Research: Papers

New Metrics for New Media:
Toward the Development of Web Measurement Standards

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Project 2000

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September 26, 1996

We wish to thank Daimler-Benz, Interval Research Corporation, Netscape Communications Corporation, O'Reilly & Associates, and Yankelovich Partners for their generous sponsorship of this effort.

This paper appears in print as: Novak, T.P. and D.L. Hoffman (1997), "New Metrics for New Media: Toward the Development of Web Measurement Standards," World Wide Web Journal, Winter, 2(1), 213-246.

Project 2000 White Paper

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1) Introduction

The advertiser-supported Web site is one of several business models vying for legitimacy in the emerging medium of the World Wide Web on the Internet (Hoffman, Novak, and Chatterjee 1995). Currently, there are three major types of advertiser-supported sites: 1) *sponsored content* sites like Hotwired, ESPNET Sportszone, and ZD Net, 2) *sponsored search agents and directories* like InfoSeek, Excite, and Yahoo, and 3) *entry portal* sites like Netscape. At present, these three classes of sites are split at about 55 percent, 36 percent and 19 percent, respectively, in terms of advertising revenue (Jupiter Communications 1996).

The sponsorship model is attracting increasing management attention because advertising is expected to be an increasingly significant source of revenues in this new medium (Rebello 1996). Sponsored sites are attractive because they are well suited to the Web environment (Hoffman & Novak 1996), yet retain important parallels to existing media in the physical world. In theory, institutional advertising practices and metaphors can be borrowed from traditional media environments to assist initial commercial efforts. Additionally, as it becomes apparent that commercial viability of the online storefront model is years away (MIT Faculty/Industry Workshop 1996), many Web managers are beginning to place more importance on advertising revenue streams as a source of profitability for online ventures (Rebello 1996).

Against this backdrop, firms are trying to understand what makes a sponsored site successful. As advertisers and marketers debate the best ways to measure and track visits and usage on commercial Web sites, most firms remain largely in the dark about how many customers exist online for their offerings. Because the industry currently lacks standards for what to measure and how to measure it, the Web is having difficulty being accepted as an advertising medium and there is no assurance that firms will be successful in generating significant revenues from advertising in the future. Ultimately, the lack of standardization will limit the long-term viability of the sponsorship model (Murphy 1996).

This lack of standardization exists on several fronts. First, there are no established principles for measuring traffic on commercial Web sites that seek to generate revenues from advertising sponsorship. Second, there is no standard way of measuring consumer response to advertisements. Third, there are no standards for optimal media pricing models. Finally, the complexity of the medium in general hinders the standardization process.

From an advertising perspective, the Web medium shares some similarity to radio: there are many different markets and they are clearly (at least in theory) segmented. But standardization in the radio medium eases the process of the media buy. In contrast, the Web presents a "nightmare" buy for agencies and their clients (CyberAtlas 1996). For example, Focalink's database of over 600 commercial Web sites (Focalink 1996) shows that there are more than 90 sizes for Web ad banners, that sites use many different metrics to price advertising, that there is no consistency in definitions even among the same or similar metrics, and that consumer demographic information is virtually nonexistent.

Despite the lack of information in this chaotic emerging environment, there is no dearth of activity. AdSpend (Jupiter Communications 1996) estimates advertising revenues for the first half of 1996 at $71.7 million, already at the level of a previous estimate of $74 million by Forrester Research for all of 1996 (CyberAtlas 1996). However, advertising revenue remains highly concentrated, with two thirds of all revenues going to the top ten of 600 advertiser supported Web sites (Jupiter Communications 1996). Estimates of Web advertising expenditures in the year 2000 range from $1.7 billion (Bear Sterns) to $1.9 billion (SIMBA) to $5 billion (Jupiter) (CyberAtlas 1996).

Despite these heady forecasts, the perception persists that Web-based advertising efforts are not (and may never be) "serious." In part this may be because traditional advertising spending easily dwarfs current Web advertising efforts. For example, the price of a single 30-second television spot on prime-time's top show, Seinfeld, is currently $550,000 (Advertising Age, 1996). As Table 1, compiled from the Direct Marketing Association (1996) and the Outdoor Advertising Association of America, Inc. (1996) shows, Web advertising expenditures represent a medium in its infancy:

Table 1: 1995 Advertising Expenditures in Various Media

Advertising Medium	Total U.S. Expenditures (billions of dollars U.S.)	Comments
Direct Response - Mail	31.2	.
Direct Response - Phone	82.7	Telemarketing
Outdoor - Traditional	1.83	Billboards
Outdoor - Out of home	3.00	Transit, Bus, Airport, etc.
Print - Magazine	12.5	.
Print - Newspaper	37.7	.
Radio	11.1	.
Television	38.1	.
Web	.312	Estimate for 1996 (Jupiter Communications 1996)
Other	21.3	.

Yet the skepticism can more importantly be traced to the fact that few have specified conclusively just how advertising on the Web can and should further a firm's strategic marketing objectives. Clearly, *standardizing the Web measurement process is a critical first step on the path toward the successful commercial development of the Web.*

Therefore, the objectives of this White Paper are to:

- Review practices for advertising measurement in traditional media.
- Examine current practice for advertising measurement on the Web, drawing comparisons to methodologies

used in traditional media research.

- Propose standardized terminology and methodology for Web advertising measurement.
- Offer preliminary recommendations for Web advertising research.
- Address the policy and strategic considerations that affect the development of Web advertising standards.

We believe that metrics based solely on impressions are necessary in the Web measurement process, but cannot and should not form the basis of a Web measurement system. Therefore, in addition to proposing a set of "basic constructs" and "exposure metrics" that define the consideration set of possible measures, we also introduce a set of "interactivity metrics" that we believe must be included in any complete program for Web measurement. We take care to identify what data are required in order to calculate a particular metric and remain cognizant of the link between Web metrics and media pricing models.

We hope our preliminary measurement proposal stimulates rigorous discussion and debate. Our intention is to encourage the competitive marketplace to adopt specific metrics from each set. Research is necessary to identify which metrics are most useful for judging the effectiveness of advertising, for determining where and how ads should be placed, and for determining optimal pricing schemes for efficient media buys.

2) Advertising Measurement Terminology in Traditional Media

There is considerable confusion regarding the terminology currently in use for Web advertising; the first step is to ensure that all are working with the same vocabulary. We propose that if there is terminology from traditional media that is appropriate to use in the context of Web-based advertising, then it should be used avoid confusion and ease the adoption process of standards formation. Thus, we begin by providing a glossary of the standard definitions for key measures in print and broadcast vehicles. Such measures are used in most media audience evaluations and for intermedia comparisons in media planning in traditional mass media.

Gross impressions /impressions	The gross sum of all media exposures (numbers of people or homes) without regard to duplication. (Surmanek 1993).
Reach	The number of [unduplicated] people or households that will be exposed to an advertising schedule at least once over a specified period of time. (Batra, Myers and Aaker 1996)
Effective Reach	The number or people who are exposed to an ad at the "effective frequency."
Frequency	The number of times that an individual is exposed to a particular advertising message in a given period of time.
Effective Frequency	The number of exposures needed for an ad to become "effective". In mass media models, effective frequency stipulates that a certain amount of exposure is necessary before it is effective, and is used interchangeable with effective exposures. Research indicates that less than three exposures will not allow adequate recall. However, too many exposures are inefficient in that incremental recall after 7, 8, or 10 exposures during a purchase cycle is very small.
CPM	Cost-per-thousand impressions (exposures). The cost per 1,000 people (or homes) delivered by a medium or media schedule.-(Surmanek 1993).
Duplication	The number or percentage of people who see an advertisement or campaign in two or more vehicles
Gross Rating Points	GRPs are a measure of scheduling impact calculated on a weekly or monthly basis. GRP for mass media can be calculated as multiplying the reach (expressed as a percentage of prospects in the target market exposed to television and/or magazine vehicles carrying the ad) by frequency. The GRP level for a particular schedule can also be calculated by summing the ratings of the individual show carrying the commercial (assuming one commercial per show).
Share	"Share of audience" is the percentage of HUT (or PUT, PUR, PVT) tuned to a particular program or station. "Share of market" is the per-centage of advertising impressions generated by all brands in a cate-gory accounted for by a particular brand, but often also refers to share of media spending. (Surmanek 1993).

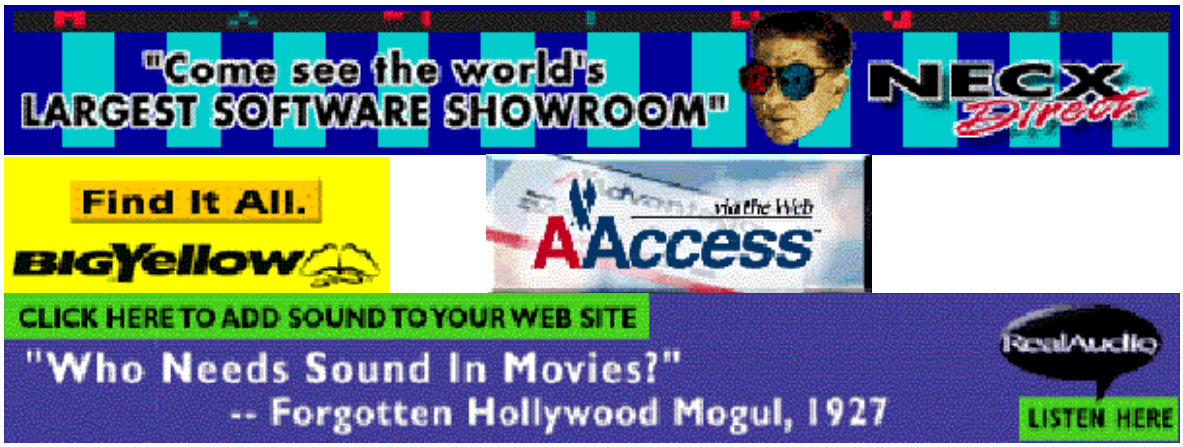
Ratings	The percentage of a given population group consuming a medium at a particular moment. Generally used for broadcast media, but can be used for any medium. One rating point equals one percent. (Surmanek 1993).
HUT, PUT, HUR, PUR	The percentage of {homes/people} tuned in to {TV/radio} at a particular time.(Surmanek 1993).
Composition	The mixture of audience characteristics found in the audience for a medium or vehicle. It also refers to the percentage of some medium's total audience made up of the target segment.
Cost per Inquiry	The cost to generate an inquiry in direct-response advertising. Calculated by the total cost of the direct-response advertising divided by the number of inquiries it generates. [www.infi.net/powerhouse/glossary.html]

3) Current Practice for Advertising Measurement on the Web

3.1) Types of Ads

We focus upon the form of advertising referred to as "banner ads" and "target ads." This primitive form of Web-based advertising may ultimately not be the most effective, but as the current dominant form, we feel it is appropriate to propose a set of standards for its measurement. At a minimum, using banner and target ads, whatever the limitations might turn out to be, provides a concrete example to work with. Although we expect Web-based advertising efforts to evolve, the problem with making recommendations more general so that they could encompass other types of yet to be developed Web-based advertising is that they would be too broad and diffuse to be practically useful.

A *banner ad* is a small, typically rectangular, graphic image which is linked to a target ad . Banner ads come in a variety of sizes, with 90 percent of banner ads ranging from 120 to 500 pixels wide (with a median of 460 pixels) and from 45 to 120 pixels high (with a median of 60 pixels) (Focalink 1996). Banner ads typically provide little information other than the identification of the sponsor, and serve as an invitation for the visitor to click on the banner to learn more. Following are a few examples of banner ads:



Target ads, on the other hand, can be fairly involved, ranging from a single web page with basic HTML, to a Web page enhanced by Java applets, audio, or forms, to a series of linked pages, or to a complete corporate "Internet Presence," "Content," or "Online Storefront" site (Hoffman, Novak & Chatterjee 1995).

Chatterjee (1996) considers banner ads to be a form of *passive advertising exposure,* in that the consumer does not consciously decide to view the banner ad. Rather, the banner ad is presented as an outcome of accessing a particular Web content page, or as the outcome of entering a series of key words into a search engine. Conventional market segmentation theory would lead us to predict that the more targeted the banner ad, the higher the click rate. Thus, ads placed on home pages of general-interest sites, or on the entry page of a search engine would have lower click rates than ads that are consistent with the content of a narrowly targeted web site, or banner ads presented by a search engine in response to specific keywords (e.g. ads for Lionel trains presented every time a visitor searches for "model railroad" or for "Neil Young").

Paid links are a different form of passive advertising, and may be most simply viewed as a text version of a banner ad.

Paid links are often incorporated in directories, which may contain large numbers of such paid links.

Chatterjee considers target ads, on the other hand, to be a form of *active advertising exposure,* since the consumer actively decides to access the target ad (I.e. by clicking on the banner ad), only after being passively exposed to the banner. *Active ad exposure is under the consumer's control; passive ad exposure is under the marketer's control.* Thus, the distinction between passive and active advertisements implies a crucial difference between banner and target ads. Further, the concept of an active advertisement is a feature that differentiates Web advertising from advertising in traditional media.

To date, most of the focus in Web advertising measurement has been upon banner advertisements. This is most likely because their passive nature means banner ads have many more parallels with traditional media planning than do active ads. The factors that affect perceptual selection (i.e., that the consumer will pay attention to an advertisement he or she comes across) in print media should also impact perceptual selection of banner ads. These factors are closely tied to the "creative" function in advertising and include size, position, directionality, motion, color, intensity, contrast, and novelty (e.g. Wilkie 1990), all of which we would expect to be useful for predicting the likelihood that a visitor will click on a banner ad.

3.2) Pricing Models

Currently, exposure models, based upon CPM or Flat Fees applied to site exposure or banner ad exposure, are the dominant approach to Web media pricing. Fees based upon actual click-throughs are also in use, where the advertiser pays for actual clicks on a banner ad that lead to the advertiser's target ad. In the following section, we consider these and other possible pricing models. While we believe it is premature to recommend any one media pricing model, it is important to understand the relative strengths and limitations of methods currently in use or that have been proposed.

3.2.1) Exposure models (CPM and Flat Fee). Flat fee pricing consists of a fixed price for a given period of time. Flat fees were the earliest Web advertising pricing model to appear. Flat fee pricing can be implemented either with or without traffic guarantees. Naturally, it would be advantageous to the advertiser to request guarantees of traffic level. The earliest ad pricing approaches on the Web simply used flat fees (e.g. ad cost per month) without clear specification of the traffic delivered in that period of time. At a minimum, accurate information on site traffic must be made available to the advertiser so that the advertiser can evaluate alternative Web media vehicles.

Assuming accurate traffic information, flat fee prices can be readily converted into a CPM (cost per thousand exposures) model. CPMs can also be enhanced by providing "guarantees" of the number of impressions in a given period of time. Thus, we consider the flat fee and CPM models to be interchangeable if traffic information, specifying the number of (possibly unique) visitors to a Web site, is available. If traffic information is not available, then flat fee pricing can still be used, although its value is then impossible to evaluate.

Ninety percent of CPMs for Web advertising sites (Focalink 1996) range from $10 to $150, with a median of $60. This compares with CPMs of $6-$14 for national television, $8-$20 for magazine, and $18-$20 for newspaper advertising (I/Pro 1996).

The ultimate challenge is to determine the business models that will be effective in this new environment. At present, the advertiser-supported business model is being largely driven by a broadcast paradigm that has initially gravitated toward CPMs as the appropriate unit of measure. In this model, the belief is that exposure-based pricing takes into account different advertisers' response functions and represents a rational way to price advertising on the Web.

But in fact, impression/exposure models go only part of the way because the Web is different from traditional broadcast media. The Web is based on a many-to-many communication model and traditional media are based on a one-to-many communication model. Thus, in addition to exposure metrics, we also need interactivity metrics. The CPM approach places too much emphasis upon the banner ad, and essentially no emphasis upon the target ad which is the "real" marketing communication that the advertiser wishes the visitor to see and interact with.

In the CPM model, larger numbers are bigger winners because the one-to-many model seeks a mass audience for its message. The dangers of relying solely on exposure models means that interactive managers will be driven to scale their sites to larger, mass audiences with more homogeneous tastes in order to attract more advertising revenue. This is in contrast with solving the more difficult problem of how to measure interactivity and price advertising according to the value of a consumer's interactive visit to the advertiser.

CPM and flat fee models do nothing more than simply count the number of visitors exposed to a particular banner advertisement on a particular site. But because consumer behavior on the Web depends upon a whole host of measurable factors, including the type of site and the consumer's motivation for visiting it (Hoffman and Novak 1996), a simple counting of visits is not sufficient to demonstrate value to the advertiser of their advertising expenditures. We believe it is meaningless to compare directly the number of visitors exposed to banner ads across pages without taking these factors into account.

3.2.2) Click through. Ad pricing based upon click through is an attempt to develop a more accountable way of charging for web advertising. The payment for a banner ad is based on the number of times a visitor actually clicked on it; this currently runs about $0.25 per click (I/Pro 1996). A relatively small proportion of those exposed to a banner ad actually click on the banner; DoubleClick (1996) reports that 4% of visitors who are exposed to a banner ad the first time click on the ad. The top 25% performing ads in the DoubleClick Network had an average click rate of 8%, with some click rates as high as 12 to 15%. Click through rates drop off after the first exposure, falling to 2% for the second and third exposures, and 1% or less at four exposures. Thus, payment based upon click through guarantees not only that the visitor was exposed to the banner ad, but actively decided to click on the banner and become exposed to the target ad. Click through payment can be viewed as payment for target ad exposures.

However, the practice is not without controversy. In April 1996, Yahoo agreed to let Procter & Gamble pay only for the "click-through," rather than gross impressions (Associated Press, 1996). Some Internet publishers feel that this pricing strategy is unfair, arguing that the click-through is at least partially a function of the "creative" and not under the publisher's control. On the other hand, as we argued above, applying only traditional media exposure models to the Web does not take into account its unique, interactive nature. Additionally, the Internet is the first commercial medium in which it is actually possible to measure consumer response, not just assume it. Thus, although the click through model may not represent the optimal approach to measuring the value of interactivity, it offers a departure point from which to proceed.

3.2.3) Interactivity. While payment based upon click through guarantees exposure to target ads, it does not guarantee that the visitor liked the ad, or even spent any substantial time viewing the ad. *We propose that a further measure of the value of an advertisement should be based upon the degree to which the visitor interacts with the target ad.* Such an interactivity metric could be based upon duration time spent viewing the ad, the depth or number of pages of the target ad accessed, or the number of repeat visits to the target ad.

Recently, a member of the Online Advertising Discussion List (1996) announced to the list that Modem Media, the interactive advertising agency, had developed a pricing model in which its clients will pay, not for exposures or click-through, but only for activity at the client's Web site. This has raised anew the controversy surrounding the best Web media pricing models, with Web publishers arguing that that the problem with activity-based measures like click-through or interactivity is that the Web publisher cannot be held responsible for the activity related to an advertisement. An analogy is drawn with print, in which the Web publisher would argue that the print medium charges for ads whether or not they lead to sales.

Not surprisingly, advertisers and their agencies argue that since the Web medium allows for accountability, models can and should be developed which measure consumer behavior. In the long run, the solution will probably be found by accepting the reality that the medium and the advertisement interact and that all parties share responsibility for outcomes.

3.2.4) Outcomes. Ultimately, marketers are interested in outcomes, and the ultimate outcome is purchase. As Stephen Klein of I/Pro stated, "One hundred thousand people going to a site is worth something, but a site that only five people visit can be worth more if they are the right five people" (Murphy 1996).

The metrics discussed thus far relate to early stages of the purchase process. Banner ads affect the consumer's awareness, and interaction with the target ad affects the consumer's comprehension and understanding. Beyond these initial stages are the marketing objectives of attitude change, purchase intention, and ultimately, purchase.

An outcome-based approach to pricing Web advertising begins by specifying exactly what the marketer would like the target ad to do. Examples of typical outcomes include influencing attitudes, motivating the consumer to provide information about him or herself, or leading the consumer to purchase. Whatever the marketing objective, the Web provides a vehicle for integrated marketing campaigns that allows the marketer to track and measure the advertisement's effectiveness.

A current example is PI ads (per inquiry) - these ads pay a royalty on actual product sales, but require no upfront payment. Consider the "Associates Program"(1) offered by amazon.com, a million-title Web-based book store. Thus far, over 300 Web sites have joined the Associates program. In this program, Associates advertise books sold by amazon.com that they feel are appropriate to the content of their Web site. If a visitor accesses amazon.com through the Associate's Web site and purchases the book advertised on the Associate's site, the Associate receives a referral fee of up to 8% of the purchase price of the book.

The next step is to develop a set of integrated response measures (over time and possibly over sites) that relate exposure and interactivity metrics to consumer response. This make take the form of, for example, purchase behavior in an online storefront, attitude change, number of visitors who request further information, and so on. However, the development of such metrics requires two things: 1) identified visitors, and 2) multi-site data on every Web site involved in the integrated marketing campaign. Until these data are available, the measurement of outcome remains elusive.

3.3) Industry Players

In this section, we categorize the competitors in the Web measurement business. This categorization proceeds by organizing firms' offerings according to the functions each serves. These functions include Measurement & Analysis, Auditing, Advertising Support, and Standards. We define each function briefly below.

Our intent is not to review in detail what each product does or how (or even how well) it does it, but instead to summarize the competitors and their alliances in terms of the markets in which they compete. Every effort has been made to sketch these relationships accurately, but the fast-moving nature of the Web measurement industry means that some inaccuracies are possible. In Tables 2 through 5 that follow, we list firms within each category in alphabetical order, list the products each firm offers within that category, table its strategic partners, and then offer any relevant observations. Partners are classified according to whether they are investors, owners, or involved in a strategic alliance. As the tables make clear, there is an enormous amount of activity in this emergent industry.

3.3.1) Visitor Measurement & Analysis. The Web measurement process involves counting and summarizing the visitor transactions on a Web site. Measurement and analysis products tell managers who is accessing their site, when, and what is being accessed. Different products perform these tasks at different levels of specificity and with different degrees of accuracy.

3.3.2) Auditing. Traditionally, the auditing process involves the objective evaluation of transaction counts by an independent agency. The purpose of the audit is to produce validated data that permits advertisers to compare Web sites in the context of the media buy. A "trusted" third party is sought to avoid any potential or actual conflicts of interest. In the Web medium, the auditing function is served both by traditional media auditors and firms that engage in the measurement process.

While prevailing industry wisdom is that independent third party audits are necessary for potential advertisers to trust traffic claims of Web sites, there are some dissenting viewpoints. Rick Boyce, vice president and director of advertising sales at *HotWired* has been quoted as saying, "No one has come up to me yet and said, 'We won't buy your site because you haven't had an independent audit. We built our own tools that allow us to measure impressions and click-throughs. But, we're different because our brand name indicates quality" (Murphy 1996). Thus, the key issue is advertiser trust, and it remains to be seen whether independent third party auditing is the only method for securing such trust.

3.3.3) Advertising Support. Recently, the industry has seen the emergence of firms dedicated to supporting the advertising function. These firms offer products that aid the advertiser, the agency, and/or the Web publisher, in the various aspects of the online media buy.

3.3.4) Standards. Numerous firms and organizations have signaled their intent to set measurement standards for Web advertising. The point of such standards is to facilitate the measurement process (what should be measured and how should it be measured?) and define universal criteria for verification of visitor measurements claimed by commercial Web sites.

Numerous strategic and policy issues affect the standards-setting process, including whether trust of the auditing function requires an independent third-party in the measurement process, and how to protect consumer privacy in the

face of extensive "clickstream" data collection efforts.

Table 2: Industry Players: Visitor Measurement & Analysis

Firm	Products	Partners	Comments
Allen Marketing Group, Inc. www.allen.com	Guest Track	.	Registration program that builds profiles of registered users and links them with log file to enable customized presentations.
Andromedia www.andromedia.com	Aria Web Recording and Reporting SystemVisiTrac (co-branded version of Aria with K2 Design)	Draper Richards, LP (investor) K2 Design (strategic alliance) Platinum Ventures (investor) Softbank Corporation (investor)	.
Bien Logic www.bienlogic.com	Surf Report	.	.
Clickshare www.clickshare.com/clickshare	Clickshare Access and Payment System	.	Registration program that tracks consumers via unique ID enabling multi-site user authentication, microtransaction billing and settlement, and cross-site access measurement; Newshare Corp. Spinoff.
Everyware www.everyware.com	Bolero	.	.
Group Cortex, Inc. www.cortex.com/sitetrack	Site Track	.	.
Interse www.interse.com	Market Focus	Arbitron New Media (strategic alliance)	Meets ABVS standards
I/PRO www.ipro.com	I/CODE Nielsen I/PRO I/COUNT	CyberAtlas (acquisition) DoubleClick (strategic alliance) Hearst Corporation (investor) NetGravity (strategic alliance) Nielsen Media Research (strategic alliance) Softbank Corporation (investor) Verifone (strategic alliance)	I/CODE is a registration program
Firm	**Products**	**Partners**	**Comments**

Logical Design Solutions www.lds.com/prodserv/prodserv.html	LDS WebTrac	Save the Children (strategic alliance)	Can match log file data to external databases
NetCount www.netcount.com	NetCount Basic NetCount Plus NetCount HeadCount	Price Waterhouse (investor)	Spin off of Digital Planet; products will be marketed under the NetCount/Price Waterhouse name
net.Genesis www.netgen.com	Net.Analysis	.	.
The NPD Group, Inc. www.npd.com	PC-Meter	.	Household panel provides demographic data on home PC usage patterns, including time spent on specific pages of the World Wide Web, in departments of on-line services, and in desktop applications.
Open Market www.openmarket.com/omi/products/webreport.html	WebReporter	.	.
Software, Inc. www.webtrends.com	WebTrends	.	Inexpensive product targeted to small and mid-size Web sites.
Webthreads www.webthreads.com	Webthreads 1.01	.	.
WebWatch www.webwatch.com	WebWatch	.	.
W3.Com w3.com	Web Site Toolkit	.	tracking system used to modify the site for different users based on profiles and browsing behavior

Table 3: Industry Players: Auditing

Firm	Products	Partners	Comments
Audit Bureau of VerificationServices (ABVS) www.accessabvs.com	Interactive Auditing Service	Audit Bureau of Circulations (wholly owned subsidiary) Interse (strategic alliance)	working with MarketArts WebFacts (formerly WebTrack);
Business Publication Association (BPA)	.	.	.
Interse www.interse.com	Interse/ABVS Daily Report Interse/ABVS Monthly Report	.	.
I/PRO www.ipro.com	Nielsen I/PRO I/AUDIT	Nielsen Media Research (strategic alliance)	can a measurement and analysis company also do independent, third-party auditing?

MarketArts WebFact WebStat www.marketarts.com	.	.	collaborating with Audit Bureau of Circulations (ABC) through a subsidiary known as Audit Bureau of Verification Services;beta-testing its auditing service at CondeNet, Atlantic Monthly, TimesFax, and Adfinder WSJ
WebWatch www.webwatch.com	.	.	.
NetCount www.netcount.com	NetCount Rate and Ranking Service	.	can a measurement and analysis company also do independent, third-party auditing?

Table 4: Players: Advertising Support

Firm	Products	Partners	Comments
Competitive Media Reporting	AdLab	USAData (strategic alliance)	.
DoubleClick www.doubleclick.net	.	I/PRO (strategic alliance)	"on demand" advertising; Poppe Tyson spin off; specializes in customized ad delivery
Focalink www.focalink.com	MarketMatch SmartBanner	.	customized ads SmartBanner matches ads to visitors and tracks ad volume MarketMatch database for agencies to assist in media buy
Jupiter Communications www.jup.com	AdSpend	.	formerly WebTrack
NetCount www.netcount.com	NetCount AdCount	.	Measurement of the performance and effectiveness of online advertisements
NetGravity www.netgravity.com	AdServer	I/PRO (strategic alliance)	management of online advertising; ad inventory management, dynamic ad targeting, real-time information andsales process automation; AdServer schedules and tracks ads across Web pages (e.g. Yahoo uses it to schedule and track 12,000 banners across 200,000 pages)
PointCast Network www.pointcast.com	SmartAd Broadcast System (SBS)	ABVS Interactive auditing (strategic alliance)	.

Table 5: Industry Players: Standards

Firm	Products	Partners	Comments
Audit Bureau of Verification Services (ABVS) www.accessabvs.com	Interactive Auditing Service	.	subsidiary of Audit Bureau of Circulations (ABC); working with MarketArts WebFacts (formerly WebTrack)

Better Business Bureau www.bbbonline.org	BBBOnLine	AmeriTech (founding sponsor) AT&T (founding sponsor) Eastman Kodak (founding sponsor) Federal Trade Commission (strategic alliance) GTE (founding sponsor) Hewlett Packard (founding sponsor) Netscape (founding sponsor) Sony (founding sponsor) Visa (founding sponsor)	Online program (1997 launch) operates as a seal of approval for Web sites in compliance with traditional BBB standards for customer service and marketplace ethics (BBB Code of Advertising)
BPA International www.bpai.com	BPA Interactive	.	International board of directors comprised of advertisers, agencies, and publishers
CASIE www.commercepark.com /AAAA/bc/casie/guide.html	CASIE Guiding Principles of Interactive Media Audience Measurement	.	Joint project of the Association of National Advertisers and the American Association of Advertising Agencies withthe support of the Advertising Research Foundation.
Interactive Alliance www.arbitron.com/nmcmi.html	Cyber Measurement Index	Audit Bureau of Circulations (strategic alliance) Clickshare (member) Interse (member) McCollum Spielman Worldwide (member) MarketCast (member) 40 other "alliance advisors"	Founders: Arbitron Company (Arbitron NewMedia) and Next Century Media, Inc.
Internet Advertising Bureau iab@edelman.com	No proposal to date	.	Formerly the Internet Advertising Council and the Web Advertising Bureau organization for ad-supported Web site and online services; Will work with Coopers & Lybrand to measure ad revenues on the Internet; First public accounting will be released in the fall.
Magazine Publishers of America (MPA) www.magazine.org /mpainfo/mpainfo.html	Proposed Standards for Internet Advertising Measurement	.	.

Newspaper Association of American (NAA) www.naa.org	The Conaghan Report: Tracking Audience and Advertising on the Web	.	.
World Wide Web Consortium (W3C) www.w3.org	No proposal to date	INRIA (host) Keio University (host) MIT (host)	Darpa provided seed funding; EC provides financial support.

3.4) Current Industry Terminology Used in Web Advertising Measurement

What do people do on the Web? Why are they doing it? As most would agree that hits are meaningless as comparative measures of visitor behavior on the Web, Web sites now tend to report visits. But, what exactly does a "visit" mean? Can Web publishers provide even the most basic descriptive statistics about their sites, including how many unique visitors are coming, how often users visit, where they tend to come from, how long they stay, the average number of pages per visit, the four or five most popular navigation patterns through the site, the most popular pages, the least popular pages, and so on?

Clear, standardized terminology and measurement procedures are needed to 1) define visits to Web sites, 2) describe consumer behavior during a visit, and 3) relate visits to interactivity and outcomes. Such standards are critical to demonstrate the viability of the Web as a commercial medium, and provide mechanisms for tracking usage as well as measuring investment opportunities and business success.

We have organized definitions currently used by the Web advertising industry in Tables 6 through 12. These definitions were compiled from the following five sources:

IPRO:	www.ipro.com/faq.html
CASIE:	www.commercepark.com/AAAA/bc/casie/guide.html
TRAFFIC RESOURCE:	www.trafficresource.com/glossary.html
Interse:	www.interse.com/ourproducts/faq.html
NetCount:	www.netcount.com/glossary.html

Unfortunately, these definitions do not always agree. Nevertheless, they provide a good starting point for developing clearer definitions. We organize the current terminology according to three categories:

Definitions:	Hits, Visitor/User, Visit/Session, Ad/Page
Exposure measures:	Ad Views, Page Views, Site Visits
Interactivity measures:	Ad Clicks/Clickthrough, Duration Time

The "Definitions" category includes basic terminology necessary to construct advertising measures. The advertising measures include Exposure and Interactivity measures.

3.4.1) Hit (Definitions)

Hits have been widely criticized as a measure of Web traffic. While the definitions of hits are quite consistent, the weakness of hits as a valid measure of traffic to a Web site is quite evident. Since hits includes all units of content (images, text, sound files, java applets) sent by a Web server when a particular URL is accessed, hits are inherently noncomparable across Web sites. The definitions are presented here only for completeness, not because we believe there is any validity to reporting hits. Other than ignorance of the meaningless of hits, the only reason we feel a Web site would report numbers of hits is that this is typically a large and very impressive sounding number.

Table 6: Definitions of Hits

hits	When visitors reach a Web site, their computer sends a request to the site's computer (server) to begin displaying pages. Each element of a requested page (including graphics, text, interactive items) is recorded by the site's Web server log file as a "hit." Because page designs and visit patterns vary from site to site, the number of hits bears no relationship to the number of pages viewed or visits to a site. [IPRO]
hits	The number of page and/or graphic files requested by visitors. A single page with multiple graphics can be counted as multiple hits since each graphic is counted as a separate hit. [TRAFFIC]
hits	The equivalent of advertising impressions here defined as "the gross number of files accessed from X site or domain during Y time." There are variable numbers of deeper files attached by hyperlinks to each page in cyberspace, making this a "rubber yardstick." As explained above, a "clickable element" is a hyperlink allowing a one-click movement to the deeper file behind the page functioning as a menu for that deeper file. Hits implies that the user has been exposed to the deeper material which may never have been selected for display on the screen. As an example, a one-second visit to a home page containing 35 hyperlinks counts as 35 hits within the current Hypertext Transfer Protocol. [CASIE] note: actually a visit measure, not a definition
request	A request is a connection to an Internet site (i.e., hit) that successfully retrieves content. Unlike a hit, a request doesn't include client or server "errors." Requests counts are conservative because browser software and many Internet gateways intercept some requests before reaching the server, and these cached requests are never logged. [Interse]
request	When a Browser asks a Web server for some unit of content. Common units of content include: images, text, pages, sound clips, video files, Shockwave files, and Java applets. [NetCount]
transfer	When a Browser completely receives a unit of content from a Web server. Note: Streamed content (such as RealAudio or Streamworks) is measured differently and does not require a complete download in order to be considered successfully transferred. [NetCount]
qualified hits	A further refinement of hits, qualified hits exclude less important information recorded in a log file as hits such as error messages, etc. While qualified hits provide a better idea of traffic volume, it is not an accurate assessment of the actual number of users. [IPRO]
click	NetCount has resolved the hit dilemma by not counting hits at all, instead reporting Page Information Requests (PIRs) and successful Page Information Transfers (PITs). PITs are a true measurement of page deliveries going beyond page requests. [NetCount]

3.4.2) Visitors/Users (Definitions)

With the exception of the CASIE definitions, visitors or users represent individuals who visit Web sites. The definitions differ according to how much is known about an individual visitor/user.

Note that CASIE defines users as the *number* of users. This is less precise than the other definitions which define a user or visitor as a person who visits a Web site. When reporting *numbers* of visitors, we prefer to use the metrics of exposures, reach and frequency discussed later in Section 4.3.2.

Table 7: Definitions of Visitors and Users

visitor	An individual that visits a web site. [TRAFFIC]
user	An uniquely identifiable person. An accurate count of users is not possible without some form of registration or authentication [NetCount]
user	A user is anyone who visits the site at least once. [Interse]
users	"the number of different people visiting X site or domain during Y time." (Reach) [CASIE] note: actually a visit measure, not a definition
unique visitor	A visitor that can be qualified as a unique individual within a given period of time. The period of time can vary, but is usually between a half hour and an hour. [TRAFFIC]

unique user	The number of different individuals who visit a site within a specific time period are called unique users. To identify unique users, Web sites rely on some form of user registration or an identification system such as I/CODE. [ICODE]
unique user	A user is anyone who visits the site at least once. Interse market focus goes through a series of attempts to recognize unique users. If your extended log files contains persistent cookie data, the software uses this data to recognize unique users. If no cookie data is available, the software uses a registered username to recognize users. If no registration information is available, the software uses as a last resort, users' Internet hostnames. Many organizations use Internet gateways, which mask the real Internet hostnames, so user counts may be conservative for those users determined through their Internet hostnames. [Interse]
identified user	A user for whom demographics are known and available. [NetCount]
identified user	"demographic measures of visits or users relating to X site or domain during Y time." (Demographics) [CASIE]

3.4.3) Visit/Session (Definitions)

Visits and sessions are defined in Table 8. Again, CASIE defines a visit as the number of visits, while we favor the other definitions that simply say what a visit is. This is because there are a variety of ways visits to a site can be counted (i.e. site exposure vs. site reach), and the definition of the method of counting visits should be independent of the definition of a visit itself.

The ability to clearly define a visit depends upon whether a visitor can be uniquely identified. If not, heuristics, such as the 30-minute timeout incorporated in the IPRO and Interse definitions, must be used to define a visit.

Table 8: Definitions of Visits and Sessions

visit	A visit is commonly defined as a sequence of requests made by one user. Once a visitor stops making requests from a site for a given period of time, called a time out, the next hit by this visitor is considered a new visit. To simplify comparisons, I/PRO uses a 30-minute time out to determine the start of a new visit. I/PRO determines site visits by adding visits from single-user Internet addresses,that can be tracked and identified, to a count of multi-user addresses. I/PRO uses a proprietary algorithm to convert multi-user hits into discrete visits. [IPRO]
visit	A visit is a series of consecutive requests from a user to an Internet site. If your log files include referrer data, then new visits begin with referring links external to your Internet site. Regardless of whether or not you have referrer data, if a user doesn't make a request for 30 minutes, the previous series of requests is considered a completed visit. [Interse]
visit	A series of transactions performed by a user at a single Web site. This differs from a "session". [NetCount]
visit	"the gross number of occasions on which a user looked up X site or domain during Y time." (Gross Exposures) [CASIE]
session	A series of transactions performed by a user that can be tracked across successive Web sites. For example, in a single session, a user may start on a publisher's Web site, click on an advertisement and then go to an advertiser's Web site and make a purchase. [NetCount]

3.4.4) Ads and Pages (Definitions)

Note that the definitions of "banner" and "advertisement" in Table 9 are very similar, with both referring to what we have previously called the passive "banner ad."

Table 9: Definitions of Ads and Pages

banner	An image on a sponsorable site that functions as a link to the advertiser's site. Banner size is usually measured in pixels: width x height. [IPRO]

advertisement	Typically a clickable image or a Java applet on a publisher's Web site, an advertisement is usually hyperlinked to a page on the advertiser's Web site. [NetCount]
Web page	All Web sites are collections of electronic "pages." Each Web page is an HTML (Hyper Text Markup Language) document that may contain text, images or media objects. A page can be either static or dynamically generated. The best known page is the "home page," which is usually a visitor's first point of entry and which usually features an index to a Web site. [IPRO]

3.4.5) Ad Views, Page Views, Site Visits (Exposure Measures)

Table 10 presents definitions of various "exposure measures" that have been proposed. For an page which contains a banner ad, ad view, page view, exposure and impression are equivalent.

Table 10: Definitions of Exposure Measures

ad views	Number of times an ad banner is downloaded and presumably seen by visitors. If the same ad appears on multiple pages simultaneously, ad views may understate the number of ad views, due to browser caching (see definition below). Corresponds to net impressions in traditional media. [IPRO]
adviews /exposures /impressions	The number of times that a banner has been presented to visitors. (equivalent to exposures or impressions) [TRAFFIC]
exposure	An Exposure is counted each time an advertisement is delivered by a Web server. Exposures can be used by Web publishers to validate the number of "impressions" that were delivered at their Web site. Exposures can be reported for stationary ads as well as for ads that rotate throughout a Site. [NetCount]
page views	Number of times a user requests a page which may contain a particular ad. Indicative of the number of times an ad was potentially seen, or "gross impressions." Page views overstate ad impressions when users turn "Auto Load Images" off to speed browsing. [IPRO]
page views	The number of times a particular Web page has been presented to visitors. [TRAFFIC]
weekly visits	The number of visitors to a web site in a given week. Multiple visits may be generated by one person. [TRAFFIC]

3.4.6) Ad Clicks/Click Through (Interactivity Measures)

Tables 11 and 12 present various "interactivity measures." The measures in Table 11 are primarily definitions of the click-through rate. Some definitions of click-through rates that have appeared in the business press lack common sense. For example, *Marketing News* (1996) offers the following definition: "The click-through rate divides the number of click-throughs by the number of hits to measure interest in an individual hot-linked ad." Considering our discussion of hits in 3.4.1, division by number of hits will make the resulting quantity completely meaningless.

Table 12 introduces the idea that interactivity can be captured through the measurement of duration time. The theoretical rationale for this notion is discussed in Hoffman and Novak (1996). Empirical support for the principle is offered by Resnick (1996).

Table 11: Definitions of Click Through Measures

ad clicks	The number of times users "click" on an ad banner to request additional information from the advertiser. Typically, users are directed ("hot-linked") to the advertiser's Web site. [IPRO]
ad click rate	Sometimes referred to as "click-through rate," this is the number of ad clicks as a percentage of ad views. [IPRO]
clicks/adclicks	The number of times that an ad has been clicked by visitors. A measure of response to an ad placement. [TRAFFIC]

click rate	The percentage of visitors that view an ad and click on it. [TRAFFIC]
inquiry	Inquiries: An Inquiry is counted each time a user clicks on an advertisement. Inquiries can be used by Web advertisers to gauge the response to their ads. By monitoring the number of Inquiries generated by an advertisement on a regular basis, advertisers can experiment with content and placement to see how changes affect response rates. The immediacy of AdCount's reporting allows an advertiser to quickly respond to declining Inquiry rates by changing a banner and then watching to see if rates improve. [Netcount]
click-through rate	Click-Throughs: To complete the equation, AdCount watches to see how many Inquiries result in successful Click-Throughs to the advertiser's Web site. A Click-Through is an accurate count of the number of times that a user left a publisher's Web site and successfully arrived at an advertiser's Web site. This provides a reconciliation for the times when a user clicks on an advertisement but receives a "server busy" error instead of arriving at the advertiser's Web site. [Netcount]

3.4.7) Duration Time (Interactivity Measures)

Table 12: Definition of Duration Time Measures

average time on page	The average amount of time spent by a user on a single Web page. Note: As users have the ability to temporarily leave a Web site and then return to the same page via the "back" button in their Browser, the average time spent on a page will not be 100% accurate.However, for a highly viewed page, the average time on page will be nearly 100% accurate. [NetCount]

4) Proposed Standardized Terminology for Web Advertising Measurement

4.1) Overview

There are three distinct levels of analysis for Web advertising measurement: (1) vehicle level, (2) page level, and (3) ad level. The ultimate objective is, by linking the various measures to consumer outcomes, to quantify the value of a visit to commercial sponsors.

For each level of analysis, there are *exposure metrics* and *interactivity metrics.* Exposure metrics are based upon the one-to-many communication model underlying traditional media, and indicate that a visitor has been exposed to (i.e. has had the opportunity to view) a web site, a web page, or an advertisement. Interactivity metrics are based upon the many-to-many communication model underlying the Web, and indicate the extent to which the visitor actively engages with the Web content or advertisement.

Exposure metrics can be behavioral (i.e. reach and frequency) or cognitive/attitudinal (i.e.recall and recognition). Similarly, interactivity metrics can be behavioral (i.e. duration time) or cognitive/attitudinal (i.e. flow (Hoffman and Novak 1996)). In this paper, we focus exclusively upon *behavioral* exposure and interactivity metrics for Web advertising measurement.

Considering these three levels of analysis, the following table presents traditional media analogs and examples of currently used exposure metrics.

Table 13: Current Metrics Used In Web Measurement

	Vehicle level	Page level	Ad Level
Unit of Analysis	Web site	Site section or page	Sponsor's Ad page
Traditional Media Analogs	Reach/frequency Circulation Ratings	Frequency Gross impressions	Recall Recognition

Current exposure metrics	Number of site accesses/visits per day Site access/visit based ratings	Number of page accesses/ visits per day	Number of ad page accesses/ visits per day

4.2) Summary of Metrics

Now consider the next table which summarizes our proposed behavioral exposure and interactivity metrics. All of these metrics are defined in detail subsequently.

Table 14: Summary of Proposed Metrics for Web Measurement

	Vehicle level	**Page level**	**Ad Level**
Exposure Metrics	Site Exposures Site Exposure Duplication Site Reach Site Frequency	Page Exposures Page Reach Page Frequency	Banner Ad Exposures Target Ad Exposures Banner Ad Reach Target Ad Reach Banner Ad Reach Duplication Banner Ad Frequency Target Ad Frequency Banner Ad Visit Frequency Target Ad Visit Frequency
Interactivity Metrics	Visit Duration Time Inter-Visit Duration Time Raw Visit Depth Visit Depth	Page Duration Time	Ad Click-Through Ad Click-Through Reach Ad Click-Through Frequency Ad Click-Through Duplication Banner Ad Duration Time Target Ad Duration Time

4.3) Definitions of Metrics

The following table summarizes the basic constructs needed to construct the various exposure and interactivity metrics. The table is followed by definitions of the basic constructs, exposure metrics, and interactivity metrics.

For example, to obtain "Banner Ad Exposures," one needs either unidentified, session, tracked, or identified visitors, plus information concerning whether the visitor was exposed to the banner ad.

Table 15: Basic Constructs Used to Derive Exposure and Interactivity Metrics

BASIC CONSTRUCTS:

Unidentified Visitor	**Session Visitor**	**Tracked Visitor**	**Identified Visitor**	**Banner Ad**	**Target Ad**	**Web Page**	**Visit**	**Duration Time**	**Multi-Site Data**	
.	.	.	.	.	.	.	.	.	.	**EXPOSURE CONSTRUCTS:**
X	**X**	**X**	**X**	**X**	**X**	.	.	.	.	Banner Ad Exposures
X	**X**	**X**	**X**	.	**X**	.	.	.	.	Target Ad Exposures
.	**X**	**X**	**X**	.	.	.	**X**	.	.	Page Exposures
.	.	**X**	**X**	.	.	.	**X**	.	**X**	Site Exposure Duplication

.	.	X	X	X	.	.	.	.	.	Banner Ad Reach
.	.	X	X	.	X	.	.	.	.	Target Ad Reach
.	.	X	X	.	.	X	.	.	.	Page Reach
.	.	X	X	.	.	.	X	.	.	Site Reach
.	.	X	X	.	.	.	X	.	X	Banner Ad Reach Duplication
.	.	X	X	X	.	.	.	.	.	Banner Ad Frequency
.	.	X	X	.	X	.	.	.	.	Target Ad Frequency
.	.	X	X	.	.	X	.	.	.	Page Frequency
.	.	X	X	.	.	.	X	.	.	Site Frequency
.	X	X	X	X	.	.	X	.	.	Banner Ad Visit Frequency
.	X	X	X	.	X	.	X	.	.	Target Ad Visit Frequency
										INTERACTIVITY METRICS:
.	.	X	X	X	X	.	X	.	.	Banner Ad Effective Frequency
.	.	X	X	X	X	.	X	.	.	Banner Ad Effective Reach
.	X	X	X	X	X	.	X	.	.	Banner Ad Effective Visit Frequency
.	X	X	X	X	X	.	X	.	.	Banner Ad Effective Visit Reach
.	X	X	X	X	X	.	.	.	.	Ad Click-Through
.	.	X	X	X	X	.	.	.	.	Ad Click-Through Reach
.	.	X	X	X	X	.	.	.	.	Ad Click-Through Frequency
.	.	X	X	X	X	.	.	.	X	Ad Click-Through Duplication
X	X	X	X	X	.	.	.	X	.	Banner Ad Duration Time
X	X	X	X	.	X	.	.	X	.	Target Ad Duration Time

X	X	X	X	.	.	X	.	X	.	Web Page Duration Time
.	X	X	X	.	.	.	X	X	.	Visit Duration Time
.	.	X	X	.	.	.	X	X	.	Inter-Visit Duration Time
.	.	X	X	.	.	.	X	X	X	Session Duration Time
.	X	X	X	.	.	X	X	.	.	Raw Visit Depth/ Visit Depth

We now present formal definitions of Basic Constructs, Exposure Metrics, and Interactivity Metrics.

4.3.1) Basic Constructs

VISITORS:

Unidentified Visitor. A visitor is an individual who visits a web site. An "unidentified visitor" means that no information about that visitor is available.

Session Visitor. A session ID is available (e.g. cookie or token) or inferred (e.g. incoming IP address plus browser type) which allows a visitor's responses to be tracked within a given visit to a Web site.

Tracked Visitor. An ID is available (e.g. cookie) which allows a user to be tracked across multiple visits to a Web site. No information, other than a unique identifier, is available for a tracked visitor.

Identified Visitor. An ID is available (e.g cookie, voluntary registration) which allows a user to be tracked across multiple visits to a Web site. Other information, possibly supplied voluntarily by the visitor (e.g. name, demographics) can be linked to this ID. Another way to obtain an identified visitor is to develop a Web gateway or panel (e.g. WebTV or PC Meter) that captures a complete record of a visitor's behavior.

WEB CONTENT:

Banner Ad. A simple advertisement whose purpose is to attract a visitor's attention so that the visitor will click on the banner ad and be exposed to the target ad. One or more banner ads appear on a Web Page.

Target Ad. The full advertisement, which may range from a single Web page to an entire corporate Web site.

Web Page. Any HTML document, either static or dynamically generated, which contains text, images, or media objects.

Visit. A series of consecutive Web page requests from a visitor to a Web site. Once a visitor stops making requests from a site for a given period of time (e.g. 30 minutes), the next request by the visitor is considered a new visit.

Session. A series of consecutive visits made by a visitor to a series of Web sites.

OTHER:

Duration Time. The length of time between two events, such as successive requests to one or more Web pages (page duration), or visits to a given Web site (inter-visit duration).

Multi-Site Data. ID's are available which allow tracked or identified visitors to be followed across multiple Web sites.

4.3.2) Exposure Metrics

EXPOSURES:

Banner Ad Exposures. Total number of times visitors were exposed to a banner ad in a time period, without regard to visitor duplication (passive exposure).

Target Ad Exposures. Total number of times visitors were exposed to a target ad in a time period, without regard to visitor duplication (active exposure).

Page Exposures. Total number of times visitors were exposed to a Web page in a time period, without regard to visitor duplication (active exposure).

Site Exposures. Total number of visitor sessions at a Web site in a time period, without regard to visitor duplication (active exposure).

Site Exposure Duplication. The number/percentage of unique visitors to a set of Web sites who visit more than one of the Web sites, in a time period.

REACH:

Banner Ad Reach. Total number of unique visitors exposed to a banner ad in a time period.

Target Ad Reach. Total number of unique visitors exposed to a target ad in a time period.

Page Reach. Total number of unique visitors exposed to a Web page in a time period.

Site Reach. Total number of unique visitors at a Web site in a time period.

Banner Ad Reach Duplication. The number/percent of unique visitors to a set of Web sites who are exposed to the same banner ad at more than one of the Web sites, in a time period.

FREQUENCY:

Banner Ad Frequency. The distribution of the number of times unique visitors were exposed to a banner ad in a time period.

Target Ad Frequency. The distribution of the number of times unique visitors were exposed to a target ad in a time period.

Page Frequency. The distribution of the number of times unique visitors were exposed to a Web page in a time period.

Site Frequency. The distribution of the number of times unique visitors came to a Web site in a time period.

Banner Ad Visit Frequency. The distribution of the number of times visitors are exposed to a banner ad during a single visit, without regard to visitor duplication across visits.

Target Ad Visit Frequency. The distribution of the number of times visitors are exposed to a target ad during a single visit, without regard to visitor duplication across visits.

4.3.3) Interactivity Metrics

EFFECTIVE REACH & FREQUENCY

Banner Ad Effective Frequency. The optimal number of prior exposures to a banner ad, in one or more visits, required for a visitor to click on the banner and be exposed to the target ad. This must be empirically determined

from the available data.

Banner Ad Effective Reach. Total number of unique visitors exposed to a banner ad a sufficient number of times (i.e., at an *effective frequency*) in one or more visits in a time period.

Banner Ad Effective Visit Frequency. The optimal number of exposures to a banner ad, within a single session, required for a visitor to click on the banner and be exposed to the target ad. This must be empirically determined from the available data.

Banner Ad Effective Visit Reach. Total number of unique visitors exposed to a banner ad a sufficient number of times (i.e., at an *effective visit frequency*) in a single visit.

CLICK-THROUGH:

Ad Click-Through. The percentage of time visitors who were exposed to a banner ad clicked on the banner and were then exposed to the target ad in a time period, without regard to visitor duplication.

Ad Click-Through Reach. Total number of unique visitors who clicked on a banner ad and were exposed to the target ad in a time period.

Ad Click-Through Frequency. The distribution of the number of times unique visitors clicked on a banner ad and were exposed to the target ad in a time period.

Ad Click-Through Duplication. The number/percentage of unique visitors to a set of Web sites who clicked on a banner ad and were exposed to the target ad at more than one of the Web sites, in a time period.

DURATION TIME:

Banner Ad Duration Time. The length of time a visitor is exposed to a Web page containing a Banner Ad. Can be reported as an average or distribution in a given time period,without regard to visitor duplication. [If have tracked/identified visitors, can also determine the total length of time unique visitors are exposed to a banner ad in a time period].

Target Ad Duration Time. The length of time a visitor is exposed to a target ad. Can be reported as an average or distribution in a given time period,without regard to visitor duplication. [If have tracked/identified visitors, can also determine the distribution of the total length of time unique visitors are exposed to a target ad in a time period].

Web Page Duration Time. The length of time a visitor is exposed to a Web page. Can be reported as an average or distribution in a given time period, without regard to visitor duplication. [If have tracked/identified visitors, can also determine the distribution of the total length of time unique visitors are exposed to a Web page in a time period].

Visit Duration Time. The length of time of a visit to a Web site. Can be reported as an average or distribution in a given time period, without regard to visitor duplication. [If have tracked/identified visitors, can also determine the distribution of the total length of time unique visitors spent at a Web site in a time period].

Inter-Visit Duration Time. The length of time between successive visits to a Web site. Can be reported as an average or distribution in a given time period, for unique visitors.

Session Duration Time. The length of time of a series of consecutive visits to a series of Web sites (I.e. Session length). [If have tracked/identified visitors, can also determine the distribution of the total length of time unique visitors spent on the Web - across sites - in a time period.]

DEPTH:

Raw Visit Depth: Total Web pages exposure/session. The total number of pages a visitor is exposed to during a single visit to a Web site. Can be reported as an average or distribution in a given time period, without

regard to visitor duplication.

Visit Depth: Total unique Web page exposures/session. The total number of unique pages a visitor is exposed to during a single visit to a Web site. Can be reported as an average or distribution in a given time period, without regard to visitor duplication.

4.4) Additional Measurement Constructs

Besides the measures we have described in section 4.3, there are additional statistics that could and should be considered in the context of Web advertising measurement. While we do not discuss these additional measures in this paper, they include:

- Primary navigation patterns through the Web site.
- Cross-site navigation patterns.
- Demographic, psychographic, and behavioral characteristics of visitors to a Web site, and to specific pages within a Web site.
- Cognitive and attitudinal measures, including flow.
- Visitor loyalty and repeat visits.

4.4.1) Outcome metrics. In addition to the behavioral and psychological measures considered above, outcome metrics must be developed. Although the models most frequently applied to the Web are based on traditional, mass media models, it makes sense to consider the direct response paradigm. Consider the following definition of direct marketing (Direct Marketing Association 1996):

> *any direct communication to a consumer or business recipient that is intended to generate a response in the form of an order (direct order), a request for further information (lead generation), and/or a visit to a store or other place of business for purchase of a specific product(s) or service(s)(traffic generation).*

The concepts of "direct order," "lead generation," and "traffic generation" are immediately and obviously applicable in the many-to-many environment underlying the Web. Consider the DMA's (1996) definitions of these "intended purposes":

> **Direct Order** includes all direct response advertising communications - through any medium - that are specifically designed to solicit and close a sale. All of the information necessary for the prospective buyer to make a decision to purchase and complete the transaction is conveniently provided in the advertisement.
>
> **Lead Generation** includes all direct response advertising communications - through any medium -that are designed to generate interest in a product or a service, and provide the prospective buyer with a means to request and receive additional information about the product or service.
>
> **Traffic Generation** includes all direct response advertising communications conducted - through any medium - that are designed to motivate the prospective buyer to visit a store, restaurant, or other business establishment to buy an advertised product or service.

We believe that outcome definitions and metrics developed from considering the Web as a unique hybrid of direct response and traditional communication media will lead to the optimal set of models for measurement and pricing.

5) Recommendations for Web-Based Advertising Measurement Standards

Figure 1 organizes many of the Exposure (rectangular boxes) and Interactivity (boxes with rounded corners) metrics and relates them to consumer outcomes. Consumer outcomes are defined in terms of a standard hierarchy of effects model (Vaughn 1979). This is a very preliminary diagram, and it is intended to suggest research hypotheses that can be tested.

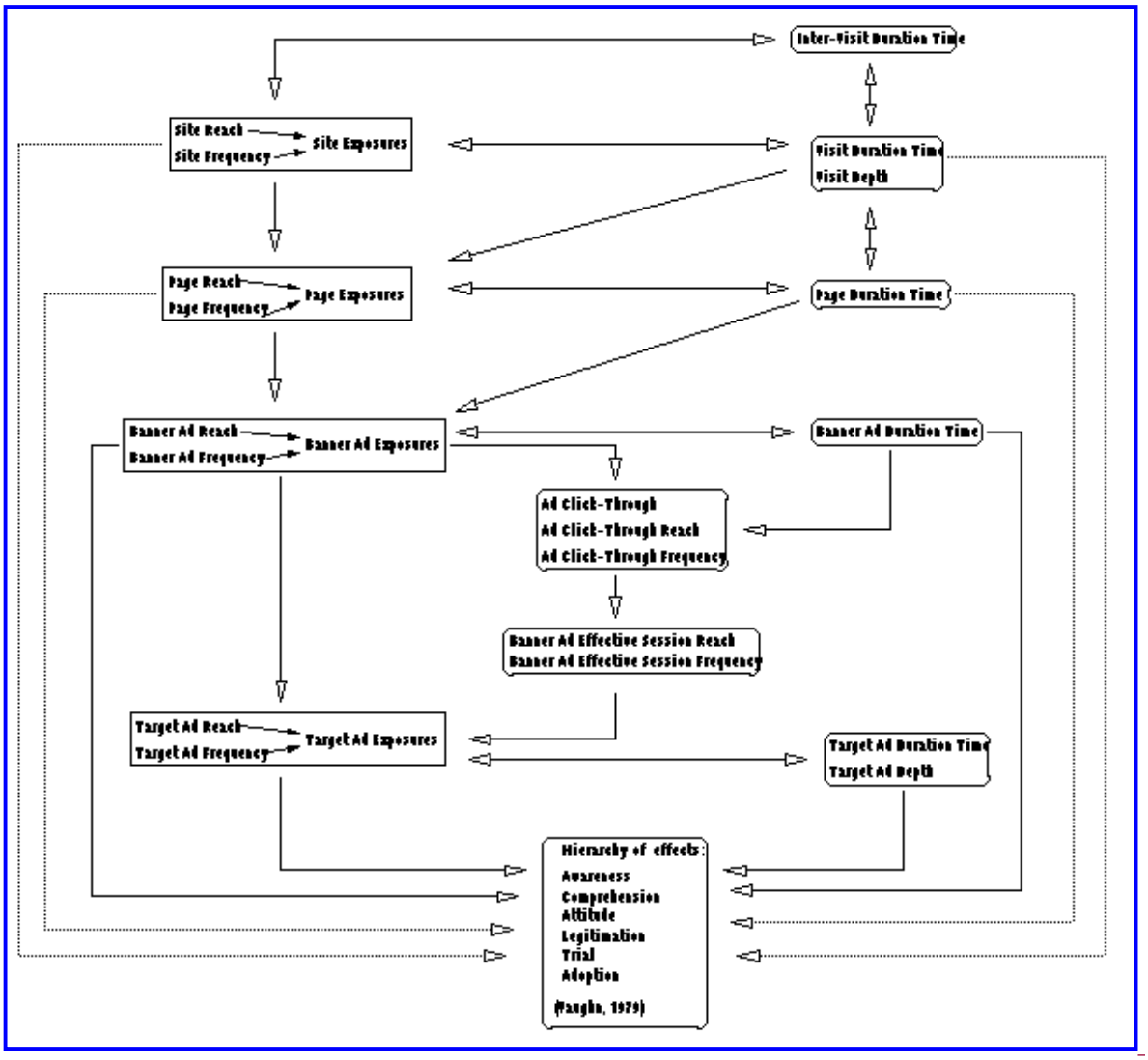


Figure 1: Relationships Among Exposure, Interactivity, and Consumer Response

Figure 1 also highlights the fact that both exposure and interactivity metrics may have (possibly different) contributions to various stages in the hierarchy of effects model. For example, we implied earlier that banner ad reach/frequency/ exposure will be related to awareness, while target ad duration time and depth will be related to comprehension.

5.1) Research Hypotheses

The next step is to generate testable hypotheses based upon Figure 1. For example, Chatterjee (1996) has proposed the following hypotheses:

1. Greater number of passive exposures will be positively associated with higher probabilities of active sponsor ad exposure.

2. Greater passive exposure duration should be associated with lower probabilities of active sponsor ad exposure.

3. Greater number of prior visits to the Web site will be associated with higher probabilities of occurrence of active sponsor ad exposure.

4. Shorter intervisit times will be associated with higher probabilities of occurrence of active sponsor ad exposure.

The practical purpose of generating and testing such hypotheses is twofold. First, we will gain a better understanding of what factors influence measures such as the ad click-through rate, or the target ad duration time. What are the benchmark values for effective reach and frequency and what affects these?

By understanding the influencing mechanisms, we can then take action to increase ad click-through rates, for example. Response functions, such as the optimal number of exposures to a banner ad within and across visits, must be determined, and have clear implications for dynamic placement of banner ads based upon a visitor's previous history of exposure to the ad.

Second, we are ultimately interested in identifying the exposure and interactivity metrics that should determine advertising prices. This will be a function of the degree to which the metric is related to influencing the stage in the hierarchy of effects model that the advertiser is focusing upon. Currently, most of the focus seems to be upon paying for banner advertising that simply delivers exposures to target ads. It is not clear that this is necessarily money well spent. If the marketing objective is to increase consumer comprehension of a firm's product line offerings, then it would make sense for the advertiser to pay more for visitors who spent more time viewing the target ad, and who viewed more pages (greater depth) of the target ad.

5.2) Web Measurement in Practice

Within firms, publishers should start to measure their sites on all of the quantities listed in Table 15. These quantities should be assessed on a weekly basis, and the weekly period itself should be evaluated for strategic appropriateness in this new medium.

The industry should consider adopting the exposure and interactivity metrics proposed in this paper. Vendor and auditor reporting should include not just reach and frequency, but duration time metrics, as well. This action requires an industry concurrence on the definition of a visit. Currently, 30 minutes is used by at least one firm as the time-out period, but this measure must be validated with observational data.

Finally, as tracked or identified visitors are required for the medium to reach its potential as a revolution in communication between firms and their customers, the industry must work to establish a mechanism for customer identification that is developed in the context of the policy and strategic considerations raised below.

6) Policy and Strategic Considerations

6.1) Policy Considerations

A number of policy issues must be considered when developing Web measurement standards. These include:

- Privacy
- Rights of consumer data ownership
- Ethics

Policy considerations are particularly important, because issues such as consumer protection, fraud, and deceptive claims are potential points of entry for government regulators into the Web marketplace.

6.1.1) Privacy. Although a thorough analysis of privacy issues is beyond the scope of this white paper it is important to raise the issue in the context of Web measurement. Networked, distributed computing environments like the Internet offer unprecedented opportunities for the invasion of privacy. This is because information about individuals is now more accessible and more easily combined and integrated than in the physical world. Thus, it is not so much that we can learn things about consumers that we could not learn before, but rather that we can gain access to such information that might have been too expensive, too time-consuming, or too difficult to traditionally gather.

In addition, it is not clear who would be able to have access to such consumer information, or what they might do with the information. In a different context, serious privacy issues have arisen regarding patient mental health information that has been entered into computer networks at the insistence of insurance companies (Lewin 1996; Scarf 1996). This information can be accessed by a class of "health information trustees" whose inappropriate use of this information in some cases has had serious and damaging consequences to consumers. A parallel class of "marketing information trustees" could potentially have access to vast databases of consumer transaction data.

In the context of Web measurement for marketing and advertising purposes, the specific issues are what information we are gathering from consumers, whether they know we are gathering it, and what we plan to do with it. There is a tension between the marketer's need to know information about individual consumers for the purposes of targeted marketing efforts and the consumer's right to privacy. We believe the ultimate solution to this tension is to enter into a full partnership with consumers in which they control ownership of their demographic and behavioral data and determine how and when (and if) it will be used. This solution respects the many-to-many model underlying the World Wide Web in which consumers can also be providers to the medium and allows consumers to remain active participants in the interactive communication process.

For a demonstration of the type of information available to marketers about visitors to web sites, visit anonymizer.cs.cmu.edu:8080/prog/snoop.pl. The "Anonymizer" site demonstrates what sort of information about the visitor is available to the Web site. Depending upon the platform we have accessed the Anonymizer URL from, the information ranges from simply stating that we are accessing the site from a particular hardware/browser platform (i.e., "a 680x0-based Macintosh running Netscape") to the deeply troubling statement, "your name is probably Tom Novak, and you can be reached at novak@moe.ogsm.vanderbilt.edu. You're located around Nashville, TN. Your computer is a Unix box running SunOS. Your Internet browser is Netscape."

The industry, consumers, and regulators have only just begun to discuss these issues. In the months to come, managers need to be prepared to address the issue of consumer privacy in online environments.

6.1.2) Rights of consumer data ownership.

Closely related to privacy is the issue of who should possess the rights to consumer navigation and transaction data. Peppers (1996) has proposed that online marketers should act as "hosts" for consumer data. In this model, identifying information is kept secret, but non-identifying information is re-marketed. Because the consumer gets communications targeted to her interests in an explicit bargain between the consumer and the marketer, such a policy, Pepper argues, can work to the mutual advantage of both consumer and marketer. Peppers (1996) also proposes that marketers develop a "privacy bill of rights" in which marketers 1) state *why* they need consumer information, including an argument of the ways in which collecting this information will improve consumers' lives; 2) agree what they will *never* do with consumer data; 3) detail what options the consumer has regarding the data and these policies; and 4) indicate what events on the the part of the marketer require *notification* to the consumer.

Many marketers feel that privacy is a "commercially valuable benefit" (Peppers 1996) and that protecting consumer privacy is actually consistent with customization to customer needs in the online environment.

We believe that the overriding principle that must guide efforts to negotiate explicit contracts between marketer and consumer is the one of "opt-in" in which the consumer is informed about the privacy consequences of their online behavior prior to engaging in such behavior. This is in stark contrast to the more common "opt-out" policy prevalent in the physical world in which consumers may never know that data is being collected about them and possibly resold to others without their knowledge.

The approaches to privacy which are most likely to attract the attention of government regulators are those which ignore consumers' rights and fail to enter into explicit agreements with consumers about their demographic and behavioral data.

The recent GVU study (Pitkow and Kehoe 1996) found that Web users value their privacy, particularly as expressed by visiting sites anonymously or by adopting various aliases depending upon the circumstances of the visit. Further, users desire "complete control" over whether a particular Web site should receive any information on them. While users recognize that marketers require demographic and behavioral data on visits for business purposes, users do not feel that marketers have the right to sell these data to other firms. Web users seemed willing to provide demographic information if marketers would tell them what was being collected and how it would be used. Pitkow and Kehoe (1996) conclude "that respondents are more concerned with their right to control demographic information, than any compensation they might receive for revealing it. Only 5.9% reported that they would not give a site demographic information under any condition." These findings suggest that privacy policies in this emerging medium should be driven by the unique characteristics of the medium (e.g. interactivity) and the desires of its users (e.g. control) as they experience that medium (Hoffman and Novak 1996).

6.1.3) Ethics. Researchers are beginning to address what constitutes ethical behavior in the conduct of online research (Boehlefeld 1996; Duncan 1996; Thomas 1996). A key result of this research, that "informed consent" is a

critical component of ethical research in many online environments, has general implications for the way marketers may approach gathering data from Web visitors. However, much more specific consumer research is necessary to determine the best ways to develop and implement such policies in commercially oriented Web environments.

"Disguised ads" are another potential ethical concern. Suppose that an advertiser-supported search agent site presented links to an advertiser's Web site at the beginning of a list produced by a search request for a set of keywords. In this case, while the requestor may believe a link appears at the beginning of the list because it is the most *relevant* to his/her keyword request, the top position of the link may be due to sponsor payments. Such practices must be made clear to users of the search agent, as they have the potential to deceive consumers and undermine trust in search agent sites.

6.2) Strategic Considerations

Numerous strategic considerations must also be addressed when developing advertising measurement standards, including:

- Target Marketing
- Comparability
- Isolated vs coordinated ad placement
- Depth vs. breadth
- Viability of the advertising sponsorship model

6.2.1) Target Marketing. Web sites facilitate one-to-one marketing by permitting customization and tailoring of content and user interface. For example, Group Cortex's Site Track product generates customized Web content, so that the navigating experience can be tailored to user's preferences. Focalink and DoubleClick provide customized placement of ads, so that different visitors see advertisements most appropriate to their interests. Intelligent agents also provide means to build a relationship between the visitor and the marketer. However, most current practice in Web advertising measurement ignores the fact that Web content and ads can be tailored to segments of respondents, or groups of respondents.

6.2.2) Comparability. The CASIE (1995) principles recommend that "audience estimates covering a particular interactive vehicle be directly comparable to estimates covering another interactive vehicle within the same interactive medium." This is a sensible recommendation, if taken as meaning that common metrics be used when evaluating comparable Web sites. However, is a Web site which does not incorporate user-driven customization comparable to a Web site which does incorporate customization? One would expect that a certain number of ad exposures at a site which targeted ads according to user preferences or demographics would be more effective than the equivalent number of exposures at a site which presented a single ad to all visitors. Thus, while it is necessary to begin with comparable metrics to compare Web sites, there must also be some adjustment for the inherent noncomparability of Web sites along dimensions which impact the functional relationship of the given metric with advertising effectiveness.

The CASIE principles further state that "comparability to measurements taken of traditional media is also desirable whenever practical. However, this is not a mandatory requirement for interactive media measurement when the behavioral characteristics of the new media themselves demand new dimensionality of measurement." Again, we believe this is a reasonable position. However, we would add that where it is possible to do so, *terminology* used in traditional media (for example exposures, reach, frequency, etc.) be used in Web advertising. This does not mean that one can or should directly compare such measures across interactive and traditional media. It simply means that the same construct is being measured. It also does not mean that traditional metrics are the only metrics applicable to Web media measurement. On the contrary, due to the interactive nature of the Web and the underlying many-to-many communication model, new metrics for advertising measurement will be useful.

6.2.3) Isolated vs coordinated ad placement. A media plan will typically involve a set of Web sites, based upon decision rules which take into account cost and effectiveness of placing ads on various Web sites. As noted, some firms, such as Focalink and DoubleClick have developed ad placement products which facilitate this media planning process. However, in these initial states of Web-based advertising, it should be expected that much of the current

state-of-the art of Web ad placement is based upon an isolated rather than coordinated media buying strategies. Effective Web measurement needs to recognize that coordinated, rather than isolated ad placement is more desirable, and that measures of visitor duplication across Web sites are necessary.

There has been inordinate interest, possibly motivated by a desire to draw analogies with traditional media, in identifying the "top" Web sites, in terms of traffic (e.g. NPD's PC-Meter) or advertising revenue (e.g. Jupiter's AdSpend). A focus of attention upon the "largest Web sites" will likely lead to a suboptimal media plan. Carried to the extreme, the vast majority of ads will be placed upon the largest Web sites, which by definition will have more heterogeneous visitor populations than smaller, more targeted Web sites.

The strategic issue of isolated vs. coordinated ad placement relates to the diffusiveness of payment for Web advertising. On one hand are large sums for ads placed on relatively small numbers of sites viewed by large numbers of visitors, while on the other hand are micropayments for ads placed on large number of sites each viewed by relatively small number of visitors.

A logical extension of this idea is what we term "transclusive advertising." Nelson (1996b) describes transclusion as "hyper-sharing: all instances and copies are resolved to the simulation of one cosmic original, which is omnipresent, a canonical address somewhere on the network." One practical application is the "transcopyright" (Nelson 1996a), which is "permission to republish.. material in any context, under the condition that only the address is distributed by the republisher."

For example, anyone could use a transcopyrighted .GIF format image by including a link on one's Web page to the *original* .GIF image, as well as a link to an original permission page which specifies the exact terms of use of the image. Thus, in advertising placement, when one considers the continuum from isolated to coordinated ad placement, a logical extension is to end-user placement of advertising. By taking Nelson's idea and substituting advertising for copyright, one can imagine a scenario where any Web site can, on its own volition, place an advertisement for company X, and be compensated by company X based upon an agreed-upon measure of advertising response. One example of a similar approach is used by the amazon.com Associates Program (www.amazon.com/exec/obidos/subst/assoc-invitation.html). In this program, any Web site can place a link to one of 300,000 books sold by Amazon.com and receive a royalty for all sales which occurred as a result of a visitor accessing Amazon.com via that link.

These examples illustrate the array of possibilities in selecting vehicles in a Web-based media plan. In all cases, in order to develop a rational measure of the cost for placing an ad, we need a standardized and appropriate methodology for advertising measurement.

6.2.4) Depth vs Breadth.

There are two complementary approaches to collecting visitor data for advertising measurement. Server access logs focus upon *depth* and, in theory, provide a complete record of all traffic to a given Web site. Of course, caching by the user's browser and caching of Web pages by Internet service causes the server access log to be an incomplete record, and an underestimate of true traffic. Given mandatory registration (e.g. I/Pro), or tracking via cookies(2), one can combine in-depth data across multiple Web sites. However, the number of Web sites that can be combined will be a small fraction of all available Web sites.

The *breadth* approach is characterized by panels of Web users (e.g. PC Meter) whose navigation behavior is tracked over the complete set of sites they visited in a given period of time. The panel consists of a sample of Web users who are representative of a larger target population.

Thus, the trade off is between information on (nearly) all visitors to a small fraction of all web sites in the depth approach, and information on (nearly) all Web sites visited by a small fraction of all visitors in the breadth approach.

6.2.5) Viability of the advertising sponsorship model

Finally, an important strategic consideration is the long-term viability of the advertising sponsorship model. Advertising sponsorship is by no means the only viable method for supporting commercial Web sites. While advertising is currently the dominant business model on the Web, online store fronts, subscriptions and micropayments(3) provide alternative business models with considerable potential (Rebello 1996).

6.3) Conclusion

In this white paper, we have argued that standardizing the Web measurement process is a critical first step on the path toward the successful commercial development of the Web. To that end, we have provided an overview of current practice and considerations which affect the question of what the standards for Web advertising measurement should be. Given the ambiguity in current terminology for advertising measurement on the Web, we have proposed a series of definitions of basic constructs, exposure metrics and interactivity metrics. We further proposed that if there is terminology from traditional media that is appropriate to the Web, then that terminology should be used to avoid confusion and ease the adoption process of standards format.

We identified two primary forms of Web-based advertising: banner ads and target ads. Active ad exposure of target ads is under the consumer's control; passive ad exposure to banner ads is under the marketer's control. This distinction has important implications for the measurement process.

In our discussion of current and emerging media pricing models we observed that CPM and flat fee models do nothing more than count the number of visitors exposed to a particiular banner ad at a particular site. Thus, we proposed a pricing model based on interactivity metrics. The rationale behind this argument is that the degree to which the visitor interacts with the target ad is a better measure of the value and effectiveness of an ad.

Ultimately, what is required is a set of integrated response measures that relate exposure and interactivity metrics to consumer response. We argued that it may be worthwhile to measure consumer outcomes in the context of direct response rather than solely in terms of mass media exposure.

Our primary objective in writing this paper is to stimulate further research and discussion and help facilitate the process of developing Web measurement standards. The preliminary diagram we proposed in Figure 1 organizes the measures introduced, and relates them to consumer response in terms of a standard hierarchy of effects model. We offered a set of initial research questions and hypotheses to be pursued and an initial set of recommendations that we urge the industry to discuss, refine, and adopt.

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(1)www.amazon.com/exec/obidos/subst/assoc-invitation.html
(2)See for examplehttp://www.netscape.com/newsref/std/cookie_spec.html
(3)See for examplehttp://www.w3.org/pub/WWW/TR/WD-mptp

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