



Description of Methodology

GAMUT - DESCRIPTION OF METHODOLOGY

This Description of Methodology (DOM) summarizes the Gamut (GAMUT) system and processes in the area of display ad impressions and the associated click activity that are being audited in accordance with the IAB Audit requirements as described in the Internet Advertising Bureau’s (IAB) Interactive Audience Measurement and Advertising Campaign Reporting and Audit Guidelines and the Internet Advertising Bureau’s (IAB) Interactive Advertising Bureau Click Measurement Guidelines, Version 1.0—Final Release, May 12, 2009 (available here: <http://www.iab.net/clickmeasurementguidelines>), and the MRC Minimum Standards For Media Rating Research (available here: <http://mediaratingcouncil.org/MRC%20Standards.htm>) in the GAMUT advertising delivery system and GAMUT’s network.

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INTRODUCTION

The Interactive Advertising Bureau (IAB) and the Media Rating Council, Inc. (MRC) set the standards for the advertising delivery and measurement in the areas of display advertising impressions and the associated click activity.

This Description of Methodology (DOM) summarizes the GAMUT system and processes in the area of display ad impressions and the associated click activity that are being audited in accordance with the IAB Audit requirements as described in the Internet Advertising Bureau's (IAB) Interactive Audience Measurement and Advertising Campaign Reporting and Audit Guidelines and the Internet Advertising Bureau's (IAB) Interactive Advertising Bureau Click Measurement Guidelines, Version 1.0—Final Release, May 12, 2009, and the MRC Minimum Standards For Media Rating Research in the GAMUT advertising delivery system and GAMUT's network in 2012.

DESCRIPTION OF METHODOLOGY (DOM)

This Description of Methodology (DOM) is submitted as part of the display ad impression and associated clicks processing and reporting across the GAMUT network audit for the IAB Audit and MRC Accreditation. To merit accreditation, GAMUT:

- Adheres to the Internet Advertising Bureau's (IAB) Interactive Audience Measurement and Advertising Campaign Reporting and Audit Guidelines
- Adheres to the Internet Advertising Bureau's (IAB) Interactive Advertising Bureau Click Measurement Guidelines, Version 1.0—Final Release, May 12, 2009
- Adheres to the Minimum Standards For Media Rating Research developed by the Media Rating Council, Inc.
- Provides full and complete information to external auditors regarding all details of its operations;
- Conducts its processing and reporting substantially in accordance with representations to its clients and external auditors
- Consents to an annual audit of its procedures by an approved MRC auditor.



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GAMUT CLIENT SIDE COUNTING (CSC) MEASUREMENT PROCESS

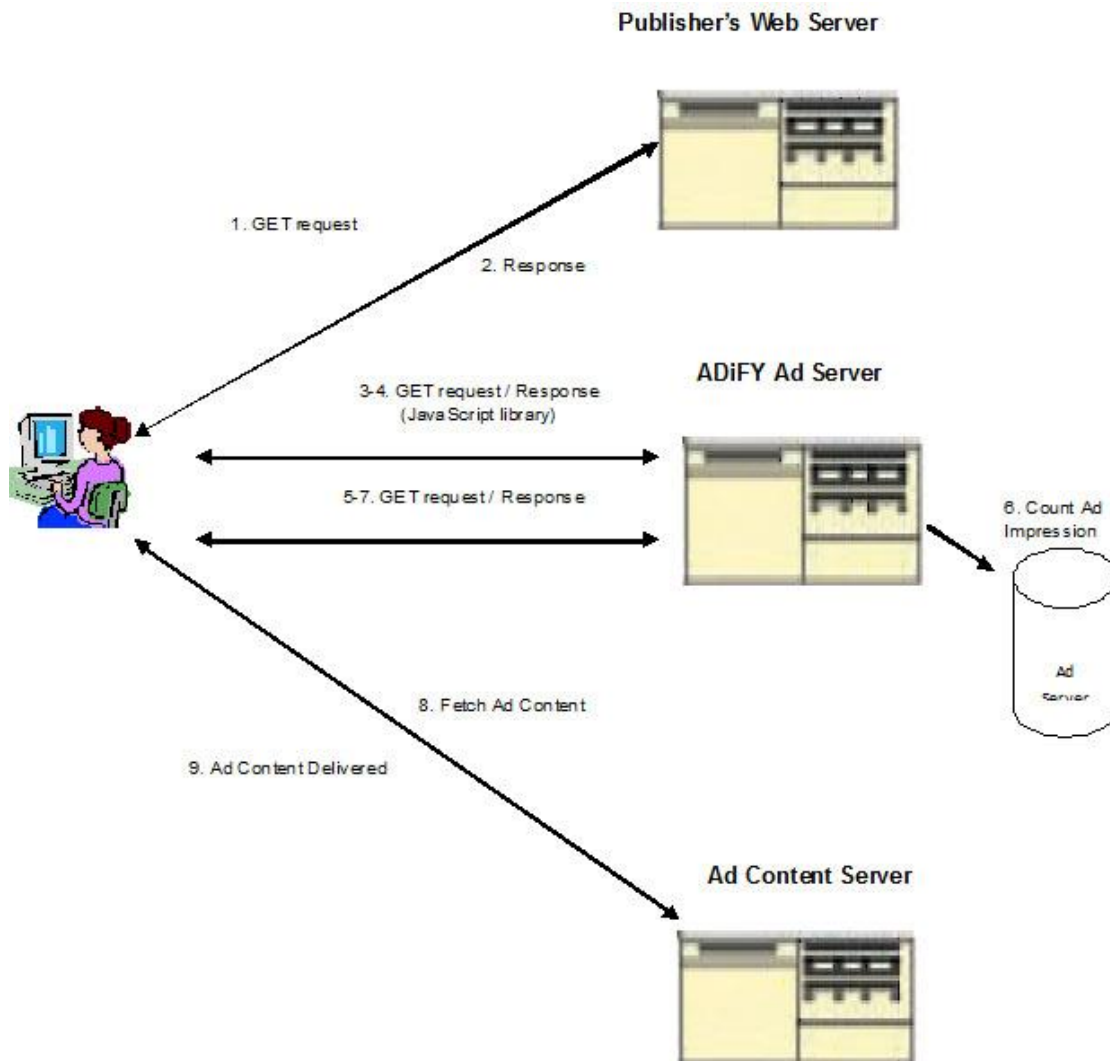
This DOM is focused on GAMUT's client side counting (CSC) display advertising impression and associated clicks measurement and reporting process. GAMUT is seeking Accreditation based on the IAB impression and clicks metric guidelines and report is focused on these metrics.

GAMUT's Client Side Counting (CSC) methodology is a browser-based measurement process based on an accumulation of advertising impression and click traffic delivered to GAMUT Network members. The methodology utilizes an IAB CSC methodology which records every transaction in the ad server log files. As this is not a sample-based measure, there are no universe estimates or statistical projections of the data. Ad impression reporting is on the basis of a particular customer order; specifically by creative. This reporting is continuously updated resulting in a measure of impressions served to date and is considered final at the month's end.

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The following figure illustrates the current GAMUT methodology:

Figure 1 GAMUT Methodology



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CLIENT SIDE COUNTING (CSC)

Client side counting (where client refers to the user's browser) relies on the browser to initiate ad requests, subsequent to the initial page request, which then results in the counting of the ad impression and click.

There are several accepted methods for performing client side counting specified in the IAB Guidelines. The IAB Guidelines require ad impressions and clicks to be counted by a subsequent request for the tracking asset and specifies certain permissible implementation techniques including the use of the <SCRIPT>, and tags. GAMUT's CSC methodology utilizes <SCRIPT> tags.

When web sites join a network, the GAMUT system (or network managers) will provide members with ad tags which are appropriate for the corresponding content. These tags will contain various attributes associated with the content (ad size, ad space id, etc.) as well as reference to a GAMUT JavaScript library (application).

For JavaScript capable browsers, the measurement process will function as follows (as illustrated in Figure 1 above):

1. The user makes a GET request for a page from one of the Websites in the GAMUT networks.
2. The Publisher's Web server responds with the source code of the page (which includes one or more GAMUT ad tags).
3. The initial call to the GAMUT ad server is for the JavaScript library.
4. The ad server will respond with the JavaScript library and the browser will load the library.
5. For each advertisement, the source code of the page will contain an ad tag that will define a series of variables which identify the AdSpaceId (site where the ad is to be displayed) along with the length & width of the ad space. The browser will execute a GET request to the ad server.



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6. After the ad server determines which ad to serve, but before it responds to the browser, it will log the request for the ad.
7. The ad server responds back to the browser with the location of the ad creative (which under some circumstances will be a redirect to another 3rd Party Ad server).
8. The browser requests the ad content from the Ad Content server (or 3rd Party Ad server).
9. The ad content is delivered to the browser (or the browser is redirected to another server until the final location of the creative is determined).

In this execution, the GAMUT Client Side Counting (CSC) will generate one impression transaction for each ad displayed on the page.

Additionally, for those browsers that do not support JavaScript (either due to age or user settings), GAMUT's CSC process will not measure, deliver, or report ads, as the GAMUT methodology relies on browsers being JavaScript enabled.

ACCUMULATION PROCESS

The GAMUT ad server captures every "impression" and click record and ad server log files are automatically rolled and processed every three minutes. For more information, see Data Collection.

DATA FILTERING PROCESS

This process ensures the accuracy of measurements by validating the accumulation process before reporting to the user interface. In accordance with applicable IAB guidelines, GAMUT discards impressions and clicks that do not meet the IAB Guidelines. For more information, see Data Editing.

DATA COLLECTION

Approximately every five minutes, the Ad Server Support service generates a "rules file" that includes information regarding every active campaign. This information is uploaded to each ad server so that when a request comes in to the ad server, the ad server can determine which ad should be served.

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The initial request from the browser for an ad comes into the load balancer (sitting in front of the ad servers). The request is then routed to one of the ad servers in order to distribute the load equally among the ad servers (there are several ad servers in rotation). Upon receipt of the request, the ad server determines what ad will be served, logs the “impression” and returns a block of html / JavaScript code to the browser (which includes the location of the ad creative and associated click URL). Upon receipt of the code by the browser, the browser initiates the call for the creative.

AGGREGATION PROCESSES

Rotation, retrieval, and processing procedures are fully automated; as such, there is a low likelihood of collection and aggregation errors. The collection and aggregation processes have several checks and balances to ensure protection against lost data and duplication.

DATA ITEMS IN THE AD SERVER LOGS

The following is a listing of data items in the ad server logs for impression records:

- TimeStamp – GMT timestamp of event (currently in seconds granularity)
- IpAddressStr – IP address of machine-browser which originated event call to our AdServer - we keep it as a long integer now (not string)
- MediaBuyId – unique identifier (all 64bit long integers) of a Line Item created by advertiser as part of a campaign.
- AdSpaceId – unique identifier of Ad Placement on the HTML page, originates from our tag that publishers puts on the page.
- CreativeId – unique identifier initialized when advertiser loads and tags creative image (ad) intended to be used for campaigns
- ReferrerUrl – previous item which led to the request
- Cookie - per-browser information previously written by GAMUT
- UserAgentString - information about the browser used to serve the page (and ad)

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Similar log information is captured for the associated click activity.

Log processing overview:

1. Ad Server receives call from a browser, processes and writes events to logs on the Ad Server.
2. Logs are moved from Ad Servers to Log Processing server (middleware) boxes through mounted NFS and deleted from the Ad Server after a successful copy. An alert is sent to TechOps personnel if this copy fails, though this has never yet occurred.
3. After a successful move to the Log Processor server they are processed – read in by the first stage application (Tight Loop). Failed logs are marked for reprocessing.

The log files are then accumulated, edited, and compiled through to produce display ad impression and click measurement and advertising reporting.

MONITORING

GAMUT maintains monitoring functions such that if any of the processes noted above fail or take longer than a nominal amount of time established for each process, an alert is automatically sent to GAMUT personnel where the Operations team will trouble-shoot the problem.

Systems Monitoring – General health

Primary system health is monitored using the Nagios monitoring platform. Critical system file and health/utilization monitoring is performed on all hosts in the production environment. Precise items being monitored vary from server to server with regard to the tasks performed by the host, but these include disk, CPU, memory, and network metrics.

System Monitoring – Platform Health

Nagios is also used in conjunction with data gathering scripts about processes that act as key performance indicators for the health of the platform. Recent data inputs are measured to insure the system is not experiencing backlogs or failures. These act as a first-response sanity check and are used to insure input data remains within expected parameters, and alert us when they are not. Additional checks look for information on adserving volume, response times and rule updates to ad servers.

In addition to Nagios, we have implemented a number of scripts that check key indicators of data processing performance and troubles.



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Scripted checks verify incoming adserver log processing timeliness, log processing failures and backlogs.

External Monitoring

Gamut leverages Keynote monitoring systems to check adserving times and content, as well as monitoring the health of our customer portal. Adserving checks are high-frequency checks on default adspaces that are only implemented on test networks, avoiding problems with identifying keynote agents as robotic agents. Adserving checks come at a frequency of seventy two data points per hour, from agents in major markets across the US.

Redundant Monitoring

In addition to production systems monitoring from both local and external services, we also utilize the PA server monitor to validate internal and external network links, monitor key systems, and externally monitor the production monitor systems, providing failsafe alerting in the case of a monitoring system failure. Any inability to connect with our production environments is treated as a production alert.

Notification and Response

Monitoring systems will provide a window into the operation of the platform, but only represents the first half of a monitoring system. The second half comes in the form of notification. All monitoring notifies the operations group any time a given check persists in returning values outside defined norms. The response team consists of one on-call agent and one backup at all times, on a rotating schedule, continuous coverage of monitoring systems by both local and offshore administrators, and a round-the-clock call center to notify the on-call agent by telephone when a critical alert comes in, escalating as necessary until an operational team member has been reached and has acknowledged the alert.

DATA EDITING PROCEDURES

In accordance with the applicable industry guidelines, GAMUT has implemented several measures to reasonably assure that data is scanned and filtered for non-qualifying activity.

The editing process includes the process of filtering erroneous, corrupt data, identified non-human traffic ("robotic impressions"), and any other unusual behavior that warrants removal from measurements using the IAB/ABCe International Spider and Bot list, utilizing the IAB recommended dual pass approach.



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The rest of this report addresses specific IAB Guidelines and related GAMUT procedures.

ROBOTS, SPIDERS AND CRAWLERS

As noted above, GAMUT utilizes a dual pass specific identification approach for filtration of robotic activity. User agents are compared to a list of known robot user agent strings and to a list of known valid browser user agent strings. Any log entries that include a known robot user agent string are eliminated from processing as are log entries that do not contain a valid user agent. A robots.txt file is also used on GAMUT servers.

Additional activity based filtration processes are employed.

GAMUT employs techniques based on identifiers, activity, and patterns based on data in the log files in an attempt to identify and filter (exclude) invalid activity, including but not limited to non-human activity and suspected invalid human or fraudulent activity. However, because user identification and intent cannot always be known or discerned by the publisher, advertiser, or their respective agents, it is unlikely that all invalid activity can be identified and excluded from the reported results.

INTERNAL TRAFFIC

GAMUT does not filter GAMUT internal traffic. The impact of internal activity was assessed as being immaterial. However, specific accounts that may be used for test purposes are flagged in the system and segregated from ordinary data for billing and reporting purposes.

CACHING

To minimize undercounting due to caching, GAMUT utilizes JavaScript to append a random string to the ad request. This “cache-busting” process is designed to create a unique URL that the user would not already have downloaded, and therefore would have to be requested from the ad server. GAMUT also makes use of appropriate HTTP headers to discourage caching by proxies and browsers.

ABANDONMENT

GAMUT’s CSC methodology does not count the ad impression until after the page content is delivered (and in the case of the click, initiates the click), which is in compliance with the IAB Guideline. However, it is possible that an ad may be requested by a browser and the user abandoning the content before the ad is actually delivered to the browser or the user is redirected to the landing page (result of click transaction).



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Although GAMUT's CSC measurement system reduces the impact of abandonment, it is possible that abandonment may have the effect of over counting ad impressions or measured clicks as the user may abandon the page content before the ad or landing page, is displayed by the browser.

AUTO-REFRESHED PAGES

Certain GAMUT network members might utilize auto-refresh on certain pages, which results in repeated loading and counting of new ad impressions. GAMUT sees this issue as difficult for third party ad serving companies to address, since GAMUT does not have control over the content which might be refreshed. GAMUT feels that the existing implementation of behavioral detection and filtration techniques adequately addresses this issue.

PRE-ISSUANCE INSPECTION PROCEDURES

GAMUT performs various data verification procedures during processing including verifying that data meets specific requirements (e.g., ad tag is valid, value is a number, value is of expected length/format). Additionally, several reports are provided to the GAMUT analysts on a daily basis, who monitor ad deliveries across the network.

Standard and custom monitoring tools are used by the system and the OPs staff to monitor activity and detect anomalous occurrences. When these automated monitoring tools identify significant events, they generate alerts, which are sent to OPS staff, and the OPS staff develops and implements a solution.

REISSUANCE

Reported impressions and clicks are considered "preliminary" during the reporting month and for five days after, and are considered "final" data five days after the month's end, unless otherwise noted.

In order to comply with industry standards, GAMUT must remove probable fraudulent and robotic activity, such as web crawlers or other non-human activity, from its reporting data to ensure accurate impression reports for advertisers. We do not currently always filter these impressions and clicks in real-time, but we do this while processing logs before they are posted to the reporting database.



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Finalized data will not be further adjusted.

The following disclaimer is currently displayed on all report pages across the entire GAMUT's applications:

NOTE: The statistics presented in these reports are measured using Client-Side Counting (CSC). GAMUT's CSC ad delivery & measurement system has been accredited by ImServices Group Ltd. (ImServices) for compliance with the Interactive Advertising Bureau (IAB) Ad Campaign Measurement & Audit Guidelines. GAMUT reserves the right to adjust final reports for impressions and clicks that it deems to be robotic, fraudulent, resulting from automated means, incentives, or other misleading processes, etc. Inventory Reports are forecasts only and not a guarantee or representation of actual or projected inventory. Geo reports may not be consistent with performance reports due to issues with geo data summarization. Geo reports should be considered directional only. If you have issues with your report statistics, please contact help@CoxDS.com.

LIMITATIONS

When GAMUT ad tags are properly implemented by the publisher, a pop-up blocker, which would prevent the pop-up window from opening, would also prevent the ad tag, which also serves as the measurement asset, from being requested, and therefore, the ad impression would not be recorded.

Ad blocking techniques or software that prevents any requests to the GAMUT domain may have no impact on the impression and click measurement as this situation may prevent both the ad request and the measurement, resulting in an accurate count of zero impressions or clicks. Flash-capability detection has eliminated a previously existing possibility that a flash ad would be counted when trying to serve one to a browser that does not have flash installed.

In situations where the user disables image rendering, the browser will not request images from the servers. GAMUT's ad serving logic is not affected by the browser's image rendering setting. If GAMUT's ad server chooses to serve images only, those ads would not be rendered. However, GAMUT will count these impressions in reports.

DATA PROCESSING AND SOFTWARE QUALITY ASSURANCE

GAMUT's change management process utilizes several tools to track all changes to production systems, and includes requirements for segregation of duties, testing and approvals prior to implementation of new functionality into the production environment. GAMUT has consolidated multiple disparate systems used in the past (TFS, Teslink, Bugzilla) into one SDLC repository in TargetProcess. This enforces feature



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definition, development and deployment timelines, testing, and production status. Combined with our TechOps ticketing system for managing physical deployments, our change management process is thusly defined end-to-end. GAMUT has also established a fully automated process to rotate, collect and process ad server log files.

GAMUT has appropriate access control procedure in place to limit access to data, servers and related databases to authorized users.

DATA RETENTION

Different data types are retained for different lengths of time:

Log files – maintained in situ for 18 months and then archived to disc and indefinitely. All impression information can be reconstructed from these files if necessary.

Databases – we retain rolling windows of 30day of daily snapshots, 12 weeks of weekly snapshots, and 8 months of monthly snapshots. At any given time, our databases contain information for the last 13 months.

ELECTRONIC REPORTING

GAMUT preliminarily reports ad impressions and clicks in a continuously updated manner via the web based reporting interface although report figures are finalized 5 days after the proceeding month's end. GAMUT's ad impression and click reports are via a reporting system (or an email report through the reporting system's export functionality) as they can provide the current count of impressions to date and allow clients to query and interact with the reports as needed. If an error correction is required, triage steps through the relevant developer; then through TechOps to reprocess logs or run scripts; then through Product if system-wide notification is necessary; then to individual account managers and members of the finance team if specific clients need to be contacted.

COMPUTATION OF REPORTED RESULTS

GAMUT's user interface provides daily, weekly, and monthly reports as part of the GAMUT service. The reporting process accepts an arbitrary date/time range to select data and then groups and summarizes data to produce daily, weekly, or monthly subtotals.



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GAMUT reports are based on the following parameters:

Day: From (including) 12 midnight to (but not including) 12 midnight.

Week: Monday through Sunday

Date Range: User can define date ranges for specific reports within the user interface

Month: Calendar month

Data is stored internally in Coordinated Universal Time (UTC or GMT). When requesting a report the user can specify a time zone for the report. (Each user has a default time zone.) The time zones are most often expressed generically like 'Pacific Time' or 'Eastern Time' which cause our reporting system to recognize shifts between standard time and daylight time at the legislated shift points.

The source of reporting data is an aggregation of the logs after being filtered as described in the Data Editing section. GAMUT does not use any data adjustment or sampling procedures to estimate the ad impression or click counts.

GAMUT reports the total number of clicks, the total number of impressions, and subsets of this data (For example: clicks, impressions, and click-through rates, by campaign, ad space, and keyword to advertisers, similar data corresponding to site statistics to publishers). The scope of the audit process covers the display impression and associated clicks advertiser reporting. These figures may fluctuate to an extent during the course of the month and are not considered final until they are frozen about the fifth of the next month. After this time, the reported display impressions and clicks will not be adjusted.

GAMUT FILTERING IMPRESSIONS AND CLICKS METHODOLOGY

CLICK MEASUREMENT METHODOLOGY

The measurement methodology is based on all click activity recorded, and does not utilize sampling for the purposes of click measurement. The click reported by GAMUT, and therefore, is the subject of this DOM, is the measurement click identified in stage 2.2 of the IAB click-referral-cycle. That is, upon receipt of the initial click transaction (measured click) by the GAMUT ad server, GAMUT records the click and issues an HTTP 302 redirect to the browser based on the location established by the Advertisers for the specific advertisement. These measured click events are recorded to GAMUT's ad server logs with the ad impressions. The ad sever log files are then accumulated, edited and compiled through fully automated processes to produce click measurement and advertiser reporting.



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A known limitation associated with this specific measurement trigger being utilized (302 redirect) are network interruptions that may result in a user who successfully received a 302 redirect, but is unable to view the resulting advertiser web site.

The counting methodology utilized is the one-click-per-impression method. The IAB Click Guidelines define one-click-per-impression as "the Click on a unique ad impression (ad creative) or individual search result has not already been counted for the session."

KNOWN ROBOTS REMOVAL

The IAB maintains a list of "known" or "well-behaved" robots (e.g. search engine crawlers).

Impressions and clicks generated by these robots are automatically removed at the ad server log level and never appear in GAMUT's logs or reports. This list is synchronized monthly at GAMUT.

CLICK FILTRATION

Clicks that do not meet the IAB guidelines are filtered at the ad server log level. Filtered clicks are automatically removed at the ad server log level and never appear in GAMUT's logs or reports.

As previously noted, GAMUT employs techniques based on identifiers, activity and patterns based on data in the log files in an attempt to identify and filter (exclude) invalid click activity, including but not limited to non-human click activity and suspected click fraud. However, because user identification and intent cannot always be known or discerned by the publisher, advertiser or their respective agents, it is unlikely that all invalid click activity can be identified and excluded from the reported results.

In order to protect click filtration processes from becoming compromised or reverse-engineered, no details of specific filtration procedures will be disclosed, other than to auditors as part of the audit process.

However the following filtering procedures are implemented in relation to the click filtration methodology:

- Third-party filtration is not used by GAMUT.
- Robot instruction files (robots.txt) are employed.

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- Sources used for identification of non-human activity: GAMUT uses the IAB/ABCe International Spiders and Bot List and Valid Browser List.
- Activity based filtration processes: Activity-based identification is employed to identify behavior that is potentially non-human or fraudulent traffic.
- All filtration is performed ‘after-the-fact’. That is, the user (browser, robot, etc.) is provided with their request without indication their traffic has been flagged, or will otherwise be filtered and removed through GAMUT’s filtering mechanisms.
- Processes are in place to remove self-announced pre-fetch activity.
- Processes to remove publisher test clicks are not in use.
- Processes to remove internally generated click testing (non-commercial) activity whether generated using manual or automated techniques are not in use.

IMPRESSION RATE LIMITER

GAMUT employs rules at the ad server level that govern whether incoming impressions and clicks are counted in reports. Impressions filtered by the Rate Limiter appear in GAMUT’s logs.

TRAFFIC ANALYSIS

Traffic analysis generates an external monthly rollup report that summarizes impressions and uniques for network owners on their networks. Traffic analysis is no longer responsible for robotic impression removal. The key functions of traffic analysis are:

- Traffic analysis: Analyses and sorts traffic by site, network, geo region and time stamp.
- Report generation. Traffic analysis generates three types of reports:
 - Traffic unique reports list the number of unique visitors to an ad space, site, or network.
 - Site cross-visitation reports list the total number of visitors to more than one site.
 - Geo Unique reports list the number of visitors from each geographical area that have visited each site.



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CONTACT GAMUT

If you have any questions or feedback, please feel free to contact GAMUT at info@CoxDS.com.