Interactive Advertising Bureau Technology Laboratory
Media Rating Council

Desktop Display Impression Measurement Guidelines

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Background

Consistent and accurate measurement of Internet advertising is critical for acceptance of the Internet as a marketplace and is an important factor in the growth of Internet advertising spending.

This document establishes a detailed definition for ad-impressions, which is a critical component of Internet measurement and provides certain guidelines for Internet advertising sellers (herein referred to as "media companies" or "sites") and ad serving organizations (including third-party ad servers and organizations that serve their own ads) for establishing consistent and accurate measurements.

Additionally, this document is intended to provide information to users of Internet measurements on the origin of key metrics, a roadmap for evaluating the quality of procedures applied by media companies and/or ad serving organizations, and certain other definitions of Internet measurement metrics.

The definitions included in this document and the applicable project efforts resulted from requests from the American Association of Advertising Agencies (4A's) and other members of the buying community, who asked for establishment of consistent counting methods and definitions and for improvement in overall counting accuracy.

Definitions of terms used in this document can be found in the IAB's Glossary of Interactive Terms.

Modernizing Measurement Task Force

The IAB formed the MMTF (Modernizing Measurement Task Force) in 2015 to serve as an advisory body that is responsible for recommending prioritization and modernization of the MRC digital measurement guidelines. This group focuses on updating and maintaining guidelines that are led by the MRC with facilitation by the IAB Tech Lab and pertains to measurement guidelines that require third party and industry oversight such as this one.

All recommended updates will be presented to and reviewed by the MMTF as well as approved by the MRC.

MMTF Participants

Ad-iD	FOX Networks Group	OwnerIQ
Adform	FOX News Channel	Pandora
AdGear Technologies, Inc.	FreeWheel	Parsec Media
ADLOOX	Genesis Media	PGA TOUR
Admiral Adblock Publisher Solutions	Google	Pinterest
Adsiduous Media	Greentarget	Pixalate
ADVR	GroupM	Positive Mobile
Alliance for Audited Media (AAM)	Hanley Wood	PR Council
Annalect	Haymarket Media	PricewaterhouseCoopers
AppNexus	Hearst Magazines Digital Media	Publicis Media
Bank of America	Horizon Media	PubMatic
Bidtellect	Hotwire	Quantcast
BlogTalkRadio	Hulu	Reuters
BPA Worldwide	IAB Tech Lab	RhythmOne
Brightcove	IAB Canada	S4M
BrightRoll	Integral Ad Science	Snap, Inc.
Burson-Marsteller	IPONWEB Inc	StartApp

Burt	Jun Group	Tech Mpire
BuzzFeed	Leaf Group	TEGNA, Inc.
Cars.com	LifeScript	Teradata
CBS Interactive	Lithium | Klout	Terra Networks USA
Celtra	Lonely Planet	The Daily News
Complex Media	Magna Global	The Weather Company
comScore	Management Science Associates	Throtle
Conversant Media	Mansueto Ventures	Time Inc.
Current	Markit Digital	Tremor Video
Demand Media	Mashable	TripAdvisor
Denstu Aegis	Mbooth	Txt Signal
deviantART	MBWW	Univision
Digital First Media	Media Rating Council	Unruly
Disney Interactive	Medialets	V12 Group
Dominion Digital Media	Mediavest Spark	Verve
DoubleVerify	Merkle	Viacom
Edmunds.com	Merriam-Webster / Britannica	ViralGains
Emogi	Moat	Visible Measures
Enthusiast Network	Mobile Marketing Association (MMA)	Washington Post Digital
Ernst & Young	Moxie	Weber Shandwick
ESPN.com	National Public Media	WebMD
Extreme Reach	Nativo	Webspectator
eyeReturn Marketing	NBCUniversal	White Ops
Eyeview	Nielsen	Woven Digital
Flashtalking	NPR	xAD
Fleishman Hillard	NYIAX, Inc.	Yieldmo
Flite	Ooyala	Zenith Media
Foursquare	OpenX	
Jumpstart Automotive Media	Opera	

Contact Information

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Scope and Applicability

These guidelines are intended to cover on-line desktop browser or desktop based display Internet activity. These guidelines include Rich Media based advertising impressions (and replace the formerly separate IAB Rich Media Measurement Guidelines) in standard web applications including e-mail, static (e.g. HTML) and dynamic (e.g. ASP) web pages that may appear in ad formats such as banners and buttons as well as interstitials and various over-the-page units such as floating ads, page take-overs, and tear-backs.

Mobile, off-line cached media and Interactive-based television were not addressed in these guidelines due to differences in infrastructure and/or delivery method. See the IAB Mobile Web and In-App Measurement Guidelines under separate cover. Also, see the *IAB Digital Video Measurement Guidelines* for further guidance on measurement of video impressions.

This document is principally applicable to Internet media companies, ad-serving organizations as well as measurement vendors and is intended as a guide to accepted practice, as developed by the IAB, IAB Tech Lab, MRC and ARF. Additionally, planners and buyers can use this document to assist in determining the quality of measurements.

1.0 Measurement Definitions

The following presents the guidance for Ad Impression counting specifically applicable to Desktop Display ad measurement:

1.1 Ad Impressions

An Ad Impression across all display marketing channels is the measurement of responses from an ad delivery system to an ad request from the user's browser, which is filtered for invalid traffic and is recorded at a point as late as possible in the process of delivery of the creative material to the user's browser. The ad must be loaded and at minimum begin to render in order to count it as a valid ad impression. Measurement of begin to render should include logical components necessary to display the ad, but does not necessarily include logical elements that are not essential (such as other tracking elements).

In the context of the guidance above, “loaded” means the logical creative file has been transmitted and received at the client-side (user device) and “render” refers to the process of painting the creative file or adding it to any portion of the Document Object Model.

The original intent was to set impression requirements closest to actual opportunity to see by the user (see specifics below). However, since the original publication of these guidelines, the emergence of the viewable impression (as defined in the MRC Viewable Impression Measurement Guidelines) as a separate metric has satisfied this intent.

Ad impression measurement remains relevant at minimum as an input into viewability metrics (such as in the Measured Rate denominator) as well as a mechanism to quantify activity measured by organizations that might not be part of the advertising chain (such as non-ad-serving third-party measurement vendors).

1.2 Impression Measurement Approaches

Two methods are used to deliver ad content to the user – server-initiated and client-initiated. Server initiated ad-counting uses the site's web content server for making requests,

formatting and re-directing content. Client-initiated ad counting relies on the user's browser to perform these activities (in this case the term “client” refers to an Internet user’s browser).

This Guideline requires ad counting to use a client-initiated approach; server-initiated ad counting methods (the configuration in which impressions are counted at the same time the underlying page content is served also known as count on decision or count on insertion) are not acceptable for counting ad impressions because they are the furthest away from the user actually seeing the ad. However, pass-through methods of signaling interactions detected on the client side from server infrastructure are acceptable.

Rich Media Advertising is defined as advertisements with which users can interact (as opposed to solely animation) in a web page format and include creative types that require functionality not native to the browser itself to render. These advertisements can be used either singularly or in combination with various technologies, including but not limited to sound, video, or Flash, and with programming languages such as Java, JavaScript, and DHTML. Sight, sound and motion ads that can run natively, such as HTML5 creatives, are considered display ads and would be covered by the display requirements above.

In the Rich Media area, where advertising creative is more process-resource and bandwidth intensive for Internet users, servers and publishers, the number of redirects in the transaction stream can impact the accuracy of ad counting due to latency. All parties are encouraged to consider this latency when considering the structure of Rich Media serving arrangements.

2.0 Ad Measurement Guidelines

The following details are key components of the Guideline:

1. A valid ad impression may only be counted when an ad counter receives and responds to an HTTP request for a tracking asset from a client. The count must happen after the initiation of retrieval of underlying page content and only when ad content has been loaded and at minimum begins to render (see note on Tracked Ads below). Permissible implementation techniques include (but are not limited to) HTTP requests generated by <IMG>, <IFRAME>, or <SCRIPT SRC>. For client-side ad serving, the ad content itself could be treated as the tracking asset and the ad server itself could do the ad counting as long as counting does not occur until ad content has been loaded and at minimum begins to render.

   Note: There will necessarily be some slight differences among measurers in the precise moment when rendering is measured as a qualification for ad impressions. The requirements above mean that the ad content must have been loaded at the client-side and at minimum begin to render into the user interface or browser such that it can be at least partially visible (also referred to as ad injection or execution). Measurement of begin to render should include logical components necessary to display the ad, but does not necessarily include logical elements that are not essential (such as other tracking elements). It does not require any portion of the ad to be visible or displayed on screen. While technical limitations may preclude requiring measurement only after an ad has fully rendered, vendors not measuring fully rendered impressions are encouraged to periodically study and monitor differences between render initialization and completion.

   See Appendix A for examples of different but valid implementation options for impression counting. Only those examples where counting follows ad content delivery are acceptable client-initiated measurement approaches. Implementations in which counting precedes ad

content delivery are not acceptable for ad impression measurement.

2. The response by the ad counter includes but is not limited to:

    a. Delivery of a “beacon,” which may be defined as any piece of content designated as a tracking asset. Beacons will commonly be in the form of a 1x1 pixel image, but the Guideline does not apply any restrictions to the actual media-type or content-type employed by a beacon response;

    b. Delivery of a “302” redirect or HTML/JavaScript (which doubles as a tracking asset) to any location;

    c. Delivery of ad content; and

    d. Expandable Rich Media ads should be counted using the aforementioned techniques using the base impression as the benchmark (and using a client-initiated method). Further activity, such as expansion of the ad upon mouse-over, can be counted as part of other measured activity, but should be segregated from the original base ad impression count.

3. Measurement of any ad delivery may be accomplished by measuring the delivery of a tracking asset associated with the ad as long as counting does not occur until ad content has been loaded and at minimum begins to render. Over-the-page ads and transitional ads should be tagged such that the Rich Media provider should count the ad only when it is played.

4. If a browser or operating system is not Flash capable, the user has disabled Flash functionality, or in other cases where the browser is incapable of loading the original intended creative due to its Rich Media contents, the Rich Media advertisements are not loadable. In these cases, the Rich Media provider must make default creatives available for the serving process (non-Flash, backup/default creatives that do not require any external functionality to render). These default creative impressions should be counted; however, for reporting purposes, they must also be segregated from the Rich Media impressions (intended Rich Media impressions that were not delivered via Rich Media). Transitional or over-the-page ads do not require a default creative.

    The party hosting and serving Rich Media assets should offer the opportunity for other organizations in the transaction stream to track Rich Media versus default ad activity. Measurement organizations must track this information. Direct knowledge of which creative was served and rendered, and segregated reporting based on that are requirements of Rich media measurement.

    Certain Rich Media vendors allow the ability to insert ad delivery tracking information, from downstream publishers or ad-servers into their ad tags. This type of coordination, which facilitates consistency of counting procedures, is encouraged and acceptable under these Guidelines.

5. The ad counter must employ techniques to minimize the potential of caching impacting Ad Impression counting. See section 2 of this document entitled Caching Guidelines for further information.

Tracked Ads

A measurement vendor may elect to measure and report the number of ads where measurement was initiated. These ads (referred to herein as Tracked Ads; alternate labeling may apply) must adhere to the requirements above (including client-initiated counting and cache controls) except that they can be counted when a vendor's measurement assets have fully downloaded and initiated, but prior to ad content loading and rendering. This metric should not be labeled as an Ad Impression, without qualification, but will assist both buyers and sellers in addressing rendering issues (by providing a means to ascertain ads that do not render) and support the transparency needed by organizations that track ads whether they render or not such as organizations that might not be part of the advertising chain (e.g., non-ad-serving third-party measurement vendors). Such measurement and reporting is allowable under these guidelines with proper disclosure and reporting in conjunction with qualified Ad Impressions.

To foster consistency in measurement and among all the parties in the transaction stream (and similar to guidance in the IAB Click Measurement Guidelines), the development of periodic and detailed reporting using a unique identifier, a unique numeric or alphanumeric string associated with the transaction, is encouraged (although not required at this time). This unique identifier is intended to assist in investigation or auditing, and is not necessarily intended for use beyond these internal purposes. A unique identifier should be considered when measuring and reporting Tracked Ads along side Ad Impressions as well as other metrics outside this scope of this document (such as Ad Requests and Viewable Impressions) in order to foster a one-to-one relationship between these metrics.

2.1 Auto-Refresh

Auto-Refresh refers to the action of serving or changing advertising or content in an automatic manner. Auto-Refresh can be set directly by a user (user initiated) or set by a site without user interaction (site initiated).

Website content owners generally directly control the use of site initiated Auto-Refresh. External parties have significantly less ability to detect, measure and report on Auto-Refresh accurately, especially when using ad centric measurement approaches. As such, content owners or media seller organizations are encouraged to disclose the use of site initiated Auto-Refresh including parameters, settings and relative volumes or otherwise make this information available for use by measurement organizations (such as by being passed as part of data transmissions) consistent with the MRC Digital Advertising Measurement Technical and Transparency Best Practices (Appendix C).

Measurement organizations are required to collect and utilize site initiated Auto-Refresh information disclosed or passed by content owners or media seller organizations. Measurement organizations are encouraged to develop techniques to detect and estimate site initiated Auto-Refresh if not otherwise disclosed or passed.

To the extent known by measurement organizations, the presence of site initiated Auto-Refresh should be disclosed to users of measurement data including the parameters and settings surrounding Auto-Refresh. Further, site initiated Auto-Refresh should utilize reasonable rates for the associated content type (sports site, news site, stock tickers, etc.) and include segregated disclosure of the Auto-Refresh counts if they are material to total impressions by campaign. User initiated Auto-Refresh is counted as a normal advertising impression.

See the *IAB Digital Video Measurement Guidelines* for further discussion of measurement and reporting issues related to Auto-Refresh.

2.2 Pre-fetch / Pre-render

Pre-fetch refers to a request for and caching of Internet content by an application that occurs prior to, but in anticipation of, the request for the content by a user. Pre-rendering is a similar, but more aggressive technique, where actual page elements and even complete pages may be loaded in a browser prior to a user navigating to a page. Such requests (Pre-fetch and Pre-render) are generally made for the purpose of speeding content access (due to the in advance caching process) if and when the content is actually requested by the user.

As discussed throughout this document, a valid impression count must happen after the initiation of retrieval of underlying page content and only when ad content has been loaded and at minimum begins to render. As such, Pre-fetch and Pre-render requests do not qualify for measurement as a valid impression unless ad content has been loaded and at minimum begins to render in response to a request by a user.

Tracked Ads should still account for and exclude Pre-render situations to account for situations where a user did not navigate to a page.

Content owners or media seller organizations are encouraged to disclose the use of Pre-fetch and Pre-render requests (such as via self-announcing) consistent with the MRC Digital Advertising Measurement Technical and Transparency Best Practices (Appendix C). Measurement organization are encouraged to implement counting methodologies in such a way as to not subject the measurement events to being Pre-fetched or Pre-rendered to reduce or eliminate reliance on self-announcing.

Other Ad-Impression Considerations

Invalid Traffic Filtration guidelines are presented later in this document. Appropriate filtration of invalid Traffic is critical to accurate measurement of ad impressions.

Media companies and ad serving organizations should fully disclose their ad impression recording process to buyers and other users of the ad impression count data.

3.0 Caching Guidelines

In some cases an ad can be rendered from a device's cache, and there is a risk that the client or server will not record the Ad Impression. Advertising instances should be counted across all ad request activity, regardless of whether the advertising or application functionality has been stored in cache. Accordingly, if cache techniques can impact Ad Impression counting, cache-busting techniques should be employed and are required for all sites and ad-serving organizations. The following techniques are required:

1. The ad counter should employ standard (HTTP) headers on the response, in order to minimize the potential of caching a time-sensitive advertisement. These standard headers must include:
    - Expiry
    - Cache-Control
2. Unique String assignment techniques (such as random number or date/timestamp append

with sufficient granularity) to identify unique serving occurrences of pages/ads.

Publishers and ad serving organizations should fully disclose their cache busting techniques to buyers and other users of their data.

4.0 Filtration Guidelines

Filtration of site or ad-serving transactions to remove invalid activity is highly critical to accurate, consistent counting. All metrics subject to audit by MRC will be expected to comply with the MRC's Invalid Traffic and Filtration Guidelines Addendum. This includes impression metrics, which should be filtered for known General Invalid Traffic as required by those guidelines. Furthermore, application of Sophisticated Invalid Traffic detection processes is strongly encouraged for monetized traffic.

5.0 Auditing Guidelines

General – Third-party independent auditing is encouraged for all ad-serving applications used in the buying and selling process. This auditing is recommended to include both counting methods and processing/controls as follows:

1. Counting Methods: Independent verification of activity for a defined period. Counting method procedures generally include a basic process review and risk analysis to understand the measurement methods, analytical review, transaction authentication, validation of filtration procedures and measurement recalculations. Activity audits can be executed at the campaign level, verifying the activity associated with a specific ad creative being delivered for performance measurement purposes.

2. Processes/Controls: Examination of the internal controls surrounding the ad delivery, recording and measurement process. Process auditing includes examination of the adequacy of site or ad-server applied filtration techniques.

Although audit reports can be issued as infrequently as once per year, some audit testing should extend to more than one period during the year to assure internal controls are maintained. Audit reports should clearly state the periods covered by the underlying audit testing and the period covered by the resulting certification.

US Certification Recommendation – All ad-serving applications used in the buying and selling process are recommended to be certified as compliant with these guidelines at minimum annually. This recommendation is strongly supported by the 4A's and other members of the buying community, for consideration of measurements as "currency."

Special Auditing Guidance for Outsourced Ad-Serving Software

Ad serving organizations that market ad-serving/delivery software to publishers for use on the publisher's IT infrastructure (i.e. "outsourced") should consider the following additional guidance:

1. The standardized ad-serving software should be certified on a one-time basis at the ad-serving organization, and this certification is applied to each customer. This centralized certification is required at minimum annually.

2. Each customer's infrastructure (and any modifications that customer has made to the ad-serving software, if any) should be individually audited to assure continued functioning of the software and the presence of appropriate internal controls. Processes performed in the centralized certification applicable to the outsourced software are generally not re-performed. The assessment of customer internal controls (and modifications made to outsourced software, if any) is also recommended to be at minimum an annual procedure.

These certification procedures are only necessary for outsource clients who wish to present their measurements for use by buyers.

Special Auditing Guidance for Advertising Agencies or Other Buying Organizations

If buying organizations modify or otherwise manipulate measurements from certified publishers or ad-servers after receipt, auditing of these activities should be considered.

There are, in addition to MRC, a number of other certifiers and types and levels of certification are available to ad serving organizations.

International Certification Recommendation

The IAB Tech Lab, and MRC encourage non-U.S. measurers of activity to adopt the practices spelled out in these guidelines. While certification regimes may vary on a country-by-country basis, we encourage measurers to be audited for compliance annually by independent, third-party auditing organizations.

6.0 General Reporting Parameters

General reporting parameters (dayparts, weekparts, time zones, etc.) provide for consistency and comparability. These should be based on the logical application of information about the usage patterns of the medium.

In order to provide for more standardization in Internet Measurement reporting, the following general reporting parameters are recommended (although not explicitly required). Note that these are only several of the possible reporting parameters that may be used. If parameters in addition to these are reported, similar rules should be defined and applied

Day — 12:00 midnight to 12:00 midnight

Time Zone – Full disclosure of the time-zone used to produce the measurement report is required. It is preferable, although not a current compliance requirement, for certified publishers or ad-servers to have the ability to produce audience reports in a consistent time-zone so buyers can assess activity across measurement organizations. For US-based reports it is recommended that reports be available on the basis of the Eastern time-zone, for non US-based reports this is recommended to be GMT.

Week — Monday through Sunday

Weekparts — M-F, M-Sun, Sat, Sun, Sat-Sun

Month – Three reporting methods: (1) TV Broadcast month definition. In this definition, the Month begins on the Monday of the week containing the first full weekend of the month, (2) 4-week periods – (13 per year) consistent with media planning for other media, or (3) a calendar month. For

financial reporting purposes, a month is defined as a calendar month.

Additional Recommendation: Dayparts – Internet usage patterns need further analysis to determine effective and logical reporting day parts. We encourage standardization of this measurement parameter.

Location – If information about the geographic location of the users is collected and reported, any limitations to the methods used should be disclosed. Location measurement and disclosure should be consistent with MRC location-based advertising guidance where applicable.

7.0 Disclosure Guidance

Media companies and ad serving organizations should disclose their ad impression recording process to buyers and other users of the ad impression count data via a description of methodology and other supplemental materials. An organization's methodology for accumulating advertising measurements should be described to users of the data. Specifically, the nature of measurements, methods of sampling used (if applicable), data collection methods employed, data editing procedures or other types of data adjustment or projection, calculation explanations, reporting standards (if applicable), reliability of results (if applicable) and limitations of the data should be included in the disclosure.

The following presents examples of the types of information disclosed.

Nature of Mobile Advertising Measurements

- Name of Property, Domain, Site, Application (if applicable) Included in the Measurement
- Name of Measurement Report
- Type of Measurements Reported
    - Time Periods Included
    - Days Included
    - Basis for Measurement (including basis for determining ad rendering where applicable)
    - Geographic Areas
    - Significant Sub-Groupings of Data
        - Demographic categories
- Formats of Reported Data
- Special Promotions Impacting Measurements (where applicable)
- Nature of Auditing Applied and Directions to Access to Audit Report
- Sampling/Projections Used
    - Sampling Methods
    - Explanation of Projection Methods

Data Collection Methods Employed

- Method of Data Collection
    - Cache Busting Techniques Employed
    - Logging Method (including method(s) for determining that ad is loaded and at minimum begins to render prior to counting, or method/basis for click measurement)
    - Logging Frequency (frequency and batching parameters)
    - Logging Capture Point (place in measurement transaction)
    - SDK and API details and functionality (where applicable)
- Types of Data Collected

    - Contents of Log Files
- Procedures to Detect and Report Pre-fetch/Pre-render as well as Auto-Play/Auto-Refresh (where applicable)
- Contacts with Users (if applicable)
- Research on Accuracy of Basic Data
    - Latency Estimates
- Rate of Response (if applicable)

Editing or Data Adjustment Procedures

- Checking Records for Completeness
- Consistency Checks
- Accuracy Checks
- Rules for Handling Inconsistencies
- Circumstances for Discarding Data
- Filtration Procedures (considering IVT Addendum controls over protecting IVT techniques)
- Handling of Partial Data Records
    - Ascription Procedures (if used or applicable)

Computation of Reported Results

- Description of How Estimates are Calculated
    - Illustrations are desirable
- Weighting Techniques (if applicable)
- Verification or Quality Control Checks in Data Processing Operations
- Pre-Release Quality Controls
- Reprocessing or Error Correction Rules

Reporting Standards (if applicable)

- Requirements for Inclusion in Reports, Based on Minimum Activity Levels

Reliability of Results

- Sampling Error (if applicable)

Data retention rules (to make customers aware of the data retained in case of reprocessing)

- Maintaining sufficient data or processes that allow for audit trail

Limitations on Data Use

- Non-sampling Error
- Errors or Unusual Conditions Noted in Reporting Period
- Limitations of Measurements

8.0 Conclusion

This document represents the combined effort of the MMTF, the project participants, and MRC to bring consistency and increased accuracy to Internet measurements. We encourage adoption of these guidelines by all organizations that measure Internet activity and wish to have their measurements included for consideration by buyers.

9.0 Who We Are

Interactive Advertising Bureau (IAB)

The Interactive Advertising Bureau (IAB) empowers the media and marketing industries to thrive in the digital economy. Its membership is comprised of more than 650 leading media and technology companies that are responsible for selling, delivering, and optimizing digital advertising or marketing campaigns. The trade group fields critical research on interactive advertising, while also educating brands, agencies, and the wider business community on the importance of digital marketing. In affiliation with the IAB Tech Lab, it develops technical standards and best practices. IAB and the IAB Education Foundation are committed to professional development and elevating the knowledge, skills, expertise, and diversity of the workforce across the industry. Through the work of its public policy office in Washington, D.C., IAB advocates for its members and promotes the value of the interactive advertising industry to legislators and policymakers. Founded in 1996, the IAB is headquartered in New York City and has a San Francisco office.

Interactive Advertising Bureau Technology Laboratory (IAB Tech Lab)

The IAB Technology Laboratory is an independent, international, nonprofit research and development consortium charged with producing and helping companies implement global industry technical standards. Comprised of digital publishers and ad technology firms, as well as marketers, agencies, and other companies with interests in the interactive marketing arena, the IAB Tech Lab's goal is to reduce friction associated with the digital advertising and marketing supply chain, while contributing to the safe and secure growth of the industry. The organization's governing member companies include AppNexus, Extreme Reach, Google, GroupM, Hearst Magazines Digital Media, Integral Ad Science, LinkedIn, Moat, Pandora, PubMatic, Sonobi, Tremor Video, and Yahoo! JAPAN. Established in 2014, the IAB Tech Lab is headquartered in New York City with an office in San Francisco.

Media Rating Council (MRC)

The Media Rating Council is a non-profit industry association established in 1963 comprised of leading television, radio, print and digital media companies, as well as advertisers, advertising agencies and trade associations, whose goal is to ensure measurement services that are valid, reliable and effective. Measurement services desiring MRC accreditation are required to disclose to their customers all methodological aspects of their service; comply with the MRC Minimum Standards for Media Rating Research as well as other applicable industry measurement guidelines; and submit to MRC-designed audits to authenticate and illuminate their procedures. In addition, the MRC membership actively pursues research issues they consider priorities in an effort to improve the quality of research in the marketplace. Currently approximately 110 research products are audited by the MRC. Additional information about MRC can be found at www.mediaratingcouncil.org.

APPENDIX A

Figures – Different but Valid Implementation Options for Impressions

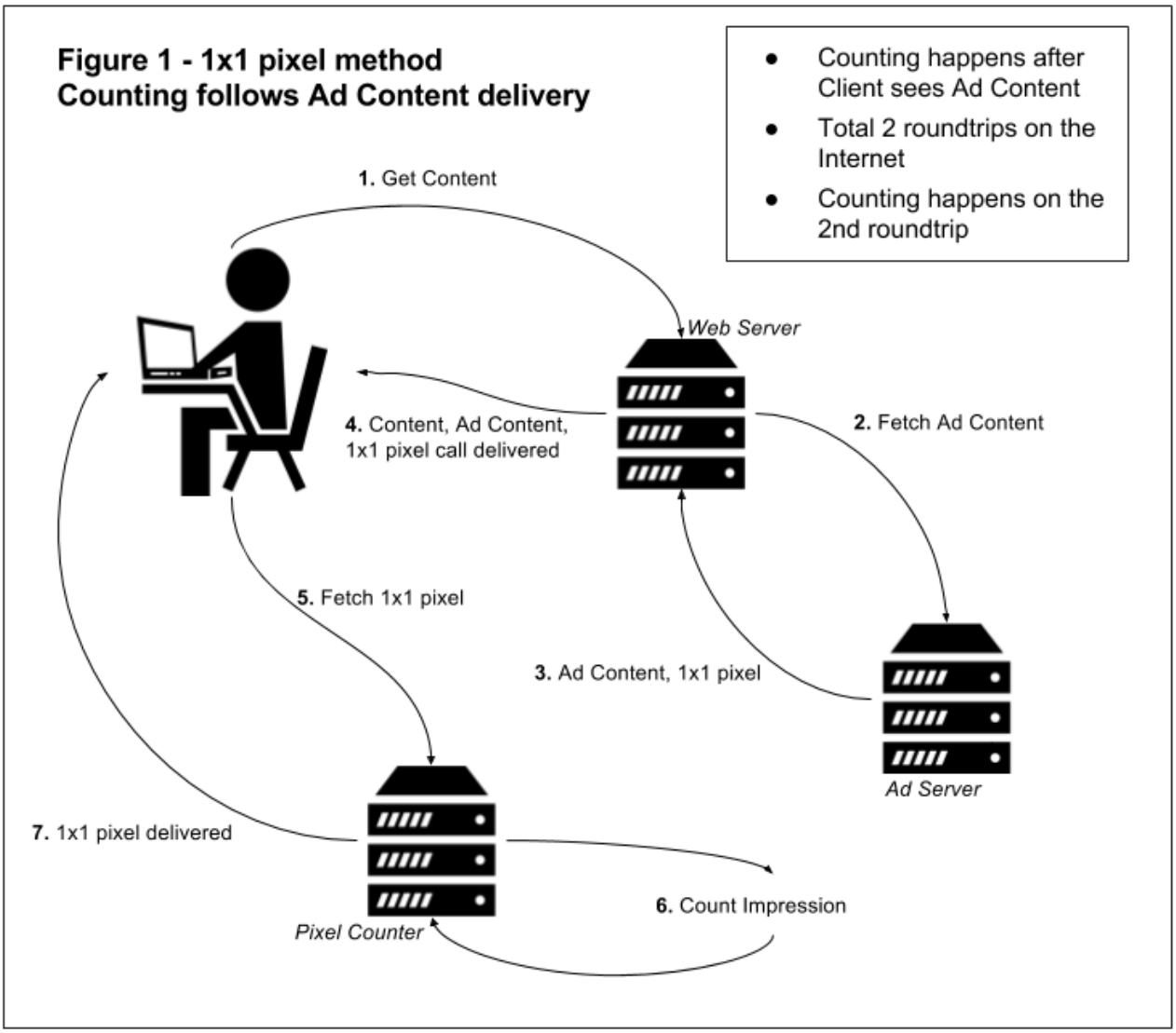


Figure 2 - 1x1 pixel, followed by 302
Counting follows Ad Content delivery

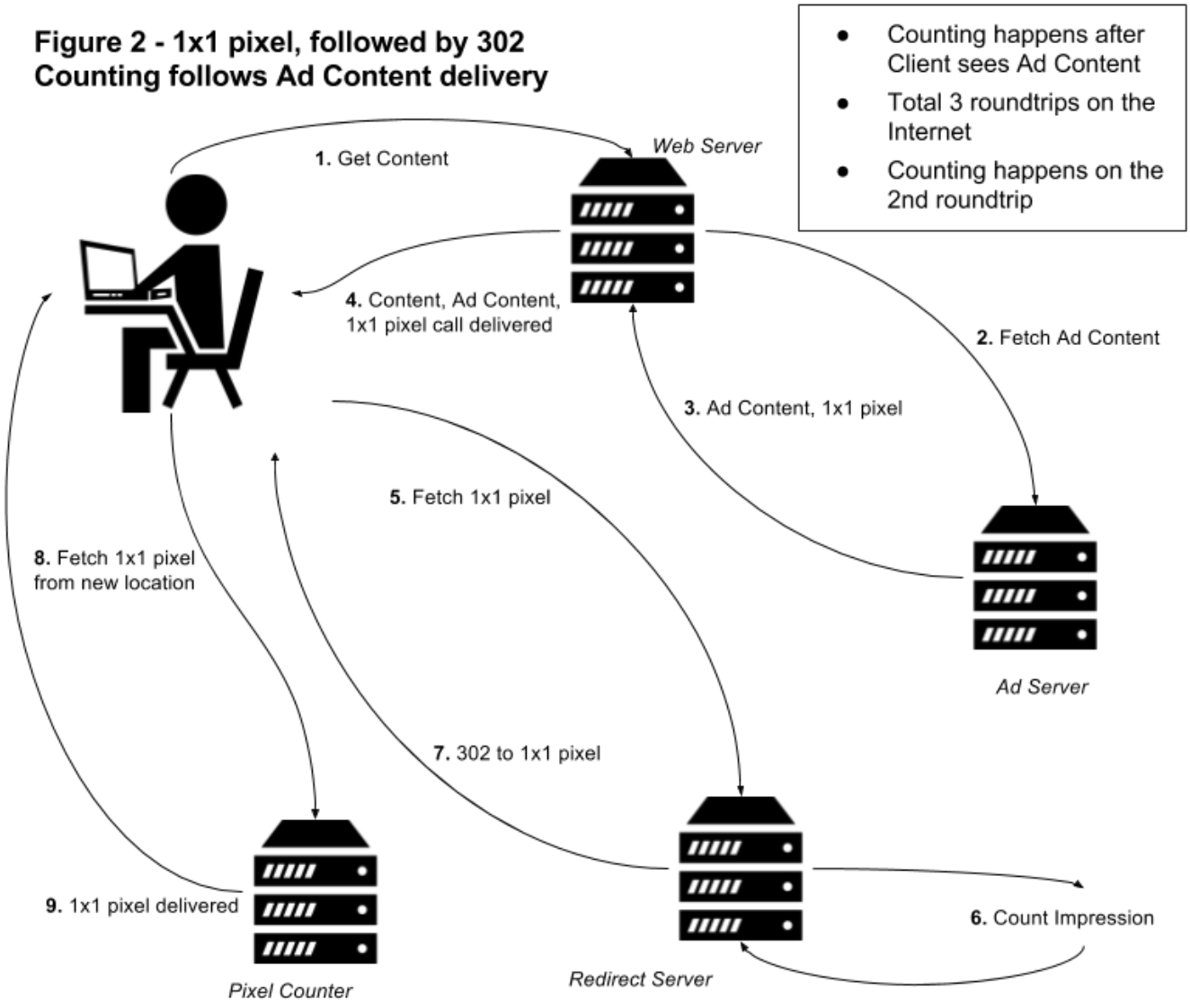
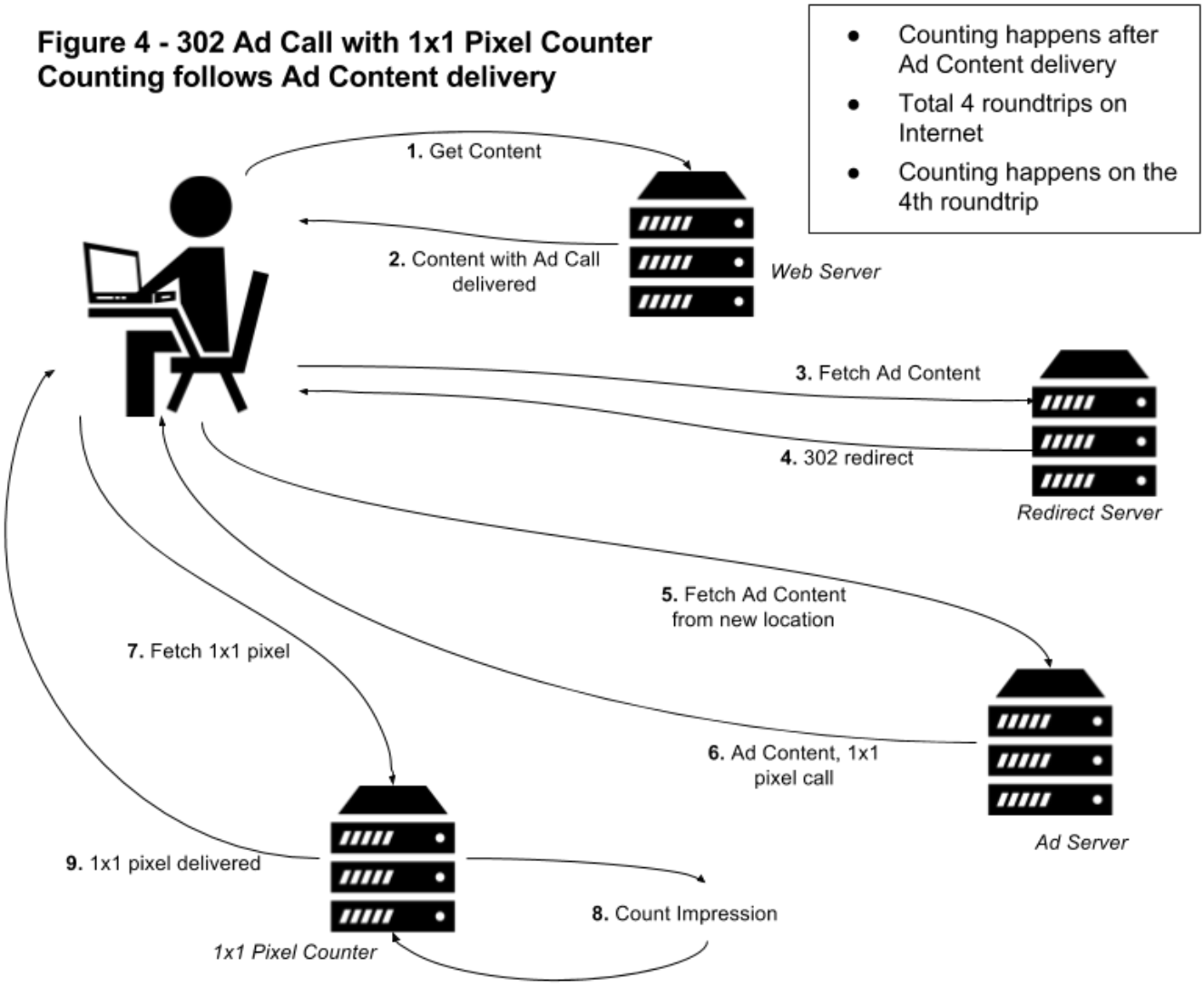


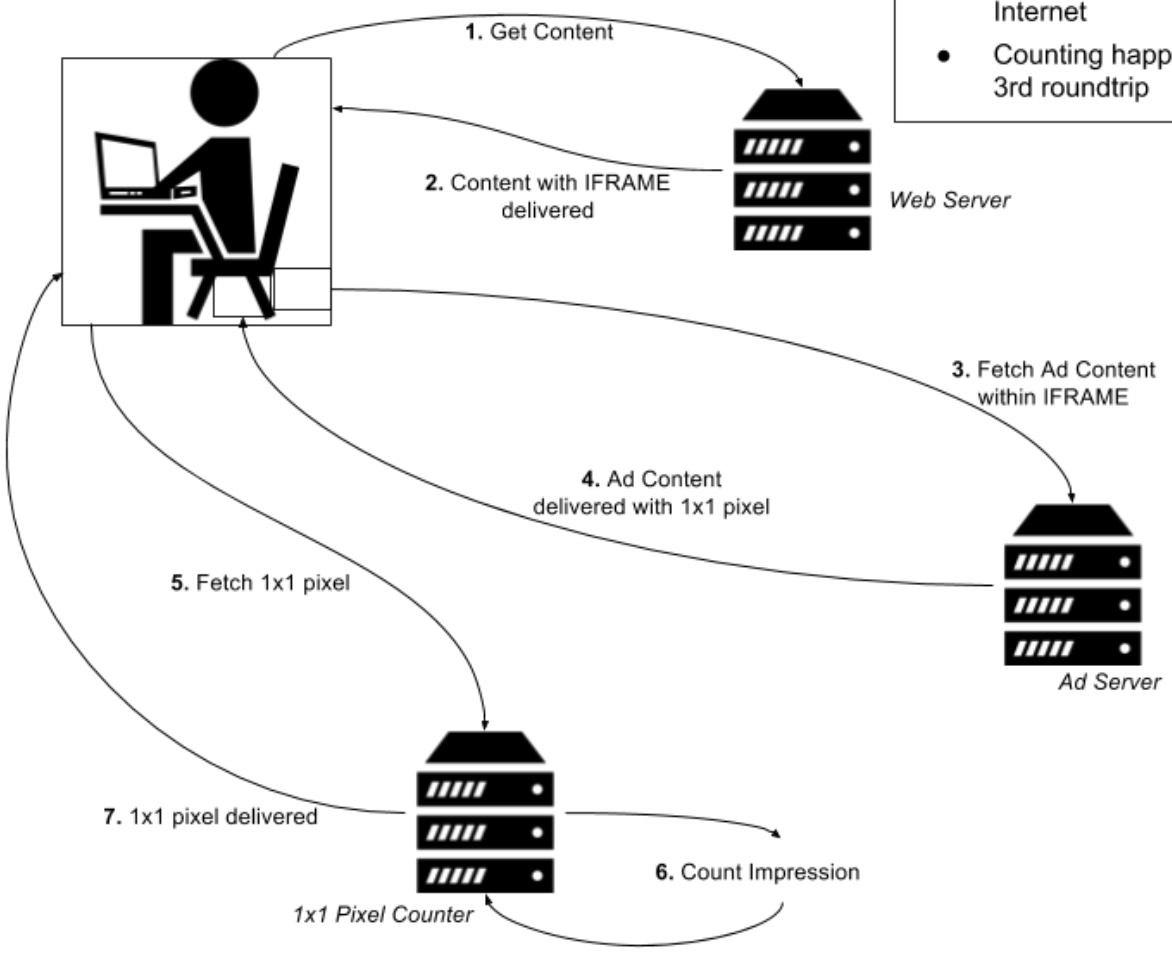
Figure 4 - 302 Ad Call with 1x1 Pixel Counter
Counting follows Ad Content delivery



Pixel Counter

Figure 6 - IFRAME Ad Call with 1x1 Pixel Counter
Counting follows Ad Content delivery

- Counting happens after Ad Content delivery
- Total 3 roundtrips on Internet
- Counting happens on the 3rd roundtrip



APPENDIX B

Page Measurement

While these guidelines cover the measurement of ad-impressions, measurement organizations may also choose to measure and report page delivery. Pages are defined as measurement of responses from a web server to a page request from the user browser, which is filtered to remove invalid traffic and error codes prior to reporting, and is recorded at a point as late in the page load process as is possible and in consideration of removing situations that do not represent legitimate user-initiated page content.

Much of this activity is recorded at the content server level.

Good filtration procedures are critical to page-impression measurement. Additionally, consistent handling of auto-refreshed pages and other pseudo-page content (surveys, pop-ups, etc.) in defining a "page" and establishing rules for the counting process is also critical. These page-like items should be counted as follows:

- Pop-ups: ad impressions (excluded from page counting)
- Interstitials: ad impressions (excluded from page counting)
- Pop-unders: ad impressions (excluded from page counting)
- Surveys: pages
- HTML Newsletters (if opened): pages if not solely advertising content, otherwise ad impressions
- Auto-Refreshed Pages: Site-set auto-refresh – pages subject to the following criteria — The measuring organization and user should consider: (1) whether the page is likely to be in background or minimized therefore diminishing the opportunity to view. If the content-type is likely to be in background or minimized while in use or the organization cannot determine whether minimization has occurred, these auto-refreshed pages may be assessed and or valued differently, and (2) that the refresh rate is reasonable based on con- tent type. User-set auto refresh – Generally counted as pages.
- Frames: pages; organizational rules should be developed for converting frame loads into pages and these rules should be disclosed. One acceptable method is to identify a frame, which contains the majority of content and count a page only when this dominant frame is loaded. These items should be separately identified and quantified within page-impression totals. Significant disaggregated categories should be prominently displayed.

Ads not served by an ad-serving system (i.e., ads embedded in page content) are generally counted by the same systems that derive pages or through the use of "beacon" technologies. In all cases, ads not served by ad-serving systems should be counted, but be disaggregated for reporting purposes from other impressions.

Media companies and ad serving organizations should disclose their page count process to buyers and other users of the page count data via a description of methodology.

APPENDIX C

MRC Digital Advertising Measurement Technical and Transparency Best Practices

Given some of the difficult measurement changes as well as the overall complexity of the advertising environment and the myriad of practices employed by participants in the digital advertising ecosystem, certain best practices should be followed to support valid, reliable and effective measurement.

Principles

- Participation is Voluntary
    - Applicable to Media Seller Organizations
    - Applicable to Measurement Vendors
    - Applicable to Media Buy-Side Organizations, See Specific Section
- Foster Accuracy and Transparency in Measurement
    - Exercise Professional Care in Discharging Measurement Related Activities
    - Continuous Improvement Mind-Set
- Seek to Accredit Measurement Functions that Impact Monetization, Use Accredited Products where Available
    - Comply with Applicable Industry Measurement Guidelines
    - If Accredited, also Comply with MRC Voluntary Code of Conduct (VCOC)
- Support IVT/Fraud Detection and Filtration Processes
    - MRC IVT Guidelines
    - TAG Activities
        - Fostering Centralized Tools and Communication about Fraud, IVT, Piracy, Misappropriated Content
        - Apply TAG Anti-Malware Principles

Measurement Interactions and Communication

- Transparency of Audience Extension Traffic Sourcing
    - Pass Information, Disclosure
- Transparency of Incentivized Browsing
    - Pass Information, Disclosure
- Collecting Measurement-Relevant Information
    - Pass Information, Disclosure
        - Auto-Play Video
        - Auto-Refresh
        - Origination Information in Proxy situations
        - Forced Duration Situations
        - Detection and Response Techniques Employed for Ad-Blocking
- Facilitate and Use Back-Up Creative, when Original Creative Cannot be Served
    - Segregate and Disclose Frequency
- Responsible Use of Browser/Application Tools
    - Page Visibility API
    - Flash Throttle (specific data elements)
    - Use of MRAID, VPAID and VAST and version
    - Protecting Security of Measurement Communication -- Encryption, etc.
    - Pre-fetch and Pre-render Considerations
    - Cache Busting Techniques (allowing random and timestamp append)
- Facilitate Unique Session and Click Identifiers
- Minimize Piggy-Back Tagging

    - Reduce/Minimize Tagging-Related Latency
- Consideration of User Experience
    - Minimizing Intrusiveness
        - LEAN
        - Guard Rails Around Redirects, Page Takeover, Clutter
- Adopt Industry Infrastructure Standards, as Appropriate -- MRAID, VAST, VPAID, SafeFrame
- Adherence with Discrepancy Resolution and Communication Processes

Marketing with Best Digital Measurement Practices (applicable to media buy-side organizations)

- Encouraging Media Seller Partners and Measurement Vendors to Adhere to Best Practices
- Establishing Campaign Requirements that are Aligned with Best Practices

Compliance Representations

- Represent Compliance with this VCOC Accurately
- Escalation Process for Misrepresentation

Other Matters

- Responsibility for Updating of VCOC