

APPDYNAMICS

# Using End-User Monitoring to better your UX



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# Introduction

Companies in the digital marketplace of the 21st century know a customer has options. She makes every minute of her day count for something, and she doesn't have time to waste sitting in front of a screen waiting for something to load. If she feels like her time is wasted by broken links or pages that load at a glacial pace, she'll click away and find a competitor who can provide better service.

The challenge of providing a fast and reliable online experience for every user is one that must be met as digital transformation continues to reshape how people conduct business and meet day-to-day needs. The retail industry, for example, has been entirely disrupted by digital transformation. Gone are the days when shopping trips to in-store locations were the norm rather than the exception. The expectations customers have of companies have changed dynamically, and companies must meet those demands or risk redundancy.

Meet Sooraya. Sooraya is the face of the new millennium – a Lebanese-American mother of two who works in medical administration in a major American city. Sooraya's life often feels like a maelstrom as she balances school and sports with her kids, work, her passion for long-distance running, and spending precious hours with her husband. As a result, Sooraya economizes her time by completing many day-to-day tasks online. Her banking, clothes shopping, and perusing new running gear are all done online. Sooraya hasn't been in a bookstore in years; the suspense novels she reads voraciously are all bought on Amazon. She even shops online for the ingredients to make her famous Lebanese *koosa*.

Every day there are more people like Sooraya who depend on reliable online service to meet basic living needs and they overwhelmingly patronize companies who can provide consistently reliable service. In this marketplace, milliseconds count. A customer who has to wait more than two to three seconds for the front-end page to load is proportionally more likely to give up and click away. The blink of an eye, a finger snap, this tiny amount of time can be the difference between making a sale and losing a transaction and sending a valued customer to a competitor.

Vendors in the digital marketplace are facing battles on many fronts. Information on service performance is stored in different systems where it is siloed and there's no full visibility when it comes to monitoring both front- and back-end services as well as third-party content from all around the globe much less correlation between the different sets of data. Websites need to provide a cohesive experience for users even though they have complex ecosystems of homegrown and third-party content (like social media – think Facebook, Twitter etc.), multiple services, and APIs (like advertising and marketing analytics) that all interconnect to provide the user experience. As every biologist, philosopher, and Jedi Knight knows, one disturbance in an interconnected system can have long and far reaching ramifications. Thus, the challenge of providing a fast and reliable experience can be a complex and potentially frustrating one.

Collecting and translating performance data is a massive undertaking but one that can be fulfilled by using a unified monitoring tool that gives full visibility of front-end and back-end systems on user impacting events. The right tool will quickly identify the root cause with full visibility and traceability of the front-end through to the back-end systems, all unified through the concept of the same Business Transaction which spans these systems and acts to minimize user impact by leveraging a symbiotic relationship between proactive and reactive capabilities. With a unified monitoring solution, a company has proactive, reactive, and insightful data to manage the customer experience. An application intelligence platform that unifies back-end monitoring with both real-user monitoring and synthetic monitoring will not only optimize the experience of a customer like Sooraya, it will also accelerate the digital transformation of a company, keeping it at the head of an ever changing industry.

The harsh reality is that when people like Sooraya have a poor digital experience or difficulty with their online tasks, they won't hesitate to find vendors who can better meet their expectations, which have been set by companies with massive technical resources. The good news is that a comprehensive and unified method of tracking and reporting user behavior can assure the experience that earns the loyalty and appreciation of customers around the globe.

**Chapter 1:** Time is money and brand loyalty; use Synthetic Browser Monitoring to get ahead of performance problems and benchmark the competition

Slow load times mean lost sales, reduced customer engagement, lower conversion rates, higher bounce rates, and, most importantly, poor business outcomes and missed KPIs. Companies need strategies for identifying performance problems before they affect customers, and for observing the actual user experience.

“Mom, they’ll be here in five minutes!”

“I heard you the first time, sweetie,” says Sooraya as she checks herself in the mirror. It’s her son’s first soccer match this afternoon and he’s bouncing off the walls in anticipation. Sooraya agreed to carpool a number of the other kids to the match, but as she glances in the mirror a thought occurs to her.

The local department store has a nice selection of fashion-forward hijabs and Sooraya already has a nice collection. Still, she thinks to herself, it would be fun to have a hijab in her son’s squad colors. If she’s going to be a suburban soccer mom she’s going to go all out. And if the department store has the right colors, she should have time to swing by and pick one up.

Her plan hits a snag when she jumps online to check the instore collection. “C’mon, c’mon,” she mutters as the page loads at a glacial pace. The front page finally loads but after clicking the accessories link she sits in front of the computer for another agonizing minute. The hijabs simply do not want to display.

“Mom, they’re here, let’s go!” comes her son’s voice from the door.

Sooraya sighs. It was a nice thought but there’s no point in running to the store if she doesn’t know if they have what she needs. Maybe next time...

Sooraya’s local department store lost a sale because they weren’t able to provide fast and reliable service when it mattered most. This is why it’s not enough for a company to simply remedy negative impact events when they occur. Using an application intelligence platform can anticipate and mitigate events proactively before they affect users.

If the department store had utilized synthetic monitoring, they may have been able to identify and resolve whatever issue was causing the delay before it resulted in Sooraya’s lost sale. By proactively testing upgrades or third-party functions before launch, synthetic monitoring provides a continuous and consistent stream of information on the functionality of a digital vendor. Comparing rates of service to competitors allows companies to stay ahead of the game and funnel customers towards themselves from competitors who do not meet the highest standard.

The use of a business transaction (BT) allows the application intelligence platform to tag and trace each customer interaction allowing a quick drill down into every line of code in an application that gets executed in order to create a response that serves the purpose of delivering the expected functionality or content. Tagging and tracing every request from end-to-end in a business transaction helps companies see where the root cause of a problem is, act quickly or automatically to remediate the issue, and know how performance affects their business outcomes. end-user monitoring uses synthetic tests to generate full end-to-end BTs as well as real-user measurements to incorporate front-end performance into the full BT.

On the other hand, real-user monitoring (RUM) focuses on tracking the performance of every customer interaction to collect data on user performance. By collecting data from each and every user, companies can spot trends that indicate negative user impact events and proactively seek to remedy them before they reach a critical level. With real-user monitoring, Sooraya’s department store would have seen a digital snapshot of an abandoned page with incomplete data. If her session was part of a larger trend, RUM would have alerted the company to the dropping traffic.

Sooraya’s negative online experience demonstrates why it’s not enough to simply resolve issues after they occur. It also demonstrates why it’s important to not rely on synthetic monitoring or RUM alone to proactively remedy issues. Synthetic monitoring and RUM work best when they are seen as a symbiotic relationship with primary and secondary functions, not two separate tools. Together, synthetic monitoring and RUM focus on addressing and resolving issues before they affect users. The next time Sooraya needs a hijab in five minutes, synthetic monitoring and RUM allow her department store to manage and ensure that she’ll be able to find what she needs with time to spare.

**Chapter 2:** Performance of mobile apps and web sites is just as, if not even more, critical as the desktop experience

Customers are increasingly transacting their business through mobile devices, both dedicated mobile applications and via the mobile browser for mobile specific web sites. If customers have poor mobile experiences, studies show that 80%+ will delete an app. Even if they don't delete the app, they may leave poor app store rankings and comments or dis your app on social media, all of which will have a negative effect on your brand equity.

Sooraya sits in JFK International on a bustling Sunday, clutching her passport and her ticket as she waits to board her plane. She's never been to Paris, but her sister has been pestering her to visit for ages and she's finally on her way. She runs down the mental list of instructions she left for her employees and family. Everything should be fine.

Still, it never hurts to be cautious, especially financially. On an impulse, Sooraya decides to transfer a few hundred dollars from her bank account to the prepaid debit card she'll be using for the trip. She pulls out her phone and logs into her online banking account. As she does, she notices that the bank's mobile app has recently updated. She taps in her transfer amount and hits the transfer button. Nothing happens. She waits impatiently until the app crashes.

Gritting her teeth, Sooraya attempts the transfer again. The same crash occurs. Knowing it's futile, Sooraya nevertheless makes a third attempt, yielding the same results.

A flight attendant calls her group to board and Sooraya stuffs her phone into her carry on, frustrated. Hopefully the site will be working again when she gets to Paris. Hopefully she'll be able to call if it isn't. Still, it's a bit of added stress that Sooraya didn't need.

Nothing is more frustrating for a customer than apps and websites not being able to complete essential functions, especially when time is limited. By tracking the quality of their new app releases with mobile RUM, Sooraya's bank would have noticed the amount of crashes users were experiencing. With the right instrumentation, they could have proactively resolved the issue before it reached Sooraya. Instead, Sooraya is boarding her flight frustrated and stressed.

Sooraya doesn't usually like using her bank's mobile website on her phone, as the app is more secure. As she boards the plane and finds her seat, she figures she has little choice. She pulls up the mobile website on her phone's browser and attempts the transfer again.

Unbelievably, the mobile website isn't working either. She hits the transfer button only to stare at a white screen for long minutes until an error message pops up.

"Can I get you something?" asks a flight attendant as she passes.

"A water and a sleeping pill the size of Starkiller Base," Sooraya mutters. The attendant doesn't catch the reference and just smiles blandly. Sooraya gives her phone one more furious look before kicking off her shoes and preparing for a long, stressful flight.

Sooraya's bank could have caught and remedied the issue with their mobile website before it failed customer transactions by proactively engaging in synthetic monitoring before they launched their upgrade. By proactively testing critical user journeys,

companies can identify problems with third party providers in the BT that impact the overall functionality of the site. Synthetic monitoring provides a preemptive, continual check of website and app functions by means of external agents. These agents continually visit websites, run scripted transactions, and provide extensive amounts of data and full waterfall charts of performance. The strength of synthetic monitoring is in its predictability and control. By specifying exactly what functions the vendor wants the external agent to test and when, the data output is both continuous and specific. It has none of the white noise or superfluous data of RUM.

Websites are getting more complex by the year. New apps are developed every day. The cutting edge upgrades vendors launch in winter can be dated and obsolete by spring. This is why end-user monitoring can feel a bit like fighting the mythical Hydra. When one problem is solved, two more spring up to replace it, and any one of these issues can affect customer satisfaction. By running predetermined scripts that test every function individually, vendors can determine whether impact events are server related or a result of issues with third-party functions. This drastically reduces the mean time to resolution (MTTR) and proportionally impacts end-user satisfaction.

Diagnosing issues as they occur is one of the functions of synthetic monitoring, but its true strength is in its ability to eliminate those issues proactively. Synthetic monitoring doesn't involve actual end-users. For this reason, vendors can test new functions and upgrades before they go on the market, eliminating problems before they affect customers. This preproduction check of every new and existing functionality builds a culture of performance within a company. Unlike RUM, synthetic monitoring can run scripts on any website, including competitors.

The main strength of synthetic monitoring is, in a way, its most obvious obstacle. As stated before, synthetic monitoring doesn't monitor actual end-users and therefore cannot offer comprehensive data on user trends. Although the monitoring is continuous, it's staggered. Performance issues can slip between tests during the times when the scripts are not being run, which means that isolated performance issues are not always addressed. Also, if a vendor's website is enormous and they choose only to run scripts on the most common user paths, impact events on rarely visited pages or products can go undetected.

Sooraya's previous negative experience could have been avoided had her bank used both synthetic monitoring to preemptively test their new upgrades before they were launched and mobile RUM to monitor for crashes, especially in their third party functions like the transfer button. Had Sooraya's bank implemented mobile RUM they would have seen the increased crash rates on critical functionality like money transfer. The bank now has to address her request via their call center, causing customer frustration and higher customer service costs for the bank.



# Chapter 3

The trip to Paris has come to an end and Sooraya is frantic. A phone call from her husband delivered the startling news that their older son has been hospitalized with a broken arm and Sooraya is determined to leave on the next flight back home. She logs into her airline's website to change her flight, only to run into the worst possible hurdle – the dreaded 404 error screen when searching for alternative flights. Once, twice, three times she tries and each time all she gets is the error message. Finally, Sooraya slams her laptop shut in frustration. She pulls out her phone to call the airline instead but its peak business hours and the lines are sure to be swamped. As a cheerful voice asks her to hold, Sooraya realizes it's almost time for midday prayers and hangs up the phone, bites back a vulgarity, and swears to herself to never fly this airline again if they can't even keep their website online.

Sooraya's airline uses synthetic monitoring to preemptively run scripts and test for user impact events, but a performance issue occurred in Western Europe where the company does not currently have any synthetic monitoring, leading to Sooraya's present dilemma. However, by utilizing RUM the airline has detected that traffic from Europe has dramatically decreased.

When Sooraya's airline notices that the trend is occurring across France, they take immediate action. The airline spins up synthetic monitoring in Europe and quickly detects the scenario Sooraya is experiencing. By addressing a content delivery network bottleneck, the airline is able to get their website back online and once again streamline the customer experience efficiently. It was a costly disruption; already several potential customers have abandoned their efforts and moved to other companies.

The benefit of RUM is collecting data on every user interaction in every location, including those where synthetic monitoring agents do not exist. real-user monitoring embeds JavaScript into websites and gathers performance data from an end-user's perspective instead of a synthetic one. Unlike synthetic monitoring where vendors choose what scripts to run and which functions to test, RUM data provides a snapshot of a user's experience exactly how it happens, where it happens, as it happens in real time. RUM observes performance over the entire globe and can monitor the differences in geography, different internet browsers, and different service providers.

The sample size of synthetic monitoring is relatively small, whereas with RUM it's staggering. Instead of a small sample size, automatic baselining will intelligently detect a poor performing session and collect additional information for later troubleshooting. Fortunately, the application intelligence platform utilizes the data from RUM agents and integrate analytics engines so the sheer amount of data can be separated into relevant data. Using user analytics, companies can view the impact performance and errors are having on the business and take proactive steps in real time to re-capture abandoning users due to application performance.

After midday prayers, Sooraya is ready to make another attempt to book her flight. She re-opens her laptop one more time. To her delight and relief, Sooraya breezes through the flight change screens. With a cheerful chime the airline informs her that she's booked on an evening flight out of Paris straight back to JFK International. Sooraya breathes a silent thanks to the airline for remedying whatever issue disrupted her flight plans quickly and hurries off to finish packing.

RUM is a powerful tool because it identifies trends that show exactly how global users like Sooraya are navigating through a site. In addition, most sites have third party services that are used to deliver additional customer experience and services. RUM and synthetic monitoring both provide waterfall charts so companies can observe how those third party services are performing at any given time and location.

Performance testing with synthetic monitoring also ensures that a vendor keeps its competitive edge by checking to see if the new functionality is working at the same speed or better than the competition. Sooraya's preferred airline runs scripts on its website frequently, but even when the site is meeting the performance standards, the airline still loses business to competitors, including with first time fliers. By running scripts on the competition, synthetic monitoring can analyze the performance speed of the competitors and pinpoint where the company is losing crucial seconds that make all the difference in sales.

When a vendor makes performance part of their business requirements they're able to define standards of performance in the preproduction stage. Since a synthetic monitoring agent exists in a controlled environment, there are no variables to account for such as machine and software configuration or internet provider service. This lack of variables assures that synthetic monitoring is always measured by the same standard before functionality is activated by a web developer or vendor.

In addition, synthetic monitoring offers visual based metrics. Vendors will know exactly how long it takes for the page to be visually complete for the user. Running scripts will time the visually complete metric to the millisecond and allow benchmarking against the competition to see where a company can optimize.

# Chapter 4

So between synthetic monitoring and RUM, which tool is better for companies to use to ensure performance standards? There's a scene in *The Matrix* where Neo tries to bend a spoon with his mind. A particularly creepy child tells Neo that the answer is not to try to bend the spoon, but to accept the reality that there is no spoon.

When it comes to determine which type of end-user monitoring is the better choice, there is no answer. Rather, the reality is that RUM and synthetic monitoring are complementary made up to two symbiotic parts in the wild ecosystems of web and mobile applications. Each type of end-user monitoring has primary and secondary functions and each one has its own strengths. Using them as one consistent monitoring tool eliminates guesswork, proactively ensures performance standards, impact events from around the world, and an insight into competitive performance.

# Conclusion

The way Sooraya balances her life, work, passions, and day-to-day tasks is a microcosm of how digital transformation has caused companies to change the way they provide excellent customer service or approach their business. Sooraya is a conservative, traditionally-minded woman who utilizes untraditional methods to manage her career and family. Sooraya's goals and desires are the same, but her expectations from the vendors she patronizes have dramatically altered as digital transformation puts access to every facet of her life at her fingertips.

Just as Sooraya balances the different parts of her life, companies must innovate quickly and maintain applications to meet her new and rapidly changing expectations. Synthetic monitoring and RUM are two tools for end-user monitoring with specific strengths, functions, and goals. When they are utilized separately, neither is capable of monitoring and addressing every possible scenario that comes up in the fast-paced global market. But when brought together in a symbiotic relationship, these two tools become an effective unified solution for monitoring and proactively creating a positive front-end experience for each and every customer.

Problems are always going to arise. Unseen complications are unavoidable. Effective end-user monitoring fosters a standard of performance, provides a competitive edge in the market, and maximizes potential for profit and customer return rate. When companies monitor and eliminate user impacting events effectively, they're not just helping themselves. They're helping artists and entrepreneurs, CEO's and activists, engineers and fashionistas, and regular people like Sooraya who just need to get through the day. A unified monitoring experience lets companies at the forefront of digital transformation deliver exceptional results to end-users and differentiate themselves among their peers.

Sooraya. Is. Exhausted. Exhausted, worn-down, anxious about her son, but happy and grateful that she was able to change her flight and arrive safely.

As the taxi sits in traffic, Sooraya decides that after the stress of the return flight, a little shopping therapy is in order. First she logs onto her online banking account to check her balance. It looks like the site has fixed its performance issues and she breezes through. Next she checks out her local department store for that hijab she had been hoping to find. Her son won't be playing soccer for a few weeks, but once his arm is healed she'll be out there sporting his colors. The department store has the perfect item and she places it in her cart. The suggestions that quickly load near the top of the page include a new series of running shoes that catch Sooraya's eye. She decides to treat herself and orders a new pair in her favorite lavender.

Sooraya arrives home, safe, and satisfied to pull the curtain on one day where everything, online and off, went right.

Most importantly for the businesses she patronizes through her digital devices, the superior customer experience provided by a performant and properly functioning set of products and services, her brand loyalty has been retained and enhanced, and those companies will achieve better business outcomes as a result of higher funnel conversions and reduced bounced rates from a satisfied customer.

A network diagram consisting of several circular nodes connected by thin lines. Some nodes are solid circles, while others are dashed circles. The connections form a complex web of relationships.

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