

WHITEPAPER

# 8 Ways Synthetic Monitoring Complements Real User Monitoring

And Why Digital Businesses Need Both

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# Foreword

How much of a difference do a couple of seconds make? It's easy to gloss over the cost of a sliver of time, but research shows that a single second delay in your website loading time can result in a 7% loss in conversions. Forty percent of web users abandon websites if they take longer than 3 seconds to load. Conversely, an increase in site speed from 8 to 2 seconds can boost your conversion rate by up to 74%.<sup>1</sup> Website and application availability also has tremendous impact on revenue, and many organizations have cited a revenue loss of over \$300,000 for every 60 minutes of downtime.<sup>2</sup>

As a business or IT leader, how do you acquire reliable data on the uptime and performance of your website or application? How do you discover when your application is down or pages aren't loading properly?

Most businesses today monitor their applications in some way. Some use only server-side monitoring techniques, which measure a server's system resources and help organizations improve their capacity planning to provide a better end-user experience. But server monitoring is only a piece in the puzzle. How do you evaluate your end-users' digital experience? Many organizations augment server-side visibility with client-side monitoring tools that measure the end-user perspective. In this paper, we'll discuss two client-side monitoring tools digital businesses have at their disposal, synthetic monitoring and real user monitoring, and we'll explore why your organization needs both.

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<sup>1</sup> Hostingfacts.com "Internet Stats & Facts for 2017" [hostingfacts.com/internet-facts-stats-2016/](http://hostingfacts.com/internet-facts-stats-2016/)

<sup>2</sup> Information Technology Intelligence Consulting "Costs of hourly downtime soars" <http://itic-corp.com/>



# Synthetic Monitoring 101

Synthetic monitoring simulates realistic traffic in scheduled intervals and provides granular data on the availability and performance of websites, applications and APIs. Often referred to as proactive or active monitoring, synthetic provides a suite of repeatable tests that deliver reliable 'before and after' data, which enables IT Operations, Development and DevOps teams to measure the effectiveness of code changes and to troubleshoot specific transaction issues. Synthetic monitoring offers a controlled environment for testing in which the user can limit the number of variables that might influence the results. This laboratory-like control is essential for generating reliable data that the business can trust.

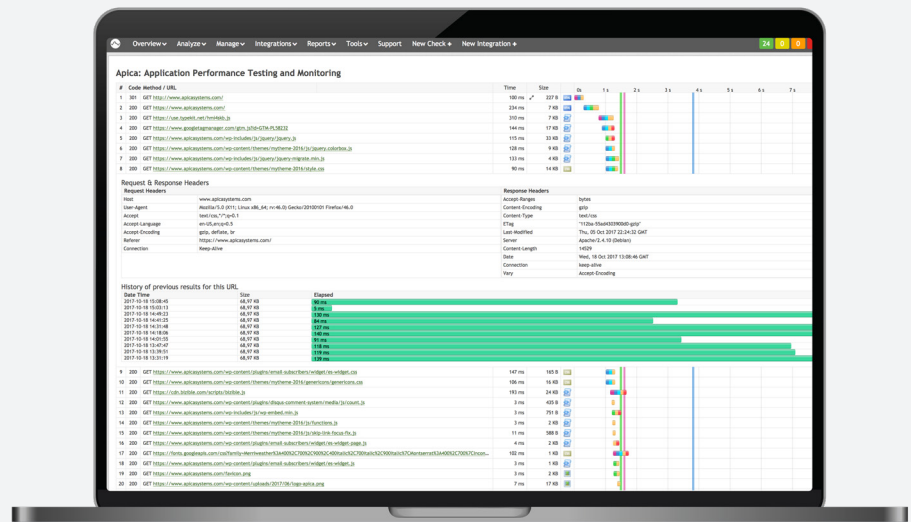
Synthetic monitoring allows you to measure every area of your website or application regardless of your actual traffic. This form of monitoring uses web browser emulation

or scripted recordings of web transactions run through a real web browser. The user creates scripts that simulate common actions or paths that an end-user would take on a site or application. For an e-commerce site, this would include adding a product to a shopping cart. For a video streaming service, this would include searching for, selecting and playing a video. Some synthetic monitoring tools automate the process of scripting, enabling the user to create scripts without writing any code.

Some synthetic monitoring tools are also built for API testing. In order to test an API endpoint, the tool would perform individual network layer calls to a URL or API in order to verify availability and performance of the site, the application or the specific API.

Synthetic monitoring is available from Apica, among others.

Synthetic monitoring tools generate virtual traffic to isolate uptime and performance issues before they impact end-users. Shown here, a waterfall graph from Apica Synthetic.



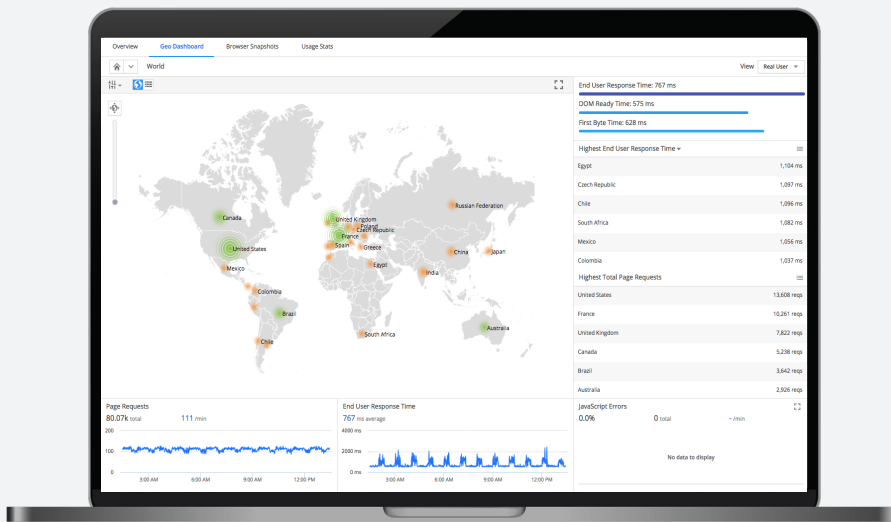
# Real User Monitoring 101

Real user monitoring is a user-driven monitoring technology that tracks actual user activity on websites and applications. RUM, as it is commonly called, observes websites and applications in real time, tracking availability, responsiveness and functionality, and provides IT Operations and Development teams with insight into how users experience an application. This type of monitoring observes users by device, browser and network access to help the business put performance issues into context. While some RUM tools analyze every transaction of every user, others are designed to observe a smaller set of users that represent the whole.

RUM can be used to track audience demographic, behavior and website or application performance metrics. Most RUM packages do audience or performance tracking well but even popular packages like Google Analytics require some customization to measure both audience and performance. RUM is sometimes referred to as real-user measurement, real-user metrics or passive monitoring, since it enables observational studies rather than experiments.

RUM allows teams to collect website or application performance metrics directly from the end-user's browser by embedding a JavaScript beacon in web pages or within the application. This beacon records select interactions between the end-user and the website or application and also captures performance data from user traffic. The beacon then sends that data back to the business so teams can analyze it in any number of ways. The data may also be used to determine if changes that are promulgated to sites have the intended effect or cause errors.

RUM, by its nature, creates a broad spectrum of information that can bring corner cases to light. From page responsiveness to DNS resolution delays, RUM provides a top-down perspective of front-end browser, backend database, and server-level issues as they are experienced by end-users. Teams rely on RUM to evaluate page load times, network requests and load by region, and to look for patterns between those metrics and device and browser. RUM services include Google Analytics, Boomerang and AppDynamics End-User Monitoring.



RUM tools track real user activity and identify errors, crashes, network requests, page load details and other metrics. Shown here, a dashboard from AppDynamics End-User Monitoring.



# 8 WAYS

## Synthetic Monitoring complements RUM

1

### Monitoring Real Traffic is Invaluable But it Comes with Limits.

RUM identifies uptime and performance issues after they affect end-users whereas synthetic monitoring exposes issues before they impact site visitors. RUM tools are constrained by end-user activity and traffic volumes whereas synthetic monitoring doesn't rely on the behavior or volume of visitors. Synthetic allows teams to run checks as they wish.

2

### Rum Provides the Big Picture and Synthetic Isolates Issues.

Synthetic monitoring provides a highly detailed view of specific application components and is optimal for isolating issues at a detailed level. Teams can design checks and alerts that focus on only the components they care about, providing the detail needed to quickly identify whether there is an issue and where it stems from.

For example, an IT Operations team can't assume they have a problem within their infrastructure when their page load time increases by 20%. A change in page responsiveness could also be caused by a widespread local access or Internet-wide network problem, an issue with a third-party resource, or a new software release for a popular device. Synthetic drills deeper and helps measure and isolate issues at a granular level.

RUM, on the other hand, provides the best representation of what a user population is actually experiencing on a website or application. Unlike synthetic, RUM collects data about every user including attributes such as browser, device and network origin. RUM is also the optimal approach for identifying problems with uncommonly used devices.

### Stay Alert, Especially When it Comes to Uptime.

3

If a website or application crashes, RUM simply stops providing data. Since RUM reporting is based on an aggregation window, it might be minutes—or longer—before teams know there is a problem. Synthetic monitoring can recognize that checks are not being completed and immediately send an alert to the appropriate teams that the website or application is down. As an added bonus, synthetic monitoring can be set up to run automatically based on alerts from other tests.



4

## Test the Waters Before Entering New Markets.

RUM is beneficial in areas where the user base is firmly established and is generating website or application traffic regularly. Measuring consistent traffic is where RUM tools shine and they can provide valuable historical data as well.

When a business plans to open up a new market, or in geographic areas where user traffic is light, synthetic monitoring is the recommended approach. Teams can perform traffic simulations prior to going live to ensure their application is available and high-performing for users in a specific region or country. IT Operations and DevOps teams also frequently use synthetic monitoring to test new features in real-world environments before rolling them out to production for use by real users. Synthetic enables teams to validate performance and avoid embarrassing feature launch failures by uncovering issues before their end-users experience them firsthand.

5

## RUM and APIs Don't Mix Well.

Not all traffic is derived from people. Websites and applications often make requests to, or receive requests from, other websites or programs using an API. RUM, by nature, measures applications with a human-user bias. RUM generally runs at the page level and most RUM dashboards are not designed to isolate and alert when there is a problem with an API. Further, since users of an application can provide different inputs to an API endpoint, it becomes nearly impossible to compare different RUM results to determine if there are problems and where those problems lie.

Because synthetic monitors can be tailored and run in set intervals, synthetic monitoring is ideal to target business transactions that are API driven. This includes transactions that trigger calls to third-party resources, which can cause performance problems that are beyond a team's control. By running checks against APIs, IT and Development can identify issues proactively and hold third-party providers accountable, or make decisions to replace third-party resources with substitutes.

6

## Validating SLAs Requires Reliable Data.

Every business that provides digital services must ensure its applications are consistently available and running effectively. RUM measurements, especially in those cases where there is sufficient traffic to show meaningful data, can be excellent for evaluating delivery on SLA. Since RUM documents the performance that end-users are experiencing, these tools can clearly show whether agreements are being met. However, RUM measurements can include components outside a business's sphere of control such as third-party micro-services, ad servers and Wi-Fi performance. These variables can distort performance data and leave organizations responsible for factors beyond their control.

Synthetic monitoring is highly programmable, allowing teams to concentrate on components that are under the company's operational control. Synthetic monitoring, as we mentioned earlier, is also useful for capturing data when there is light, or no, traffic. This allows organizations to track the performance of digital services 24/7.



7

### To Diagnose Issues Accurately, Beware of False-Positives.

RUM captures high-level performance problems across users and devices. With RUM outputs, teams can recognize that a problem exists and they can derive a limited understanding of where the problem originates. Synthetic monitoring allows IT and Development to isolate each component on a page, compare results against benchmarks, and identify anomalies and false-positives. This accelerates root-cause identification, which reduces Mean Time to Repair (MTTR).

8

### Size Up the Competition.

Evaluating the uptime and performance of competitors' digital experiences can help businesses evaluate their own application performance and inform their objectives. Synthetic monitoring can measure the performance and availability of any publicly-available website or application, so learning how a competitor's application performs is easier than it might seem.

## Synthetic Monitoring vs. Real User Monitoring

Objective	SYNTHETIC	RUM
Monitor for Availability 24/7	X	
Monitor Real User Traffic		X
Monitor APIs and Web Third-Party Providers	X	
Ensure SLAs are Met	X	X
Monitor Transaction Performance	X	X
Test Features Before Release	X	
Test for a New Geographical Market	X	
Measure Impact of Performance Issues on End-Users		X



# Why use Synthetic Monitoring and RUM Together?

At first glance it may seem that having only synthetic monitoring or RUM would be sufficient for a monitoring strategy. But as we've outlined in this paper, both tools deliver significant value for issue resolution and digital experience management, and synthetic monitoring and RUM are often used in concert to measure application delivery and improve uptime and performance.

RUM shows businesses that their applications have performance issues and synthetic shows where the problems lie. By implementing a RUM tool, digital businesses acquire a comprehensive view of end-users' online experience. The addition of synthetic monitoring enables the business to identify performance and uptime issues proactively in order to gather details which isolate root cause.

Businesses that use both monitoring tools rely on synthetic monitoring to validate RUM outputs. With the ability to run controlled tests and minimize external variables, synthetic monitoring can authenticate patterns, trends and anomalies in RUM data and ensure IT and Development teams focus on isolated issues, not false-positives. For example, if the RUM tool exposed a significant decline in page load time for a given page, region and browser, the team could create synthetic checks that replicate a common user journey on the page in order to validate the problem and isolate the component—or components—contributing to it.

Monitoring magic.

## Conclusion

Businesses do themselves and their customers a disservice if they limit themselves to one type of client-side monitoring or the other. Monitoring websites, applications and APIs are not a zero-sum game, and there isn't a single solution that meets all needs and answers all questions.

Both RUM and synthetic monitoring provide unique value and visibility into application performance, and the strengths of each dovetail with the other substantially. Tapping the complementary nature of synthetic monitoring and RUM puts digital services, and digital experience, in the best possible light.





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