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RESEARCH NOTE

DATE: December 10, 2010

TO: Catalyst Investors

FROM: Tyler Newton, Susan Bihler

SUBJECT: **Display Advertising Market Primer**

Abstract:

The goals of this market primer are to provide you with a general understanding of the display advertising industry, the "real time bidding" technology ecosystem and a market map of that ecosystem. We have also provided additional information in the appendix, including an overview of the evolution of online advertising and regulatory issues that could have a major impact on the market.

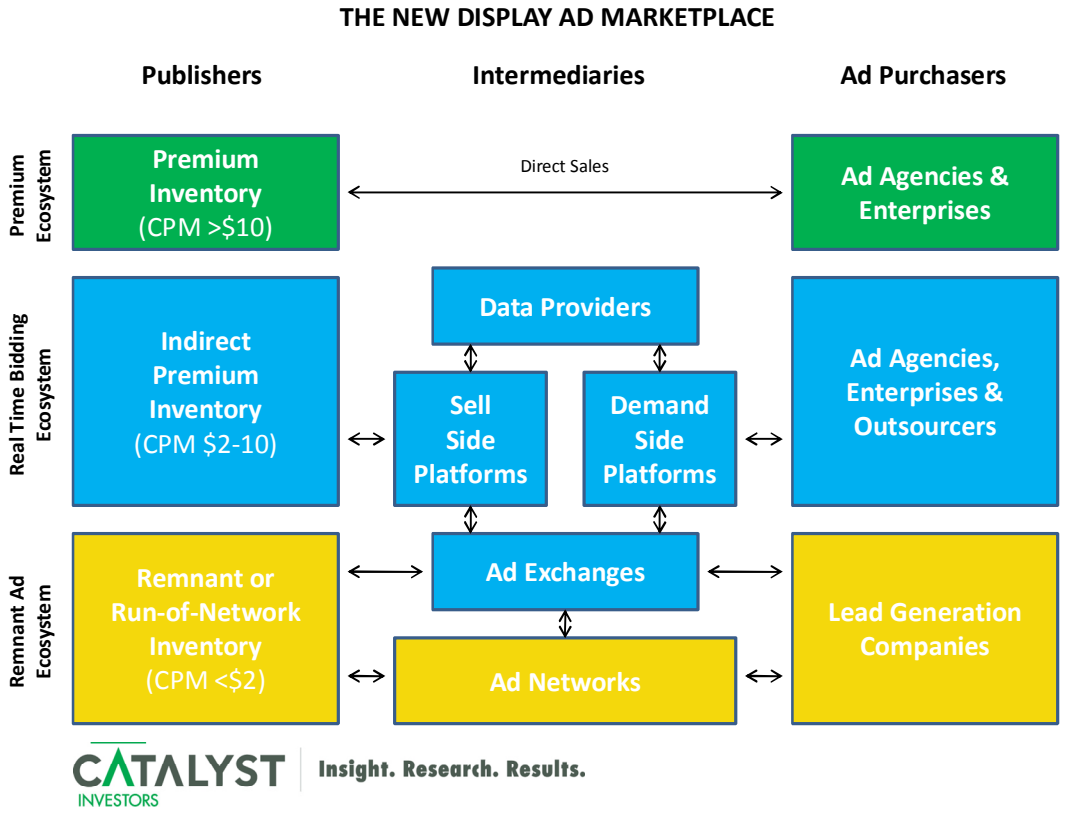
The real time bidding ("RTB") marketplace is fairly early stage. We may or may not find opportunities for investments directly in the RTB technology space, but we wanted to at least have us all understand the fast-moving, dynamic technology ecosystem that is revolutionizing the online advertising market. Venture investors have been active in this market, but growth/buyout investors have not. There is a risk that the companies remain too early stage and/or or only investable at extremely high valuations, but we won't know until we "get in the mix". At the very least, we should be able to come out of this project with views on how RTB will affect other elements of the online advertising market, including content publishers, lead generation companies, ad networks and other marketing services firms.

Real Time Bidding: The solution for display advertising

Display advertising is a form of brand advertising that "warms" potential leads by building brand and product awareness. The online display ad market consists of banner ads, rich media, and video, and is usually measured by the number of views or impressions. Online brand advertising has historically lacked the audience targeting and dynamic pricing found in online performance marketing like search engine marketing and lead generation. For this reason, pricing for the vast majority of display advertising inventory has been very low. As performance marketing has matured and become more efficient, marketers have begun to re-focus on online brand advertising. The display ad market had been missing platforms that could tie demographic targeting and dynamic pricing together for publishers and advertisers. Thus, a more sophisticated ecosystem for buying brand advertising has been created; that ecosystem is called Real Time Bidding.

The idea behind the RTB ecosystem is to bring the science of search marketing and lead generation to the display ad business. Advertisers need neutrally-provided targeting data (Data Providers) and exchanges on which they can buy inventory at scale (Ad Exchanges). Publishers need the ability to manage their inventory and aggregate themselves with other publishers (Sell Side Platforms). Advertisers also need media buying platforms to aggregate campaign performance and inventory pricing data (Demand Side Platforms). Demand Side Platforms provide automated access to auction-based display advertising inventory, enabling a marketer to set up campaigns with very distinct demographic target attributes and pricing. The RTB ecosystem allows advertisers and publishers to buy and sell demographics almost like we can trade stocks. Technology is allowing advertisers to shift from indirectly buying demographics by buying media to directly buying the audience themselves. As the display advertising market becomes more transparent and efficient, pricing for display advertising has improved and the display ad market is now growing faster than the search and lead generation markets.

The new display ad marketplace looks like this:



The Players

- **Publishers –** On the left side of the chart are content publishers, who are anyone on the internet that has advertising inventory to sell, including banner ads, rich media, ads tied to online video and mobile advertising.
- **Intermediaries –** In the middle of the chart are the intermediaries. Intermediaries bundle inventory from various publishers to provide scale to ad purchasers. The best intermediaries use technology to add value to the inventory beyond bundling.
- **Ad Purchasers –** Brand advertisers either purchase advertising directly or through digital ad agencies or other online marketing outsourcers. The major purchasers of remnant advertising tend to be performance marketers like lead generation companies.

Ad Ecosystems

- **Premium –** (Shown in green above) The best advertising inventory is called premium inventory. Such inventory consists of banners and rich media spots on the top and upper right of the most popular pages (i.e. the front page of WebMD, the front page of Yahoo! Autos, etc.) and video ads attached to popular video content. Such ads are sold the old fashioned way: by highly-paid ad salesmen selling directly to big enterprises and advertising agencies at CPMs of $10 or more. Premium ads represent approximately 10% of all display advertisements.
- **Remnant –** (Shown in orange above) Before the emergence of Real Time Bidding ("RTB") all inventory that wasn't premium inventory was considered remnant, or run-of-network, inventory. It wasn't efficient to sell such inventory directly, so advertising networks were invented to bundle up remnant inventory to sell to advertisers. Because major brand advertisers were wary of having their brands placed randomly around the internet next to who-knows-what content, remnant advertising was generally sold to lead generation companies and ecommerce marketers looking to arbitrage ad inventory into clicks / leads. Remnant inventory, the remaining 90% of display advertising, was generally sold at CPMs of less than $2.
- **Real Time Bidding –** (Shown in blue above) The bifurcated market between premium and remnant advertising created a vast supply of undervalued online ad inventory existing on quality content sites that lacked the scale to sell to brand advertisers directly. The only way to achieve the scale was to create on automated system that could replicate the efficient and ROI-driven system that existed with search advertising on Google and Yahoo/Overture.

Real Time Bidding

- **Data Providers –** If the goal of RTB is to enable advertisers to purchase demographics at scale, then both sellers and buyers need a neutral party to provide data about the underlying demographic and behavioral information data about individual consumers. Data providers install cookies across thousands of websites and use consumer surfing information. This surfing information can be used to determine the demographics, interest and recent shopping habits of

the user. Privacy is a paramount concern, so data providers must limit information to general information and not personal information. (Please see "Privacy Issues" below for more detail.)

- **Sell Side Platforms ("SSPs") –** SSPs provide technology to publishers to manage and sell their ad inventory.
- **Demand Side Platforms ("DSPs") –** DSPs provide a platform for ad purchasers to evaluate trends in the display ad market and to assess the performance of various marketing campaigns.
- **Ad Exchanges –** Ad exchanges have provided a neutral marketplace for publishers (via SSPs or ad networks) to sell inventory to ad purchasers (via DSPs).

The RTB marketplace is still relatively new, but it appears that advertisers and publishers are beginning to realize the benefits of automated ad platforms. Google's DoubleClick Exchange more than tripled in the past year, and it is estimated that at least 50% of all targeted online display advertising will be bought through real time platforms by 2015.[1] More traction will likely occur throughout 2011 most likely sold as a compliment to direct sales and/or ad network inventory.

[1] Agencies Tool up for Data-Driven Media Buying. Jack Marshall. October 14th 2010.

Real Time Bidding Ecosystem

Ad Exchanges:
Google DoubleClick
Yahoo Right Media
Microsoft AdECN
ContextWeb
Ad Brite
OpenX

Data Providers:
Axciom
Blue Kai
Targus Info
Data Logix
Experian
Exelate
AlmondNet
Turn
Demdex
Magnetic
Buy Sight
Data Logix
Blue Cava

Data Analytics:
Google Analytics
Bizo
Quantcast
Adchemy
Permuto
ClickForensics
AdReady
MarketShare Partners
WebTrends
Dapper

Brand Safety:
DoubleVerify
AdSafe

Vertical Ad Networks:
JumpStart
Glam
NetShelter

Ad Networks:
Advertising.com (AOL)
Burst Media
Commission Junction (VCLK)
Kanoodle
Casale
Yahoo
Google
Specific Media
Microsoft/Atlas
Tribal Fusion
interCLICK
Visual DNA
Audience Science
Rocket Fuel
Pulse 360
24/7 Real Media (WPP)
Marchex
Collective Media
Adconian
Vantage Media
Addynamix

Demand Side Platforms:
DataXU
MediaMath
[x+1]
Invite Media (Google)
Turn
Search Ignite
Adnetik
TraffIQ
Tumri
Triggit
Efficient Frontier
The Trade Desk
X.A. Net
Appnexus

Sell Side Platforms:
Ad Meld
Peer 39
PubMatic
Rubicon

Ad Servers:
DoubleClick (Google)
Atlas/Accipiter (MSFT)
Pointroll
OpenX
Vindico
Telemetry
Innovid

<u>Video Ecosystem</u>
Content Aggregators/sharers:
Hulu
Qlipso
Ooyala

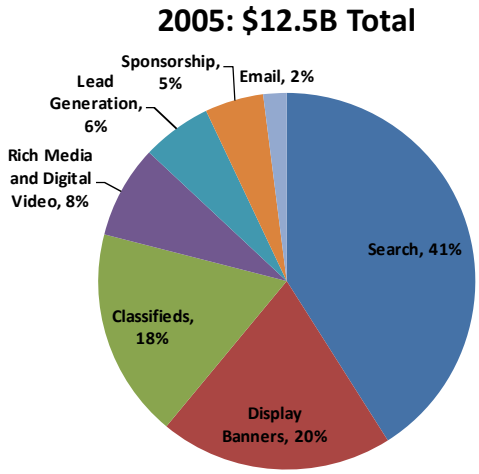
Video Ad Networks:
Tremor Media (Scan Scout)
Brightroll/Brightroll Exchange
Freewheel
SpotXchange

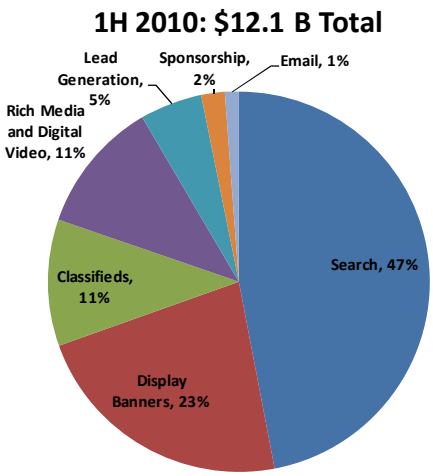
Video Ad Platform/Exchange:
Adap TV
Unicorn Media
Brightcove
YuMe
VideoEgg/SAY media

Video Servers:
Brightcove
EyeWonder (Limelight)
Live Rail

Expected Growth of Display Advertising

Internet advertising revenues in the United States totaled $12.1 billion for 1H 2010, an 11.3% increase from the same period in 2009. Search advertising has remained the largest online advertising revenue format, accounting for $5.7 billion, or 47% of 1H2010 revenues of $12.1 billion. Search has increased from $5.1 billion for the entire year in 2005. Search is followed by display related advertising revenues, including Display/banner, rich media, digital video and sponsorship, totaled $4.4 billion or 36% of 1H 2010 total online advertising spend. In 2005, Display related advertising revenues totaled $4.3 billion for the full year.

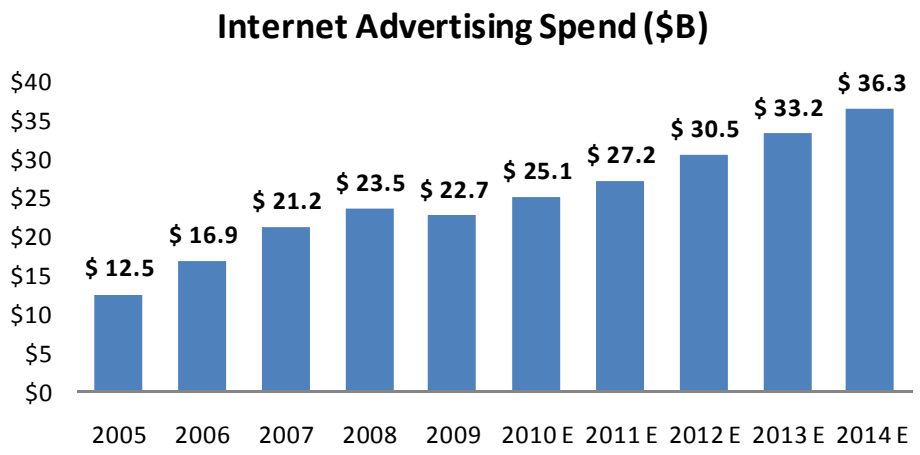




Performance-based pricing models continue to be favored as 61% of 1H2010 internet advertising revenue is based on performance. 35% is attributable to impression-based, while the remaining 4% is a hybrid of the two models.

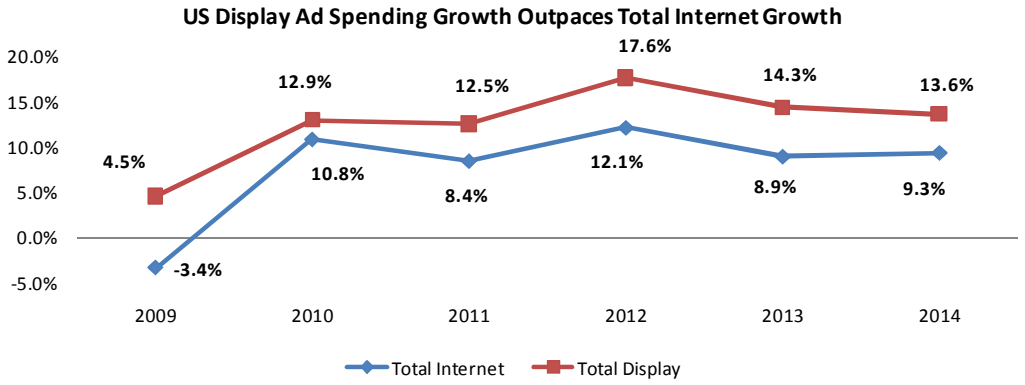
Total Internet. Total U.S. advertising spend was affected by the recession as companies significantly reduced and scrutinized advertising budgets. Online advertising, however, has been the fastest growing segment of the market, rising to $23.4B in 2008 from $4.6B in 1999, a CAGR of 20%.[2] US online advertising spending is expected to increase at a CAGR of 10% from $25.1B in 2010 to $36.3B by 2014. This $11B in new advertising spending will be flowing into online marketing tools such as search, display advertising, email advertising and lead generation.

[2] Pricewaterhouse Coopers and IAB Advertising Revenue Report 2008.



Source: IAB Internet Advertising Revenue Report

Display growth. US display advertising is actually expected to outpace total internet growth as seen in the chart below.



Source: eMarketer

Display advertising is expected to increase from $7.6B to 14.7B from 2009 to 2014, a CAGR of 14%, driven by the growth of banner ads, rich media and video. Video is the prime source of display ad growth growing at 30- 48% each year.

Video Platforms

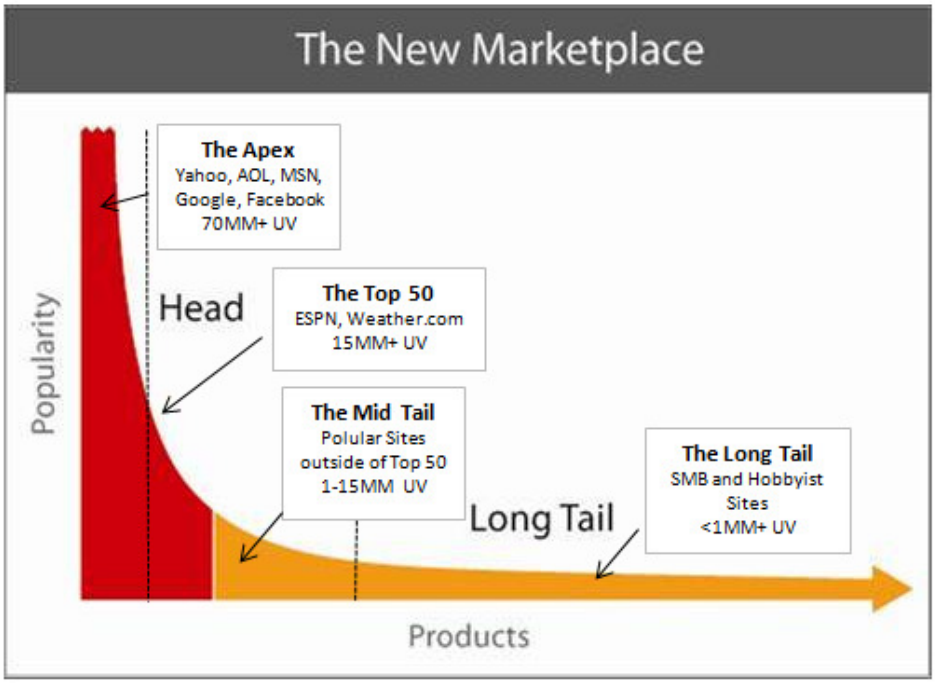
Non-premium web video inventory is separately being sold through video exchanges such as Adap TV and BrightRoll (BrightRoll Exchange) using real time bidding and selling specifically as video advertisements. These ads are typically placed before or during a video clip and are generally more complex than basic banner ads. However, similar to display or banner ads, the audience data will be extremely important when bidding on ad placement. For example, advertisers using video platforms

can bid on a video ad on a site which attracts a specific demographic. Investment opportunities in this space may be earlier stage with lower revenue but high growth potential.

Implications of Real Time Bidding for Online Publishers

Rise of the Mid-Tail publisher. There are no real economies of scale barriers to producing content, but there is a scale barrier to having direct access to advertisers. Sites with unique visitors over a certain level have historically been able to sell premium advertising at higher costs (CPMs) through a direct model. Long-tail websites with lower unique visitors do not have direct access to advertisers and therefore rely on Google to sell advertising (Adsense) which is highly automated. Mid Tail sites, such as enthusiast sites or niche sites, are currently forced to sell to small advertisers if at all, and lack a scalable automated system to efficiently sell display ads.

Real Time Bidding is a boon for mid-tail publishers. Inventory that currently gets sold at CPMs of less than $2 through ad networks can be sold for $5 or more. While a big chunk of that increase will go to the players in the RTB ecosystem, the inventory can be sold without expensive salespeople in a highly automated manner. Publishers instead will be compensated purely for attracting valuable demographics with their content.



Consolidation? We suspect that the Data Providers and Exchanges could be combined. Since the exchanges are owned by the internet big three (Google, Microsoft and Yahoo), and that Google and

Microsoft own ad server companies, we could easily see the sell side of the platform collapse down to an oligopoly between two or three companies pretty quickly.

Independent DSPs? If the big internet companies control the technology that serves and sells ad inventory, it is unlikely that they would also dominate the DSP space. This would be a similar industry structure to the search engine marketing space, whereby sophisticated marketers acquire their web analytics tools from third party companies like Omniture, Pardot, or Webtrends. (Although Google does offer a simple analytics package for free.)

At this stage we see attractive opportunities throughout the RTB ecosystem, although we feel that with data providers and SSPs, we would want to focus on the clear leaders most apt to get acquired by the internet giants. There is probably more leeway with the DSPs to not need to pick the clear winners (although that would not be a bad strategy anyway.) In the video sector, the same dynamics as the display ad ecosystem apply, but everything will be a bit more early stage. Video advertising is also growing faster and attracts higher CPMs, so we may want to be willing to take some extra risk to make investments in the leaders of the video sector.

Open Question List

1) **Who gets paid what & with what margins?** The challenge during our deal sourcing initiatives will be to understand the pricing opportunities between all parties involved. As the process is highly automated, we would expect to invest in a platform with the capabilities to generate relatively high margins.
2) **If CPMs increase from $1 to $5, what % goes to the publisher?** We expect that intermediaries may benefit from the increase of CPMs instead of the publisher.
3) **Do we expect the RTB ecosystem to become monopolized?** There may be one or two RTB platforms that become the major players, or will Google's DoubleClick monopolize the market?
4) **Who will have the most power?** Will Google lead this market as they have with search?
5) **Do we expect Ad exchanges to buy Data companies?** We expect that as the data companies hold the most valuable audience data, they will likely be the most attractive targets for ad exchanges.
6) **What is the role of Ad Servers?** Like Google/DoubleClick, 24/7, Atlas

APPENDIX

The Evolution of Display Advertising

Old Media: Display advertising is internet lingo for what used to be known simply as advertising. In offline advertising, advertising agencies would advise clients on creative content and help them purchase ad inventory in television or print media in ways that would target likely purchasers. As recently as thirty years ago, the only advertising outlets with any scale were three broadcast television networks and mass market magazines like Sports Illustrated and Time. For most companies, the target demographic was people age 18-49…not exactly a niche.

Old Media 2.0: Cable television and niche magazines started to break the audience into crude niches. MTV targeted young adults, Nickelodeon and the Disney Channel targeted kids, Field and Stream targeted hunters and fly fishermen, etc. That opened up the national advertising market to somewhat more narrow brands. Advertisers still knew that there was a ton of "leakage" with non-target demographics. As department store merchant John Wanamaker said, "Half the money I spend on advertising is wasted; the trouble is I don't know which half."

The Internet Accelerates Advertising Innovation

THE EVOLUTION OF ONLINE MARKETING

Ads 1.0 The "Dot Com" Era 1995-2002	**Ads 2.0** Performance Marketing Dominates 2002-2008	**Ads 2.5** Display Ad Innovation 2006-2008	**Ads 3.0** Audience Revolution 2008 - ?
Premium Banner Ads	Paid Search	Vertical Ad Networks	Data Providers
Online Classifieds	Ad Networks	Ad Exchanges	Real Time Bidding Platforms
	Lead Generation		Video RTB Platforms

Ads 1.0 - banner ads. When the internet arrived, advertising, in the form of "banner ads" was sold the same way as traditional advertising. Highly-paid ad salesmen would pitch big ad agencies on buying banner ads on the big websites, most of which organized themselves like an online version of a newspaper magazine. The "portals" like AOL, Yahoo and MSN and big "category killer" sites like WebMD and Cnet were the only properties with sufficient scale to profitably sell advertising inventory to traditional advertisers. At the time most of the money being spent on banner ads came from other "dot coms" essentially trading venture capital money among themselves.

Ads 2.0 - search. After the dot-com crash cratered the banner ad business, a new kind of internet advertising stormed onto the scene: search advertising. Search marketing was very attractive to marketers for two big reasons. First, Google searches reveal buyer intent…they are actually searching to buy, or at least research, a specific product. In addition, web analytics tools could reveal the actual conversion rate on "click-throughs" from search marketing ads or from natural search results. All of a sudden, advertisers had hard ROI figures with which to make marketing investment decisions. Search engine marketing ("SEM"), search engine optimization ("SEO") and their close relative lead generation created a revolution in performance marketing and made Google the most profitable company on the Internet.

Ads 2.0 - ad networks and lead generation. Display ad inventory on the internet is almost unlimited. Only a very small number of websites had the sufficient scale to support a professional ad sales team, and only a small portion of even those sites' inventory was saleable at premium prices. Advertising networks create scale for advertisers by aggregating huge amounts of non-premium display ad inventory and reselling them in bundles. Ad networks benefitted from selling bulk, and generally don't have the technology or the inclination to discern the quality of the content next to which ads are placed. The lack of visibility or control makes traditional brand advertisers reluctant to use ad networks. Thus ad networks are generally a vehicle for lead generation companies who use creative display ads to draw clicks from surfers looking for mortgages, student loans and the like.

Ads 2.5 – Display ad innovation. As search and lead generation came to dominate online advertising, advertising innovators started to wonder if there was a way to efficiently sell display ads to the brand advertisers that would be willing to pay higher CPMs than ad networks. Several ad networks were launched that focused on a particular targeting technology (i.e. behavioral, geographic, contextual, etc.). Vertical ad networks like Glam Media aggregated content that targeted certain demographics, not unlike how cable channels segmented the marketplace. Ad exchanges were launched to create the dynamic pricing environment that existed in search marketing.

Ads 3.0 - Real Time Bidding and the "Audience Revolution"

The revenge of brand marketing. As performance marketing has matured and become more efficient, marketers have begun to re-focus on online brand advertising. While the display ad innovations of Ads 2.5 were helpful, what was still missing were the platforms that could tie the targeting and the dynamic

pricing together for publishers and advertisers. A more sophisticated ecosystem for buying brand advertising was needed. That ecosystem is called Real Time Bidding.

The Audience Revolution. The idea behind the Real Time Bidding ecosystem is to bring the science of search marketing and lead generation to the display ad business. Advertisers need neutrally-provided targeting data (Data Providers) and exchanges on which they can buy inventory at scale (Ad Exchanges). Publishers need the ability to manage their inventory and aggregate themselves with other publishers (Sell Side Platforms). Advertisers also need media buying platforms to aggregate campaign performance and inventory pricing data (Demand Side Platforms). Demand Side Platforms provide automated access to auction-based display advertising inventory, enabling a marketer to set up campaigns with very distinct demographic target attributes and pricing. The RTB ecosystem allows advertisers and publishers to buy and sell demographics almost like we can trade stocks. Technology is allowing advertisers to shift from indirectly buying demographics by buying media to directly buying the audience themselves.

Measuring ROI

Brand marketing may not be as efficient as performance marketing at measuring ROI, but when a customer goes to Google or Yahoo to start a search – 18% of the time they are searching for an advertised brand.[3] Even though the majority of US digital marketing spend is devoted to search, it is limited in its influence because it requires a consumer to actively seek out a product, service or solution. Customer brand recognition goes hand in hand with the success of search. According to the Atlas Institute, brand marketing increases the conversions of search ads by 22% over search alone.[4]

Testing campaigns online is easier than any other media outlet; however there remains a challenge to determine the best possible approach to measuring brand effectiveness on a viewer. CPM (Cost per thousand Impression) is the method by which display ads or banner ads are typically sold. The effectiveness of the CPM metric is harder to measure than CPC (Cost per Click), which allows marketers to know exactly how many individuals clicked on an advertisement. According to Google representatives at the 2010 IAB MIXX Conference, new metrics which require more interaction with the consumer such as an "engagement" metric – i.e. when a user has to engage in an ad before or during a video clip online by clicking to view an ad– may be more important than the "click" by 2015.

Privacy Issues

Online privacy and data collection are among the biggest concerns for consumers when it comes to behavioral targeting online. Data collection, such as a consumer's location, age, or web browsing activity, can help advertisers target more effectively, but also causes others to question how such sensitive information is being used. The most common form of monitoring this data is by placing

[3] Hallerman, David. "The Keys to Online Display Advertising." eMarketer, June 2010.
[4] Atlas Digital Marketing Insight: "The combined impact of Search and Display advertising – Why advertisers should measure across channels." Esco Strong. 2007.

"cookies" on a user's computer to track and store information. Advertisers then use this data to decide which specific ads to place in front of that user when they are online. Many data providers who install cookies onto a user's computer resell data to third parties. Data must be handled with care, and only sold "anonymously" without providing personal information. While targeting may benefit a consumer's online experience, the protection of their sensitive data is critical to consumers, governments, and agencies including the American Association of Advertising Agencies, the Interactive Advertising Bureau, the Direct Marketing Association and the Federal Trade Commission (FTC).

In 2009 the FTC proposed four self-regulatory principles for companies involved in behavioral targeting: (i) transparency and consumer control, (ii) reasonable security and limited data retention (iii) notification with regard to material changes to privacy policies, (iv) affirmative consent before using sensitive data – especially with regard to children, health, or finances – for behavioral targeting. [5] The FTC strongly urges companies to comply with these guidelines. Consumers should be notified of behavioral targeting practices of a company before a cookie is uploaded on the user's system. They should also have the option to "opt-in" to be targeted and receive more tailored advertising, giving a consumer control. Advertisers can market more efficiently if consumers and the FTC are satisfied with their marketing tactics, but again these are self-regulated guidelines and not 100% enforced.

Lawmakers are now debating whether, or how, to update advertising laws for the Internet age, without stifling growth or hurting media outlets dependent on advertising revenue.[6] In the meantime, free browser add-ons are now available such as *Ghostery* and *Better Privacy* that are used to identify companies monitoring a user's web experience and allow that user to delete cookies and prevent certain companies from tracking them. These add-ons allow users to stop behavioral targeting campaigns from certain or all advertisers.

Due to the unclear privacy regulations, advertisers have a risk of breaching privacy guidelines with regard to consumer data, which could result in a tarnished brand image, loss of customers and legal penalties. According to an eMarketer survey, 98% of marketers spend less on behavioral ads than they otherwise would because of privacy concerns. As data transparency and consumer demographics are essential to the real time bidding ecosystem, until guidelines are clear, advertisers can't fully embrace the benefits of display ad optimization.

Brand Safety

Brand safety is a major concern for online brand advertisers. Advertisers fear that an automated system will place an ad on inappropriate websites (i.e. adult or violent content) that could permanently taint the brand image. According to the CTO of Turn, approximately 40% of publisher web sites do not reveal the exact URL of ad placement to brand advertisers. Brand marketers want to have the comfort that their ads are being displayed on quality sites.

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[5] FTC Staff Report: "Self-Regulatory Principles for Online Behavioral Targeting" February 2009.
[6] Kirchhoff, Suzanne. "Advertising Industry in the Digital Age." Congressional Research Service, November 2009.

Transparency to the advertisers is starting to improve. IAB created four tiers of brand safety standards: Tier 1 is considered Safe, content appropriate for audiences of all ages, Tier 2, defined as Mild, supports content appropriate for ages 12 and over, Tier 3, is Moderate, which may contain community-moderated user-generated content such as forums or social networks, and Tier 4 is for Mature, content geared toward audiences 18 and older. Categorizing inventory under these tiers can create more transparency to the advertiser and allow the advertiser to bid on the appropriate quality tiers.[7]

Additionally, AdSafe, the rating standard for online media, and AdMeld, one of the largest real time bidding platforms, formed a partnership to address the brand safety issues that advertisers have had with regard to real time bidding. Advertisers using AdMeld will receive real time information as to their ad placement before the bid based on AdSafe's publisher content rating system. [8] Implementing AdSafe, or a similar privacy and placement check in the real time bidding system would limit the risk of the investment and strengthen the capabilities of the company.

Catalyst's View: Privacy regulations and companies that restrict cookies could definitely limit the growth of data-driven display advertising as it requires an increased availability of audience data. Catalyst would only invest in companies following the above guidelines and principles, but also understand that if the FTC or any other government agency increases their scrutiny of the collection of consumer data, real time bidding (or any company that uses behavioral targeting) investments could become less attractive. Data Providers, the companies that are responsible for data protection would probably be the most likely companies to suffer consequences, but exchanges that use specific data as a competitive advantage would likely be severely affected as well.

Privacy concerns represent a threat to the display ad ecosystem, but the likelihood that the FTC will completely restrict the capture of data is very low. We expect that as users become more aware of the benefits of targeting, and how they can protect their own data, these tactics will be embraced. With regard to brand safety, as display advertising platforms implement safety regulations and bidding guidelines based on tiers of quality content, advertisers will learn to trust automated platforms and adopt the process more willingly as they will not have to rely on picking and choosing placement for each ad. In addition, consumers will have more comfort sharing information with companies they trust, just like in the offline world.

The bottom line is we expect that the movement will be toward transparency, brand safety and consumer protection. Just as with lead generation, we do not believe that business models that generate short-term profits by cutting corners in these areas create long term value. We will be focused only on those companies that take the long view on building trust with both consumers and advertisers.

[7] Online Media Daily. November 20, 2010. Sullivan, Laurie. "*Do Brands Really Know Where Ads Appear*?"
[8] Adotus. November 4, 2010. "AdSafe Partners With AdMeld to Verify Before the Bid." Dunaway, Gavin.