

# GIMBAL

## The Definitive Guide to **LOCATION DATA**



## Introduction



There is a lot of confusion that exists about location data. Although the concept has been around for a while, the mobile advertising and marketing industries have a habit of making claims and conflating ideas so often that it becomes difficult to understand what is real, what is possible, and what is completely unfounded.

After years of internal research, curation, and training our team members, we decided to make this guide – The Definitive Guide to Location Data – public, in order to share how location technology works, the valuable data it generates, and where it can be applied.

Our intention is always to keep things as non-technical as possible, but this is technology we're talking about. At times, I'll present more information than you'll need, but you can decide if you want to dig into the details. My goal is to keep this guide up-to-date as trends change and new capabilities emerge.

Lastly, if we have left out information or you have a different perspective on the methodologies listed below – or if you love the guide and find it super useful – please let me know:  
[matt.russo@gimbal.com](mailto:matt.russo@gimbal.com)



Enjoy,  
*Matthew Russo*  
COO / CMO,





## Overview

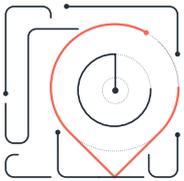
In the context of this analysis, location data refers to signals provided by a mobile device as a proxy to where individuals go in the physical world.

Since 2013, the percent of Americans that own a smartphone has increased from 35% to 77%.<sup>1</sup> Similarly, greater than 9 out of every 10 smartphone owners (94%) carry their phone with them “frequently” and 82% say they “never or rarely turn their phones off.”<sup>2</sup>

Thanks to these adoption rates and the utility the mobile app ecosystem provides to end users, smartphone usage is saturated and ubiquitous. As a result, smartphones have the potential to deliver a significant amount of location data from two primary sources.

**CHAPTER 1**

# How Mobile Location Data Works



## What technologies generate location data?

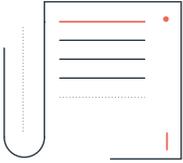
### How can it be used?

Unbeknownst to the average consumer, there are countless technologies at play that make our smartphones the irreplaceable wonders that transform our lives and shape the way we go about our day. Mobile location data are derived from interactions between smart devices and other pieces of technology that transmit, interact, and process location information. In that way, smartphones aren't designed to broadcast their location by default, but they are equipped with the technology to do so.

## Receivers (a.k.a. smartphones)

Running inside each modern smart device is an Operating System, or "OS." Mobile operating systems like iOS and Android tell the device how to function, and what it can and can't do. Manufacturers of the OS offer up the functionality of the phone through what are called App Services. App Services act as "ingredients" developers can choose to include in their app. Developers then take these each individual services and configure them directly into their own apps, or include them in Software Development Kits (SDKs) for others to build on top of and incorporate into their apps. Because different SDKs have different functionality and use cases, an app may run many different SDKs depending on its utility to the end customer. Per mParticle, "it's estimated that apps have 14 SDKs [installed on average]." 1.





## MOBILE SDK OPTIONS

Popular SDKs provide functionality like:

- App Monitoring
- Behavioral Analytics
- Marketing Automation
- Advertising
- DMPs and Tag Managers
- Payments
- ...and more

Why is this important? No two SDKs are alike. If certain data can be collected from an SDK, the means by which it is collected and its usefulness will vary widely. Said another way, just because an app can collect location data doesn't mean all location data is of the same quality or can be executed on for the purposes of advertising, marketing, measurement, and more.





## Signals

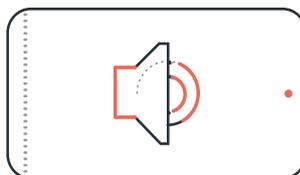
Contrary to popular belief, mobile devices don't actually transmit – or send – location data by default. Instead, they act as powerful receivers, listening for signals sent by other pieces of technology. Location data signals are most commonly transmitted by GPS, WiFi, cell towers, and beacons.

### GPS

The Global Positioning System (GPS), also known as NavStar, was developed by the United States military in the late 1970s and is a public utility maintained by the U.S. Air Force that provides users with positioning, navigation, and timing services.

Currently, there are 31 functioning GPS satellites in orbit (with 34 more planned in the future), each circling the Earth every 12 hours or so. Each satellite continuously beams data down to Earth to technologies like navigation systems, smartphones, wristwatches, shipping containers, and more to provide the information necessary to reliably and accurately track the location of physical objects.

### HOW DOES GPS WORK?



Because smartphones and other devices aren't actually sending data to satellites, location is derived by comparing the highly accurate timestamps against the position of GPS satellites when a GPS signal is received.



Put another way, GPS signals are best outdoors when there is an open sky but are significantly less reliable indoors and in “urban canyons” (cities with tall buildings).

## GPS ACCURACY

The Global Positioning Services’ (GPS) accuracy is more or less the same for everyone using a mobile device – regardless of the data source (more on this in sections below).

The same is true for location services offered to iOS and Android developers (via the operating systems and their apps) from the likes of Apple and Google. GPS affords some degree of increased accuracy with the help of Wifi access points and cell towers, but generally speaking, GPS location has advantages and disadvantages of its own.

### Cell Towers

Because most smartphones are connected to cellular networks in order to place and receive phone calls, the location of a device can also be derived via multilateration between multiple cell towers. As the strength of a signal changes between towers, the location of a device may be approximated and, therefore, location data is generated.

### WiFi Networks

WiFi networks have the ability to provide more granular (or precise) location – particularly indoors. By utilizing crowdsourced WiFi data of the surrounding networks, smart devices may be able to generate location data when GPS or cell tower signals are not available.

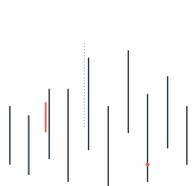
### Beacons

Beacons are small, physical products that transmit information packets via Bluetooth low-energy signals. These signals can be “seen” by smartphones and other devices that are configured to identify those signals through a corresponding SDK. Beacons are most commonly powered via batteries or USB and transmit their signals many times per second



## CHAPTER 2

## Location Data Sources



## Where does location data come from?

## What are the pros and cons of each source?

When it comes to location in advertising and marketing tech, it is assumed that all data is the same. This couldn't be further from the truth. Most data are either a byproduct of an SDK designed to do something other than collect accurate location or is produced using sub-par methodologies.

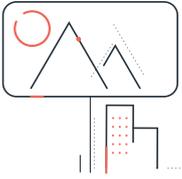
To understand what we mean, it helps to understand where most location data comes from in the ad tech ecosystem.

### Ad Buying: A Primer

Before jumping into location data sources, it first helps to understand the ways purchase ad inventory digitally today.

- 1. Direct Deals** – Striking a deal with a content publisher – like a website, social network, or mobile app – to buy a predetermined amount of impressions directly on a single site. The advantage is that advertisers can reach consumers on contextually-specific sites and apps. The downside is often scale, as well as the manual nature of making direct buys through a number of publishers.





**2. Ad Networks** – These companies work with content publishers to group desirable ad inventory, often across like-content publishers, together and sell it to advertisers looking to reach specific types of audiences. The advantage is more scale than direct buys, but advertisers must buy pre-packaged bundles of ad inventory from whoever network has struck a deal with. The previous two media buying options typically do not provide location data – at least not at a scale useful enough for the purposes of audience building or footfall attribution.

Alternatively, the primary source of data coming from non-Location SDKs is a byproduct of buying ad impressions programmatically through ad exchanges (see below).

**3. Ad Exchanges:** Ad exchanges enable publishers to offer up their inventory programmatically through the use of computers and allow advertisers to bid on that inventory in real-time (known as RTB, or real-time bidding). This is how the majority of ad inventory is bought and sold today, and it allows advertisers to reach consumers regardless of the apps and websites they frequent. Ad exchanges provide advertisers a way to target ideal consumers, rather than ideal content which can be limiting.

Each opportunity to buy an ad programmatically through ad exchanges produces “bid request.”

This leads us back to the original question “Where does location data come from?”





## Location Data Source #1

### Ad Exchanges (a.k.a. “The Bid Stream”)

Some of the data in a single programmatic bid request from ad exchanges might include things like:

- Timestamp (13:40:29 UTC)
- Mobile Advertising ID (MAID), sometimes referred to as “Device ID”
- Location in the form of lat/long, city, or both
- Connectivity (WiFi / 3G / 4G)
- Device Type (make/model)
- Operating System (iOS, Android)
- Ad exchange name (PubMatic, Nexage, Smaato, etc.)
- Name of the mobile app or URL of the website
- and more...



Any company with access to a demand-side platform (DSP) gets to see location data that might be appended to a bid request – whether they serve an ad or not.

These are the criteria that demand-side platforms look at to determine if they want to bid on that opportunity based on the targeting parameters of the campaigns they are running.

- Lat/long outside of the desired city? Don't bid.
- Operating System = iOS but the advertiser only wants to target people with Android devices? Don't bid.
- Name of the app or website is on a blacklist? Don't bid.
- All details meet the parameters of the campaign? Bid!

Individually, each bid request isn't that useful from a location data perspective, but across millions of bid requests per second, the amount of data being generated is astounding.

The advantage of bid requests is that there are billions of them to review every day. The sheer scale of this data set is driven by the OpenRTB standards put forth by the IAB and adopted by supply-side platforms (SSP) who allow advertisers to offer up their ad inventory in a programmatic fashion.

However, from an attribution standpoint, the downside of bid requests is that they are brief, incomplete sightings of a device that surface when there is an opportunity to serve a mobile ad impression. These requests are the equivalent of walking around with your eyes closed, opening them briefly, trying to determine where you are, and then closing them again.





## Location Data Source #2

### Publisher Data

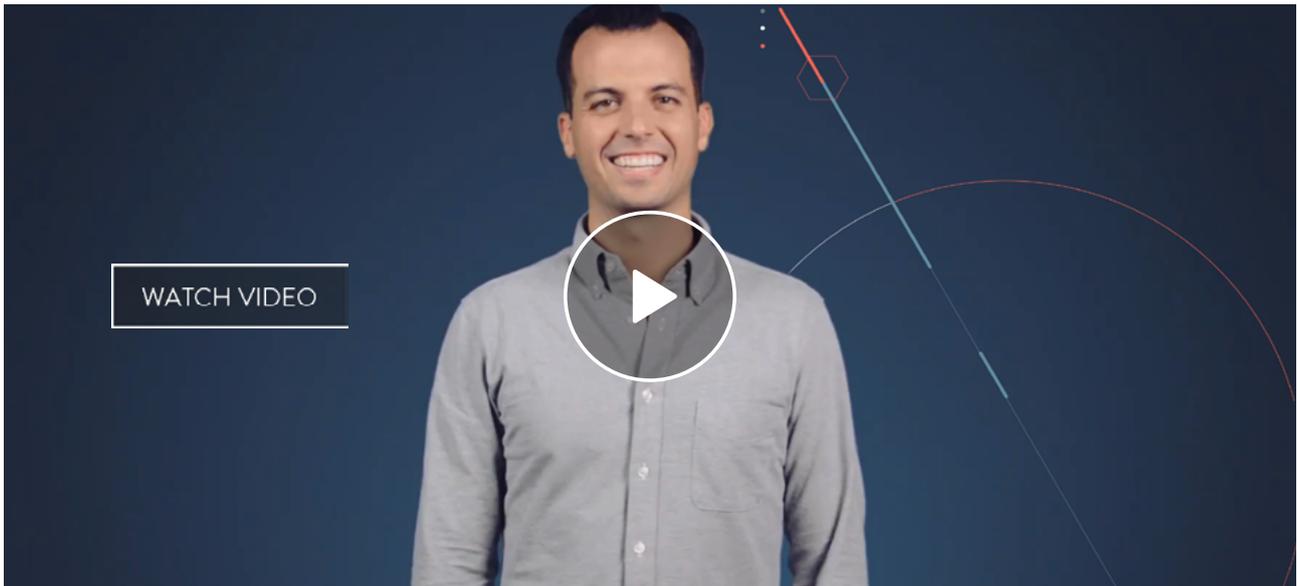
As mentioned in Chapter 1, publishers of mobile apps may include various SDKs that ask for the location of a device without a reliance on a user to make an ad call. App publishers may decide to ping a phone's operating system to launch a certain feature, like a geo-enabled lookup of nearby restaurants. So long as a consumer has opted into that app using Location Services (either while the app is In-Use or Always), that app publisher can use the location data generated by the OS to provide a useful service to its user.

## Location Data Source #3

### Location SDKs

Location-focused software development kits (SDKs) provide apps with the most precise and actionable location data that can be executed across a variety of channels. Different Location SDKs have different capabilities, but some (like Gimbal's) are architected in ways that allow for precise measurement of entry and exit events into pre-specified areas called geofences and can do so without draining a user's battery. Another primary different in well-built Location SDKs is the ability to monitor and process location data in an always-on state, even while an app is closed and in the background.





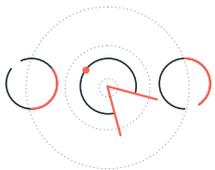
This is done with consent by the end users who have opted-in to those settings from the app. The advantage here is that advertisers can monitor places of interest (i.e. the location where visitation attribution occurs) to more accurately predict if and when an individual crosses a geofence or proximity beacon. This can take place without the need for a user to call a mobile ad through a bid request OR have one of Gimbal's partner apps open in the foreground.

Both sources of data are useful and serve important roles depending on who a marketer is trying to reach. There are limitations to both, which is why Gimbal relies on both for certain applications.



## CHAPTER 3

## Accuracy, Precision, and Access



## Macro, Micro, and Scale Considerations

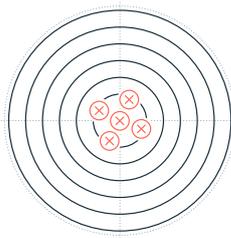
Most location data captured by smart devices come in the form of decimal degrees that express latitude and longitude coordinates of the device, commonly referred to as “lat/long”. These coordinates offer insight into where a device is at the time it received GPS, WiFi or beacon signals.

But what do these numbers mean? How do we know if they’re accurate? And what can marketers do with this information?

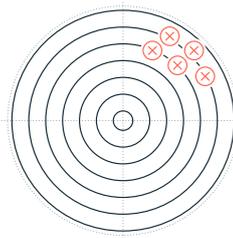
First, lat/longs are geographic coordinates represented as decimal degrees. This pair of numbers – displayed with a comma between them – describes how far away from the Equator (0 degrees latitude) and the Prime Meridian (0 degrees longitude) a location is on the surface of the Earth.

## Accuracy of Location Data

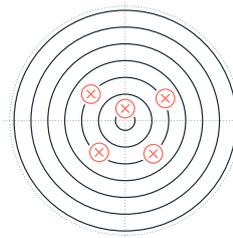
The easiest way to think about location accuracy is to envision a dart board. If a piece of location data is inaccurate, it means that the signal (GPS, Wifi or other) is saying the central point of that location is in a



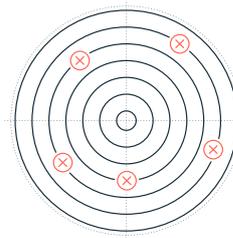
**HIGH ACCURACY**  
**HIGH PRECISION**



**LOW ACCURACY**  
**HIGH PRECISION**



**HIGH ACCURACY**  
**LOW PRECISION**



**LOW ACCURACY**  
**LOW PRECISION**





## Precision of Location Data

Second, the number of decimal points is important in determining how precise a piece of data is. The more digits, the smaller the radius. Location data can be appended with up to 8 digits after the decimal point, but that level of precision is not useful for the purposes of advertising or marketing.

### DEGREE PRECISION VERSUS LENGTH

Courtesy of Wikipedia<sup>2</sup>

	DECIMAL DEGREES	DMS	QUALITATIVE SCALE
0	1.0	1° 00' 0"	Country or large region
1	0.1	0° 06' 0"	Large city or district
2	0.01	0° 00' 36"	Town or village
3	0.001	0° 00' 3.6"	Neighborhood, street
4	0.0001	0° 00' 0.36"	Individual street, land parcel
5	0.00001	0° 00' 0.036"	Individual trees, door
6	0.000001	0° 00' 0.0036"	Individual humans

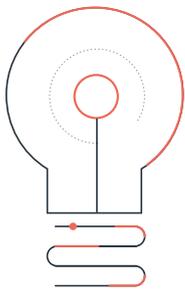
### SUPPLEMENTING GPS-DERIVED LOCATION DATA WITH BEACONS

So what happens when precision is critical and GPS signals can't do the job? This is where complete location solutions, like Gimbal's, help marketers shine.

Well-built micro-location, or proximity, beacons provide signals that can be calibrated to twelve inches or less when necessary. Beacons transmit a signal (or packet) that a Location SDK listens for and upon recognition, will more precisely register the location of a user's device.

When considering beacon manufacturers to integrate into your location stack, the quality of the components used is the most critical factor in determining if the location data generated will be accurate.





### SHAMELESS PLUG: GIMBAL BEACONS

While this is an industry resource that should remain as unbiased as possible, I would be remiss not to mention the design of Gimbal's beacon hardware as a significant advantage over other options in the market.

Every Gimbal beacon model was initially designed and engineered within Qualcomm. The electrical, mechanical, and environmental engineering was designed in-house including the board, transmission packet design, and – most importantly – the antenna, which was built with an eye toward precision and reliability. Most beacon “manufacturers” in the space simply source cheaply made equipment found on production marketplaces and rebrand them with their own logos.

Custom-engineered antennas on our industry-leading beacon products are designed, tuned, and tested in the United States and then manufactured to strict quality standards by Tier 1 manufacturers by the same manufacturers that produce the most loved consumer-facing advanced technology devices in use today. Gimbal is the only beacon provider that does this.

The antenna is the most important component of the beacon because it is the antenna that assures that the beacon is more accurate than GPS. Gimbal Places defined by one or more Gimbal beacons not only are far more accurate than GPS but can be far more accurate than other





### Scale of Location Data

The sheer volume of potential transactions taking place within the bid stream generates an incredible volume of location data to browse through, analyze, and use – or ignore. But is more necessarily better? According to a report by Thinknear published at the end of 2017, only 30% of location data included within ad inventory is what they classify as hyper local – or “accurate to within 100 meters of the user’s real-time location.” It is difficult to tell if the other 70% is less accurate due to accuracy or precision issues (see above), but with billions of potential to choose from, advertisers should have enough remaining inventory to choose from, right?

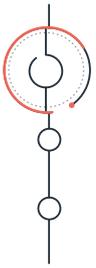
*The answer is maybe.*

The more narrow the targeting for a campaign is, the more difficult it becomes to find the scale necessary to fulfill sizeable budgets over time. This phenomenon isn’t unique to location-based targeting tactics either. The more demographic, psychographic, or 3rd-party segments applied to a mobile media campaign, the smaller the potential audience becomes. The balance between precision and scale is something that marketers may always have to balance.



## CHAPTER 4

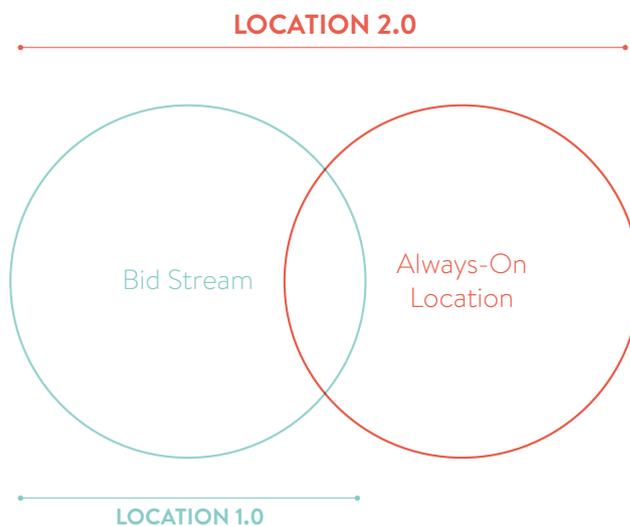
# Challenges



### Balancing the Pros and Cons of Different Sources

One of the most challenging aspects of working in the location-based advertising and marketing space is the assumption by partners, brands, agencies and competitors alike that all location data is the same. While I do believe location data is a commodity (technically, a “digital commodity” that can be produced and sold or used by a near infinite number of end consumers), that doesn’t mean all sources are undifferentiated.

As discussed in Chapter 2, the primary source of location data in adtech – in terms of sheer volume – is the bid stream, producing billions of location data points each day. Yet, the bid stream’s biggest challenge is that it is completely and unequivocally undifferentiated. Any organization that utilizes a DSP has access to the same location data as its competitors and, as a result, is building undifferentiated products and solutions atop an undifferentiated data set. (GPS, Wifi or other) is saying the central point of that location is in a fundamentally different spot.





## Advantages of Different Sources

### Bid Stream

- **Advantages**

- Scale – sheer volume of ad inventory being bought and sold
- Variety – location data coming from many different apps and websites

- **Trade-Offs**

- Brief, incomplete snapshots of a device
- Only useful for mobile advertising applications (tied to a phone's Advertising ID)
- Single source of input (geofences) may lead to inaccuracy
- Difficult to validate accuracy of 3rd-party data being passed from publishers

### Location SDK

- **Advantages**

- Always-on – the ability to generate location data from users while apps are inactive, in the background of a phone
- Dwell Time – determine length of stay at places of interest
- Proximity – ability to connect with additional, more precise signals like beacons help validate and pinpoint device positions

- **Trade-Offs**

- Scale (potentially)



## Other Factors

### REGENCY

One advantage bid stream data has is its ability to be immediately transacted when it comes to buying media. The ability to purchase ad impression in real-time is the source's key advantage. But what if buying an impression isn't the goal? What if you want to know where a device is right now – but it hasn't requested an ad recently?

### FREQUENCY

The difference between a first-time visitor and a repeat, daily customer at retail store can mean the difference between generating a noisy, wasteful audience and a highly custom and targeted one.

How often do you visit the same locations week after week or month after month? Now consider how often you actively use your smartphone at those locations and use apps that serve ads. Without the ability to detect visitation passively, marketers will almost certainly be unable to take visitation frequency into account when creating audiences.

### ADDRESSABILITY

Lastly, marketers need a way to identify and reach consumers across different marketing channels (the “output”) regardless of how the data is generated (the “input”). When using a Location SDK within your own app, marketers have the ability to use the location data it generates to send push or in-app messages on demand because a relationship has already been established with the app user. The input (Location SDK in an app) matches the output (push message from the app). So what happens with the input source doesn't match the output channel? For example, what happens if you want to retarget patrons who frequent a location (using Location SDK data) through a mobile ad campaign (outside your app). The connective tissue here is the Mobile Advertising ID (MAID). MAIDs are the anonymous identifiers unique to each device that allow ad technology and data companies to group devices into segments based on a variety of attributes.



## CHAPTER 5

## Connecting Offline with Online



### Implementing Digital Data in a Physical World

At Gimbal, we think about our beacons a lot like we think about pixels in more traditional digital marketing settings: they are digital cookies for the real world.

For anyone operating a website, you know that you can use pixels to both create audiences (for targeting later on) or to track conversions (to track the efficacy of channels against a specific outcome).

What's exciting about how to bridge these two worlds is that the most clever marketers are able to find signals of intent (targeting) from non-obvious sources. So we view our platform as a way for clever marketers to have an advantage over other marketers.

In some platforms, the signal of intent is baked into the distribution channel itself. Within Google Search, for example, Google both understands consumer search terms as a potential signal of intent AND can simultaneously serve an AdWords ad for advertisers trying to reach that type of audience.

But other signals, like where a person goes in the physical world and how long they dwell there, can serve as new signals of intent. Think of the last time you actually got in your car and drove around aimlessly. It never happens. Once marketers have location data, it's up to them to use the appropriate tools to reach them on both traditional and digital channels. Of course, there is no guarantee that a marketer's assumptions will be correct about what will drive results – in the same way Google can't guarantee which keywords will and won't perform – but Gimbal believes that if advertisers have full transparency to determine their own ROI, it allows them to identify a new category of milestones from the physical world and use those for targeting and attribution.





## Translating Lat/Long to POI

Latitude and longitude coordinates (often referred to as “lat/long”) by themselves are meaningless without metadata that tie a location to something meaningful. But having the ability to translate those coordinates to a point-of-interest (POI) helps make the data understandable.

This is what Gimbal Places do. When passed a lat/long, Gimbal is able to translate that information in real-time into something actionable.

Places can be created by naming the geofences that you manually add to our platform, or they can be overlaid atop a point-of-interest database of your own.

Perhaps most importantly, the platform allows marketers to scale to an unlimited number of Places while still maintaining that focus on battery efficiency within their app. We do this by intelligently caching Places that matter most to each app and dynamically rotating the Places that an SDK monitors for as it moves about the physical world.

By dynamically scaling the intensity with which we derive location accuracy to each and every user in real-time, Gimbal can deterministically verify an arrival event at a Place, ensuring accuracy is at its best only when it needs to be – rather than draining their battery for continuously requesting accurate location when they’re not near Places of Interest.



**CHAPTER 6**

# Use Cases for Location Data



## Targeting, Measurement & Movement

Do you have your own mobile app? How many monthly active users does it have? Are you generating your own data using a Location SDK? Does your app have proper user consent and location permissions? Do you operate a demand-side platform? What are you looking to build or accomplish?

These are all questions that must be answered in order to determine the type, scale, and output of an organization's location data needs. The balance of quality, precision, and scale are always equalizing factors that must be considered when evaluating sources. However, the use cases below are the most common today.

### 1.) LOCATION ANALYTICS

Humans are overwhelmingly creatures of habit, yet countless variables impact the routines we build up and maintain over time. Environmental factors like roads being built or closed for construction determine how we get to and from work each day. Social factors impact which venues get recommended to us by our friends and, therefore, where we go to dinner. Corporate influences like new product launches and branding campaigns shape our perspectives on the brands we buy and the retailers we should shop.

Although online shopping continues to grow, over 90% of commerce in the United States still takes place in the physical world – in person, at stores, behind the cash register.





As a result, location data can be used to analyze where groups of individuals go in the physical world over time and serve as an indicator of their behaviors and how movement trends are changing.

For example, marketers and analysts may be interested to learn:

What brands are winning/losing over time on a national, regional, DMA, or store level?

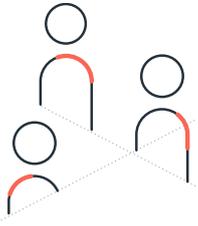
- What a brand's market share is within a given category?
- Who their biggest competitor is by DMA?
- Who their most loyal customers are and where they live?
- What else they know about our top customers based on where they "live," "work," and other locations they frequent?
- If their customers only loyal to a single brand within a category?
- How often their competitor's loyal customers frequent our own locations?
- ... and more.

On a micro level, business operators hotels can use the same location data that powers the customer experiences to create heatmaps of foot traffic patterns and dwell times in areas like the lobby, bar, check-in area, and more which allows them to streamline their internal processes.

Having this data at their fingertips, business operators can their employees to answer questions that lead to operational insights, like:

- As a Global Operations project lead, I want to understand if our guests are spending more or less time at the front desk when arriving at the hotel.
- As a General Manager, I want to understand the usage of behavior of my guests at various outlets.
- As a Banquet Manager, I want to identify when a conference breaks for coffee.





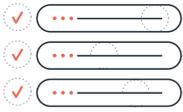
With the right data sets, marketers and analysts are able to answer questions about the physical world they never knew to ask, use those insights and make informed decisions about their planning and marketing efforts, and export that data for the purposes of targeting, attribution, and retail site selection.

## 2.) TARGETING

Location is one of the most powerful indicators of interest and ultimately purchase intent. Most people have routines they follow every day of the week, hitting those repeatable points of interest – home, work, gym, grocery store, bar/restaurant, child daycare, and more. And if you're like most people, your most frequent locations will change on the weekend, sometimes less routine, but still carry highly valuable nuggets of information.

Over time, those nuggets compound to paint a fairly clear picture of who you are and what you're interested in. By taking into account the powerful context of where people go, marketers are able to create pools of targetable audiences. This, in turn, helps marketers create scalable, place-based audiences for targeting. When creating location-based audiences, marketers often consider two dimensions: timeliness (historical visitation vs. real-time) and marketing channel.





- **Timeliness**

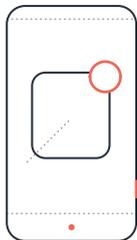
- **Real-Time:** Most programmatic media campaigns rely on real-time location data in order to make relevant buying decisions for each impression. But as we discussed in previous chapters, the accuracy of location data coming from the bid stream can greatly impact how precise a marketer can choose to be. Targeting a geographic area too narrowly will likely not have the scale (number of people inside that boundary) necessary to fulfill large budgets. As a result, most campaigns target broad areas like DMAs, cities, or zip codes to discover and serve ads to devices at the moment an ad opportunity surfaces.

- **Historical Retargeting:** Using location data to identify devices who have been to locations in the past allow marketers to selectively delay the delivery of their message. For example, many marketers build audiences of people who have visited competitor's Places over time, and then target those devices later on – perhaps when those people are at work or at home after dinner.

- **Channels & Mediums**

- **Programmatic Media:** “Walled Gardens” like Facebook, Google, and LinkedIn allow advertisers to reach people based on targeting attributes unique to their platform. However, if you want to reach consumers when they aren't using those platforms, marketers can purchase display impressions across millions of independent apps and websites that offer their ad inventory “programmatically.” In doing so, devices can be targeted based on real-time data coming from the bid stream or by being added to audiences ahead of time so that when they appear or become active, advertisers can purchase those impressions immediately.



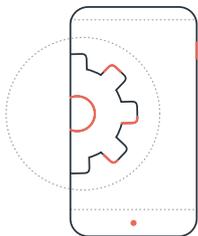


- **Cross-Device: Today**, smartphones are essential products for most modern Americans. However, mobile devices often aren't the only device a consumer uses on a daily basis. In fact, the average U.S. consumer owns and uses 3.6 devices each today. When it comes to location data, those other devices (desktop computers and tablet) don't typically leave their primary locations. This is where cross-device solutions can help. By using cross-device (or "identity") graphs, marketers are able to identify other stationary devices that share households of smartphones that have visited interesting locations. The result broadens a marketer's capability to reach consumers at different times of the day and through different ad formats that are more native to corresponding screen sizes.
- **In-App and Push Messages:** Implementing a Location SDK directly into an app allows marketers to create a direct line of correspondence between the location data flowing into the app and the ability to immediately trigger push or in-app messages.
- **Email:** Depending on a brand's marketing and CRM technology stack, it is possible to link a customer's device with other information like email and mailing addresses. In doing so, the brand's consumer-facing app would be able to use visitation of their customers to trigger a location-based email from their email service provider (ESP) of choice.

### 3.) PERSONALIZATION

Alongside the ability to build audience segments, location data can also be used to customize the creative that a subset of those audiences may receive. In practice, this means tailoring the message of a campaign (be it through paid media, push notifications, or emails to customers) based on the individual.





For example, one of our Location Platform customers in the hospitality industry has deployed over 6,000 beacons across 500 hotels. Using this rich location data, they are able to identify and greet their VIP members (both in-app and at the front desk) differently than a guest who randomly wanders in off the street.

In-app messaging can also be customized based on where visitors have – and haven’t – visited yet. It might make sense to remind guests who haven’t been to the spa yet that there is a special promotion running this weekend, but it wouldn’t make sense to send that same message to all on-premise guests, especially to those who just spent an hour in the spa getting a message.

#### 4.) AUTOMATION

In the ad tech space, the goal of most agency efforts is to effectively reach consumers who the brand doesn’t already have a “relationship” with by properly allocating budgets across paid media channels like display ads, television, radio, and more.

But when a relationship has already been established with a consumer (in this case, in the form of an app download), brands can set up marketing automations to trigger location-based workflows across their owned and operated channels.

Location-triggered push notifications within an app are obvious, but other omnichannel scenarios like sending emails or direct mail to customers when they visit competitor locations are also possible with marketing cloud connections.

Rule-based messaging can be automated using location triggers much like transactional emails can be sent when a customer buys something online.





## 5.) MEASUREMENT

For years, marketers have been trying to solve John Wanamaker's quote "Half the money I spend on advertising is wasted; the trouble is I don't know which half."

Location data can act as the link between the unique devices served an ad campaign that later visited a point of interest. By bridging the gap between the digital (programmatic advertising) and physical (store location) worlds, attribution solutions help marketers quantify the return on their ad spend against metrics other than clicks or online "conversions" like checkouts.

Of course, the location data source used to power these attribution solutions impact their insightfulness. For example, if the location data source can determine how long someone spends at a location (dwell time), that data can act as a filter to weed out false positives like passersby or store employees.

As the industry progresses, technology providers with cross-device solutions will begin to decouple the impact of mobile-only campaigns to offer a more comprehensive understanding of a marketer's mix as they pertain to driving in-store foot traffic.

## 6.) OTHER

The above outputs are primarily focused on advertising and marketing use cases because that is the world that Gimbal lives and breathes.

However, location data, like any data set, can be used to build or enhance a nearly infinite number of products and applications. Hedge funds, insurance companies, demographic data providers, risk and fraud mitigation firms, and regional development councils all stand to learn and improve their offerings by better understanding where people go.



## CHAPTER 7

## Verification of Location Data



### The Difference Between 1st- and 3rd-Party

How do you know if you have \$5 in your bank account or \$5 billion? Do you need someone to check for you and audit if the money is actually in your account?

Now what if someone else – perhaps, an elected official – says they have “billions” of dollars? Should you take them at their word, or would it be more believable if an outside party verified the claim?

The logic for verifying location data is the same: verification needs to take place when you don't have access to the source of the data in question.

Lately, there has been an uptick in industry conversations around the need for third-party verification of location data as a way to ensure the integrity of its use cases, particularly when being applied to buying media.

We believe companies that place transparency at the forefront of their location offering will win in the coming years. This is not surprising considering this is the same thing the programmatic advertising industry has been going through on the inventory side over the past couple of years.



Since its inception, Gimbal's SDK has been installed on smart devices over 250 million times.

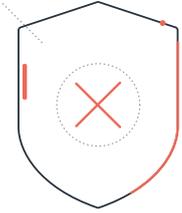
That said, third-party validators only need to exist when companies are buying third-party data or media – particularly commoditized location data that comes from the bid stream. If an organization or technology provider doesn't own the source of the data it is utilizing, there is the potential for inaccuracies or overall degradation as it works its way through the supply chain.

As a result, attribution companies that rely on the bid stream can't necessarily "see" or verify what they are buying in action. Because the location data is a byproduct of serving ads and passed to them by a 3rd-party, they must trust partners that they are going to do the right thing. This doesn't mean partners are doing anything purposefully malicious, but it does make verifying the accuracy and precision of that data more difficult.

On the other hand, Gimbal has been a primary mobile marketing tool for Fortune 500 brands using our self-serve location management platform. Those customers use data from our SDK as a utility within their own 1st-party mobile apps. They can literally see the platform in action and test our location triggers in the real world. Since it is 1st-party data, they can determine if it's not working for their own use case in real-time prior to pushing the functionality to their production apps in use by thousands or millions of people.

The point is that the platform is tried and tested on a regular, 1st-party basis. In order to continue to maintain our solution and pricing in market, we must maintain accuracy. The Gimbal platform is used to make large scale business decisions by these corporations and metrics are compared to other measurement tools including visual signals, WiFi, in-store purchase metrics, and more.





## Verify Gimbal's Location Accuracy Yourself

### HERE'S HOW

If you are interested in setting up and testing the accuracy of the same location software that powers our attribution platform, you can take the following steps:

1. Sign up for a free Gimbal Manager account
2. Create your own Geofence
3. Download the Hello Gimbal app (Android | iOS) onto your phone
4. Link your Places to the Hello Gimbal app on your phone using the QR code (third box on the home page once logged into Gimbal Manager)
5. Monitor your Place events in and out of that Geofence, or receive real-time push notifications by setting up Communicate events to experience the accuracy of location data



## CHAPTER 8

## Privacy &amp; Security



### Location Data and The Future

The European Union's comprehensive consumer privacy guidance, known as GDPR, was the first piece of sweeping legislation to put consumers in more control of the data they are generating through various technological services.

Earlier this year, Vermont passed legislation to bring further transparency to the data collection and brokerage practices of their residents. Companies (technology-based or not) who "aggregate and sell data about consumers whom the business does not have a direct relationship with" must now register with the state and:

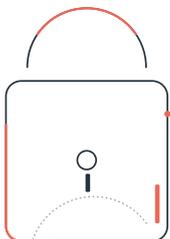
- Specify their data collection practices

- State the number of past breaches their organization has been exposed to

- Provide opt-out options for consumers

By 2020, the California Consumer Privacy Act (CCPA) is expected to follow suit and aims to empower California residents to find out what information businesses are collecting on them, provide them with a way to opt-out of their information being shared or sold to outside parties, and put additional controls in place should a company have their data breached.





Of course, the practice of generating data to classify and add consumers to lists for targeting, measurement, and attribution is not new. Credit card companies have long tracked and sold lists of individuals who purchase specific products or those within a certain category. Technology companies embed tags websites to monitor, store, and action the pages you view, elements you click on, and items you purchase online. Loyalty cards entice shoppers to participate with coupons and rebates in order to track purchases and prove the effectiveness of campaigns launched by shopper marketing groups. Location data is particularly interesting because of how personal it seems. Even though most data generated in the ad tech and mar tech industry is de-identified (through Mobile Advertising IDs, or MAID) and aggregated (targeting groups and not exposing individual devices), there is a certain “creepiness” factor that exists, as though someone is watching or following you as you move about the physical world. Leaving aside the fact that companies that collect and sell personally-identifiable data (like first and last names, email addresses, and home addresses) have existed for decades, we believe in and agree with steps that legislators and trade organizations are recommending to provide consumers with as much privacy as they way. Gimbal is currently working on a few initiatives that we’ll post here in future updates as they become publicly available.



## CHAPTER 9

## Conclusion



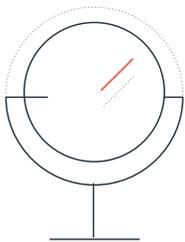
## A Recap and Things to Consider

What became obvious while writing this guide is that there are an incredible number of moving parts in play that generate, ingest, filter and analyze location data each day. The goal for me as a marketer and educator is always to make concepts as clear and concise as possible. Unfortunately for a topic with this level of complexity, it required more explaining than I would have liked.

So as a wrap-up, I'd like to leave you with a few tools and resources that will help you determine if location data can be useful for your organization. As always, if you have questions or see obvious topics that I have left off, please find my email address at the top of this guide and drop me a note. I plan to keep this guide up-to-date as our industry progresses, and I'd love for you to be a part of the conversation.

Thanks,  
Matt





## Tips for Selecting a Location Intelligence Provider

1. Do you use 1st-party data, 3rd-party data, or both?
2. Where does your data come from (bid stream or location SDK)?
3. If you use 1st-party data, identify the SDK and/or apps using the SDK.
4. Of the SDKs listed, what is the primary function of the SDK (serving ads or collection location data)?
5. Do you have a micro-location solution like beacons?
6. Do you offer a way to test or validate the data ourselves?
7. Is your technology certified? If so, by whom?
8. Do you have any references who use your data in a 1st-party fashion?

### SUPPLEMENTAL RESOURCES

- [Mobile Advertising Glossary](#)
- [The Difference Between Ad Networks & Ad Exchanges](#)
- [Permissions and User Opt-In for Location-Based Services](#)
- [What is Location 2.0?](#)
- [Location 2.0 eBook](#)
- [Arrival: Dwell-Based Location Attribution](#)

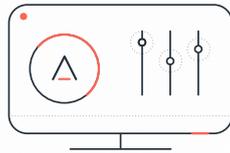


## LEARN MORE

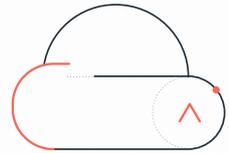
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Ad Platform



Location Platform



Data Cloud



[gimbal.com/learn](https://gimbal.com/learn)

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