc.), number of subscribers to different services and types of services, including information about corresponding demographic breakouts. The sample size is 250,000 annually.

Additionally, Comscore uses S&P Global (formerly SNL Kagan) for information on MVPD footprints, subscribers by service provider, etc. Comscore uses ZIP code demographics data from Devonshire Ltd.

Roadmap: Beginning in January 2023, Comscore's OTA calibrations will leverage Smart TV / ACR data inputs.

Households with multiple TV sets

Comscore data is sourced from MVPDs which report tuning from all/almost all TV sets in each household. In cases where tuning data is received from a subset of TV sets (which can happen most often in DBS/satellite households), the missing tuning is estimated by comparing the viewing from "fully reporting households" to partially reporting households and apply a ratio estimator based on number of STBs present and number of STBs reporting, by network.

Comscore claims that 60% of their STB households have 2 or more devices, compared with Smart TV households where 90% report one device. Comscore utilizes Smart TV data for validation purposes, not audience measurement, which reduces the impact of Smart TV single TV set per households on Comscore measurements.

Comscore has a patent-pending method to deduplicate MVPD STB data and Smart TV/ACR data at the device level for use in a co-mingled STB/Smart TV data. The process pairs devices on a weekly basis to identify new and changing associations (e.g., consumer moves their Smart TV to a different location in the home; consumer gets a new set-top-box from MVPD).

Hispanic households

Comscore reports Hispanic households and weights Hispanic households to their Hispanic universe estimates. Comscore uses US Census



data and demographics data sourced from Devonshire to estimate Hispanic universes. Hispanic viewing is identified with Comscore's MVPD match to third-party demographics sourced from Experian.

Privacy

Comscore claims that they adhere to CCPA, COPPA and GDPR. Comscore has ISO 27001 certification for information security management and ISO 27701 certification for its privacy information management system. Comscore's privacy principles and privacy policy are available online.

Deprecation of Digital IDs

Comscore currently uses a patented, deterministic device graph as the foundational identity management system. Comscore anticipates that a probabilistic device graph will be required as the industry moves away from persistent digital identifiers and as deterministic digital identifiers are deprecated. They are developing a probabilistic device graph to address the loss of persistent device identifiers. Comscore is using resources including the Comscore Total Home Panel to observe IDFA loss and persistent cookie loss and create a hybrid deterministic/probabilistic methodology.

Roadmap: Comscore intends to use its proprietary Total Home Panel to inform and validate the probabilistic device graph and has conducted an early test of the methodology to develop cohorts comprised of trackable and non-trackable digital identifiers.

Streaming Apps

Streaming app content and ads consumption is measured with the cooperation of the streaming app owner. Comscore measures streaming ad exposure on 15 of the 27 ad-supported streaming apps/sources on the CIMM-provided list. Comscore measures streaming content consumption on eight of the 29 streaming apps/sources on the CIMM-provided list, including title-level identification where the content is on live TV, not on live TV and original programming.

“Walled Gardens”

Comscore claims to partner with Walled Gardens for advertising and content measurement. Advertising campaigns running on YouTube, YouTube.com and YouTube TV can be measured in Comscore Campaign Ratings (CCR).

Roadmap: Comscore plans to incorporate Facebook reporting within CCR. Measurement of households that subscribe to a virtual MVPD (such as Hulu Live or YouTube TV) that do not also subscribe to a linear MVPD service is in “beta” reporting mode. Measurement will be based on Smart TV / ACR data and Comscore's Total Home Panel. Comscore is planning to include these vMVPD estimates in its currency measurements beginning in January 2023.

Invalid Traffic (IVT)

Comscore uses proprietary IVT filters on all digital traffic.

Time-shifted Viewing

Comscore reports time shifted viewing for linear TV DVR and VOD on a Live + same day, live + 1, Live+3, Live+7, Live + 15 basis.

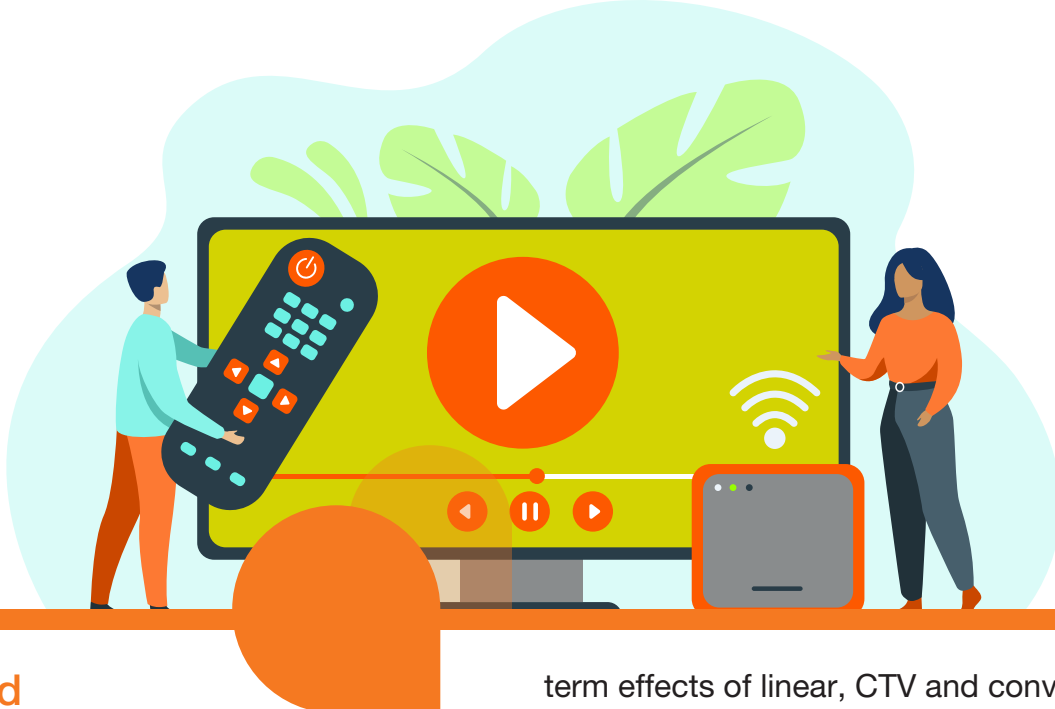
Local measurement

Comscore provides local measurement, covering national U.S. content and ads and local affiliate content and ads in 210 Comscore Local Markets.

Comscore Roadmap

Comscore priority feature development on the roadmap:

- (1) to include virtual MVPD measurement in TV currency metrics, as described above,
- (2) including ACR data as a calibration input to TV currency metric to account for OTA viewership, and



3. Innovid

Innovid Company Statement

Innovid delivers a unified view of converged TV advertising through its cross-platform, TV measurement solution, InnovidXP. Driven by over one billion video impressions processed daily and powered by the scale of our ad server that covers more than 95 million households, Innovid empowers thousands of advertisers to measure linear and CTV together – delivering a consistent, accurate analysis of ad delivery, performance and audience reach across devices and platforms, including walled gardens.

As an always-on independent global software solution, InnovidXP measures every form of TV advertising including linear, CTV and digital, addressable, and various forms of video on demand (AVOD, BVOD, etc.). The platform delivers real-time, cross-platform TV measurement, including audience demographics and attribution such as reach, frequency, unique and unduplicated reach, and outcomes. TV analytics are leveraged to inform planning and buying across linear and CTV advertising, directly driving media and creative optimizations.

The granularity of impression-based insights in the platform produces the metrics that matter to local, national, and global advertisers, assessing audience reach, along with the immediate impact and longer-

term effects of linear, CTV and converged TV campaigns. Innovid's cross-platform coverage includes more than 1,000 unique publishers globally, all 210 local DMAs and more than 75 international markets.

Real-time reporting is available at granular levels and on multiple campaign dimensions such as:

- Impression delivery
- Ad frequency
- Optimal reach and frequency
- Impression delivery and performance by creative and campaign
- Impression delivery and performance by network/publisher, day of week, time of day, genre, etc.
- Unique and unduplicated reach for CTV beyond linear and by each individual publisher and platform
- Conversions - Cost per response, cost per acquisition, etc.
- Online outcomes - web visits, registrations, sales, app downloads, etc.
- Audience
- Cross-device reach and frequency

Innovid generates revenue from three core offerings: ad serving, dynamic creative personalization and converged TV measurement. All revenue generated through the InnovidXP platform represents more

than 6,000 advertisers spanning CPG, Auto, Retail, DTC, Finance, Insurance, Travel, Entertainment, QSR, Education, Charities / Non-Profit, and Technology.

What Innovid measures (high-level description)

Innovid measures the audience reach and effectiveness of TV advertising, including ad campaign delivery such as reach and frequency, the unique and unduplicated reach to understand incremental audiences across publishers and platforms, and online outcomes.

Cross-platform measurement is based on digital ad impressions from Innovid's ad server footprint and direct publisher certifications, combined with linear TV ad impressions data from various Smart TVs and other 3rd party data sources.

Innovid provides measurement for local, national, and global advertisers and covers all forms of TV, including linear TV, CTV, addressable and digital platforms, including some of the largest "walled gardens."

Innovid reports ad exposure on Linear TV, DVR, MVPD and VOD using data from Smart TV sets and reports streaming ad exposure on CTVs, mobile, tablet and desktop devices for most ad-supported streaming apps. Innovid also reports digital ad exposure captured via its ad server footprint, pixel tags and publisher-provided ad logs.

Innovid uses its proprietary device graph and identity framework, Innovid Key, to match linear TV ad exposure with streaming/digital ad exposure. The matched TV-digital data is the basis for cross-platform, unduplicated reach, and frequency measurement. Innovid weights households in the matched data subset to the U.S. population and projects digital ad impressions in the subset to the census of digital ad impressions captured on the ad server. Innovid works with multiple device graph providers to onboard 1st and 3rd party audiences, including TV viewership segments for advanced audience intelligence that informs targeting and activation.

Real-time reporting and data are primarily accessed via an always-on dashboard. However, clients also can receive raw data feeds or API/BI integrations. Innovid also works with industry and agency systems like OpenAP, MediaOcean, etc. Innovid measurement is not available on a syndicated basis.

Innovid Methodology

Data footprint

Innovid's global measurement is based on a footprint of linear and CTV households containing Smart TVs from Inscope/Vizio and other sources. Innovid claims a data footprint that has access to more than 95 million CTV households and 30 million linear TV households based on a combination of Smart TV datasets and certification across 1,000 publishers and platforms. Innovid reports that 13.5 million Inscope devices qualify for reporting on a weekly basis but did not provide number of households reporting. Inscope reports that they have 22 million opted-in devices and approximately 1.1 devices per household. Innovid uses MVPD STB data for reports provided to MVPDs. Innovid does not identify MVPD partners.

Ad impressions

Digital ad impressions are captured through Innovid's global ad serving solution. Additional data is collected when an ad tag is fired on a CTV device that has Innovid's proprietary SDK installed. For clients that do not use Innovid for ad serving, Innovid provides an impression tracker for implementation on third-party ad servers as well as a Response Tracker (running on advertiser websites).

For linear TV impressions, ad occurrence / ad schedule data is automatically created by a combination of proprietary and third-party ACR.

Innovid also measures MVPD addressable/DAI ad impressions.

For CTV ad impressions Innovid tracks second by second viewing as well as quartile and completes, and for linear they define an ad impression as exposure for 1 or more seconds.

Competitive ad exposure

Innovid sources ad occurrence data from a 3rd party, which is used for measurement and attribution. Competitive intelligence is not currently core to the platform offer and is being evaluated for 2023.

Content viewing

Innovid does not report on program viewing but does report on advertising at the program level.

Persons and Households

Innovid measures households, defined by an IP address, and matches ad impressions to a partner device graph and to Innovid's proprietary identity solution, Innovid Key.

Persons measurement is currently being evaluated with TVision.

Cross-platform unduplicated reach

Innovid matches ad exposure from its panel of Smart TVs to digital ad exposure using Innovid's identity framework, Innovid Key. The matching process creates a pool of households where both TV and digital ad exposures are observed, and is the basis for unduplicated, cross-platform reach and frequency calculations. The observed measurements are extrapolated to the total U.S. population and the total ad impressions universe.

CTV streaming ad impressions are captured on a census basis. Cross-platform ad impressions require the establishment of a dataset where both CTV/streaming and linear TV ad impressions are observed.

Innovid uses either Innovid Key 3p identities or cryptographically hashed, full-resolution IP addresses as the basis of the match between the linear TV and streaming/CTV ad impression datasets. The matched data is used to observe deterministic overlap between exposure on linear TV and ad exposure on CTV/streaming and to observe unique and duplicated reach. Innovid measures the unique reach of each channel (linear and CTV) at the publisher level and the overlap in ad exposure at the household level.

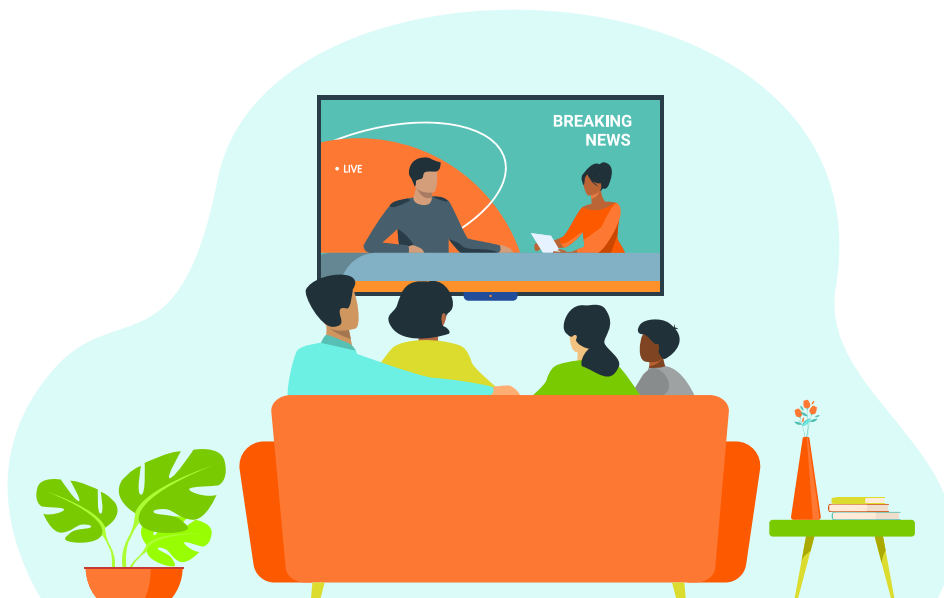
Device Graph

Innovid uses Innovid Key for device graph functionality. Innovid Key's approach to household and device identification depend upon the partner (LiveRamp, OpenAP and Transunion). Innovid Key for first-party and third-party data matching.

In environments where subscriber IDs, IDFAs or other PII identity resolutions exist, Innovid has utilized Experian, Adobe, LiveRamp and others. Where no identity solution is available, such as cookie-less/ non-authenticated CTV, Innovid supports privacy compliant, hashed IP addresses for pseudo-identity. Desktop, mobile, and other devices associated with each household are linked using cryptographically hashed IP addresses matched to the viewing household.

Universe Estimates

Nielsen is Innovid's source of U.S. regional population estimates.



Weighting

CTV, mobile, and desktop impressions are not weighted as they are collected at the census level and therefore do not require weighting for extrapolation.

Linear impressions are weighted demographically in each of the 210 DMAs. Weighting coefficients are provided by Smart TV OEMs and validated against independent weighting using third-party demographic data. These are then weighted against regional demographics prior to scaling.

Scaling calculations take account of the expected number of TVs in any household, applying a logarithmic formula to adjust for the fact that not all households will have a relevant TV (i.e., one that captures viewership). Scaling can also be configured to apply demographic weighting and client-provided weightings.

Demographics and Audiences

Innovid works with third-party data partners, such as TransUnion, to measure audience segments.

Third party segments are appended to each household and applied to impressions within the household. When first party segments are supplied at the impression level, these co-exist with the third-party segments. Measurement analysis is then presented by segment.

Integrations

InnovidXP is accessible via an online portal/dashboard, and supports data feeds, BI tool integrations and APIs. Innovid is integrated with OpenAP.

Innovid is integrated with Mediaocean and maintains a proprietary campaign management API that can be integrated into other platforms upon client demand. Innovid lists integrations with publisher ad sales systems as “optional.”

Accreditation

Innovid is currently evaluating the recently released MRC Outcomes and Data Quality Standards. As of Q1 2023, Innovid has not

moved to submit InnovidXP for accreditation, reporting that they are awaiting feedback from agency and brand partners as to the value of MRC accreditation within the measurement and outcomes space. Innovid’s ad management platform, which encompasses ad serving and dynamic creative personalization, holds 10+ accreditations, related to ad impression measurement across desktop, mobile and CTV. For a full list of Innovid accreditations, please visit the MRC website.

Mobile and Desktop

Ad exposure and TV ad performance is available cross-device, including mobile and desktop.

Dealing with measurement challenges: Innovid

Non-broadband households

Innovid models viewing in non-broadband households and includes it in the universe estimates to which the data is weighted. The model is not specified.

Over-the-air only (OTA) households

Innovid models viewing in non-broadband households and includes it in the universe estimates to which the data is weighted. The model is not specified.

Households with multiple TV sets

Innovid’s approach to measurement takes into account the expected number of TVs in any household. Innovid applies a logarithmic formula to adjust for the fact that not all households will have a relevant TV (i.e., one that captures viewership).

Hispanic households

Innovid does not report viewing by ethnicity.

Privacy

Innovid claims that they are compliant with CCPA and GDPR.

Deprecation of Digital IDs

The link between linear TV or CTV viewership and web outcomes does not rely on cookies. Hashed IP addresses are a proxy for household identity, and it is possible IP Address could be redacted for web users on certain devices and browsers. It is likely that there will be increased obfuscation of IP addresses in the future.

Innovid supports a range of non-cookie, non-IP based identities through its Innovid Key technology. Innovid Key facilitates third-party identity resolution through LiveRamp (including ATS) and TransUnion / OpenAP with plans to add ID.5 and UID2 support. Innovid invests in approaches to identity modeling and extrapolation for cases where direct measurement is not possible.

Streaming Apps

Many streaming apps limit or prohibit measurement via Smart TV ACR. Streaming app content and ads consumption is measured with the cooperation of the streaming app owner. Innovid measures streaming ad exposure on 24 of the 27 ad-supported streaming apps/sources on the CIMM-provided list. Innovid does not measure streaming content consumption at the title-level.

“Walled Gardens”

Innovid includes aggregated ad impressions measurements from platforms such as Google and Meta (Facebook/Instagram).

Invalid Traffic (IVT)

Innovid filters for GIVT across all ad impressions, including OTT ad impressions, following guidelines established by MRC.

Time-shifted Viewing

Innovid does not measure time-shifted viewing on linear TV.

Local measurement

Innovid can break-out 210 local television markets for reporting purposes.

Innovid Roadmap

Innovid’s roadmap is focused on unified measurement across all platforms for more accurate and consistent approach to counting and ascribing value, informing data-driven audience reach and activation, optimized media planning and buying, and creative strategy. The roadmap includes:

- Automated cross-publisher frequency management
- Converged TV age/demographic reporting
- Co-viewing for linear, CTV and Converged TV
- Cross-platform reach and frequency simulation for media planning
- Converged TV content viewership





4. iSpot

iSpot Company Statement

iSpot.tv is a real-time TV measurement company used by brands and networks to measure every second of linear ads on TV and unify linear and streaming across 400 top publishers and platforms. iSpot measures the complete lifecycle of TV advertising from concept to airings and audience verification to conversion in a single platform, iSpot delivers fast, accurate and actionable insights for planning, buying, and optimizing TV.

iSpot originates measurement using its patented ad catalog, on screen verification from a panel of 40 million opted-in Smart TVs, 12 million set top boxes and a proprietary device graph that includes millions of connected phones, tablets and computers and billions of connected pixels, giving customers a complete view into ad exposures, attention metrics, business outcomes and brand lift from TV and streaming investments.

iSpot's scale, precision and expertise enable industry specific benchmarks, brand specific KPIs and emerging currencies that networks and brands can use to justify, optimize, and transact on. The company offers CTV validation products that prove the on-screen delivery and value of streaming advertising and iSpot's Unification offering is the default measurement system for CTV platforms including the Trade Desk.

- **Complete Campaign Lifecycle Measurement for Advertising:** iSpot measures ad campaigns from concept to conversion in a single unified platform, including creative testing, media verification, attention measurement and business outcomes including conversion, lift, foot traffic, app activity, web, and call center activity.
- **Full Spectrum Ad Coverage:** iSpot has a patented system for the detection, tagging and on-screen verification across linear, VOD, time shifted delivery and is expanding to include streaming, AVOD and CTV. iSpot captures TV creatives for more than 40,000 advertisers over 10+ years with 1.8M ads.
- **Unified, Cross-Platform Measurement:** Purpose-built to ensure uniformity and quality of data captured across all forms of linear TV and 400+ streaming publishers/DSPs that brings together millions of devices, websites, and brand-level activity.
- **Competitive Insights & Benchmarking:** Current and past ad performance, competitors' creatives and media plans, and industry and event-specific norms.
- **Real-Time Results for Data-Driven Optimizations:** Real-time in-market measurement to adjust on the fly, monitor creative wear, and measure media delivery.

- **Large-Scale, Representative Panels:** TV ad impressions across 40 million Smart TVs, set-top boxes, and 300+ streaming platforms/DSPs are connected to household demographic and co-viewing data, and extrapolated based on the US Census. In Q4 of 2022, iSpot made a strategic investment in TVision Insights, which gave the company exclusivity to person level data covering 900 CTV sources for the purposes of currency products. Creative assessment data is also balanced to the US Census with the largest sample sizes for rapid creative testing.
- **Top Data Scientists & Media Experts:** 100% US-based team of leading data scientists and highly experienced media experts.
- **Industry Integration:** iSpot data can be leveraged within platforms like Neustar, Oracle, Snowflake, etc., or within their own internal tools to perform advanced MTA, MMM and TV ROAS analysis. iSpot is integrated into The Trade Desk and claims to be the default system for measuring incrementality, with various integrations with TV network systems for transactions.

What iSpot measures (high-level description)

iSpot measures program and ad campaign delivery and ad outcomes for traditional and advanced audiences, based on digital ad impressions from pixel tags, publisher-provided ad logs or direct integrations with networks.

This is combined with linear TV ad impressions data from Inscope/VIZIO, LG Smart TVs and 5 other unidentified OEMs and calibrated with STB data and personified with a proprietary use case of TVision's panel. iSpot uses its proprietary ACR technology to create the ads catalog that is the basis for detecting and verifying ad impressions on Smart TVs.

iSpot measures digital content consumption based on partnership integrations with streaming apps and Conviva.

iSpot measures content consumption, ads impressions, reach and frequency and outcomes on linear TV, DVR and MVPD VOD on a national basis. This covers national

broadcast TV networks, national cable TV networks, syndication covering local airings in >50% of US households and local broadcast television in 210 DMAs in their syndicated Media Measurement service.

iSpot measures CTV, mobile and desktop content, and ad impressions via its non-syndicated Unified Measurement service. Reporting is dependent upon agreement with the streaming app provider, integration with Conviva (for content) and use of a pixel tag (for ad impressions).

iSpot uses IP address as the primary method to match Linear TV households with streaming/digital ad exposure. The matched TV-digital data is the basis for unduplicated reach and frequency measurement. iSpot adjusts the data using ARF DASH for digital media usage behaviors and characteristics and STB data to provide greater household coverage. iSpot adjusts time-shifted viewing using TiVo STB data. iSpot projects the matched data to the U.S. population and ad impression universe.

Epsilon is the primary source of demographics. iSpot onboards 1st and 3rd party audiences, including TV viewership segments for targeting. Reports and data are available through a dashboard, data feeds, API/BI integrations, OpenAP and agency planning/buying systems.

iSpot Methodology

Data footprint

iSpot's data footprint is comprised of more than forty million opted-in Smart TVs from seven OEMs, calibrated with data from 12 million Set Top Boxes and a person-level panel of 5,800 households. iSpot has integrations with Epsilon, TransUnion and Experian and location-level data from PlacelQ. iSpot captures digital ad impressions using server integrations and pixel data.

Ad impressions

The process starts with an iSpot ad catalog, created using iSpot ACR technology. iSpot sends the iSpot ad catalog to VIZIO and LG to identify ad impressions from linear

TV stations and networks. The ad catalog enables measurement of ads that run on linear TV (including DVR and VOD), CTV or both within the VIZIO and LG data footprints. TMS is the source of supplemental metadata for ad impressions.

Digital ad impressions are captured via a pixel tag installed by publishers or server to server integrations. This enables all impressions to be captured.

Competitive ad exposure

iSpot has a catalog of 1.9 million creatives, and ads measurement for more than 300k ads per year. This allows reporting competitive ad schedules and ad exposure sourced from its own ACR technology and ad catalog. Ads are categorized by creative, brand, industry, parent company, genre, demographic, age, daypart. Programs are categorized by airings, shows, networks, type of impression (linear, VOD, OTT). Attention metrics, network viewership, addressable ads, creative variations, and onscreen messaging are reported.

Content viewing

iSpot measures linear TV content consumption using a proprietary method that includes ACR fingerprinting, on screen verification, show and ad pod verification.

iSpot measures streaming content consumption using a similar method that also includes sensor level app data from Conviva and direct integrations with inventory owners.

iSpot reports on 27 of the 29 streaming apps on the CIMM streaming app list and reports on consumption at the app and program/title-level.

Persons and Households

iSpot content consumption, ad campaign delivery and on-screen verification is measured based on person and households. Households are defined by a mix of verifiable signals including IP address. iSpot recently made an investment in TVision and uses the TVision panel to determine the probability of who, within the household, is in front of the TV across a variety of different household types. The probabilities describing who is in front of the TV are then applied to the household impression data using the demographics of persons living in the household. iSpot also verifies viewership using a proprietary system that references viewing behaviors, uses statistical model and persistent consumer surveys.

Cross-platform unduplicated reach

iSpot has a Unified Measurement methodology to match ad exposure from its footprint of Smart TVs to digital ad exposure and content consumption from Smart TVs to streaming consumption. The match primarily uses IP Address. The matching process creates a pool of households where both TV and digital ad exposure or consumption is observed, and is the basis for exposure measurement and unduplicated, cross-platform reach and frequency measurements. The observed measurements are extrapolated to the total U.S. population and the total ad impressions universe.



Identity / Device Graph

iSpot groups ad impressions data into households using Epsilon IDs. Devices are matched to households using IP Address. iSpot works with third-party device graph partners Experian, LiveRamp, Epsilon, Adobe, Oracle, TransUnion and Neustar to onboard/match first- and third-party audience segments and viewership audiences for advance targeting.

Universe Estimates

U.S. Census is the source of U.S. population estimates. The population estimates are supplemented by the ARF DASH study (approximately 10,000 survey sample size).

Weighting

iSpot projects their data to 122.8 million U.S. households. iSpot establishes two “panels” for the purpose of weighting to adjust for viewing by primary and secondary television sets in Smart TV households. iSpot weights the data to be demographically and geographically (market-level) representative of the U.S. population

Demographics and Audiences

Epsilon is a source of demographics. iSpot has validated the demographics by comparing them to Oracle data. Additional validation is in progress. iSpot reports persons 2+, 18+ and multiple segments. iSpot reports persons 7+, for program ratings

iSpot onboards first- and third-party audiences through partnerships with multiple device graph vendors. Marketers can choose their preferred device graph vendor for this process.

Integrations

iSpot measurement is accessed via an online portal/dashboard, and supports data feeds, BI tool integrations and APIs. iSpot is integrated with OpenAP and with agency planning/buying systems including The Trade Desk. iSpot data can be leveraged within platforms like Neustar, Oracle and Snowflake. iSpot is not integrated

with publisher ad sales systems.

Accreditation

iSpot is currently seeking MRC accreditation for its ad schedule/ad airings data. iSpot intends to seek accreditation for ad impressions data after ad airings accreditation.

Mobile and Desktop

Ad exposure on mobile and desktop devices is dependent upon a publisher pixel tag or publisher/brand-provided ad log files

Measurement challenges: iSpot

Non-broadband households

Non-broadband households are included in the universe estimates to which the service is weighted; however, whether non-broadband households are measured is not specified.

Over-the-air (OTA) viewing

OTA households are included in the universe estimates to which the service is weighted, however, how OTA households are measured is not specified. iSpot claims to be able to isolate OTA viewing and report on it via custom analytics.

Households with multiple TV sets

VIZIO, LG and five other OEMs used by iSpot typically measure one OEM's TV set per household. iSpot addresses the missing viewing that could result by weighting the data as two separate “panels” (primary TV set and secondary TV set) and adjusting viewing levels to levels observed in a footprint of 12 million Set Top Box (STB) households. The STB data enables correction for under/over reported viewing and other issues such as SD/HD viewing skews.

Hispanic households

Hispanic households are included in the universe estimates to which the service is weighted. iSpot's data footprint consists of

more than five million Hispanic households. iSpot does not break-out ethnicity for reporting purposes in its dashboard. iSpot reports the major Spanish language networks. Spanish speaking audiences (and other ethnicities) can be broken out through custom analytics.

Privacy

iSpot uses Smart TV data and brand-authorized data that is obtained via double opt-in with express and informed consent. iSpot claims to adhere to CPPA and COPPA and complies with the US Agreement that's governed by GDPR.

Deprecation of Digital IDs

iSpot claims to have a methodology to improve loss of fidelity due to cookies deprecation; however, the methodology is not specified. IDs are periodically refreshed using partners such as Experian, Epsilon and LiveRamp.

Streaming Apps

Several streaming apps prohibit or limit measurement via Smart TV ACR. iSpot does not measure ads that run in streaming apps where the app owner prohibits measurement unless the publisher or advertisers incorporates a pixel tag or provides log files of ad exposure.

iSpot measures streaming ad exposure on 27 of the 27 ad-supported streaming apps/sources on the CIMM-provided list. iSpot measures streaming content consumption on 27 of the 29 streaming apps/sources on the CIMM-provided list, including title-level identification when the content is on live TV and not on live TV. iSpot measures original programming via partnerships with networks and via Conviva.

“Walled Gardens”

iSpot does not include aggregated ad impressions measurements from platforms such as Google and Facebook, but it has integrations with YouTube.

Invalid Traffic (IVT)

iSpot does not currently use an IVT solution to screen digital ad impressions. Linear and streaming impressions on Smart TVs are only counted when a TV is on, verified 'on the glass.' In the event of false impressions delivered to external streaming devices from the Smart TV when the TV is off, iSpot can detect them.

Time-shifted Viewing

iSpot reports ad impressions as Live+Same Day only or combined with time-shifted impressions as needed. Time-shifted buckets include L+3, +7, and up to 30 days.

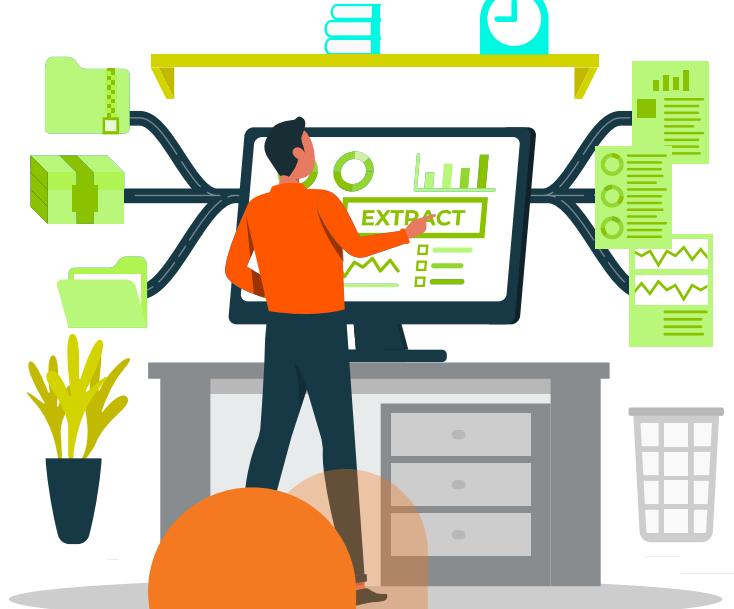
Local measurement

iSpot does not provide measurement for local television markets but enables local market breakouts in the national measurement service.

iSpot Roadmap

iSpot priority feature developments on its roadmap include:

- Network filtering to measure incremental streaming on a per-network basis
- Advance audience segment filtering within cross-platform solution for networks
- Integration with Mediaocean Prisma, Tunity, the out of home measurement system it acquired in March 2022.
- Integration with CoreMedia Systems
- Out of home (OOH) integration and ratings development
- Demographic breakouts by race within cross-platform and media measurement services
- Competitive data for streaming/CTV



5. LiveRamp Data+Math

LiveRamp Data+Math Company Statement

LiveRamp is a trusted, neutral platform for the fragmented TV, CTV, and digital ecosystem. It enables clients to connect data within their enterprise and cloud solutions, collaborate with partners and activate data. With more than 500 integration partners, 160 programmatic platforms and customer experience applications, LiveRamp helps transform data into meaningful customer interactions.

Today advertisers have more choices than ever before. More devices, more viewers, more content, more platforms. Through a common, interoperable ID (RampID) that is deterministically matched in a privacy compliant manner, LiveRamp enables customers to join fragmented, disparate data sets together. The data can be distributed for measurement and be used by clients for operational, data science and self-serve measurement solutions. LiveRamp has partnerships across major television networks and digital platforms.

LiveRamp measurement applications include cross screen measurement, TV ad exposure data feed and LiveRamp Data Hub. LiveRamp measurement is enabled by LiveRamp's RampID interoperable identifier

and the LiveRamp's cloud-based identity translation layer.

LiveRamp's cross-screen measurement offering, Data+Math (D+M), is a trusted dashboard offering utilized across publishers, brands, and agencies. By tapping into LiveRamp's identity graph centered around RampID, D+M provides a 360-degree view of impressions delivered to households to deliver cross-screen Reach/Frequency view - and deeper connection to business outcomes for attribution measurement.

Data+Math licenses linear TV data from Comscore and Inscope or receives Linear TV exposure data from MVPDs or media owners directly, CTV/OTT data, most major DSPs, streaming audio, and digital display publishers. The data are matched using the LiveRamp device graph, which is used to facilitate integration with client first party and third-party data for audiences and/ or conversion events data reporting. Data is reported at the household level.

LiveRamp's Vizio sourced TV Ad Exposure Feed offering allows customers to export direct data feeds of households exposed to their brand's ads or include their competitor's exposures. The feed, centralized on RampID, is cleansed, and configured so that it is readily consumable by the client's in-house analytics environments.

Cross-screen data from publishers and brands are also made available in LiveRamp Data Hub, a collaborative, self-service framework for custom analytics and/or activation use cases that maintains privacy controls such as reporting minimums and transparency. This program is currently a Beta offering.

Data+Math enables marketers to measure TV's impact on audiences and business outcomes at scale, across screens and across formats, Data+Math provides cross-screen reach, frequency and attribution using a customer's first-party data (such as sales, app installs, usage tracking, sign-ups), website visitation data (via a website pixel tag), app downloads, and Nielsen Catalina-sourced sales and units data.

What LiveRamp Data+Math measures (high-level description)

Data+Math measures advertising campaign delivery and outcomes for the TV universe and advanced audiences, based on digital ad impressions from pixel tags and publisher-provided ad logs, combined with linear TV ad impressions.

Linear TV is measured via Data+Math is integration with Comscore and Vizio Inscope. Both partners provide a panel of Comscore or Vizio Inscope TV households that meet reporting qualifications to measure linear TV impressions and reach. In addition, Data+Math can onboard a media owner's specific viewership footprint through LiveRamp where the media owner shares the footprint and exposure data.

Streaming, audio, and digital ad impressions on CTV, OTT, mobile and desktop devices are captured via pixel tags and ad server logs. Digital ad impressions are matched to the linear TV panel via LiveRamp's device graph. The TV data are the panel basis for unduplicated reach and frequency measurement. Digital ad impressions data are scaled/weighted to represent the universe of digital ad impressions.

Data+Math onboards first- and third-party audiences, including TV viewership segments,

using the LiveRamp device graph. Third-party demographics are sourced primarily from Epsilon.

LiveRamp Data+Math Methodology:

Data footprint

Data+Math measures TV viewership in 30 million U.S. households, sourcing data from one or more TV providers including Comscore, Ampersand, Comcast, Spectrum, DirecTV, Dish, Cox and Inscope/Vizio.

Data+Math creates an in-tab sample that is nationally representative using Comscore and Inscope households. Households are selected based on TV viewing behavior, demographics, and cross-device/web visibility. Linear TV in-tab sample that qualifies for reporting in a 30-day period: Comscore (8-10M), Inscope (3-4M), Ampersand (16-18M).

Ad impressions

Data+Math incorporates TV ad exposure data from various sources:

- Kinetiq's ad catalog of Linear TV ad occurrence / ad schedule data: The ad occurrence data is matched to Comscore and Inscope/Vizio viewership data to identify ad exposure. The ad catalog enables measurement of ads that run on linear TV (including DVR).
- Inscope ACR (auto-content recognition) of Linear TV ad occurrence / ad schedule data: The ad occurrence data is matched to Comscore and Inscope/Vizio viewership data to identify ad exposure. The ad catalog enables measurement of ads that run on linear TV (including VOD).
- Via MVPDs and TV programmers directly through exposure files sent through LiveRamp.

Streaming and digital exposure are captured through pixel tags or ad log exposure feeds. Data+Math does not use a minimum number of seconds threshold to report streaming and digital ad impressions, however streaming

tags can be enabled with a third-party verification partner's on-view event instead of the impression event.

Roadmap: Connecting TV and digital ad exposure in clean rooms and the cloud.

Competitive ad exposure

LiveRamp does not report cross-screen competitive ad schedules or ad exposure. LiveRamp's Vizio sourced TV Ad Exposure Feed allows customers to export data feeds of households exposed to their competitor's Linear TV ads, reporting timestamp, network, program, and creative name.

Content viewing

Data+Math does not measure content (program level) viewing.

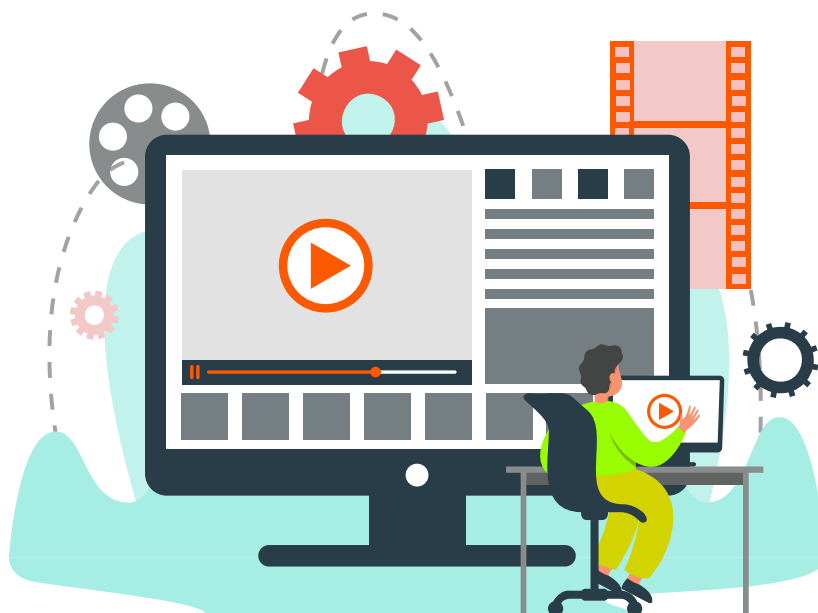
Persons and Households

Data+Math provides measurement of households defined by LiveRamp's device graph. Data+Math does not measure at the persons-level.

Cross-platform unduplicated reach

LiveRamp measurement is based on advertising campaign delivery on Comscore viewership data, Inscope/Vizio Smart TV data, or publisher provided TV exposure data, supplemented with digital ad impressions on CTV/OTT/streaming, mobile and desktop devices. Data+Math pairs exposure and attribution data to one household Ramp ID to enable unduplicated reach metrics.

1. Linear TV impressions and reach: LiveRamp creates a sample from the TV data source using in-tab rules (households must appear in TV viewership a minimum threshold per month or quarter) and qualification rules (households must appear in national demographic dataset). Each household is assigned a weight such that the sum of the weights in a sample add up to the TV viewing universe in the US. TV impressions and reach are calculated using this weighted sample.
2. Digital impressions: Digital impressions are captured via pixel tags, server ad logs or other data. Digital impressions are matched to the Linear TV sample above to calculate digital impressions within this sample. The universe of impressions in the raw digital data is used to scale up the observed, matched impressions to represent platform, property (network) and date.
3. Cross-screen Reach: In parts 1 and 2 above, a single household might have one weight for TV and different digital impressions "scale factors" depending on the platform, property, and date. To calculate cross-platform reach, scale factors are calculated for each household for all (TV and digital) impressions at the same grain of platform, property, date. The scale factors are aggregated into a single effective weight for the household, determined by its impressions on different platforms. These effective weights are then used to calculate cross platform reach.



Device Graph

Data+Math leverages LiveRamp's RampID and identity products. For linear TV, LiveRamp anonymizes and resolves TV device IDs to LiveRamp RampIDs at the household level. When a digital ad exposure is collected with a pixel or log files, the included online IDs are processed via the LiveRamp device graph, resolving these exposures to a RampID. Data+Math matches ad exposures back to the Data+Math sample, which is also resolved to the same RampID. Cross-screen ad exposure and conversion data are matched to one household Ramp ID to enable unduplicated reach metrics.

Universe Estimates

Nielsen is the source of U.S. population estimates.

Weighting

National ad campaigns are typically projected to the TV household universe estimate published by Nielsen. There are cases where ad campaigns are projected to the media seller's footprint instead (such as Ampersand or Samsung).

Data+Math creates in-tab samples that are nationally representative using Comscore or Inscope households. Households are selected based on TV viewing behavior, demographics, and cross-device/web visibility.

Demographics and Audiences

Epsilon is the primary source of demographics. LiveRamp onboards additional first- and third-party audiences through the LiveRamp device graph.

Integrations

LiveRamp claims to have an identity infrastructure with more than 500 integrations. Data+Math is integrated with OpenAP and an approved OpenAP XPM measurement provider.

Data+Math measurement is accessed via an online portal/dashboard, API integrations,

data feeds and BI tool integrations including Tableau, Looker, and Bokeh. Data+Math is not integrated with publisher ad sales systems or agency planning/buying systems.

Accreditation

Data+Math is not currently seeking Media Ratings Council (MRC) accreditation.

Mobile and Desktop devices

Ad exposure on CTV, OTT, streaming, mobile, and desktop devices is dependent upon a publisher pixel tag or publisher provided ad log files. The captured online IDs are matched to a household using LiveRamp's identity graph and resulting in a true view in household cross-screen reporting.

Dealing with measurement challenges: LiveRamp Data+Math

Non-broadband households

Measurement of non-broadband households is dependent upon the source of TV viewership data. Whether measured or unmeasured, they are included in the universe estimates to which the data is weighted.

Over-the-air only (OTA) households

Measurement of OTA households is dependent upon the source of TV viewership data. Whether measured or unmeasured, they are included in the universe estimates to which the data is weighted.

Households with multiple TV sets

Measurement of multiple TV sets per household is dependent upon the source of TV viewership data. Comscore includes multiple sets per household and is weighted/adjusted to represent this universe. Vizio Inscope ACR generally measures one TV set per household. Data+Math does not make its own adjustments to the data for number of television sets.

Either Comscore or Inscope/Vizio data is used in Data+Math measurements, not both, therefore Data+Math does not de-duplicate households that may contain both a Vizio TV set and an MVPD STB.

Hispanic households

Measurement of Hispanic households is dependent upon the source of TV viewership data. Whether measured or unmeasured, they are included in the universe estimates to which the data is weighted. Data+Math believes they are getting an accurate representation of Hispanic households through their partnership with Comscore.

Privacy

Data+Math claims that LiveRamp meets current privacy standards. Certifications for CCPA and GDPR or other privacy compliance were not specified.

Deprecation of Digital IDs

LiveRamp reports that they are continuing to invest in premium publisher integrations, which are built on PII and non-cookie platform identifiers.

LiveRamp expects other current tracking mechanisms such as pixels or IP address alone to run into regulatory hurdles, therefore LiveRamp is supporting the ability to work between multiple identity infrastructures via clean room and cloud transcoding solutions.

Streaming Apps

Streaming app content and ads consumption is measured with the cooperation of the streaming app owner. Data+Math measures streaming ad exposure on 19 of the 27 ad-supported streaming apps/sources on the CIMM-provided list. Data+Math does not measure streaming content consumption at the title-level.

“Walled Gardens”

Data+Math does not include aggregated ad impressions measurements from Walled Gardens such as Google and Facebook.

Invalid Traffic (IVT)

Data+Math does not use an IVT solution to screen digital ad impressions, however its streaming tags can be enabled with a third-party verification partner’s on-view event instead of the impression event.

Time-shifted Viewing

Measurement of time-shifted viewing is dependent upon the source of TV viewership data.

LiveRamp does not distinguish between linear TV VOD and DVR ad exposures in reporting.

Local measurement

Data+Math does not provide measurement in local television markets.

LiveRamp Data+Math Roadmap

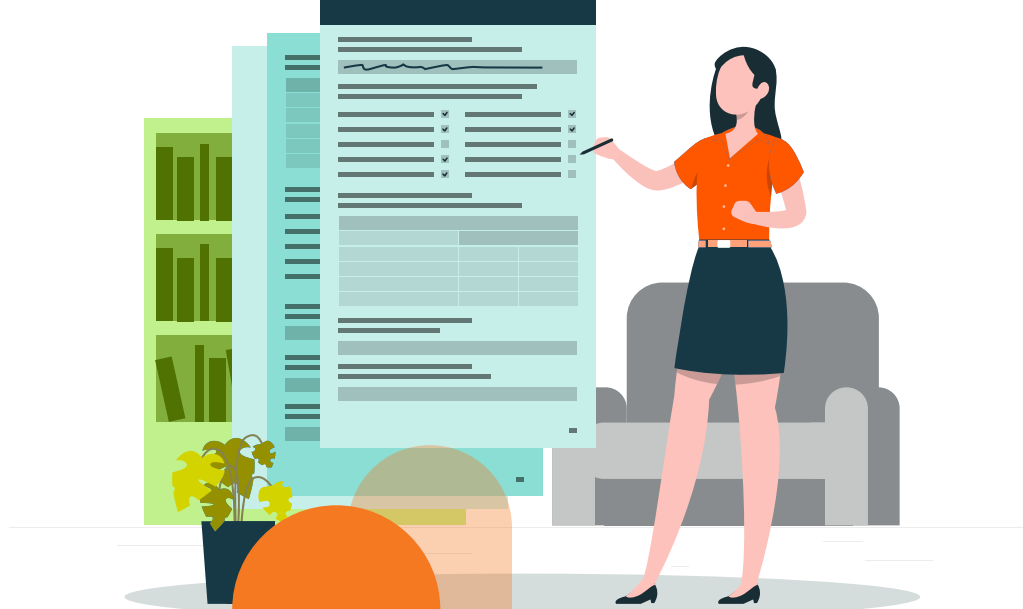
LiveRamp’s acquisition of DataFleets technology is the basis for enabling marketers to access data for their own data science, attribution, and analytics.

Product releases include:

February 2023: Beta launch of LiveRamp Data Hub in Safe Haven: Including query thresholds; controls for data governance; many-to-many collaboration.

2023: Upgrades to the Data+Math reporting attribution model, including longer duration and customized timeframe reporting

2023: Upgrades to cross-screen measurement household identity spine to include digital-only HHs (cord cutters) to allow for multiple currency and measurement providers to calculate their own metrics while still maintaining a sense of reference that is a large data set vs a proprietary panel approach.



6. Nielsen

Nielsen Company Statement

Nielsen delivers audience measurement representative of the US population for both ads and content. Nielsen provides viewership and impact analytics primarily to media publishers and marketers and their advertising agencies for linear television, streaming and digital. Nielsen delivers comprehensive coverage of national ads – nearly 100% of linear TV ads, more than 90% of digital ads and more than 75% of CTV ads.

Audience insights are available by household, age, gender, and many other characteristics. Reported characteristics include hundreds that are collected directly from Nielsen's panels and data integrations through third party research firms or clients' first party data. Nielsen delivers de-duplicated reach and frequency measurement for ads and content via Total Ad Ratings and Total Content Ratings.

Through Nielsen's impact solutions, clients can optimize marketing ROI throughout the customer journey. Nielsen has also embarked on a transformation of its audience measurement suite of solutions to deliver Nielsen ONE – a cross-media first product suite that will launch at the end of 2022. With the involvement of several early companies participating in the Nielsen ONE Alpha program, Nielsen ONE Alpha is designed to offer both comparability and audience

deduplication across all screens (linear TV, connected TV, computer and mobile).

Nielsen's areas of distinction include the following:

1. Representative – delivering audience estimates fully representative of the US population, including race, ethnicity, geography, education, cable status (with broadband only and over the air homes) and coverage of connected device providers including Hulu, Roku, Amazon and more.
2. Comprehensive and Person Level – measuring all operable TV sets in the home, all devices connected to those TV sets, all people in the home including visitors, the vast majority of content owners
3. Transparent – continually audited by an independent third party and delivering detailed methodology reviews to MRC committee for accreditation process.

Nielsen currently provides cross platform measurement and planning services for ads and content. Nielsen's solutions set is evolving to Nielsen ONE which will have comprehensive, resilient and deduplicated cross-media measurement. The platform will provide reach, frequency and other audience metrics across linear programming, streaming, connected TV (CTV) and digital channels. This will enable buying and selling of media using a single currency that is trusted, independent and standardized across the industry.

What Nielsen measures (high-level description)

Nielsen measures content consumption and ad campaign delivery and outcomes for linear TV, CTV, and digital platforms, based on demographics and audiences for linear TV measurement and demographics and advanced audiences for ads measurement.

Nielsen linear TV content and ads measurement uses consumption data from 41,000 U.S. households / 101,000 person consumer research panel where Nielsen meters are installed for measurement. Linear TV content measurement includes DVR and MVPD VOD when the ad schedule is the same as the linear TV ad schedule. When the MVPD VOD ad schedule is not the same as the linear TV ad schedule, it is credited as “Library VOD” and reported separately from the Nielsen currency metrics.

These measures are supplemented with streaming measurement on CTV, mobile and desktop devices where the publisher uses Nielsen technology (SDK) for measurement. Ads measurement on linear TV is from the Nielsen TV panel. Ads measurement on CTV, mobile and desktop devices is based on pixel tags and client-provided ad logs.

Nielsen provides measurement on a national basis and across 210 local markets, called Designated Market Areas (DMA).

Reports and data are available through a dashboard, data feeds and BI/API integrations and in ad buyer and ad seller systems. Nielsen content measurement is available on a syndicated basis. Ads campaign delivery measurement is available on a proprietary basis.

Nielsen Methodology

Data footprint

Nielsen linear TV measurement (including DVR and MVPD VOD) is based on 41,000 randomly selected U.S. households (approximately 101,000 persons). 38,000 households

(94,000 persons) qualify for reporting in a 30-day period.

Nielsen provides out-of-home viewing from a 60,000-person panel where viewing is detected via a portable meter using passive (watermarking) technology. Nielsen has separate 32,000-person desktop panel, 18,000-person mobile panel and panels in local markets. The desktop and mobile panels are used to inform demography for desktop and mobile measurements.

Roadmap: Nielsen is incorporating MVPD STB and Smart TV ACR data into its Nielsen ONE measurement service. The methodology has not been specified.

Ad impressions

Nielsen uses Nielsen AdIntel ad occurrence / ad schedules matched to Nielsen linear TV consumption data from the Nielsen TV panel to identify viewing to advertising.

Linear TV ad impressions are also detected using Nielsen’s active/passive meter for advertisers that watermark the ads. Nielsen partners with Extreme Reach to automate ads watermarking. Digital ad impressions are captured via ad server integrations or pixel tags, which enables a census of digital ad impressions to be captured. Digital ad impressions are matched to linear TV ad impressions using Nielsen’s device graph.

Ad campaign delivery measurements include unduplicated reach, frequency, impressions, and other metrics. Nielsen reports ad campaign delivery on a persons basis. Persons are determined from the Nielsen TV panel and projected to the digital ads universe.

A linear TV ad impression is credited as follows: the viewing source that is tuned for the majority of a minute receives credit, and any ads within that minute are receive credit for that audience. For Digital & CTV, Nielsen counts the ad impression when the pixel tag fires and provides options to apply qualifiers including MRC Viewability standard.

Roadmap: Addressable MVPD ad impressions from Dish, DirecTV, Vizio and Roku is

on Nielsen's roadmap. Nielsen ONE will enable inclusion of ads overlays in the measurement and sub minute measurement (15 seconds or more interval) and measurement of individual ads.

Content consumption

Nielsen linear TV content and ads measurement is based on viewing from 41,000 randomly selected and recruited U.S. households to create a representative, longitudinal consumer research panel. TV sets in Nielsen households are installed with an active/passive meter.

The primary means of identifying content and ads on linear TV is using "passive" technology. The "passive" technology identifies watermarks in programming and ads that have been inserted by publishers and advertisers. The watermarks are matched to a dictionary of watermarks to identify the content and the advertising. "Active" technology is used where watermarks are not available. Active technology creates fingerprints of content and ads as they are viewed and matches them to a dictionary of fingerprints established by Nielsen as it monitors programming.

Once tuning events are detected, they are matched to program schedules and metadata provided by Gracenote and provided by the publishers.

Demographics are captured using a remote-control device. Households are instructed to identify whether they are in the viewing audience using a remote-control device programmed with household member names and providing for guests. Household members and guests are prompted approximately every 30 minutes to indicate whether they are in the viewing audience.

Approximately half of Nielsen households also have a streaming meter installed which captures consumption on streaming apps, reported at the total app-level. Nielsen reports program/episode-level detail for streaming providers Netflix, Amazon, Hulu, Disney+ and AppleTV.

Nielsen's primary C3 Average Audience metric is the average of minutes where the majority of each minute is advertising, capturing live and time-shifted viewing over a three-day period. VOD ads exposure outside of the C3 window is captured where MVPDs watermark the advertising, enabling the DAI feed to be identified and reported.

Roadmap: Nielsen is expanding its data footprint in an initiative called Nielsen ONE to enable measurement at a more granular level than can be achieved using a research panel alone. The initiative will incorporate MVPD STB and Smart TV ACR data. Nielsen consumer panels will be used to validate and calibrate the STB and ACR data and measure audiences missing from the STB and ACR footprints.

Competitive data

Nielsen reports competitive ad schedules and competitive ad campaign delivery for linear TV and CTV using its TV panel. Ad campaign delivery measurement on CTV, mobile and desktop, where data collection requires pixel tag or other tech integration by the advertiser, is proprietary to the client.

Persons and Households

Nielsen measures persons and households for linear TV and CTV content and ads measurement. Nielsen measures persons for streaming on mobile and desktop devices and digital ads measurement.

Cross-platform unduplicated reach

Nielsen observes duplication across linear TV and streaming for persons within households installed with both the TV active/passive meter and the streaming meter. Duplication is further observed across mobile and desktop devices after the digital ad impressions and content, if applicable, are matched to the household using the Nielsen device graph.

Device Graph

Nielsen uses its own device graph to match mobile and desktop device ads impressions to

Nielsen TV panel data. Nielsen's device graph is integrated with Experian's device graph.

Roadmap: Nielsen intends to integrate with additional third-party device graphs.

Universe Estimates

Nielsen uses data from the U.S. Census and a proprietary Nielsen enumeration survey to generate TV Household Universe Estimates:

Nielsen defines a television household as a home with at least one operable TV/monitor with the ability to deliver video via traditional means of antennae, cable STB or Satellite receiver and/or with a broadband connection.

Weighting

Nielsen households and persons in the TV panels are weighted to match Nielsen universe estimates on dimensions that include geography, demography, ethnicity household size and other dimensions. Weighting is also used to account for daily variations in household and persons participation. Nielsen evaluates the weighting controls annually to ensure the weighting model is consistently using the characteristics that are most related to tuning.

Nielsen reports that as of February 2022, 18 of the 25 LPM (active/passive meter) markets and 19 of 31 TV set meter markets are +/- 2 percentage points from the Universe Estimate

for the following market characteristics: Hispanic, where applicable, Black, Age of Householder <35, 35-54 and 55+, Cable+, OTA, BBO, HH Size 1-2, 3-4, and 5+, Presence of any children <18.

Demographics and Advanced Audiences

Demographics are captured directly from Nielsen panelists. For national panelists who are also measured in local markets using set meters, and for national panelists with unidentified demography, demography is assigned using a methodology called Viewer Assignment Methodology.

Additionally, Nielsen can match panelists to third-party sources of consumer data or use fusion methodologies to report additional demographics. Nielsen works with third-party providers MRI Simmons, Nielsen Catalina Solutions, Nielsen Buyer Insights, Polk, and Quotient and can support first party data integrations.

Viewer Assignment is a statistical technique that uses demographic-based tuning event in 'people meter' households and assigns demographics to tuning events in 'set meter' households where the household demographic composition is known but not the demographics for each tuning event.



Integrations

Nielsen measurement is accessed via an online portal/dashboard, data feeds, BI and API integrations.

Nielsen is integrated with OpenAP to activate advanced audiences. Nielsen is integrated in publisher ad sales systems and agency planning/buying systems.

Accreditation

Nielsen is currently seeking Media Rating Council (MRC) re-accreditation for its measurement services.

Mobile and Desktop devices

Ad exposure measurement on mobile and desktop devices is dependent upon a publisher pixel tag, publisher integrations or publisher/brand-provided ad log files. Streaming app content consumption on mobile or desktop devices is dependent upon permission of the streaming app owner as is reported through separate products, including Digital Ad Ratings (DAR), Digital Content Ratings (DCR) and dTVR.

Dealing with measurement challenges: Nielsen

Non-broadband households

The Nielsen panel includes non-broadband households.

Roadmap: Nielsen intends to change how it uses the Nielsen panel (methodology unspecified) to fill in the gaps in MVPD STB and Smart TV data, including measurement of non-broadband.

Over-the-air only (OTA) households

The Nielsen panel includes OTA households

Roadmap: Nielsen intends to change how it uses the Nielsen panel (methodology unspecified) to fill in the gaps in MVPD STB and Smart TV data, including measurement of OTA households.

Households with multiple TV sets

The Nielsen panel measures all TV sets in the household.

Hispanic households

The Nielsen panel includes Hispanic households. Nielsen uses an area probability sample, in-person recruitment, differential (higher) incentives, Bilingual (English and Spanish) field staff and recruitment materials, weighting, and other techniques to maximize participation by groups including Hispanic households.

Privacy

Nielsen does not specify compliance with CCPA and GDPR.

Deprecation of Digital IDs

Matching digital ad impressions to Nielsen's TV panel relies on digital IDs to establish which ad impressions and mobile and/or desktop devices belong to the same household. Nielsen's current ID resolution system is a consent-based system.

Roadmap: Nielsen intends to contextual data (metadata) to create a probabilistic device graph to address gaps in IP Address coverage. Nielsen supports use of universal identifiers such as UID2.0 and ID5 and hashed email addresses.

Streaming Apps

Nielsen measures streaming ad exposure on 26 of the 27 ad-supported streaming apps/sources on the CIMM-provided list. Nielsen measures streaming content consumption on 26 streaming apps/sources on the CIMM-provided list including title-level identification where the content is on live TV. Nielsen measures streaming content consumption on 16 of streaming apps/sources on the CIMM-provided list including title level identification where the content is not on live TV. Nielsen measures original programming on streaming apps/sources for 6 streaming apps/sources.

Nielsen measures Vizio WatchFree, Samsung TV Plus and Roku Channel live streaming/FAST channels streaming apps.

“Walled Gardens”

Nielsen does not include aggregated ad impressions measurements from platforms such as Google and Facebook.

Invalid Traffic (IVT)

Nielsen does not specify IVT solutions or partners.

Time-shifted Viewing

Nielsen reports time shifted viewing for linear TV DVR and VOD on a Live+3 and Live+7 basis.

Local measurement

Nielsen provides local measurement, covering national U.S. content and ads and local affiliate and syndication content and ads in 210 DMAs.

Nielsen Roadmap

Nielsen priority feature development on the roadmap is Nielsen ONE, which incorporates MVPD STB and Smart TV ACR data in the measurements.





7. Samba TV

Samba TV Company Statement

Samba TV is a global leader in first-party data for TV & omni screen audiences, advertising, and analytics. Samba TV's Automated Content Recognition (ACR) software is integrated into the hardware of leading Smart TV brands (24 globally, 10 US), and provides insight into content viewership and advertising exposure across broadcast, cable, OTT, and digital media.

As a leader in cross-platform measurement today, Samba TV provides campaign measurement for top marketing, publishing, and agency clients for audience delivery, deduplicated reach and frequency, as well as business outcomes. They offer live campaign dashboards (updated every 24 hours) that clients tap into for in-flight campaign optimization, including a view of audience aggregated and deduplicated impressions by channel and by individual TV, CTV, and digital publishers. Additionally, Samba TV offers exposure-level reporting for all these metrics.

Samba TV measurement products and services are built on first-party, deterministic TV viewership data from their U.S. research panel of 3 million ACR households, normalized at the DMA level to be representative of the U.S. population geographically and demographically (age, gender, ethnicity, income). Samba TV's TV data footprint is the most diverse and

representative, as it is pulled from the greatest number of Smart TV manufacturer partners in the industry. Their U.S. panel, proprietary identity graph covering 106M U.S. HHs, and a variety of log-level and pixel integrations across the publisher/platform landscape enable their multi-channel, partner, screen, creative and tactic-level measurement products.

Samba TV's services are differentiated based on these key benefits:

- **First Party Data and End-to-end Owned Tech Stack:** Samba TV's ACR technology is built into the Smart TVs of manufacturing partners. They capture exposure to content and ads using their own technology assets including an identity graph, ad schedule and curated measurement panel. Samba TV's solution is fully connected end-to-end, with no loss of fidelity when measuring the overlap of ads between their TV panel and identity graph, which allows Samba TV to capture and measure more advertising insights at the most granular levels.
- **Measurement Panel:** Samba TV's first-party U.S. TV data footprint is diverse and representative, drawn from 10 Smart TV manufacturers who sell TVs at nearly every price point and combination of features, across a multitude of retail distribution channels. Their panel is 100% opt-in and consists of only ACR data to accurately capture the ever-evolving viewership landscape.

- Identity: Samba TV is an identity leader and service provider, with an owned and operated 106M HH US Identity Graph, which serves as the spine for their cross-channel measurement products. This identity solution takes a private graph approach that deduplicates multiple sources of identity to a single household, allowing for the clean and precise integration of multiple identity keys and numerous third-party data sets for licensors.

What Samba TV measures (high-level description)

Samba TV measures content (programming, network, and platform) consumption across linear TV (inclusive of DVR and VOD) and streaming TV, as well as advertising impressions, reach, frequency, and outcomes across linear TV (inclusive of DVR/VOD), streaming TV, linear addressable and digital platforms. Measurement is delivered on a national basis and locally in the top 20 DMAs.

Ad exposures for linear TV, DVR, VOD, and select linear addressable and streaming, are captured via ACR technology. The majority of linear addressable TV, streaming TV, and all digital advertising across mobile, tablet and desktop screens are captured via Samba TV pixel tags and publisher-provided ad logs.

Samba TV uses its own U.S. TV panel and identity graph to match CTV and digital ad impression data to linear TV consumption and ads data. The matched results are extrapolated to the total U.S. household population and total ad impressions universe and are the basis for unduplicated reach and frequency measurement.

Experian is Samba TV's primary source of demographic info. Samba TV can onboard first- and third-party audiences, including TV viewership segments for advanced targeting.

Reports and data are available through a dashboard, data feeds and BI integrations. Samba TV licenses its raw data but does not currently offer content measurement or advertising exposure data on a syndicated basis.

Samba TV Methodology

Data footprint

Samba TV's TV measurement is based on a footprint of approximately 3 million households using Smart TV sets from 10 manufacturers. The manufacturers include Sony, Phillips, Sharp, Toshiba, Sanyo, Element, Magnavox, Seiki, Westinghouse, and TCL. Approximately 1.8 million of the total 3 million household footprint qualifies for reporting in a 30-day period.

Ad impressions

Ad exposures for linear TV, DVR, VOD and select linear addressable and streaming are captured via ACR technology. The majority of linear addressable TV, streaming TV, and all digital advertising across mobile, tablet, and desktop screens, are captured via Samba TV pixel tags and publisher-provided ad logs. Social, digital radio and other walled-garden publishers work with Samba TV by providing direct API access or ad logs for deduplication and inclusion in measurement.

Linear TV ad occurrence data is supplemented with ad occurrence data from Kinetiq to increase local affiliate spots and align the data to industry-standard brand taxonomy. This enables a census of digital ad impressions to be captured. Digital ad impressions are matched to Samba TV households using Samba TV's identity graph.

An ad impression is defined as viewing for 5 seconds or more.

Content consumption

Samba TV captures linear TV program schedule data using ACR. The program schedule data is matched to linear TV consumption data to assign program titles and network/station. Metadata is provided by Redbee Media.

Samba TV reports linear TV consumption and streaming consumption as it occurs using OTT devices (Amazon Firestick, Roku, etc.). This includes programs that run on linear TV for which there is a program schedule, and

programs that run on streaming apps that have been pre-ingested into the Samba TV system. Samba TV has an extensive streaming content library with more than 22,000 hours of content. Samba TV is currently adding more than 1,500 hours of new content per month. Content can also be specifically ingested to meet client needs.

Samba TV reports audiences to programming across linear, streaming, and FAST platforms. Samba TV supports reporting at the title, network, seller (vendor), platform and device type levels of granularity.

Competitive data

Samba TV reports competitive ads across all linear TV channels. Streaming ad exposure is reported when collected via Samba TV ACR. Samba TV does not report competitive digital ad exposure data collected via pixel or ad log.

Persons and Households

Samba TV measures household viewership behaviors and reports on persons within households when reporting demographics but does not personify or report ad exposures or co-viewing impressions. Experian is Samba TV's primary source for demographics, and Samba TV can onboard first- and third-party advanced audiences, including TV viewership segments for advanced targeting.

Cross-platform unduplicated reach

Samba TV matches content consumption and ad exposure from its footprint of Smart TVs to digital ad exposure using their proprietary 106M household identity graph. The matching process creates a pool of households where both TV and digital ad exposures are observed. This is the basis for unduplicated, cross-platform reach and frequency measurements. The observed measurements are extrapolated to the total U.S. population and the total ad impressions universe.

Identity / Device Graph

Samba TV's identity graph uses a deterministic / probabilistic hybrid matching algorithm that utilizes 70 days of historic data to match a device to a household.

Samba TV's Identity Graph is anchored around TV sets, which are an immovable household indicator. Samba TV leverages a variety of technology and partnerships to map the mobile, tablet and desktop devices in each household surrounding those TV sets. Samba TV claims that this TV-focused identity model is unique for identification and measurement of streaming TV advertising.

Identifiers are collected from Samba TV enabled televisions, Smart TV partners, and using the Samba TV pixel tag. Samba TV's identity graph utilizes IP, cookies, MAIDs, device IDs and proprietary Samba TV IDs, as well as location and timestamp, to create device and household level mappings (hashed emails on the Q4 2022 roadmap). Samba TV validates its identity graph via partnerships with Experian and LiveRamp.

Samba TV has integrations with leading identity partners (Experian, LiveRamp, Neustar, TapAd) to enrich their graph and improve the ease of onboarding customer datasets

Universe Estimates

Samba TV sources universe estimates from Nielsen (Nielsen Local Television Market Universe Estimates and National Television Household Universe Estimates).

Weighting

Samba TV Smart TV households are weighted to match Nielsen universe estimates and 121 U.S. households. Samba TV has Smart TVs in all 210 DMAs in the U.S. and the distribution of TVs aligns with the distribution of households in the U.S. Samba TV then weights its panel against the annual U.S. Census American Community Survey (ACS) data for geography and demographics (age, gender, ethnicity, income).

Samba TV reports that in their most recent panel, median HH weights range from 5 to 25

households in the U.S, meaning that for the DMA with the sparsest coverage within the Samba TV panel a single HH would represent at most 25 other households.

Demographics and Advanced Audiences

Experian is Samba TV's source of household demographics. Samba TV also creates advanced audiences defined using TV viewership and ad exposure data (such as Cord-Cutters or Light/Medium/Heavy Viewers, or Sports Fans).

Samba TV onboards first- and third-party audiences for advanced targeting through partnerships with multiple identity graph vendors including LiveRamp, Neustar, Experian and TapAd. Samba TV can also work with partners such as Transunion, Adstra and Acxiom. Marketers can choose their preferred identity graph vendor for this process.

Integrations

Samba TV measurement is accessed via an online portal/dashboard, data feeds and BI tool integrations. Samba TV does not currently support API integrations. Samba TV is not currently integrated with OpenAP, publisher ad sales systems, and agency planning/buying systems.

Accreditation

Samba TV is not currently seeking Media Rating Council (MRC) accreditation.

Mobile and Desktop devices

Ad exposure on mobile and desktop devices is gathered via publisher pixel tag or publisher/brand-provided ad log files. Samba TV does not measure consumption from streaming apps on mobile or desktop devices.

Dealing with measurement challenges: Samba TV

Non-broadband households

Non-broadband households are not measured. They are included in the universe estimates to which the data is weighted.

Over-the-air only (OTA) households

OTA only households are not measured. They are included in the universe estimates to which the data is weighted.

Households with multiple TV sets

Samba TV measures one TV set per household. If there is more than one smart TV set in the household, Samba TV retains the primary television set in the measurements.

Hispanic households

Samba TV reports that their unweighted Hispanic composition within their measurement panel closely aligns to the U.S. Census. (17.6% in Samba TV vs. 18.5% in Census). Samba TV reports a weighted Hispanic population difference of 0.0032% vs. the US Census.

Privacy

Samba TV is certified as GDPR compliant by ePrivacy and applies the GDPR standards globally. Global application of the GDPR standards, including processing the consumer's personal information based on opt-in consent, advances Samba TV's compliance with other data protection laws. Additionally, Samba TV complies with the unique components of other applicable data protection laws such as the CCPA and its requirement to provide the consumer with a "Do Not Sell My Personal Information" website opt-out.

A certified government auditor has designated Samba TV to the Children Online Privacy Protection Act's Safe Harbor based on its compliance with COPPA.

Samba TV is ISO 27001 certified.

Deprecation of Digital IDs

Samba TV will continue to collect signals from Samba TV HHs, which includes a unique television identifier and IP address in both the U.S. and international markets.

Digital browsing data capture will be impacted by digital ID deprecation. Samba TV says they are committed to continuing to capture or source signals that will still be available after the changes and/or lean on partners that are able to collect these signals reliably, including Experian and LiveRamp.

The Samba TV identity graph methodology is rooted in first-party, 100% opt-in ACR TV data. Samba TV does not foresee that deprecation will impact the ability to run a strong graph. Samba TV states that they are committed to being identifier-agnostic and meeting the market with identity solutions.

Streaming Apps

Many streaming apps prohibit or limit measurement via Smart TV ACR. Samba TV measures content and ads from streaming apps on Smart TVs where the consumption occurs via an OTT device. Samba TV measures ads from streaming apps where the publisher or advertiser incorporates a pixel tag, ad server integration, or log files.

Samba TV does not measure content or ads from streaming apps that are installed / pre-installed on the Smart TV set because streaming apps generally prohibit measurement.

Samba TV measures streaming ad exposure on 27 of the 27 ad-supported streaming apps/sources on the CIMM-provided list. Samba TV measures streaming content consumption at the title-level on 29 of 29 streaming apps/sources on the CIMM-provided list where the content is on live TV and for original programming. Title-level measurement of streaming content consumption is limited for content not on live TV.

Roadmap: To provide greater insight into streaming content viewership, Samba TV is creating a re-weighted panel based on households where OTT devices are used for streaming.

“Walled Gardens”

Samba TV does not include aggregated ad impressions measurements from platforms

such as Google and Facebook in their cross-publisher reporting. Samba TV has partnerships with Facebook (and other walled environments) to enable single publisher measurement.

Invalid Traffic (IVT)

Samba TV typically partners with MOAT for digital ad verification services but can utilize the clients preferred partner as needed. Samba TV utilizes opted-in Smart TV households that have been cross-validated by the Samba TV Identity Graph and Experian. Outliers such as abnormally high household level IP traffic and device counts are filtered from the data.

Time-shifted Viewing

Samba TV can measure streaming AVOD, streaming SVOD, MVPD VOD, TV VOD and DVR consumption. There are limitations on distinguishing these content sources from each other when measuring linear TV-originated or syndicated content.

Local measurement

Samba TV measurement covers national U.S. content and ads, local affiliate content and ads, and local operator/MVPD ad inventory in the top 20 DMAs.

Samba TV Roadmap

Samba TV priority feature development on the roadmap:

- Samba TV plans to launch a new measurement platform for cross vendor reach and frequency measurement to enable deeper insights and interactivity from the delivery layer of our solutions.
- Samba TV recently launched an incremental reach dashboard designed to allow advertisers the ability to optimize digital campaigns mid-flight for more efficient reach expansion.
- Samba TV is actively developing their next generation of measurement delivery offerings to increase flexibility, surface new learnings, and improve the overall experience.



8. VideoAmp

VideoAmp Company Statement

VideoAmp is an advertising measurement and optimization platform increasing the value of advertising by redefining how media is valued, bought, and sold. The VideoAmp platform automates advertising workflows, deduplicates audiences across traditional TV, streaming video, digital media, and walled gardens and connects media exposures to an advertiser's sales.

VideoAmp provides two types of measurement:

- Audience Measurement: VideoAmp enables advertisers and publishers to analyze cross-platform reach and frequency across demographic and advanced audiences and identify share-shift opportunities to maximize reach at the optimal frequency. VideoAmp provides demographic and advanced audience measurement for linear, digital, and cross-platform content and campaigns.
- Outcome Measurement: VideoAmp enables advertisers to quantify the online, offline, or tune-in conversions delivered as a result of ad exposures with Multi-Touch Attribution and Lift. VideoAmp solutions assign fair and accurate credit to each touchpoint along the consumer journey and identify the most effective partners and audiences at driving ROAS.

VideoAmp's competitive advantages lie in the following areas:

- Foundation in Cross-Platform Measurement: VideoAmp was founded in 2014 to measure audiences across platforms and capture changing viewership behaviors. VideoAmp has invested heavily in building technology to support the use of big data for cross-platform measurement, and now, currency.
- Data Quality and Methodology: VideoAmp's proprietary commingling process solves for inaccuracies and gaps in a single data source, like Smart TV or Set-Top-Box alone. VideoAmp commingles Set-Top Box (STB) and Smart TV Automatic Content Recognition (ACR) television exposure datasets, ingesting, cleansing, and enriching to earn the dataset the label of currency-grade.
- Focus on Privacy: Along with our partners, we moved measurement towards a more secure future using privacy technologies and 'cleanrooms', making integration easy for publishers across use cases, using VideoAmp UIs and APIs to simplify, facilitating advanced measurement with fewer query constraints and allowing for more complex methodologies and requiring only one day of publisher resources.
- Holistic Workflows: VideoAmp powers workflows across the advertising ecosystem including planning, activation, measurement, and optimization.

- **Interoperability:** VideoAmp integrates with buy and sell side including OpenAP, Lake5, Mediaocean, Freewheel, Operative, MSA, and Star Media, with others coming.
- **Industry Initiative Participation:** VideoAmp commits best-in-class measurement assets, including being charter sponsor of the ARF DASH study, license to S&P's Kagan data, and participation in the HyphaMetrics Content Metrics and TVision/Gemius trials.
- **Talent:** VideoAmp has heavily invested in talent over the past two years, from key executive hires to bolstering engineering teams. With its exponential growth, VideoAmp has preserved a culture of high-performance with a laser-focus on creating the tools and software the buy and sell side need to make more sophisticated, data-driven decisions.

What VideoAmp measures (high-level description)

VideoAmp measures both content and advertising, across demographic and advanced audiences, with the ability to connect advertising exposure to business outcomes through multi-touch attribution and lift. Measurement includes linear TV, streaming and digital platforms on a national and local basis to provide a holistic view of performance for both advertisers and publishers.

Cross-platform measurement consists of a variety of linear TV and digital data sources. Digital ad exposure is captured via a measurement pixel and publisher-provided ad logs, which can be integrated within a data clean room as a privacy-first, closed environment to enable matching of first party data with partner data. In addition, VideoAmp works with Conviva to provide census-level streaming content measurement.

For linear data, STB and Smart TV ACR data are comingled and deduplicated from sources including Inscope/Vizio Smart TVs, DISH STBs, TiVo STBs, Frontier STBs, and Comcast STBs. VideoAmp measures content consumption, content reach and ad impressions as well as

reach and frequency and outcomes on linear TV, CTV, and digital platforms.

VideoAmp reports content and ad exposure across Linear TV, DVR, MVPD VOD on connected Smart TV sets and non-Internet connected TV sets. VideoAmp reports streaming (linear and VOD) consumption on CTVs and streaming ad exposure on CTVs, mobile and tablet, depending upon agreement with the streaming app owner.

VideoAmp leverages multiple identity providers as a multi-sourced or “comingled” identity solution. The matched TV-digital data, resolved to the VideoAmp identity graph, is the basis for unduplicated reach and frequency measurement. VideoAmp projects observed reach curves in the matched data subset to the U.S. population.

Reports and data are available through a dashboard, data feeds, API integrations and integration with OpenAP and other partners.

VideoAmp can deliver ratings datasets at different cadences depending upon use case and client need. Actualized ratings are reported 19-23 days after airing for currency guarantees. Preliminary C3 ratings are delivered 5 days after air. Overnight ratings are delivered next day after air. Overnight capabilities will be expanding in 2023.

VideoAmp Methodology

Data footprint

VideoAmp measurement is based on a footprint of 39 million U.S. households. Measurement is based on Inscope/Vizio Smart TV sets, and Dish, Frontier, TiVo, and Comcast STB data. VideoAmp has access to other sources of MVPD STB data for reports specifically for those MVPDs. Households that resolve to a VideoAmp ID, via the multi-sourced ID graph, are included in the measurements. VideoAmp does not publicly disclose the number of households that qualify for reporting in 30 days.

Ad impressions

Digital ad impressions are captured through a measurement pixel and publisher-provided ad logs, which can be integrated into privacy-first clean room environments. For linear TV, addressable advertising, and FAST streaming impressions, VideoAmp leverages publisher-provided as-run logs, which is a requirement for all currency deals measured and guaranteed on VideoAmp data. Kantar ad occurrence data and Gracenote program data is used for planning, testing and research purposes. FAST streaming channel ad impressions are determined using a time-based match between ad occurrence data and viewership.

VideoAmp recommends that clients use an ad impression definition as exposure for two or more consecutive seconds, as per the MRC.

Competitive ad exposure

VideoAmp reports competitive ad exposure on linear TV from its commingled TV viewership footprint.

Content viewing

VideoAmp provides both national and local market content measurement.

Persons, Households

VideoAmp measures households and persons.

Currently personification is based on the household demographic composition and the viewing occurring within the household via an algorithm run against every in-tab household

to assign viewership probabilities to each household member. The algorithm is trained using TVision data.

Roadmap: VideoAmp is investigating alternative techniques and tools for training the algorithm and collecting co-viewing data as enhancements to data footprints that would become currency of record in the future.

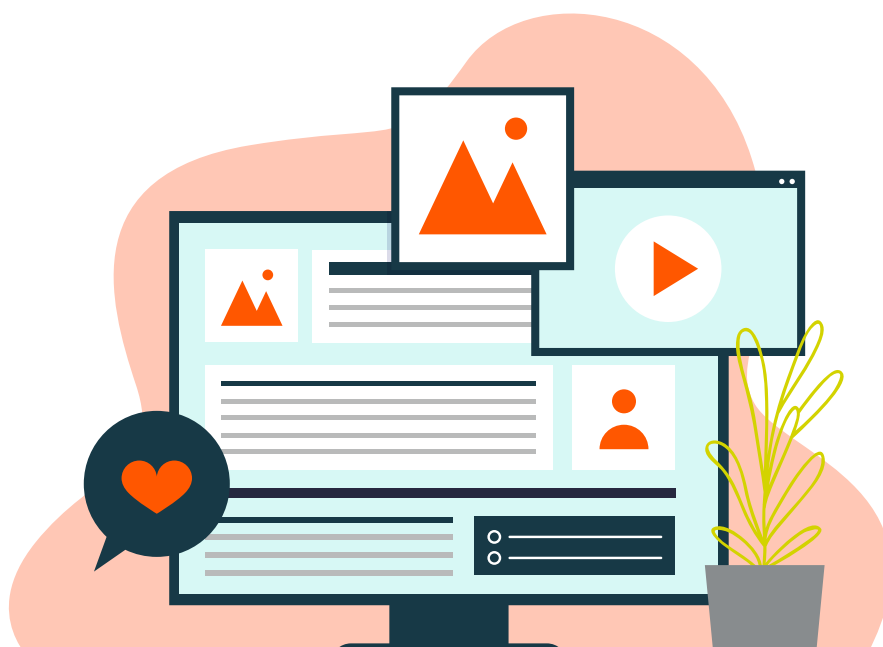
Cross-platform unduplicated reach

VideoAmp matches ad exposure from its footprint of Smart TVs and STBs to digital ad exposure using device identifiers such as cookies, device IDs and IP addresses plus additional metadata that is resolved through multiple match sources and matched to a VideoAmp Household ID.

The matched identifiers create a pool of households where both TV and digital ad exposure is observed, and is the basis for unduplicated, cross-platform reach and frequency measurements. The observed measurements are extrapolated to the total U.S. population and the total ad impressions universe.

Device Graph

VideoAmp leverages multiple identity providers as inputs into a multi-sourced or “commingled” identity solution. Smart TV and MVPD STB households are matched to VideoAmp household IDs. Digital ad exposure data from any source is mapped to VideoAmp household IDs using multiple identity providers including



Experian, LiveRamp, Transunion, Open ID, and other identity resolution providers.

Universe Estimates

The U.S. Census is VideoAmp's source of U.S. population estimates. The ARF DASH study and S&P/Kagan are VideoAmp's sources for TV household type.

Weighting

VideoAmp weighting dimensions include age/gender, race/ethnicity, HH size, education, and other variables. The households are weighted to the full U.S. population. VideoAmp also controls for Over the Air (OTA), bundle (i.e., cable, satellite, and vMVPD), and stream-only households.

VideoAmp's footprint includes households in every local TV market, and they report that the population in the local market generally reflects the U.S. census distribution. Market footprint distributions before and after weighting are available to clients upon request.

Demographics and Audiences

VideoAmp supports demographic audience measurement for households and persons as well as onboarding of first, second- and third-party audiences for advanced measurement as requested by clients. VideoAmp supports creation of advanced audiences based on linear TV ad and content viewership as well which can be used for further optimization.

Integrations

VideoAmp measurement is accessed via an online portal/dashboard and supports data feeds and APIs. In addition, VideoAmp is integrated with OpenAP and was a launch partner for XPm, as well as Mediaocean system to enable seamless billing and media execution workflows for agencies. VideoAmp is also integrated as white label solution for planning and measurement into client workflow systems.

Accreditation

Roadmap: VideoAmp will commence the MRC process with a pre-audit in 1Q 2023.

Mobile and Desktop

VideoAmp measured mobile and desktop via digital identifiers such as cookies and device IDs captured via measurement pixel or publisher digital ad log files.

Dealing with measurement challenges: VideoAmp

Non-broadband households

Non-broadband households are not included in VideoAmp measurement; however, they are included in the universe estimates to which the data is weighted.

Over-the-air only (OTA) households

VideoAmp uses Kagan for OTA universe estimates by market and weights at the marketing or market cluster-level to represent OTA households.

Households with multiple TV sets

VideoAmp weights the data to account for partial-TV set coverage in Smart TV households.

VideoAmp de-duplicates households that may be included in both the Inscope/Vizio Smart TV and MVPD STB data sources.

Hispanic households

VideoAmp weights Hispanic households in the sample to the universe of Hispanic households. VideoAmp introduced a weighting enhancement to measure Spanish language sources.

Privacy

VideoAmp claims that they are compliant with CCPA and GDPR. They do not list any certifications.

Deprecation of Digital IDs

VideoAmp claims that the elimination of third-party cookies, persistent IP address and unavailability of device IDs does not significantly impact identity resolution solution currently. VideoAmp claims to be future proofing identity by focusing on privacy enhancing technologies, direct publisher and advertiser integrations, and the use of persistent identifiers such as hashed subscriber IDs (example: hashed emails) within secure, privacy-safe environments as a primary key for identity resolution. VideoAmp is also involved in model-based approaches that do not rely on digital identifiers, unlike the industry's current framework.

Streaming Apps

VideoAmp streaming app measurement is dependent upon partnerships. For streaming apps that are measured, they are measured at a census-level (i.e., via server logs or measurement pixel). VideoAmp streaming app measurement does not rely on Smart TV detection.

“Walled Gardens”

If the YouTube, Meta (Facebook, Instagram) and Amazon platforms allow direct partnership integrations, VideoAmp would be able to measure these digital platforms

Invalid Traffic (IVT)

VideoAmp relies on publishers to filter out invalid traffic from digital data provided for measurement.

Time-shifted Viewing

VideoAmp measures DVR playback but does not measure MVPD/Linear TV VOD

Local measurement

VideoAmp provides measurement for local television markets.

VideoAmp Roadmap

VideoAmp priority features development on their Roadmap includes

- Out-of-home measurement that can be optionally used for transactions
- Methodology enhancements to support Local and Addressable sources for live currency guarantees
- Continuing to expand the Commingled Identity Graph for identity resolution and demographic resolution
- UI enhancements including an insights and reporting suite for Publishers
- Additional API suite development including solutions for audience management
- Incremental development of VideoAmp clean room integrations
- Continuous iteration to deliver actualized ratings datasets more quickly, and support for always-on overnight ratings datasets





Partnering with Measurement Providers

This section assesses the important considerations for marketers when a marketer is deciding to partner with a measurement provider.

Business and Operational Considerations

Business Applications

The measurement providers in this Guide each attempt to address the key business applications in media buying, selling and performance evaluation for linear TV, CTV, and digital ad investments. In addition to considerations regarding the measurements themselves, marketers, agencies and publishers should consider the following questions regarding business applications when partnering with a measurement provider.

Media buying

Are the measurements stable and reliable over time? Does the data cover all the investment options available to or required by the marketer? Can the measurements be integrated into my media planning and buying platform?

Efficiency

When combined with cost information, do the measurements enable the marketer to understand relative costs of the investment options available and used by the marketer?

Media planning

Does the data provide visibility into all the marketer investment options on a cross-platform and cross-channel basis?

Optimization

Does the measurement provide enough granularity into publishers and audiences to make short-term investment decisions. Are the measurements provided with enough frequency and with a short-enough turn-around time to be operationally effective for daily or weekly decisions? How frequently are measurements available? Can the measurements be integrated into my BI tool or attribution platform?

Consumer insights

Do the measurements provide unduplicated reach & frequency, to evaluate performance from a consumer's perspective, and assess the number of consumers exposed to the advertising and the number of times they were exposed?

Effectiveness

Do the measurements provide lower-funnel behavioral outcomes, such as sales response or behaviors highly correlated with sales response for the brand, such as in-store or website visits? Can I access data in an un-tabulated form to use my own attribution methodologies to investigate effectiveness?

Measurement of Ads and/or Content

Marketers increasingly optimize their ad spend using their brands' advertising campaign delivery metrics, instead of content consumption, because ads data are available quickly and on a cross-channel basis. Content measurement is typically available on a syndicated basis and has the visibility required to identify investment opportunities in advance of the actual ad spend and to negotiate ad pricing.



Questions to Ask?

Does your measurement service include content measurement or ad campaign measurement or both? Is content measurement linear TV or linear TV and streaming? What streaming content or apps are measured? Which are reported?

Currency

Marketers have embraced ad campaign delivery measurement for targeting advanced audiences, optimization, and performance measurement. Measurement providers profiled in this Guide are taking these ad campaign measurements a step further to use them as the basis for currency. Legacy measurement uses a more aggregated approach, where content consumption minutes are measured along with ad consumption minutes, and where the ad minutes are then broken-out to report currency. It's clear that the future of currency is measurement of precise ads exposure, not an aggregation of minutes.



Questions to Ask?

How should I think about using ad campaign measurement as currency? How is the data surfaced to ad sellers? How do my agencies use the data to negotiate pricing and to maximize efficiency?

Reports and Metrics

Marketers should ask measurement providers about metrics and reporting breakouts. A list of metrics and breakouts is in the Measurement Today: What We Discovered section.

Commercial considerations

Marketers place high value on objective, third-party measurement which is generally considered measurement that is independent of the ad sales transaction process. For some providers, measurement is enabled by (and may be contingent upon) operational or ad sales considerations, such as using the provider's ad serving solution. There are differing perspectives on whether companies that sell media or leverage operational solutions to provide measurement constitute objective, third-party measurement.



Are there commercial considerations beyond measurement, such as using your ad serving solution or buying advertising on your platform to access the measurement solution?

Operational capacity

Operationally, measurement providers should have clear, written guidelines that include steps that the marketer and their vendors need to take for implementation. The guidelines should include approximate timing of each step, as well as any testing procedures to ensure the ad tech is correctly implemented. For example, if the measurement provider requires a tracking pixel, they should clearly communicate timing to provide it and have a support team to help implement it and test it.

In addition, if data is required for internal BI tools, or if integration with partners is required, such as media planning and buying, billing systems, you should plan for this with the measurement provider.



Questions to Ask?

Do you have written guidelines for my organization to implement your measurement solution? What is the timing for each step? What testing process do you have to make sure it's implemented correctly? Can I export the data into my internal BI tools? Is your data integrated with my media buying and planning system?

Privacy

Marketers should have clear privacy policies and practices established and require that measurement providers have clear privacy policies and practices that are compliant with privacy regulations.



Questions to Ask?

Is your data and data operations compliant with CCPA, GDPR and/or other privacy regulations? Do you have certifications or independent audits to ensure compliance? Can you share your privacy policies and practices as it relates to measurement, including consumer opt-in/opt-out, data collection, storage, measurement, and reporting?

Ad tech stack and partnerships

Measurement providers should have ad tech and ad tech partnerships already in place that enable data matching and audience onboarding.

The measurement provider should have experience working with the third-party data providers used by the marketer and their own device graph and/or relationships with third-party device graph providers. For example, marketers such as Quick Service

Restaurants (QSRs) may require location data to create their consumer targets and measure in-store visits. Automotive brands require auto registration data sources. Consumer Packaged Goods (CPG) requires data relationships with grocery, drug, and mass merchants.

Marketers with first-party data, such as ecommerce retailers and Direct-to-Consumer (DTC) brands, require the ability to onboard their first-party data for targeting and measurement purposes. Therefore, they should make sure that the measurement provider can accommodate this and can clearly articulate their process to adhere to privacy compliance regulations and best practices.



Questions to Ask?

Do you have experience working with [location data provider, retail data provider, other third parties to define my target audience? How does your process ensure that my first-party data is kept secure and confidential and managed for privacy compliance?

Device Graph

The purpose of a device graph is to link devices to households using common identifiers. Device graphs collect a matrix of identifiers that are continually updated. For example, a mobile device and a connected TV that use the same household IP address will be linked to that same household. If the IP Address changes, the change will be managed in the device graph so that the mobile device and connected TV are still linked to that household.

For video measurement on Smart TVs, IP Address is the central identifier. For video measurement from STB data, anonymized subscriber name and address is the primary identifier.

Most measurement providers work with a wide range of device graph providers that continuously capture IDs from multiple sources and match them to households. Some measurement providers also have their own device graph to support this process of 'householding'.



Questions to Ask?

What device graphs do you integrate with? Does your measurement solution integrate with my device graph provider to onboard my first-party audiences? What match rate can I expect between my first party-data and your data footprint? If I use a third-party audience, what match rate can I expect?

Methodology Considerations

TV Data Footprint

Understanding the overall size of the measurement provider's data footprint is important and so are questions about the extent to which the footprint contains consumers in the marketer's target audiences. Be aware, too, that it's not the overall size of the data footprint that's important, but instead the size of the data footprint that has opted into measurement, the size of the data footprint that qualifies for reporting and the size of the data footprint that is used to observe duplicated and un-duplicated audiences.



Questions to Ask?

How many households opt into measurement? What is the sample size for my target audience that will qualify for reporting? Does my target audience percent approximately match the percent of my target in the population? What is the sample size for my audience in the 'matched data' that is used to compute unduplicated reach?

Coverage of U.S. viewers

Most measurement providers don't have access to data that is inclusive of all segments of the U.S. population. STB data covers geographic areas only where the MVPD has subscribers. Households that do not have an MVPD subscription, including Over-the-Air (OTA)-only households, will be excluded from STB data. Ad impressions can only be captured from STB data within the STB footprint, so that does not include all ad impressions. Most measurement providers who use STB data ingest ad logs from MVPDs for addressable advertising, so that the dataset contains all impressions instead of a subset.

ACR data covers specific Smart TV manufacturers. Although ACR data can have more dispersed geographic coverage than STB data, the brand of TV a consumer purchases can be influenced by factors such as income and propensity to use features like streaming, gaming, or recording/playback. ACR data measures only Internet-enabled Smart TVs specific to the manufacturer providing the data, not all TVs, in the households. If the marketer uses a pixel tag or uses the measurement provider's ad server, the pixelated/served CTV ad impressions can be captured, not just those within the CTV footprint.

To account for these deficiencies in coverage, measurement providers use weighting. Some measurement providers use supplemental consumer research panel data and/or the ARF DASH survey data to fill in the gaps.

Universe estimates and weighting

Many measurement providers purport to measure total U.S. households or total U.S. television households, even though the data footprint does not contain all segments of the U.S. or U.S. television household population.

To correct for missing segments of the population, and geographic and demographic under- or over-representation, all measurement providers employ some form of weighting. In addition, some measurement providers incorporate additional data to account for characteristic relevant to streaming and TV consumption, such as streaming usage and subscription information. However, if there is no data for a segment in the data footprint, weighting is not an adequate correction mechanism.

What population does your reported data represent? What are the dimensions you use to weight your data footprint to this population? What is the source of universe estimates? Do you weight for attributes relevant to streaming and TV consumption, such as devices or streaming apps used? What is the profile of your data footprint before weighting and after weighting, to understand the representativeness of the data footprint?



Questions to Ask?

Does your service measure OTA-only and broadband-only households? What is the source of data about these households? What is the methodology to represent their viewing? To what extent does your measurement include representation of ethnic groups such as Hispanic persons and households? What is the geographic coverage of your measurement service and what are the skews by geography?

De-duplicated, cross-platform reach

All measurement providers endeavor to report unduplicated reach, as well as ad exposure frequency and impressions. Each measurement provider identifies households or people (or both) from which streaming and linear TV consumption is captured. The data is captured from different sources and methods and must therefore be matched to households to create a unified view. The matched data forms the households or people from which



Questions to Ask?

unduplicated reach and frequency can be observed. From there, how the measurement provider utilizes the matched data differs from provider to provider. Generally, the measurement provider uses one of these three methodologies:

- **Option 1:** Reach and frequency are calculated based on the matched data, then the results are weighted to the observed census ad impressions (for digital and streaming) and national U.S. population (for linear TV).
- **Option 2:** The matched data are the training set for a reach and frequency model. The model is applied to the observed census digital and streaming ad impressions and the projected linear TV ad impressions.
- **Option 3:** The matched data are the training set for linear TV viewing coefficients, which establish the probability of viewing. The TV viewing coefficients are applied to households or persons from which digital and streaming ad impressions are captured, so that every household or person with digital or streaming ad impressions have a measure of TV ad exposure.



Questions to Ask?

What is your methodology for unduplicated reach and frequency? Is the methodology deterministic (directly observed) or probabilistic (modeled based on directly observed data)? How are the measurements validated?

What counts as an ad impression?

Most measurement providers require a minimum number of seconds viewed to count a television or streaming ad as an ad exposure. However, there is a healthy debate in the media industry about the definition of an ad impression. A digital display ad that is viewable on the webpage for two seconds is not equivalent to a television advertisement that the consumer might watch for 30 seconds.

Both could be counted as one impression, even though they aren't equivalent. It's important that digital ad impressions are filtered for non-human traffic, such as BOT traffic and may not be viewable on the webpage. Measurement solutions should have processes or partnerships in place to filter invalid digital ad impressions from the reported data.

Industry trade associations have minimum standards for ad impressions and viewability, including the Interactive Advertising Bureau (IAB) Ad Impression Measurement Guidelines and the Media Rating Council (MRC) Viewable Impression guidelines.



Questions to Ask?

What are the minimum seconds of viewing required for my ad to count as an impression? How do you filter digital ad impressions for invalid traffic? Do you use industry standards such as MRC or IAB to determine what counts as an ad impression?

Persons and Households

Persons measurement is challenging, and measurement providers are developing a wide array of methodologies to include persons in their measurements. Methodologies vary from applying a general demographic profile to the reported audience metrics to more sophisticated approaches that create probabilistic persons assignment, such as identifying the presence of the demographic segment in the household then using consumer panel or other data to establish the statistical probability that the person viewed the content or was exposed to the ad.

Marketers should also be aware that measurement providers use varying definitions of a household and cover varying numbers of TV sets per household.



Questions to Ask?

What is your definition of a household? Do you measure all devices and TV sets in the household? Does your measurement service include persons measurement? How are the persons probabilities established? Do you partner with a third-party panel or other data providers to train your algorithm? How do you validate that the persons measurements are accurate?



Questions to Ask?

(If measurement provider uses both ACR and STB): What is your methodology to combine STB and ACR data? What process do you use to deduplicate households that are in both the STB and ACR sample?

What methodology do you use to adjust for “STB on/TV set off” viewing events? How do you adjust for CTV where the streaming app is on but the TV set is off? How have you validated your approach? What is the average number of STBs and/or measured Smart TVs per household in your reportable sample? What is the average number on a total U.S. basis?

Capturing All Consumption

Measuring all viewing and/or all ad impressions by persons or households is a challenge. STB data is generally a more comprehensive measure of total linear TV viewing because households tend to have a STB installed on each TV set.

However, STB data, if unadjusted, can overstate actual viewing because STBs capture tuning whether the TV is off or on. STB data may not contain end-times of the consumption event, which then need to be estimated. Measurement companies have long-established edit rules to correct for these STB data conditions. ACR data from OTT devices can be similarly affected: tuning can be captured from the OTT device when the TV set is off.

ACR data is generally a less comprehensive measure. The household may have opted-out of measurement. There may be only one Internet-enabled Smart TV in the household that is capable of measurement. If there are multiple Smart TVs, they may be from different manufacturers that are not in the measurement provider’s data footprint. Not all STBs in a household may report data.

Some measurement providers use both STB and ACR data. They may be combined, or one is used to calibrate the other. Households can be present in both the STB and ACR datasets, so a process should be in place to de-duplicate the household, so that the viewing is not reported multiple times.

Time-shifted and On Demand viewing

Most STB data contains detailed information about DVR record and playback events so that time-shifted consumption can be calculated and represented in the audience measurements. STB data often contains data about video on demand (VOD) viewing events, however, not all STB data providers include it and not all measurement providers license it.

ACR data includes any consumption on the Smart TV set; however, accurately identifying time-shifted DVR consumption and VOD consumption is a challenge. If the content is unique to a broadcast or cable network, it can be accurately credited to the broadcast or cable network. If the content is not unique to the broadcast or cable network, most providers use business rules to credit the consumption, including source used before and after the tuning event and other factors.



Questions to Ask?

Do you include time-shifted/DVR consumption and VOD consumption in your measurement service? Is the consumption broken out, combined, or included with Linear TV consumption? How do you identify the source when time-shifted viewing (TSV) or VOD content is sourced from multiple broadcast or cable networks?



Questions to Ask?

How does your solution incorporate ad impressions data from search and social platforms such as Google (including YouTube), Instagram, TikTok and Facebook?

Mobile and Desktop

Most measurement providers include ad impressions from any digital device (Smart TV, mobile, desktop) in their measurement service, by virtue of pixel tags, SDKs, or server ad logs. Measuring content consumption is not common across providers and measuring content consumption on mobile and desktop devices is even less commonplace.



Questions to Ask?

Are streaming ad impressions on CTV, mobile and desktop devices included in your measurements? Are they reported by device? Are other digital ad impression types included? Do you provide content or app-level measurement for streaming?

“Walled Gardens”

It is not typical for measurement providers to include measurements from Google, Meta (Facebook) or other platforms in their measurements. This is a significant drawback, as marketers require insights into all their channels to make meaningful comparisons prior to making investment decisions.

Deprecation of Digital IDs

Identifying which devices belong to the same people and households to create the matched Linear TV and digital/streaming data is complex. Moreover, there is risk that matching methods used today are not sustainable in the future due to increasing privacy regulation and deprecation of digital IDs.

Most measurement providers have strategies in place to maintain high quality measurement in the face of digital ID deprecation. However, IP Address is highly relied upon to match digital ad impressions and audience data to both STB and ACR data. IP Addresses are increasingly non-persistent and masked, which reduces the number of households to which devices can be matched. There is concern about whether IP Address will meet what may be more stringent definitions of consumer privacy in the future. The IP Address assigned to the household by the Internet service provider can change over time. If the IP Address of the household in the TV data is different from the IP Address of the same household in the consumer attribute data, the consumer attribute data will be incorrectly applied. If the match isn't accurate, the cross-platform audiences won't be accurate either.



Questions to Ask?

What are the steps you take to validate that the TV data are matched to households accurately? What steps do you take to screen IP Addresses for accuracy, and ensure that the match between the TV data and my first and/or third-party consumer data and digital ads impressions is accurate?

About the Author



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APPENDIX: Tools of the Trade

This section provides an overview of the technologies used to capture viewing consumption data.

ACR (Automated Content Recognition) and Connected TV (CTV)

ACR is technology in the Smart TV set that can monitor the audio and/or video as it plays on the screen. A Connected TV (CTV) is a Smart TV that is connected to the Internet.

ACR data is licensed by measurement providers from TV set manufacturers or their agents. The key ingredients to capture viewing that occurs on an Internet-enabled Smart TV set are (i) ACR viewing event signature data and (ii) the ACR dictionary data.

The ACR technology creates continuous signatures or fingerprints of the programming on the screen and sends the fingerprints and timestamp information back to a data collection center where they are matched to a dictionary of fingerprints.

The dictionary of fingerprints is created via independent TV channel monitoring stations. Publishers and marketers can also provide copies of content and ads in advance so that they can be added to the dictionary for later detection.

To identify the program viewed and the ad impression, ad and content signatures captured during viewing events are matched to the dictionary of content and ad signatures. To identify the viewing source, such as a broadcast network, cable network or TV station, the source gets credit for the viewing event where the content and time of consumption is unique to the source. If the content and time is not unique, an assignment process is used.

ACR data matching

ACR data providers do not have a subscription relationship with the household and therefore have limited ways to uniquely identify the household. The main ACR data identifier is the home IP Address used by the Smart TV and other devices to connect to the Internet. Measurement providers use processes to filter non-residential IP Addresses from the IP Address pool, identifying high volume IP Addresses and filtering them from the data. In the future, changes to IP Address including IP Address masking and IPv6, could prevent or inhibit its use as an accurate identifier.

Pixel tags, Log files, SDKs, and Ad Servers

The most common methods used to measure digital ad exposure – whether streaming, digital video, banner ads or other forms of digital advertising – is by using pixel tags, log files, SDKs (software development kits) or by using the measurement provider’s ad server. When a marketer uses a pixel tag, SDK or ad server for measurement, every instance of the digital, streaming or CTV ad exposure is captured. This is often referred to as “Census” measurement, where all possible exposures or consumption events are captured.

Marketers instrument their digital ads and websites with pixel tags and SDKs provided by the measurement provider or work with the measurement provider’s ad server to automate data collection. When a digital device requests the ad or content from the server, a pixel tag fires that creates a record of the activity. When the ad server is used, a record in the server log file is created for any instance of the ad delivery. Ad log files are generally used to capture MVPD addressable advertising, because the STB uses different ad serving technology than other devices.

STB (Set Top Box)

MVPDs are Multi-channel Video Programming Delivery providers, including cable operators, satellite TV providers and telecom TV. Video is typically delivered via a “Set Top Box” (STB) that can capture consumer interactions with the box, including channel changes and timestamp information. Virtual MVPDs (vMVPDs) deliver the same programming using an Internet-connected application instead of a STB. Measurement providers license STB data directly from MVPDs or from STB data aggregators.

To capture linear TV viewing that occurs via an MVPD requires (i) the STB data, (ii) the programming schedule and (iii) the ad schedule. Note that streaming and CTV consumption are not captured via the STB device.

STB data consists of events created by actions on the STB and via the remote-control device, such as channel changes, record, and playback events, mute and pause actions. These remote-control events are used to create tuning events – start and stop times – for both live and time-shifted viewing. To identify the viewing source, such as the network or TV station, the channel ID associated with the tuning event is matched to a channel dictionary. To identify the program, the start and end time of the tuning event is matched to a programming schedule. To identify an ad impression, a schedule of ad occurrences is used. Where there is an overlap between the tuning event and an ad occurrence in an ad schedule that meets the measurement provider’s viewing threshold, an ad impression is counted.

STB data matching

MVPDs have the physical address of each household as part of the paid subscription and knows whether the household is residential or non-residential. MVPDs contract with trusted third parties to create anonymized identifiers for households with a physical address. The trusted third party works with other third-party device graphs to “onboard” or match MVPD households with digital, streaming and consumer attribute data.

APPENDIX: Streaming apps/sources

Measurement providers were asked whether they currently measure and report viewing to these streaming services, and whether that reporting includes ad exposures, title level viewing for content on live TV, title level viewing for content not on live TV and original programming. These are the streaming services listed in the CIMM RFI: Amazon Prime, Amazon Fire, AMC+, Apple TV+, Chromecast (Google), DirecTV Stream, Discovery+, Disney+, FAST channels, fuboTV, Google TV, HBO Max, Hulu, Hulu Live, IMDB, Netflix, Paramount+, Peacock, Philo, Plex, Pluto, Roku, Sling, Spectrum, Tubi, YouTube, YouTube TV, Xfinity, Xumo