

Google Analytics for mobile apps shutdown: Analysis of the implication of switching to Google Firebase.

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1 Introduction

Monitoring and analyzing the usage of digital products is important, as it allows the publisher to find out how the product is used and improve it based on the behavior and interests of their user to achieve higher user satisfaction and a higher profit. One of the biggest segments for user tracking are websites. In 2018, only 6% of bloggers stated that they do not have access to analytics (Crestodina 2018). Additionally, more than 40% report strong results if they always check their data. This can be explained by the insights the blogger get into the behavior of their readers (Crestodina 2018). That is why analytics is also becoming more important for mobile applications (Parate, Jain, and Kim 2016). In 2017, more than 45% of apps on the App Store and Google Play used an analytics SDK (Appfigures 2017).

1.1 Googles Frameworks

Due to the high potential and demand for analytics, many commercial solutions exist. Google offers two products for analytics: Google Analytics and Firebase analytics. In the following sections, we will discuss the different histories and goals of Google Analytics and Firebase as this influences how they are designed and structured, both conceptionally as well as technically.

1.1.1 Google Analytics

The foundation of Google Analytics was bought by Google in 2005. This was used to create a platform to track the website activities of users. Currently, Google Analytics is the most popular analytics tool for websites (W3Techs 2019). Later, Google expended the service for mobile applications by providing an SDKs for the two major mobile platforms, iOS and Android.

Currently, Google offers two plans (Google, Inc. 2019b). The free plan, called Analytics, has some limitations in the amount of data that can be collected, the reporting and analytics options are limited and some integrations with other Google services (e.g. Google BigQuery), which allows more advanced reporting are not available. The paid plan, called Analytics 360, does not have these limitations and has a Service Level Agreement. Therefore, Google recommends Analytics 360 for large enterprises.

1.1.2 Firebase Analytics

Firebase was developed by Firebase, Inc. since 2011 as a platform for mobile app development. More specifically, they created products to create real-time apps starting with a real-time database. Later in 2014, Google acquired Firebase and integrated multiple of its

products into Firebase and extended the products (Tamplin 2014). Google probably bought Firebase intending to replace the mobile sector of Google Analytics (Linhart 2016).

As of today, Google promotes 17 products on their website, grouped into the three categories **Build better apps**, **Improve app quality**, and **Grow your business** (Google, Inc. 2019f). Originally, the Analytics product was only called **Analytics**. However, later it was rebranded to **Google Analytics**¹. Since the name is indistinguishable from the original Google Analytics, this paper uses **Firestore** for the whole service and **Firestore Analytics** for the Analytics product in Firebase to differentiate these from Google Analytics. **Firestore Analytics** is part of the last Category, thus **Grow your business** (Google, Inc. 2019f).

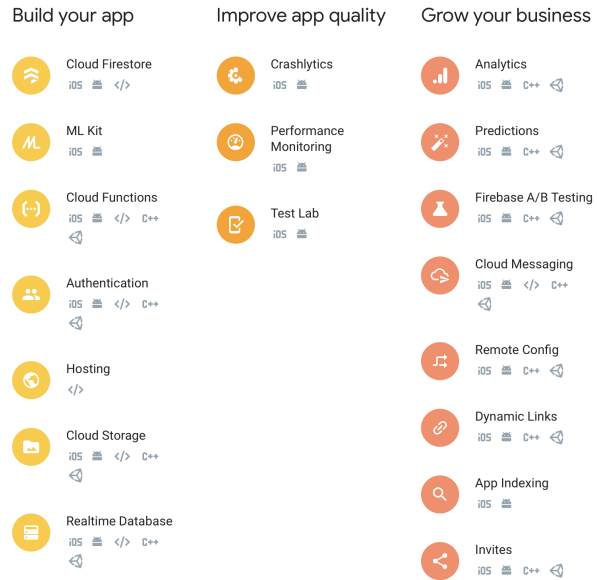


Figure 1: Firebase products overview (Google, Inc. 2019d)

1.2 Google Analytics shut-down

Recently, Google has decided to shut down Google Analytics for mobile apps. Because of this, app-owners using this platform with the free plan received an email as shown in section A.1.

The email states that Google "will begin to sunset [their] Google Analytics for mobile apps reporting and the Google Analytics Service SDK" (Ahava 2018). The data collection will stop on October 31, 2019. After that, all data will be accessible via the website and API until January 31, 2020. Initially, only customers with the free plan will be affected but all Analytics 360 customers will be affected at a later point in time (Ahava 2018).

In the email, Google recommends using **Firestore Analytics** in the future as an alternative to continuing collecting analytics data.

¹Sometimes Google still uses just **Analytics**. Their documentation overview uses the old name as shown in figure 1 (Google, Inc. 2019d) while the product overview uses the new name (Google, Inc. 2019f).

1.3 Goals of this paper

This paper will analyze the transition from Google Analytics to Firebase Analytics. As Google Analytics was originally designed for websites while Firebase and Firebase Analytics are new products specifically designed for mobile applications, we will first look into the different requirements of websites and apps for an appropriate analytics tool so that we can then analyze how these app requirements were met with the for websites designed tool Google Analytics and what changes are necessary to switch to the for apps designed tool Firebase Analytics.

1.4 Non-goals of this paper

This paper will not compare or evaluate different analytics tool for mobile apps or websites. Also, this paper will not analyze the process of deciding on one tool. The scope of this paper is limited to Google Analytics and Firebase Analytics as a current example of two tools. The decision for these tools is only based on the required changes for all apps using Google Analytics.

2 Analytics for mobile

As stated in the introduction, analytics services were first used for websites. Later, mobile app developers also started to collect user activity data and used the existing tools created for websites and used them for their apps. This is an understandable decision as the infrastructure, including the existing APIs, servers and reporting tools, already exists and can be reused for a comparable product.

However, apps and websites have different requirements when it comes to analytics. Integrating an analytics tool is an investment and can dramatically change the success of a product, both a mobile app and a website (Parate, Jain, and Kim 2016). To create a successful product, the users' needs have to be understood. These tools can give insight into what users want so that the product can be adapted accordingly. Therefore, these differences should be addressed when deciding for and integrating an analytics tool to make the most out of the collected data. The different requirements can be directly derived from the two major differences in the usage of websites and mobile apps.

2.1 Context

One major difference is the context in which websites and apps are used. Websites are mainly accessed in a session. The user enters the website and tries to reach a goal in that session. In

many cases, there is no user login or other authentication. Apps on the other hand apps are much more user-focused. A user has to install the app first on a device. From that point on the user can use it multiple times until the app might be uninstalled by the user. The single sessions do not play a major role for mobile devices as a user can suspend an app multiple times during the usage for example because a new text message is received. Suspending and resuming an app are just two kinds of events that can be tracked for the user.

2.2 User interaction

The second difference is the kind of interaction which is used. The main components of a website are the webpages. The user interacts with the website by navigating between different pages most of the time by clicking on different elements. Traditionally, the only interaction on webpages were forms. These can be filled out and submitted. In recent years more interactive websites became popular. For example, the WebSocket protocol, which was first standardized in 2011 (Fette and Melnikov 2011), allowed a continuous connection between the client and the server so that content can be loaded during the usage of a webpage. But this kind of websites only represent a small portion of all websites and most web analytics tools were created earlier. Therefore, these tools still focus on page-based websites.

Apps are less focused on pages. Instead, the user stays on a web-page-equivalent user interface and could have many ways to interact with the content. Many apps make use of gestures to initiate events. Common gestures used in most apps include pull-to-refresh to update the current set of data or swiping on an element to delete it. This makes the content of a page in the app highly dynamic and interactive so that just tracking the visited pages limits the insights in the behavior of users as it is more important how the user interacted with the app.

Additionally, completely different ways to initiate tasks might be available to the user as modern mobile operating systems offer more complex interfaces to allow the user to interact with apps, for example, iOS includes the option to simulate a file system the user can interact with. These kinds of interactions do not fit into the page concept at all as the app only receives events like listing the content of a directory or deleting a file. To track these kinds of user interactions the page-based approach is unsuitable although it is highly important to include this in the analysis to get a complete picture of the user interaction. Implementing and maintaining these user interactions is expensive and therefore it should be analyzed whether they add value to the app and how the user profit from them.

2.3 Summery

In the following table 1, the differences in the context and user are summarized.

	Context	User interaction
App	Session	Web Pages
Website	User	Events

Table 1: Comparison of the requirements for an analytics tool.

Due to the differences, websites require an analytics tool which is session and page focused while an app requires one which is user and event focused (Nabler Marketing 2017) if one wants to achieve a good tracking coverage and useful data. However, you have to keep in mind that the requirements are not true for every app or website. Some websites that are highly event-driven and apps that only use static pages. Therefore each app or website should be analyzed and a detailed tracking plan should be created and documented first as their might be different requirements. These requirements might also influence which of the many existing tools should be used (Appfigures 2017; 42matters 2019). But still, the requirements above are true for the majority of apps and websites.

3 Switching

In this section, we will look into the required changes, both the conceptual changes and technical changes which are required during a switch from Google Analytics to Firebase. Also, we will look at new opportunities that will be possible with a switch to Firebase and some limitations that come with Firebase.

3.1 Conceptual changes

As indicated in section 2, the biggest conceptual change is moving from a session and page based tracking framework to a user and an event-based one.

On one hand, switching from user to session-based tracking is quite easy, when using the frameworks provided by Google, as these frameworks abstract those and there are no changes necessary. There might be some changes required for the reporting but in general, they do not differ much on a conceptual level and the implementation was already done by Google.

On the other hand, switching from page-based tracking to event-based tracking requires more work. If a tracking plan for the app in question already exists, it must be adapted, otherwise, the first step should be to create one (Alowaisih 2018). This analytics plan should not contain a list of pages or screens anymore. Tracking those will happen automatically and

is a natural side effect and not the focus anymore. Instead, all the events that the user can trigger or encounter should be included. How they can be structured depends on the app. For example, an app that mainly consists of workflows (e.g. shopping: add an item to card → increase quantity → select predefined payment options → accept terms → buy), it is a good idea to analyze those and structure the events accordingly. Analyzing and documenting the events helps to create a consistent data basis which will increase the quality of reports later.

Additionally, make sure to use the default events provided by Firebase (Google, Inc. 2019c). Currently, there does not seem to be special handling for those events but it is expectable that Google will implement reports targeted for these events as it would not make sense to define these lists and advice developers to use them. Moreover, these lists can be used to get an idea of what kind of event can or should be tracked. As every app is different and has varying requirements, one should take the time and analyze an app and not only use the standard lists from Google or other sources (Alowaisih 2018).

Another big change is the user interface of Firebase. Compared to Google Analytics, it is currently very limited and most of the reporting tools are not as powerful. To achieve more advanced reports, other tools like BigQuery must be integrated and used to analyze the collected data. There will probably be some improvements on the user interface especially because the user number will increase with the shutdown of Google Analytics for mobile apps (Tamplin 2014).

3.2 Technical changes

In this section, we want to outline the necessary technical changes required to replace Google Analytics with Firebase Analytics and show some implementation details. We will look into the implementation of tracking different screens a user visits and tracking event. Due to the huge similarities of the Firebase SDK interface design on the different platforms, we will rarely differentiate between the platforms in the following sections.

3.2.1 Tracking screens

In contrast to Google Analytics, Firebase Analytics tracks screen views automatically. To do this, Firebase tries to infer a useful name for the current screen. On iOS, the framework uses the class name of the current view controller while on Android the class name of the current activity is used.

Because Firebase is not focused on screens anymore, this information is used differently. On the one hand, a new event `screen_view` will be tracked. These events contain properties

for the previous and the current screen name, screen class, and a screen id. This replaces the old screen tracking of Google Analytics while integrating it in the new event-based approach.

On the other hand, the screen name, screen class, and screen id will be attached to all following events as parameters until the user changes the screen again. Therefore it is possible to track the same event for similar actions on different screens. For example, it is possible to track an event `delete_item` both on a screen with a list of items as well as a screen displaying the details of an item.

The automatic tracking is a useful feature as it makes sure that every screen is tracked and therefore a users journey through the app is plausible afterward. However, in many cases, custom names are preferred and should be used. The technical class names often have a suffix like `ViewController` or `Activity` which is not useful when analyzing the usage of the app. Therefore, the framework offers multiple ways to overwrite the screen name to fit the architecture of your app. Overwriting these names is especially useful when switching from Google Analytics. On the one hand, the app already has the infrastructure to set screen names and on the other hand, the custom names used with Google Analytics were used in the past in reports so that everyone working with the reports is familiar with these names.

3.2.2 Tracking events

Events are the main concept used in Firebase (Linhart 2016). As described in the previous section, even screens are tracked using events. Besides screens, there are 26 other events which are tracked automatically by Firebase. Some of them – specifically 6 – are only tracked on Android devices due to the lack of data on iOS (Google, Inc. 2019a). The automatically tracked events include events regarding ads displayed with AdMob via Google Mobile Ads SDK, in-app purchases and subscriptions, app installations and installations as well as notifications send with FCM². These events only cover the very basic usage of an app and are not sufficient to gather any useful information. Therefore it is crucial to implement the events defined as in section 3.1 to leverage the power of the new event-based approach.

3.2.3 User properties

User properties are metadata about users. They are collected for each user and can be used to filter events later. Some properties are automatically collected by Firebase, like gender, country, and language. Additionally, up to 25 user properties can be defined for all installations of the app. These can be used, for example, to distinguish between paid and

²Firestore Cloud Messaging is aside from Analytics another product in Firebase which allows sending push notifications to apps on different platforms.

free users. User properties cannot be deleted once they are tracked so that only important properties should be included to make sure to have user properties left for future changes.

3.3 Opportunities

As outlined before in section 1.1.2, Firebase is not only an analytics tool but a collection of different tools. Google describes Firebase Analytics as “the heart of Firebase” (Google, Inc. 2019e). One of the key capabilities of Firebase Analytics is audience segmentation which allows creating a group of users. These groups can be automatically created based on user properties and events. After that, the custom audiences can be used in other Firebase tools. This includes FCM which allows sending a notification to an audience and Remote Config to which allows enabling and disabling specific features for an audience (Linhart 2016).

3.4 Limitations of Firebase Analytics

The new Firebase Analytics comes with a set of limitations, especially when compared with Google Analytics 360. Most of these limitations are easy to overcome when one is aware of them (Klymenko 2018). However, some of them could prevent the use of Firebase for an app with a huge user base so that a different tool from a competitor has to be used.

3.4.1 SLA

Firebase has two paid plans but Firebase Analytics is always free and does not have a paid plan. Also, there are no announcements for such a plan, yet. Therefore, Google does not offer any support plans which might be a requirement for many companies. The only support offered by Google as of now is the documentation (Google, Inc. 2019d) which includes a complete API reference for all supported platforms and so-called Codelabs (i.e. guided tutorials) for most platforms.

Additionally, there are many resources, including blog posts, articles, and answers on discussion boards, created by the community which can be found online. Even Google recommends using these resources in their blog (Stevenson 2018). But still, there is no liability from Google. Therefore Firebase Analytics is not yet an option for many companies and explains why Google does not shutdown Google Analytics 360 yet. However, their strategy is to move all apps from Google Analytics to Firebase and therefore a paid plan with SLA for Firebase Analytics can be expected.

3.4.2 Collection limits

As described before, Firebase analytics has two main concepts for tracking: events and user properties. Of course, some collection limits apply to those.

User properties For one app instance³, a maximum of 25 user properties can be collected. Each of these consists of a key with at most 24 characters and a numeric value or string value with at most 36 characters. All of these limitations should be enough for most apps. However, user properties cannot be deleted after they were tracked once. So this limit should be kept in mind during the decision which user properties should be tracked.

Events Additionally, for one app instance a maximum of 500 distinct events can be tracked. Each event name has a maximum of 40 characters and has up to 25 parameters. Each of these parameters consists of a key with at most 40 characters and a numeric value or string value with at most 100 characters. Again, the distinct events cannot be deleted anymore, so you have to be aware of this limit during the design phase of your analytics implementation. The other limits should not be a problem either as long as they are kept in mind while defining the events.

Google Analytics comparison Google Analytics allows more parameters, the parameter names are allowed to be longer and the parameter values can be more complex data structures like dictionaries. In most cases, the length limitations should not be a problem during normal usage although the limit has to be kept in mind especially when moving from Google Analytics to Firebase because longer keys worked there.

4 Conclusion

Google replaces the mobile section of Google Analytics with Firebase. Due to the shutdown of Google Analytics for mobile apps, every app that still uses this service for analytics has to be updated. One reasonable option now is to switch to Firebase, Googles new mobile-optimized analytics service. There are of course many other alternatives which should be evaluated first (Appfigures 2017; 42matters 2019). As described in section 2, the first step for a successful switch should be creating a detailed tracking plan or analyze the existing plan. This step should not be skipped, because it will dramatically influence how the data can be used afterwards. After that, the technical implementation should be relatively straight forward.

³An app instance is one project created in the Firebase console

5 Outlook

Firebase Analytics will probably evolve in the next years. There are still some features missing and some of the limitations outlined in section 3.4 do not fit for customers with Google Analytics 360. As discussed in section 3.4.1, it is foreseeable that Google will shut down Google Analytics 360 for mobile apps as well so that there will probably be a paid Firebase Analytics version as well in the future.

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A Appendix

A.1 Email from Google regarding the shutdown of Google Analytics for mobile apps

Dear Google Analytics customer, You are receiving this email because you are in the first wave of customers who have been identified as users of the older style of Google Analytics for mobile apps reporting and the Google Analytics Services SDK. Specifically, we are notifying you regarding your Google Analytics property(ies) (, ID: UA-XXXXXX-YY:).

We want to let you know that in October 2019 we will begin to sunset our Google Analytics for mobile apps reporting and the Google Analytics Services SDK. We are investing our resources in the latest style of app reporting in Google Analytics that works in conjunction with Firebase – Google’s integrated app developer platform. As such, the following will take place:

- In 2019, we will begin to decommission properties that receive data exclusively from the Google Analytics Services SDK.
- Data collection and processing for such properties will stop on October 31, 2019.
- Reporting access through our UI and API access will remain available for these properties’ historical data until January 31, 2020.
- After our service is fully turned down, these properties will no longer be accessible via our Google Analytics UI or API, and their data will be removed from Google Analytics servers. You will receive further notification when this time nears.
- At this time, no Analytics 360 properties are impacted by these changes.

We want to give you plenty of time to make the transition. The good news is that the latest solution using the Firebase SDK is even more intuitive and includes free and unlimited event reporting to meet the needs of app-centric businesses. We’ve invested heavily to make this solution best-in-class, with new features and capabilities rolling-out continually. Additionally, our offering is closely integrated with other Google products and features to help grow your app business like Crashlytics, AdMob and Remote Config.

Getting started with our latest app reporting features is simple and straightforward. Here’s how. For additional information on our new Google Analytics app reporting, visit the Help Center.

Thank you,

- The Google Analytics Team