

AKAMAI WHITE PAPER



Delivering the Best Mobile Experience:
Why Leading Brands Choose Akamai



TABLE OF CONTENTS

MEETING TODAY'S MOBILE MANDATE	1
5 CHALLENGES TO DELIVERING THE BEST MOBILE EXPERIENCE AND HOW AKAMAI OVERCOMES THEM	2
Challenge 1: Limited and Constrained Connectivity Hinder Mobile Web and Mobile App Experiences	2
Challenge 2: Mobile Web and App Users Suffer Device Limitations	4
Challenge 3: Device Fragmentation and Browser Diversity Complicate Content Delivery for Mobile Websites and Apps	4
Challenge 4: Mobile Web and App Developers Struggle to Keep Pace with the Demands of Change	5
Challenge 5: Mobile Apps Require Unique Optimizations	6
CONCLUSION: TRUST AKAMAI, THE MOBILE DELIVERY LEADER	7
The value of availability	7
Industry-leading expertise	8
Customer support	8

Meeting Today's Mobile Mandate

The consumerization of technology and rise of mobile adoption in emerging and established markets have driven companies to invest enormous capital and resources into pursuing the best possible mobile experience for all of their end users. But, without a focused mobile performance solution, these investments can only go so far.

Stakeholders across the business have a vested interest in overcoming mobile delivery challenges for both mobile websites and mobile apps. Developers, application owners, CIOs, and CMOs all understand the mandate to deliver mobile experiences that thoroughly engage their audiences. After all, satisfied mobile users behave in ways that support core business objectives – they browse more pages, transact more frequently, and spend more time and money¹. Conversely, dissatisfied users abandon sites and mobile apps, lose trust in a brand, engage less readily, and share their disappointment both privately and on social media.

Many organizations offer mobile websites as well as mobile apps to their end users in addition to the more conventional channels. This strategy is sound – mobile websites are usually intended to reach broad audiences by providing more exposure to help acquire net-new customers, whereas mobile apps are the best way to engage with the existing customer base to strengthen brand loyalty via richer experiences. App users frequently have a positive perception of a brand which prompted them to download the app in the first place — as a result, these users also expect richer and more engaging user experiences.

The staggering pace of progress in mobile technology poses new challenges. The overwhelming diversity of smartphones and tablets, variety of operating systems, and many different browser alternatives (each offering a different set of capabilities) coupled with multiple connectivity scenarios make delivering optimal mobile experiences consistently to all end users particularly challenging.

In this hyper-competitive and extremely fragmented landscape, unsatisfied mobile device users can easily switch to competitor sites or apps and are often vocal about their poor experiences on social networks. Businesses cannot afford to deliver disappointing mobile experiences; they must capitalize on the mobile opportunity by satisfying the rising expectations of today's users. Akamai's cutting-edge solutions can help businesses overcome technological shortcomings and the challenges associated with delivering the best experience to mobile users.

While some vendors claim to offer mobile-specific technologies, Akamai offers capabilities designed to overcome the challenges of all aspects of mobile experiences — including mobile connectivity, delivery speed, device diversity, and developer complexity.

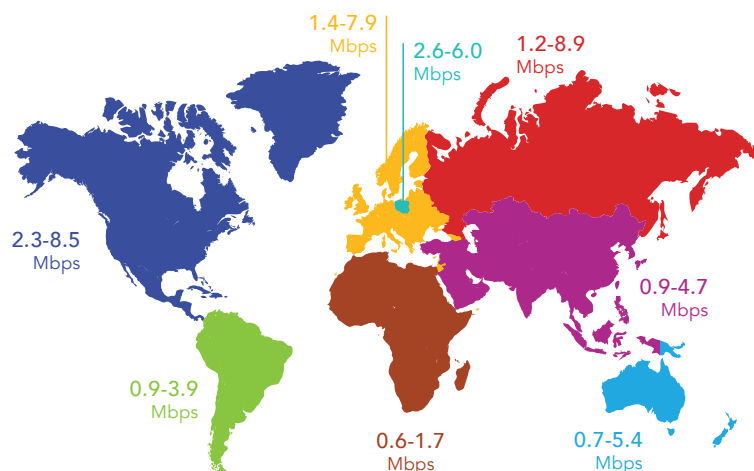
5 Challenges to Delivering the Best Mobile Experience and How Akamai Addresses Them

The mobile “last mile” confounds many efforts to deliver the best mobile experience possible that includes slow networks, unreliable connections, diverse devices, and limited hardware. All of these factors result in end-user interactions that don’t measure up to expectations as compared with a traditional desktop experience. Akamai provides a global network and purpose-built features designed to address these shortcomings in a way that no other solution provider can match.

Challenge 1: Limited and Constrained Connectivity Hinder Mobile Web and Mobile App Experiences

Mobile sites and applications must overcome first- and middle-mile bottlenecks, just as traditional websites do for desktop clients. However, mobile sites and apps are also subject to additional connectivity challenges in the last mile (between a CDN edge and the user) that are far more difficult to surmount. Consider the following²:

- Mobile connections are four times slower on average than a standard desktop landline.
- Roughly half of mobile users report speeds of less than 4 Mbps which can decrease content access and increase end-user frustrations.
- Mobile network throughput can be unpredictable, even when connecting via WiFi.
- Mobile connection speeds vary from country to country, making it extremely difficult to ensure consistent user experiences around the world.



As a result, last-mile connections frequently result in poor end-user experiences due to high latency (i.e., the time delay involved in sending a packet across the network from the mobile device to the data center and back) and packet loss.

Mobile Matters Across the Business

Developers: Those creating mobile-first sites and mobile applications need the flexibility and agility to:

- Iterate quickly
- Integrate services from a variety of sources and vendors
- Confidently develop apps that work across diverse devices, connectivity, and user scenarios and context

Application owners: Those responsible for the success of their company's mobile site and applications want to ensure the best user experience possible, as this translates to higher adoption, conversion, engagement, and revenues.

CIO: The technology leader wants mobile sites and applications – and all related technologies – to interoperate seamlessly with the company's existing technology stack. This is increasingly important in an ecosystem of API-driven data sources.

CMO: The company's marketing chief wants assurance that the brand is well represented in the mobile context to help drive further brand awareness and loyalty that translates into revenues.

Akamai Solution: Optimize Based on Connection

The Akamai Intelligent Platform™ can help overcome these bottlenecks and last-mile latency by delivering content as close as possible to every mobile user globally. The Akamai Intelligent Platform™ is unparalleled – spanning more than 200,000 servers in over 110 countries – and is uniquely suited to accommodate the widest range of connectivity circumstances. This enables businesses to optimally deliver content and apps to mobile users with widely varied connections including Wi-Fi, cellular, and wired broadband connections.

Connections With and Deployments Within Cellular Networks

Akamai addresses mobile-specific performance at all critical layers: at the Internet core, the Akamai Intelligent Platform edge, and within cellular networks. Akamai achieves this by directly connecting to most of Mobile Network Operators (MNO) on a global scale. In addition, Akamai deploys servers inside MNO mobile core networks that reduce latency during the cellular network connection of mobile devices on the Internet.

The Akamai Intelligent Platform employs other technologies when network conditions are unpredictable. It further optimizes the time requests spend transiting the network to keep all mobile experiences consistent, regardless of their connectivity by:

- **Compressing Images Based on Network Quality**

By observing network conditions, Akamai's Adaptive Image Compression is able to apply additional compression to images without sacrificing perceived image quality on a device with a smaller screen. The Akamai Intelligent platform varies the level of compression for JPEG images based on real-time network conditions, meaning pages load faster and more consistently on mobile devices – even when network conditions are poor.

- **Managing Mobile Traffic for Consistent Mobile Experiences**

Global Traffic Management is a DNS-based service designed to help Akamai customers monitor their mobile traffic on a global scale and make changes, such as load distribution, accordingly. This means that mobile users can be served content more efficiently from data centers that are highly available, load balanced, and well suited for the end-user's current circumstances.

- **Compressing Data for Faster Data Transfer to Mobile Devices**

Akamai's proprietary data compression optimization that is built into certain Android handsets, called SHUTR (or "Suppressed Headers for Uplink Traffic Reduction"), is designed to reduce data transmission between mobile clients and the Akamai platform. This helps reduce the amount of data that needs to transit lossy cellular networks in order to deliver a more consistent experience.

Challenge 2: Mobile Web and App Users Suffer Device Limitations

The broad range of devices available to mobile users has created great opportunity for application and mobile web developers. While the very newest devices available offer increased screen sizes, greater RAM, and increased CPU cores, many devices still suffer from screen-size limitations as well as processor and memory constraints that can hinder page rendering speed and the performance of web-connected mobile applications.

Akamai Solution: Optimize Performance with Device Limitations in Mind

Using unmatched intelligence built into its platform, Akamai can apply powerful optimizations to help overcome limitations in the quality of mobile connections. Whether end users access content via mobile websites or mobile apps, Akamai can help less-capable devices maximize the end-user experience with:

- **Faster Mobile Web Page Rendering**

Akamai's EdgeStart reduces the time to deliver the first part of the HTML response, allowing the browser to download important resources such as JavaScript (JS), Cascading Style Sheets (CSS), and some images earlier to increase page load speed. This is particularly beneficial for mobile sites and for end users distant from the origin. EdgeStart leverages Akamai's global footprint of Edge servers to get a response back to the end user as quickly as possible.

- **Earlier Rendering of Above-the-Fold Content for Mobile Websites**

Building on Akamai's powerful EdgeStart capability, Akamai's Edge CSS is designed to help improve the end-user experience by accelerating the rendering of the web page. Edge CSS expedites the request for all CSS files on a page required to render the page. Critical CSS is a more advanced alternative: it analyzes the end-user device and its viewport and accelerates the download of CSS files that are required to render content in the device's viewport, increasing the visible page's download speed.

- **Bypass Embedded Third-Party URL Bottlenecks**

In modern web pages, there are often dozens of calls made for content on external domains. This is frequently the case for mobile websites utilizing third-party services and applications. While performing a DNS resolution for each individual hostname does not take long, enough resources served from external domains can lead to a performance bottleneck. DNS Prefetching avoids this by performing DNS resolutions before objects on these third-party domains are actually requested.

In addition, DNS prefetching can also perform preconnections and initiate links with these third-party URLs after DNS resolution. This helps prevent embedded third-party content from becoming a bottleneck during page rendering.

- **On-Demand Image Loading for Faster Mobile Page Downloads**

Pages are often much larger than the size of the browser window, especially on small mobile screens. However, browsers will load all the images and code on the page — regardless of what will be visible to the end user. Akamai On-Demand Image Loading will only load the images visible within the current viewport. As the user scrolls down, new images are loaded on demand. Just-in-time image loading helps improve page load time and reduces bandwidth for cases when a user doesn't actually scroll down a page.

Challenge 3: Device Fragmentation and Browser Diversity Complicate Content Delivery for Mobile Websites and Apps

Consumers access content from over 24,000 different types of devices a day³: a number that will continue to increase in the coming years. The wide variance of mobile device capabilities poses additional complications to mobile delivery.

The sheer number of mobile browsers available further compounds the device diversity challenge. In addition to the "big four" browsers (Chrome, Safari, Firefox, and Internet Explorer), users access content from over 10 other browsers, each with its own version and feature set. When you multiply the number of browser types by browser versions, it's easy to see why businesses struggle to ensure that sites and applications are delivered, loaded, and rendered consistently across the ever-expanding mobile device ecosystem.

Akamai Solution: Optimize by User Type

Akamai offers powerful features that can identify characteristics of specific devices to deliver the best possible experience for every mobile end user via:

- **Device Characterization for Granular Insight**

Using information derived from the browser's user-agent, the Akamai Intelligent Platform deciphers many characteristics of the requesting device – such as screen size, JavaScript support, and more. By then making these characteristics available as part of the HTTP request header, Akamai empowers companies to make intelligent decisions regarding how to respond to a particular request.
- **Improved Image Development Process**

Akamai's Adaptive Image Compression and Device Characterization features (described earlier) work hand in hand with the Image Converter Cloudlet to maintain image quality on diverse devices. Image Converter uses a pristine source image to create and deliver derivative images that are created at run-time. This capability allows organizations to make powerful and intelligent image transformation and delivery decisions without costly custom development.
- **Mobile Content Targeting via Mobile Detection and Redirect**

Calling upon a monthly updated user-agent database hosted on the Akamai Edge, Akamai's Mobile Detection and Redirect evaluates incoming HTTP requests and discerns device characteristics. Based on this, Akamai can redirect smartphone, feature phone, and tablet users to sites that are specifically designed for their device type. This is intended to improve first-hit response times while reducing the cost of implementing and managing such logic at an organization's on-premise or cloud-based data center.
- **Browser-Specific Image Optimizations for Faster Image Delivery**

New browser-specific image formats allow the same quality experience to be delivered in a reduced payload size, compared with standard JPEG. Akamai client-side optimization recognizes situations where JPEG images can be replaced by browser-specific image formats, resulting in a significantly better user experience.
- **HTTP/2 Support Considering All User Scenarios**

When new Internet protocols emerge, adoption may be fragmented across the user base; some users may be slow to upgrade to new browsers and stay on older versions that don't support new protocols, such as HTTP/2. Akamai HTTP/2 implementation is designed to help customers provide the best user experience for all users by offering the best of both worlds – improving performance through better connection and resource management for browsers that support HTTP/2, while still offering the best-in class client-side optimizations for older browsers that don't support HTTP/2.

Challenge 4: Mobile Web and App Developers Struggle to Keep Pace with the Demands of Change

Developers have enough difficulties dealing with the challenges we have outlined above: constrained and uncertain cellular networks, underpowered devices, and device diversity. Additionally, it's challenging to build web applications and mobile applications that get noticed, keep users engaged, and meet their continually evolving requirements, which can cause developers to fall behind business requirements.

In today's world, websites are indexed and ranked higher by search engines based on their "mobile-friendliness." This makes mobile performance and the delivery and management of content for mobile end users more crucial than ever.

Akamai Solution: More Control and Easier Management of Mobile Content

Akamai provides key insight, control, and management designed to allow developers to understand how users actually experience their websites and apps and then respond to those needs instantaneously with:

- **Real Time End-user Insight**

Akamai enables visibility and control over end-to-end application performance by delivering real-time insights into the end-user experience in the form of Real User Monitoring ("RUM") and Akamai's Cloud Monitor service. Akamai's RUM collects performance data from real end users based on various factors such as browser type, geography, OS, or protocol (including IPv6 and HTTP/2). Akamai's Cloud Monitor service delivers critical transaction event data from Akamai's Intelligent Platform to customers' reporting environments to simplify the task of monitoring complex web applications.

- **Web-Based Management Portal**

Akamai's Luna Property Manager offers self-service configuration tools to give customers access to an extensive set of rules-based logic to manage cache controls, header and cookie handling, performance optimizations, mobile request handling, and many other advanced features. Akamai also makes it easy to access, use, and manage its unique capabilities – including all Luna capabilities – via APIs.

- **Fast Page Content Refresh and Configuration Changes**

Akamai offers the ability to purge cached items in less than 5 seconds so you can stay ahead of your mobile users. This capability is designed to help developers anticipate the needs of their end users and respond to new business requirements quickly.

Challenge 5: Mobile Apps Require Unique Optimizations

Accelerating mobile websites requires HTML and image optimizations, but mobile applications present their own unique challenges when it comes to performance. Many mobile apps function via API requests to origin, which requires optimizing API calls.

Akamai Solution: Employ API Specific Optimizations

Akamai delivers over 225 billion API and web services transactions on its Intelligent Platform every day. Akamai leverages a unique set of API-specific capabilities designed to provide performance, scale, offload, and reliability to mobile websites and mobile applications:

- **Accelerate APIs for Faster Mobile Apps**

Akamai offers core technologies, such as SureRoute, that can improve the performance of delivering your APIs. SureRoute chooses an optimal path to your origin server to ensure that dynamic API content is delivered to consumers via the fastest, most reliable route. Inside the Akamai network, proprietary techniques are used to avoid Internet congestion points and unnecessarily long routes. Additionally, real-time data collected by Akamai selects the optimal path between your origin infrastructure and the Akamai Edge servers.

- **Cache APIs for More Efficient Mobile App Content Delivery**

APIs often service request data even if the data has not changed. Yet API responses are often highly cacheable, containing content that does not change frequently. Akamai can cache these responses at the Edge (even for mere seconds) to position the content closer to the consumer requesting it. Caching keeps requests off the network, helping to preserve the battery life of mobile devices.

- **Compress APIs to Reduce the Size of Mobile App Calls**

Akamai can compress API responses that use text-based data formats such as JSON or XML. Compression of API responses can reduce the payload size and thus the delivery time of API responses. Additionally, if the system consuming the API supports GZIP decompression, Akamai customers can enable compression of API calls even further, which can result in a 60-90% reduced payload size.

Akamai is the only CDN that has developed unique capabilities to offer measurable performance optimizations for every mobile use case.

Real-world Success: Akamai customer accelerates mobile App APIs by 153%

Countless businesses have taken advantage of Akamai's unmatched capabilities to optimize the mobile experience. Blued, which developed a Chinese dating application for gay men, is one of them. This native mobile app on iOS, Android, and Windows relies on a JSON-based HTTP API to enable numerous innovative features. However, Blued found it challenging to ensure the best end-user experience possible when delivering its application from two data centers in China.

By taking advantage of Akamai Ion, the company was able to accelerate its HTTP-based API calls and user transactions such as registration and login. The result was a 153% performance boost that yielded higher user satisfaction and engagement and helped Blued more quickly sign on new users in the United States and Southeast Asia.

Every day, Akamai:

- Optimizes over 200 billion API calls.
- Serves over 145 TB of mobile app data.

- **Prioritize APIs for Better App Traffic Management**

API call volumes can be unpredictable, and a peak traffic event could overwhelm your infrastructure, resulting in a poor end-user experience. The Akamai API Prioritization Cloudlet provides a configurable policy that when activated, will respond to a percentage of API calls with an alternate, non-HTML asset, such as JSON or XML. These assets can be deployed on Akamai NetStorage to help alleviate strain on the API service. The Cloudlet can also be used to define and prioritize particular traffic segments to an API while serving other consumers an alternate static experience. For example, during peak hours of an API-driven web service or app, Akamai can help segment their audience and direct a portion of API requests to an alternate .json or .xml response delivered from Akamai NetStorage. This reduces the volume of requests that are sent to the dynamic application to a level that it can handle. Akamai can then serve an alternate static experience to the overflow traffic, helping those visitors to still have a quality experience even though they are not accessing the application directly.

In addition to these built-in capabilities, Akamai customers regularly leverage custom capabilities for mobile apps by working with the Akamai Professional Services team. These custom solutions include:

- **Faster User Authentication via APIs**

Each API request associated with a mobile app is essentially two requests: the first to authenticate, the second to return the requested response. To ensure that this does not present a performance challenge, Akamai can cache the authentication key under a unique cache key for a few seconds to negate the need to return to the authentication server for every request reducing time to authenticate.

- **Easier App Support by Using API Versioning at the Edge**

API versioning at the Edge can help translate or orchestrate requests for different API versions. Akamai makes it easy to craft logic on the Akamai Edge to modify request parameters to rewrite URL structures or headers that deliver the proper version of an API to a consumer.

This functionality provides the ability to dynamically translate API calls on the fly between a legacy API version and a newly released version. This optimization is intended to allow organizations to focus on development while Akamai handles the translation.

- **Efficient App Development and Improved App Performance with ESI**

Edge Side Includes (ESI) is a simple markup language that allows customers to define components of content that may be dynamically assembled and delivered at the Edge. As a result, businesses can develop applications once and choose where the application should best be assembled: on the content management system, the application server, or on Akamai. This reduces complexity, development time, and deployment costs.

ESI can be used to coalesce multiple API calls at the Edge and API calls that are associated with different functions of an app into a single API call. This can significantly reduce API traffic and improve mobile app performance.

Conclusion: Trust Akamai, the Mobile Delivery Leader

To capitalize on the mobile opportunity, businesses must deliver high-quality site and app experiences that consistently meet or exceed the levels of performance and responsiveness end users expect. As we've explored, this is challenged by connectivity constraints, device limitations and fragmentation, browser diversity, app requirements, and the pace of change. Fortunately, organizations no longer need to settle for mobile experiences that leave end users dissatisfied. With unique and advanced technology, network deployment, infrastructure, expertise, and optimizations, turn to Akamai for solutions that are designed to ensure high-performing mobile sites and apps. By leveraging these Web Performance Solutions – especially the flagship performance product Akamai Ion – businesses can deliver mobile experiences that translate into brand awareness, user adoption and engagement, and increased revenues.

The value of availability

In the ever-competitive world of mobile commerce, organizations cannot afford to have their sites or apps go down – a few seconds of downtime can result in significant financial losses. For these customers, Akamai web performance solutions are backed with industry-leading Service Level Agreements that guarantee 100% availability.

Industry-leading expertise

Akamai has been helping businesses meet and exceed user expectations across devices and networks for over 18 years.

- **Services:** Through the Akamai Professional Services team, customers gain access to the expertise of more than 500 professionals in 23 locations worldwide. This team of experts draws upon years of experience designing and implementing solutions for more than 1,000 Akamai customers, helping them solve complex infrastructure, delivery, and application performance challenges.
- **Experience:** Since its founding in 1998, Akamai has consistently led the CDN market with innovative services and features. Akamai's unmatched, globally distributed Intelligent Platform delivers up to 15-30% of all web traffic daily, has served some of the Internet's largest events, and supports many of the world's biggest brands.
- **Technology leadership:** Since its inception, Akamai's founders and employees have developed innovative, industry-leading solutions designed to overcome even the most complex Internet delivery challenges. Akamai has secured hundreds of patents in its pursuit of providing the best end-user experience possible. Akamai has also led the effort to develop open-source initiatives such as Edge Side Includes. As a future-forward company, Akamai is involved in developing and supporting new Internet protocols (e.g., IPV6, HTTP/2) for the next generation of web applications.

Customer support

Akamai's highly skilled global services and support team is available 24/7 to assist customers with issues of all levels of severity. Customers can choose from tiered support offerings to take advantage of the level of support that best fits their needs. To complement this, Akamai assigns every customer a dedicated and integrated multi-discipline account team. This team of skilled and knowledgeable individuals can help customers address any technical issue and achieve their business goals through the effective use of Akamai's solutions.

For more information please visit our mobile performance web pages at akamai.com/mobile and you can even share your mobile site URL, and we'll create a customized report, which shows how we can optimize your brand's mobile experience.

Source

1. <https://content.akamai.com/PG2920-Performance-Matters.html>
2. Akamai's State of the Internet
3. Akamai



As the global leader in Content Delivery Network (CDN) services, Akamai makes the Internet fast, reliable and secure for its customers. The company's advanced web performance, mobile performance, cloud security and media delivery solutions are revolutionizing how businesses optimize consumer, enterprise and entertainment experiences for any device, anywhere. To learn how Akamai solutions and its team of Internet experts are helping businesses move faster forward, please visit www.akamai.com or blogs.akamai.com, and follow @Akamai on [Twitter](https://twitter.com/Akamai).

Akamai is headquartered in Cambridge, Massachusetts in the United States with operations in more than 57 offices around the world. Our services and renowned customer care are designed to enable businesses to provide an unparalleled Internet experience for their customers worldwide. Addresses, phone numbers, and contact information for all locations are listed on www.akamai.com/locations.