



Getting Started with Mobile Attribution

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Introduction

The Rise of Marketing-Driven Installs

Welcome to the mobile-first era of digital marketing. With greater consumer adoption of advanced and yet affordable smartphones, and higher functionality being shifted to the apps within them, there can be no doubt that mobile has taken over.

In fact, according to a recent study by eMarketer, mobile claimed about 70% of the total US digital advertising space in 2018, while AppsFlyer predicts app install ad spend will grow 45% this year to hit nearly \$40 billion worldwide. The problem is that this success has also led to intensifying competition with over 4 million apps in the App Store and Google Play. As a result, the current reality of mobile is that app store discovery is broken. What this means is that driving “pure organic” users at scale is not a realistic outcome for most apps. That’s why app owners are realizing that marketing-driven, non-organic installs play an increasingly important role in the mix.

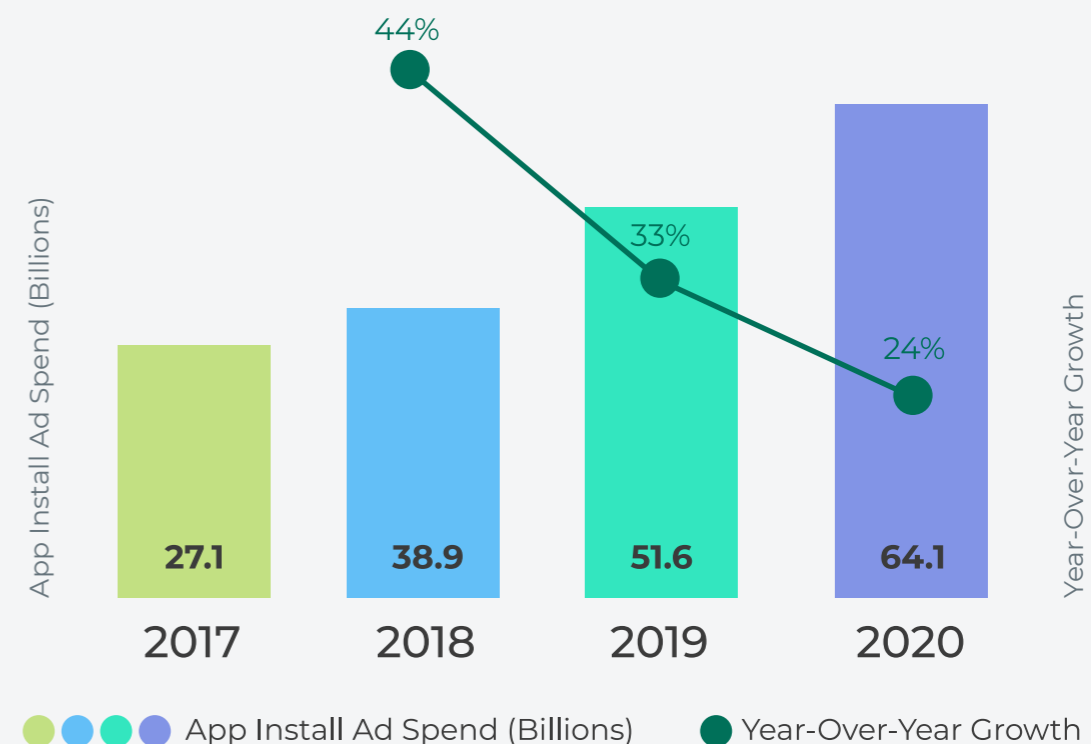


According to our data, between 2016 and 2017 there was a 22% rise in the share of non-organic installs in the app install pie. Between 2017 and 2018, the share jumped by 28%. This puts mobile attribution at the very heart of a marketer’s tech stack. Unlike organic traffic, marketers have far more control of their non-organic traffic, and they are able to leverage attribution and marketing analytics data to inform their decisions and maintain profitability against their spend.

However, rising demand has also led to rising media costs, in addition to significant retention and monetization challenges. Therefore, apps cannot rely solely on non-organic installs. Marketers need high quality organic users – even a fraction of them – in order to reduce their effective cost and drive profits.

Ultimately, successful apps use a combination of non-organic and organic installs to rise above the competition.

Global App Install Ad Spend, In Billions (2017-2020)



Chapter 1 | Mobile Attribution Under the Hood

Before we open the hood and take a look inside, let's take a step back and explore the core value of attribution: The mobile and digital ecosystems are highly complex with hundreds and even thousands of media players. Without attribution, marketers lack the right kind of visibility into their performance, which leads to significant overspending.

In order to make sense of it all and pay for demonstrated value, marketers need to work with a partner that has a view from above and is a source of truth that can rule which marketing activity should be credited for delivering a desired action and which should not.

Mobile attribution works with multiple identifiers to measure the pre and post install user journey with great accuracy and persistence across long stretches of time. These identifiers can be divided into two groups.

1. **Deterministic matching** uses multiple identifiers including device IDs (Apple's IDFA and Google's GAID), Google Play Referrer, and customer identifiers (i.e. anonymized log-in data or hashed email addresses) to match and accurately identify users on whatever mobile device they may be using.

2. **Probabilistic matching** is a statistical model that uses anonymized attributes such as IP addresses, device types, browsers, geos and operating systems, to create likely statistical connections between devices. Because it is not as accurate as deterministic matching, it is always used as a fallback mechanism.

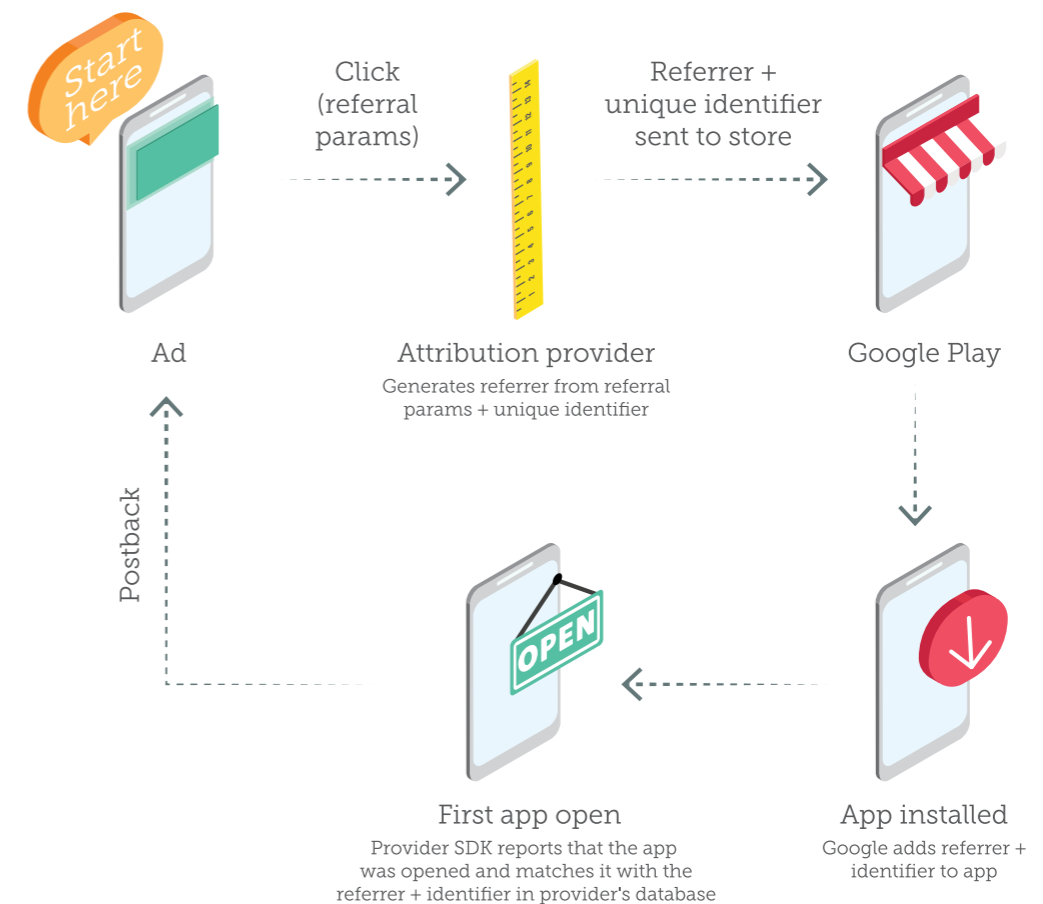
Let's dive in.

Deterministic Attribution Methods

Google Play Referrer

An identifier unique to Android devices which enables marketers to attribute ad activity to media sources for Google Play Store apps (not supported on Android out of store). In this case, the attribution provider can send tracking parameters to the store, which then passes them back to the source when the app is downloaded.

The tracking provider will most likely use the referrer method as it only depends on itself to create this match - it simply uses publicly available data from the referral source.

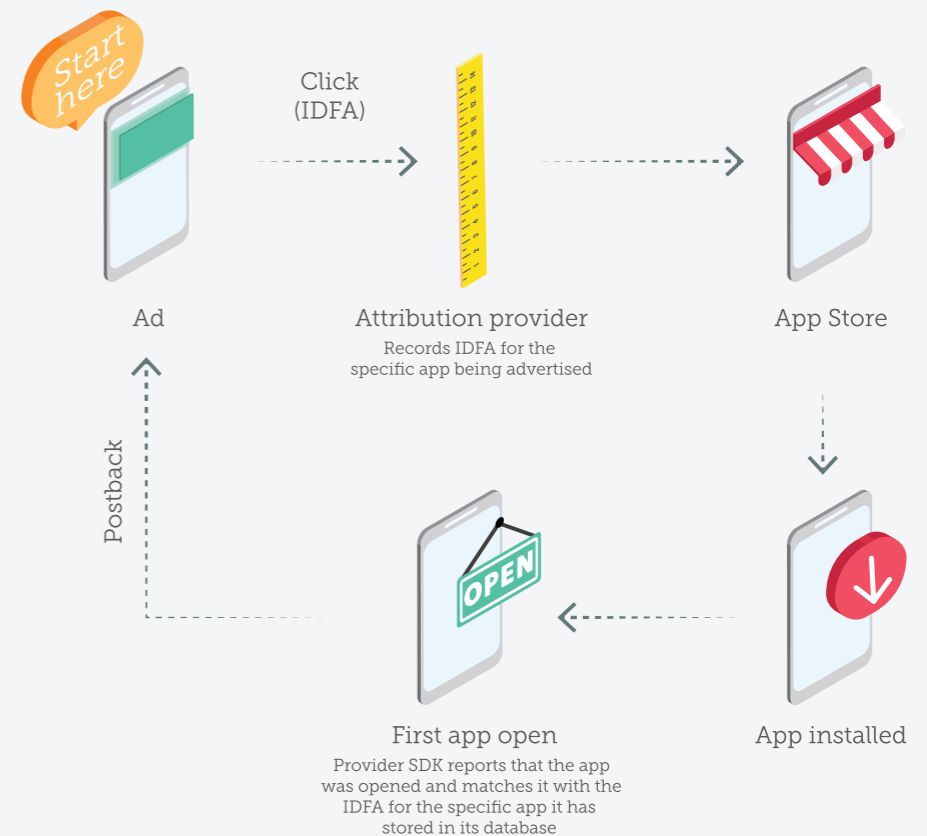
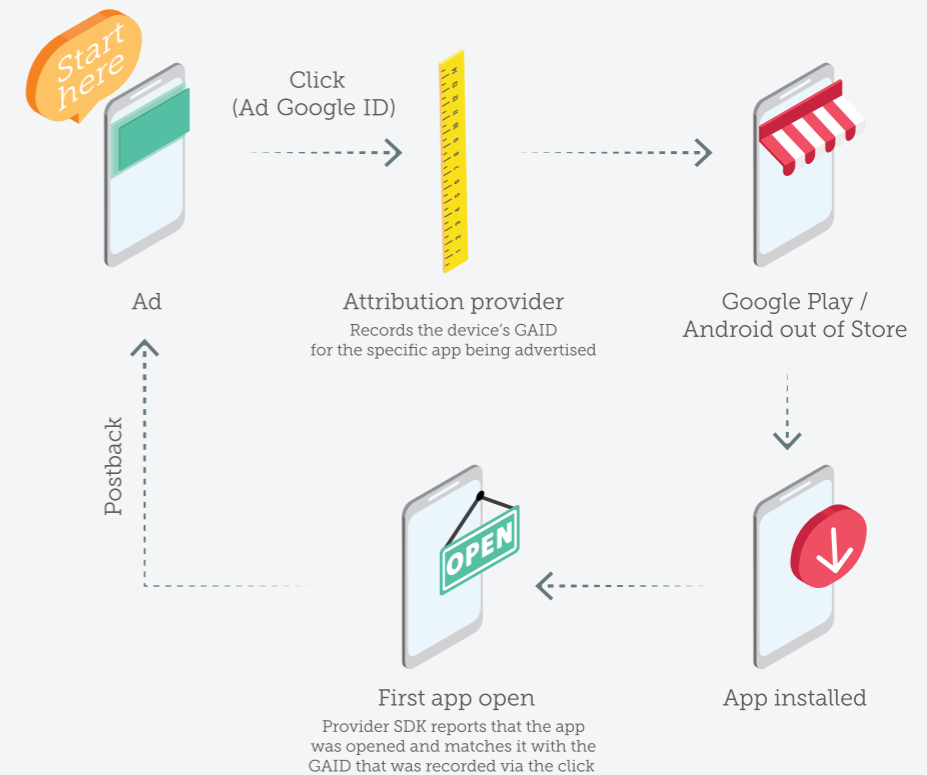


ID Matching - GAID and IDFA

There are two main types of device IDs that attribute installs the same way:

- A Google Advertising ID (GAID) is the device ID used to measure Android installs for both the Google Play store and Android out-of-store.
- An IDFA is the device ID used to measure Apple installs for the Apple App Store.

It is important to note that device IDs are not supported in the mobile web and also require configuration on the media partner's side, which means they are sometimes unavailable (whether not configured or not configured correctly).



ID Matching With an SRN

Unlike with regular ID matching, attribution performed with self-reporting networks (SRNs) is more limited due to the fact that the install data is kept with the network and not sent automatically to the attribution provider. SRNs include Facebook, Snapchat, Google Ads, Twitter, and a few others. In order to attribute installs to SRNs, upon the first app launch, the attribution provider checks whether the app is configured to receive traffic from these sources.

An attribution provider queries all SRNs configured for the app, using the unique device ID of the new install. That is done via dedicated MMP (Mobile Measurement Partner) APIs, which SRNs enable the provider to use. Based on the returned answers, the provider can then attribute new users to SRNs.



Probabilistic Attribution Method

Fingerprinting

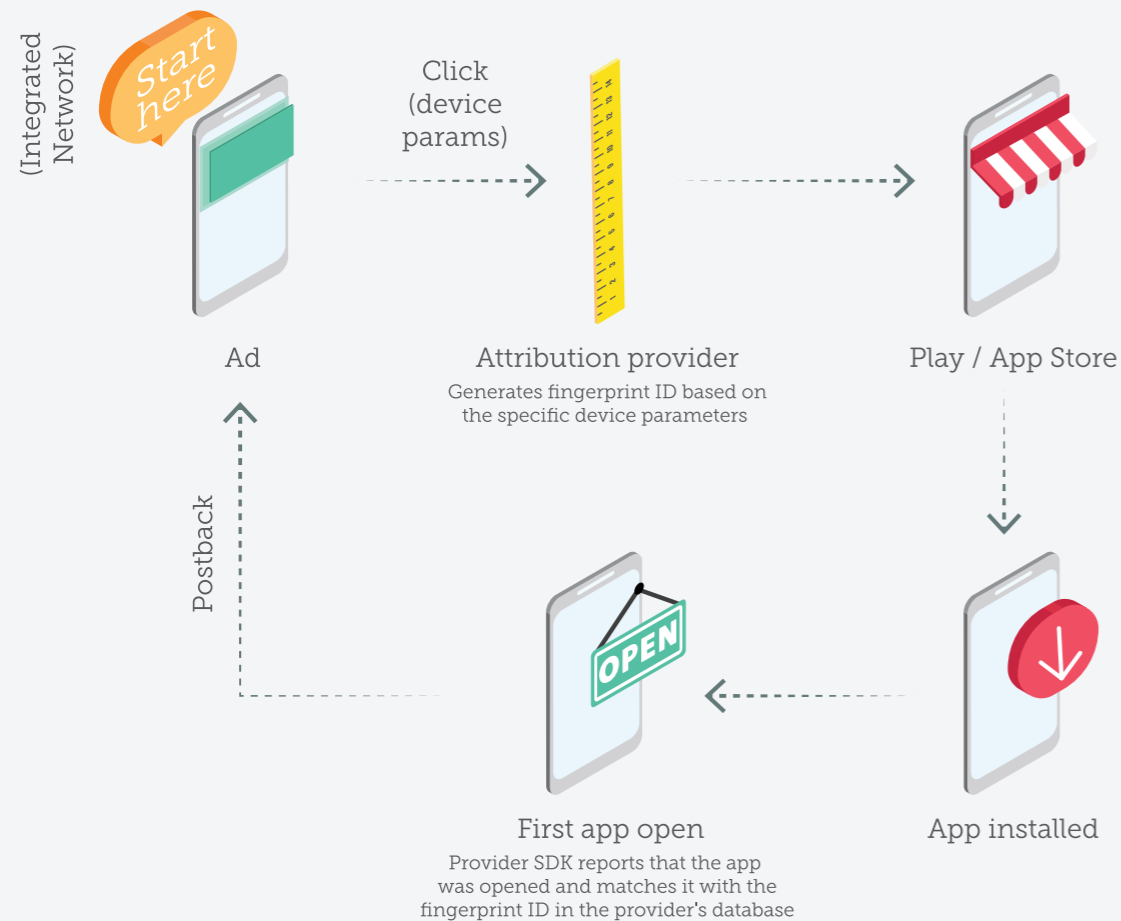
Fingerprinting is an identification method that uses publicly available parameters (i.e. device name, device type, OS version, platform, IP address, carrier, among others) to form a digital fingerprint ID that statistically matches specific device attributes.

Fingerprinting is vital, especially in iOS

While probabilistic attribution methods are not as strong as deterministic methods in practice, the fingerprinting method is nonetheless critical to mobile attribution, particularly on a platform level. By default, iOS has fewer methods available with which it can create a user profile, as there is no referrer like for Android and Google Play. Therefore, when ID matching is not possible in iOS, fingerprinting is used as a backup.

In fact, about 25% of installs in iOS are attributed with fingerprinting. This statistic becomes especially more important knowing the strength of iOS marketing and user acquisition despite only a 15% device share compared to Android. Although ultimately Android still leads iOS in both device share and non-organic installs, because of the high value of iOS users, as well as the overall user experience of iOS devices, Android is only 4x higher in global installs and only 35% higher in the US. Therefore, even though the attribution industry standard may turn to deterministic methods, fingerprinting plays a vital role nonetheless.

The following illustration explains how it works:



Beware: Outdated Fingerprinting

Fingerprinting fails without IP uniqueness. It loses all value when thousands and tens of thousands of users share the same IP address, which is quite often the case with many wireless carriers or public WIFI networks, to name a few examples.

To make matters even worse, some attribution providers use fingerprinting even when DeviceIDs are present on the click, substantially decreasing their measurement accuracy. AppsFlyer data shows that these fingerprinting inaccuracies double the number of attributed installs, wasting up to half of the marketing budget on otherwise organic users!

Misattributed installs due to fingerprinting inaccuracy lead to a bleeding cash cycle for marketers, in which strong user acquisition performance is driven and the business is led to further invest in the wrong places. The bleeding cash cycle is particularly dangerous because it drives compounding losses, draining budgets today and wasting tomorrow's spend as well.

The Bleeding Cash Cycle



Solution: Adaptive Fingerprinting

Achieving IP uniqueness for shared, public addresses often stands as the main obstacle in effective fingerprinting, but advances in attribution technology have worked to overcome this challenge. Driven by massive scale, adaptive fingerprinting solutions assign an IP uniqueness rating to all collected IP addresses within the attribution provider's database. From there, the platform uses a dynamic attribution lookback window which grows, shrinks, or closes depending on the population size of devices using a specific IP address.

For example, an install from a home wifi network that is shared by only two devices will be given a longer attribution lookback window than an install from a more popular, and therefore less unique, IP address. At the same time, fingerprinting based on popular IP addresses shared by thousands or tens of thousands of users, such as in airports, are unreliable signals, and are removed altogether.

Mobile Attribution Windows

The business side of install attribution is based on predetermined time frames, aka lookback windows. That means the period of time in which a user's action preceding an install - whether ad click or view - counts as having an impact on the decision to download an app. There are two main types of windows: click-based and view-based.

Click-Based Attribution

Most attributed mobile installs come from user clicks on ads: banners, videos, interstitials etc. Note that installs occurring within the lookback window are considered as non-organic and are attributed to the media sources. Beyond the lookback window, they are considered as organic installs.

- 1. 7-day standard:** If a user clicks on an ad served by network X, and then installs the app within 7 days of that click, it would get the credit for that install - assuming there wasn't another click that followed (under the last-click attribution standard).
- 2. 24-hour fingerprinting attribution window:** If there is no device ID or referrer, an install can be attributed based on fingerprinting. Its accuracy level is high only in the short term, and therefore its window is shorter.

View-Through Attribution

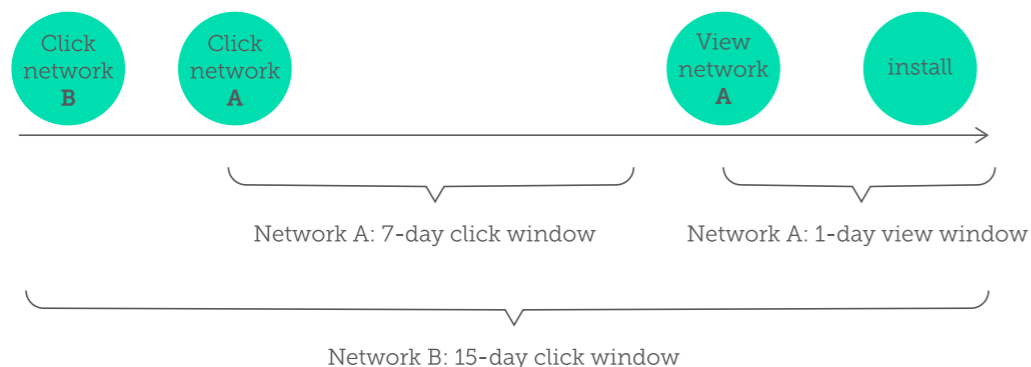
New installs by users who have viewed mobile ads, but have not clicked on them, can be attributed to the ad networks that served the ads. In such a case, the window is short - usually up to 24 hours. However, since the click is mightier than the view, it always wins (assuming it occurred within its own window).

The Tech Giants

Facebook, Google, and Twitter have their own rules in place, for both click-based and view-through windows. For Facebook and Google, windows are fixed (non-configurable) at 28 and 30 days, respectively, while Twitter allows a choice between 1, 7, 14, 30, and 90 days.

Because they mostly work on a CPC basis, these media sources will charge for any click that occurred within their window, whether or not it was the last click. Regardless, they are also informed by the attribution provider that there was an install and use that data for their own optimization purposes.

Let's look at the following example to better illustrate the rules of attribution windows:



Which networks “wins” attribution credit in the example above?

The answer is: **Network B**

This is because:

- a) Network B had the last click within the lookback window
- b) Clicks win over views, even if the latter is within its window

Configurable Attribution Windows

Both click-based and view-through attribution windows can be configured in the attribution provider's dashboard, allowing marketers to customize the attribution period based on the relationship established with their media sources. By configuring different attribution lookback windows for different media sources, the attribution provider ensures that attribution is carried out according to the agreed-upon terms, as well as with greater flexibility for all parties.

Generally, networks look to achieve the longest possible windows, while advertisers want to have the ability to normalize their data and compare apples to apples when running their analyses. For example, since effective CPI is very much dependent on the duration of a window, proper comparison is not really possible when comparing networks with different windows.

A configurable window can also be of use when running campaigns that are limited in time. For example, a taxi app's 24-hour special campaign promising installers the first ride for free - in such a case, it would be of great value to get reports only on installs that occurred within that one day window.

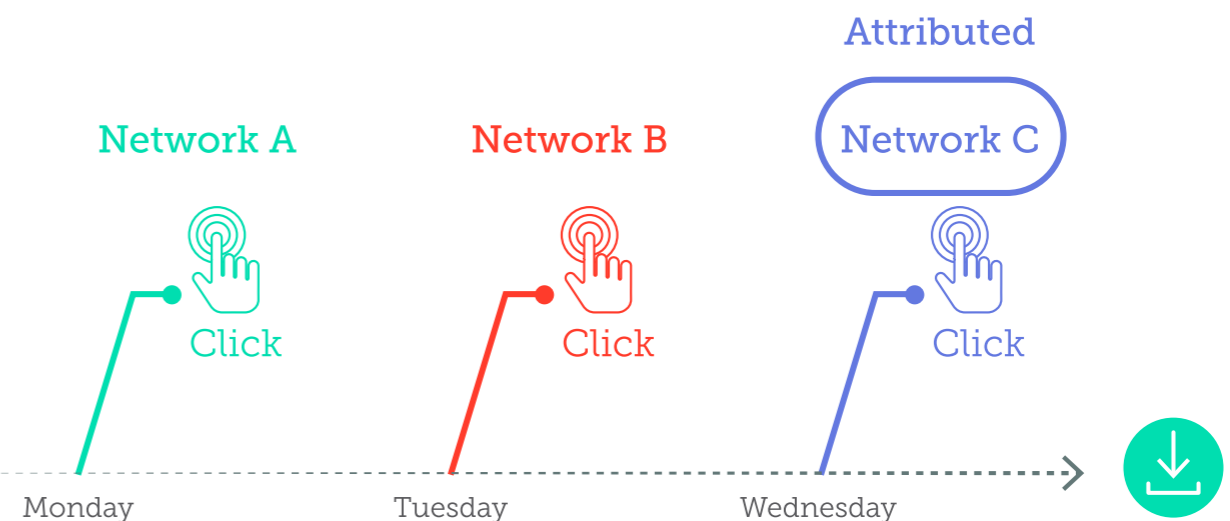
Mobile Attribution Models

The good news is that marketers can gain visibility into multiple insights across the consumer journey through **multi-touch attribution**. For example, app marketers can see that network A delivered multiple assists, or had the highest share of first touches. So if increased awareness is the goal, a marketer can place more weight on first touches. If it's conversions, more weight can be placed on last touch closers. If more and more advertisers build these models internally, they can then demand that their media partners play by these rules as far as billing is concerned.

In the example below, we can see a single device user journey:

The attribution model is the structure through which advertisers pay media sources and draw insights on the value of different marketing efforts.

When it comes to billing, **last touch attribution** reigns supreme. It occurs when an install is matched to the last interaction, or touch, in the user journey within the attribution window. In this case, the promotion which produced the last touch gets the full credit and payment. This model is currently an industry standard, but it is clearly a flawed model for today's multi-channel world.



Integrated Partner Ecosystem

When exploring attribution providers, you'll probably run into each one flexing its muscles by boasting a large number of integrated partners. What is this and why is it important? There are several main reasons, the top two of which are:

1. **Universal SDK.** If advertisers want to work with an ad network or other partner the attribution provider is integrated with, they don't have to add its SDK. It all goes through the tracking company's SDK that sends a postback filled with data back to the network.

This solves a major headache for marketers (and their developers) who have a hard time involving their IT to integrate every single partner they want to work with, not to mention the fact that data can be both collected and shared with all partners via the SDK.

Not only does such a universal platform allow marketers to run campaigns with any media source in the world, but it ultimately enables universal optimization for both networks and advertisers, boosting the entire mobile ecosystem. On the developer end, the universal SDK

allows for a smoother overall operation, improving app performance, user experience, and future development.

2. **Access to the entire mobile marketing ecosystem.**

Integrating with an attribution provider's universal SDK rounds out your marketing tech stack. It includes not only a connection to the entire media ecosystem, but also to other SaaS companies, primarily for data and automation purposes.



Key Partners in an Attribution Provider's SDK

The integrated partner ecosystem of an attribution provider is not strictly limited in the diversity of the services offered, but in general, the types of partners offered by a good provider fall into one of the categories below:

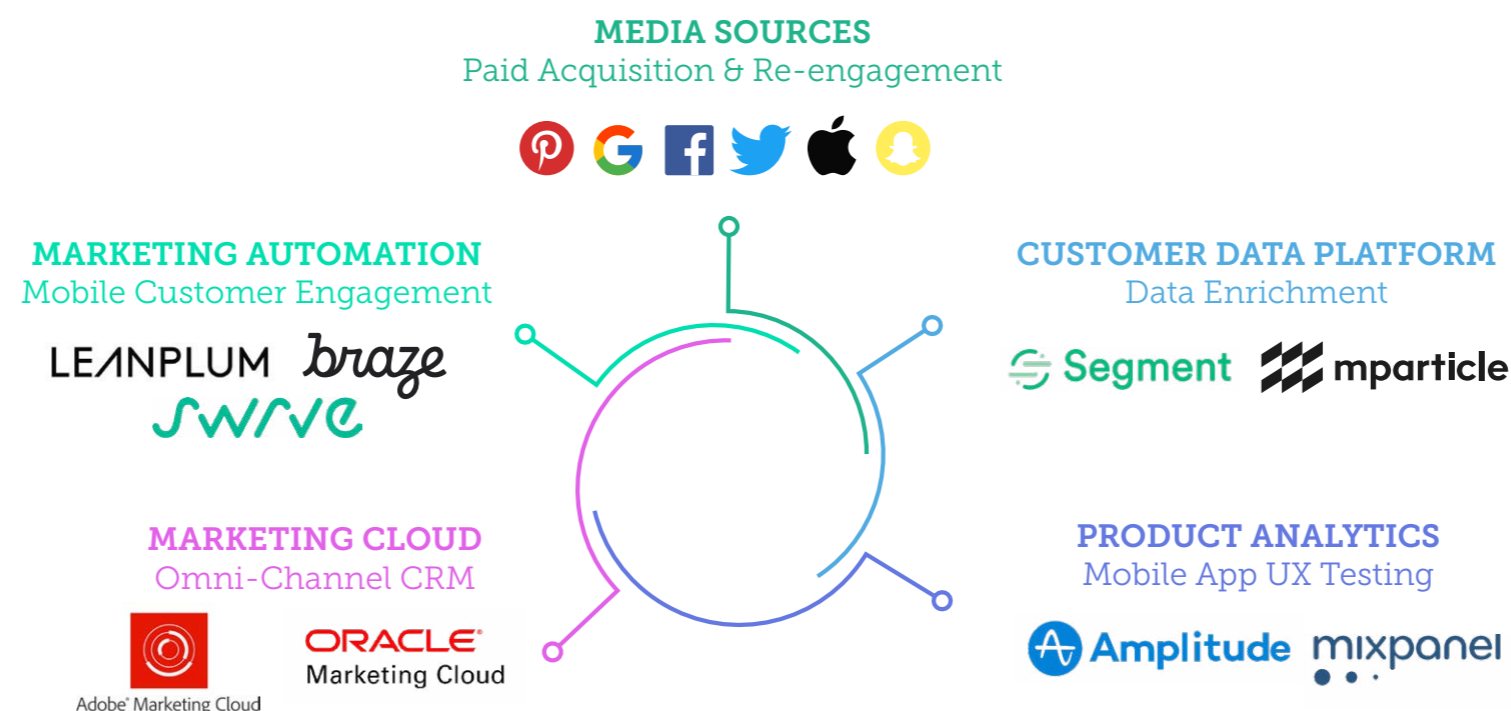
1. Media Sources

There are two main categories of media sources, which serve paid ads for awareness, acquisition and re-engagement campaigns:

- **Ad Networks, Demand-Side Platforms (DSPs) & Publishers** - The universal integration offers the most accurate, unbiased data because all configured media sources' data are factored into the reporting. That is, advertisers get the whole picture of their user's activity and journey from an attribution provider's many networks rather than parsing together separate data on their own. In this way, advertisers can more easily reach different user segments since media sources all work a bit differently with different scopes.

- **Self-Reporting Networks (SRNs)** - While the aforementioned networks accept an attribution provider's tracking links and post backs, there are certain networks (SRNs) who require their own proprietary technology for measurement. These media sources require that marketers use either their own SDK for measurement, or an approved third party attribution partner.

Part of the problem is that these media sources also happen to be some of the largest networks in the world: Facebook, Google, Instagram, Apple Search Ads, Snap, Twitter, Tencent, and others. Given many marketers regularly use SRNs, but also that these networks are unable to see installs from other networks, using an independent attribution provider is necessary to avoid misattribution and/or duplication.



2. Technology Partners

While attribution is a core component of the mobile tech stack, other technology partners mutually enhance data and campaign orchestration across different areas of the customer lifecycle:

- **Marketing Automation** - While media sources serve messages to users across paid channels, automation partners are differentiated through their focus on re-engagement with existing users via CRM channels and the product itself. Customer engagement can be paired with audience segmentation and A/B testing through push messaging, email marketing, in-app communications or SMS. Examples of automation companies include Braze and Leanplum. Many automation partners have an SDK themselves, but don't actually perform attribution despite this data being mission-critical to their functionality.
- **Product Analytics** - Focused on mobile app experience, product analytics companies such as Amplitude and Localytics specialize in UX testing and persona categorization. Through behavioral and predictive analytics, they provide an easy structure for product optimization in addition to reporting on retention metrics, user funnels and cohort analysis. As the product interface is closely connected with product messaging (i.e. push notifications), some of these companies also offer features that intersect with marketing automation.
- **Marketing Cloud** - Perhaps the broadest partner category, marketing cloud companies offer similar services to

product analytics and marketing automation—but instead of focusing on the mobile app alone, they provide customer identity management, campaign orchestration and analytics across a full suite of channels including web and offline CRM. Some cloud providers such as Adobe, Oracle, Salesforce and IBM also offer additional products that overlap with paid advertising, such as data management platforms (DMPs) for 1st/3rd party audiences and demand-side platforms (DSPs) for ad serving.

- **Customer Data Platform (CDP)** - An emerging player in the marketing tech world, customer data platforms, or CDPs, collect, unify, segment, and activate user data from various SDKs. While similar in some ways to marketing cloud providers in that they both offer customer profile management, CDPs do not provide campaign orchestration or engagement services, nor do they provide direct reporting. Instead, they focus on automating and enriching the assignment of customer data segments between *all* other systems in an advertiser's tech stack in real-time. This not only makes it easier to set up new SDKs, but also maintains consistency for aggregated raw reports downloaded from data warehouses and visualization products such as AWS or Tableau. Examples of CDPs include mParticle and Segment.

What do all of these technology partners have in common? Within the SDK integration, the attribution provider's clients are shared mutually with technology partners and typically look to pass attribution data between both for the purpose of creating more robust user profiles. This is done via a postback, the same mechanism with which attribution postbacks are sent to media partners, and is fully controlled by the attribution provider. This allows technology partners to pair 1st party data between sources—for instance, marketing automation partners can segment cohorts by acquisition date, install source and in-app behavior to create more advanced persona-based sequences using AppsFlyer data.



Deep Linking

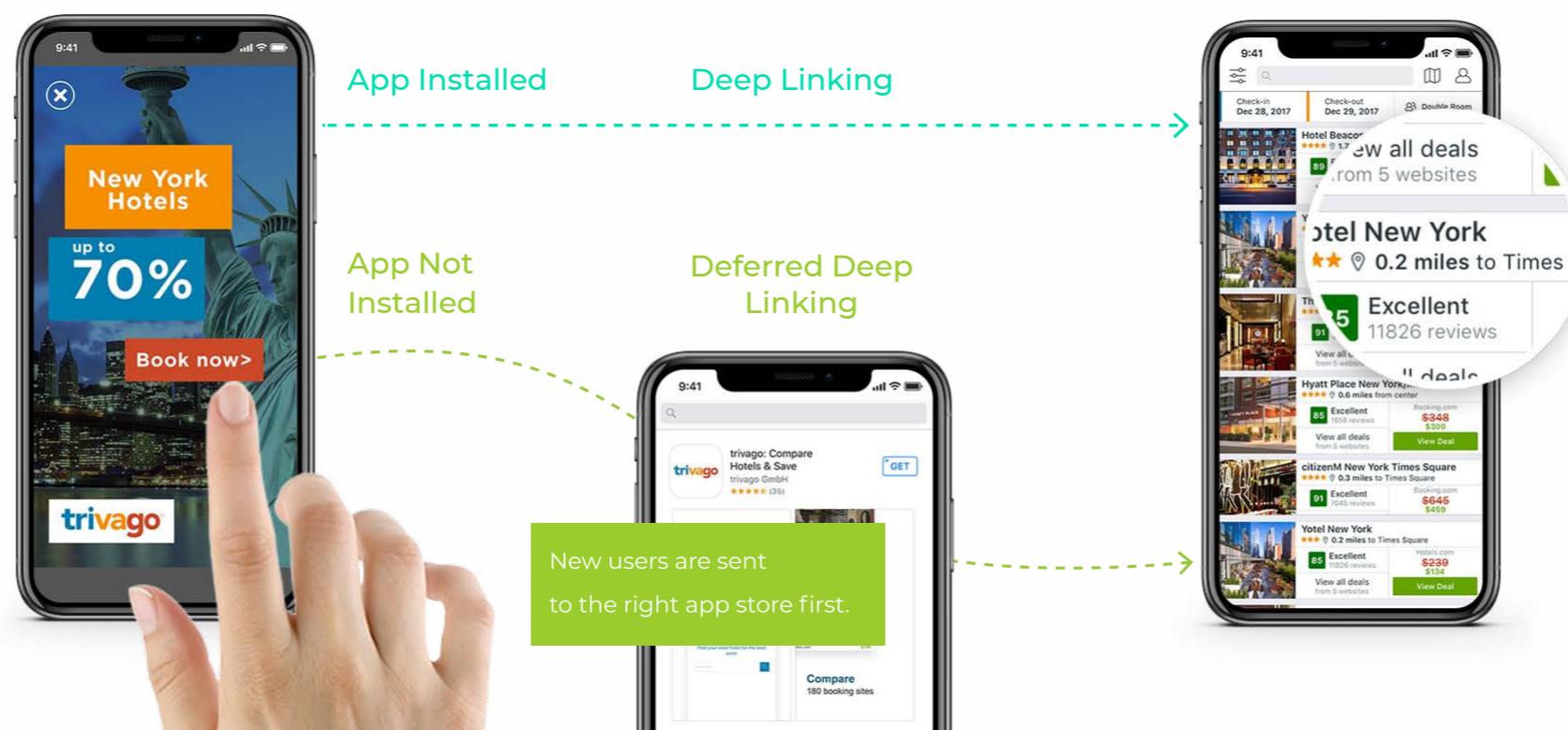
Particularly relevant for user acquisition and retargeting campaigns, deep linking is a marketing method that creates a contextually-relevant user experience across channels, platforms, and devices. How? Through a mobile deep link, which contains all necessary information, users are brought directly to a specific page within an app rather than just the home page, seamlessly guiding the journey from promotion to landing page and ultimately boosting conversion rates.

Deep links are used to drive customers to product pages, execute paid campaigns on Facebook, route users to an app store from web and email, and communicate important offers and deals in an app, for some use cases among many. Once a complex technological innovation, deep linking is now a commodity that is available from all major attribution providers

with basic to advanced capabilities. However, remember that the focus should always be on attribution first and deep linking second, and especially that these tasks should not be divided between two providers. Dive into the amount of attribution features, network integrations, experience, and scale the provider has before seeing how their deep linking addresses your user experience needs and app goals.

By prioritizing attribution, but keeping both functions under the same roof, you will cut down your tech costs, consolidate complex data into a single dashboard, and make your crucial marketing analytics much easier harness.

For more information on this powerful tool in the marketing tech stack, read our complete [deep linking guide](#).



Re-engagement and Retargeting

To overcome the retention challenge and foster stronger relationships with consumers, paid retargeting and owned media re-engagement campaigns (email, push) allow marketers to re-connect with existing users and reactivate dormant ones. In an increasingly saturated market, this practice has significant value.

In a ideal scenario for retargeting, users have already installed and used an app, so the likelihood of them engaging with it again of their own volition (organically) are much higher than the chances of a user organically discovering an app for the first time. Hence, the question that lingers in the back of marketers' minds: to retarget [through paid campaigns] or not to retarget, and to what extent. The answer to that question is often "yes" as incrementality tests have shown (see [here](#) and [here](#)).

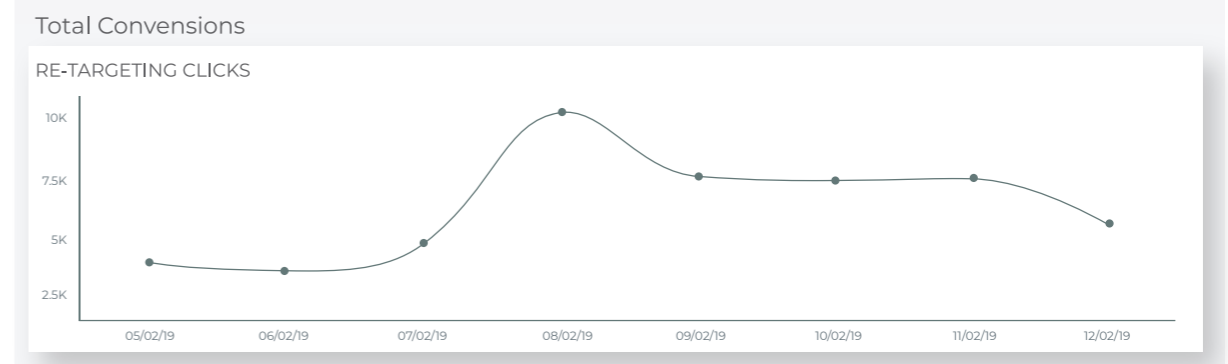
Retargeting Attribution

Mobile retargeting, aka re-engagement attribution, occurs when an existing user that has the app installed engages with the retargeting campaign and opens the app. In this case, matching is done via deep linking (which has an

attribution provider's parameters) or a device ID if a deep link isn't available.

Re-Engagement Attribution Window

The number of days in which an event can be attributed to a retargeting campaign is known as a re-engagement attribution window. It starts when the actual retargeting attribution occurs (after click and app open), and finishes at the end of the designated re-engagement attribution time period.



Chapter 2 | **Post-Install Marketing Analytics**

Now that we understand the ins and outs of how attribution works behind the scenes, let's turn our attention to the business value of attribution, best practices, and pitfalls to watch out for. Note that this topic is complex and contains many important nuances, but for the purposes of this guide, we will only explore the basics.

App marketing is an evolution in progress - that has been true since its inception several years ago and remains true still - but the direction is crystal clear: performance, specifically of post-install user actions in a freemium-driven economy.

To illustrate the necessity of performance, and value-based metrics, consider these examples. You are working with an ad network that is delivering high rates of new users, but upon a closer look, you realize that the users themselves are low quality and have either poor retention or low lifetime value (LTV). Your user base may have grown, but many of these users may not have had any active app sessions nor completed any in-app actions.

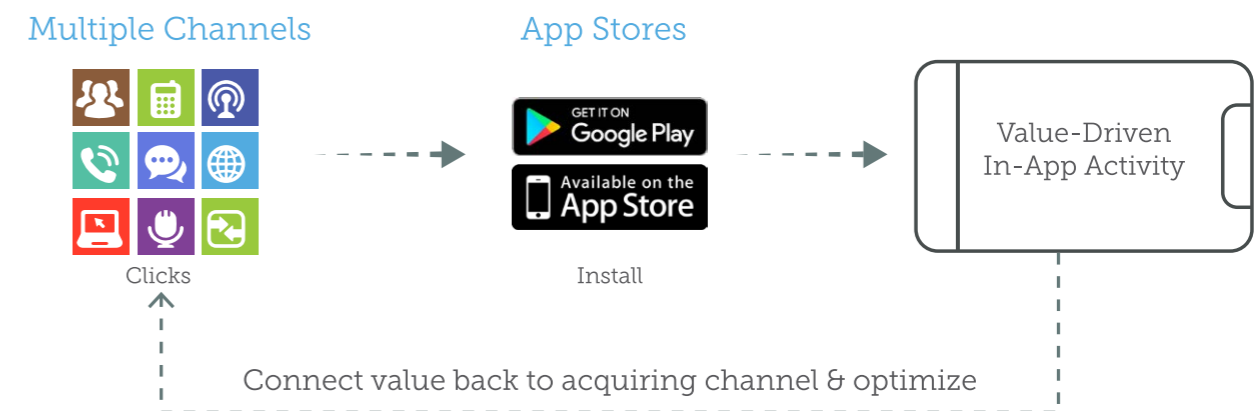


From Volume to Value

A properly attributed campaign that's tied to in-app events allows marketers to better optimize and make informed decisions on which channels and media sources to work with. Volume is important both for pushing an app's ranking in the app stores, and for serving as the baseline from which a marketer can find the highest quality users.

The key lies in your ability to significantly shoot up the percentage of loyal users. How so? For one, by effectively managing your ad spend - investing more in media sources and channels that have shown that they can deliver not only an install, but also a loyal, high-value user who meets your goals, whether engagement or revenue-related.

Here's how this works:



In-App Events to Get Started With

Now that we've cleared away some of the dust about why connecting your marketing analytics back to your channels, networks, campaigns and, ultimately, attribution, let's take a closer look at choosing which granular metrics will best serve your app's goals.

Basic

- Install / loyal user, conversion rate
- App opens (for retention)
- Revenue
- Average Revenue Per User (ARPU)
- Number of purchases

Verical Specific



Travel

- Hotel / flight / package searched / viewed
- Add to wishlist
- Registration
- Initiated checkout
- Hotel/flight/package booked



Gaming

- Tutorial completion
- Facebook registration
- Achievement unlocked
- Level passed



e-Commerce

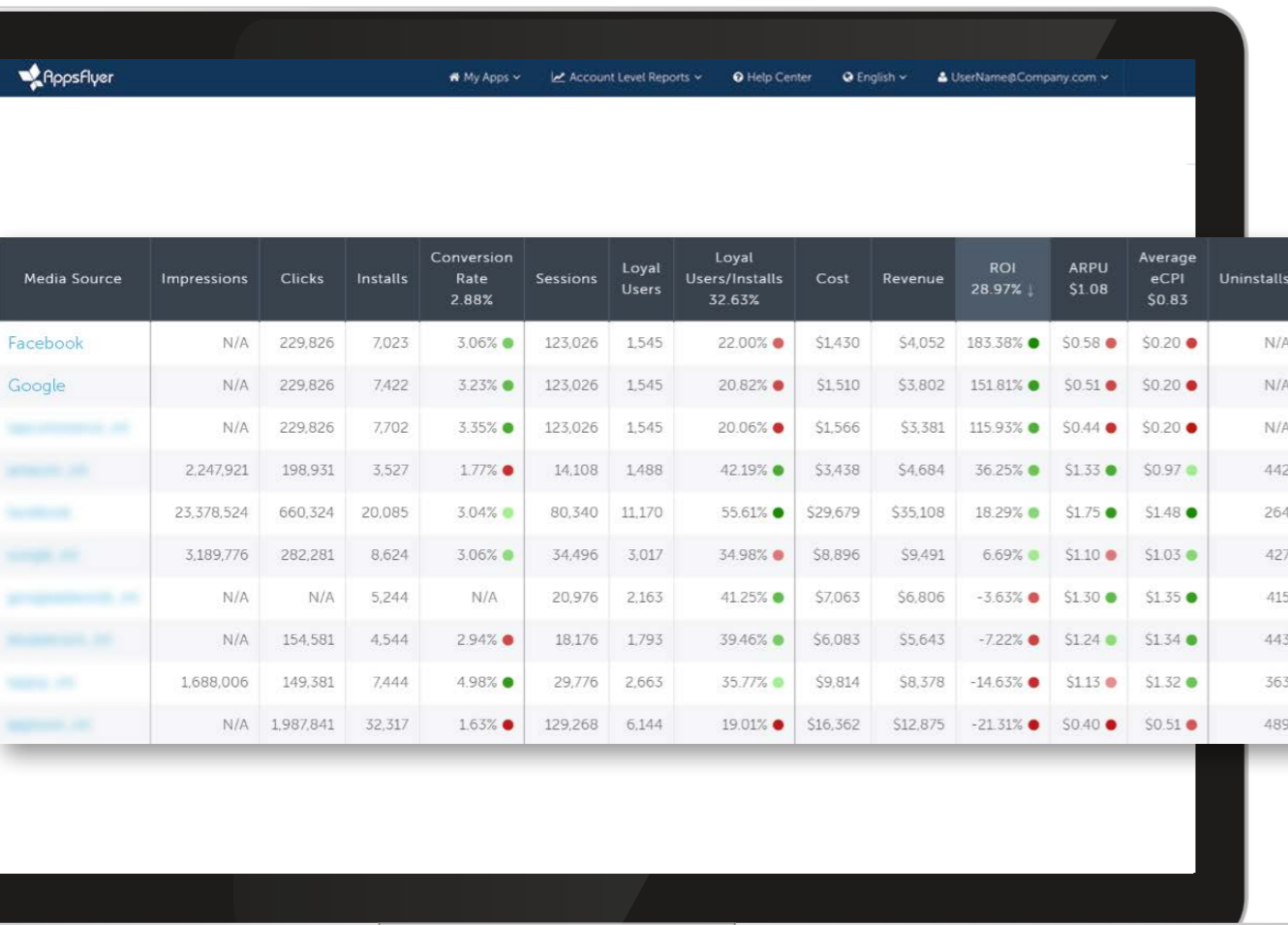
- Product viewed
- Product added to cart
- Registration
- Product Purchased
- Logged-In

LTV Measurement

Mobile has created tremendous opportunities for marketers to not only reach a significant number of consumers at practically all times, but also to boost user loyalty. However, with millions of apps in the app store and ever-increasing user expectations, user loyalty, retention and profitability remain significant challenges for apps. With less ongoing engagement, monetization becomes difficult with users making fewer purchases and viewing fewer ads. The result is that lifetime value (LTV) drops.

To overcome the overall monetization challenge, apps must maximize the potential of multiple revenue streams: in-app purchases (IAP), in-app advertising (IAA), paid-for apps, and subscriptions. The 'paid-for' model only works for a small percentage of apps with unique content and a top brand. The subscription model is most beneficial for a minority of apps that consistently provide ongoing value to loyal users and offer regularly updated features or content.

Ultimately, the vast majority of revenue for apps comes from IAP and IAA. While the former commands the lion's share of revenue, the latter is eating an increasingly larger piece of the pie as more and more developers seek to monetize their in-app ad real estate and take advantage of rising media costs, wearing their publisher rather than advertiser hat.



Media Source	Impressions	Clicks	Installs	Conversion Rate 2.88%	Sessions	Loyal Users	Loyal Users/Installs 32.63%	Cost	Revenue	ROI 28.97% ↓	ARPU \$1.08	Average eCPI \$0.83	Uninstalls
Facebook	N/A	229,826	7,023	3.06% ●	123,026	1,545	22.00% ●	\$1,430	\$4,052	183.38% ●	\$0.58 ●	\$0.20 ●	N/A
Google	N/A	229,826	7,422	3.23% ●	123,026	1,545	20.82% ●	\$1,510	\$3,802	151.81% ●	\$0.51 ●	\$0.20 ●	N/A
Instagram	N/A	229,826	7,702	3.35% ●	123,026	1,545	20.06% ●	\$1,566	\$3,381	115.93% ●	\$0.44 ●	\$0.20 ●	N/A
Twitter	2,247,921	198,931	3,527	1.77% ●	14,108	1,488	42.19% ●	\$3,438	\$4,684	36.25% ●	\$1.33 ●	\$0.97 ●	442
LinkedIn	23,378,524	660,324	20,085	3.04% ●	80,340	11,170	55.61% ●	\$29,679	\$35,108	18.29% ●	\$1.75 ●	\$1.48 ●	264
Google Ad	3,189,776	282,281	8,624	3.06% ●	34,496	3,017	34.98% ●	\$8,896	\$9,491	6.69% ●	\$1.10 ●	\$1.03 ●	427
Instagram Ad	N/A	N/A	5,244	N/A	20,976	2,163	41.25% ●	\$7,063	\$6,806	-3.63% ●	\$1.30 ●	\$1.35 ●	415
Facebook Ad	N/A	154,581	4,544	2.94% ●	18,176	1,793	39.46% ●	\$6,083	\$5,643	-7.22% ●	\$1.24 ●	\$1.34 ●	443
Twitter Ad	1,688,006	149,381	7,444	4.98% ●	29,776	2,663	35.77% ●	\$9,814	\$8,378	-14.63% ●	\$1.13 ●	\$1.32 ●	363
LinkedIn Ad	N/A	1,987,841	32,317	1.63% ●	129,268	6,144	19.01% ●	\$16,362	\$12,875	-21.31% ●	\$0.40 ●	\$0.51 ●	489

Cost Measurement

So you're measuring your revenue, but in order to truly make sense of the return on your marketing investment, your return on ad spend (ROAS), the cost of your marketing effort must also be factored in. Whatever the method you choose to measure cost, it is important to properly define the business model and different rates you agreed on with your media partner, including breakdown by geo, quality of inventory (incentivized vs. non-incentivized, premium vs. non-premium). Don't forget to continuously monitor that you are billed accordingly.

Other considerations to take into account include:

- **Breakdown of cost** - Don't settle for getting cost data per campaign; instead demand access to cost data by ad group, creative variation, geo, and publisher. The greater the granularity, the more data you'll have to work with for optimization.

Also consider the different pricing models that are available and used among networks, which might vary in your own dashboard. These are cost per thousand impressions (CPM), cost per click (CPC), cost per install (CPI), and cost per action (CPA). It is important to

understand the benefits and implications of each, as well as how to use them towards your company's goals, given this diversity.

- **Cost data from the big tech giants** - The top networks in mobile advertising, such as Google, Facebook, Snapchat, Twitter, and others, require a unique integration through an API to pass cost data to their official measurement partners. Compare this to standard networks, whose cost data can be retrieved simply through click-based attribution. More importantly, in order to calculate your true ROAS, cost data must be received from all these partners in order to see the full picture, on both the global and regional levels.

Types of Reports

Data reports sit at the heart of the mobile marketing operation. Without them, you simply cannot properly inform the decisions critical to success. However, like other elements of the mobile landscape, data is multi-faceted, since they can be analyzed by two main methods and come in two main forms.

Methodology: Lifetime vs. Activity Data

There are two main methods for analyzing your users' events data: Lifetime Value (LTV) or Activity. Events data relates to any actions performed by users post-installation, such as in-app purchases, registrations, level completions etc. Installs data is neither considered to be activity nor LTV data.

- **Lifetime** - Lifetime value data includes all events performed throughout the lifetime of users that installed during a specific date range. It is useful for showing the quality of users from different media sources, which is why good campaign optimization depends on LTV data.
- **Activity** - Activity data includes all events performed by all active app users during a specific date range. It shows an accurate breakdown of chronological events. As such, it is useful for measuring the overall performance of media sources during specific date ranges.

The Train Analogy

Imagine someone next to a railway watching a train passing by. In a single minute this person sees only the current actions performed by ALL of the passengers. This is activity data.

Another person is inside one of the railroad cars. This person sees ALL the actions performed only by the passengers that boarded the train with her, from their arrival (install) until departure (uninstalling) from the train. This person cannot see anything performed by passengers on other railroad cars, as they were boarding either before or after her. This is lifetime value data.

Form: Aggregated vs. Raw Data

Although data is useful for different purposes no matter which way you slice it, it can come in two main forms: aggregated and raw.

- **Aggregated** - This data collects all raw data from the multiple sources you have previously selected and compiles it into the various summary reports, charts, and graphs seen in the dashboard. These reports offer clearer insights on your data activity, allowing you to focus on future action items rather than strictly data analysis, and are generally more digestible.
- **Raw** - Your data may hold tremendous amounts of potential value, but not an ounce of it can be delivered without uninterrupted, consistent access to quality data in its purest form — raw data.



Here are just a few of the many ways you can utilize it to optimize your marketing performance:

- basis for performance-based billing
- your own fractional attribution logic
- marketing and product funnel analyses
- highly-targeted retargeting campaigns
- specific user segmentation
- identifying potential fraud
- optimizing and building better targeted messages

User Acquisition Optimization

It cannot be understated - in the competitive mobile landscape, marketers who are well-armed with their data and know how to use it will come out on top. User acquisition is a science and an art and therefore no easy task, but with the right tools in place, it can drive results.

In order to maximize the efficiency of these tools, marketers must also consolidate and analyze their data in a single universal dashboard. Let's take a look at some example of in-app KPIs from AppsFlyer's own dashboard.

Table 1: Sorted by Number of Installs

Aggregated Performance Report ⓘ

All Media Sources

Media Source	Clicks	Installs ↓	Conversion Rate 18.72%	Sessions	Loyal Users	Loyal Users/Installs 30.51%
Network 1	1,500,774	77,985	5.20% ●	141,492	5,580	7.16% ●
Network 2	38,875	18,791	48.34% ●	157,898	12,337	65.65% ●
Network 5	29,383	12,887	43.86% ●	122,859	8,939	69.36% ●
Network 4	29,970	10,912	36.41% ●	71,379	6,025	55.21% ●
Network 3	98,844	8,686	8.79% ●	40,906	3,756	43.24% ●
Network 6	18,615	5,674	30.48% ●	43,788	3,538	62.35% ●

If volume is what you're after, Network 1 clearly delivers. But if it's post-install value, it delivers a loyal-user-to-install ratio that's well below average. When focusing on this KPI, Networks 5 and 2 reign supreme.

This app has a very solid client base with owned channels Email and SMS leading the pack. The table also shows that, while user value delivered by organic traffic is below average, it delivers the majority of the apps' revenue.

Table 2: Sorted by ARPU (Average Revenue Per User)

Media Source	Revenue	ARPU \$653.28 ↓
Email	\$257,084	\$1,725.40 ●
SMS	\$278,149	\$1,305.86 ●
Network 1	\$2,365,751	\$842.50 ●
Network 5	\$4,568,333	\$811.28 ●
organic	\$52,742,356	\$647.91 ●
Network 2	\$450,266	\$633.29 ●
Network 6	\$87,121	\$631.31 ●
Network 3	\$834,087	\$587.80 ●
Network 4	\$541,907	\$217.90 ●

Campaign B of a travel app is obviously delivering massive scale, but when it comes to the average order value (AOV), it actually comes in last. Although Campaign A delivered only 43 purchases, it had the highest AOV.

Table 3: Sorted by Purchased Items (Unique Users)

Campaign	purchased_ite... (Unique Users)	purchased_ite... (Event Counter)	purchased_ite... (Sales in USD)
B	2,803	4,496	\$4,027,384
C	332	576	\$579,017
A1	192	384	\$365,995
A	33	43	\$46,973
D	21	25	\$24,513

Retention

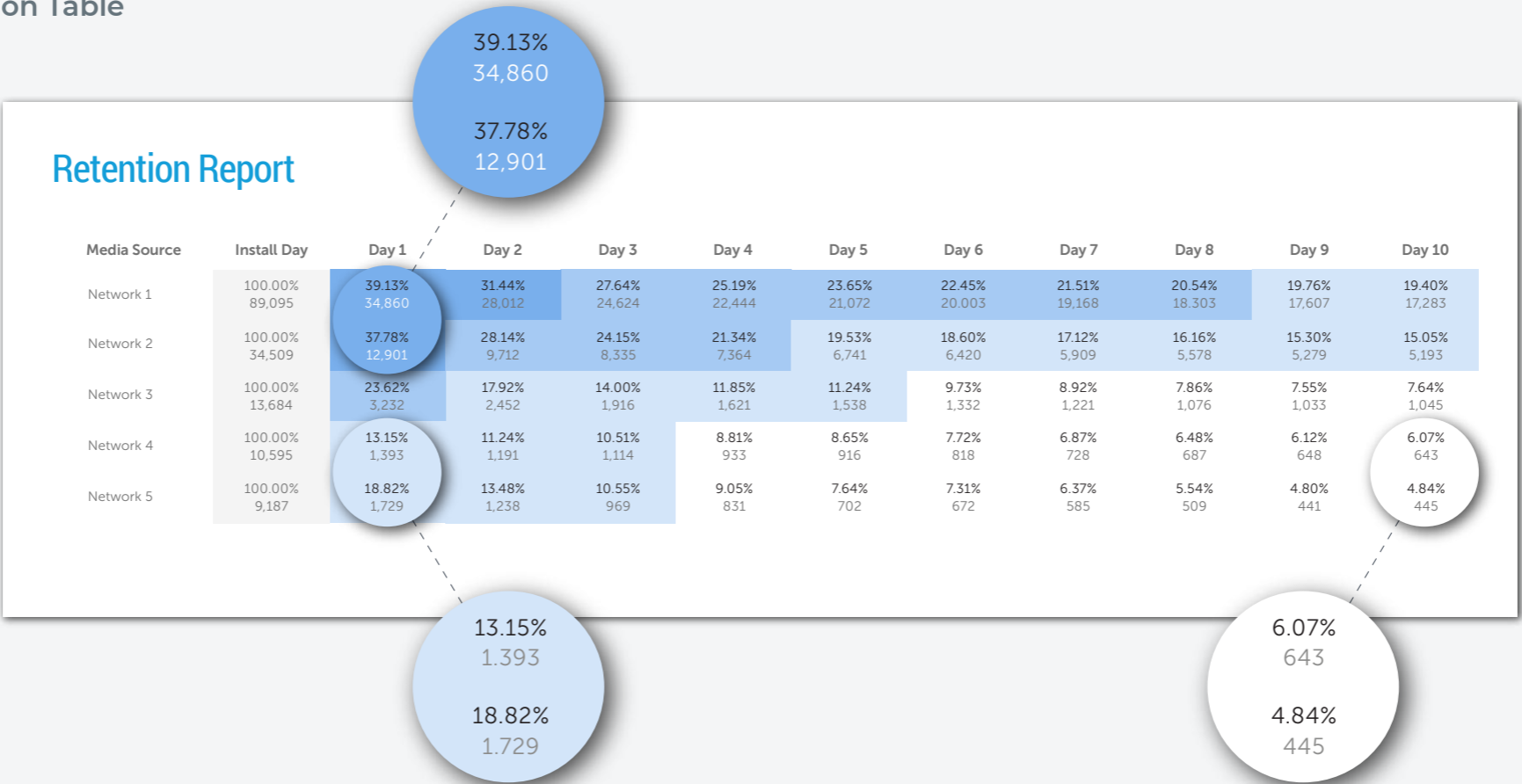
Your users have downloaded your app. That’s an important step. But most of the work is still ahead. Now you have to make sure they open the app, use it regularly, and actually drive real value for your business.

So how do you get a user to open your app and not the dozens installed (on average) on his device, not to mention the thousands of potentially relevant apps for that user in the app stores just waiting for their chance to take your place? Retention is a major challenge in app marketing, but getting it right is critical because it is the basis of monetization and lifetime value, especially in a freemium-dominated market.

The retention rate is calculated as the unique number of users acquired by a specific network who were active on a specific day/week out of the total number of unique users who first launched the app in the selected timeframe.

The following chart from the AppsFlyer dashboard clearly shows that Network 1 has the highest retention rate from the get go, while Network 2 starts strong and remains strong, although not as good as Network 1. Network 4 has the lowest retention on Day 1, but over time, it is Network 5 that loses the most users, as only 4.8% remain after 10 days.

Chart 1: Retention Table



Uninstall Measurement

Removing an app from a device is quite an aggressive move, clearly indicating that something is wrong. Understanding why, when and which users uninstall apps is extremely important in the fight against churn.

Uninstall measurement allows app developers to apply privacy measures in order to protect their customers' privacy and data. This data can be used to exclude users who uninstalled their app (and are clearly not interested in their service) from their targeting.

Setting up uninstall measurement for your app is a relatively simple process. Developers only need to add and adjust a small amount of code on the SDK, and then you'll be well on your way to getting uninstall-driven insights.



Cohort Analysis

A cohort report enables you to group users with common characteristics and measure specific KPIs over different timeframes.

For example, one cohort can be users who first launched an app any time during the month of January, while another cohort are those who launched it during February and live in the US. This form of grouping enables an “apples to apples” comparison and therefore gives a more accurate indication of change over time. It tells us about the quality of the average customer and whether it’s increasing or decreasing over time.

Let’s explore the following example from AppsFlyer’s cohort report. This cohort includes users from Great Britain who installed the app between January 1 and January 31. They are then grouped by the media source that acquired them,

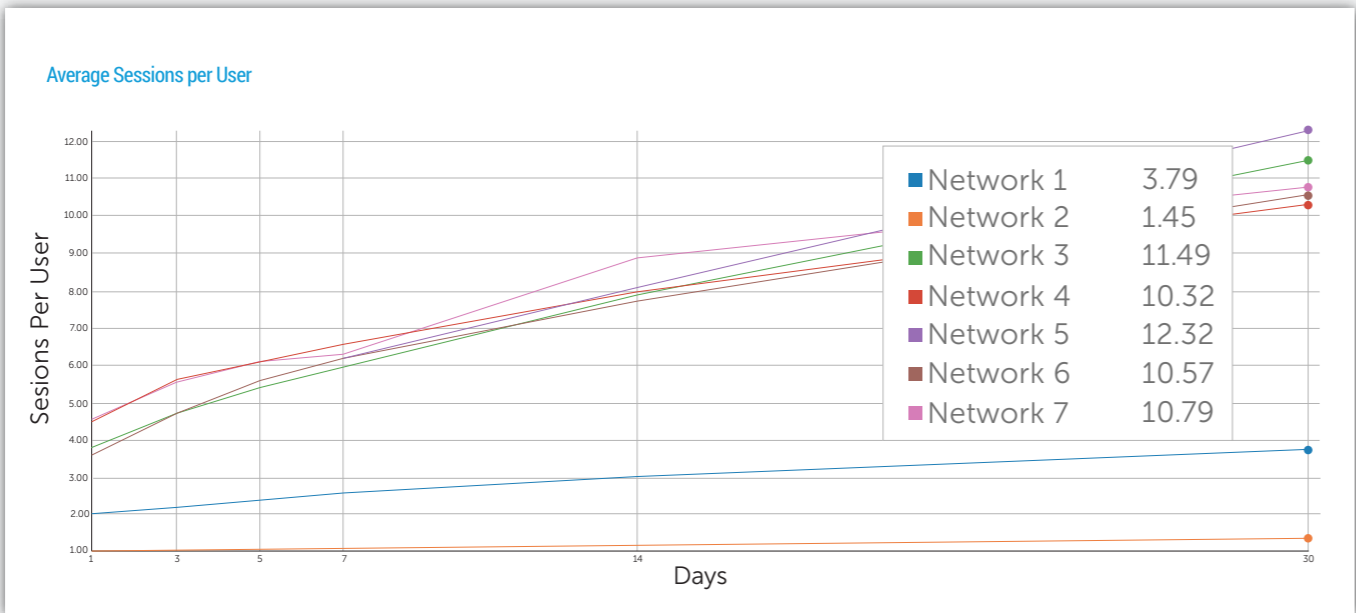
which allows us to analyze which network delivered users with the highest average sessions per user over time.

Unlike retention, the metric is calculated per different timeframes, which represent the first X activity days per user, and then accumulated among all users (that’s why the graph points up).

What can we learn from the graph?

- Networks 1 and 2 underperform - consider removing these
- Network 5 growth (purple) is most impressive and constant over time - budget increase can make a lot of sense here
- Network 7 (pink) line loses its curve from day 14, meaning engagement is dropping. Perhaps a retargeting campaign before day 14 can help maintain the curve in the long run.

Chart 2: Cohort Report



LTV vs. CPI - One Formula to Rule Them All

If we had to sum up a single formula of success in mobile advertising, this would be it:

$$LTV > CPI$$

The bottom line is that, if your users generate greater value over time (spend or engagement, depending on your goals) than what you invested to acquire them, you're doing something right. Remember, this takes time! Sometimes even months to break even.

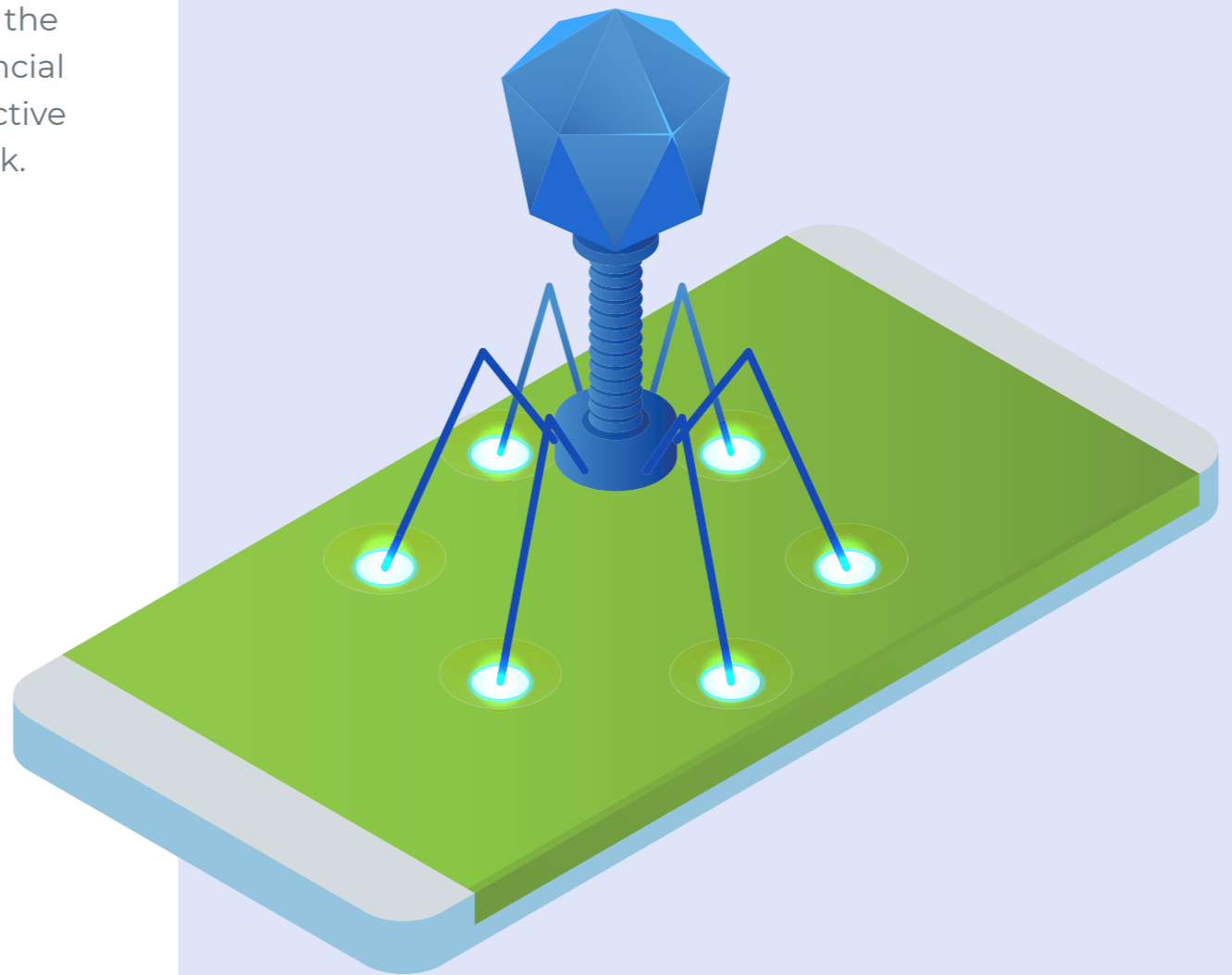
This formula factors in a lot of what we've discussed: acquiring the best users in the first place and then maximizing the value of the existing ones.



Chapter 3 | Fraud

Fraud is a pervasive and inevitable challenge in mobile - preparing your app's infrastructure for potential attacks now before they become a problem will pay off big time in the future.

The [latest study](#) by AppsFlyer on the global state of mobile fraud showed 30% more fraud in Q1 2018 compared to the previous year, hitting roughly \$700-800 million of financial exposure across all verticals worldwide. No doubt, effective fraud protection is a must have in your marketing stack.



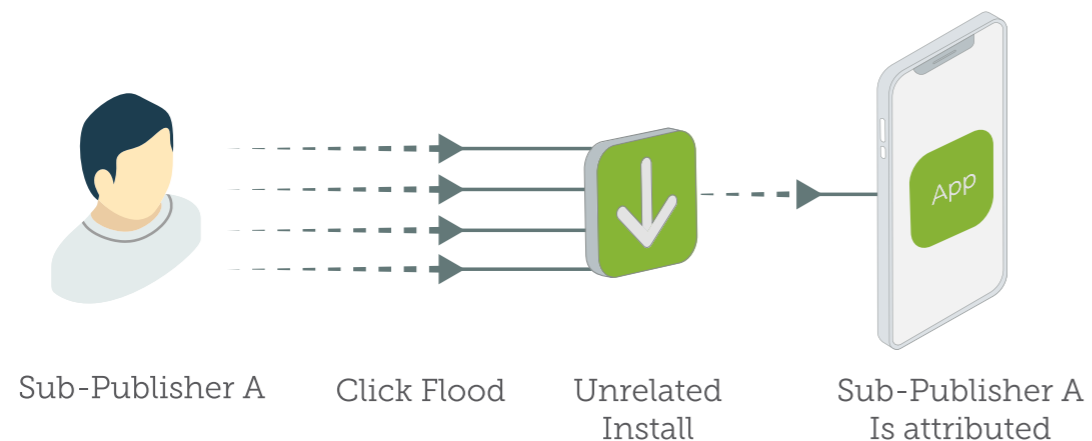
Types of Fraud

In the past several years, we've seen app install fraud come in waves as part of a game of cat and mouse, or to be precise a high stakes arms race between fraudsters and protection solutions.

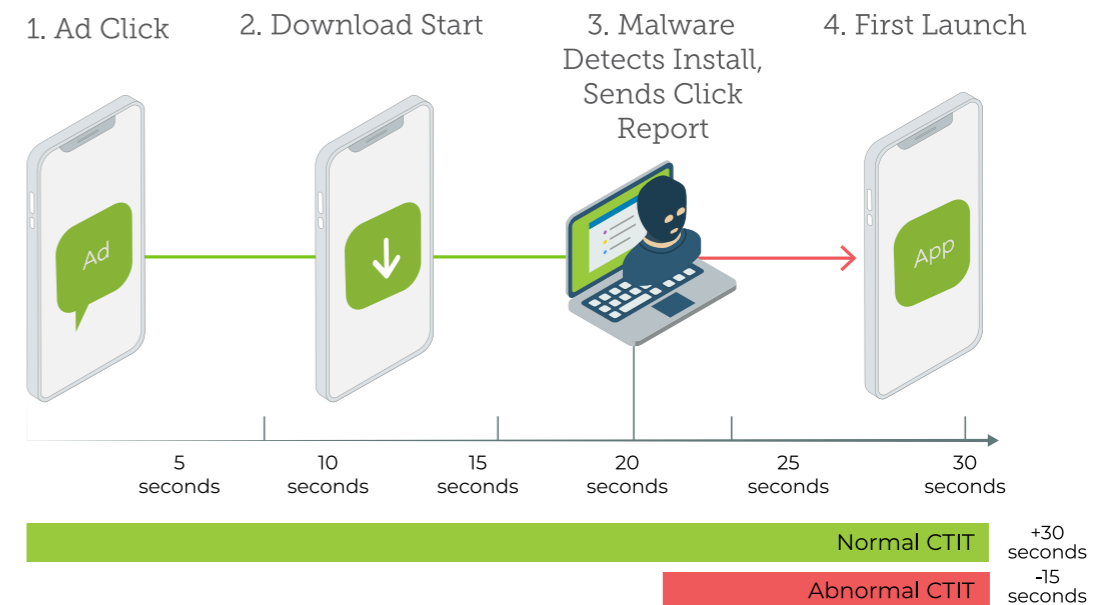
In general, fraudsters schemes can be divided into two: faking users or hijacking real users.

Real users:

- **Click flooding** - In click flooding, fraudulent publishers send a “flood” of false click reports to a massive amount of devices, hoping to randomly get credit for an install (organic or non-organic) that follows.

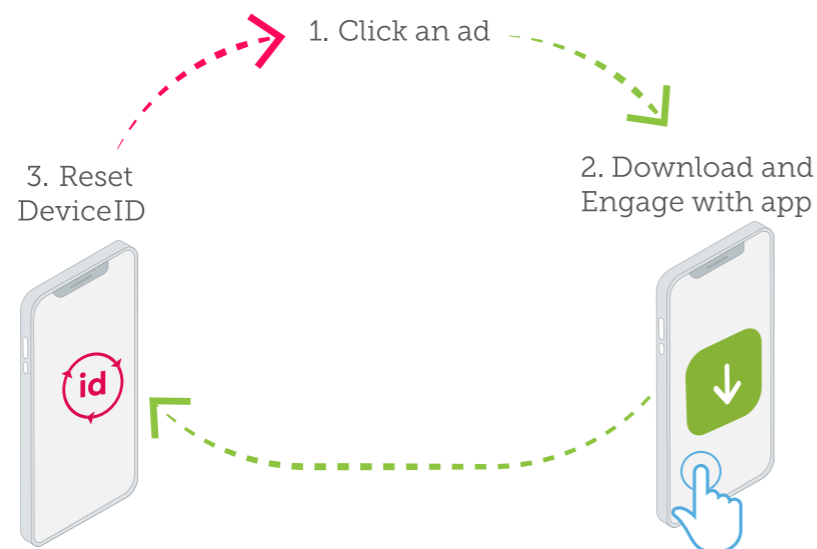


- **Install hijacking** - Install hijacking is a type of fraud that uses malware to game attribution platforms. Because attribution only occurs when the app is opened for the first time, a false click report is fired as soon as a download starts, thereby becoming the last click.



Fake users:

- **Bots** - Bots are malicious code that run a set program or action. While bots can be based on real phones, most bots are server-based. Bots aim to send clicks, installs and in-app events for installs that never truly occurred. As bots and malware have become more advanced, some have developed the ability to simulate actual user patterns — making them harder to detect.
- **Device farms and device ID reset fraud** - Device farms are locations full of actual mobile devices clicking on real ads and downloading real apps, hiding behind fresh IP addresses and resetting their DeviceIDs to avoid detection.



A new wave of fraud from device farms now uses emulators rather than physical devices. An emulator is just software; it enables fraudsters to generate endless variations — whether device IDs, phone settings — again, making this fraud harder to detect.



The Face of Effective Fraud Protection

Because of the ways in which fraudsters continue to adapt to new technologies and initiate their increasingly advanced attacks in waves, effective fraud protection should not only be able to keep up, but stay ahead with the following two ingredients:

1. Massive cross-network scale with significant, complementary market penetration
2. Machine learning to pull actionable insights from the data. Even more, a provider's fraud solution should focus primarily on blocking but also include post-install detection when real-time blocking is not possible.

These qualities, paired with multi-touch attribution capabilities and a secure SDK, will make it much harder for fraudsters to attack... and win.

Read more information about fraud and the protection technology available [here](#).

Final Thoughts

The mobile revolution is in full swing with the number of competitors (of even a single app) reaching into the hundreds and even thousands. To survive in the intense mobile jungle, an app should not only deliver a superior user experience, but invest in both paid campaigns - acquisition and retargeting - on top of granular data measurement and ongoing optimization to ensure success.

It's no longer enough to rely on app store discoverability in a landscape where organic installs are on the decline and organic search is largely broken. What is required is a mix of organic and non-organic installs to drive traffic and ensure that the users who reach your app are engaged and converting. That is, the focus of mobile app marketing has shifted from volume to value, emphasizing high lifetime user value and retaining active users over time above scale and installs.

Linking it all together, an advanced attribution analytics platform is a must-have component in a marketer's tech stack. It can help you reach these goals by connecting the fragmented mobile ecosystem and properly identifying users, while tying attribution to post-install events to achieve the highest possible ROI on your advertising campaigns.

So here's the bottom line: the mobile industry is fierce, but informing mission-critical strategies and processes with decisions driven by the data laid out above will give you the competitive edge you need and point you in the direction of success.





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About the Author

Jillian Gogel is the content marketing manager at AppsFlyer. She is passionate about solving tough communication problems and creating sustainable relationships between partners, marketers, and clients through data-driven content. You can follow her on [LinkedIn](#).

About AppsFlyer

AppsFlyer's technology is found on 98 percent of the world's smartphones, making it the global leader in mobile attribution and marketing analytics. Data-driven marketers trust AppsFlyer for independent measurement solutions and innovative tools to grow and protect their mobile business. With Facebook, Google, Twitter, Pinterest, Snap Inc., Tencent, and 4,600+ other integrated partners, and clients including HBO, Waze, Alibaba, Skyscanner, Activision, and 12,000+ leading brands worldwide, AppsFlyer has 15 global offices to support marketers everywhere. To learn more, visit www.appsflyer.com.