

AD TARGETING IN  
A MULTI-SCREEN  
WORLD

LEVERAGING DEVICE DIVERSITY TO  
UNLOCK THE MULTI-SCREEN  
ADVERTISING OPPORTUNITY



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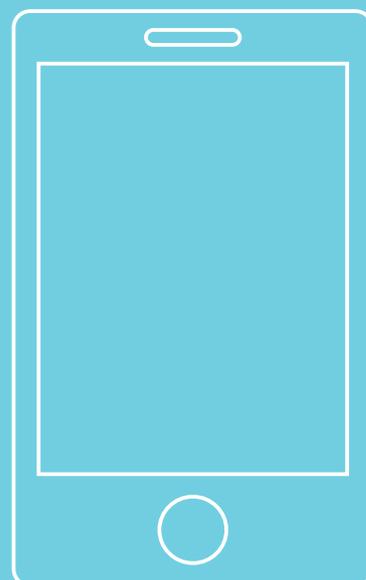
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# AD TARGETING IN A MULTI-SCREEN WORLD

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**04** INTRODUCTION

**04** MOBILE ADVERTISING : THE PAYMENT  
ENGINE FOR APP AND MOBILE WEB ECOSYSTEM



# INTRODUCTION

## Mobile Advertising : The Payment Engine for App and Mobile Web Ecosystem

Mobile advertising has clearly come of age. As the mobile ecosystem in general continues to enjoy a meteoric rise, with over 6 billion subscriptions now active across the globe, mobile advertising has become, in effect, the de facto monetization system for mobile apps and mobile web.

Gartner Research estimates that global mobile advertising spend was \$13.1 billion in 2013 and is projected to rise to almost \$42 billion by 2017<sup>1</sup>. Mobile advertising is considered so important to the business model of Facebook that its fortunes on the stock market track the market's belief in its ability to monetize this channel. Mobile advertising is expected to account for nearly 25% of total ad spend for 2014 according to eMarketer<sup>2</sup>.

This paper will describe the mobile advertising ecosystem with a focus on how companies involved in the Advertising manage the realities of a multi-device environment. The key players in the ecosystem will be described along with technical details of how mobile advertising works and how it might evolve.

- 6 billion new connected devices set to enter the market this year alone ([IHS](#)).
- Nearly half of smartphone owners (46%) and tablet owners (43%) said they use their devices as second screens while watching TV every day.(Nielsen)
- [Gartner](#) predicts that there will be 30 billion connected devices in use by 2020

<sup>1</sup><http://www.hasoffers.com/blog/top-25-mobile-advertising-ecosystem/>

<sup>2</sup><http://abcnews.go.com/Technology/wireStory/emarketer-sees-2014-mobile-ad-spending-315b-22967340>

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# 6 WAYS TO TARGET A MULTI-DEVICE WORLD

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**06** 6 WAYS TO TARGET A MULTI-DEVICE WORLD

**07** EXTENDING TARGETING TO THE DEVICE



## 6 WAYS TO TARGET A MULTI-DEVICE WORLD

Advertising has historically suffered from a measurability problem. As famed advertising pioneer John Wanamaker so succinctly stated:

**“Half the money I spend on advertising is wasted; the trouble is I don’t know which half.”**

Internet advertising has greatly increased the ability of advertisers to precisely target audiences. There are myriad ways in which this is achieved, mostly related to the content of the current and previous pages visited by the user.

Traditional internet advertising relies on two sets of data to deliver its results:

### 1. Contextual Relevance

- The content you are currently viewing
- Time of day
- Other tie-ins e.g. offline ad campaigns

### 2. Purchase Intent

- History of interest in certain products
- Products related to previous purchases, searches or site visits
- Products bought by others with similar behavioural profile

# EXTENDING TARGETING TO THE DEVICE

Mobile advertising can extend this targeting capability further by incorporating information about the user's device and hints from the user's context. There are a number of key pieces of data that may be utilized:

1. Device type
2. Device make & model
3. Device properties
4. Device location
5. Connection information
6. Other device sensors

Looking at each of these in turn we can go into the targeting possibilities offered.

## Device Type

Both mobile web and native app advertising allow the ad publisher to determine the nature of the device. The device type can typically be broken down as follows:

- wearable device
- mobile phone
- e-reader
- tablet
- desktop PC / laptop
- games console
- TV



Each category can be broken down further as required e.g. phones can be subcategorized as feature phone, smart phone, phablet and on on. Tablets typically fall into two categories delineated by the 7" and 10" screen size segments.

This broad device category is a strong input in deciding the most appropriate ad to serve. A person using a tablet is most likely to be in a sedentary context; a person using a smartphone could be in just about any context; a games console user is almost certainly at home and in a recreational frame of mind.

These device types hint at context, which is a strong indicator of propensity to perform certain actions. As an example, a person using a smartphone is less likely to follow-through on a purchase of an item where visualizing or inspecting a product is an important factor in their choice; the same transaction is more likely to conclude successfully on a desktop or tablet where visual inspection is more easily accomplished.

## Device Model

Device model data can be used in a wide variety of ways from the most simplistic (“Get ringtones for your model name phone”) to more sophisticated campaigns based on specific device models and propensity to perform certain actions (“Upgrade your iPhone 4S to an iPhone 5S today”).

Sometimes an advertising campaign can simply be targeted at a hit list of devices that are known to be popular in certain segments of the population. For example, targeting affluent users might focus on recent high-end devices only.

In addition to providing the broad device type, most device intelligence solutions will also provide specific model name, marketing name and manufacturer for any given device.

## Device Properties

Device properties make strong targeting data. Some of the more important ones are described here.

- **Screen dimensions.** For maximum effectiveness, ad banners should be sized appropriately for each device. In addition to making sure that the ad is correctly displayed on the screen, not doing so unnecessarily penalises the end user and increases the annoyance associated with ads.
- **Device operating system.** At the very least, knowing the device OS allows advertisers to present deep links to the relevant app store. Perhaps more interestingly, the OS type can be used to infer information about the user of the device e.g. iOS users may be less price sensitive than Android users, Blackberry OS users are much more likely to be corporate users and so on.
- **Year released.** The year in which a device was released can be used to target older devices that may be upgrade candidates.
- **HTML5 support.** This can be used to determine the richness of experience that should be served to a given device, in addition to making sure that the ad renders correctly.
- **Network protocols supported.** A device that supports only GPRS should be served an experience that works well at this speed.



Device intelligence solutions contain many additional properties for each device that can further enhance targeting. It is worth noting that feature phones and lower-end smartphones still make up a significant proportion of mobile advertising and hence are worth catering for.

## Connectivity Information

Unlike desktop PCs, mobile devices tend to connect to the internet in widely varying ways, each of which yields different information that can be used for targeting or optimisation of the user experience. The following information is often available from device intelligence solutions:

-  • Network operator—the name and marketing brand of the mobile operator to which the user is currently connected.
-  • The country from which the users request originated.
-  • WiFi connection. It can be very useful to know if a user is connected over WiFi or not since this has a strong bearing on whether the user will tolerate a large download or not.
-  • Current bandwidth available to device. In a web context it is possible to determine in real time the bandwidth available to the end user. This information can be used to lighten an experience if appropriate.

These pieces of information can be used as powerful new targeting hints.

## Device Location

One of the holy grails of mobile advertising is availing of the fact that the user's device knows where it is. This information is made available in two ways:

1. Approximately, via cell tower and WiFi hotspot triangulation
2. Accurately, using the device's GPS receiver

Location-specific targeting opens up an entire new range of possibilities that weren't really available with desktop and laptop devices. Geo-location has always been available to some extent via a user's IP address but this has suffered from both accuracy issues and lack of precision, since typically only city-level precision is available.

Where a GPS signal is available (generally in any place with a clear view of the sky) devices can report their position to within a few metres accuracy. This opens up the possibility of hyper-local targeting e.g. advertising to people within a city block or short drive of a certain store.

With this great precision comes the user interface problem of how to expose this targeting ability to supply-side customers in a manageable way.

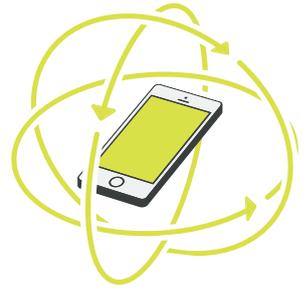


GPS location is available for both web apps and native mobile apps.

### Mobile Sensors – Accelerometer and compass

Most smartphones also include an accelerometer and compass. These sensors together allow an advertiser to know precisely which way a device is pointing, both in terms of compass direction and orientation in 3D. The physical orientation of a device can be used to infer information about the physical context e.g. if the device is perfectly horizontal it's probably sitting on a table, which means the user is not out and about; if the device is tilted to 120 degrees from horizontal the user is probably lying down. The accelerometers can be used to determine if the user is on the move or not.

As with location information, these sensors are available for both web apps and native mobile apps.



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# DEVICE TARGETING IN ADVERTISING PLATFORMS

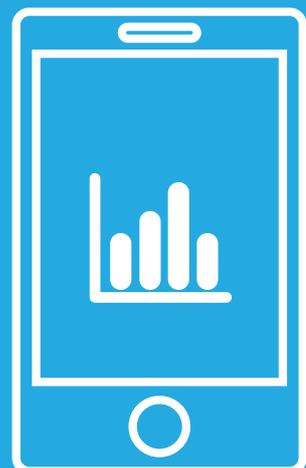
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# CHANNELS

There are two channels in which fine-grained device targeting can be achieved:

1. Web advertising (on mobile or fixed devices)
2. In-app advertising

In order to detect the nature of a device, a server-side component in the ad server typically needs to query a device intelligence solution such as DeviceAtlas using some unique attribute of the device as a key.

## Web Channel

In the web context this identifier is called the User Agent string. It is sent by the browser with every request it makes to a publisher or ad network's server. This string can be used to uniquely identify the device type in greater than 99% of cases and return a full set of hardware and software properties for the device in question. Some device intelligence solutions also allow real-time client-side properties to be gathered e.g. device location, currently available bandwidth, physical device orientation.

## Native Apps

Within a native mobile app things are slightly different. The underlying device APIs available to app makers allow apps to query the model and name of the device and report it to ad exchanges, analytics suppliers or publishers themselves, but the absence of a standard reporting schema has created a problem for the native apps advertising channel for several reasons:

1. App UAs are not well structured, and often do not include device identifying information.
2. App-reported model names don't necessarily match the marketing name in use by consumers and may vary by region.
3. While the make and model pair may be human readable (eg Samsung GT9100), varying non-standardized device make and model pairs are not suitable to handle device specific ad targeting programmatically without a standard device ID.
4. Make and model alone is not enough for fine-grained targeting—you typically need properties of the device also.

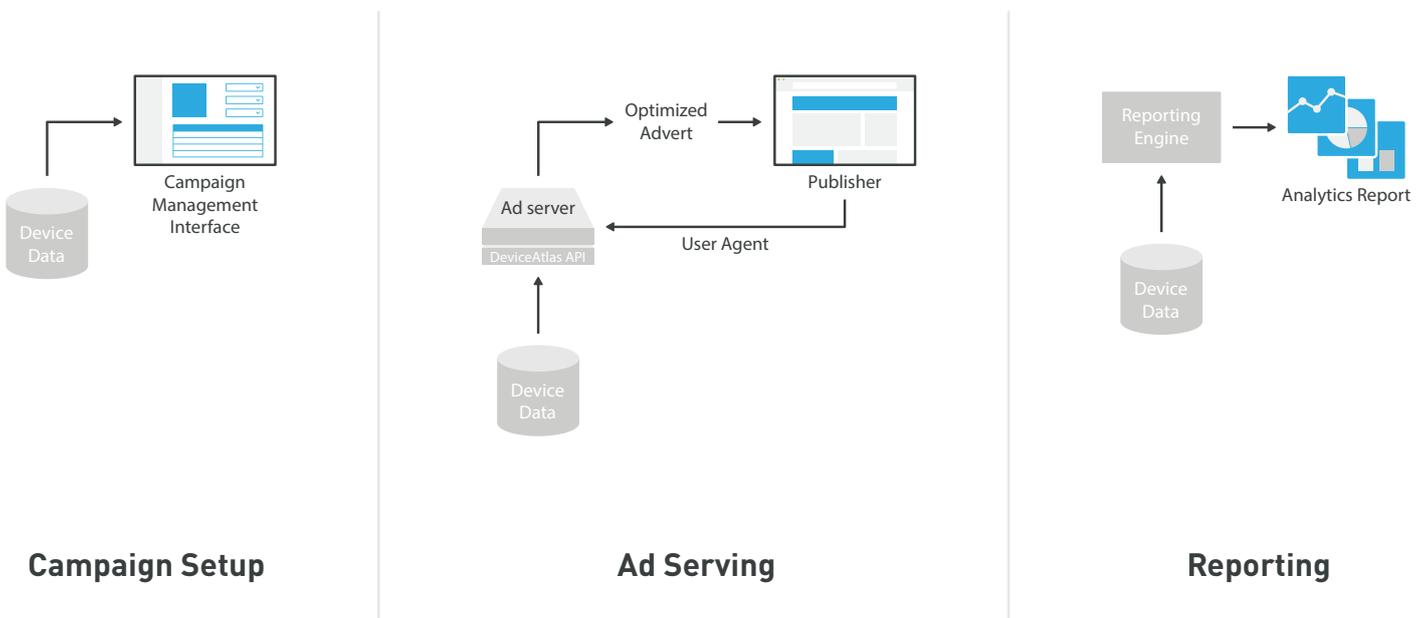
Full-service advertising platforms that support both in-app and (mobile) web advertising it is useful to be able to use the same device intelligence platform regardless of the channel in question, since this will allow for seamless targeting of devices across both in-app and web channels.

# HOW DEVICE INTELLIGENCE IS USED IN ADVERTISING PLATFORMS

Device intelligence is typically used in advertising platforms to embed an accurate and continuously updated database of connected devices into the platform and provide the ability via an API to precisely detect in real-time which devices are requesting ads.

This provides ad platforms with the ability to:

- Target campaigns according to device category
- Enable granular targeting of advertising campaigns by device capability
- Report accurately on fill rates and targeting accuracy



# TECHNOLOGY REQUIREMENTS

The mobile ad ecosystem has evolved significantly; both publishers and advertising agencies are sophisticated shoppers when it comes to choosing ad networks.

There are four key measures used to evaluate a mobile ad network.

1. **Fill Rate.** This is a success measure for an ad network and measures what percentage of inventory slots are successfully filled with an ad, or # ads delivered / # ads requested. An unfilled ad is wasted inventory, representing lost earnings to a publisher. Fill rate issues are generally caused by technical faults within an ad network's servers.
2. **Click Through Rate (CTR).** This is a success measure of an advertiser and is a measure of the percentage of ad impressions that result in a successful click through from end-users.
3. **Response Time.** The response time of an ad network measures how long it takes to respond to a bid request for an available impression. A poor response time means that ads will show up relatively slowly on the web page or app, thus reducing their effectiveness and potentially annoying users.
4. **Targeting Accuracy.** Ad networks need to ensure that targeting requests from agencies are matched correctly to end users. Mismatched targeting based on poor device data accuracy make both the agency and publisher look bad at best, and may cause an ad not to show or a click to fail at worst. Furthermore, poor accuracy will negatively affect the CTR.

Both fill rate and response time metrics require that ad networks use the best technology available to deliver their ads—speed and reliability are paramount characteristics of successful ad networks.

## Speed

With potentially billions of ad requests going through advertising platforms on a daily basis, the speed that device identification can be carried out is a key technology requirement. To avoid impacts to the end user major publishers will have stringent SLA requirements in place to for ad delivery performance.

## Accuracy

Data accuracy too is extremely important. Not only is it at the very foundation of the Real Time Bidding, it is necessary to ensure that fill rates are as high as possible by keeping the quantity of ad requests from unknown devices to an absolute minimum.

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## INTEGRATION POINTS

The following are the main integration points of device intelligence with advertising platforms.

### Campaign Management

Device intelligence can be used to power campaign management interfaces with up-to-date device information, ensuring that the advertisers can create campaigns across a wide variety of up to data parameters. This is typical for DSP (Demand Side Platforms) where an advertiser can determine targeting criteria for a specific campaign. It is important for the Ad platform that the device data is programmatically available to it and that device data can be updated on a daily basis.

### Ad Serving

Device intelligence can also be used to provide high speed device recognition, permitting optimal ad selection for the visiting device. Ad serving platforms can utilize an accurate device detection to determine which version of an ad to serve to a device.

Serving optimal ad content, maximizes fill rates, click-through rates and ensures the ad server maintains a high accuracy rate.

### Reporting/Analytics

Accurate device intelligence plays an important role in providing the data needed to support reporting requirements for the different players in the advertising chain.

On the one hand, it is used to support the analytics requirements of advertisers and publishers, to measure campaign effectiveness across different devices.

On the other, as all ad platforms generate reports and audit trails, using a well established device intelligence solution such as DeviceAtlas ensures that reporting aligns with the major commercial web analytic platforms in use by a large proportion of Fortune 500 companies. Such an alignment of reports can save account managers significant headaches and work when it comes to reconciling reporting data from multiple sources.

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# REAL-TIME BIDDING

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# REAL-TIME BIDDING (AND WHERE DEVICE INTELLIGENCE FITS IN)

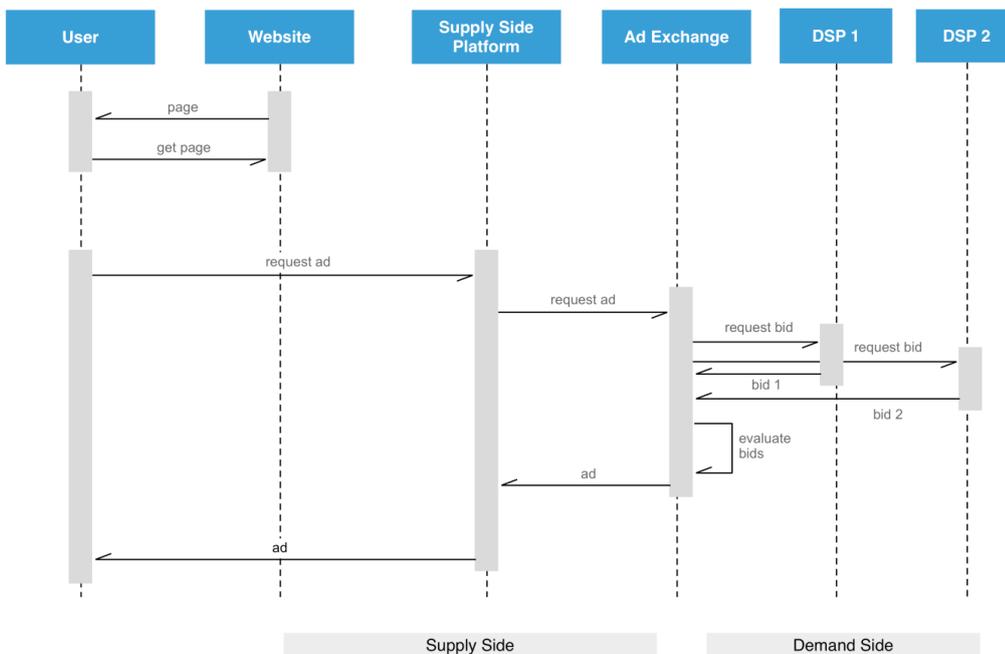
Real Time Bidding (RTB) has emerged as a standard to enable an efficient marketplace for ad inventory. RTB is the industry's solution to the problem of creating this marketplace and standardising the interaction between its actors. The OpenRTB Consortium was formed in November 2010 with this purpose in mind and today eighty companies currently participate.

RTB has been around for longer on the fixed web but its features really shine in the mobile world where so much more contextual information can be added into the mix. The RTB full specification is published in an open spec on the Interactive Advertising Bureau's website . There is also an open GitHub repository<sup>2</sup>.

Growth in RTB has been very strong. IDC expect more than 40% of total mobile and online display advertising to be RTB based in 2017."

## How It Works

Clearly, the interactions between entities in the ad ecosystem are going to be complex due to the number of parameters that are exchanged. RTB is a real-time protocol that allows demand-side entities to make bids on impressions as they become available. The following sequence diagram shows a simplified version of the flow.



<sup>1</sup> <http://www.iab.net/rtbproject>

<sup>2</sup> <http://openrtb.github.io/OpenRTB/>

## Where Device Data Fits in

To ensure that bidders have all of the information they need to make an informed decision on a bid, and the amount they're prepared to pay, the RTB specification supports a very rich set of metadata about each impression available.

The following is a simplified list of the information made available in the bid request sent out by the ad exchange:

- If the bid request is for impressions in a native app or website.
- Details of creative - banner or video, dimensions, formats etc
- Description of site or app
- Content description
- Description of Publisher
- Description of Producer
- User's segmentation details - DOB, gender, associated keywords and buyer IDs.
- Response window for bidders - the time (measured in milliseconds) bidders have to respond to the request for bids.
- User's device properties - everything known about the user's device.

The site visitor's device information is part of the information contained in the RTB specification and lists everything known about the user's device. This part of the bid request is called DeviceObject.

DeviceObject effectively passes a user's device context information back to advertisers bidding on inventory.

If you are a publisher selling inventory through RTB enabled SSPs (Supply Side Platform), you want to be sure that your inventory is not being undervalued. This is only possible where the SSP can accurately populate device information based on the UA string.

Device description repositories like DeviceAtlas, are used at different points throughout the RTB ecosystem to convert the UserAgents of visiting devices into rich device information to help the bidder assess the full value of the impression.

The Device Object currently contains the following details of the device. It is the role of device intelligence solutions such as DeviceAtlas to provide the following information at the device level.

Field	Scope	Description
dnt		If "0", then do not track is set to false, if "1", then do no track is set to true in browser.
ua	Recommended	Browser user-agent string. This is basis of accurate and real-time device detection on the web channel
ip	recommended if geo not supplied	IPv4 address closest to device.
geo	recommended if ip not supplied	Geography as derived from the device's location services (e.g., cell tower triangulation, GPS) or IP address.
device IDs	Optional	Various forms of device ID hashed using different algorithms
ipv6	Optional	IP address in IPv6
carrier	Optional	Carrier or ISP derived from the IP address. Should be specified using Mobile Network Code (MNC)
language	Optional	Browser language; use alpha-2/ISO 639-1 codes.
make	Optional	Device make (e.g., "Apple").
model	Optional	Device make (e.g., "iPhone").
OS	Optional	Device operating system (e.g., "iOS").
osv	Optional	Device operating system version (e.g., "3.1.2").
js	Optional	"1" if the device supports JavaScript; else "0".
connectiontype	Optional	Return the detected data connection type for the device.
devicetype	Optional	Return the device type being used.
flashver	Optional	Return the Flash version detected.

## Future RTB Directions

The RTB Device Type field currently covers only the following device types.

- Mobile / tablet
- Personal computer
- Connected TV

Merging mobile and tablet devices in one targeting group seems like a missed opportunity. As mobile and tablet can be two completely different targeting contexts. in two separate targeting groups.

The missing device types such as e-readers, games consoles, set-top boxes and wearable devices may provide a future direction to the RTB spec. Given the targeting potential of these categories it seems near-certain that this category will expand.

DeviceAtlas is actively working with the IAB to help define the future direction of the RTB standard.

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# CONCLUSION

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## CONCLUSION

All indications are that the exploding device diversity that we have witnessed over the past decade or so is set to continue, if not accelerate. There are multiple drivers behind this trend.

Firstly, as Moore's law continues its inexorable progress, it becomes feasible to incorporate connected devices into ever more areas of our lives, and into devices where it would previously have been unfeasible. This trend stems from both the reducing physical size of devices as well as their decreasing cost.

Secondly, the rise of the Android mobile operating system has fundamentally changed the landscape for device manufacturers. In this new landscape it has become significantly easier and cheaper for manufacturers to push out new products and innovate on hardware, because so many of their costs are reduced by the availability of a free, world-class OS. In particular, this lets manufacturers that have traditionally been better at hardware than software to compete with the best on the world stage. Additional free operating systems will only increase this effect.

Thirdly, cellular data is getting cheaper, faster and more ubiquitous, enabling use cases that weren't previously viable e.g. cellular connectivity in Amazon's Kindle, numerous recent connected car models and GPS devices.

Finally, cheaper manufacturing enabled by globalisation and commodity off-the-shelf components has drastically reduced the physical cost of building mobile devices, an effect that is further bolstered by a market with over 6 billion new connected devices entering it every year. This reduced cost lowers the barrier to entry for manufacturers, driving further innovation and so creating a virtuous cycle.

All of these factors, taken together, make for a convincing case that the the growth in device diversity is set to continue for the foreseeable future.

The first wave of diversity, already partially underway, will be wearable devices ("wearables"), meaning smart watches, fitness/health trackers and head-mounted devices. In parallel with this wave we will see many more connected vehicles coming to market as vehicle connectivity moves downwards from luxury market to mass market.

These underlying trends mean more channels for mobile advertising and additional targeting opportunities from each new class of device and the user contexts that they engender.

As connected devices embed themselves ever deeper in our lives, the

importance of device and contextual information will increase. A poorly targeted ad banner on a web page is a minor inconvenience; a poorly targeted ad on a watch or head-mounted device is likely to cause aggravation. Device fragmentation is sometimes cited as a reason why mobile advertising got off to a relatively slow start but in fact it is a strong targeting opportunity and differentiating feature for ad exchanges.

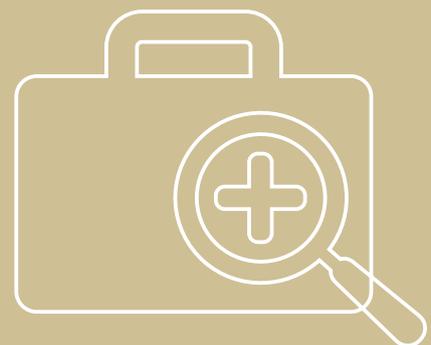
Leading advertising platforms will be able to distinguish themselves by their ability to target successfully as the landscape evolves to envelope new devices, contexts and use cases. The key to evolving apace with the landscape will be understanding the device and its capabilities, and the associated user contexts.

Mobile advertising is a fundamental building block of the mobile landscape, acting as it does as the de facto monetization instrument for countless apps and sites. As assured as its future is, its very form is likely to evolve significantly in the near term future to track changes in devices and use cases. The only certainty is rapid evolution. Demand-side and supply-side companies will need to adapt quickly to track these changes but if they do so, the future looks to be very bright.

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# MORE INFORMATION

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# ABOUT DEVICEATLAS

DeviceAtlas high-speed APIs and accuracy make it the solution of choice for the today's online advertising industry.

- To power the campaign management interfaces with up to date device information
- To provide high-speed device recognition, for optimal ad selection per device.
- To support analytics requirements, measure and report on campaign effectiveness across different devices and platforms.

DeviceAtlas powers hundreds of billions of ad placements on a monthly basis worldwide, due to its market leading performance and reliability.

Contact us today [sales@deviceatlas.com](mailto:sales@deviceatlas.com) to organize a trial or visit [www.deviceatlas.com](http://www.deviceatlas.com).

## ORGANISATIONS & LINKS

- IAB. Interactive Advertising Bureau—business organisation that develops industry standards and tries to control legislation that would adversely affect its members:  
<http://www.iab.net>
- MMA. Mobile Marketing Association. Standardizes ad sizes and formats:  
<http://mmaglobal.com>
- Summary of ecosystem players:  
<http://www.hasoffers.com/blog/top-25-mobile-advertising-ecosystem/>
- OpenRTB Project:  
<http://code.google.com/p/openrtb>
- RTB effectiveness claims:  
<http://mobilemarketingmagazine.com/adfonic-real-time-bidding-drives-ctr-97-cent/>