

Invalid Traffic Detection and Filtration Standards Addendum

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1 Overview

This document presents additional Standards for the detection and filtration of invalid traffic applicable to all measurement organizations of advertising, content and related media metrics (including outcome measurement) subject to accreditation or certification audit. MRC's original guidance is contained in measurement guidelines maintained by the IAB, MMA and/or the MRC (all written by MRC) that pre-date this addendum – including served ad impressions, clicks, rich media, digital video, rich Internet applications, audience reach, in-game advertising, mobile web advertising, in-application advertising, ad verification and viewable impressions. This addendum was prepared for the use and benefit of the media industry, especially those constituents that analyze digital and cross-media metrics or audience volumes, composition and behaviors, whether for content or advertising in media. These Standards are directly applicable to measurement products including those that rely on pixels, tagging, beaconing, cookies, redirects or other message tracking, SDKs or other forms of census-like tracking as well as online digital or internet panels. In addition, these Standards shall be applied to various degrees to linear television measurement within cross-media measurement products, especially with regard to tuning through connected TVs (CTV) and Over-The-Top (OTT) devices and within corresponding applications such as in cases of carriage of linear content through Virtual MVPDs and for IP enabled Set Top Boxes.

For organizations that use panels to track digital usage, this reported activity should be free of invalid traffic, and the detection and filtration requirements apply (although specific detection techniques may be different), however the reporting mechanisms can merely be stated in net audience activity, rather than at the levels of General and Sophisticated as outlined in Section 7 (this is herein referred to as a “panel reporting-only exception,” i.e., much of the guidance herein applies – this exception is merely about reporting structures/requirements). This reporting-only exception for panel measurement arises because the application of filtration and other controls to remove invalid traffic can be significantly different and reliant on panel and measurement instrument controls (not addressed herein).

This addendum initially resulted from a project led by the MRC, IAB, MMA and other industry groups, and both the initial version and update were created with the participation of a large group of digital measurement practitioners as well as a group of industry technical experts. This addendum and any updates will also be reviewed and approved by major buyer-side trade organizations (4As, ANA) and their constituents and thereafter provided to the public through a formal period of public comment prior to formal adoption.

For the purpose of this document, Invalid Traffic (IVT) is defined generally as traffic or associated media activity (metrics associated to ad and content measurement including audience, impressions and derivative metrics such as viewability, clicks and engagement as well as outcomes) that does not meet certain quality or completeness criteria, or otherwise does not represent legitimate traffic that should be included in measurement counts. Among the reasons why traffic may be deemed invalid is it is a result of non-human traffic (spiders, bots,

etc.), or activity designed to produce IVT. Further delineations of IVT types for General and Sophisticated levels are defined and discussed further in this document.

1.1 Applicability

All digital and cross-media metrics subject to audit by MRC or certification auditors must comply with this addendum. This addendum is applicable to all existing digital and cross-media measurement guidelines and standards as well as the reported metrics described therein. The changes denoted in this update are effective immediately (upon issuance); a one-year grace period from the date of issuance is being provided for existing accredited/certified measurement organizations.

This addendum is intended to lead toward improved measurement practices and because of the dynamic nature of causes for, and detection processes applied, these requirements are expected to change over time; improvements are likely to be from enhanced accuracy and more robust removal of traffic that should not be monetized for advertising purposes.

The sponsors of this addendum strongly encourage all organizations that measure advertising traffic or audience (beyond the accredited or certified organizations where it is required) to apply the standards in this addendum. Those organizations that undergo audits to verify measurement metrics should expect their auditors to expand the scope of their audit to include testing/validation of organizational structures, compliance with control objectives and application of the specific procedures required herein.

Updating Process

Comments on the contents of these Standards or suggestions for enhancing content can be submitted to staff@mediaratingcouncil.org (using a subject line of “IVT Standards Comments”). MRC will seek to update these standards as needed, and will do so immediately if significant invalid traffic discoveries or significant alternative IVT processes are encountered. Changes to these Standards will be vetted through an ongoing working group, established from volunteer media organizations, agencies, marketers and auditors. Since the initial publication of this document MRC has kept IVT requirements updated through a series of interim memoranda that have since been incorporated as part of these updated Standards. As such, this update supersedes any previously issued guidance or memoranda.

Levels of Accountability

The terms “shall” and “must” can be used interchangeably in this document – these are requirements. Provisions that are non-mandatory invoke the term “should” and are presented as “recommendations.”

1.1.1 General Orientation

This addendum will strengthen existing IVT filtration and removal guidance in several important ways by requiring accredited or certified measurement organizations (or those in the process of an audit) to: (1) adopt processes that are continuously applied across all measured traffic, audience or content, (2) require processes that are “continually monitored and periodically updated” to ensure detection and filtration methods change as the underlying IVT and causes change, (3) increase the specificity of detection and filtration requirements in many areas as compared to prior guidance promulgated by MRC, IAB and MMA, and (4) provide broad recognition for the need to implement requirements with a higher level of diligence in protecting the reported metrics from material levels of IVT. All of these requirements particularly relate to advertising metrics that are reported externally and used as primary and ancillary advertising monetization inputs.

1.1.2 Categories of IVT and Associated General Requirements

This addendum establishes two categories of IVT. The first, referred to herein as “General Invalid Traffic” or GIVT, consists of traffic identified through routine means of filtration executed through application of lists or with other standardized parameter checks. Key examples are:

- Known *invalid* data-center traffic (*determined to be a consistent source of invalid traffic; not including routing artifacts of legitimate users or virtual machine legitimate browsing*);
- Bots and spiders or other crawlers¹ (except those as noted below in the “Sophisticated Invalid Traffic” category);
- Activity-based filtration using transaction-level data and parameters from campaign or application data;
- Non-browser user-agent headers or other forms of unknown browsers;
- Pre-fetch or browser pre-rendered traffic (*where associated ads were not subsequently accessed by a valid user; note: updated IAB/MRC Measurement Guidelines require an ad to have loaded and begun to render in order to record an impression; as a result, pre-fetch or pre-rendered traffic shall not be included in Gross impression counts*);
- Invalid placements (specific to ads); small, barely visible or invisible ad delivery or illogical (non-industry standard) ad size of: 0x0 and 1x1 as delivered on the client side (Note: When using declared ad sizes, efforts should be made to determine whether bid request declarations are for request purposes only or represent actual placement size); and

¹ See Section 7 for further requirements related to reporting matters. While these requirements discuss accuracy issues with reporting of discrete IVT categories, they also encourage reporting known and declared bots, spiders and crawlers present on a property with permission of the publisher (e.g. for purposes of enabling measurement or brand safety) as a discrete subset of GIVT so that it may be differentiated from other invalid activity.

- Non-rendering capabilities; sessions or traffic without the capability to render or display images (other than cases of disabled image rendering) as determined at the client side even though rendered impressions or other activity may be associated with them such as headless browsers or component devices without a display component. **To be clear, this required GIVT category relates to measured activity (such as rendered impressions) associated to sessions where device information appears incapable of or illogical with rendering ability. Non-rendered impressions should continue to be omitted from Gross Impression measurement and not treated as IVT.**

This does not relate to and is agnostic of visibility or viewability of an ad. Further, updated IAB/MRC minimum display impression guidelines require confirmation of begin to render in counting. It should be noted that video and audio impression guidance already requires play-head movement which is akin to the begin to render requirement and non-rendering IVT should not include audio players and related sessions where image rendering is not required or expected.

Please note, the above GIVT categories are defined for illustrative purposes to be applied in MRC IVT accreditation audits and should not be confused with the Trustworthy Accountability Group's (TAG's) IVT Taxonomy v2.0, which, while fairly consistent and partially sourced from MRC's assessment structure, was not expressly created for MRC IVT audit purposes.

The second category, herein referred to as "Sophisticated Invalid Traffic" or SIVT, consists of more difficult to detect situations that require advanced analytics, multi-point corroboration/coordination, significant human intervention, etc., to analyze and identify. Key examples are:

- Automated browsing from a dedicated device: Known automation systems (e.g., monitoring/testing), emulators, custom automation software and tools;
- Automated browsing from a non-dedicated device: infected and hijacked devices (and sessions within) as well as incentivized automated activity;
- Incentivized human invalid activity²: self-directed activity to benefit self or harm others and directed activity;
- Manipulated activity: Forced new browser window opening, forced tab opening, forced mobile application install (mobile re-direct), forced clicking behavior, tricking users to click / accidental clicks, clickjacking (UI redress attack) and hijacked measurement events;
- Falsified measurement events: visit, impression, viewability, click, location (specific to location falsification aimed at generating invalid ad activity, but not necessarily including validation of exact location for targeting purposes), referrer, consent string, conversion

² Such as click farms where non-robotic activity can be determined to be organized and directed across multiple users or machines. Excludes disclosed self-directed activity without the express purpose of manipulating measurement such as reward programs, but such activity when known, should be considered discretely for reporting as a subset of valid ad activity.

attribution and user attribute spoofing as well as Server Side Ad Insertion (SSAI) spoofing where applicable to a measurement organization;

- Domain and App misrepresentation: App ID spoofing, domain laundering and falsified domain / site location;
- Bots and spiders or other crawlers masquerading as legitimate users detected via sophisticated means;
- Hijacked ad tags and creatives (specific to ads);
- Hidden/stacked/covered/transparent/invisible or otherwise intentionally obfuscated ad serving such as Z-order stacking, banner stuffing, transparent ads and background cycling and pop-under with auto-close (specific to ads);
- Invalid proxy traffic (*originating from an intermediary proxy device that exists to manipulate traffic counts or create/pass-on invalid traffic or otherwise failing to meet protocol validation*);
- Adware and Malware that conduct deceptive actions including ad injection and unauthorized overlays;
- Incentivized manipulation of measurement (*invalid incentivized promotion of an entity, without its knowledge or permission such as shilling or for purposes of manipulating measurement – excludes cases where the entity paying for the incentive is the entity being promoted*);
- Misappropriated (pirated or stolen) content (*where used to purposefully falsify traffic at a material level*);
- Cookie stuffing, recycling or harvesting (*inserting, deleting or misattributing cookies thereby manipulating or falsifying prior activity of users*); and
- Differentiating valid and IVT traffic when originating from the same or similar source in certain closely intermingled circumstances³.

The term IVT refers to both GIVT and SIVT collectively. Additionally, later in this addendum, specific aspects of GIVT and SIVT procedures are further explained. It is expected that, over time, items that are currently included in the definition of SIVT may be incorporated into standardized, objective lists and criteria through industry organizations and as a result, may be re-categorized as GIVT. Any such changes will be announced as part of updates to this document and general measurers will be given a defined period to adopt.

IVT does not include general editing such as cleaning, removal of corrupt or incomplete traffic or deduplicating traffic due to processing or timing artifacts unless evidence is present to suggest such edited traffic is generated by one or more of the techniques discussed above.

All accredited or certified digital measurement organizations must apply GIVT detection processes as specified herein; application of SIVT detection processes are strongly

³ Invalid traffic from compromised machines or devices must be filtered and excluded, but attempts must be made to preserve and credit valid activity. Measurement organizations may develop inclusion/exclusion rules based on the percentage of valid to invalid activity on a machine or device with auditable empirical support based on minimization of false positives/negatives as discussed within these Standards.

encouraged. In cases where the measurement organization of record for the campaign or application solely applies GIVT detection processes, buyer organizations are encouraged to consider adding a capability including SIVT processes through a third party or alternate method. Accreditation or certification of any digital measurement requires the organization to apply GIVT detection techniques as is compliant with these Standards; GIVT techniques or procedures are not separately accredited or certified. SIVT detection functionality is eligible for independent accreditation or certification.

All GIVT areas as discussed above and further in Section 4.2 are required to be adequately covered at minimum and SIVT accreditation requires effective coverage of ALL applicable categories and techniques discussed in this document (ad hoc or incomplete coverage is considered insufficiently compliant with these Standards). It should be noted that some subcomponents of SIVT as described above involve specific metric types, such as Clicks and Viewable Impressions. Measurement organizations may have varying levels of coverage of these metrics and as such, certain aspects of SIVT may not be applicable to their measurement.

Known GIVT must be removed from monetized counts and metrics and is subject to industry communication requirements specified herein. Measurement organizations that apply SIVT techniques are likely to need to remove identified SIVT downstream from original detection at later times to protect detection procedures from reverse engineering. Also, detection procedures for SIVT may take time to execute and may not be feasible to apply to real-time processes. SIVT must be segregated and reported when reporting total net metrics. Additionally, enrichment/attribution must be disabled for impressions identified as SIVT, if the measurement organization is capable of doing so (as applicable). *[See the Other Matters section for guidance with backward looking disclosures of invalid traffic issues discovered after campaign reporting.]*

GIVT must be excluded, where possible, from ancillary processes that impact monetization, such as goal setting, targeting, frequency capping, etc.

In general, the goal of establishing two types of invalid traffic (General and Sophisticated, with the required differences in treatments) is to manage discrepancies between measurement organizations to a minimal level – the critical aspect here is the GIVT technique, which all organizations must apply. GIVT techniques will rely extensively on list-based common filtration procedures and parameter-based techniques.

The addendum adds requirements for a defined measurement organizational focus on invalid traffic with accompanying internal controls. Stronger communications, both internal and external, are addressed herein – although this area is complex and evolving.

Digital Audience and Cross-Media measurement inclusive of conversion or outcome attribution where activity is reported by demographic and behavioral attributes must be based on filtration for both GIVT and SIVT, including invalid traffic that may exist in television

components where applicable. The *MRC Cross-Media Measurement Standards* have stipulated Cross-media measures that do not incorporate SIVT filtration may still be reported in addition to fully compliant metrics with proper labeling, segregated reporting and clear disclaimer (these would not be considered fully compliant with the requirements of the Cross-Media Audience Standard, but can be audited and accredited as long as fully compliant corresponding metrics are also reported and audited).

In some cases, measurement organizations may collect non-advertising data such as user counts and page visitation. On a case by case basis, some of the above GIVT and SIVT categories may not be applicable, such as falsified impressions, viewability and clicks or hijacked, hidden or stacked ads. However, to the extent these IVT elements are present on a property being measured for non-advertising data, this should be considered and disclosed as appropriate.

1.1.3 Industry Resources and Lists

We believe industry organizations such as TAG or the IAB Tech Lab will and should continue to help administer an expanded set of lists that will allow for uniform application of most GIVT processes. For example, the [IAB/ABC International Spiders & Bots List](#), is maintained by the [Alliance for Audited Media/AAM](#) on behalf of the IAB Tech Lab. These lists can be coordinated with similar lists produced by entities outside of the United States, for example in the UK by ABC or other digital measurement governance organizations.

Wherever applicable, measurement organizations can use their own lists or detection/filtration bases if their internal processes lead to more complete or accurate filtration, rather than industry-based lists. The burden of proof is on the measurement service to demonstrate that their lists or processes meet or exceed the effectiveness of industry lists or processes, however evidence of this can be assessed objectively and independently by auditors without the need for the measurement organization to subscribe to said industry lists.

Measurement organizations should be aware that the objective of industry lists is to facilitate as complete as possible General filtration processes and comparable processes, hence all measurement service discoveries (for General filtration) are encouraged to be communicated to industry organizations such as TAG, IAB and/or MRC Staff for inclusion on lists via formal processes to regularly update such industry organizations. Such communications shall be conducted with sensitivity to the risk of reverse engineering that could potentially result. Decisions to forgo communication by measurement services must be supported by auditable evidence of such risk. See Section 2.4 for further discussion of reverse engineering concerns with respect to communications and disclosures.

1.1.4 Data-center Traffic (previously part of interim guidance)

The filtration of invalid data-center traffic contemplates the availability and use of industry lists in order to promote consistency amongst vendors. While measurement organizations are strongly encouraged to utilize available industry lists, there may be limitations to these lists

(e.g. the TAG Data Center IP list is limited to traffic from data-center IP addresses where human traffic is not expected to originate and excludes mixed data-center IPs). In lieu of or in addition to the use of such industry lists, measurement organizations must seek alternate means to develop filtration rules for this type of invalid traffic. While impression-level granularity in filtration is preferred, as a starting point, the MRC is requiring filtration of **invalid** data-center traffic originating from IPs associated to the three largest known hosting entities: Amazon AWS, Google and Microsoft. This means filtration of IPs within those of known hosting entities determined to be a consistent source of invalid traffic not including routing artifacts of legitimate users or virtual machine legitimate browsing.

This list could be readily compiled based on information currently and commonly available for immediate use by measurement organizations (with the use of exception strings to reduce false positive filtration of legitimate traffic as discussed in these Standards). This list shall be maintained by vendors and subject to continuous evaluation and update.

Vendors shall supplement these lists with other information, third-party sources or other techniques in order to meet the objective of effective filtration of this type of invalid traffic and to account for smaller data centers that may be a source of IVT. However, as discussed below, vendors are required to empirically support identification of invalid traffic or filters as well as to analyze and minimize false positives resulting from them. The use of proprietary or outsourced lists requires auditable support and is subject to Business Partner Qualification requirements outlined further below.

The presence of proprietary or multiple commonly available lists utilized to filter GIVT runs counter to a primary objective of this category of IVT in that it potentially detracts from consistency in application across vendors. By design, GIVT filtration is intended to be consistent between vendors. For this reason the MRC continues to encourage TAG or other industry organizations to develop a periodic function to routinely ingest and compare such lists with results made available on a controlled basis.

Finally, measurement organizations will also routinely identify invalid data-center traffic through analysis of traffic patterns or more sophisticated techniques beyond the use of known data-center sources. To the extent that data-center sources are identified via general techniques such that they can be filtered under the definition of GIVT, such sources should be routinely documented and communicated to industry leads (MRC, IAB and TAG Staff) in a timely manner as required in Section 3.5 below. Measurement organizations may choose to classify invalid data-center traffic as SIVT if detected via sophisticated means, but should periodically report detected sources to industry leads to update commonly used resources in order to migrate this to GIVT where possible and reduce discrepancies. Such classification should be documented and supported by auditable evidence, but is subject only to the limited communication requirements discussed in Section 3.5.

2 Internal Controls – Control Objectives

For the purposes of this addendum, which relates to digital advertising measurement, Internal Controls are defined as follows:

Systematic and/or manual activities (e.g., reviews checks and balances, processes and procedures) instituted by a measurement organization to (1) process and administer measurement in an orderly and efficient manner, (2) prevent and detect errors, irregularities, fraud and misstatement, (3) protect resources, (4) ensure complete and accurate data, (5) produce reliable, accurate reports in an expected time-frame and (6) execute measurement as management intends. Internal controls shall be executed over time by the organization as routine processes.

Measurement organizations must have specifically directed internal controls for the filtration and removal of invalid traffic. This addendum does not present a list of all potential internal control objectives and processes, it is merely intended to state certain minimum controls that shall be present. This addendum does not prevent a measurement organization from adopting additional, stronger objectives and controls it believes to be warranted. Certain control objectives specified below have additional considerations, which are presented to help inform measurement organizations of specific aspects expected to be present in conducting the control.

A periodic risk assessment (at least annually for both GIVT and SIVT as applicable) for the measurement organization shall be performed in conjunction with assessing the sufficiency of the internal control objectives and resulting internal controls. The results of such periodic risk assessments shall be tied to controls. This shall include assessments of the continued relevance and effectiveness of IVT procedures, in addition to ongoing analyses of accuracy and the identification/internal reporting of false positives and negatives discussed below. Where applicable, especially for public entities, these internal controls and the resulting processes can be coordinated with other related controls to maintain regulatory compliances (such as public company accountability compliance [e.g., SOX]) and other protection measures such as content piracy protection. Specialized accreditation or certifications focused on audience measurement or ad traffic measurement shall also consider these processes.

Periodic IVT risk assessments must be performed considering each specific relevant platform (i.e., desktop/mobile web, vs. In-App, vs. OTT) and are encouraged to be differentiated by or include other pertinent traffic segmentation such as video vs. display, geography or client type (e.g., managed-service vs. self-service, etc.) as applicable. Results of risk assessments must be directly tied to discrete controls for each platform and segmentation. If a measurement organization believes platforms or traffic segmentations demonstrate similar risk profiles and should be assessed as a group, this shall be supported by auditable demonstrable evidence.

Risk assessments are important and required for SIVT functionality which may differ among measurement organizations using varying techniques and resources, but are also applicable and required for GIVT functionality, particularly those processes that may differ by the environment measured by organizations such as business partner qualification, data center identification, activity-based techniques and viewability falsification.

Accordingly, the following specific minimum internal control objectives shall be addressed:

2.1 Invalid Traffic Detection and Removal Process Controls

A measurement organization shall have sufficient controls to detect and remove known GIVT (including both non-human traffic and illegitimate human activity) from reported metrics. We strongly recommend that whenever feasible, SIVT should also be segregated and removed from downstream net campaign total reporting and from data enrichment/attribution processes since reverse engineering is a significant concern. [See reporting-only exception for panel measurement products in Overview section above.]

Organizational processes shall evolve and “learn” over time based on periodic risk assessment and empirical support directly tied to IVT controls to ensure digital environment changes are considered and new invalid traffic orientations are detected.

2.1.1 Considerations for Control Objectives:

- a. The measurement organization shall maintain detailed written internal standards and documentation for invalid traffic detection, as a supplement to these Standards.
 - i. This internal documentation shall be detailed enough for alternate internal users who may need to execute IVT functionality to understand each detection procedure employed by the measurement organization, the purpose of the procedure, individuals performing the procedure and how the procedure is performed as well as the frequency of the procedure. An updating infrastructure shall be in place to ensure the documentation remains up to date with current practices.
- b. Measurement organizations have a responsibility for certain aspects of the behavior of their business partners in the supply chain – they must have a qualification process to make sure they are dealing with a legitimate entity with appropriate traffic-related internal controls. The size/materiality, nature and history of business partner relationships must be considered in these qualification processes. Accordingly, business partners themselves have a responsibility to detect and remove IVT.

Third-party measurement organizations are generally not in control of campaign business partner qualification and selection, so their responsibilities are limited to inquiries of their customers as to their knowledge and application of the principles

expressed herein. Third-party measurement organizations are responsible for their own business partner selection methods, for example Data Enrichment Providers, etc.

Measurement organization responsibilities include downstream/upstream partner qualification, monitoring and data trending. This implies each downstream/upstream partner must make similar diligent efforts to comply with the requirements of this addendum, and compliance with this addendum shall be the subject of partner qualification discussions. For accredited measurers, in the case of material downstream/upstream partners involved in the ad serving or delivery transaction, this implies more than inquiry since compliance must be audited/tested by an independent third party, with accreditation/certifications applied. If material downstream/upstream partners do not participate in accreditation/certifications, these situations shall be maintained in an internal record (which could be used in discussions involving IVT investigations over time, sometimes with customers). *[Note: In this context, a “material business partner” means an organization that is part of capturing traffic or enriching traffic measurement and/or an organization originating the terms and conditions of the campaign that outsources these transactional chain functions.]*

Business partner qualification processes shall still be applied with small volume entities, although measurement organizations may establish a materiality policy subject to review by auditors for differential treatment. Additionally, small volume entities shall be periodically (annually) evaluated in aggregate to ensure cumulative materiality is considered.

To the extent advertising agencies or other buyer organizations are involved in establishing tags or entering serving parameters, legitimacy and appropriate controls must be the subject of business partner evaluations for these entities (for new and/or suspect entities).

The definition of business partner above and the considerations given to size/materiality, nature and history shall be consistently applied to all referenced requirements for business partners throughout this document. See section 3.4 for further business partner qualification requirements.

- c. Sufficient empirical evidence shall exist supporting specific invalid traffic detection parameters, edits, etc., employed by the measurement organization and accordingly the reasons for removal (and disclosure) of known IVT
 - i. Evidence for a specific parameter shall be retained for a sufficient period – subject to MRC retention requirements and one year past the modification or sunset of the rule. Obfuscated or truncated data used as supporting evidence may be maintained to satisfy this requirement, should there be PII or privacy concerns, requirements or data collection restrictions, but must be available in a transparent manner to accreditation/certification auditors

- ii. Different metric/transaction types and varying risks associated with transaction types must be considered
- d. Escalation procedures shall exist to allow removed or suspected legitimate publisher sources of invalid traffic to challenge that process, if they believe they represent legitimate traffic – this requirement pertains to exclusions at the publisher, network and exchange levels only, not specific user-agents, URLs or proxy servers. Escalation processes are principally applicable to monetized traffic only, are subject to materiality requirements, and are generally applicable where already established communication linkages and relationships do not exist. See Section 5.2.1 for additional requirements related to discrepancy resolution.
- e. Employee policies that discourage bad behavior impacting reported metrics or the credibility of the measurement organization must be present [(i.e., specifically prohibiting: employee participation in or financially benefiting from IVT generation, purchasing or selling IVT (except for the purpose of company sanctioned research – see below), linkages with suspect business partners and lack of transparency in IVT actions)]. An employee code of conduct related to invalid traffic is encouraged. Organizations may acquire traffic suspected of being or including IVT in order to test, evaluate or develop invalid traffic approaches; this is not to be considered objectionable behavior provided that the entirety of the acquired suspected traffic is removed from billable counts and reported metrics in a timely manner.

2.2 Change Controls

A measurement organization must have sufficient controls to ensure development of and changes to its invalid digital traffic processes are authorized, tested and approved prior to being placed in production

2.3 Access Controls

Access to invalid traffic detection parameters and base analytics/support data shall be restricted to authorized measurement organization users, except as suggested for external communication (in limited instances) in these standards. Further, strong user access and password policies shall be enforced for client users of data. Weak access control and account credential protection policies present a risk that Business Partner Qualification controls discussed in Section 3.4 can be rendered ineffective as this may allow unauthorized access to IVT data by entities not qualifying as business partners.

2.4 Disclosures

Measurement organizations shall provide sufficient disclosures to allow buyers that rely on measurement metrics to understand the totals of GIVT counts removed (*from all reported*

metrics), SIVT at the campaign total level (*this macro-level campaign total disclosure is intended to help protect against reverse engineering of detection controls*), and SIVT that is removed from enrichment/attribution downstream in later processes, and reported legitimate counts; and as well, upon request, the specific transaction level details (subject to reverse engineering concerns discussed below) that facilitate reconciliation of removed or not-attributed invalid activity and legitimate counts in the monetization process.

Communication with publisher organizations about significant negative (subject to materiality discussed below) matters should be made (this is naturally required as part of the ad monetization process), unless the publisher organization is reasonably suspected to be an illegitimate organization (based on empirical support) solely focused on perpetrating invalid traffic. Publishers that have been negatively impacted by significant invalid traffic findings (whether by General or Sophisticated detection) may make inquiries of measurement organizations aimed at understanding detection results, but responses to these inquiries shall not entail details that may jeopardize detection methods in the future. See Section 5.2.1 for additional requirements related to discrepancy resolution.

Contractual requirements should be structured to enable appropriate communication, however ultimately contractual/legal requirements control communication levels.

Reverse Engineering Concerns

All communications must be conducted with sensitivity to the risk of reverse engineering that could potentially result. Decisions to forgo communication by measurement services must be supported by auditable evidence of such risk. Furthermore, if measurement services do forgo certain of these communications because of supportable concerns over reverse engineering risks, they are strongly encouraged to offer in person inspection or other alternative secured mechanisms to subscribers to allow for review and reconciliation of results.

Attribution

In all cases attribution processes shall not be applied to any form of invalid traffic including GIVT or SIVT. We strongly recommend that whenever feasible, SIVT shall also be segregated and removed from downstream net campaign total reporting and from data enrichment/attribution processes, since reverse engineering is a significant concern. GIVT shall not be subjected to attribution processes because it is removed as detected and therefore is not included in further downstream processes. **Digital Audience and Cross-Media measurement inclusive of conversion or outcome attribution must be based on filtration for both GIVT and SIVT, including invalid traffic that may exist in television components where applicable.**

Guidance Concerning Materiality – Matters in this document which reference “significant” or “material” are generally considered to meet this threshold when they meet or exceed 5% of reported activity – therefore, invalid traffic occurrences or false positives or negatives that meet or exceed 5% (individually or in aggregate) are considered material. Internal controls

shall be structured to detect and correct matters errors or false positives or negatives below this threshold for reported metrics. [Note: For extremely high volume campaigns thresholds can be lowered as individual entity impact may be significant at lower percentages than 5% -- auditors and measurement entities shall discuss exceptions to the 5% threshold during the audit process and base these judgments on objective criteria.]

The general 5% threshold specified above may be modified by a measurement organization in select unusual circumstances (when supported by empirical evidence and judgment), but documentation must be retained by the measurement organization and available to auditors. This type of modification is not permitted as a pervasive general rule, but can be considered especially in the case of false positive materiality rates conservatively established at higher levels with documented agreement from affected seller organizations and clear disclosures to users.

Additionally, measurement organizations may utilize relative materiality thresholds (5%) in conjunction with absolute dollar values (empirically supported) or alternative statistical measures such as standard deviation to further reduce instances of classifying statistically insignificant matters as material.

2.4.1 Decision Rate

IVT measurement organizations shall take steps to disguise and vary scripts and tags to avoid detection and prevent reverse engineering if possible. Bad actors may attempt to avoid or obfuscate detection by returning manipulated information, downloading a tag without payload return, preventing interaction with a tag, patching scripts or bypassing an intermediary and making direct requests. **As a result, in addition to taking steps to secure and protect tags, measurement organizations must actively report IVT “decision rates” (or an alternate and descriptive name) or situations where insufficient signals are collected to make an IVT decision.**

This decision rate shall be computed as recorded impressions where the vendor was able to collect sufficient information and signals as designed/intended to be collected and used to make an IVT determination; divided by the total number of impressions (or respective transactions, if applied to something other than impressions) intended for measurement and reporting by the same measurement organization. Impressions without sufficient information to make an IVT decision must be reported as such and must not contribute to IVT metrics or rates. Decision rates can be reported on both the basis of tracked ads and impressions, but it is not expected that downstream metrics such as viewability would include impressions without sufficient information to make a GIVT decision (differential GIVT and SIVT reporting of decision rates for downstream metrics is permissible) and the panel reporting exception described herein applies to the decision rate as well. The decision rate shall also be reported by media type and environment (desktop/web, in-app and OTT) and shall be presented for GIVT and SIVT distinctly if different. MRC may consider decision rates, much like viewability measured rates, when making accreditation decisions based on benchmarking across audited vendors.

Further, measurement organizations must differentiate between degrees of detection capabilities (when a decision can be made or when varying tags such as SDKs, scripts or pixel tags are applied and differential signals are collected) and empirically support the effectiveness of each across environments. Limitations of each technique (such as instances where certain normally collected and utilized fields are not available) shall be actively disclosed and quantified to client users where applicable and appropriate and considering reverse engineering concerns discussed throughout this document. In situations where differential detection capabilities are present and vendors may not be able to make a full IVT decision, this traffic must be reported as unknown and not included in the numerator of the decision for purposes of IVT reporting and not assumed to be valid or invalid unless supported to be without material false positives or negatives.

The data fields required to consider an impression recorded where the vendor was able to collect sufficient information and signals as designed/intended to be collected and used to make an IVT determination may vary depending on vendor methodology and environment, but must be empirically supported and demonstrable through auditable evidence.

As an illustrative example, for a campaign of 100 total Rendered Impressions, if a measurement vendor receives full information to make an IVT determination for 80 of those rendered impressions, receives partial information and can make an empirically supported IVT determination for 5 rendered impressions, receives partial information and cannot make an empirically supported IVT determination for 5 rendered impressions and receives no information for the remaining 10 rendered impressions, it should be reported as:

100 Rendered Impressions (intend for measurement and reporting)

85 Recorded Impressions (80 full + 5 partial)

15 Unknown (5 partial + 10 no information)

Decision Rate = 85 Recorded Impressions ÷ 100 Rendered Impressions = 85%

In the above example, only the 85 recorded impressions must be used for resultant GIVT metrics and rates as well as downstream metrics such as viewability (differential GIVT and SIVT reporting of decision rates for downstream metrics is permissible).

If a measurement organization has a decision rate of 100% across all measured traffic, this can be generally disclosed in reference materials without the need for discrete reporting, with appropriate support. **It is not necessarily always desired or required to have 100% signal collection to have effective IVT defenses and the decision rate is designed to be informational to users of measurement data. It is important that steps are taken to educate users related to this metric and its meaningfulness. There is also a risk of assisting bad actors by highlighting lack of coverage of certain properties or inventory types and as a result, reporting of decision rates should be limited to users of reported data that have been subject to Business Partner Qualification.**

3 Organizational Functional Areas Now Required

(Outsourcing of Certain Functions to a Third-Party is Acceptable, as long as Compliance is Maintained)

Measurement organizations shall develop and maintain an organizational structure inclusive of functional areas designed to perpetuate the appropriate detection and filtration of invalid traffic. These organizational areas are not mandated specifically by name, but are important to be present by function; specifically, the functions specified below are important, but it is not mandated that they be segregated or titled in the manner presented herein.

3.1 Traffic Quality Office, with a Responsible Data-Quality Officer

The measurement organization shall establish a function specifically designated to ensure protection of reported metrics from invalid traffic and perpetuate accurate reporting. This function shall have specified leadership reporting high enough within the management structure to affect change, if necessary, in management policies, procedures, internal controls, reports (including specific client reports) and consideration of data errors and reissue cases. This function shall also assess risk periodically posed by invalid traffic and ensure adequate resources are devoted to the effort.

This quality function must be maintained independently from data collection, processing and reporting, and sales functions. Technically competent personnel shall execute the duties of the Quality Office with appropriate objectivity.

3.2 General Data Analysis

A measurement organization shall establish and maintain a function that assesses and researches the attributes of the data it collects and reports. A part of this research-oriented function is to provide input into new methods of invalid traffic detection and alerting as well as the efficacy of existing employed methods at removing material invalid traffic.

This general data analysis function shall contain the following areas, which are considered useful to the invalid traffic detection process:

- Data Attribute & Pattern Analysis
- Statistical Data Monitoring and Trending
 - Levels (depending on the measurement organization) – Sites, Ads, Campaigns, applications, etc.

As mentioned above, this analysis function must devote particular attention to development of thresholds for internal data checks and alerting functions, and whether these items remain effective over time.

Data quality and completeness is a critical element of invalid traffic detection and filtration and accordingly this function must be independent from data collection and charged with ensuring business partners and other sources of traffic data are complete and fully populated to

facilitate application of internal controls and detection processes. Data completeness for events or transactions shall include elements such as device information, user information (cookies, IP address, user agent string [as complete as possible, unmodified], and relevant ad serving information (ad serving sources, placement and campaign information, site information, application information, referrer information, etc.). The objective is to ensure the full record is received, not partially or fully lost or otherwise not corrupted.

The objective of measurement organizations and their business partners shall be to ensure transparency with respect to where the ad is served from, the device type and the user agent receiving the ad. This information shall be captured in ad serving transactions and maintained across business partner information transfer. The following fields shall be captured by the measurement organization, *where possible/applicable (current or future data collection restrictions to measurement related to user identification and privacy requirements may preclude collection of one or more of these fields; while MRC believes current privacy requirements allow effective IVT telemetry in all required areas, should future requirements arise that consistently limit IVT capabilities across vendors, MRC will reassess requirements accordingly)*:

- Event Type (describes the nature of the transaction)
- Transaction ID (unique identifier for a given transaction)
- Timestamp
- IP Address (X-Forwarded-For especially in instances of traffic routing or use of proxies such as in a corporate structure, for OTT or Server Side Ad Insertion [SSAI])
- MAC Address
- User Agent (full user agent string, browser and OS)
- Cookie/Unique Identifier or Mobile ID Field^^
- App Identifier (iOS IFA [numeric or bundle], Google AID, Windows AID)^^
- Mobile Telephone Number (can be partially obscured for PI reasons)^^
- Referrer Site Information, if applicable
- Consent string, if applicable
- Device ID, Device Type^^
- Carrier Information; Carrier Routing^^
- Location information^^
- Publisher ID, Site ID, Section ID, Placement ID
- Publisher site governance audit or certification information
- IAB Tech Lab Ads.txt and App-Ads.txt^^ information
- URL (full URL of the page or app where the ad was served)
- Advertiser ID, Campaign ID, Creative ID, Creative Type, Ad ID
- Method (e.g., GET, Post)
- Status Code (e.g., 200, 302, 400, 500)
- Pre-Fetch Headers (X-MOZ/FireFox, X-Purpose/Safari)
- OpenRTB attributes, where applicable
- Video/Audio Ads Completion Data (i.e., start, 25%, 50%, 75%, complete)

^^ The above list includes specific fields for mobile devices, although many of the general fields also apply to a mobile environment.

General Note 1: Based on the above, the practice of buying anonymous traffic, if and when several of these fields are not populated, is strongly discouraged. The existence of this type of traffic and volumes of this traffic included in reported metrics must be disclosed, although null values for certain of the above such as user agent does not necessarily mean traffic is invalid unless direct evidence supports this.

General Note 2: Personal Identifying Information (PII) legal requirements and restrictions or browser restrictions may dictate eliminating one or more of these fields from retained records or altering the content of fields for identity protection purposes. In these cases deviations must be supported by the measurement organization's privacy policy and must be available for review by auditors. **Differential collection by browser or environment due to data collection restrictions should be considered, disclosed as a limitation where applicable along with any related impact and be periodically studied with regard to the impact on IVT effectiveness. Auditable evidence of this periodic study shall be retained for inspection. As discussed throughout this document, measurement organizations should take steps to mitigate false positive/negative IVT identification and should take care to not erroneously invalidate traffic with missing information due to privacy constraints without direct IVT signals and instead consider this unmeasurable for IVT (not valid by default).**

Measurement organizations are expected to comply with legal and business contractual requirements within the countries they operate; accordingly if a formal (legally dictated) privacy restriction in a country prevents the capture and tracking of certain of the fields stated above, these can be excluded. In all cases, documentation of legal limitations, by country, shall be maintained by the measurement organization. The MRC Staff will attempt to collect these data collection restrictions across measurement organizations to understand the consistency of interpretations as well as build an understanding of regional differences in laws.

3.2.1 Sampling (*previously part of interim guidance*)

Section 6 of these standards states impression level granularity is preferred in determining the validity of traffic. The MRC is aware of the use of sampling or selective application of IVT decisioning whereby measurement organizations may expend differential effort in determining the validity of certain impressions and may not apply some or any of their IVT measurement techniques to portions of measured and reported traffic. While these standards do not expressly disallow sampling of IVT measurement, such approaches are not in accordance with the impression-level premise. Further, these standards contain several sections addressing the concerns of reverse engineering of IVT techniques and contain strong requirements of a measurement organization to take care in obfuscating sophisticated techniques so that they may prevent defeat of them. Sampling or selective application of IVT decisioning of transactions may not only inhibit a measurement organization's ability to comply with these requirements, but also presents a potential weakness in IVT detection and filtration techniques that may allow an IVT perpetrator to infiltrate portions of traffic with less robust measurement and detection capabilities applied.

Due to these concerns, additional rigor and consideration of IVT sampling techniques is required including significant unique disclosures. First and foremost, a measurement

organization must be able to support and demonstrate that a sampling approach to IVT measurement is as effective and as obfuscated as a census approach with regard to reverse engineering. Further, a measurement organization employing IVT sampling shall apply enhanced quality control and monitoring over sampled measurement on an ongoing basis.

Additionally, a measurement organization applying IVT detection and filtration to less than all measured traffic shall disclose and quantify its specific methodology to users. Specifically, the *MRC Viewability Guidelines* introduce the concept of a “measured rate” which requires measurement organizations to quantify and disclose the portion of traffic for which they measure viewability as a required metric in viewability reporting. Likewise, measurement organizations employing an IVT sampling approach must disclose an IVT decision rate reflecting sampling, essentially representing the portion of measured traffic by level of IVT telemetry actually applied (full, partial or none). Additionally, to the extent measurement organizations already report a measured rate for viewability, but the true measured rate for IVT is less than this rate due to sampling, both metrics must be disclosed. See Section 2.4.1 for further requirements related to the decision rate.

Further, evaluation and examination of digital measurement in conjunction with *IAB/MRC Measurement Guidelines* includes application and evaluation of *MRC Minimum Standards* as part of the MRC examination process, however, due to the census nature of most digital measurement, many sample-based requirements of the *MRC Minimum Standards* may not be completely applicable. However, a sample-based IVT approach does not constitute census measurement of IVT. As such, measurement organizations shall consider, apply and comply with certain sample-based provisions of the *MRC Minimum Standards*. Specifically, the following are presented for application to IVT sampling along with a description of their relevance to the approach:

-*MRC Minimum Standards* A.1 and B.1: IVT sampling approaches (the specific differential IVT decisioning applied) shall be designed to reduce the effects of bias and distortion and known biases shall be disclosed and quantified.

-*MRC Minimum Standard* A.3: IVT sampling shall be designed to reflect the population of traffic measured. Moreover, such sample design shall consider material differences in site content and design, environment (desktop, mobile, etc.) and placement type as well as inventory sources (purchased, exchange, programmatic) among other aspects of traffic and reflect the relevant portions of the measured traffic population. Such aspects shall be defined and disclosed along with any sample exclusions.

-*MRC Minimum Standard* A.13: Algorithms or models used in IVT sampling shall be empirically supported and based on systematic, logical procedures. Such support must be periodically updated and auditable by design. Arbitrary decisioning (such as application of IVT decisioning to every n^{th} impression) is likely not supported and is discouraged as it is not random and likely easily subject to discovery and manipulation.

-MRC Minimum Standard B.7: Each report where IVT sampling is applied must state that the data obtained from the samples used in measurement are subject to sampling errors.

-MRC Minimum Standard B.8: With respect to sampling error:

-Each report where IVT sampling is applied shall contain standard error data relevant to the metrics contained therein. The report shall also contain a non-technical explanation of the meaning and use of standard error as well as a clear guide to how the data may be applied to any given metric contained in the report.

-The method used to develop standard error estimates as well as the formulas used to compute the standard errors must be fully disclosed.

If a measurement organization uses IVT sampling in any material way or for any material portion of traffic, such sampling must be included in the scope of the audit.

In some cases, measurement organizations' clients are themselves choosing to only include the IVT tag on specific impressions, and not all impressions. Effectively, the client is sampling, not the measurement organization. In many of these cases, the measurement organization is not aware of the fact that the client is sampling by placing their tag on only a subset of their impressions/traffic. Measurement organizations shall take steps as part of onboarding quality control and ongoing data analysis to identify and properly account for (disclose and adhere to requirements above) such applied sampling, but may differentiate this from vendor agreed sampling. Vendors shall establish procedures to identify, disclose and communicate such instances of client sampling as well as to communicate with clients where this occurs, establish policies and guardrails for this practice and offboarding procedures should client applied sampling be determined to be outside of agreed upon parameters.

To the extent vendors become aware of unauthorized sampling or sampling outside of the control of the measurement organization, this must be disclosed, segregated in reporting and disclaimed as unaccredited.

3.3 Invalid Traffic Process Development and Modification (Updating)

The measurement organization shall maintain a specific functional responsibility in the development and modification of invalid traffic detection and filtration processes. This function may bridge operational departments, but all efforts must be coordinated through some central authority (as to ensure completeness of coverage and seamless processes). Functions to be considered shall include:

- Data Attribute and Parameter Inventory – specified what type of data is maintained, sensitivity of data (privacy, security, etc.), usefulness of this data in invalid traffic assessment and detection, data edits, trends and assessments employed by data type.
- List Maintenance and Coordination – to the extent industry lists are employed from external sources, these lists must be gathered timely and applied as intended.

- IVT Process – control of and inventory of IVT processes employed by the measurement organization across functional areas. This function includes the testing and approval of all applied techniques and new techniques as they are implemented.
- IVT (Known and Suspected) Tracking and Trending – gathering information on the effectiveness of processes employed, findings and whether these are presented uncovered threats and risks.
- Documentation Requirements – establishing documentation requirements necessary for exclusion of traffic and for resolving ambiguous situations, as well as documentation authorized for responding to information requests about invalid traffic sources, etc.
- External Source and industry Monitoring – monitoring outside organizations and sources to learn about new invalid traffic-related detections, processes and risks
- Forensic Investigation Processes – post measurement process to investigate potential indicators of IVT or previously undetected items, to learn new attributes about these items and foster evolving detection processes.

3.4 Business Partner Qualification

Measurement organizations often deal with business partners in either measuring or fulfilling advertising transaction or both – as previously noted (section 2.1.1) a “material business partner” means an organization that is part of capturing traffic or enriching traffic measurement, and/or an organization originating the terms and conditions of the campaign that outsources these transactional chain functions (size/materiality, nature and history of business partner relationships shall be considered as discussed in section 2.1.1). A key aspect of protecting the supply chain of advertising transactions is to ensure business partners are legitimate and that they carry similar interest in detecting and filtering invalid traffic. 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 invalid traffic processes employed by each business partner.

Measurement organization responsibilities include downstream/upstream business partner qualification, monitoring and data trending. This implies each downstream/upstream business partner shall make similar diligent efforts to comply with the requirements of this addendum, and compliance with this addendum should be the subject of partner qualification discussions. For accredited measurers, in the case of material downstream/upstream partners involved in the ad serving or delivery transaction, this implies more than inquiry since compliance should be audited/tested by an independent third party, with accreditation/certifications applied. If material downstream/upstream partners do not participate in accreditation/certifications, these situations shall be maintained in an internal record (which could be used in discussions involving IVT investigations over time, sometimes with customers).

In addition, third-party measurement organizations have a responsibility to inquire of their customers (business partners in general) as to their knowledge and application of the IVT principles expressed herein. This includes all clients regardless of their position in the ad-chain (buy or sell-side). Measurement organizations shall not just repurpose existing client

acceptance procedures designed to ascertain financial wherewithal or ability to pay; initial business partner qualification procedures shall be explicitly designed to be focused on IVT awareness, policies and practice.

These functions include:

- Initial Qualification of the Business Partner (executed prior to doing business); key questions to consider here include (***but are not limited to; measurement organizations should consider these specific questions, but can differentiate potential business partners by logical level or grouping to apply a subset or alternate versions of them or demonstrate coverage of the risks associated to any of these through other means***):
 - Are partners legitimate businesses? For example, do they have a known address, tax id, phone number or other contact information, relevant industry trade organization membership, third-party data reviews, verified TAG-ID or other certifications, other customers, etc.
 - Are partners known “bad actors?” (for example, already appearing on organizational or industry exclude lists)
 - Do partner business models function without the presence of significant IVT?
 - Are partners legitimately interested in removing IVT, or are they seeking access to IVT detection results for the purpose of evasion? This may be determined by probing questions or direct attestation.
 - Does there appear to be a legitimate business case for the partner to be engaging the measurement organization for the services provided?
 - Did the business partner previously engage other IVT services?
 - Are they an identifiable legal entity?
 - Are the principals (owners and executives) known in the ecosystem?
 - Have the entity or the principals been associated with IVT, malware or other negative aspects of the ecosystem in the past?
 - Does the business partner appear to have any history of detected reselling of purchased impressions, or is the entity’s business model one that purchases impressions, and then resells them?
 - Do their revenues, campaign volumes and other information appear to justify the spend with the measurement organization?
 - Does the potential business partner intend to implement the measurement on a sample or test basis, limiting measurement to subsets of their traffic (see Section 3.2.1 for further requirements related to sampling)?
 - Do the reasons for this partner to be deploying limited measurement make business sense?
 - Does the measurement organization require specified criteria for the test by which the results will be measured?
 - Does the potential business partner appear to want to test with the measurement service, without a reasonable commitment to move forward with executing a contract (*qualification procedures shall be performed prior to engaging in test activity with a potential business partner*)?

- Do they appear to request periodic testing (i.e., on a recurring basis), without formally engaging the measurement organization?
 - Does the measurement organization limit testing opportunities to prevent this potential risk from occurring?
- For buy-side business partners:
 - Will the potential business partner have the ability to run advertising with scripting or the ability to include/insert other third-party tags that have the ability to executing scripting?
 - Do the potential business partners have advertising technology relationships with vendors that employ robust malware detection, or, if the potential business partner is not the ultimate advertiser, does the potential business partner maintain malware detection?
 - Are the buyers legitimate (safeguards against bad actors posing as buyers)?
 - Are there controls and segregation of duties that would prevent personnel within the organization who may be incentivized to allow or create IVT (those responsible for campaign performance and success) from doing so? This may be determined by inquiry where applicable.
 - Is there a general awareness and education related to IVT at the organization?
- Qualification analytics as part of onboarding when engaging with a business partner including evaluating site visits by number of new users, traffic acquisition practices, sourcing vendors used and proportion of paid traffic, traffic quality monitoring procedures and IVT prevention results.
- Ongoing Evaluation of Business Partners, Linked with IVT results after initial engagement and qualification
 - Trending of IVT and other data trends by business partner subject to materiality discussed within this document
 - Periodic review of actions taken by business partners in response to reported and verified IVT results
- Periodic Auditing and/or Gathering Evidence of Partner Certifications
 - Review of third-party audits regarding partner certification, where possible, otherwise consideration must be provided to contractual provisions that allow direct checking of processes and procedures employed by the business partner.
 - For accredited measurers, material downstream/upstream business partners must supply evidence of compliance with this addendum through independent accreditation/certification processes, or if not available a record of validation status must be maintained for future reference.

Measurement organizations will be required to provide evidence of partner qualification vetting processes during accreditation or certification audit processes and to maintain an auditable documentation trail of partners/clients added, rejected and terminated based on these processes. Additionally, accreditation or certification auditors will examine evidence of use of review/audits by measurement organizations over business partners as well as using

appropriate contract language with business partners with applicable qualification requirements.

Finally, measurement organizations may develop and enforce techniques that can be used to limit the risk of accepting a business partner that is not identified as a very-low risk partner, but is also not identified as high enough risk to reject them as a business partner (sand-boxing) in order to observe information that may help strengthen future controls. These include:

- Limiting granularity of data provided to potential partners during testing;
- Limiting granularity of data provided to new business partners during their initial measurement periods, to allow for the measurement organization to assess the levels, types, and sources of IVT noted within their impressions as part of ongoing monitoring. If they appear to be legitimate actors, the measurement organization can then begin providing more granularity in reporting; and
- Requiring impression measurements directly from the ad server of record for the impressions and compare the total traffic to that being tagged with the measurement organization's tag. If the partner is only implementing the tag on limited sets of their traffic, or if the overall volumes appear materially lower than expected, the measurement organization must seek to understand why, and assess if this identifies a risk that the partner is attempting to assess subsets of their traffic and how the measurement organization identifies those subsets of their traffic (IVT or not-IVT).

3.5 IVT-Related Communications (Internal, IAB/MRC, Outside Practitioner, and Legal)

Each measurement organization shall have functions devoted specifically to communications related to IVT matters. **Routine communication functions are limited to GIVT detection and processes. SIVT detection and processes must be closely controlled and subject to limited communication to staff of industry oversight bodies as required, etc., these shall only occur on a broad generalized basis when major new issues [of new methodologies for creating and monetization of invalid traffic types] are discovered, and information about such discoveries must be communicated in a manner that maximizes the effectiveness of reducing IVT.**

Communication processes shall encompass: (1) ensuring internal notifications are provided as necessary to foster awareness and clues to detecting invalid traffic (referred to as "internal communications"), (2) communication with industry leads in this area – specifically MRC, IAB and TAG Staff (referred to as "industry communications"), (3) communication of learning and best practices in a facilitated manner to other industry practitioners to encourage ecosystem improvements (referred to as "outside practitioner communications"), and (4), as necessary, communication to law enforcement and/or measurement service legal counsel on significant invalid traffic matters (referred to as "legal communications").

Item #3 above is a new area driven by this addendum whereby we are encouraging communication of GIVT findings and techniques of discovery to enable ecosystem improvement. We believe practices and communication mechanisms in this area are needed and should continue to evolve, but we also believe TAG (with MRC Staff assistance, where necessary) should continue to maintain secure mechanisms for reporting and information sharing by IVT measurement organizations as well as resultant lists of findings (identified IVT sources) – where applicable, IAB Tech Lab and/or TAG filtration lists will continue to be facilitated, as expanded by the requirements of this addendum. Information gathered by the MRC Staff related to new or emerging identification techniques would be made available solely to measurement organizations participating in the accreditation process and disseminated in a controlled manner to other organizations with a need to know and subject to the MRC Staff confidentiality restrictions. Specifically, in all cases, MRC will maintain the identity of the disclosing party as confidential, and will not disclose this information to any outside party.

MRC strongly believes that our organization can be of assistance if included in such communications early in the process in that we may confidentially disseminate details of any additional heuristics or techniques discovered and ensure they are applied consistently across all accredited IVT measurement organizations. Communications with law enforcement, where appropriate, are also encouraged and it is understood that the involvement of law enforcement may impact or restrict the ability of measurement organizations to communicate details of ongoing investigations externally.

All communications must be conducted with sensitivity to the risk of reverse engineering that could potentially result. Decisions to forgo communication by measurement services must be supported by auditable evidence of such risk. Furthermore, if measurement services do forgo certain of these communications because of supportable concerns over reverse engineering risks, they are strongly encouraged to offer in person inspection or other alternative secured mechanisms to subscribers to allow for review and reconciliation of results.

Measurement organizations are encouraged to participate in groups that may be formed by reputable industry bodies related to IVT, to encourage consistency of knowledge and industry action.

Processes to dictate communication policies and instances to be communicated shall contain:

- Alert analysis and findings analysis to identify situations that must qualify for communication
- Internal and External disclosure policies and qualified disclosure participants (information recipients).
- Error correction policies and materiality policies (forward and backward-looking data implications on reported metrics shall be included).

Communications Between Buyer and Seller Organizations: Measurement organizations must maintain the technical capability of sharing IVT related reports with seller organizations, when their buyer clients provide permission to do so or when this communication is pre-arranged in

campaign terms and conditions. Legitimate seller organizations must be informed of significant negative findings as described in Section 2.4.

Communication Requirements for IVT Special Purpose Measurement Organizations: Certain measurement organizations perform IVT detection and other forms of ad verification as a primary business function, i.e., they offer IVT detection and reporting services. For these special purpose organizations, the following communication requirements are relevant:

- Communication with customers prior to execution of an IVT service should occur to properly set expectations – if illustrative example results are shown to potential customers using site-based information/discovery, this information must be real rather than hypothetical, otherwise disclosure as hypothetical must be made. Customers shall be informed of the technical limitations, if any, of the general nature of the IVT services performed as well as past experience with false positives.
- A key focus of performing IVT services is the improvement of the advertising ecosystem, hence communication of known exceptions to customers as well as sellers (to enable process correction) is strongly encouraged.
- Completely anonymous monitoring of advertising campaigns for IVT should not occur.

Communication Requirement for Sophisticated IVT Techniques – Measurement organizations applying sophisticated techniques are generally not required to communicate the specific nature and extent of these sophisticated techniques to the industry, due to concern regarding reverse engineering of detection methods. However, these measurement organizations must contribute to industry-maintained lists (e.g., TAG) related to General IVT Methods, to the extent they identify relevant sources of IVT.

A measurement organization must retain documentation of communication policies as well as a log of specific communication instances for internal compliance reviews as well as external audit organizations.

4 Invalid Traffic Detection – Specific Tasks Required

In addition to tasks required by existing measurement guidelines, the following presents tasks required by this addendum. Measurement organizations choosing to not execute one or more of these tasks must be prepared to demonstrate compensating controls that derive materially similar results either through parallel testing of obviated controls or through other empirical analysis.

4.1 Pre-Traffic/Campaign Preparation and Historical Analysis

4.1.1 Front-End Partner/Source Qualification

As described previously, partners or other advertising traffic sources must be evaluated and determined to be legitimate and also concerned with removal of invalid traffic.

Measurement organizations should coordinate with partners or other sources to ensure

business and technical resources and processes are in place to allow compliance with this Addendum.

4.1.2 Analysis of Acquired/Purchased Traffic

If an organization subject to measurement by a vendor specifically purchases traffic (such as through an intermediary) or makes use of an assigned traffic arrangement, the ultimate source of traffic to the party from which that organization obtains the traffic must be known (on a per-impression basis), at minimum to the intermediary, and subject to similar invalid traffic detection and filtration by either the purchaser or the originator of the traffic. Measurement organizations should coordinate with the seller or provider of the traffic to ensure business and technical resources and processes are in place to allow compliance with this addendum – see requirements herein related to business partner qualification. The fact that traffic is purchased does not absolve the ultimate measurement organization from the responsibility to ensure the traffic is materially free from invalid traffic. Organizations are encouraged to require that intermediaries they directly engage with in such arrangements are accredited or certified.

Traffic sourcing is a practice by which digital media publishers acquire visitors or traffic through third parties that are not organic to the publisher's property. Traffic sourcing comes in multiple varieties including benign sourcing like paid search and affiliate traffic to direct manipulation of traffic counts through means that are unknown to the user through redirects (clear IVT) and resold. The source of traffic may have a bearing on its likelihood of validity and warrant differential IVT consideration. Traffic sourcing varieties also shall be considered in the context of how they impact the typical audience profile of the property as this may differ from a buyer's goals or parameters.

Sourced traffic, for purposes of this document, is any traffic that originated from any means other than a direct URL entry/site search or app download and initiation (organic traffic). Sourced traffic can further be classified into Affiliate, Referral, Search and Purchased. Affiliate traffic is defined as traffic directed to properties from commonly owned and associated properties. Referral traffic results from a direct advertising or email campaign where interaction (such as a click) drives traffic to a property. Search traffic represents traffic originating via search engine results other than direct ad campaign interactions (such as keyword and search engine optimization). Purchased traffic represents traffic redirected from properties other than those owned by the entity acquiring the traffic or otherwise incentivized activity (users compensated for visiting).

Where known, through referrer, known buyer/seller arrangements, or other analytics, measurement organizations must present a segmentation of relevant measured activity **for purchased traffic only as part of IVT requirements** differentiated from all other traffic categories defined above at least at campaign level granularity. As part of this reporting, measurement organizations shall also report unknown sourcing where a determination cannot be made. Unknown traffic shall not be reported as non-purchased without direct evidence and support. Measurement organizations are responsible for developing effective

means to detect the source of traffic and ascertain which category it falls in. Limitations in this area shall be disclosed and quantified. These categories should still be subject to normal IVT filtration except in certain cases of undeclared purchased traffic as discussed below.

As traffic sourcing varieties also shall be considered in the context of how they impact the typical audience profile of the property as this may differ from a buyer's goals or parameters, for audience measurement (covered separately as part of *MRC's Digital Audience-Based Measurement Standards*), all sourced traffic categories detailed in this section should be segmented and disclosed and as a result, measurement organizations also measuring and reporting audience should consider developing segmentation and reporting mechanisms to distinguish all categories defined herein in addition to the IVT requirement of purchased traffic disclosures. However, for purposes of IVT measurement, only purchased traffic must be segmented in reporting. MRC intends to add an addendum to the Digital Audience-Based Measurement Standards formalizing this requirement further.

Please note: In order for traffic sourcing to be known to third party measurement organizations, a certain degree of reliance on customer signals is required to identify and properly classify traffic sourcing arrangements. Measurement organizations must make attempts to collect these signals and must utilize them when provided. Limitations or situations where these signals are not available must be fully disclosed. First-party measurers of their own traffic must adhere with these disclosure requirements. Likewise, third-party measurement organizations interacting directly with seller/publisher organizations must make efforts to obtain sourced traffic information and where provided, disclose it if material. Finally, buy-side measurement without direct seller interaction may require broader industry solutions to obtain and disclose sourced traffic information. Buy-side measurement organizations are encouraged to make efforts to obtain this information, and also participate in efforts for broader industry technical and transparency solutions. MRC plans to participate in and encourage such industry efforts.

In addition to these reporting requirements, measurement organizations must consider each form of sourced traffic when considering the validity of associated activity (audience as well as ad serving activity to sourced traffic). Affiliate, Referral and Search traffic may require less additional consideration than Purchased traffic. Purchased Traffic must be subject to enhanced procedures and scrutiny. Purchased Traffic that is unknown to buyers or not declared should be considered for filtration and Purchased Traffic that is otherwise obfuscated as well as Purchased traffic exhibiting robotic characteristics shall be filtered as invalid.

Sourced traffic types and corresponding requirements for both buy and sell-side reporting (at the impression level or on a percentage basis) can be summarized as follows:

Traffic Type	Organic	Affiliate	Referral	Search	Purchased
Definition	Direct URL entry/site, search, app download	Traffic directed to properties from commonly owned	Direct advertising or email campaign	Traffic originating via search engine results other than ad campaign	Traffic redirected from properties other than owned (acquired or otherwise incentivized activity).
Reporting Segmentation Required?	No for IVT Yes for Audience	No for IVT Yes for Audience	No for IVT Yes for Audience	No for IVT Yes for Audience	Yes for IVT and Audience
Additional Filtration Required?	No	No	No	No	Additional filtration should be considered where unknown to buyers or not declared and must be filtered when otherwise obfuscated or where exhibiting robotic characteristics.

4.1.3 Data Analysis and Discovery Functions

Section 3.2 of this Addendum describes the requirement for a data analysis function. Minimum tasks for this function are as follows (all General tasks must be used by the measurement organization):

GIVT Processes

- Establish Legitimate Baselines and Control Group(s) of Data, allowing, but not limited to, ongoing analysis of accuracy and the identification/internal reporting of false positives and negatives
- Data Ingesting and Trending; Pattern Analysis
 - Techniques to Ensure Complete Data Ingesting
 - Disclosure of sampling methods and error rates, as applicable
- Other Forms of Analytical Review to Seek Nuanced Invalid Traffic Orientations
 - Machine and Human Review Techniques
- Review of Transaction Parameters and other relevant data points related to measurement data and appropriateness of parameters for IVT determination with regard to specific advertising transactions. Assessment and periodic re-evaluation of transactional motivations and/or effects
 - Determination of sources of monetary transactions and issues these may cause in traffic legitimacy – a “follow-the-money” orientation
 - Assessing the financial benefits of IVT to parties in the transaction chain who are not the ultimate sources of or targets of such IVT

- Outputs from these data analyses are used to periodically inform and modify existing list-based and activity-based techniques

Additionally, the following data analysis and discovery functions are strongly encouraged for SIVT Process measurement organizations:

- Indirect Detection Techniques – alternatives to be considered for inclusion but are not limited to:
 - Primary Research
 - Traps, honeypots
 - Properly evaluated/supported captcha functions
 - Using device or parameter-based fingerprinting, as permitted depending on privacy circumstances

Machine Learning (previous applied under MRC Brand Safety Addendum)

Measurement organizations may use Machine Learning utilized for IVT processes whereby models or algorithms are used to automatically ingest, analyze and classify activity for purposes of validity. Machine Learning consists of utilizing datasets to train and evaluate models or algorithms such that they can predict outcomes on an automated basis. It is critical that rigorous data quality and analysis procedures are applied to the processes to select training data, select parameters used in the model, prepare data, select the model, train and evaluate the model as well as to periodically tune it.

The ability of Machine Learning to accurately predict outcomes is correlated to the size and quality of the data underlying it. Measurement organizations must establish minimum data sample sizes and quality thresholds when selecting training and evaluation data sets for Machine Learning. To the extent reduced performance or accuracy is expected in certain data conditions (such as in smaller sample sizes, shorter collection periods, missing or lower quality data, etc.), this must be actively disclosed to users via estimates of error using statistical methods or observed error.

Further, the data selected and the parameters or fields used shall be relevant to the use of the model (empirical support must exist that establishes a relationship between data or parameters used and IVT determinations). When preparing training and evaluation data, which must consist of distinct and mutually exclusive data sets, robust data quality procedures shall be applied to clean, normalize and deduplicate data as well as to account for or adjust data imbalances or biases. Biases in training and evaluation data shall be reduced to the extent possible and disclosed where material.

Additionally, the model or algorithm selected for specific Machine Learning functionalities must be appropriate for the intended use and periodically updated or refreshed. Use of Machine Learning models must be logical and defensible based on empirical support that is documented and made available for audit. Such support must be periodically validated and updated. Training and evaluation of the model will likely result in weighting or bias adjustment as well as parameter tuning, and this must also occur on a periodic basis.

Machine learning methodology and procedures must be actively disclosed to users at a non-technical level, including relevant data set sizes, models used and data sources while ensuring proper safeguards against reverse engineering of IVT techniques employed. The level of reliance on machine learning versus human intervention or manual review must be generally disclosed.

Human Intervention

Machine Learning should be deployed in conjunction with focused Human Intervention.

Weights and bias adjustments resulting from the periodic training and evaluation of Machine Learning models should be used to focus such Human Intervention. In other words, known biases or weaknesses in the model or for specific data conditions should inform procedures that include manual human review of activity for IVT classifications. Even where Machine Learning is not utilized, a robust set of risk-based criteria is necessary to drive focused Human Intervention. Such risk-based criteria should include considerations of data conditions or types that are more difficult to measure or categorize for IVT.

As Human Intervention involves manual review of activity, consideration should be given to time constraints and scalability. In conjunction with risk-based considerations, Human Intervention policies should be designed with volume and the need for timely review and IVT classification in mind in order to ensure staffing levels are adequate to meet workload needs based on reporting timing policies and volume.

The personnel performing Human Intervention must be adequately trained and supervised. The results of Human Intervention must be periodically reviewed and formally documented. All personnel (including supervisors) must be furnished with detailed instructions and manuals covering all steps of their work. Personnel performing Human Intervention must be periodically assessed for performance. Lower performing personnel should be re-trained and their work in production environments should be limited.

The results of Human Intervention should be used to periodically validate the results of Machine Learning and to update evaluation data sets. It is expected that Human Intervention be used as an ongoing and continuous quality control, but that results are used to update Machine Learning as frequently as is feasible and at least several times annually.

4.2 Analysis of Specific Production Traffic or Campaign Data

Invalid traffic detection and filtration can occur early in an advertising transaction based on known conditions at the time (“up-front detection”) or may be applied after the transaction takes place based on backward looking assessment procedures (“back-end detection”). Each technique has certain strengths and weaknesses, and both have a place in a well-executed traffic protection strategy. Measurement organizations must employ elements from both of these detection and filtration techniques on an ongoing basis, while minimizing the potential for their use to signal the detection methodologies to perpetrators of IVT.

Up-front detection techniques where a bid request is not fulfilled or otherwise blocked due to IVT must be employed with caution because they are particularly prone to telegraphing detection techniques, in most cases, to the traffic source because of an element of blocking that becomes apparent. As such, they tend to become less effective over time without additional research and development into new detection methodologies. *Application of these techniques on an up-front basis is not required.* Back-end detection and removal techniques are more invisible to the source, and therefore less prone to signaling detection methodologies to IVT perpetrators, however they may add complexity to reporting and processing, since data that flows through the measurement organization will therefore contain IVT transactions that are removed in later stages. See further guidance on up-front techniques in Section 4.2.1 below.

The following techniques shall be employed by the measurement organization to the extent necessary to filter material General Invalid Transactions:

[Note: All of these techniques shall be employed by measurement organizations, but use of an up-front blocking technique is not required – these techniques may be employed at any time in transaction processing prior to reporting and monetization.]

- List or Parameter Based Detection
 - Traffic that Does Not Originate from Known Browser Types
 - Non-Browser User-Agent Header
 - Known Invalid Data-Center Traffic Identified Pre-fetch Calls that do not include a timely in-view trigger
 - Known Dangerous or Fraudulent Sources, Based on Specifically Identified Blocking Lists
 - Robotic Indicators or Suspect Strings
 - The Use of “Exception” Strings is Required to Minimize Ambiguous Cases and to Avoid False Positives
 - Includes Suspect Visitors to robots.txt (identifying any visitor to robot.txt and ensuring proper handling of these user agents in filtration processes)
 - Activity-Based Detection and Removal Techniques – Based on transaction-level data and parameters from campaign or application data; traffic is removed when thresholds or other negative evaluation criteria are met
 - Continuous; Full Coverage of Monetized Traffic
 - Speed of Transactions
 - Repeat Transactions
 - Interval Testing
 - Outlier Identification
 - Missing Values, Missing UAs, etc.
 - Transaction Protocol Verification
 - Inconsistencies in Transaction and Browser/Agent Parameters
 - Auto-Refresh Ad Detection – Based on publisher chosen, auditor validated, criteria (To Be Segregated if material, Not Removed)

- Invalid placements; barely visible or invisible ad delivery or illogical (non-industry standard) ad size of 0x0 and 1x1 either declared or delivered at the client side
- Non-rendering capabilities; sessions or traffic without the capability to render or display images (other than cases of disabled image rendering)
- Viewable Impression Falsification where applicable and viewability is measured
 - Manipulation, hijacking, alteration or injection of false or misleading viewable impression decision data into the transaction stream – these issues can be detected at any stage of ad serving and/or executing viewable impression-related functions.

The following types of SIVT and related processes are applicable to SIVT detection techniques:

- SIVT Detection (not part of GIVT)
- Automated browsing from a dedicated device and a non-dedicated device; incentivized human invalid activity; manipulated activity; falsified measurement events; domain and app misrepresentation; bots and spiders or other crawlers masquerading as legitimate users detected via sophisticated (non-routine or list based detection) means; hijacked ad tags and creatives; hidden/stacked/covered/transparent/invisible or otherwise intentionally obfuscated ad serving; invalid proxy traffic; adware and malware; incentivized manipulation of measurement; misappropriated content; cookie stuffing; recycling or harvesting of cookies; and differentiating human and IVT traffic when originating from the same or similar source in certain closely intermingled circumstances.
 - Internal reporting with sufficient detail to allow meaningful analysis of and reporting of false positives and false negative (where known) rates
 - Sophisticated Activity-Based Detection or Analyses – Up-front or back-end techniques using analytical review of traffic data or attributes but requiring multiple sources of information or inferences made from complex multi-data-point assessment of transaction sets (generally over more than one campaign). Often these are developed over time and can be very complex. Additionally, this area can involve bringing ancillary data assets to bear beyond the body of traffic directly under measurement by the service.
 - Note: Execution of techniques to detect these types of complex invalid traffic scenarios may involve complex analytics, corroborative investigation, human intervention, meta-analysis of advertising data or transactions across time and cannot necessarily be learned and applied effectively in a single campaign. Some Sophisticated issues may require adjustment after campaign reporting; these adjustments must occur within 14 days of the campaign's completion date and are required only if historical data is available to perform such an analysis.

- Note: Certain Sophisticated techniques can be performed as up-front processes. If so, a delay in reporting is optional. If no delay in reporting is chosen, results of these up-front Sophisticated techniques shall be reported just as GIVT techniques are reported.

4.2.1 Up-Front Techniques (*previously part of interim guidance*)

Invalid traffic detection and filtration can occur early in an advertising transaction based on known conditions at the time where ad requests are blocked due to IVT or pre-bid filtration where bid requests are not fulfilled due to IVT; referred to as “up-front techniques”, collectively)) or may be applied after the transaction takes place based on backward looking assessment procedures (“back-end detection”). Such up-front techniques may even occur in between a bid or ad request and serving of an ad, leading to blocking of certain sources (referred to as pre-serve).

Each technique has certain strengths and weaknesses, and both have a place in a well-executed traffic protection strategy. Measurement organizations may employ elements from both of these detection and filtration techniques on an ongoing basis, while minimizing the potential for their use to signal the detection methodologies to perpetrators of IVT.

While the MRC does not disallow up-front IVT filtration techniques (blocking of invalid traffic), we have not required them to be utilized due to certain limitations. Specifically, these include the increased risk of telegraphing detection techniques related to up-front IVT filtration which not only leads to diminished effectiveness over time but may also facilitate the creation of sourced traffic with characteristics specifically designed to defeat detection and filtration through A-B testing. This risk of reverse engineering increases when supply-side ad serving entities employ up-front measurement organizations on a single source basis. Furthermore, back-end detection and filtration techniques are required for compliance with the Standard. Digital measurement organizations employing up-front IVT filtration techniques must do so in combination with required back-end detection and filtration techniques.

Up-front techniques may lead to back-end discrepancies when compared to vendor reported results that solely use back-end techniques. As a result, use of up-front IVT filtration techniques must be fully disclosed and does not obviate the requirement to include in such disclosures a quantification of the impact on reported metrics of exclusions resulting from them. Such impact may be on the basis of blocked or rejected bids by disclosing requests, bids, blocks and served impressions categorized by relevant IVT category, where known. It is understood that a measurement organization may not have full visibility into how their up-front resources are deployed by an ad-server, platform or network and as a result, may not be able to directly quantify the impact on requests, bids, blocks or impressions. In this case, the measurement organization must make efforts to periodically estimate this impact and disclose it generally.

If a measurement organization uses up-front blocking or identifies invalid traffic concurrent with ad-serving as part of its overall General and/or Sophisticated Invalid Traffic procedures (so there is a possibility this traffic would not be included in “Gross” metrics above) this practice

must be known to measurement data users. Blocking or other exclusions that result from these practices must be quantified and disclosed if material and if not included in Gross metrics.

Finally, up-front IVT filtration techniques are generally probabilistic in nature as they rely on historical traffic patterns and heuristics to determine the likelihood that a bid request is invalid or valid as opposed to back-end detection techniques that may be deterministic and utilize impression level telemetry to classify the validity of traffic. This introduces the risk that IVT decisions may be made on incomplete or reduced information. For this reason, any vendor utilizing up-front techniques in place of one or more required back-end techniques must be able to empirically support that such up-front techniques are as effective as the back-end techniques they purport to replace or supplement, and back-end telemetry and validation must be present to continually support this approach. Such empirical evidence must be demonstrable and auditable via substantive testing and shall be periodically updated.

In certain cases, measurement organizations may employ up-front techniques where a bid is pre-emptively invalidated based on IVT, but is still fulfilled with an impression served. Such approaches may obviate some of the requirements of up-front approaches discussed above such as those related to preventing reverse engineering (as the bid request would still be fulfilled and not known to a potential bad actor) and disclosure as filtration of impressions would still be reported. Further, if up-front techniques are based on list-based resources developed and deployed based on back-end techniques such as bots and spiders, they may be considered deterministic and require less support than probabilistic techniques.

The MRC highly encourages inclusion of auditing of up-front techniques in the scope of an IVT accreditation audit and **requires this if these techniques directly impact reported results of the audited service**. Further, MRC believes the use of up-front and back-end techniques in tandem can be particularly effective.

4.2.2 Mobile In-App and OTT Controls (*In-App content previously part of interim guidance*)

These IVT Standards apply to mobile in-app environments and the MRC believes the provisions for GIVT are equally sufficient in these environments (with a note below) as they are in desktop and mobile web environments. However, the MRC also believes the risks and techniques perpetuated in mobile in-app environments and OTT environments related to SIVT exhibit differential characteristics when compared to those employed in desktop or mobile web environments. Moreover, IVT detection assets utilized in desktop or mobile web environments (such as JavaScript, cookies or Flash) may not be available or function within mobile applications. As such, measurement organizations performing SIVT measurement and filtration in mobile in-app and OTT environments must consider supplemental guidance herein.

Measurement organizations applying SIVT detection and filtration techniques must consider mobile and OTT applications discretely in risk assessments should they represent a material portion of measured and filtered traffic. Such consideration must not only be with the intent of assessing differential mobile in-app risks, but also to determine whether corresponding in-app

and OTT specific controls are relevant including mobile in-app and OTT specific analyses, applied thresholds, detection techniques and filtration processes.

Mobile in-app and OTT specific SIVT considerations shall include (but not be limited to) where known:

- Detection measures and capabilities at various application stages (downloaded, open, initialized, in-use online or offline).
- Fraud types, models, risks or incentives not covered in the existing SIVT (or different from those in desktop and mobile web environments).
- Whether specific types of mobile in-app and OTT inventory are priced at a premium and may draw more focus or risk for potential IVT generation.
- Relative sophistication of potential IVT schemes required in certain in-app and OTT environments; while such sophistication may decrease the incidence of IVT schemes or those perpetuating them, it might also involve techniques that are more difficult to detect.
- Susceptibility of apps to transmission interception; mobile applications and OTT traffic may be configured to transmit data externally and the encryption and security protocols of these transmissions (or lack thereof) may drive increased risk that warrants consideration by measurement organizations.
- App store policies and protections; while a measurement organization must be aware of and consider/leverage any vetting or security policies applied by application stores, these policies shall not be relied on in place of direct measurement controls as they often do not consider invalid traffic aspects of applications.
- Consideration and differentiation of unofficial and side-loaded apps as well as developer source.
- To the extent that IVT and measurement detection assets (such as JavaScript, Flash or cookies) or other techniques deployed in desktop/mobile web environments do not function within applications or OTT, measurement organizations should consider additional assets or telemetry to serve as compensating controls and to cover detection gaps.
- Presence of proxy traffic or routing artifacts that 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 OTT 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. OTT measurement organizations shall consider these aspects of OTT traffic when applying invalid traffic detection and filtration techniques to it and consider false positives 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 below for purposes of IVT).

Measurement organizations applying SIVT detection and filtration techniques must consider mobile applications and OTT discretely in business partner qualification procedures where applicable. Such consideration shall include initial, ongoing and periodic qualification processes specific to mobile application and OTT traffic as well as IVT processes applied to it by business partners. These processes may involve determining application properties, configuration and communication protocol (whether an app routes, directs or receives traffic/communications to/from other apps or properties) as well as determining mobile application and OTT specific traffic sourcing or extension arrangements.

Measurement organizations applying SIVT detection and filtration techniques must also consider mobile applications and OTT discretely in setting parameters or determining heuristics used should they represent a material portion of measured and filtered traffic. Mobile in-app and OTT SIVT specific considerations must include (but not be limited to) where known:

- Different/additional benchmarks or thresholds for sophisticated activity-based considerations for mobile application and OTT traffic.
- Consideration of known app and OTT behaviors that may be indicative of SIVT.
- Environments where IVT and measurement detection assets (such as JavaScript, Flash or cookies) or other techniques deployed in desktop/mobile web environments do not function as discussed above where alternative assets and data points may be utilized.
- Presence of proxy traffic or routing artifacts that may obfuscate origination information or limit the granularity of data collected for purposes of IVT determination as discussed above and as a means to collect originating and more granular data (such as X-Forwarded-For data).
- Differentiation of parameters or heuristics by device such as:
 - Device type/operating system
 - Device status (stock/jail-broken) where known and applicable
- Differentiation of parameters or heuristics by app type/properties such as:
 - Communication protocols (whether an app routes, directs or receives traffic/communications to/from other apps or properties as discussed above)
 - Presence of multiple re-directs
 - Permissions
- Differentiation of parameters or heuristics by user such as:
 - Population or content of collected user information, or lack thereof
 - Inconsistent user parameters

Certain list-based and parameter-based detection (included within GIVT) may utilize or rely on industry lists or assets (such as those published by TAG). Some of these lists or assets may not fully contemplate, cover or be relevant to mobile in-application or OTT traffic if they are solely based on IP address and do not account for mobile and OTT proxy routing. As a result, measurement organizations are encouraged to evaluate any industry lists or assets used in GIVT detection and filtration for mobile in-app and OTT coverage and to apply incremental procedures that consider mobile applications and OTT discretely should they represent a

material portion of measured and filtered traffic. The MRC intends to continue to work with TAG and other applicable industry bodies to ensure mobile in-application traffic and OTT is considered in ongoing efforts and tools.

Further, vendors measuring application installs as a relevant in-app metric must take precautions regarding the quality of this metric given the ease to create and prevalence of invalid install traffic. Valid app installs must be tied to corresponding valid impressions and clicks directly measured and subject to unique identifiers. In addition, specific activity-based logic shall be applied to the relationship between impressions, clicks and installs including the time between them (short, illogical durations may be a signal of invalid activity) as well as to post-install activity (non-use or deinstallation may also be a signal of invalid activity). Invalid installs may be tied to generation of invalid impression and click activity through hidden ads, redirects and routed traffic and must be considered regardless of the reporting of app installs when measuring application activity.

Finally, Server-Side Ad Stitching or SSAI (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 infrastructure is common today to certain OTT environments (discussed in further detail below), but also is becoming increasingly prevalent in in-app and digital video ad serving.

In SSAI, 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. When an ad-stitching service 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 aspects of OTT and SSAI traffic may require further consideration with regard to invalid traffic filtration. Specifically, the potential disproportionate presence of proxy or data center 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. OTT measurement vendors should consider these aspects of OTT traffic when applying invalid traffic detection and filtration techniques to it and consider false positives as required (proxy and data center traffic must be known to be invalid in order to be filtered, otherwise it should be treated as unknown for IVT measurement).

4.2.3 Logged-In Environments

Some platforms or publishers may require registration/accounts and users to be logged-in in order to use and generate traffic on the platform. Account credentials and user information may be used to determine the validity of resulting user activity or may be purported to mitigate risk and obviate the need for certain detection and filtration procedures. Auditable empirical

support must be provided in these instances and back-end techniques and analysis described in this document are required to be considered. Use of account and user validation as a means for IVT detection must be disclosed and quantified. The type of account and whether this requires a subscription should also be considered when using account validation as an IVT control as these may indicate stronger signals of validity. Initial account validation must also be accompanied by ongoing and recurring validation. **Where used, an account-level approach to IVT must be supported through ongoing transactional level analyses and monitoring and validated account activity must be subject to ongoing back-end analysis.**

4.3 Removal of Internal “Unnatural” Activity

Measurement organizations shall have procedures to segregate all internally generated activity (that of the measurement organization and the organization under measurement) which does not represent legitimate advertising consumption or otherwise valid internet traffic – for example: software testing; tag testing by publisher, agencies and advertisers; corporate mandated transactions that may drive traffic unnaturally high, offline scanning or other contracted site governance techniques, etc. These activities are considered invalid traffic for advertising commerce purposes if material, but are allowed to be removed prior to impression counting (prior to invalid traffic measurement and reporting) with appropriate support.

Development and testing environments shall be logically segregated from or clearly distinguished in production environments as to not commingle test and production transactions. Such traffic may be excluded from impressions altogether with support and mechanism to do so (dedicated IPs/campaign IDs and contractual or other evidential support for the activity). Publishers should provide a mechanism to identify and segregate this traffic or otherwise declare it to measurement organizations as well as ad servers, as absence of these mechanisms precludes measurement organizations from doing so. Excluded test impressions may be separately reported (distinguished in some manner) to help reconcile and minimize discrepancies. See Section 6 for further details related to reporting of known and disclosed crawlers, bots, spiders and other site governance activities present for brand safety, contextual classification and other measurement purposes that are not separated from production, but may qualify for discrete GIVT reporting classification.

4.4 Relevant Policies

Measurement organizations shall have sufficient internal policies to guide the determination of legitimate versus invalid traffic, and in ambiguous situations a vetting and escalation procedure must be executed to lead to a final determination about traffic records. These decision protocols must be documented in sufficient detail to handle materially occurring cases, and concepts must be documented to help guide unusual conditions. Traffic quality determinations shall be guided by industry guidance, internal guidance and traffic quality officer functions using authority granted by management.

Measurement organizations shall have specific procedures for the capture of exclude lists (as specified by customers or experience) and the confidentiality of these lists as well as list updating procedures.

The materiality of invalid traffic discoveries must be evaluated on the basis of the traffic of impacted campaigns (individually), time, and customer relationships (i.e., how much historical invalid traffic has been encountered for customer entities and partner qualification procedures). Assessments shall be backward looking across historical data for the need to correct previously reported estimates, as well as the forward implications on current traffic yet to be reported. Material items (those in excess of 5% of campaign traffic and an absolute dollar amount where applicable and empirically supported) shall be disclosed to the parties involved in the advertising monetization – buyers and sellers – by the measurement organization.

All communications must be conducted with sensitivity to the risk of reverse engineering that could potentially result. Decisions to forgo communication by measurement services must be supported by auditable evidence of such risk. Furthermore, if measurement services do forgo certain of these communications because of supportable concerns over reverse engineering risks, they are strongly encouraged to offer in person inspection or other alternative secured mechanisms to subscribers to allow for review and reconciliation of results.

4.4.1 Discrepancy Resolution

While the GIVT aspects were defined and designed to be routinized and systematic, vendors are also encouraged to apply SIVT, which may also lead to discrepancies in filtered and reported traffic for the same content or pages. While the required reporting funnel of GIVT and SIVT will help users quantify the impact of these techniques, leading to greater transparency than was formerly present, the assets and techniques used may vary (and SIVT filtration may not converge as closely as viewability measurement).

For purposes of this document and this discrepancy resolution process, significant or material discrepancies are generally considered to be greater than 5% of the affected metric. Additionally, relative materiality thresholds may be used in conjunction with absolute dollar values to further reduce instances of classifying statistically insignificant matters as material.

1. Informal Procedures:

The nature of the parties included in this process (whether they are contractually bound or have client relationships) will likely influence the level of communication that takes place. However, parties affected (buyers and sellers) by IVT measurement are strongly encouraged to supply related information prior to campaign initiation and to informally engage in early (suggested first 20% of campaign) communication of initial performance.

Initial communication prior to a campaign is more likely between buyers and sellers where a direct relationship exists, but shall include details related to the measurement organizations utilized. Once a campaign commences, this communication may include

one or more measurement organizations as necessary. Similar to guidelines covering the conduct of ad verification, early review of campaign results is strongly encouraged by all parties. Likewise, early communication of significant findings or discrepancies by buyers or sellers as well as contracted measurement organizations is encouraged. Early identification and communication minimizes potentially material conflicts among parties since timely correction can be made, assuming parties are acting in good faith. Communications regarding IVT using consistent language is encouraged including utilizing the TAG Taxonomy designed to assist with this purpose.

Measurement processes shall be transparent to customers and seller organizations, in that both know the general criteria being used for evaluation including the metrics being used and expected discrepancy resolution procedures as detailed below (details of specific proprietary methods may be excluded). Seller organizations shall be provided with a clear process to report inaccuracies, false positives or general discrepancies to the measurement organization (see step 2 below for further details). The notification of issues to the seller organizations shall occur as per the contractual terms between the buyer and seller.

Notification of discrepancies to non-customer parties subject to measurement by an accredited vendor may require customer permission or may in fact be executed by the customer, but in all cases the measurement organization must have follow-up procedures to enable full communication to take place, or if not, adequate reasoning for perpetuating discrepancy situations. The measurement organization is encouraged to maintain a process and registry of significant discrepancy types for measured campaigns, which shall be appended for known causes, vendor partner comments and resolution.

Our expectation is that these informal procedures will resolve the vast majority of discrepancies. Only when these informal means do not result in agreement should parties proceed to steps 2 and beyond. When it appears likely that these subsequent steps will be required, entities must strive to retain the data necessary to conduct formalized discrepancy resolution.

2. Formal Discrepancy Resolution Request:

Should informal resolution disclosures and discussions not satisfy one or more affected parties, an affected entity (buyer or seller) may lodge a formal request for discrepancy resolution via a standard template email to other party and measurement organization(s).

Accredited measurement organizations must provide disclosures instructing non-customer parties how to contact the appropriate personnel to lodge a formal request for discrepancy resolution. Customers must be provided similar information through methodological or contractual disclosures. Measurement organizations shall ensure that

personnel are assigned to receive and respond to these inquiries and are encouraged to maintain a structure that escalates these requests to the appropriate personnel where necessary.

Formal request materials may include, but are not limited to:

- a. A request template with required information detailed below including name of entity and property, specific discrepancies noted and specific campaign details including domain and site, time, format, metrics in question, etc.
- b. Detailed reference point for discrepancy (internal measurement, third party vendors, etc.). NOTE: There will be limited visibility into the methodology of unaccredited or unaudited reference point sources. These procedures apply to discrepancies between audited and accredited measurement sources only.
- c. The initial request must include the following fields of data for the campaign/site and period in question where applicable to the discrepancy (requestor must provide/attach reference data with these fields as part of request where applicable; log-level data granular to the impression is suggested where able to be provided and subject to reverse engineering protections):

Advertiser name & ID
Campaign name & ID
Creative type and dimensions
Date range

Variables:

Campaign total
Placement Dimensions and Format
Desktop/Mobile web/Mobile app Segregated
Domain/URL name
Placement name & ID
Device type
OS
Browser, frame type
Timestamps

Metrics:

Total analyzed impressions
Measurable impressions
Filtered/blocked impressions separated into:
General IVT
Sophisticated IVT
Blocked impressions (ad verification)

Measurement methodology (tag and collection types)

A short description why impressions were filtered/blocked: e.g. according to bot list, suspicious user activity, keyword or content exclusion list

- d. Involved parties shall set mutually agreed upon expectations for timing of vendor response to request (vendors are encouraged to develop response SLAs depending on expected volume). Vendors may choose not to engage in the reconciliation process (which must be documented internally with cause), in which case skip to step 4.

3. Formal Discrepancy Resolution Procedures:

Vendors shall maintain a formal process for requestor and vendor to engage in reconciliation and review of supplied data. This must be directly between the involved parties (in person or meeting/call of some kind) where possible and with customer agreement. It may not be necessary or feasible to have all involved parties (including involved vendors) meet simultaneously, but a communication mechanism summarizing separate meetings for all parties must be maintained.

- a. Parties must respond and propose a reasonable SLA for response and resolution (mutually agreed timeline for evaluation and response; suggested 30 days).
 - b. Initial response shall include action items and milestones.
 - c. Prior to data exchange, measurement organizations shall conduct a measurement (or tag) review to ensure that ads and sites in question are properly instrumented. If errors in measurement instrumentation are discovered, measurement organizations must follow their existing client notification and data reissuance policies.
 - d. Involved parties must discuss outcome categories including agreement with no changes/disclosure, agreement with changes/disclosure (differing levels of disclosure to protect reverse engineering for IVT) and disagreement (step 4).
 - e. Agreement with methodological changes that require restatement or disclosure may involve vendor auditors.
 - f. If in the parties' judgment there are aspects of the ultimate resolution steps that may impact standards, parties are encouraged to involve MRC for educational purposes. If resolution reveals noncompliance with measurement requirements, MRC shall be directly informed.
4. In the event of a continued disagreement in step 3, the discrepancy discussion could be escalated to a third party, generally MRC. Affected parties may agree not to pursue this course of action and such agreement should be mutual and documented by accredited measurement organizations involved. The objective of MRC involvement will be to determine whether the source of discrepancy is derived from noncompliance or incongruence with IVT requirements. This is a non-binding and voluntary process.
- a. If this course is taken, the third party (in this case MRC) will review the request and provided data from previous steps.

- b. The third party will engage in a three-way discussion including party (and applicable vendor) lodging request and party (and applicable vendor) subject to the request. This discussion may take place between two parties at a time if requested, but allow reconciliation between all three parties at some point.
- c. If this three-way discussion and review results in resolution or agreement between parties, the process reverts to the disclosure process discussed in step 3 to close the issue.
- d. If disagreement persists and the discrepancy related to any noncompliant treatment, MRC may suggest a solution and/or possible involvement of vendor auditor to review provided data and conduct testing with the objective to reach agreement and resultant disclosure if applicable.

4.5 Requirement for Backward-Looking Assessments and Correction

When new types of invalid traffic are discovered or otherwise overlooked invalid activity are identified by a measurement organization (and result in IVT procedural or filtration changes), these standards require a backward-looking analysis to ensure previously processed and reported ad campaign data was not materially impacted. This is required only if historical data is available to perform such an analysis (new data or signal was collected and available during the analysis period). If material omissions or errors are identified in previously reported ad campaign data, the measurement organization has a responsibility to inform customer users of the data considering reverse engineering concerns discussed throughout this document, including both buyer and seller organizations. The following are the general requirements of backward-looking analyses:

- Consider the frequency of reporting – long-term campaigns that execute over several months should be evaluated over the period of the campaign. Shorter campaigns only require evaluation over the applicable shorter campaign period.
- This period is not required to exceed 14 days but can be longer based on the measurement service's customer service terms or the campaign period.
- If a customer waives the requirement for backward-looking assessments formally in campaign terms and conditions, this requirement can be ignored; such a waiver must be an exception from normal Terms and Conditions, rather than a standard inclusion.

A backward-looking assessment from the discovery date of IVT (discovery date is defined by MRC as the date a measurement organization has identified and determined all the parameters required for a new filter) is required for situations of invalid traffic that are identified as requiring filtration. The discovery date may occur subsequent to the first identification of potential IVT traffic, and if so, these Standards require the backward-looking assessment to include at least the 14 days prior to the discovery date (as well as consideration whether a longer period should be analyzed based on the length of the campaign). MRC will consider alternate time periods or approaches with support on a case by case basis.

4.6 Communication Functions

A previous section of this addendum identified internal and external communication functions. Each measurement organization shall have appropriate procedures to administer these functions as well as the pre-identified communication mechanisms and processes. GIVT, where material, shall be communicated with sufficient supporting information, which may include -UA Strings, IP Addresses, and the Proxy Servers involved as well as new or emerging GIVT detection techniques and evidence to support the invalid determination. Detection technique information will be strictly protected by the staff of the MRC but may be generalized and shared among other auditing organizations and/or accredited/certified measurement organizations.

5 General Methodology Disclosures

Measurement organizations are required to take care to not disclose information that would allow reverse engineering of detection processes or avoidance by perpetrators. However, this information protection does not absolve the measurement organization from the need to disclose and provide comfort as to the nature and sufficiency of internal controls as well as ensure business partners understand that procedures are applied in compliance with measurement guidelines. The following invalid traffic processes require description in disclosures of methodology:

- GIVT Process Description
- Presence of SIVT Processes, with a High-Level Description
- Frequency of Processes; Granularity – Impression Level Preferred (see discussion regarding sampling above)
- Updating Processes
- Traffic Acquisition Processes Employed and Approximate Volume
- Partner Qualification Controls
- Nature and Scope of Process and Transaction Auditing Exercised
 - Internal and External

Measurement organizations shall have published error correction and reissue criteria, which are objective in nature and prescribed so as to drive consistency of application.

Material Business Partner relationships (an organization that is part of capturing traffic or enriching traffic measurement and/or an organization originating the terms and conditions of the campaign that outsources these transactional chain functions), especially when they impact traffic processing either downstream or upstream, must be disclosed to the extent possible. Additionally, measurement organizations must have the ability to report information related to IVT traffic sources to those traffic sources when deemed appropriate by the measurement organization management and their business partners.

6 Reporting Metrics Associated with Invalid Traffic Functions

Measurement organizations shall report the nature and volume of GIVT detected for the purposes of reconciling to served impression counts and to ensure a full accounting for all impressions, whether monetized or not. *(Since GIVT detection and removal are required for all measurement organization, the disclosure of these invalid counts and net resulting valid impressions enable a comparison between measurement organizations.)* This type of reporting helps bring confidence to users of data on the application of detection procedures and the removal of problematic transactions. [See reporting-only exception for panel measurement products in the Overview section above.]

SIVT volumes must be segregated and reported at the time of reporting campaign totals in aggregated periodic reporting (so as to protect from reverse engineering). Additionally, we strongly recommend that SIVT is removed from processes that enrich/attribute transactions for monetization purposes, including when such IVT inflates engagement metrics. [See reporting-only exception for panel measurement products in the Overview section above.]

The types of metrics that must be reported for production campaigns are as follows:

Overall Entity or Metric Level:

- Validation Indicator By Metric (MRC Accreditation or other Certification or None/Blank)

Specifics for Campaign Reporting – Always Present; Actual Report Headings in Quotations:

- “Gross Metrics (Completely Unfiltered)”
- “Net Metrics (Filtered for GIVT Requirements)” ; this would be inclusive of known SIVT where applicable
- IF APPLICABLE TO THE CAMPAIGN OR MEASUREMENT ORGANIZATION – “Total Net Metrics for the Campaign (Filtered for SIVT Requirements)” *(segregated incrementally from the prior total net metrics filtered for General IVT)* Similarly at the Placement level, if required by Terms and Conditions.

Downstream Reporting (Strongly Recommended Whenever Feasible):

- Various Un-enriched/Un-attributed Transaction Data – As flows through monetization process (Filtered for SIVT Requirements)

Specifics for Campaign Reporting – Available Upon Request to Assist in Reconciliation Procedures:

- Disclose Placement URL to Buyer, Where Applicable
- Reporting Period, including time zone

Note 1: If a measurement organization is unable to separate GIVT and SIVT in their reporting of valid impressions, as described above, or if measurement organizations decide to forgo this segregation due to the risk of reverse engineering (which must be on an exception basis and

supported by auditable evidence of such risk) the organization shall be prepared to otherwise estimate the relative proportion of these techniques in a more generalized manner. Again, these separations were intended to enable a comparison between measurement organizations on a common basis, which remains a valid objective by users.

Note 2: The availability of placement URL information for a campaign (used for reconciliation purposes) is generally for a limited time, due to data size. Unless contractually modified/extended, this data can be made available for seven (7) days from the transaction date, which emphasizes the need for timely campaign stewardship and monitoring by all parties. Measurement organizations are likely to choose to maintain data (section 3.2) for longer periods than 7 days, in accordance with record retention policies.

Note 3: If a measurement organization uses up-front blocking or identifies invalid traffic concurrent with ad-serving as part of its overall GIVT and/or SIVT procedures (so there is a possibility this traffic would not be included in “Gross” metrics above) this practice must be known to measurement data users. We require that the impact of blocking or other exclusions that results from these practices be quantified and disclosed and if not included in Gross metrics, if material.

Appendix A contains an illustration showing metrics to be reported at the Gross, Net of General Filtration, and Net of General and Sophisticated Filtration levels. Downstream metrics such as viewability, engagement, audience and attribution (including conversions) should only be reported at the Net or Total Net levels where applicable (not Gross). Again, the *MRC Cross-Media Measurement Standards* have stipulated Cross-media measures that do not incorporate SIVT filtration may still be reported in addition to fully compliant metrics with proper labeling, segregated reporting and clear disclaimer (these would not be considered fully compliant with the requirements of the Cross-Media Audience Standard, but can be audited and accredited as long as fully compliant corresponding metrics are also reported and audited).

Some vendors may choose to separately report IVT categories by the techniques or threat models described throughout this document. However, these categories are often not mutually exclusive as invalid traffic is likely to be detected by or result from more than one category. As a result, precision and accuracy in reporting at this granular level is challenging, may involve judgment and may be inconsistent across vendors. While MRC does not preclude such reporting as it may be valuable to users and discrepancy resolution, MRC has historically not considered this granular reporting for accreditation as it is not specifically defined within this Standard. Some vendors may choose to separately report suspected IVT categories and not also include them in GIVT or SIVT filtration due to their unconfirmed nature. Again, this is not precluded, but to the extent this is a required IVT category, it shall either be included in IVT filtration where known, or otherwise treated as unknown and not included in the numerator of the decision rate discussed above.

However, MRC would make an exception and consider granular reporting of GIVT only due to known crawlers, bots, spiders and other site governance activities present and allowed for

purposes of brand safety, contextual classification and other measurement purposes. Such reporting is encouraged to distinguish GIVT that is expected and should not reflect negatively on a publisher source.

Human Labelling (previously part of interim guidance)

Vendors adopting only GIVT provisions by definition will be applying incomplete filtration (exclusive of SIVT) and as a result, will provide incomplete assurance that traffic is human. Even those vendors that apply SIVT provisions will be subject to materiality, error and potential incompleteness due to timing related to new or emerging IVT considerations as well as a certain level of undetermined, un-measurable or unclassified traffic. Moreover, SIVT provisions alone do not include techniques to verify presence of a user, verification of audience or assurance that a human is present when measurement takes place. Finally, IVT may include illegitimate human activity (such as incentivized manipulation of measurements) so therefore human traffic may not be completely valid.

Invalid Traffic is defined generally as traffic that does not meet certain ad serving quality or completeness criteria, or otherwise does not represent legitimate ad traffic that shall be included in measurement counts. Among the reasons why ad traffic may be deemed invalid is it is a result of non-human traffic (spiders, bots, etc.), but also other activity designed to produce fraudulent traffic. These Standards strengthen existing invalid traffic filtration and removal guidance in several important ways, but compliance with them does not guarantee (or require) absolute assurance that traffic is human.

For these reasons, the MRC does not believe the labeling of traffic net of filtration as “human” to be appropriate or accurate and does not consider such labeling compliant with the IVT Standards. Alternative wording and labeling from what is discussed above (Gross, Net and Total Net) and required in the Standards (other than “human”, such as “valid”) is subject to MRC approval on a case-by-case basis.

7 SIVT Detection and Filtration

As noted above, measurement organizations must apply GIVT detection processes. However, the application of SIVT detection procedures is not required, but is strongly encouraged, therefore some vendors may not apply these advanced techniques (and they are required in some instances discussed earlier in this document).

GIVT techniques shall be removed from reported counts by all measurement organizations; however, if a measurement organization applies SIVT techniques the existence of these processes shall be disclosed (with appropriate down-stream reporting as specified earlier herein). In certain cases duplication or overlap in IVT detection may occur between General and Sophisticated techniques – these overlapping IVT transactions must be considered GIVT items, wherever possible.

A measurement organization's application of GIVT techniques will be verified as part of accrediting or certifying the metrics it chooses to submit to audit, i.e., no separate accreditation or certification of GIVT techniques will be made.

SIVT detection methods are extremely proprietary and are not specified in detail within this addendum. However, the MRC will retain information about these methodologies and will undertake validation of these methodologies in separate special-purpose examinations. These SIVT detection methods can be accredited, assuming they can be verified, described in an understandable manner without damaging the ability for these methods to be effective (i.e., descriptions can be general enough to prevent manipulation to avoid detection), and the overall effectiveness and coverage can be established.

All measurement organizations that report metrics and that submit for accreditation or certification under IAB or MRC measurement guidelines must comply with the GIVT requirements in this document, and they are encouraged to apply SIVT detection techniques. As previously noted, SIVT detection methods can be validated but they are not described herein. Measurement organizations that apply SIVT detection processes are strongly encouraged to seek accreditation/certification of these processes due to the implications of these processes on reporting accuracy. In most cases, since Sophisticated Invalid Filtration measurement organizations also apply General processes and in some cases are already subject to audit for existing measurement products, these examinations can be conducted simultaneously for efficiency purposes.

8 Participating Organizations

Participating Working Group Organizations:

4As	EY	Meetrics
ABC	Facebook	Meredith
ACA	Federated Media	Method MI
Adloox	Financial Times	Microsoft
Alliance for Audited Media	Flashtalking	NASCAR Digital Media
Amazon Advertising	Forensiq	New York Times
Amazon-Lab126	FreeWheel	News Corp NewsIQ
BabyCenter	Gateway Blend	Nielsen
BPA	General Motors	Nucleus
Canoe Ventures	Google	Oracle/Moat
Cars.com	GroundTruth	P&G
CBS Interactive	GroupM	Pandora
Centro	Havas Media	PGA TOUR Digital
Cheq	Homes	Pixalate
CMAC	Horizon Media	Protected Media

Comscore	Hulu	RRC
Consultant	IAB	Sizmek
Conversant	IAB Canada	Spectrum
Daily Beast	IBM Watson	Sylo
Deloitte & Touche	Impact	TAG
Digital Content Next	Inc. & FastCompany (Manseuto)	TechTarget
Discovery	Initiative	Triton Digital
DoubleVerify	Integral Ad Science	Turner
Edmunds.com	Manta	Verizon Media
Elsevier	Mantis Ad Network	White Ops
Evite	MediaMath	
Extreme Reach	Mediaoptimise	

9 Contact Information In Case of Questions or Issues

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10 Appendix A - Illustrative Reported Metrics by IVT Filtration Level

Viewable Impression Specimen Report MRC IVT Detection & Filtration Addendum

The following chart illustrates the metrics that should be reported by the various levels of IVT filtration - Gross (Unfiltered), Net of General IVT, and Net of General and Sophisticated IVT. The metrics can be reported by measurement segment, i.e., by campaign, placement, section/page, creative, creative type, geography, device type, etc., as required by the applicable terms and conditions of the transactions.

		Gross Metrics (Unfiltered)													
		Delivered Impressions	Clicks												
Gross Metrics (unfiltered)															
- These would include the total number of Rendered compliant impressions, and Clicks, prior to the application of filtration, in order to provide comparability and transparency among vendor(s) at the most basic level to determine if the population of impressions and clicks being measured align, prior to 'any further processing. This is required for all vendors.															
		Net Metrics (Filtered for General IVT)													
Delivered Impressions	Clicks	Viewable Impression Metrics				Viewable Impression Distribution				Other Metrics reported by the vendor...					
		Viewable Impressions	Non-Viewable*	Unmeasured Impressions*	Viewable Rate (%)*	Measured Rate (%)*	Viewable (%)*	Non-viewable (%)*	Unmeasured (%)*	Unique Cookies*	Frequency*	Other metrics...*			
Net Metrics (Filtered for General IVT)															
- These would include the application of General IVT filtration for Delivered (Rendered Compliant) Impressions, and Clicks, with the addition of Viewable Impressions for all vendors (including those that apply Sophisticated techniques); but the remainder of required Viewability metrics, and any other presentations of the data such as reach, frequency, quartiles, interactions, etc. (denoted with *) for those vendors that only apply General Filtration. The purpose is to provide a second comparison point based on General IVT filtration methods to allow for cross-vendor alignment prior to the application of vendor-specific Sophisticated IVT, which may have a higher likelihood of creating differences in the final reported metrics. If Sophisticated vendors are unable to separate General and Sophisticated Invalid Traffic in their reporting of valid impressions, they may otherwise estimate the relative proportion of these techniques in a more generalized manner with proper disclosure.															
		Total Net Metrics (Filtered for General and Sophisticated IVT)													
Delivered Impressions	Clicks	Viewable Impression Metrics				Viewable Impression Distribution				Other Metrics reported by the vendor...					
		Viewable Impressions	Non-Viewable	Unmeasured Impressions	Viewable Rate (%)	Measured Rate (%)	Viewable (%)	Non-viewable (%)	Unmeasured (%)	Unique Cookies	Frequency	Demo Group (1)	Demo Group (2)	Demo Group (n)	Attribution /ROI
Total Net Metrics (filtered for any and all IVT); Applies Only to Sophisticated Vendors															
- This represents the Sophisticated vendor's "last/best" metrics, reflecting the results of all filtration techniques, data quality techniques, and adherence to all requirements across all applicable Standards and Guidelines. It is at this level that all remaining metrics (beyond the "building block" metrics of Delivered Impressions, Clicks and Viewable Impressions, which are required as noted in the two initial data presentations above are required) reported by the vendor applying Sophisticated techniques across the Service, would be reported to users in Dashboards, UIs, APIs, exports, or through other means.															

Note: Downstream metrics such as viewability, engagement, audience and attribution should only be reported at the Net or Total Net levels where applicable (not Gross).

11 Appendix B – Change Log

The following represents a summary of material changes to these Updated Standards from the initial release October 31, 2015. They are summarized with appropriate page and section references for ease of understanding and compliance.

Section	Subject	Change Detail	Page #
1.1.2	Invalid placements	Added 0x0 and 1x1 as new GIVT required area.	5
1.1.2	Non-rendering	Added non-rendering capabilities as new GIVT required area.	6
1.1.2	SIVT Details	Added specific SIVT areas previously required.	6-7
1.1.2, 2.4	Audience and Attribution SIVT	Formalized requirement for SIVT in Audience and Attribution.	8, 15
1.1.2	Non-advertising data	Added consideration of applicability of certain GIVT and SIVT categories on non-advertising data.	9
1.1.4	Data center traffic	Added and updated previous interim guidance on data center traffic requirements.	9-10
2	Risk assessments	Added specific requirements on risk assessment by platform and relevant traffic segment as well as linkage to controls.	11
2.1.1.b	Business partners	Added clarification on business partner types.	12-13
2.4.1	Decision rate	Added requirement to disclose decision rate along with definitions, calculations and requirements for supporting partial detection decisions.	16-17
ß3.2	General data analysis	Added details and clarification related to general data analysis and added considerations of data collection restrictions and privacy requirements.	18-20
3.2.1	Sampling	Added and updated previous interim guidance on IVT sampling requirements and disclosures.	20-22
3.4	BPQ	Added further details and requirements by partner type for business partner qualification.	23-26
4.1.2	Acquired/Purchased Traffic	Added requirements for treating and disclosing levels of purchased and acquired traffic.	29-32
4.1.3	Machine Learning and Human Intervention	Formalized requirements, previously enforced under MRC Brand Safety Addendum for use of Machine Learning and Human Intervention in IVT.	32-33
4.2.1	Up-Front Techniques	Added and updated previous interim guidance on up-front filtration requirements.	36-37
4.2.2	Mobile in-app and OTT	Added and updated previous interim guidance on mobile in-app requirements and added OTT considerations.	37-40
4.2.3	Logged-in environments	Added guidance and requirements for logged-in and subscription based environments.	40

Section	Subject	Change Detail	Page #
4.3	Internal traffic	Added allowance for holding test traffic and site governance activities out of IVT as internal activity.	41
4.4.1	Discrepancy resolution	Added detailed IVT discrepancy resolution procedures and requirements.	42-46
6	Reporting	Added more reporting detail and clarification of requirements.	48-49
6	Reporting	Formalized previous requirement to disclose and quantify impact of up-front techniques.	49
6	Reporting	Formally added prohibition of separate IVT category accreditation with exception for site governance activities.	49
6	Reporting	Added previous interim guidance on human labelling.	50