PROGRAMMATIC AND RTB

Challenges and Opportunities

CLEARCODE

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INTRODUCTION

Programmatic is more than just a buzzword; it's the future of online-media buying and selling. It's an exciting and ever-evolving industry comprising of a number of intermediaries and technology platforms.

In this guide, you'll learn more about the programmatic landscape, process of real-time bidding, and challenges currently facing the industry, and will be presented with many opportunities that lie latent, ready for the right party to bring them to life and change the programmatic world.

The Beginning of Online Display Advertising

In the early days of online display advertising, the exchange between the advertiser (or agency) and the publisher (the website owner) was a direct sales process. The advertisers would contact the publisher and purchase ad space (inventory) on its website on a fixed cost-per-thousand basis – known as Cost Per Mille, or CPM. This system meant advertisers would pay a certain price for every 1,000 impressions (meaning 1,000 views).

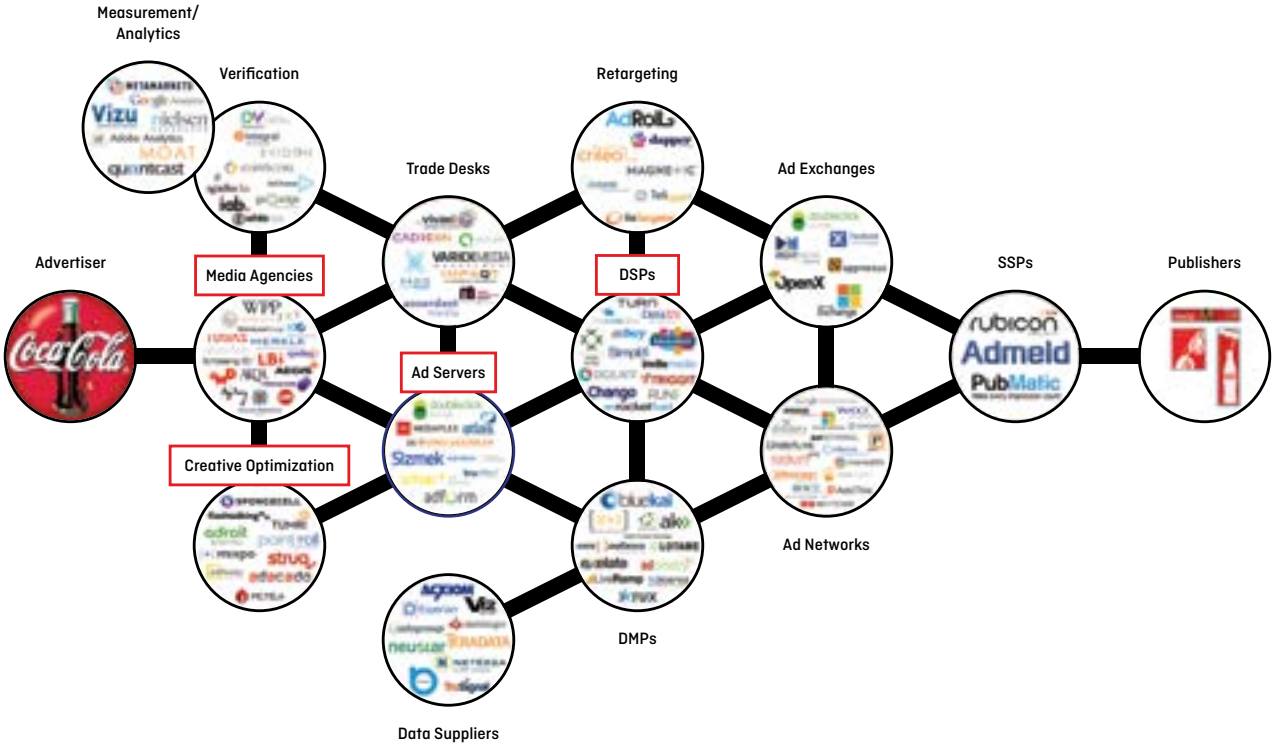
Difficulties emerged when the number of websites, and therefore publishers, began to increase. The once-straightforward direct sales process started to become more complex, unhinged, and drawn-out. While Premium ads – those bought by advertisers directly from the publishers – were still common, publishers soon found that a lot of other available inventory wasn't being filled and fell victim to oversupply.

To counter this problem, technology platforms such as Advertising Networks started to materialize, providing an easier, more efficient, and more automated way to buy and sell available inventory.

The introduction of ad networks, and the later evolution of ad exchanges, marked the beginning of what is known today as the **programmatic buying landscape.**

The Programmatic Buying Landscape

What started out as a close business relationship between advertisers and publishers is now a vast landscape that includes multiple companies and technology platforms.



Source: Display Ad Tech, www.displayadtech.com.

MEDIA AGENCIES

Media agencies are responsible for creating, planning, and executing online advertising campaigns for their clients (advertisers).

AD SERVERS

These technology platforms host the advertiser's creatives (ads) and assist in delivering them to the publisher. Many ad servers also provide in-depth campaign analytics, such as engagement metrics and conversion reports.

RETARGETING PLATFORMS

Retargeting platforms are responsible for displaying ads to users who have already searched for or viewed certain products and services. This is a very popular form of advertising and examples of retargeting are a lot more obvious than audience-targeted ads.

DSP

A demand-side platform is a technology system that allows media buyers to connect with various ad and data exchanges through one user interface. DSPs operate similar to stockbrokers, in that media buyers use them to purchase ad inventory from publishers through the ad exchange, as investors use brokers to purchase stock from companies via the stock exchange.

DMP
Data-Management Platforms are responsible for collecting, storing, and organizing massive loads of data for advertisers, taken from a wide range of first-party, second-party, and third-party sources. This data is stored and pushed through the DMP's software and undergoes a process called data classification. Each piece of user data is analyzed and put into different categories (also called data taxonomies) in order to build distinct user profiles.

AD EXCHANGE
Ad exchanges are dynamic technological platforms that facilitate the buying and selling process of available impressions between the advertisers (buyers) and the publishers (sellers).

SSP
The supply-side platform is designed to help publishers sell their inventory to multiple ad exchanges in an automated, secure, and efficient way. Even though publishers don't need to use an SSP to sell inventory on the ad exchange, the technology it uses offers the most yield from their inventory and helps them gain clearer insights into their audience.

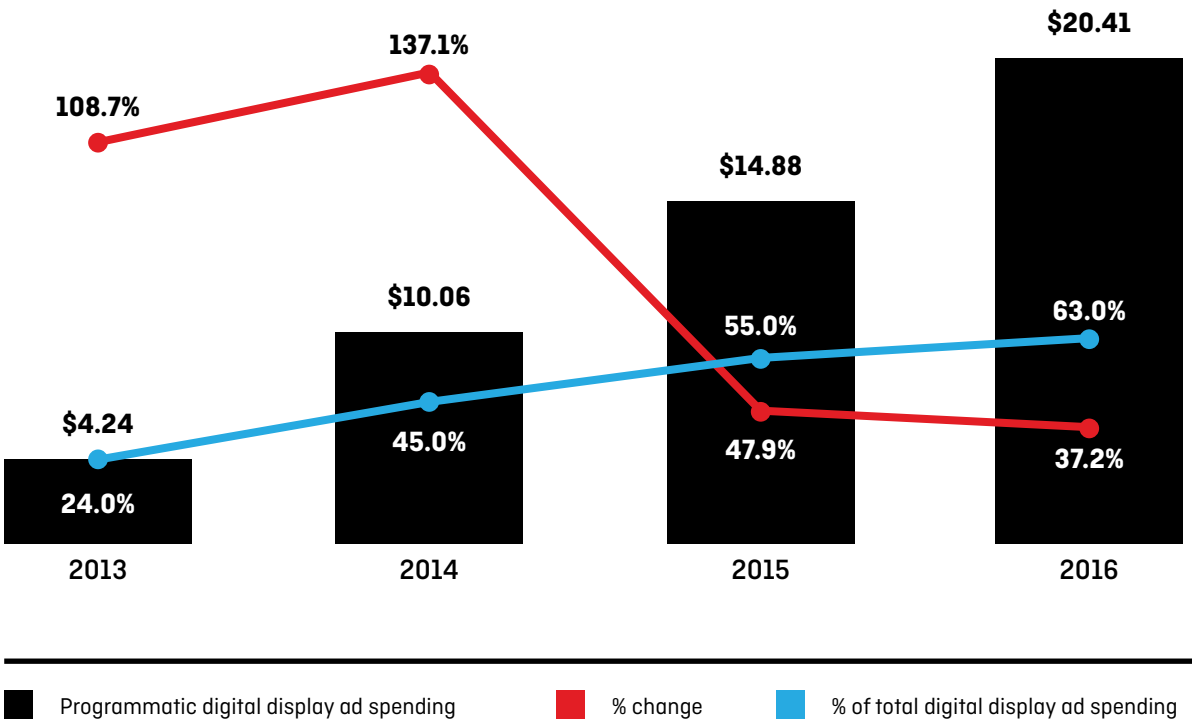
The Rise of Programmatic

Ever since its introduction to the online display advertising ecosystem, programmatic has gone from strength to strength.

Figures from a recent study conducted by eMarketer show that programmatic digital-ad spending in the U.S is set to reach $20.41 billion in 2016.

US Programmatic Digital Display Ad Spending 2013-2016

billions, % change and % of total digital display ad spending

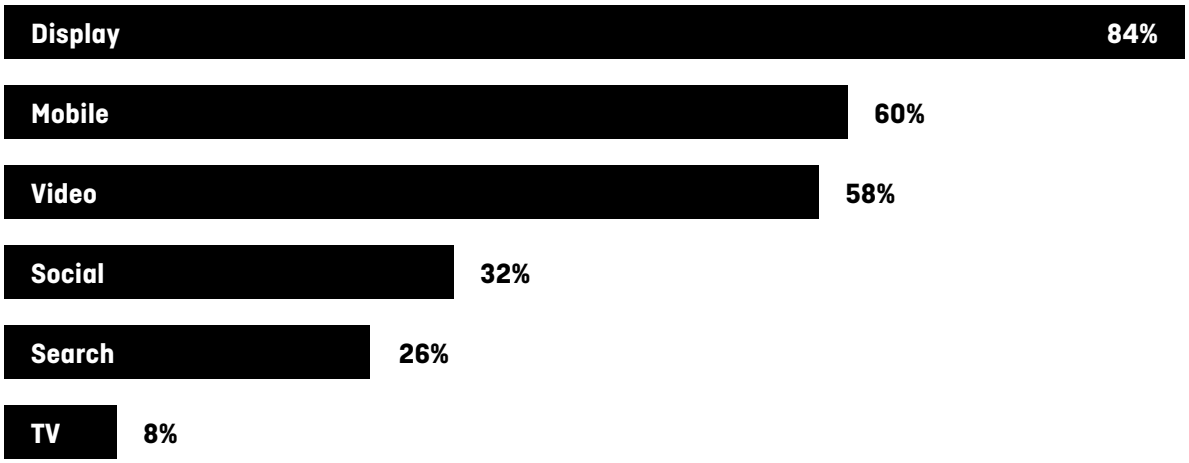


Source: US Programmatic Ad Spend Tops $10 Billion This Year, to Double by 2016, October 2014, eMarketer

The growth of programmatic is also set to massively spill into other areas of display advertising, such as mobile, video, and television.

Channels Used by US Advertising Executives for Programmatic buying, June 2014

% of respondents



Source: Can Adressable TV Take Programmatic TV to the Net Level?, September 2014, eMarketer.com

What is the Difference Between Programmatic and RTB (Real-Time Bidding)?

There is a lot of confusion within the advertising industry surrounding the terms **programmatic and real-time bidding (RTB)**. The fact that they are often mentioned in the same sentence leads to a false belief that they are somewhat interchangeable. However, there is a difference between the two.

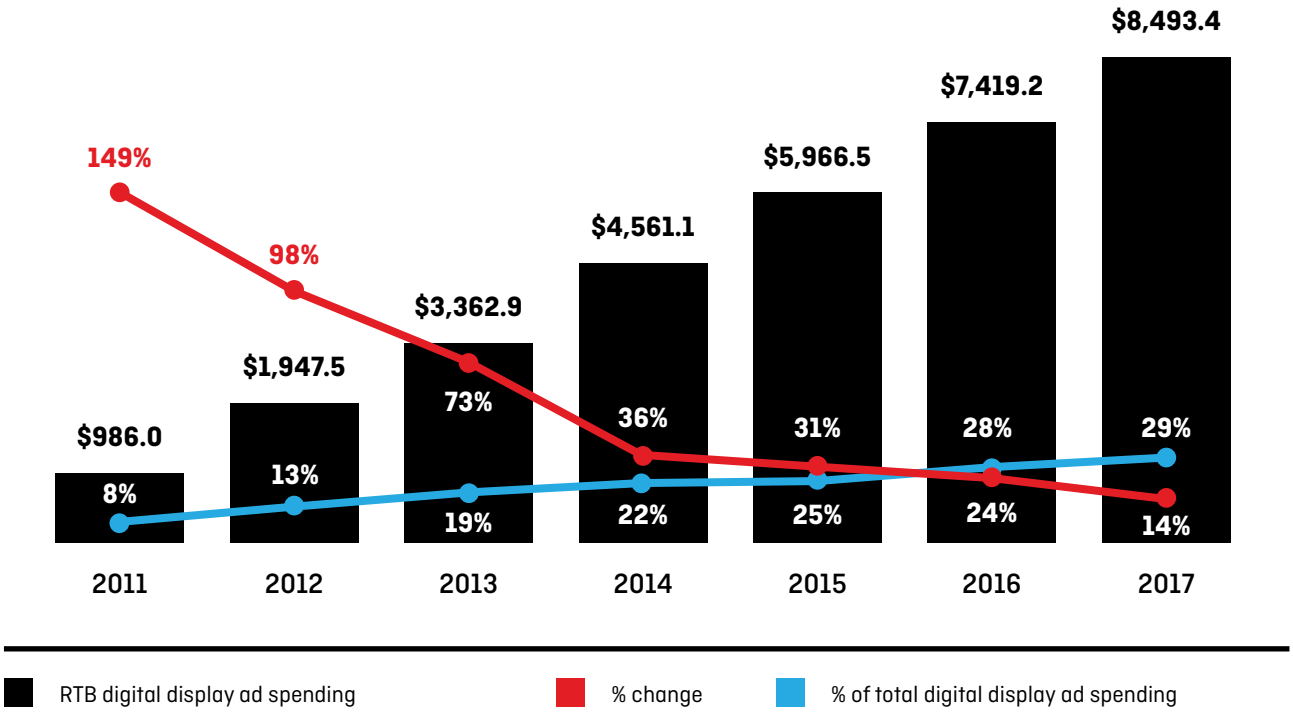
Programmatic refers to the use of technology, algorithms, and data to buy and sell online media.

Real-time bidding is a component of programmatic, but refers to the real-time auction that takes place between the DSP and ad exchange.

It's also important to note that while almost all online media today is bought and sold programmatically, it is not necessarily through the RTB process, but this is certainly changing and is highlighted by reports from eMarketer.

US Real-Time Bidding (RTB) Digital Display Ad Spending 2011-2017

millions, % change and % of total digital display ad spending



Source: RTB Ad Spend Continues Robust Growth, April 2013, eMarketer.com

How Does Real-Time Bidding Work?

The RTB process is comprised of a number of platforms and systems within the display advertising ecosystem.

The whole RTB process begins when an Internet user accesses a website or web application. Right from the get-go, the publisher's site sends a message to the **supply-side platform** saying there is an impression available.

The supply-side platform analyzes information about the user (location, web history, and, if available, age, gender, and any other user information), then sends this information to the **ad exchange**.

Once the ad exchange receives this information, it connects to **demand-side platforms** and relays information about the user. The **ad exchange** starts an auction, and the **DSPs** then bid on the impression based on what that particular impression is worth to them, determined by predefined parameters set by advertisers. The advertiser that bids the highest amount wins, the information is sent back to the **publisher**, and an ad is displayed to the **user**.

This whole process is repeated for every available impression on a web page every time a user accesses a website, a new page, or refreshes the page.

From Selling to Sold in Under 100 Milliseconds

One of the most remarkable facts about RTB is the speed of the auctions; each transaction takes about 100 milliseconds (one-tenth of a second).

To put that into perspective, it takes about 300 milliseconds to blink.

Benefits of Real-Time Bidding

RTB has completely changed the online display advertising industry for all parties involved. Apart from the obvious benefits (improved targeting and retargeting, higher revenues on impressions, reduced inventory waste, greater control, etc.), RTB also provides many advantages through the use of real-time analytics:

For Advertisers

INCREASED AD EFFECTIVENESS

An integral part of any campaign run via RTB is campaign-performance analysis. Analyzing the performance of each campaign through real-time analytics enables advertisers to quickly move their focus from one group of ads to another based on their performance. With RTB, this can be done programmatically, meaning that changes are done automatically by an algorithm without the involvement of humans.

RECOGNIZING FRAUDULENT INVENTORY

Ad fraud is a massive concern in the display advertising industry, reportedly taking $6 billion from advertisers each year. Real-time analytics combined with fraud-fighting technologies can assist advertisers in identifying potentially fraudulent inventory - extremely high click-through rates (CTRs) are often a sign of bots at work - and thus reducing the amount of lost revenue to ad fraud.

CAMPAIGN OPTIMIZATION

Another key benefit offered by real-time analytics is the possibility to apply advertising strategies and tactics to campaigns to increase their overall effectiveness. Identifying the performance of a campaign, or several campaigns running simultaneously, in real time enables advertisers to increase the response rates of specific ads by applying certain tactics. By recognizing in real time which audiences and ads are producing the best click-through rates, reach, and engagement, advertisers can take action and change the direction of certain campaigns on the fly.

For Publishers

INCREASED REVENUES

As a publisher's inventory is now available to a large number of advertisers, the number of potential buyers is considerably higher. This results in more inventory being sold and at a higher price.

OPTIMIZED PRICE FLOORS

Through the use of real-time analytics, publishers can adjust the CPM price floor of their inventory to maximize revenue by analyzing the real prices advertisers are paying for certain audiences. Take, for example, a travel site that sets a CPM price floor of $1.50. By analyzing the going rate for this audience, the publisher may find that many advertisers are paying a CPM price floor of $1.40. The publisher can then make changes accordingly and start earning revenue that otherwise would have been lost.

Media Channels

Display

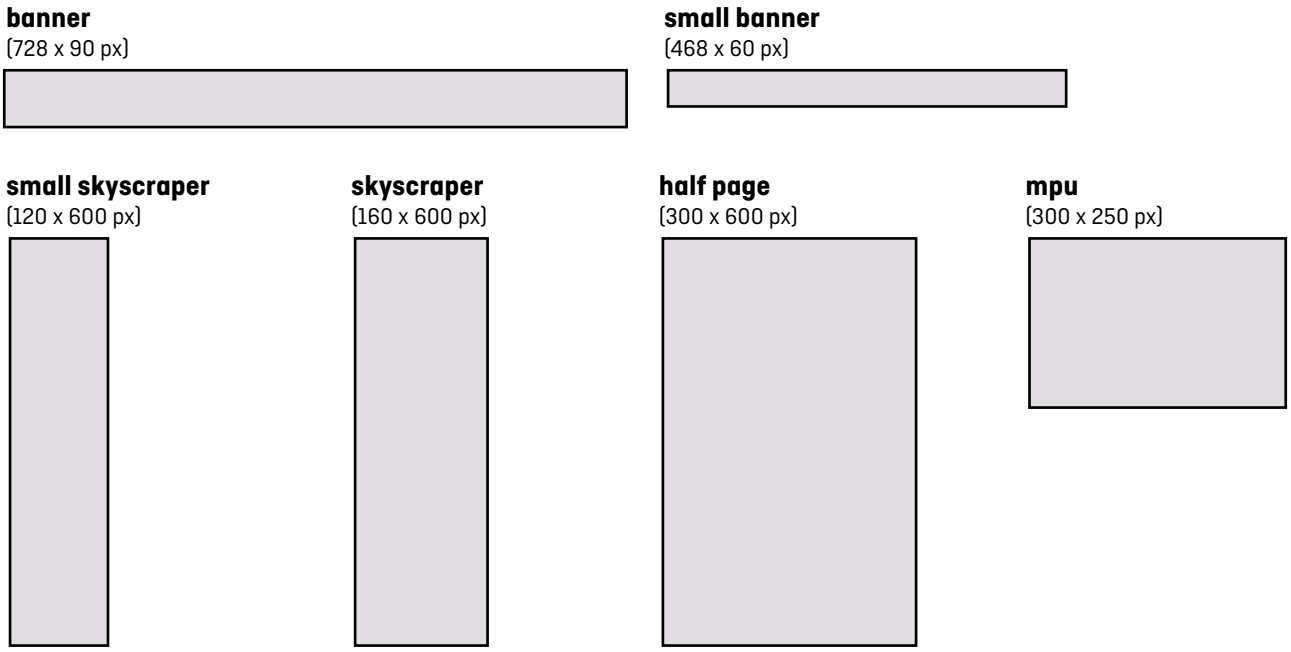
Display advertising refers to ads displayed on desktop computers and laptops.

Traditionally, display ads were static (pixel ads) and didn't contain any interactive or dynamic elements. Nowadays, display ads come in a range of formats:

- Static image or animation
- Video
- Rich media ads (containing interactive elements, including animation, sound, and video)
- Overlays, expandables, and other custom ad units (ads that expand when a user hovers their mouse over the ad, or pushes the page content to the side)

The size, shape, and placement of display ads has changed over time. The Internet Advertising Bureau (IAB) regulates the size, weight (file size), frames per second, animation length, and sound settings of videos and animated ads.

Here are the main size guidelines for display ads:

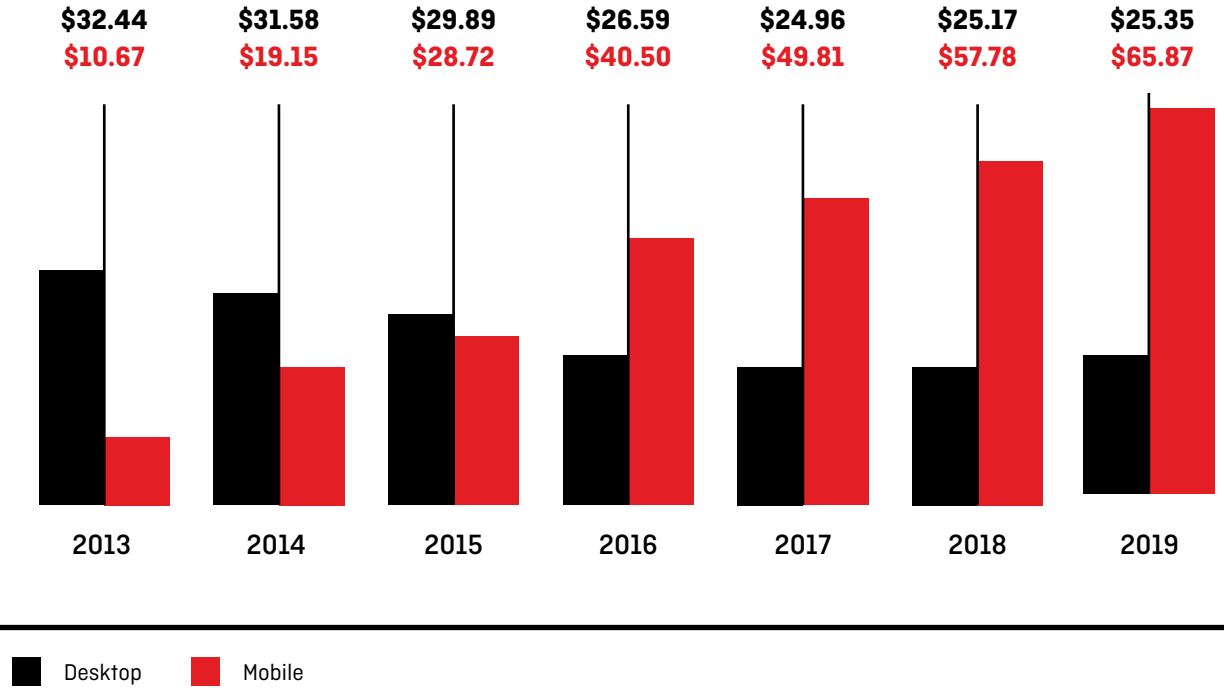


Mobile

For many years, display advertising has held the number-one position in online ad spend, but other areas of online advertising are quickly catching up. One of the biggest movers is mobile, which is set to surpass desktop ad spend in 2016 and account for 72% of U.S. digital ad spend by 2019.

US Digital Ad Spending, by Device, 2013-2019

billions



Source: Mobile Will Account for 72% of US Digital Ad Spend by 2019, eMarketer, 2015

Ads on mobile devices are similar to those displayed on desktop devices, but have a slightly different format.

Native

Native advertising is one of the newest forms of online advertising and was created as a way to increase campaign ROI and engage with target audiences in a new way. Ads are made to match the look and feel of the rest of the content on a website. It is designed to blend in to follow the natural form of the user experience.

Ads should match both the **form** (visual design of the site) and **function** of the website, meaning it behaves the same way as natural content. In short, a native ad is not supposed to look like an ad.

Native ads are generally found on content-rich sites, such as news sites, blogs, and social media networks.

Here are some of the most common forms of native advertising:

Recommended Content (aka recommendation widgets)

You may have glanced over this type before and presumed that it is actually content from the website you're reading. However, the telltale sign is the message above the ads, usually written as, "From the Web" or "Recommended for You."

Because this type of ad appears on content-rich sites, the chances of a user clicking through is considerably higher.

Another form of recommended content is paid inclusion (sponsored content/ advertorials) which involves businesses paying to show their content on a website, like a news site or blog, and is displayed just like other forms of content on the site.

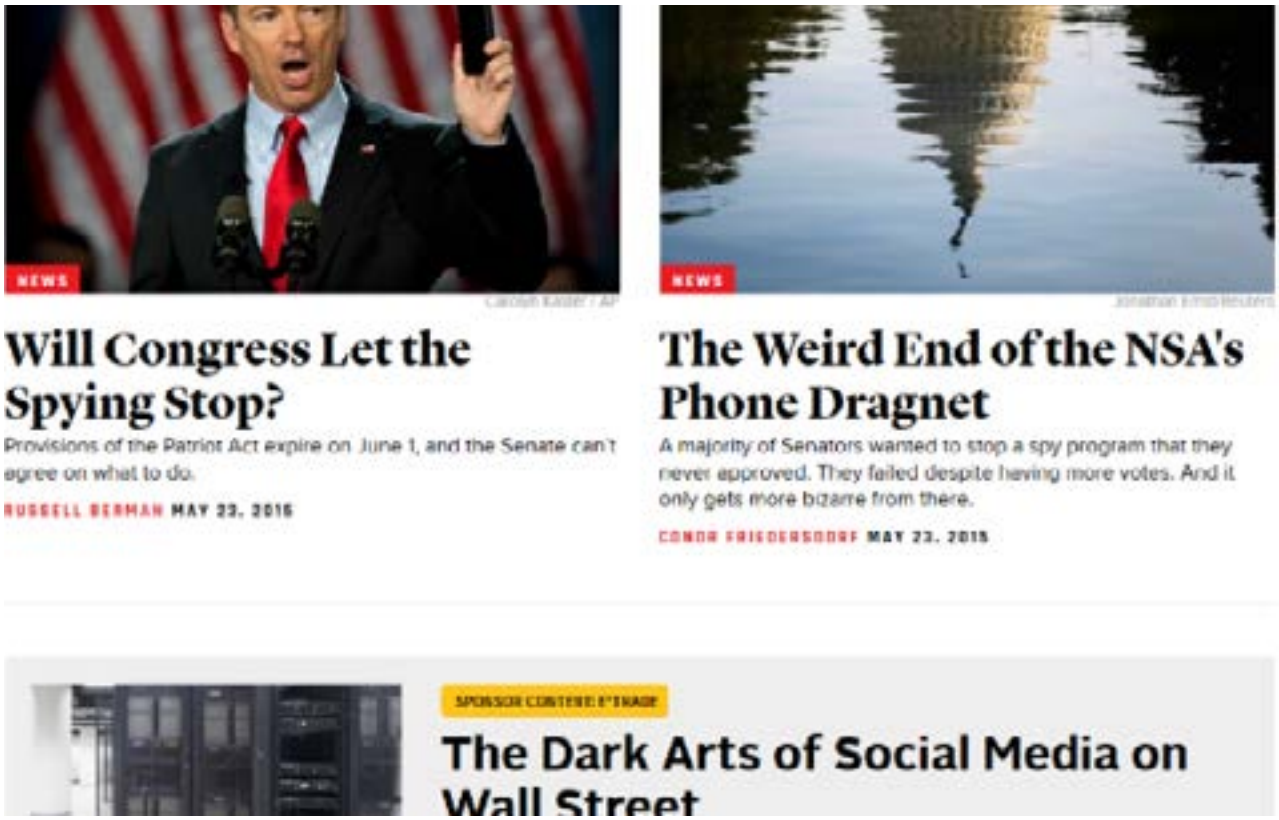


Image source: The Atlantic, www.theatlantic.com

The article above is an example of sponsored content. When the visitor clicks on the article, they are usually presented with the content and displayed an ad asking them to take some sort of action, such as visit the advertiser's site or even purchase a product.

In-Feed/Social

These native ads appear on social media sites. Facebook, Twitter, LinkedIn, and more recently Pinterest, are all displaying native ads to their users.

Paid Search

The paid ads at the top of search results look and feel like part of the search query.

Images source: Native Advertising Playbook, IAB.

Part of OpenRTB

OpenRTB is a project that comprises of companies representing both the buy and sell side of the real-time bidding process. It provides industry standards and API specification for businesses interested in buying and selling online media through ad exchanges.

In January 2015, OpenRTB added native advertising as part of its new release (2.3). This marked a significant turning point for native advertising, as it is now possible to target, optimize, and purchase native ads programmatically, which benefits both the advertiser and publisher.

The Effectiveness of Native Advertising

Native advertising so far is providing advertisers with better campaign ROIs and is more effective at engaging with users.

Here are some statistics regarding their performance:

- In-feed native ads are 25% more effective in capturing a user's attention than traditional banner ads.
- Native ads are viewed 52% more frequently than banner ads.
- Purchase intent increases 18% with native ads than with traditional banner ads.

- Consumers actually looked at native ads more than original editorial content – Native, 26% vs. original content, 24%.

Statistics provided by sharethrough.com.

Even though native advertising is currently limited to display advertising, there is a lot of potential for other areas, such as in-game and virtual-reality advertising.

Video

Video advertising is another advancement showing great promise. According to BrightRoll, a video-ad platform owned by Yahoo!, 2015 is set to be the year for programmatic video-ad buying, with 22% of agencies planning to spend a majority of their programmatic budget on video advertising - up from just 6% the year before.

Different Forms of Video Advertising

Video advertising covers a wide range of formats. Some of the most common are:

In-Stream Video Ads

These ads come in two forms: **linear** and **non-linear**.

Linear video ads run in-line with the content and can either appear before the video plays (pre-roll), during the video (mid-roll), or after the video has finished (post-roll). They can also appear as an interactive video, whereby an ad takes over the whole screen and encourages the user to interact with it (e.g. click on a button, sign up for a newsletter, etc.)

Non-linear ads include overlay ads and non-overlay ads. Overlay ads run simultaneously with the video content and are usually located at the bottom of the screen. Non-overlay video ads are very similar, except they are located outside of the actual video content, therefore not overlaying the video. The main advantage of non-overlay is that it doesn't cover important information like subtitles, whereas overlay ads do.

In-Banner Ads

These types of video ads either start off as expanded video ads that overlay the website's content, or expand and overlay the content when a user hovers their mouse over the ad.

In-Text Video Ads
These ads appear when a user hovers their mouse over a group of highlighted words (like in a paragraph of text). In order for the video ad to begin, the user needs to hover over the highlighted text.

In-Game Video Ads
Often used as a way to monetize online games, these video ads appear while a game is loading or in between levels. With in-game ads, the video player overlays the game.

The Future of Programmatic: TV, Games, and the Internet of Things (IoT)

Programmatic TV

Programmatic TV is one of the newest areas of the programmatic industry and is still very much in its infancy.

Similarly to online display advertising, programmatic TV uses technology to make the media-buying process much easier and more effective.

It can achieve this by focusing on two main areas: **data** and **automation**.

Data
The collection and analysis of audience data helps advertisers show their ads to the right users. In traditional TV advertising, audience data is collected by TV networks, but in programmatic TV, it is collected from set-top boxes and media-monitoring and research companies.

Automation
Programmatic TV involves buying advertising space in an automated fashion based on analyzed data. This not only helps advertisers target audiences better, but also makes the media-buying process more efficient.

One of the biggest challenges advertisers and agencies face with programmatic TV is showing the right ad to the right person. Even with analyzed data, it is extremely difficult to know who the end user is going to be.

Gaming

Gaming is another area of advertising and programmatic that is still quite immature but destined for great things.

The popularity of online gaming, and the fact that it covers a range of platforms (consoles, PC, and mobile devices), means that advertising opportunities are huge.

The most popular advertising formats found in games include:

- **Around Game Environment Ads:** Very similar to traditional banner ads found on desktop and mobile.

- **In-Game Ads:** A subtle advertising method that appears within the game itself and doesn't include any interactive elements (clickable buttons, etc.) - similar to product placement in films.

The IoT

The Internet of Things (IoT) relates a network of physical objects containing software, sensors, and a connection to the Internet and other devices.

The potential of this industry as a whole is major, with experts suggesting that by 2020, there will be 50 billion objects associated with the IoT. From an advertiser's standpoint, this is a completely untapped area for reaching a target audience on a whole new level.

The main challenge that exists is how to collect, analyze, use, and optimize the mountains of data set to flow through the IoT in the very near future.

CHALLENGES AND OPPORTUNITIES

Although programmatic is on the incline and flowing into other areas of digital advertising, there are still a number of challenges that plague its present landscape and threaten its future. Where there are challenges, however, there are opportunities.

Below are 11 issues currently affecting the programmatic industry, as well as the opportunities within them.

Data-Driven Media Buying

If technology platforms are the engines of the online advertising ecosystem, then data is the fuel that powers them.

The Internet has created an abundance of user data extremely beneficial for advertisers, divided into three forms - first-, second-, and third-party.

First-Party Data

First-party data is information gathered straight from the user or customer and is considered to be the most valuable form of data, as the advertiser has a direct relationship with the user (e.g. the user has already engaged and interacted with the advertiser).

First-party data includes:

- Data from an advertiser's web- and mobile-analytics tools
- Customer Relationship Management (CRM) systems
- Transactional systems
- Data collected from subscriptions and newsletter signups

Second-Party Data

Second-party data is much less common than first- or even third-party sources and is essentially first-party data from a different advertiser. The information is initially collected in the form of first-party data, then passed on to another advertiser through a partnership agreement, commonly known as data co-ops.

For example, a website selling sports equipment (let's call it All Sports) may partner with a website promoting sporting events (we'll call them Half-Time). When a user visits All Sports, a cookie is created, then given to Half-Time to target ads to the user. Now when that user visits a completely different site, they will be served an ad from Half-Time.

Third-Party Data

Over the years, third-party data has received a pretty bad rap, mainly due to privacy concerns. However, this type of data is still regularly used by marketers to help reach and target a desired audience, even though it isn't considered as valuable as first- or second-party data.

Third-party data is collected from a range of sources and sold to advertisers for audience targeting. More and more advertisers and agencies are now moving away from third-party data, as it is often outdated, incomplete, or irrelevant.

Data Optimization

Even though every DSP on the market should provide advertisers with basic analytics (click-through rates, impressions, etc.), they don't offer the kind of in-depth data that helps truly optimize campaigns. Instead, there are a few data-optimization techniques that can increase the performance of a campaign:

Blacklist domains that return poor results - generally those in the bottom 10-20% (can be done via most DSPs).

Analyze devices used to view ads and optimize the ads so they can be easily viewed on those devices (e.g. desktop, mobile, etc.).

Improve audience targeting by segmenting customers based on economic value to the brand or product.

Use popular scoring models to better define segments.

Analyze location data to see which areas are performing better than others, and reallocate media spend to those areas.

Challenges

In addition to the above techniques, companies are also investing in machine-learning algorithms and artificial intelligence to achieve the marketing holy grail - putting the right ad in front of the right person at the right time - in which data plays a pivotal role.

Even though data is making success more attainable, it still faces several challenges:

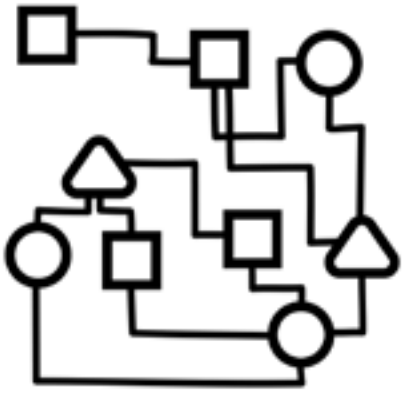
- **Non-Dynamic Pricing:** Media is still priced the same way it was in the early days (on a CPM basis) and is therefore based on the value of demand for the data.

- **Transparency:** There is a lack of transparency on reporting and billing of usage for both buyers and sellers.

- **Privacy:** Companies must adhere to new privacy regulations regarding data protection, sharing, retention, and storage (the right to be forgotten) that are continually being introduced.

Opportunities

The constantly growing amount of online user data, as well as the strong demand for optimized data, allows companies to produce solutions to these challenges. Such opportunities include technology that stores, protects, and makes sense of data gathered from the increasing number of online and offline sources.



Increasing Fragmentation and Complexity of the Ad Ecosystem

The complexity of the online advertising ecosystem increases with every new technology platform. Advertisers and agencies have struggled to keep up with the times, and the confusion around ad technology is producing a few negative side effects.

Source: LUMA Partners, lumapartners.com.

Challenges

The ecosystem's intricacies are highlighted by LUMA's image of the current landscape, shown above. The sheer number of technology platforms and constant fragmentation of the industry is causing many advertisers to distrust the whole system. They are used to working directly with humans, and the complexity of advertising technology currently found in the industry is pushing them further and further away, despite these platforms being created to make it easier to buy media online. Couple this issue with a growing lack of transparency and you've got a situation where the future of programmatic is being threatened by its own shortcomings.

Opportunities

As the programmatic industry is in dire need for simplicity, there are multiple opportunities to help make the ecosystem more advertiser- and agency-friendly, including:

- Developing non-tech-friendly platforms that make it easier to buy media programmatically,

- Educating and training advertisers and agencies on the programmatic landscape and helping them to better combine their skills and experience with technology platforms,

- Making the market more transparent to advertisers.

Measurement Discrepancies Across Platforms

During an online advertising campaign, buyers view reports from publishers' and their own ad servers. These reports list the number of impressions, the CTR, and other metrics relating to the ad. Sadly, it's not uncommon for all ad servers to return different statistics.

Discrepancies have been a problem in the industry ever since the first ad servers were introduced, and it has flowed into other areas as well, such as mobile advertising.

Challenges

Unfortunately, there are a handful of reasons why separate ad servers return different statistics and some are much harder to solve than others. The main issues are:

Relying on User-Side Data Tracking

Information about the ad impression is sent by the browser/app on the user-side asynchronously, usually to more than one tracking service. The information may not be delivered due to several reasons:

- Loss of Internet connection.
- Navigation to another site by the user, canceling the connection by the browser automatically.

- Antivirus and/or ad-blocking software barring the tracking request.

Time Differences

If ad servers are generating reports in different time zones, this could cause the numbers to be off. To fix this issue, compare reports from all ad servers using the same time zone.

Cachebuster

Many modern browsers cache (store) a website's content and images locally on a user's computer when the user visits a website for the first time. Then, when the user visits the website again, all content and images are loaded from the user's computer, rather than from the original server. This allows browsers to improve performance and speed when loading web pages.

Unfortunately, if an ad appeared when the user first visited the site, it will be saved and displayed from the cache upon their second visit and will not be tracked.To solve this problem, the advertiser's tracking team needs to add a cachebuster (a unique piece of code, usually a number) to ensure that a new ad impression is called every time a new page loads.

It's important to note that there will always be discrepancies between ad servers, but the difference should fall within 10%, according to IAB Terms and Conditions. As long as discrepancies are within this range, we can all agree to honor (and more specifically, bill for) one of the party's numbers.

Opportunities

Despite the challenges currently at play, there are ways to remedy a majority of the discrepancy issues, including:

- Adherence to industry standards set by the IAB.
- Usage of industry-accredited ad servers.
- Better education for all parties involved on challenges, and comprehensive documentation on how to solve them.

One positive step towards fixing discrepancy issues has been the introduction of measurement guidelines from the IAB, which help define metrics used in reporting, state when they should be counted, and explain how they should be implemented by ad servers, DSPs and other ad technology platforms.

Viewability

Ad viewability is one of the biggest issues in today's online display advertising world.

Determining the viewability of an ad - whether that ad was seen by the website user - is becoming more troublesome to measure.

The current industry standard for viewable impressions, as provided by The Media Rating Council, states that for an ad to be registered as viewed, it needs to have met these two criteria:

For display:

50%

50% of an ad's pixels were in view on the screen.

1 sec

Ad was viewed for a minimum of one second.

For video:

50%

50% of the video was visible.

2 sec

Ad was viewed for a minimum of two seconds.

Challenges

Since the early years of online display advertising, the most popular pricing model for selling online ads has been CPM.

The problem with this model is that many ads are not seen by the user at all because they are displayed below the fold (the part of the website that is not seen without scrolling).

There is also a consistent problem of fraudulent sites and bots using a variety of tricks and bad practices to register ad views, even though they were never displayed on the website.

In addition, advertisers also have to worry about banner blindness - a phenomenon in which website visitors consciously or subconsciously ignore banner-like information - but this is much harder to overcome and requires the help of optimized data to target the right audience as well as more attractive creatives to grab attention.

Opportunities

A number of companies have already started developing technology platforms to solve this problem, but this is an ever-evolving issue, and opportunities to develop such solutions grow by the day. They include:

- Building technology platforms that help advertisers accurately measure the viewability of their ads.
- A partnership between vendors and trade associations (like the IAB) to create industry standards.
- Adopting new standards (like the Cost Per Thousand Viable CPMV model) and making viewable impressions standard in RTB. This will allow advertisers and agencies to pay for only the impressions that were displayed to the user.

Advertising Fraud and Artificial/Bot Traffic

The rapid growth of programmatic has not only attracted advertisers and publishers, but also criminals and hackers. The billions of dollars that flow through the programmatic landscape each year has enticed criminals to create technologies and techniques to steal money from unsuspecting advertisers.

Fraud existed from the beginning of online advertising, but it has been gaining traction as the RTB (real-time bidding) model is now being widely adopted - the distributing nature of the RTB ad exchange makes it easier to commit and conceal fraud.

It is estimated that $6 billion is stolen from advertisers every year due to this act, but because it can be very hard to detect, and the technology to protect advertisers is immature, the actual figure may be much higher.

Challenges

What makes online ad fraud so challenging is that there are so many possible ways to steal money from advertisers. The most common include:

Invisible and Hidden Ads

This type of attack makes the ad invisible on the website, even though the impression will be reported. There are several techniques used in this type of attack:

- Display an ad in a 1×1 pixel iframe.
- Display ads outside of the viewport area.
- Display (multiple) re-sized ads.
- Display several ads in an iframe loaded to a single ad slot (essentially, out of all the ads loaded, only one will actually be visible to the user).

This type of fraud should not be mistaken with non-viewable impressions, because banners that properly display on the page but are not seen by the user (i.e. at the bottom of the page) are valid, accountable impressions.

Impression Laundering

Impression laundering conceals the real website where the ad is displayed.

HOW IT WORKS

The advertiser buys ads from a carefully selected publisher (one with a relevant audience and content that coincides with the advertiser's brand), usually paying high CPM rates. A portion of purchased impressions are served on irrelevant websites (i.e. high-traffic sites with illegal content, which are hard to monetize).

Then, through a complex number of redirects and nested ad calls through iframes, the ad calls are 'laundered' so that the advertiser sees legitimate sites instead of the real sites where their ads are displayed.

Hijacking Ads

Also known as ad-replacement attacks, this type of fraud involves malware hijacking an ad slot on a website and displaying an ad, which generates revenue for the attacker rather than the publisher (the owner of the website).

This could be done in a few ways:

- Compromising the user's computer to change the DNS resolver (i.e. resolving the ad.doubleclick.com domain to the IP of the server controlled by the attacker, and therefore serving different ads).
- Compromising the publisher's website or the user's computer to change the HTML content on the fly (changing ad tags placed by the publisher to tags controlled by the attacker).

- Compromising the user's proxy server or router (or the ISP's router) to spoof the DNS server or change the HTML content of the site on the fly.

Hijacking Clicks

Similar to hijacking ad placements, an attacker can hijack clicks. When the user clicks on an ad, the attacker redirects the user to another site, essentially stealing a prospective client from the advertiser.

There are a few ways in which the attackers can achieve this, by:

- Compromising the user's computer to change the DNS resolver.
- Compromising the publisher's website and hijacking the click (i.e. by inserting an onClick event on the iframe with the ad).
- Compromising the user's proxy server or router to spoof the DNS or change the HTTP request on the fly.

Popunders

Popunders are similar to pop-up windows with ads, with the exception that the ad window will appear behind the main web browser window, rather than in front. It can be combined with the impression-laundering technique to generate additional revenue.

In some domains, this is considered a completely legal advertising method, but most of the ad networks forbid it.

Bot Traffic

Attackers can use a botnet (either consisting of compromised users' computers and/or a set of on-demand cloud and proxy servers) that generates fake traffic to the website for more ad revenue.

Opportunities

It's a constant arms race between ad fraudsters and ad-technology companies trying to prevent these types of fraud, similar to the war between hackers creating computer viruses and antivirus software companies.

The opportunities within the ad-fraud challenge relate to technology. By building ad-fraud-fighting systems, companies can help advertisers reduce the number of dollars lost to fraud.

Cross-Device Targeting

Nowadays, it is not uncommon for users to have more than one device, whether that be a laptop, smartphone, tablet, or game console.

Challenges

This multi-platform usage makes it tough for advertisers to make connections and identify the same user across multiple mobile devices. The challenge is to connect user data gathered across a range of devices linked to different networks and create a full view of the user's journey.

Another main challenge relates to cookies. For many years, cookies were the primary method for tracking Internet activity, especially on desktop, but as more and more users access the Internet across multiple devices, cookies are becoming increasingly less effective.

Opportunities

The industry has already seen a number of new possible solutions to the cross-device tracking issue, but more still needs to be done.

Some of the possible ways to track users across multiple devices include:

Universal Login

Universal logins allow users to log in to many sites and apps with an existing set of credentials, instead of creating a new username and password for each particular

site or app. Many of the larger tech companies already offer this option for users and you've probably already seen examples on the websites you enjoy:

Companies that provide users with this kind of universal login are able to track them across many sites, apps, and devices; however, only a limited number currently offer this option to their users.

Device Fingerprint

Device Fingerprint uses an algorithm to identify the user based on standard attributes passed on by their device, which may include device type, operating system, IP address, user-agent, and fonts. This method of tracking isn't as accurate as others, as the attributes collected may change over time due to device updates, and multiple devices could be linked to the same profile.

Statistical ID

This method of tracking uses algorithms that operate off a user's device, using information provided by the device and its gateway to access the Internet. The Statistical ID method is a probability-based solution, which makes accuracy and stability difficult to achieve.

Paywalls and Subscriptions

By prompting a user to subscribe to a publisher's website (e.g. news site or ecommerce store), data can be collected and shared across multiple devices. However, the problem with paywalls (a system whereby a website limits the amount of articles users can access without a subscription) is that they are incredibly ineffective - only about 0.5%* of users subscribe to a paywall.

Therefore, if publishers and ecommerce stores want users to log in every time they access the site on every device, there needs to be an incentive to do so.

**Source: Metered Paywalls Average Conversion Rates Less Than 0.5%, Subscription Insider, April 30, 2014 by Minal Bopaiah.*

Native Advertising

Publishers are already seeing a real increase in revenue from this new form of advertising. However, there are few hurdles it must overcome before it achieves true success:

Challenges

Scaling Custom Content

Unlike banner ads, where advertisers can create a series of creatives and push them out to many different publishers, native advertising requires a lot of custom ad formats. Advertisers are not able to scale these campaigns in the same way they can with other types, and although the introduction of the OpenRTB 2.3 standard has helped ease this problem slightly, it is still a largely unsolved issue.

Finding the Balance Between Editorial Standards and Advertising

Right from the beginning, native ads created a fair share of controversy.

Many feel that consumers are being tricked into thinking this type of content is part of the site's organic content. By disguising ads as regular posts, users often can't tell the difference between regular blogs, news stories, and native ads.

On a deeper level, native advertising is breaking the separation of church and state, which, in the media world, refers to the separation of editorial content and business operations (typically advertising), and means that a news company should provide independent reporting free of paid influence.

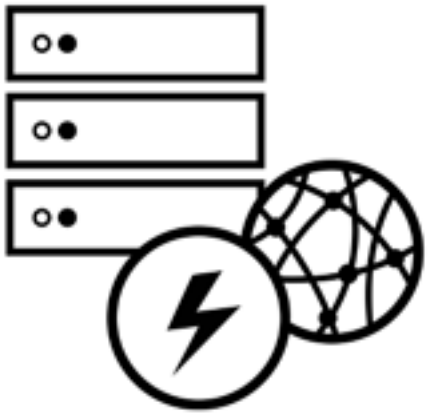
As advertisers move toward making custom native ads appear more like editorial content for increased effectiveness, user frustration grows, as for them, the difference between the two is becoming harder to identify.

Delivery and Display Challenges

Currently, it is difficult for advertisers to display native ad creatives across a wide range of publishers, as advertisers buy a single ad unit (i.e. image + header text + article preview text) to be displayed variously on different sites. The challenge here is to develop technology on both the supply side and the buy side to help automatically customize creatives depending on where they are displayed.

Opportunities

From a technical standpoint, there are a host of opportunities to develop technologies for both advertisers to deliver native ads and publishers to display them. For example, developing technology to help scale campaigns across multiple publishers.



Integrating Offline and Online Data

Over the past few years, marketers have become fond of multi cross-channel attribution models. These models make it easier to understand the impact each digital marketing channel (social, display, paid search traffic etc.) has on their online sales, how effective the campaigns are, and how the channels interact with each other. They also help marketers attribute the revenue to each channel and calculate ROI, which is an essential metric when justifying and (re)allocating future media budgets.

There is, however, one main problem: **cross-channel attribution does not take into account both offline sales and marketing.**

So in other words, it will work perfectly in the case of an online-only business using online-only marketing channels. In reality, such businesses are in the minority. As an example, let's look at retail:

In 2013, ecommerce accounted for 5.8%* of total retail sales – $263.3 billion was spent in online stores, but **think about the remaining 94.2%!**

**Source: U.S. Department of Commerce, Quarterly Retail eCommerce Sales 1st Quarter, 2015.*

What's more, online presence drives more revenue offline than online. It is predicted that by 2017, more than **half of all U.S. retail sales will be influenced**

by the Internet in some way, so there is a huge opportunity for underserved marketers who can use the data to improve their ROI on marketing budgets.

**Source: Forrester Research Inc. report "U.S. Cross-Channel Retail Forecast, 2012 To 2017.*

Challenges

One of the main reasons it is so challenging to attribute offline data with online data is that there are so many factors to consider when determining how consumers make purchasing decisions, and even with some of the most effective methods, there is still plenty that cannot be accounted for.

Another main challenge relates to collecting offline data. Even though technologies are emerging to help solve these issues, such as beacons, it is still a difficult area.

Opportunities

A number of methods are available for attributing online and offline data, and while they help bridge the gap, they are very simple techniques (e.g. point-of-sale and online surveys, postal code collection at point-of-sale, coupons, etc.) The real opportunities lie within technology.

Below are a few tech-based methods with the potential to offer better online-offline attribution.

Vanity URLs and Phone Numbers

Vanity URLs are unique addresses, such as myproduct.com or mybrand.com/product.

The idea is that brands can come up with a unique domain name (or URL) and show it in their commercials. The unique URL will redirect the user to the proper destination page and add parameters (UTM tags) for the traffic attribution. The same principle works with phone numbers - a company can set up a phone number, attach it to its ads, and then attribute calls to the ad when customers use that phone number.

Although attributing Vanity URLs was a popular and effective option (especially compared to basic methods like direct-traffic attribution), it has lost its accuracy because many users will now just type the brand name in a search engine to find the website. Most modern browsers are integrated with search engines encouraging users to do just that instead of typing the full URL.

Time-Limited Attribution Windows

When a marketing campaign has a specific airing time (i.e. TV, radio campaigns), we can attribute the difference in traffic/conversions compared to a similar period in time before (our baseline).

There are a few questions that arise immediately:

- How many minutes/hours after the airing time shall we still attribute the difference?
- What are the best techniques we can use to weed out visitors who were not exposed to the campaign?
- When do we need to worry about the impact of other campaigns?

This can become a complex process and it's beyond the capabilities of standard web-analytics packages.

Beacons

Beacons are low-energy Bluetooth devices a customer may interact with when using an app on a smartphone. It's a very hot, widely discussed technology that emerged in 2013.

In a nutshell, brands engage customers by interacting with smartphones at the POS with beacons located throughout the store. The point is to deliver a better customer experience, but also to track customers.

If a customer has an app that supports beacons, it can send data about their visit to a POS or physical location. The important thing is that the apps may not necessarily be related with the brand; they would just collect the data from beacons and share it with advertiser.

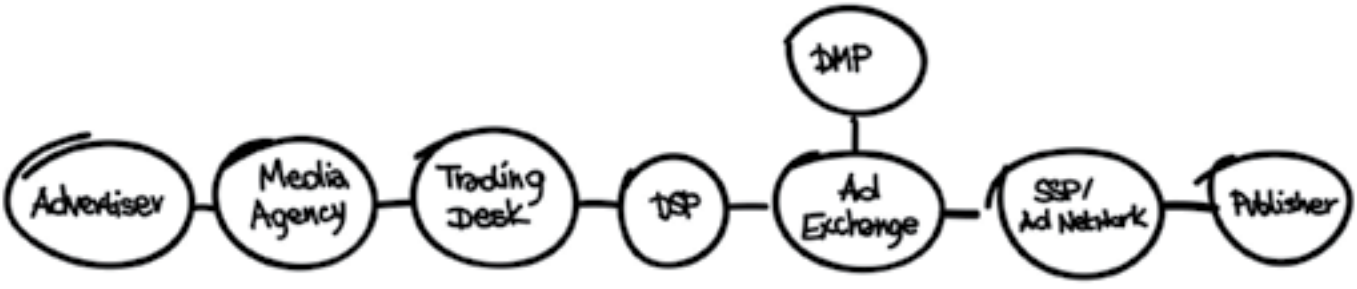
The app may also pass the iOS IDFA (identifier for advertisers) or Android device ID, which will help to connect the user's offline behavior with their online activity (app usage, website visits, and purchases).

Transparency Issues

Back when the movement of media between the advertiser and publisher was a purely direct process, both parties knew how much the media was being sold and purchased for. While this direct process is still occurring today, benefits offered by technology platforms (DSPs, SSPs, DMPs, etc.) are leading to an increase in programmatic media buying for both remnant and premium inventory.

However, even though these platforms are providing advertisers and publishers with an easier and more optimized way of buying and selling media, they have essentially become the middlemen and are making the true cost of media harder to identify.

When an advertiser makes a media purchase with their agency, they are often unaware of just how many hands their budget passes through, and how many commissions are paid to intermediaries and technology platforms before it finally reaches the user - it is not uncommon for an ad to pass through five different parties en route to its destination. That's up to five middlemen all taking commissions and charging their own fees.



Knowing exactly how much commission each technology platform takes (DSP, Ad Exchange, SSP) is extremely hard to calculate, and even if this information is passed on to the advertiser, it can be more difficult to validate and confirm.

This lack of transparency has damaging effects on the reputation of programmatic buying and causes those involved in the process to distrust other parties in the ecosystem.

One opportunity that exists in the transparency challenge is to inform the advertisers how much of a cut each intermediary and technology platform takes. By making the market more transparent, advertisers will be able to take control of their media campaigns, calculate their true ROI, and start to invest more in the industry through increased levels of trust.

Privacy and Data Ownership Issues

Over the years, the issue of user privacy and how their data is controlled and regulated has come under a lot of scrutiny.

In industries like online advertising that collect massive amounts of first-, second-, and third-party data across multiple devices and channels, user-data protection and privacy are big issues that need close attention.

Personally Identifiable Information (PII)

PII is a data set that can be used to single out a real person. The types of PII include:

- Name
- Address
- Telephone number
- Email address
- Financial account numbers
- Social security number
- Government-issued identifiers

As PII is extremely sensitive, it is not generally used in online advertising. Instead, non-PII is used for tracking and targeting, which is any type of information not used to identify a particular user. One example of non-PII is a cookie.

Piggybacking

Piggybacking refers to the event of a tracking bug loading another tracking bug. The problem with piggybacking is that the publisher could install one piece of technology that may load without their consent, allowing other trackers to share/sell the publisher's data. This way, the flow of data about users cannot be controlled, as even a publisher does not know where or when the data ends up being shared.

Challenges

At present, there are a number of challenges that face user data and privacy and the problem is growing by the day.

Data Ownership: How to Protect Advertisers' Data

Advertisers, publishers, and all other online companies that handle data have a certain responsibility to ensure that the user information they collect, store, and utilize is kept safe. This is often a challenge, as controlling data isn't always an option, but there are a few ways advertisers can protect their data:

- Host user data on their own infrastructure.
- Choose technology vendors that adhere to user data and privacy best practices and regulations.
- Become a member of privacy and data-protection regulators, such as the Network Advertising Initiative.

User Privacy Protection (Opt-Out Initiatives, How Data is Shared)

Users can also protect their own privacy and manage privacy preferences in their Internet browser (e.g. turn off third-party cookie tracking, activate the Do Not Track feature, etc.).

However, more needs to be done to make the issue of user privacy more prominent to online visitors.

One such initiative includes allowing users to opt out of marketing activities. While this option is available to a certain extent, this is often something that needs to be proactively done by the user. A better solution would be to directly ask users whether they want their data to be tracked, rather than making them disable tracking themselves.

Opportunities

Technology

For every new piece of technology that collects, stores, and analyzes user data, there is an opportunity to develop technology that protects this information by allowing users to control their data, opt in and out of certain activities, and delete data collected by other parties.

Privacy as a Business Model

Just as privacy invasion (such as data broking) has emerged as a business model, privacy itself can become a business model as well. Not only will this help solve many privacy challenges, but it will also highlight the number of questionable practices used by large corporations.

In-House Programmatic Technology and Custom Programmatic Platforms

In the early days of programmatic, many advertisers rented technology platforms, such as a DSP, to conduct their online advertising campaigns.

Although the decision to rent a DSP still, in many cases, is the more popular option, an increasing number of advertisers and ad agencies are considering building their own DSP, thus taking the programmatic buying process in-house.

There are a few advantages and disadvantages for renting and building a DSP.

Advantages of Renting a DSP:

- Instant access to valuable DSP features and a vast source of inventory.
- Access to industry experts and technical support.
- No ongoing maintenance costs.

Disadvantages of Renting a DSP

- High markup costs (on purchased inventory).

- Lack of transparency.
- Lack of or limited customization possibilities.
- No ownership of data.

Advantages of Building a DSP

- No markup on media spend.
- Control and ownership of data.
- Control over DSP features and roadmap.
- Increased company value.
- Integration with other technology systems.

Disadvantages of Building a DSP

- Relatively high up-front costs to build or acquire the technology.
- Steep learning curves.
- Maintenance costs.
- Additional risks due to inexperienced staff.

For more information about considerations surrounding renting or building a DSP, read our ExchangeWire article, Should Agencies Acquire or Build a Technology Stack to Remain Competitive?

Glossary: Essential Terms Used Throughout This Publication

Ad exchange - Dynamic technological platforms that facilitate the buying and selling process of available impressions between advertisers (buyers) and publishers (sellers).

Ad network - A technology platform that buys unsold (aka remnant) inventory from publishers, runs the inventory through their technology, aggregates the audiences, and then packages it all up and sell it to advertisers.

Ad server - A web server responsible for hosting the advertiser's creatives (ads) and assisting in delivering them to the publisher.

Ad tag -A piece of software code is used to call an ad from an advertiser's ad server to enable an ad to be displayed on website. Ad tags are usually provided directly to the publisher or to an ad network.

CPM - *Cost Per Mille* (thousand). When inventory is purchased on a CPM basis, the advertiser pays a set price for a thousand impressions.

eCPM - *Effective Cost Per Mille*. A measurement used to determine the performance of ads purchased on a CPM basis. eCPM is calculated by dividing the total earnings from the ads by the impressions and then multiplying that number by 1000 [eCPM = (earnings ÷ impressions) x 1000]

CTR - *Click-through Rate*. A CTR states the percentage of clicks an ad received compared to the number of overall impressions [CTR = (Clicks ÷ Impressions) x 100]

Conversion - A conversion is registered when a user completes a certain goal that has been predefined by the advertiser.

DSP - *Demand-Side Platform*. A technology platform that allows media buyers to connect with various ad exchanges, ad networks, and and data exchanges through one user interface. Most DSPs have real-time bidding capabilities.

DMP - A system (similar to a database) responsible for collecting, storing, and organizing data for advertisers, taken from a wide range first-party, second-party,

and third-party sources.

Impression - Each time a single online ad is displayed to an user it counts as an impression.

Inventory - Available ad space on a website.

Premium Inventory *(Non-Remnant Inventory)* - Inventory purchased by advertisers directly from the publishers.

Remnant Inventory - Inventory that couldn't be sold directly to an advertiser.

SSP - A technology platform designed to help publishers sell their inventory to multiple ad exchanges in an automated, secure, and efficient way.

PII - *Personally Identifiable Information*. A data set that can be used to single out a real person.

Price Floors - the minimum monetary amount each ad should be sold for as set by the publisher.

Publisher - In the context of display advertising, the publisher is the website that users visit.

Programmatic - refers to the use of technology, algorithms, and data to buy and sell online media.

Real-time bidding - a component of programmatic that refers to the real-time auction that takes place between the DSP and ad exchange.

Re-targeting (Re-marketing) - A process used to display ads to users who have already searched for or viewed certain products and services.

ROI - Return on Investment. The benefits (often financial) one receives from an investment. In the advertising world, advertisers often calculate the ROI based on how much profit they make from their online advertising campaigns.

See more: http://iabcanada.com/files/RTB-Glossary-English.pdf and https://wiki.appnexus.com/display/industry/Display+Advertising+Glossary

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