

# Optimize Mobile KPIs with User-Centered App Metrics

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## Mobile lives between life's moments

Your mobile business success depends critically on a strategy that is user-centered. Nearly 30% of consumers indicate that they will consider leaving a brand solely due to a poor app experience.<sup>1</sup> Mobile users' attention spans are short and instant gratification is the expectation. They demand to get what they want, in the moment, wherever they are. More than 65% of smartphone owning adults in the US access online resources while in the car, 63% while shopping, 42% while on public transportation, and almost 50% admit to being online while in the bathroom!<sup>2</sup> User interactions on mobile differ from those on the web because mobile users are on the go – their interactions are often very short and very goal-oriented. User satisfaction means delivering an experience that always works for them on-the-fly between the other moments of their lives.

Your users' experience with your app depends on how well the flow of the app enables a user to achieve his or her intent. User-centered design is not new and much has been written about the importance of a problem-free, responsive, mobile app. But the metrics typically measured as indicators of mobile success – acquisition, retention, time in app, and so forth – are on their own not measures of user experience. In most cases, these metrics measure end results. The following paragraphs focus on this challenge and provide a framework for thinking about app metrics and benchmarks that impact user experience and, in turn, drive the end results of your mobile business.

## Mobile Business KPIs are Driven by App Metrics

Organizations typically measure their mobile progress by tracking business oriented Key Performance Indicators (KPIs) such as new customer acquisition, engagement, churn, and revenue. These business metrics are themselves based on a set of more fundamental measures. For example, “customer acquisition” is often measured as a count of app installs over a period of time. Similarly, session time – the amount of time spent within the app – is often used to estimate “engagement.” On the development side, crash rate (the number of times the app crashes divided by the number of times the app is launched) has become the de facto metric for the app's reliability and performance. None of these metrics, with the exception of crash rate, ties directly to the user's ability to satisfy a need or desire as the user interacts with your business via your app.

To gain a truer picture of what drives your business KPIs on mobile, you need the “why” behind the “what.” Clearly, measuring crash rate alone is insufficient. To succeed, you must monitor a broader set of metrics and you may need to hold your app to a higher standard than you might think.

## What app metrics should you monitor?

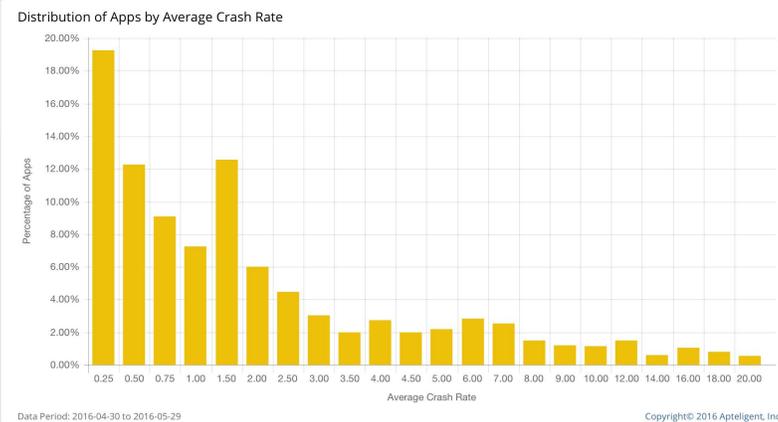
Consider this basic framework that categorizes issues with your mobile app from the user's perspective:

1. **Failure:** the app crashes, freezes, or an error prevents completion of a user's flow in the app and there is no workaround.
2. **Frustration:** the app is slow to start, operations are much slower than expected, or a key operation fails but can be retried.
3. **Annoyance:** the app drains battery noticeably faster than others or an operation sometimes takes longer than expected.

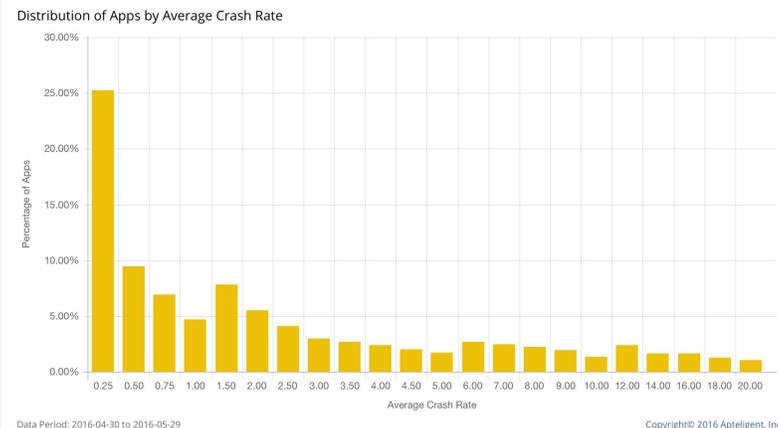
At a bare minimum, you must monitor for app "failures" like crashes and freezes – these are unexpected issues that are front and center to your users. Nothing will convince a user to abandon your app faster than these failures. The best apps have crash rates of 0.25% or lower (measured as a percentage of app launches). Approximately 75% of all apps across iOS and Android platforms do not meet this standard.<sup>3</sup> User interface freezes are similar to crashes in that they prevent the user from continuing a flow within your app. Accordingly, you should target a low incidence rate for user interface freezes similar to that of crashes. If your goal is to deliver a market-leading experience to your users, your tolerance threshold for "failures" should ultimately be no higher than 0.25%.

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### IOS



### Android

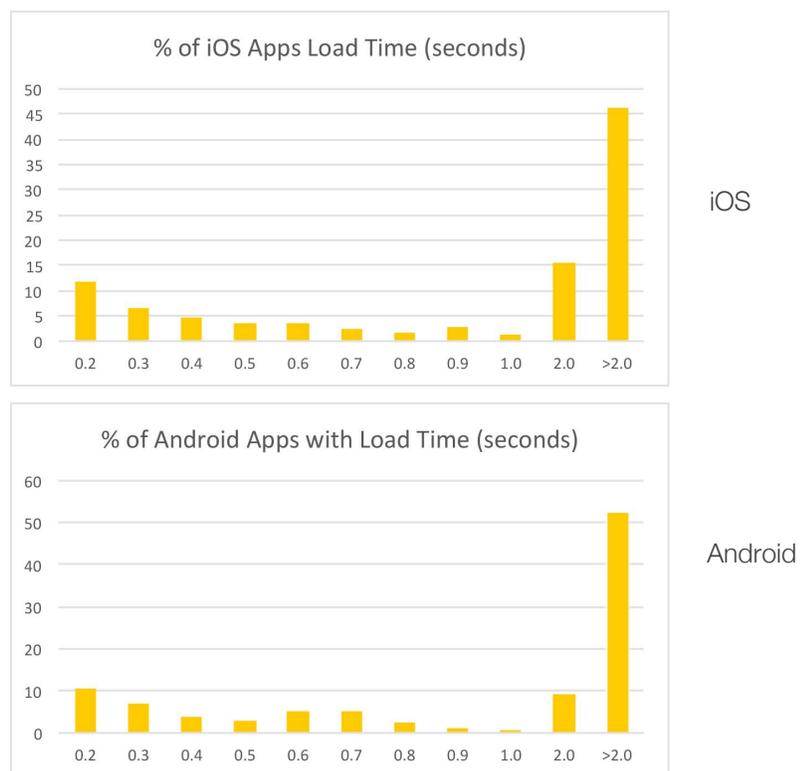


Other data suggests the bar should be set higher, finding more than half of users expecting load time to be two seconds or less.

“Frustration” and “annoyance” issues are often trickier because their impact on user experience depends on both the severity of the issue, and crucially, where the issue occurs in the app’s intended flow for the user. This means you must monitor potential issues in your app to which you are probably currently blind. Start by monitoring the time it takes to access the visible and important user flows (how customers typically journey through your app). Address “frustration” and “annoyance” by giving priority to flows that align strongly with user intent. To do this effectively, you will at a minimum need to understand these flows and measure their performance by geography, OS version, and device. If the flow depends on connectivity to a third-party or back end service (e.g., “search”), you will also want to understand how your users get connectivity (cellular or WiFi), which carriers are most important for your users, and how the quality of carrier service impacts the experience of using the app.

First, once the app has been installed, your user’s first intent is to open the app. App load is common to every app and therefore should be first on your list of user flows to monitor.<sup>4</sup> Fully half of consumers consider app load time a source of frustration and almost 25% would leave a brand if they found the app load time unacceptable. In a 2015 survey, almost 70% of users indicated that load time should be less than six seconds – and 36% demanded it be under three seconds.<sup>5</sup> Other data suggests the bar should be set higher, finding more than half of users expecting load time to be two seconds or less.<sup>6</sup> It is clear that slow app load times can lead to app abandonment, affecting both new and current users. Accordingly, you should monitor it as it is a key metric that directly ties and app performance metric a business result. Aptelligent data shows that 46% of iOS apps and 53% of Android apps globally across all categories take more than two seconds to load.<sup>7</sup>

Distribution of Apps by App load (iOS and Android)]



Once you have a measure of the user's first interaction loading the app, your next priority for monitoring "frustration" issues is to instrument monitoring of the flows in your app that align strongly with user intent once the session has started (pressing the "Checkout" button for example). Important flows found in many apps – such as Login, Browse, Search, and Checkout, to name a few – typically depend on off-app services to get data from a server. These third-party and internal back end services are often the root-cause of user-visible app issues. Service-backed flows introduce complexity. The performance of the service itself, the type of connectivity (cellular or WiFi), differences across carriers (Verizon, Orange, AT&T, T-Mobile, or one of many hundreds of others globally), and finally the service quality available in the user's location all can have a profound impact on the user's experience. Unless you have visibility from the point of view of the end user and the device in his or her hands, you really don't know what experience your app users are enjoying (or not enjoying!).

Unfortunately, the latency and reliability of third-party services varies from one provider to another and also by geography. Their performance isn't in your control, but monitoring key third-party services – *from the perspective of your users* – can provide important insight into the drivers of your business KPIs. For example, that dip in engagement you saw last week in Europe might be related to a third-party service outage in the region. Your app can "see" the issue as the user sees it – your IT department most likely cannot.

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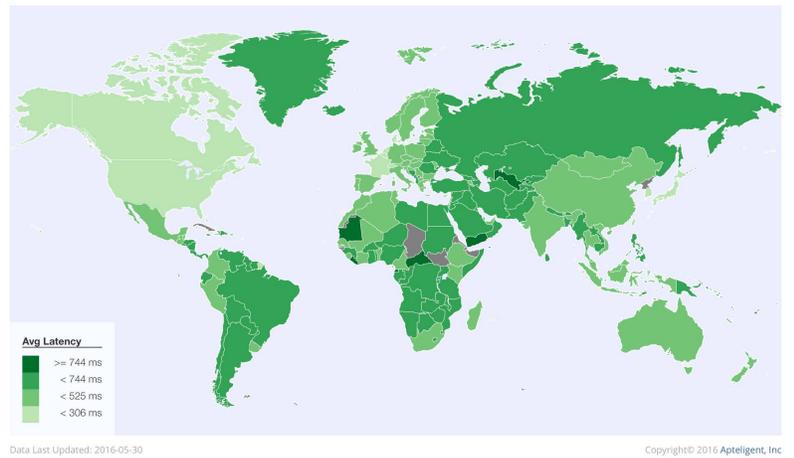
Benchmarks of Top Cloud Services

	Facebook	Google-analytics	DoubleClick	Apple	Flurry	Scorecardresearch	Amazonaws	Gstatic	Urbanairship	2o7
<b>Avg Latency (ms)</b>	631.40	152.67	391.25	546.05	1092.96	281.77	348.44	345.11	685.96	280.45
<b>Avg Error Rate</b>	1.75%	0.09%	0.10%	0.57%	0.63%	0.14%	0.27%	0.10%	1.25%	0.26%

Data Period: 2016-04-14 to 2016-05-13

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Similarly, the presence, type, and performance of your users' connectivity can impact their app experience. If a primary use case for your app occurs while your users are traveling, then monitoring your app's behavior under intermittent connectivity is important. Most likely, your app is used or will be used at more than a single intersection of latitude and longitude. Carrier latency rates varies widely across the world and carrier latency varies widely from WiFi latency. This can directly affect the likelihood that a user flow succeeds and will directly affect how long it takes. Understanding the context of how your users connect will enable you to optimize their experience.



Average Carrier Latency by Country



Average WiFi Latency by Country

As with the earlier example of an app being used during travel, the user flows that are key to your app will depend on your app and how your users engage with it. In an m-commerce app, searching, selecting and placing items for purchase into a shopping cart, and then completing payment and checkout may be the key flows. In a hotel app, checking in, locating the room, and unlocking the door might be the key flows. Remember, the user is setting out to undertake an often simple task – and each interaction is expected to take place quickly and without complication. Your app must enable them to accomplish their goal without getting in the way.

Now that you are measuring key issues and tracking the most important user flows in your app, how should you think about setting performance targets? One typical approach is to benchmark yourself against your category and then set your standards a nudge higher than your competitors. But is that enough to meet user expectations?

## User-centered app metrics

In his article [Powers of 10: Time Scales in User Experience](#), Jakob Nielsen describes research-based time-frames that are basic to human perception. These will influence how users perceive your app. To summarize his article and place it in the context of mobile app experience, if the user expects:

- an operation to be instantaneous, then it should take no more than 0.1 second
- the app to be “working” on their behalf, then the operation should take no more than 1.0 seconds; if it takes longer, the user’s flow of thought is interrupted and the user begins to get impatient

When you tap a button within an app on your mobile device, for example to enter a phone number, you expect an instant response. If there is any perceptible delay, you will likely tap the button again. When you tap on an app icon to start it or tap “Go” to confirm a search, you expect the app to take a little bit of time. You likely are not put off by a delay of a second. But if it takes much more than one second, you begin to get impatient. As the time it takes for a “working” operation increases in your app, so increases the population of your users experiencing frustration when they have to try the operation again. Worse, an increasing number of users will abandon the operation, and potentially abandon the app itself over time.

Let’s apply these research-backed insights to some common app interactions and the acceptable times for them to complete, from the perspective of your users. Your particular app may have different flows but these provide a good reference for thinking about user expectations for common interactions.

Operation	User Expectation	Time
App load (time to availability of first user-interaction)	App is “working”	1.0 s
Login (not including data entry)	App is “working”	1.0 s
Registration (not including data entry)	App is “working”	1.0 s
Search	App is “working”	1.0 s
Screen transitions	Immediate	0.1 s
Browse	Immediate	0.1 s
Add to shopping cart	Immediate	0.1 s
Checkout	App is “working”	1.0 s
Locate (e.g., locate store)	App is “working”	1.0 s
Barcode scan	App is “working”	1.0 s

Will all of your users abandon your app if you don't hit these targets? Of course not. However, some of them will abandon the operation they sought to perform – searching for a flight, viewing a shopping cart, loading a game at the bus stop – abandonment that costs you revenue and damages your brand. Some of them will stop using your app. The longer your app takes to deliver basic responses and the more friction your app creates for your users, the more you will lose.

Clever app designers and developers employ techniques that give the user feedback that things are happening even though the app is waiting on data, such as loading UI elements in a very specific, optimized order. These techniques often serve to mitigate the risk of perceived app slowness and can help to keep the user engaged. However, you must first monitor and identify issues in the flows of your app to understand where the app may be falling short of user expectations. This will allow you to optimize through redesign, improved user communication, or improved back-end service performance.

## Summary

The user's context has a direct impact on their experience. Where they are, what they are doing – these are variables that you cannot control. At a bare minimum, monitor for app “failures” like crashes, hangs, and exceptions.

In addition to app “failures”, cast a wide net to monitor potential issues in your app that impact business metrics to which you are currently blind. Start by monitoring the time it takes to access the visible and important user flows (how customers typically journey through your app). Address “frustration” and “annoyance” issues by prioritizing those flows which align strongly with user intent.

App load time is a key user flow because it is the entry to your app and has a direct connection to your business result through your abandonment KPI.

Design your app using assumptions about network performance using real data that measures latency and error rates in your most important geographical markets; for example, by building a seamless transition to a degraded but faster mode when latency increases.

To set app metric targets, you can use benchmarks for your app category and set your standards a bit better than your competitors. Even better is to recognize the insights of human perception research by setting metrics that meet or exceed your users' intrinsic stopwatches. When the user expects something to be immediate, your app should take no more than 0.1 seconds to preserve the user's impression. When the user expects your app to be “working,” it should take no more than 1.0 seconds to keep the user's attention and avoid building frustration.

Monitor these five key metrics. For excellence, hold yourself to these user-centered targets:

1. Crash rate of  $\leq 0.25\%$  (as a percentage of app loads)
2. User Interface Freezes  $\leq 0.25\%$  (as a percentage of app loads)
3. App Load Time  $\leq 2.0$ s to be “average”,  $\leq 1.0$ s to fully meet user expectations
4. Immediate operations (screen transitions, browse, add to cart ...)  $\leq 0.1$  s
5. “Working” user flows (app load, search, login, ...)  $\leq 1.0$  s

Network service interactions have a strong and unpredictable influence on app operations where the app is “working.” To ensure you are meeting your targets, monitor these from the user’s point of view (i.e., devices in users’ hands in the wild). Identify the services and network calls on which your most important user flows depend, then track the duration of the user flow and health of the underlying network calls over time and between app releases.

Ensure your metrics are constantly improving by trending your app metrics version-over-version, when internal infrastructure changes occur (e.g., new release of an internal API or back-end services), and when there are major ecosystem events (e.g., when a new OS is released). A user-centered view of app metrics trended over time will enable your organization to answer the critical “why” questions when there are changes to the “what” that your business KPIs provide.

For the most up-to-date statistics please visit <https://data.apteligent.com>

## Aptelligent

Aptelligent provides tools that empower mobile developers and product managers to troubleshoot, prioritize, and resolve issues that damage their users’ app experience. Developers get detailed, real-time information to find and resolve crashes, freezes, and issues in key userflows. Product managers and KPI owners get global mobile industry and competitive insight to better plan and focus their mobile initiatives, as well as real-time visibility to app metrics that enable rapid issue detection, prioritization, and release-over-release app improvement.

### Footnotes

1. “Software the New Battleground for Brand Loyalty”, Zogby Analytics, 2015, based on a survey of 6,770 consumers and 809 business decision makers in 18 countries.
2. “Mobile Moments Transform Commerce and Service Experiences”, Forrester, Julie Ask, March 29, 2016
3. Aptelligent research data as of April 2016, <https://data.apteligent.com>
4. App load time is the time between the user’s tap on the app icon to when the app becomes usable and interactive.
5. “Software the New Battleground for Brand Loyalty”, Zogby Analytics, 2015, based on a survey of 6,770 consumers and 809 business decision makers in 18 countries.
6. “Mobile Apps: What Consumers Really Need and Want, Equation Research, 2013
7. Aptelligent research data as of April 2016, <https://data.apteligent.com>



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### About Aptelligent

Aptelligent provides the world’s leading mobile application intelligence solution enabling enterprises to accelerate their mobile business. The company’s solution monitors every aspect of mobile app performance and provides a real-time global view of app and transaction metrics across iOS, Android, Windows Phone 10, Hybrid and HTML5 apps. Trusted by three of the top five credit card issuers, three of the top five media companies, three of the top five retailers, and two of the top three hotel chains with the success of their strategic mobile app initiatives. Aptelligent is leading the drive to the App Economy. Learn more at [www.apteligent.com](http://www.apteligent.com).