



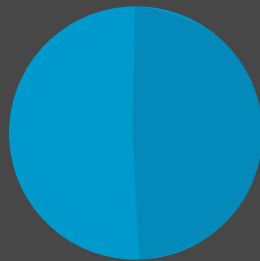
**Monitor | Optimize | Validate**



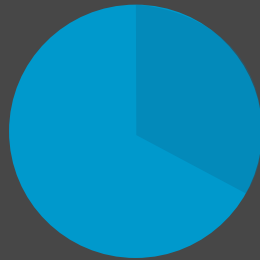


For online users,  
**slow is the  
new down**

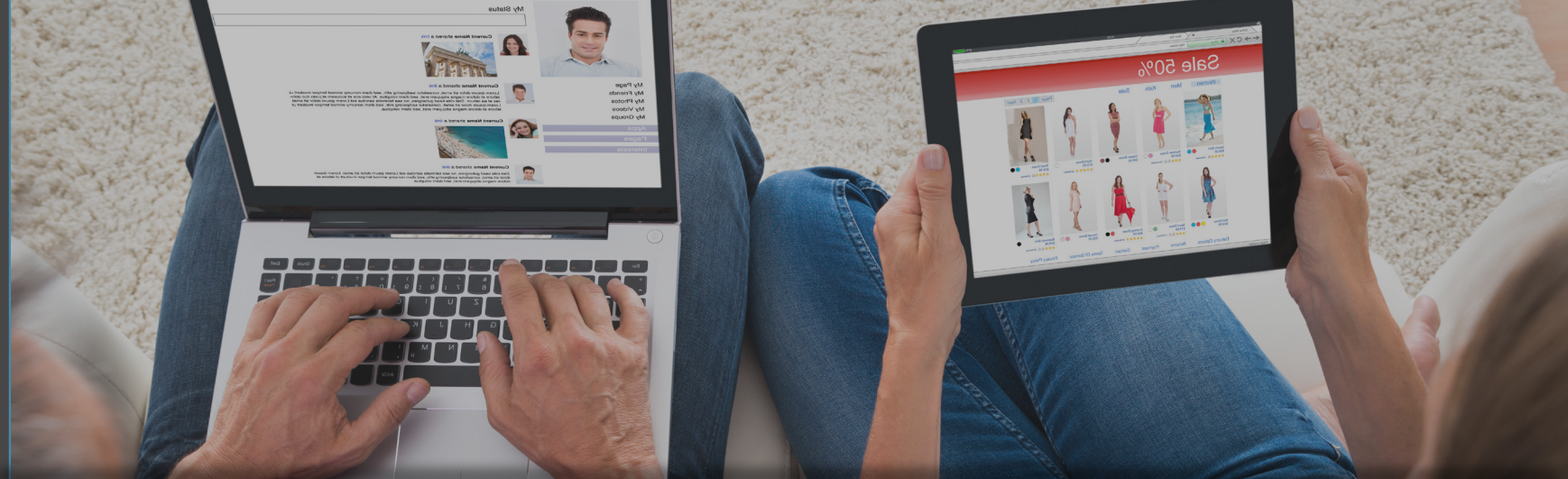
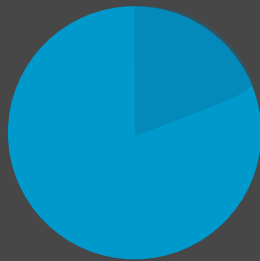
**49%**  
expect **<2 second**  
page load times



**30%**  
expect **<1 second**  
page load times



**18%**  
expect **instant**  
page load times



**Your online users are unique with different attitudes, opinions, and preferences.** They consume your web and mobile applications on different devices, from various browsers, across a myriad of locations. To reach and connect with them, you create engaging, personalized content and experiences with a variety of tools and techniques, all of which add complexity to your applications.

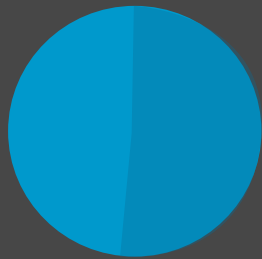
This complexity brings variability—inconsistent performance across devices, locations, and network connections – which leads to slowdowns and errors, and even availability or business continuity challenges. Online users have become highly demanding and quickly lose patience and trust when digital experiences don't meet their expectations.

Just being available isn't enough in today's digital economy—an alternative is just a few clicks away for customers if you fail to satisfy them. But when the dynamic, engaging, and personalized content that users demand—differentiating your business and brand—is the very thing that's creating poor performance, you need actionable intelligence to fix it.

To strike the right balance between rich and responsive online experiences, you must understand user behavior by geography, network, and device access as well as how those factors impact the way your application is used. With a continuous approach to digital performance management, you can monitor, optimize, and validate user experiences to maximize online revenue.

Page load time  
is one of the **greatest  
predictors of  
bounce rates**

**53%**  
of visits to  
mobile sites are  
**abandoned after  
3 seconds**



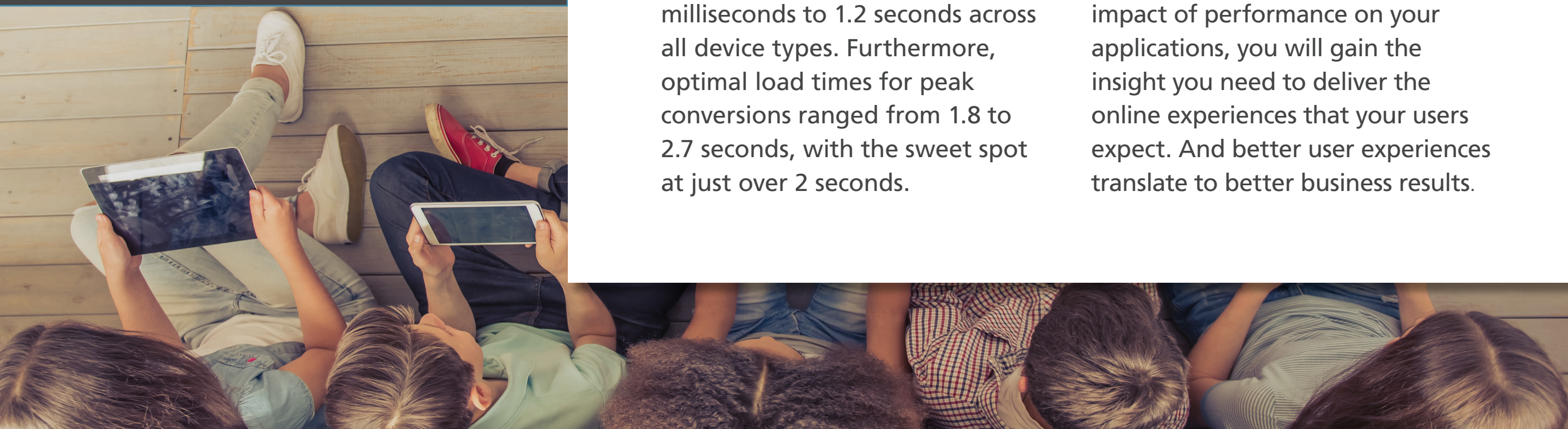
## Improve online performance by continuously managing user experiences

The slower your pages, the more likely users will go elsewhere – 53 percent of visits to mobile sites are abandoned after 3 seconds.

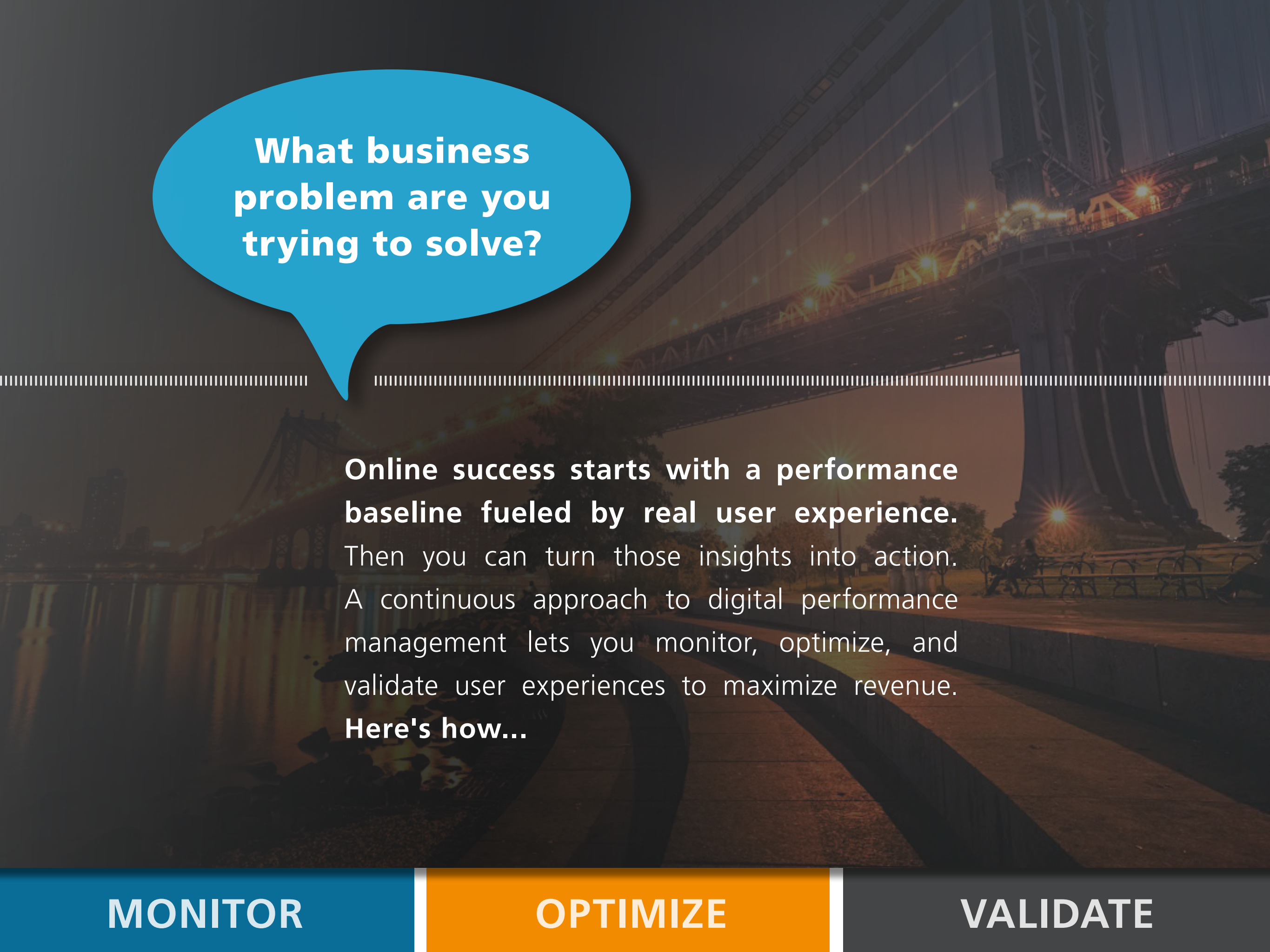
Just a 2-second delay in load time hurt bounce rates by up to 103 percent and correlated with up to a 51 percent decrease in session length, according to the latest data from The State of Online Retail Performance. The data found that optimal load times for the lowest bounce rates ranged from 700 milliseconds to 1.2 seconds across all device types. Furthermore, optimal load times for peak conversions ranged from 1.8 to 2.7 seconds, with the sweet spot at just over 2 seconds.

When you only have a few seconds to captivate online users, there's no time to waste figuring out the source of slowdowns. But where do you start? According to the Digital Performance Golden Rule, "80-90 percent of end-user response time is spent on the front-end. Start there," asserts Steve Souders, author of High Performance Web Sites.

By continuously monitoring, optimizing, and validating the impact of performance on your applications, you will gain the insight you need to deliver the online experiences that your users expect. And better user experiences translate to better business results.







**What business  
problem are you  
trying to solve?**

**Online success starts with a performance  
baseline fueled by real user experience.**  
Then you can turn those insights into action.  
A continuous approach to digital performance  
management lets you monitor, optimize, and  
validate user experiences to maximize revenue.  
**Here's how...**

**MONITOR**

**OPTIMIZE**

**VALIDATE**



**What pages are users spending the most time on?**  
**What devices are they connecting with?**  
**How long are users willing to wait for a page to load?**



**MONITOR**





# Monitor

## end-to-end performance

If you're not monitoring front-end performance, you're missing most of the performance picture. Basic monitoring tools only provide limited information on back-end processing such as database problems and system outages—important components that are easier to control, but only make up a small fraction of the user experience. They also don't provide perspective on perceived performance from your users, such as if site components are loading smoothly or a page looks complete.

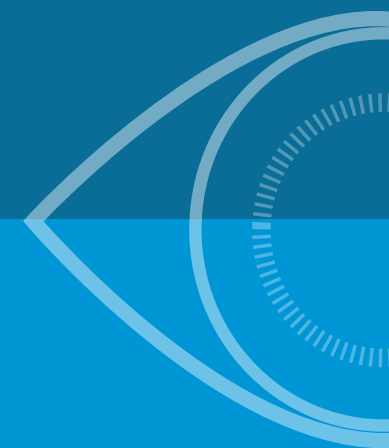




**There are two types of monitoring tools** synthetic and **real user measurement (RUM)**—each offering valuable insight into performance. Synthetic monitoring is a simulated health check of your site or application that can help you find code defects, benchmark against the competition, and compare current and previous versions of your pages. RUM measures actual online experiences to correlate performance with business results, track how visitors move through your site, and identify the most critical pages.

The only way to truly see front-end performance the actual experiences your users are having—is with digital performance management that incorporates RUM. RUM tracks session paths, bounce rates, user think time, user location, device type, network type, third-party resources, and peak analysis—all critical pieces in understanding and predicting how users will behave. It also allows you to map user data to business objectives with key performance indicator (KPI) metrics such as bounce rate, conversion, session length, and revenue.

**RUM** helps you understand how users are interacting with your online applications so you can optimize that behavior across locations and devices. With this understanding, you can move away from reactively monitoring performance—chasing problems down as they occur or, worse, learning about them from your users—to an ongoing, proactive approach.





## To **monitor** performance effectively:

- **Establish a current performance baseline.** Assess the overall performance of your online properties to identify opportunities for improvement. RUM allows you to monitor user behavior, how that behavior changes across dimensions, and performance impact on behavior.
- **Define a performance target and associated ROI.** Determine the revenue opportunity for performance by calculating ideal speed for maximum conversions using real user behavior, then forecast the revenue opportunity resulting from a specific performance improvement.
- **Identify the most critical pages to the user experience.** Find out which pages are most likely to frustrate your users. Then prioritize your resources and optimization efforts on the pages that provide maximum ROI, not necessarily the slowest pages.
- **Isolate the most impactful page components.** There are many individual elements—objects like HTML, images, and JavaScript to name a few – that make up a digital experience. Once you identify critical pages, target the objects that will improve the user experience the most.
- **Create performance benchmarks.** Establish benchmarks for ongoing measurement and align them with business objectives.



**Stage Stores** discovered that many customers were accessing its online store via e-reader. It acquired new devices to represent user access points and ensure code releases functioned on them.

**Deckers** found that time-to-interactive—the point at which a customer feels like the page is complete—was a powerful metric in moving the needle of conversion and improved it across all properties by 33 percent.





Which pages are having the most impact on revenue?  
What is the ideal page load time for conversion?  
Are there simple fixes that can yield big results?



**OPTIMIZE**



**Optimize** performance  
for the most revenue impact

Once you understand how real users are interacting with your site, you can analyze the data to create a punch list of fixes. This data will help you prioritize and allocate resources to the optimizations that will have the most impact on user experiences and business objectives.





**Focus your optimization efforts** on the pages that provide maximum ROI. Though it may seem counterintuitive, sometimes these are not the slowest pages. For example, your checkout pages might be slower because they need to check inventory and verify payment, but users won't even make it there if the product or offer pages they're browsing take too long to load, so those pages should take priority.

When you're optimizing performance, you'll be able to make tradeoffs between richness and responsiveness. Images, video, third-party scripts, and custom fonts are driving the average web page to more than 2 MB in size. Even with technology and network advancements, most access points can't keep up with this bloat. Forrester Research cites an example of pushing the same high-resolution, 3 MB image for a Retina display to all mobile devices, punishing mobile customers with devices that cannot render the extra resolution with extra latency.

Finally, **APIs and third-party integrations** are both popular ways to increase agility and personalize user experiences. Securing endpoints is critical to ensuring that your differentiation isn't turned against you. Safeguarding applications and user data as well as readiness to mitigate the threat of DDoS attacks should always be top of mind.



## To maximize **optimization** efforts:

- **Address key pages first.** The slowest pages shouldn't always be top priority if users don't interact with them or mind waiting (as in the checkout example). The pages that customers land on first—such as campaign landing or SEO pages – must be in top shape for the best first impressions.
- **Tackle the most common bottlenecks.** Typical slowdowns include poorly performing images, slow geographies where the content delivery network (CDN) is not optimized, JavaScript stopping your users from seeing content instantly, and unreliable third parties.
- **Fix performance issues thoughtfully.** Resolutions should improve the user experience and business KPIs, not just a performance budget.
- **Maximize global delivery and offload.** Get the most important content as close to users as possible or optimize for visual impact and immediate engagement to accelerate page loads. For example, for cellular connections, pre-positioning provides access to content locally to avoid buffering.
- **Secure every app and endpoint.** Check configurations to ensure information is not compromised and availability is not hindered by an attack. Make sure you have visibility into attack vectors and a runbook to address cyber security threats to maintain brand integrity.

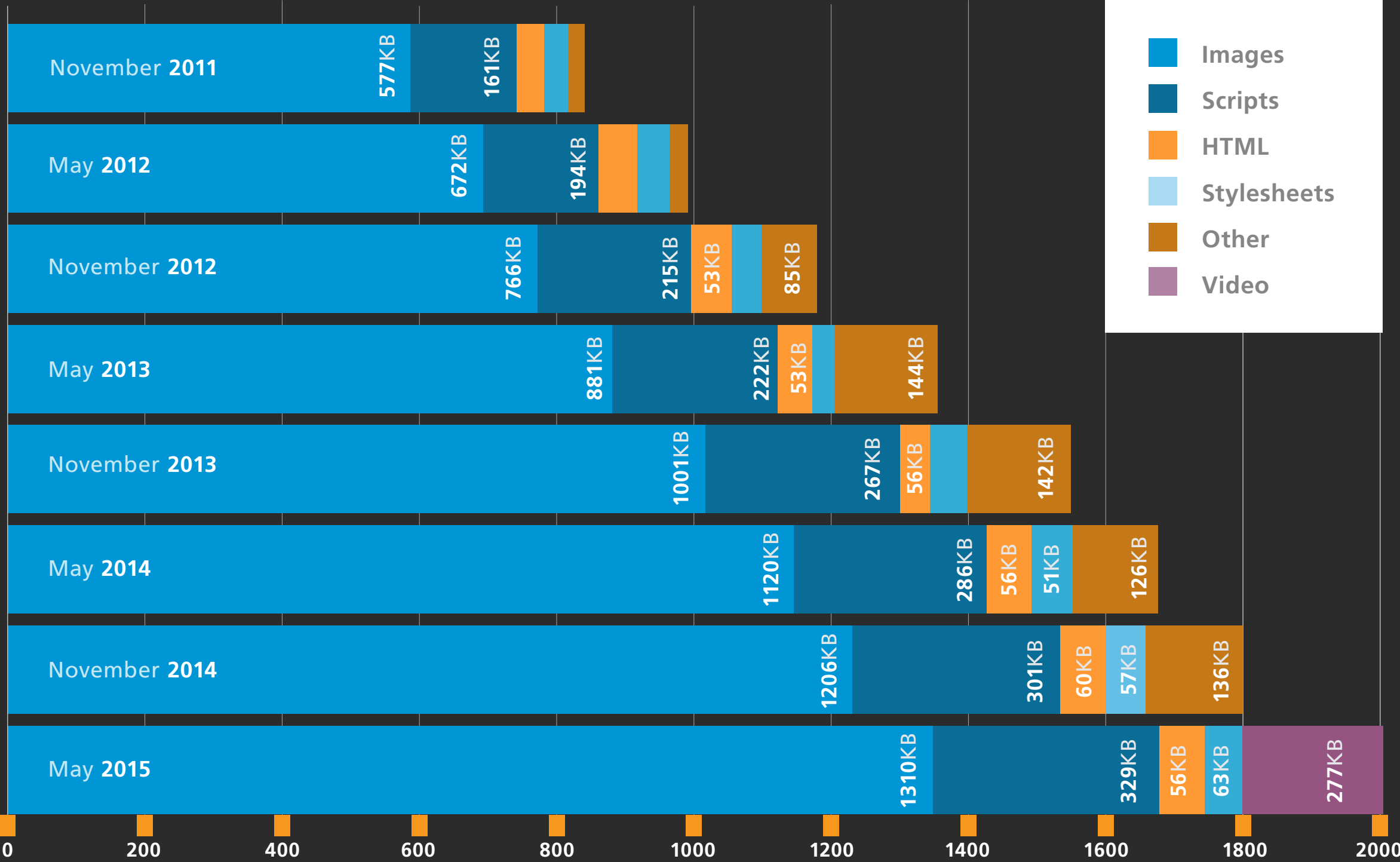


**LINEN CHEST** saw a 19 percent increase in conversion rates by optimizing images and reducing image weight by up to 90 percent. The percentage of mobile users experiencing load times faster than 3 seconds nearly doubled.


**FANATICS** found that its images were too large for mobile devices, where more than half of customers were making purchases. It used built-in CDN capabilities to reduce image size and cut load time in half, drastically improving page load speeds. Image optimization contributed to a 2-second load time improvement and almost doubled mobile conversions.



# Page asset breakdown over time







**Are we testing the right user paths?**  
**Can our site handle the anticipated traffic?**  
**Did the changes result in the desired business outcomes?**

 **VALIDATE**

# Validate

## performance improvements

Once you identify problem areas on your site and optimize the most important pages to increase performance, it's time to validate that user experiences actually improve with these changes. **It is important to test online performance early and often** as well as understand the benefits of testing in both lab and production environments.





**Performance testing** in the lab allows you to examine new code and configurations for bugs or regressions before they are released into production. Lab testing enables you to push the system to the breaking point to identify capacity limits and how to recover from failure. However, some common performance complications are not found in lab tests, including load balancer issues, network configuration problems, bandwidth constraints, and CDN readiness.

The only way to be truly confident in online performance—and to verify that performance changes have the desired impact on user behavior—is to test it in real-world situations. To make live testing successful, you must have real-time analytics to see if the site has started to experience poor performance or become unresponsive—and the ability to abort load testing immediately. With solid internal monitoring practices, including RUM data, you can safely validate performance in production without adversely impacting users.

**RUM data** also allows you to create more realistic tests. You can take real user behavior and play it back at scale and from the same geographic locations where your users access your application to prove the functionality of your applications and infrastructure. You can also create test plans based on real user paths, to ensure the right pages are vetted before your customers interact with them.



## To **validate** online performance:

- **Confirm changes improve performance and user experiences.** Run tests in pre-production environments to verify your site is ready for peak periods. Then re-run those tests in production to confirm that performance issues are fixed. If not, retest until you can validate optimizations.
- **Load test for scale and distribution.** Use findings in the monitoring stage to design realistic tests that follow actual user paths and mimic user behavior from device access to geography.
- **Consider the impact of bots on peak and flash traffic.** It's critical to factor in the impact that automated traffic from competitors' scrapers and aggregators can have on your site, making your promotion a failure to launch if not addressed correctly.
- **Set up meaningful alerts.** Avoid alert fatigue and react quickly by identifying thresholds that impact performance and receiving notifications when important metrics are missed—not just when the site is unavailable.
- **Adequately prepare for big events or new releases.** Spin up large-scale loads from geographic distributions where you anticipate traffic to stress the system before your event. Set up waiting rooms for incidents where access is delayed, so users stay with you.



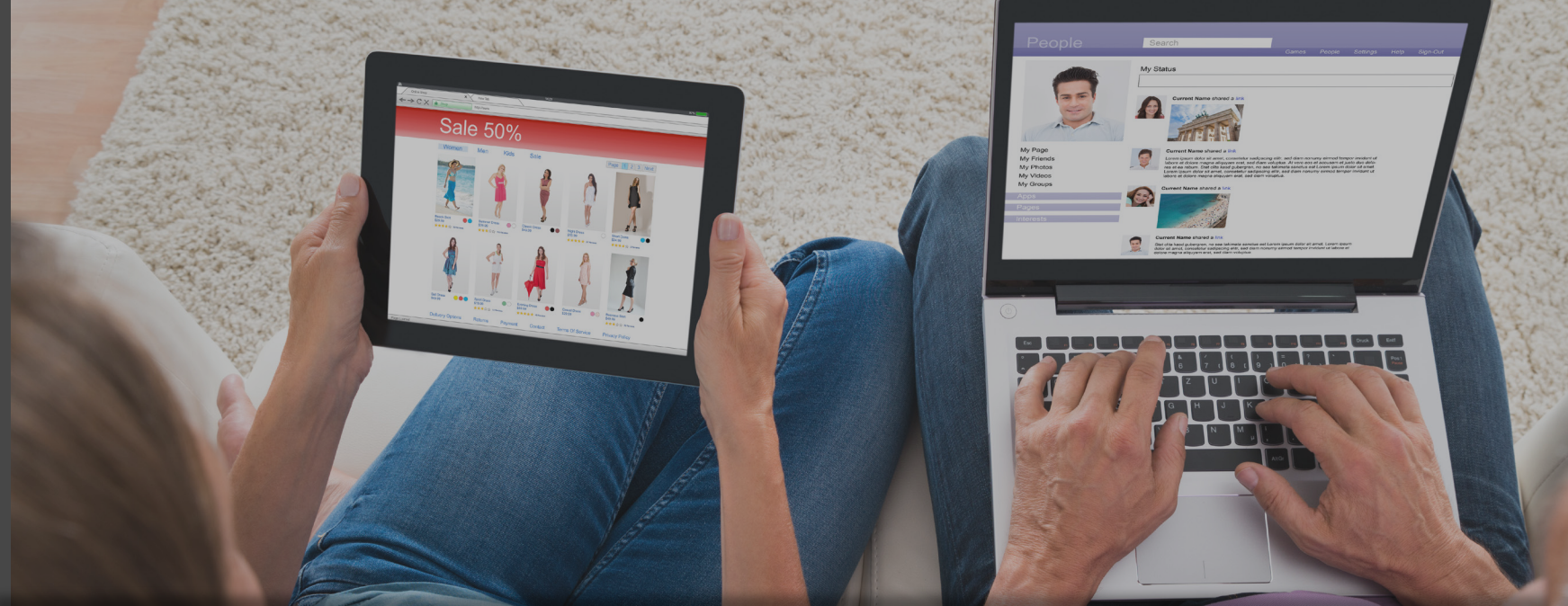
**Nordstrom** saw the business value of testing in production at the 2014 Anniversary Sale—its biggest event with traffic peaks 4-6 times higher than usual—when it found two critical defects in production that it was not able to see in the performance test lab.

**Office Depot** discovered user paths it wasn't testing, including critical pages that affect the success of promotions such as campaign landing page.

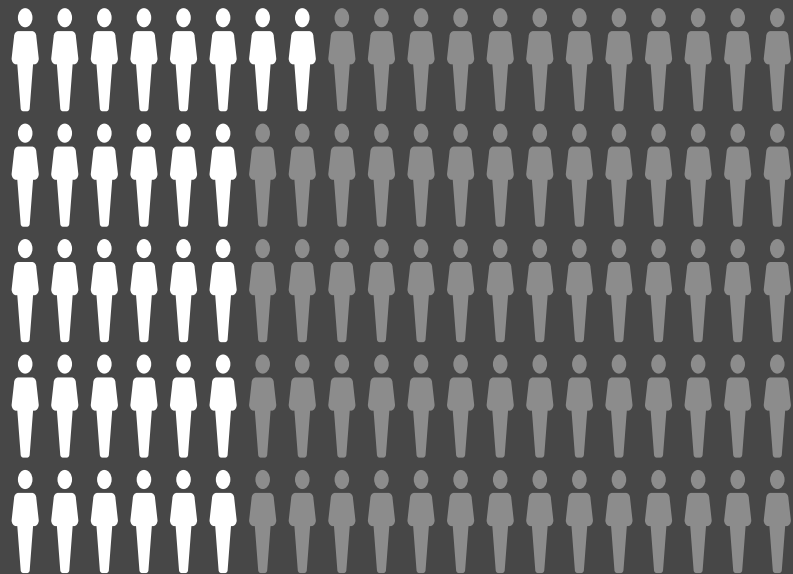




2.4  
seconds  
is the  
sweet spot  
for peak  
conversions

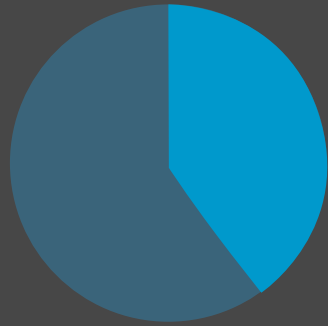


28% of customers **won't return** to a slow site



When you get closer to your online users by understanding their unique needs, access points, and frustrations, you can deliver rich experiences that differentiate your brand and maximize online revenue. **Your digital performance management tools should align your business strategy and IT execution without introducing additional complexity.** A scalable, secure, and integrated solution to monitor, optimize, and validate end-to-end performance will allow you to deliver the user experiences to succeed in today's digital economy.

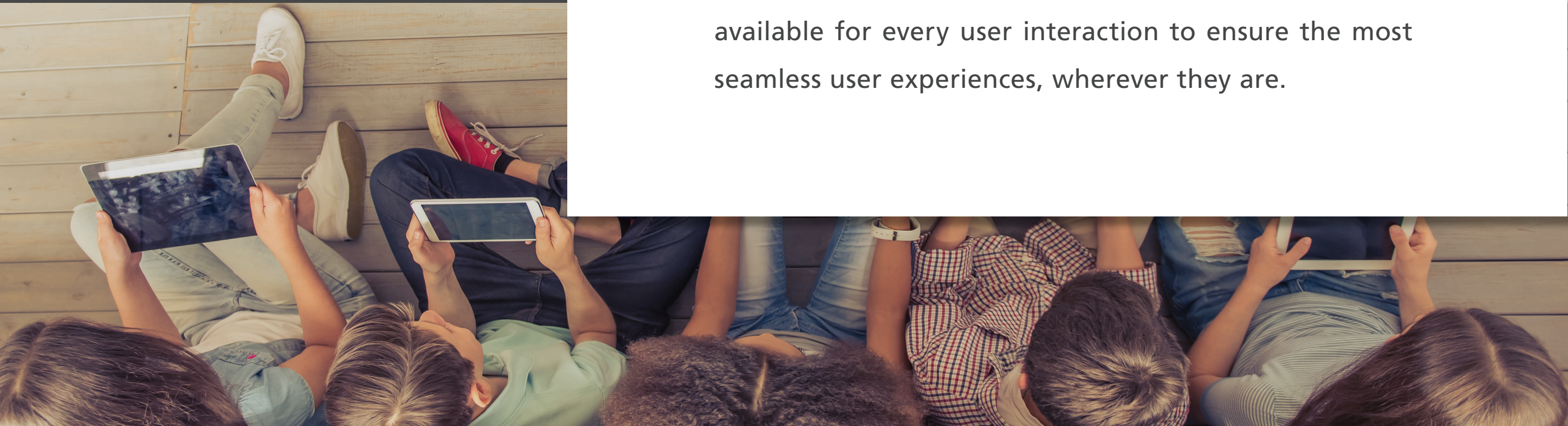




**Application attacks  
erode customer trust  
and have increased**

**35%**  
since 2016

Trusted by all 20 of the top global commerce companies, Akamai is the world's largest and most reliable cloud delivery platform. Its industry-leading technology overcomes Internet bottlenecks across the globe and protects businesses and their users from advanced security threats. With a complete digital performance management offering, Akamai delivers real user insight to identify and prioritize where to take action, integrated tools to optimize performance, and scalable testing to simulate realistic scenarios for the confidence that your applications will meet user expectations. Akamai's global cloud delivery network helps you get closer to and more available for every user interaction to ensure the most seamless user experiences, wherever they are.







**LEARN MORE** about how digital performance impacts your business with the latest findings from [The State of Online Retail Performance](#).

Find out how Akamai's new digital performance management platform can help you maximize online revenue at [benelux@akamai.com](mailto:benelux@akamai.com).

