comScore Media Metrix Description of Methodology

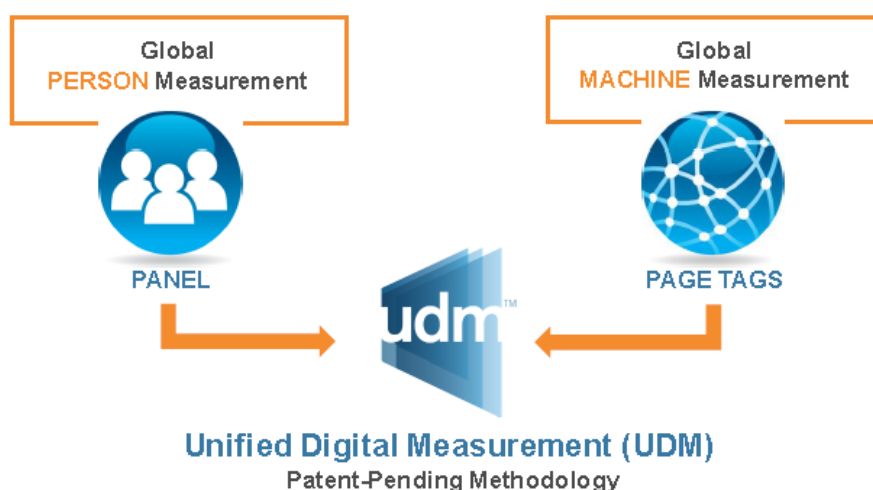**Unified Digital Measurement™**

United States

November, 2013

1 Introduction

This document provides an overview the methodologies used by comScore to deliver Internet audience data for the United States.

Unified Digital Measurement™

comScore's measurement methodology, Unified Digital Measurement™ (UDM), involves integration (or "unification") of person-centric data collected from a sample of online-recruited panelists, with server-centric census data from tagging web entities.

2 Panel Methodology

Panel Measurement

At the heart of comScore's Unified Digital Measurement™ is a large panel of Internet users. comScore recruits panelists which are identified as Home or Work panelists based on the ownership of their respective machines, i.e., computers personally owned by the panelist (or their household) qualify them as Home panelists, computers owned by the panelists' employer qualify them as Work panelists.

comScore employs an Internet panel methodology which provides a comprehensive view of the PC-based Internet activity of a panel of web users, across all web entities, regardless of browser type. The panel methodology allows comScore to have visibility into exposure to websites and their different content elements, to the ads placed on these sites, to streaming, to Instant Messaging clients, and to all other web-based technologies and

protocols. Because panel measurement is conducted via a software meter that resides on the panelist's computer, comScore is able to observe "private browsing" sessions, as well as secure sessions. The panel is weighted and projected to the home and work Internet universes in the United States, allowing the behavior of panelists to be projected to the U.S. Home and Work Internet user populations at large.

Enumeration Survey and Population Targets: Establishing the Internet Universe

Each month, comScore conducts an enumeration survey to provide monthly estimates of household and individual Internet usage, in aggregate and by demographic for both the home and work Internet universes. (Note that the Home and Work universes refer to ownership status of the machine, not physical location; a laptop owned by an employer, and used in the home, is still considered a work machine.) The enumeration survey is a single stage data collection process that is administered via telephone by third party vendors. The enumeration survey uses a dual frame landline and cellular random digit dial (RDD) sample designed to include persons in households with landline telephone service (with and without cell phone service), and persons in households with cell phone only service. comScore's primary focus in measurement is on active Internet users, defined as *persons age 2+ who were active on the Internet in the last 30 days from a home or work computer or shared use computer*

Panel Recruitment

comScore's Media Metrix panelists are recruited exclusively via the Internet, in two ways: the Affiliate Program and through a series of Third-party Application Providers ("TAP").

The affiliate program is a broad network of generally small-audience web entities where potential panelists are recruited via banner or text ads which make one of two general appeals: make your voice heard or get a "Value Proposition" (what one might think of in a traditional research context as an incentive) by joining a panel. Prospective panelists who click on these banner ads are directed to comScore's panel registration site, PermissionResearch.com. Permission Research panel members recruited though the Affiliate Program are informed they will be joining an Internet market research panel that tracks their online browsing and purchasing behavior, and are explicitly presented our privacy policy. Upon registration and opt-in, panelists provide their full demographic

information, along with household information, and they download the software meter that passively tracks their behavior while using the computer.

However, the majority of comScore panelists come from the TAP program. The TAP program involves comScore's partnership with third-party application providers who offer visitors a vast array of free software, applications and utilities in return for "eyes on." Typically, this means eyes on an advertisement but for comScore it means eyes on a recruitment solicitation. The solicitation is always separate and explicit. In most cases, the consumer can decline to join the panel and still receive the free incentive. The consumer can always decline the invitation.

Home and Work Panels

comScore classifies metered panelist machines into one of two panels - home or work. The home panel is comprised of machines (and the persons using them) owned by a member of the household. The work panel is comprised of machines (and the persons using them) owned by an employer. Note that the panels are ownership-based, not location of use-based. A work laptop is in the work panel regardless of whether usage occurs in the office, in the home, at Starbucks… or anywhere.

Demographic and Session Assignment

Since the panel is the source from which demographics are derived, it is particularly important to understand how demographics are derived from the panelists.
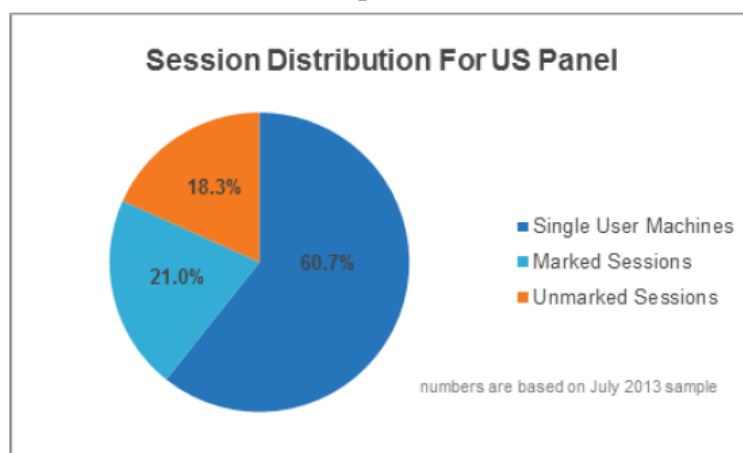
Most reported demographics are household-level (e.g., household size, presence of children). Household demographics are relatively straightforward; all the machine users in a given household will carry the same household-level demographic characteristics. Several methods are used to collect household demographics, including self-reporting during recruitment or via monthly Mini-Booster or other surveys, third-party data appends from Accudata, or in some cases, using behavior-based modeling.

Of course, personal demographics, age and gender, are the demographics most commonly scrutinized in evaluating media audiences. In order to accurately assign age and gender, it is essential to be able to identify the specific session user from among the persons who might be using the machine. Unlike household-level demographics, different persons within

the same household (and on the same machine) can have different ages and genders. Therefore, differentiating among machine users at the session level is essential in order to accurately assign age and gender to the usage in that session.

As noted, the comScore meter captures all web activity in a passive fashion. The meter does not require the majority of empanelled session users to identify themselves at each web session. This non-intrusive approach is a fundamental part of comScore's measurement philosophy because it reduces both panel fatigue (and the subsequent turnover that results) and potential biases, as panelists are reminded prior to each user session of the fact of measurement.

Source of User Session Assignment

Session Distribution For US Panel

- Single User Machines — 60.7%
- Marked Sessions — 21.0%
- Unmarked Sessions — 18.3%

numbers are based on July 2013 sample

Without log-ins, how does comScore know who is using the machine? The answer is Session Assignment Technology (SAT), a proprietary technology that allows comScore to create household member rosters and assign sessions to the specific user of the machine, in increments as discrete as 15 minutes.

On a projected (after sample weighting is applied) basis, approximately 60% of panel sessions occur on single-user machines. On single user machines, the user for any given session is a priori known. Each machine begins with a roster of at least one user, with the roster identifying members of the household using the machine. The SAT process is constantly updating information about a machine's users and will add a new user to the household roster if there is empirical evidence to support it.

Among multi-user machines, comScore is able to determine the specific machine user for over 50% of the multi-user sessions based on "session markers." Session markers are cues observed within the session that allow SAT to know, through empirical observation, which household member is at the machine. For example, the use of an email address is a discrete identifier within a machine's household roster. If a user fills out age and gender in a form during the session, this can be used as a session marker. And often, visiting a website and logging in involves passing metadata, such as age/gender, back to the panelist machine that allows SAT to know empirically which household member is using the machine and qualifying as a session marker. This leaves under 50% of multi-user sessions for which further user-identification is required. In these cases, comScore is able to assign the session to the appropriate user based on an analysis of biometrics (unique user fingerprints based on keyboard activity), time of day modeling and/or site affinity modeling.

SAT is continuously validated against "who are you?" self-identification pop-ups on a subset of US panel machines where the users select from among a list of total household members identified during recruitment.

3 Site Centric Measurement

What are tags?

A tag, sometimes referred to as a tracking pixel, is a transparent one by one (1X1) pixel graphic image that is placed on a web site or other web based content asset and is used to track an 'event'. Each time the content asset is served upon the end-consumer, a tag call is made and that event is logged on the tag host server, thus enabling all tag events to be tracked. These events include a visit to a web site or page within a website, serving a video, delivery of an advertisement or delivery of distributed content. Information such as the IP address of the computer that retrieved the image, a timestamp of when the tag was retrieved, the type of browser, previously set cookie values, etc. can be passed along with the tag call.

comScore has created a self-service interface for content owners to manage and validate their tag implementation process. Once the tag code is implemented, comScore goes

through a rigorous validation and filtering process before releasing Unified data as part of syndicated Media Metrix reporting.

4 Unification of Panel and Site Data

Census or "site-centric" data allows for a direct measure of a census of all the activity occurring at the website or web entity. While census data alone is insufficient for audience measurement, the opportunity that census data provides when integrated – unified – with panel data is profound. comScore uses cookies and tagging to collect site-centric census data from participating publishers. Publishers may deploy comScore's mobile-optimized tag across all online content – "traditional" web entities, mobile web entities, and even mobile apps. When combined with the panel, this census dataset provides all the data necessary to improve the precision of audience estimates for all the persons in the geographic universe.

By combining panel data, cookies, and tags, comScore can project website audiences for the Media Metrix universe (Internet access from home-owned and work-owned computers). An important user benefit of the comScore Unified Digital Measurement approach – the development of audience reach projections based on census cookies and panel-derived cookie-per-person values (or Cookie Deflation Factors) – is that this approach allows publishers to understand in a precise fashion the process of getting from census cookies (a figure which should closely conform to that publisher's internal Unique Cookie Web Analytics count), to the reported Unique Visitors projection. comScore has developed proprietary techniques for integrating panel and census data to produce the audience estimates. These proprietary techniques include the filtration of non-human traffic and the calculation of Unique Visitors. Key to these computations is an understanding of cookie deletion patterns via panel observation of persons interaction with cookies. From the Media Metrix panel, comScore develops empirically based counts of cookies per person (CPP) for specific websites. Once total cookies are known, then the application of these precise CPP metrics, applied to the filtered census cookie metrics, produces more accurate estimates of the true number of unique persons or users visiting web entities.