Server-Side Ad Insertion and OTT Guidance

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Media Rating Council, Inc.

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1 Overview

This document presents additional guidance for digital video ad measurement within the Connected Television (CTV) environment as well as for measurement of digital video ads using Server-side Ad Insertion (SSAI) integrations. MRC's original guidance in these areas is contained within the IAB/MRC *Digital Video Impression Measurement Guidelines*, last updated in June 2018 and written by the Media Rating Council (MRC) in collaboration with the Interactive Advertising Bureau (IAB).

This document was prepared for the use and benefit of the media industry, especially those constituents that measure and analyze digital video across desktop, mobile web, mobile in-app and CTV environments.

The additional guidance contained in this document initially resulted from a project led by MRC which brought together those industry members with a role in video delivery that may be involved in SSAI along with measurement vendors in the MRC process tasked with measurement of video delivery, inclusive of SSAI. The objective of this initiative was to discuss the process, resulting measurement challenges, and possible best practices or industry solutions to enable more complete, valid, reliable and effective measurement.

As it is further explained within this document, SSAI is most prevalent in the Over the Top (OTT) environment, and during initial industry discussions several challenges specific to OTT measurement were raised. As such, the scope of this initiative was later broadened to also include a discussion of overall OTT measurement, its challenges, as well as a consolidation of current OTT guidance and an update on its current definition.

1.1 Connected Television (CTV) and Over the Top (OTT) definition

The IAB/MRC *Digital Video Impression Measurement Guidelines* currently define Over the Top (OTT) as the delivery of digital video to televisions via internet-connected devices (or functionality within the television itself). This includes both IP set-top boxes that receive signals from digital video ad servers (and widgets on them) as well as USB and HDMI multimedia devices, connected TVs and gaming consoles that do not require set top boxes or converters.

As part of MRC's industry initiative to discuss SSAI and OTT, and its resulting measurement challenges, it was brought to light that the current definition of OTT within the IAB/MRC *Digital Video Impression Measurement Guidelines* may need to be updated to reflect the current technology as well as to specify the measurement and viewership differences that are relevant to MRC consideration and the MRC accreditation process.

The original definition was constructed based on a consolidation of industry feedback and was designed to differentiate OTT from traditional digital video based on the viewing environment (i.e., displayed to a TV where multiple viewing and co-viewing may occur) and based on the

measurement (which often cannot be measured in the same way as traditional digital video delivery due to limitations on JavaScript and SDK in OTT environments as well as due to additional challenges such as TV Off). OTT is also differentiated from linear video in that ads are often delivered digitally and dynamically, although this is converging somewhat with addressable TV.

However, a recently promulgated industry definition has distinguished this environment as Connected TV (CTV) and based the broader OTT definition on the type of content being delivered (premium, long-form, etc.), regardless of whether this content was delivered to a TV screen or to another device such as a computer or a mobile device[1]. While MRC finds this to be meaningful from a utility perspective, it may lead to subjective classifications of content that lead to inconsistent and unstable classifications that do not lend themselves to objective measurement categorization as the current IAB/MRC definition, which is based on clear technical aspects.

As such, industry discussions have raised the importance of continuing to define this environment using a device-based approach (i.e., video content delivered to a TV screen), which tends to drive measurement and viewing behaviors (as mentioned above, content and ads displayed to a TV screen may present different behaviors such as co-viewing, which may not occur widely in other platforms such as desktop and mobile). However, it has become clear that the industry widely refers to the current IAB/MRC definition of OTT, as Connected TV.

In order to better align with the industry's current definition of this environment, we will rename the former Over the Top or OTT definition as Connected TV or CTV. It's important to note that this name change does not impact the above criteria for defining this environment, which continues to refer to the delivery of digital video to televisions via internet-connected devices (or functionality within the television itself), including both IP set-top boxes that receive signals from digital video ad servers (and widgets on them) as well as USB and HDMI multimedia devices, connected TVs and gaming consoles that do not require set top boxes or converters

Further, based on the clear utility of maintaining a broader content-based definition that represents the aggregation of platforms where digital video inventory is bought and sold, we intend to also maintain the concept of Over the Top (OTT) as a broader term which encompasses the above CTV criteria as well as non-linear video content that is typically delivered to a TV screen that may also be available via desktop or mobile devices (i.e., streaming services). While we continue to believe that CTV needs to be independently considered as part of the accreditation process (as it has been based on our current guidance) due to several aspects that make measurement unique and often times challenged in this environment, we have established this broader OTT term to meet the current measurement

[1] The IAB Tech Lab recently updated the definition for Connected TV (CTV), which is now defined as video that is internet delivered and viewed on a TV. Over-the-Top (OTT), on the other hand, is defined by the IAB Tech Lab as a term that distinguishes premium television content from the vast world of online video where user-generated content is commonplace, regardless of the devices content is delivered to. Source: https://iabtechlab.com/blog/ott-vs-ctv-what-is-in-a-name/

user's need of being able to analyze measurement performance metrics across different devices and platforms by content provider. As such, our intention is to continue to independently and discretely consider CTV in terms of measurement requirements and accreditation, but allow and encourage measurement organizations to provide aggregated reporting of OTT metrics based on platform as well as segregated by platform/device type so that users can understand overall performance as well as performance by platform/device type.

The MRC intends these definitions to supersede those previously published as part of the IAB/MRC *Digital Video Impression Measurement Guidelines* as applied to the MRC accreditation process effective with the final publication of this document.

This document provides further clarification regarding the definition of CTV and OTT as well as further guidance around measurement of digital video ads within this environment.

1.2 Server-side Ad Insertion Definition

Server-Side Ad Stitching (can include Stream Stitching, Video Pre-Loading or Ad Stitching) is defined as the use of an intermediary server to insert ads dynamically into video streams on the server side or directly embedding ads into video content prior to content delivery. This type of integration is mostly a solution to enhance user experience, as both the video content and video ads are stitched together into a single stream. This infrastructure is common today to certain CTV environments (discussed in further detail below), but also is becoming increasingly prevalent in digital video ad serving as well as part of addressable linear delivery. In server-side ad stitching, the player may not be able to process ad tracking, and the ad-stitching service cannot access cookies used in traditional client-side tracking. Instead, the ad-stitching service must identify devices where ads play by utilizing a combination of other methods.

The IAB/MRC *Digital Video Impression Measurement Guidelines* provide guidance related to measurement when SSAI is involved, and this guidance has been incorporated below. Recent industry discussions have highlighted the different challenges currently present in measuring ads within SSAI implementations, as well as concerns raised by measurement vendors and video content providers. For example, given the different types of SSAI implementations currently available, SSAI integrations have become fragmented in the industry, presenting challenges to measurement vendors. It's also been brought to light that many SSAI providers may need further guidance regarding what data should be provided to measurement vendors to enable client-side measurement. Furthermore, SSAI providers may not be aware that certain client device data should be passed at different points in time, may not be familiar with Video Ad Serving Template (VAST) player macros, or which specific parameters (i.e., X-Device-IP) are key for enabling client-side measurement.

Certain devices, such as Smart TVs, may not have the capability for a client-initiated integration, furthering measurement challenges. However, through industry discussions it has been brought

to our attention that SSAI inventory on major platforms tends to be enabled for client-initiated measurement.

Given the above, it's necessary for SSAI providers and measurement vendors to collaborate in order to perform client-initiated measurement, as integrations between these two parties are often necessary. The necessity of this collaboration further complicates measurement. Privacy restrictions are also evolving rapidly, further restricting the data that can be made available and communicated between parties.

Understanding these challenges, a need for potential solutions and initiatives to enable SSAI measurement transparency and consistency has been raised, and this document is intended to provide further guidance in this area.

The following are excerpts from the IAB/MRC *Digital Video Impression Measurement Guidelines* containing specific measurement guidance for digital video ads within the OTT environment as well as SSAI integrations.

2 Measurement Guidance (from the IAB/MRC *Digital Video Impression Measurement Guidelines*, pages 12-14 as well as Section VII; the Auto-Play Addendum)

OTT digital video may be measured via JavaScript player integration or Software Development Kit (SDK)/Application Programming Interface (API) integration. However, certain CTV environments may not be able to be directly measured via conventional tracking means (tracking scripts or application measurement) or at all. Any such measurement limitations should be clearly disclosed and quantified to users of the measurement service.

To the extent it can be measured, CTV video Impression measurement is subject to the same guidelines applied to traditional online digital video measurement described throughout the *Digital Video Impression Measurement Guidelines* document, including client initiation, filtration for invalid traffic and requirements for the ad to be loaded and at minimum begin to render (after the initiation of the stream, post-buffering, when the ad itself begins to appear or begins to play) in order to count it as a valid ad impression.

Latency

The infrastructure of OTT video ad serving environments may be more complex than traditional online video serving and involve the use of proxies or distributed networks. Such complexity might lead to latency in measurement (leading to inaccuracies, delays in collection of timestamps, or loss of data). While client-initiated and "begin to render" requirements help mitigate measurement discrepancies due to latency, measurement vendors should periodically study the impact of potential latency and its effects on measurement accuracy, as this can particularly affect measurement in situations where progress events are used to measure and

report events such as duration metrics. Material measurement limitations due to latency should be disclosed and quantified to the extent known.

The above latency considerations should be applied to other measurement infrastructure that do not involve direct signaling to measurement vendors such as in server-to-server architecture discussed earlier in this guideline as well as pass-through techniques involving multiple collection points.

Continuous Play

Continuous Play (also referred to Post-Play and analogous to Auto-Play) refers to a configuration that will play the next episode in a series or related content automatically after the end of previous content without user interaction. This is prevalent in OTT, but may also occur in traditional digital video and VOD content delivery. The implementation of Continuous Play may vary in terms of time between content, number of pieces of content that play automatically, capping and user interaction prompts. Continuous play may also manifest in "play-list" environments where a series of video content (and ads) is automatically played without additional user interaction and this guidance should apply to those environments.

Section VII (the Auto-Play Addendum) of the IAB/MRC *Digital Video Impression Measurement Guidelines* states that certain video content, such as television programs available on Internet, may contain structures similar to commercial pods interspersed within the content. Since the user is likely to have a reasonable expectation that such a commercial structure exists when they execute the video these ads do not constitute Auto-Play. These ads, however, should be counted as they are viewed, essentially not ''pre-counted."

However, to the extent that the video content itself (inclusive of advertising) is played without user interaction (Continuous Play) this should be disclosed to users of measurement data including disclosure of the parameters and settings to the extent known by measurement organizations. Further, for material levels of known Continuous Play, quantification and reporting of accompanying advertisements on a campaign basis within production reports directly is encouraged in conjunction with inactivity rules discussed throughout this document.

TV Off

Certain CTV devices may include dedicated power sources and as a result, may be independent of the power state of the TVs used to display their content. In such environments, CTV video content and advertising may be played while corresponding TV sets are off. Measurement vendors should consider this limitation as well as its effect on measurement of CTV video and clearly disclose it as a general limitation.

Current technological limitations make it difficult for a measurer using digital measurement assets to detect the power state of a TV in all situations, therefore detection of TV Off is not currently a requirement for CTV video impression measurement. However, recent industry

discussions have brought to light that certain platforms may be able to provide parameters that could assist measurement organizations in identifying the power state of the TV. We encourage measurement vendors to conduct research in this area, and we continue to encourage the development of a technological or industry solution to this limitation so that it may be considered in the future. While this is currently a common limitation requiring disclosure, it is likely that in the near future solutions or signals will emerge that will require vendors in the accreditation process for CTV to adopt or utilize.

Mobile Application Considerations

Many CTV video serving implementations utilize application environments that exhibit similar or identical attributes as mobile applications. To the extent CTV measurement utilizes application environments, measurement vendors should apply the guidelines and concepts included with the IAB/MRC *Mobile Application Measurement Guidelines* including, but not limited to:

a) Inclusion of off-line activity where applicable
b) Downloaded applications and versioning
c) Application Pre-Loading
d) Developmental controls and quality control over SDK/API integration

Additionally, related to the Continuous Play and TV Off considerations and as discussed above, measurement organizations should institute specific "inactivity rules," by which a user visit is terminated and thus excluded from additional contributions to measurement after a predetermined level of consecutive inactivity (Note: inactivity is intended to be excluded from base measurement altogether as part of data editing and should not be treated as filtered IVT, however, disclosure or reporting of the amount of activity excluded and not reported due to inactivity rules is permissible) .These inactivity criteria should be fully disclosed, and it is expected they may be modified in the future based on evidence from empirical study of the evolution of users' habits.

Inactivity rules may be based on application idle or time out, which is generally defined by the application developer (but can be user configurable) based on time since last interaction and can result in an application running in the background or being inactive. Device idle or power state should also be considered for inactivity rules and may be user configurable.

These inactivity rules may vary based on the type of application involved. For instance, some applications are designed for long periods of inactivity (such as long-form video, or scoreboards, to name two examples), in which case a longer inactivity threshold may be more appropriate than in another situation where longer periods of inactivity are not normally to be expected. Additionally, while legitimate inactive periods were considered when inactivity rules requirements were first established, such as public spaces hosting devices that are constantly serving content and ads to multiple people at a time without any user interaction (i.e., airports, hospitals, hotels, etc.), it's important that research around elongated inactive sessions takes

these possible environments into consideration as they may represent legitimate traffic, even if a session seems inactive for a long period of time. See the IAB/MRC *Mobile Application Measurement Guidelines* for further guidance related to inactivity in applications.

Invalid Traffic

As discussed in Section 4.3 of the IAB/MRC *Digital Video Impression Measurement Guidelines*, filtration of site or ad-serving transactions to remove invalid traffic (IVT) is highly critical to accurate, consistent counting. All metrics subject to audit by MRC will be expected to comply with the MRC's *Invalid Traffic Detection and Filtration Standards Addendum (Updated in June 2020)*. However, certain aspects of CTV traffic may require further consideration with regard to invalid traffic filtration. Specifically, the presence of proxy traffic or routing artifacts may obfuscate origination information or limit the granularity of data collected for purposes of IVT determination. The potential disproportionate presence of proxy or data center traffic in CTV traffic (due to the delivery models present) may not only lead to false positives (valid traffic filtered), but also inhibit the ability to collect certain parameters or originating information necessary to effectively evaluate traffic for validity. Further, SSAI artifacts may be spoofed by bad actors attempting to subvert measurement. OTT measurement organizations shall consider these aspects of CTV traffic when applying invalid traffic detection and filtration techniques to it and consider false positives/negatives as required. Proxy and data center traffic must be known to be invalid in order to be filtered, otherwise it must be treated as unknown and not included in the numerator of the decision rate discussed within the *Invalid Traffic Detection and Filtration Standards Addendum*. Additionally, providers indicating use of SSAI must be verified as such by measurement vendors and their traffic must be discretely measurable for IVT or otherwise treated as unknown (not whitelisted as valid).

3 Server-Side Ad Insertion/Stitching and Server-to-Server Measurement Guidance (from the IAB/MRC *Digital Video Impression Measurement Guidelines*, pages 9-10)

When SSAI is involved, the ad-stitching server may send tracking on the player's behalf, but this tracking may be limited and not fully able to satisfy client-initiated measurement requirements. This server-to-server tracking process may also be problematic because all the tracking is coming from one IP address and therefore may be susceptible to IVT filtration techniques. Certain measurers may use custom integrations or leverage aspects of the IAB's VAST and Video Player-Ad Interface Definition (VPAID), which allow header identification of IPs. Custom solutions should be clearly disclosed as part of methodological documents and should also comply with the client-initiated and rendered counting requirements within this document. To the extent that measurers are not able to effectively measure in these environments, they should be included and dimensioned within limitation disclosures.

Measurement that does not meet the client-initiated counting requirements discussed above or does not account for post-buffer and play requirements for a valid Digital Video Ad Impression

should be segregated in reporting and disclaimed as non-compliant. Further, traffic that cannot be fully measured for invalid traffic should be treated as unknown unless known to be invalid. Measurement that includes signals outside of the vendor's direct control (such as in server-to-server architecture or in publisher signaling such as VAST and other APIs) is permissible when it meets client-initiated and render requirements. However, this should be subjected to robust initial and ongoing quality control as well data analytics exercised by the measurement vendor to ensure compliant measurement and to monitor for potential changes and errors.

Measurement vendors are required to conduct quality control procedures to onboard, vet and periodically review the use of indirect or third-party inputs into measurement. Such quality control procedures should include (but not be limited to) executing scripts in third party environments to verify appropriate and accurate implementation both during onboarding and periodically on an ongoing basis. Use of code libraries and a process for validating the analysis of data collected by publishers or vendors using standard agreed upon signaling is strongly encouraged. Third party or publisher providers of measurement inputs may choose to have their functionality and inputs centrally validated/examined to provide assurance to their measurement users. This approach could significantly reduce (but not eliminate) the testing required by measurement users.

Measurement vendors using third-party or indirect signals for measurement should take steps to ensure their solution adequately covers any scenarios that may inhibit complete measurement. Any resultant limitations should be adequately disclosed in conjunction with the disclosure requirements referenced within the *Digital Video Impression Measurement Guidelines*.

4 Guidance and potential solutions for challenges with SSAI measurement

The following is a list of potential solutions and initiatives that could enable more consistent measurement of SSAI:

4.1 Standardization of terminology

Industry standardization and guidance around SSAI, such as standardization of possible measurement solutions (i.e., what is acceptable and what is required) is encouraged so users understand the differences between different SSAI integrations. Standardization may also include an industry agreement on the data that measurement vendors should receive from SSAI providers, inclusive of signals that can enable proper IVT filtration by measurement vendors. As further discussed below, integrations between measurement vendors and SSAI providers to enable data transfers should ensure data is adequately protected and privacy requirements are met.

Furthermore, some limitations to this initiative that should be considered are the rapidly evolving requirements around privacy, and the potential for certain data to become unavailable in the near future.

4.1.1 Privacy considerations

The following guidance should be considered by measurement vendors and SSAI providers when transferring and utilizing data from users' devices.

Vendors must make efforts to obtain the end user's permission, and to provide concise, clear privacy policy notices describing how their services use and share data and what the consumer's choices are. Use of clear opt-in practices is required and vendors are encouraged to establish first-party relationships for collection of data where feasible.

A vendor must clearly state in their privacy policy why they are collecting this information and how it may be shared.

Measurement organizations are encouraged to consider additional industry and regulatory guidelines in this area. Privacy regulations as they emerge must be monitored and staged for the measurement organization as soon as known.

4.1.2 SSAI within CTV

There are certain measurement requirements that are specifically material in the CTV environment (discussed above), such as a measurement vendor's ability to detect inactive sessions or continuous play sessions. As SSAI is most prevalent in this environment, a standardization approach should also include data requirements for SSAI providers within the CTV environment, to ensure that signals that can enable identification of such instances (i.e., inactive sessions, continuous play sessions) are being passed to measurement vendors.

4.2 Disclosure of IP ranges

Disclosure of IP ranges used by SSAI providers may assist measurement vendors in effectively identifying SSAI traffic. Because SSAI traffic may be seen by measurement vendors as coming from a few IP addresses, it is often times misclassified as IVT (i.e., data center traffic). By asking SSAI providers to disclose the IP ranges they utilize, measurement vendors may be able to identify SSAI traffic and segregate it for further analysis and reporting. Risks and limitations to consider under this potential solution are: (1) IP addresses may pose a higher risk of spoofing, therefore strong IVT detection and filtration controls would be necessary to detect any IVT posing as SSAI; (2) certain SSAI providers have been known to have variable/dynamic IP addresses, which may limit their ability to provide a relevant IP range. Furthermore, as privacy regulations continue to evolve there may be the potential limitation of SSAI providers not being

able to provide full IP addresses, although server IP addresses have not been impacted by privacy regulations thus far.

One potential solution to effectively enable industry sharing of SSAI IP addresses is to centralize the establishment and maintenance/updating of this list through an industry body. While this solution would not be expected to encompass 100% of SSAI providers' IP addresses, and may need to be updated periodically due to providers potentially using dynamic IPs, this initiative coupled with efforts by each measurement service, could drive consistency and efficiency in identifying SSAI traffic.

As stated above, integrations between measurement vendors and SSAI providers to enable data transfers (including disclosure of IP ranges) should ensure data is adequately protected and privacy requirements are met. Additionally, providers indicating use of SSAI must be verified as such by measurement vendors and their traffic must be discretely measurable for IVT or otherwise treated as unknown (not whitelisted as valid).

4.3 Certifications and other enablers

We encourage the establishment of a certification process where SSAI providers could become certified as an intermediary or input that measurement vendors use or rely on, as well as utilizing SSL certificates between the SSAI provider and the ad server/measurer in order to authenticate the third-party data. Both these efforts would likely involve other industry organizations such as IAB Tech Lab.

4.3.1 Certification process

An SSAI certification initiative could encompass a technical evaluation of the SSAI provider's measurement and integration process with measurement vendors. The certification process should look to assess the following areas, at minimum:

a. Initial qualification assessments conducted by the measurement vendor to ensure the SSAI provider is not a bad actor. For this purpose, the SSAI provider would be considered a measurement vendor's "material business partner" and initial qualification assessments should follow the guidance provided as part of section *3.4: Business Partner Qualification* of the *Invalid Traffic Detection and Filtration Standards Addendum*, which states that each measurement organization that interacts with business partners must have policies and procedures to ensure they are working with legitimate business partners and a general understanding of the IVT processes employed by each business partner. Due to the nature of SSAI traffic (i.e., originating from a few IP addresses, or a single IP address) IVT perpetuators may disguise themselves as SSAI providers. As such, initial qualification assessments should also include considerations to ensure that the SSAI provider's infrastructure is legitimate and not a means to mask IVT.

b. Further validation testing to assess the accuracy of the data being passed by the SSAI provider and validate that it meets MRC requirements. Testing in this area could include code review, scripted testing or other analyses to ensure that code is implemented properly and that signals being passed to the measurement vendor are counted based on client-initiated signals.

c. Ongoing procedures and controls to ensure data transmission continues to run properly over time.

Once the SSAI provider's data is certified, such provider may be used by measurement vendors, and SSAI traffic coming from those SSAI providers, would be able to be leveraged for MRC accreditation. One aspect to consider under this initiative is the extent to which the SSAI implementation is customizable at the publisher level, and whether that customization across the industry can lead to measurement and/or compliance challenges. One potential solution should this create segmentation is for the industry to also standardize the level of customization at the publisher level, thus enabling consistency across the ecosystem.

4.3.2 SSL certificates

Measurement vendors have indicated that SSL certificates as well as other ways to authenticate third-party data are currently used across the industry. However, certain authentication methods (i.e., IP addresses, JSON files) may be easier to spoof by IVT perpetuators. Therefore, this initiative would look to encourage the use of SSL certifications as an industry best practice that minimizes risks.

4.4 Next steps

Once the above solutions have been defined and discussed with the industry, MRC plans to begin liaising with other industry organizations such as IAB Tech Lab for technical solutions including standardized data requests/fields or VAST Macros.

5 Participating Organizations

Participating Working Group Organizations:

[TO BE INSERTED WHEN DOCUMENT IS FINALIZED]

6 Contact Information In Case of Questions or Issues

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