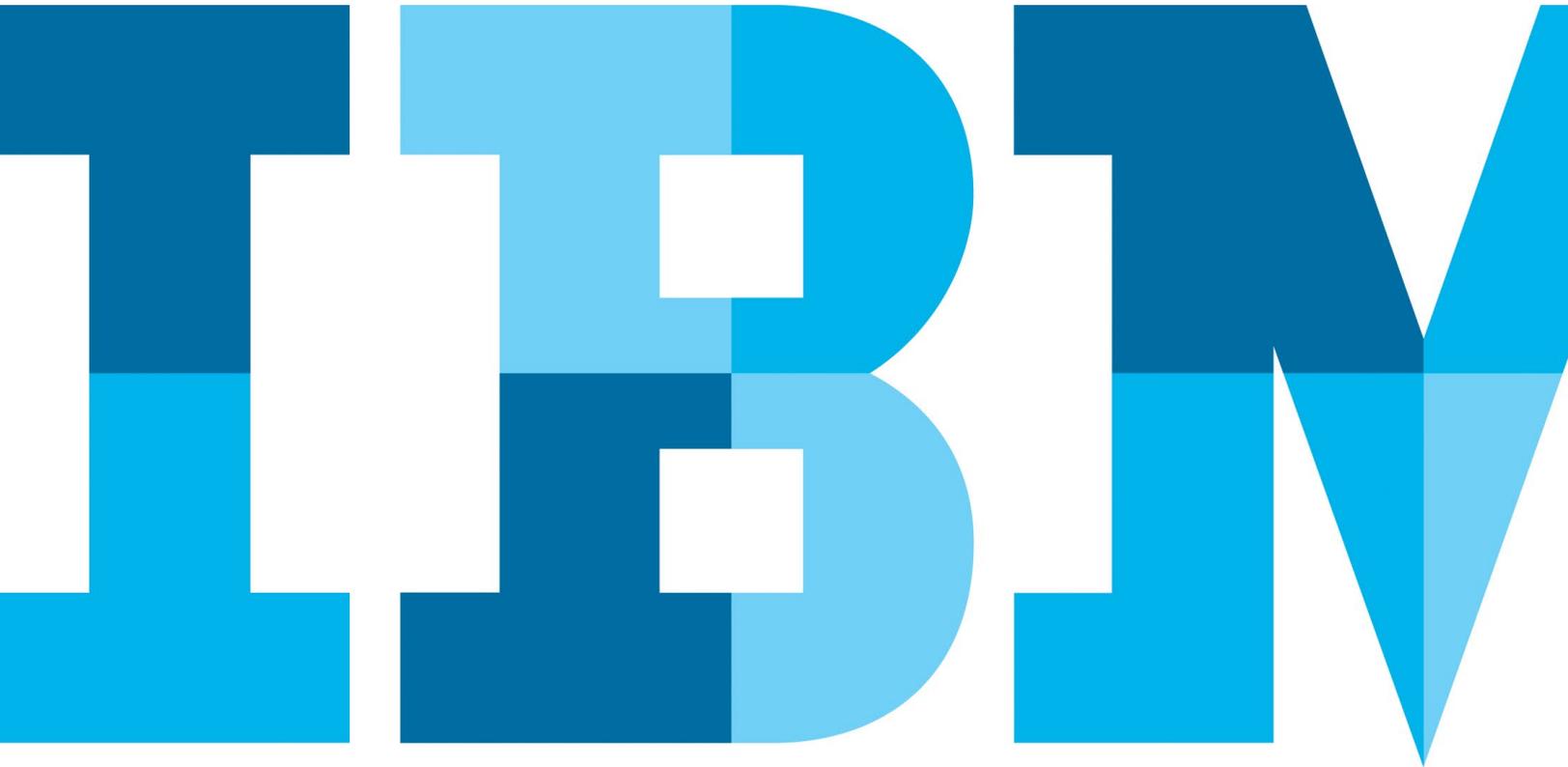# Online performance seriously impacts the bottom line

For e-commerce success, you need to meet user expectations with fast, reliable performance across web and mobile platforms

IBM

Introduction

The opportunities in today's e-commerce marketplace are huge—prompted by forces ranging from the exploding growth of online commerce itself to the rise of mobile computing. These same opportunities, however, also present new challenges that can ultimately impact the success of your e-commerce and other online initiatives.

To stay competitive, the web experience that your online platform delivers must meet or exceed customer expectations. It must be fast, engaging and responsive. As a result, the mobile and web architectures that support it are now business-critical. To meet evolving e-commerce and online demands, you need to meet pivotal challenges in the design and development of your web applications and infrastructures.

This white paper explores the opportunities and challenges experienced by e-commerce and other firms with a significant online presence, as well as the capabilities and solutions they must embrace to deliver high-performance design and a responsive experience—all requisites for success in this transformative and competitive environment.

The online channel sees unprecedented growth

E-commerce firms across the globe are experiencing a shift in their revenue sources to a model that is increasingly dependent on the online channel. Brick-and-mortar businesses are now embracing e-commerce and working to maximize the opportunities the online channel can bring. And the result is impressive. Online retail spending in the US grew to 14 percent of the retail total in 2013, while overall consumer retail spending in the US only grew by half as much.[1] This significant rise in online purchases presents a huge opportunity for the full range of e-commerce businesses.

What is more, the mobile platform extends this fast-growing online opportunity still further. The use of mobile devices for e-commerce has now extended across industries and continues to climb rapidly. For instance, in the UK, mobile computing is already accounting for one third of online sales—one study found that 32 percent of all online purchases in the UK between November 2013 and January 2014 were made using mobile devices.[2] In addition, global e-commerce sales via mobile devices in 2018 are expected to reach USD638 billion—roughly the same level as the world's entire e-commerce market in 2013.[1]

The adoption of mobile computing, however, isn't only about retail. Recognizing the power of the mobile platform to impact the bottom line, financial services companies are also making the transition to mobile services. A recent study reported that 32 percent of US adults, or 35 percent of cell phone owners, bank using their mobile phones.[3] The increasing adoption of mobile devices presents new sales and growth opportunities for a range of e-commerce firms. But it also presents new obstacles to maximizing the returns from this rapidly growing channel.

Customers expect fast, high-quality web experiences

As online channels—and specifically the mobile platform—grow, customer expectations for a superior online experience grow right along with them. If an organization does not provide customers and potential customers with the optimal experience they prefer, users can usually find a competitor who does—raising the competitive stakes. The issue boils down to speed, which has become critical to the success of e-commerce and other online operations. It's reported that a one-second delay in web page load time can mean 11 percent fewer page views, a 16 percent decrease in customer satisfaction, and a 7 percent loss in conversions.[4]

Many firms find, in fact, that their customers not only expect better responsiveness of their web and mobile applications but that they also demand richer content. Yet with its sophisticated graphics, sound, images, videos and applications logic, rich content can add up to large payloads and more complex rendering—all of which can slow online responsiveness.

Don't get off to a slow start.

A one-second delay in web page-loads can cause:

11% decrease in page views*

16% loss in customer satisfaction*

7% loss in customer conversions*

Supporting online commerce requires speed, speed and more speed.

Deliver winning performance.

E-commerce firms must deliver highly-responsive and fast web experiences to keep customers engaged. They need online performance solutions that ensure:

High performance:
Accelerate feature-rich web experiences to meet customer performance expectations.

Scalability:
Scale to meet increased volume with solutions that allow faster data access and application performance.

Availability:
Avoid site failure in order to consistently deliver fast, responsive online experiences.

Intelligence:
Leverage device and network intelligence for insights into your users' mobile consumption.

Security:
Protect transactions and data to ensure a safe online experience for your customers.

"Just One Second Delay in Page-Load Can Cause 7% Loss in Customer Conversions," Tag Man, March 14, 2012

Amid online success, technology challenges emerge

As organizations work hard to optimize and effectively manage today's and tomorrow's online business, they are rapidly discovering that maximizing performance of the online experience is central to success. They also recognize that the technical architectures necessary to support these growing online channels are now business-critical.

In order to consistently deliver high-quality and highly responsive experiences to capture online opportunities, e-commerce firms face technology challenges in providing rich content and managing capacity demands and new workloads. They must find effective ways to overcome the limitations the mobile channel presents, scale up to accommodate peak loads and address performance issues on almost every front. Two areas present particular performance challenges:

Mobile devices and connectivity

Mobile devices have changed the commerce landscape, rapidly becoming not only the easiest way for customers to buy but also the most effective way for organizations to reach consumers at the moment of decision. Yet organizations are struggling to deliver mobile experiences that live up to user expectations. More users accessing more dynamic content on more devices can pose a performance bottleneck. And getting the necessary performance from a web-hosting environment for mobile devices is different than providing performance for desktop users. The challenges mobile computing presents to organizations seeking to deliver optimized web experiences include:

- **Mobile networks:** Unlike fixed-line networks, mobile networks were not designed for web traffic—they were designed for voice. As a result, they often experience speed and reliability issues that can impact load times.
- **Vast diversity of mobile devices:** The wide range of mobile devices and usage contexts pose new performance issues— among them, slow processing due to the fact that mobile devices have only a fraction of the CPU power of desktops.

- **The rapid pace of innovation:** In rapidly growing mobile and online environments, devices, networks, software, protocols and standards are continually in flux—creating complexity and unpredictability that can make it difficult to ensure high performance and a consistent user experience.

In response, e-commerce firms and others doing business online must find effective ways to overcome the limitations of wireless networks and delivery systems—and they must design strategies for handling the extensive diversity of end-user devices, each of which has its own capabilities and limitations.

Responsive web design

Many organizations have attempted to improve the way they engage mobile users by using responsive web design (RWD). This web development approach seeks to provide an optimal viewing experience by enabling web pages to respond to the screen size and other elements of the context in which they are loaded so that the user interface changes accordingly.

But while adopting a RWD strategy is a step toward addressing website usability and design challenges, issues persist. RWD sites tend to be complex and, as a result, they can make mobile performance painfully slow. One of the challenges presented by the large, complex pages associated with RWD is that end users' browsers need to process and render them. Processing and rendering on underpowered mobile devices with limited computing power, however, can result in slow performance that negatively impacts the user experience. Reports suggest, in fact, that most RWD sites do not meet end users' expectations for a high-quality online experience.[5] However, steps can be taken—as outlined in this white paper—to isolate and alleviate responsive performance barriers in order to ensure an optimal user experience.

Solutions required for fast, reliable online experiences

Faced with today's online user expectations, system performance challenges and the need to understand in real time what platform customers are using, e-commerce enterprises and other organizations with a significant online presence must transform their ability to deliver responsive and fast mobile web performance. In the competitive arena of digital customer engagement, web developers and architects must examine, measure and reevaluate how they can improve their delivery of:

- High-performance responsiveness
- Scalability
- Availability
- Intelligence
- Security

The goal is ultimately to reduce the complexity of delivering high-performing web experiences with proven technologies that increase conversions and user engagement by delivering highly responsive user experiences.

High performance

For the online customer, and particularly the mobile user, speed is integral to a satisfactory engagement. And for e-commerce enterprises, delivering fast, high-quality web experiences for highly interactive content is critical for increasing conversion rates and to improve the bottom line. In fact, sluggish page loads can significantly reduce customer engagement. For example, Etsy discovered that adding 160 KB of image bytes to its pages increased the bounce rate by 12 percent.[6]

Enabling mobile devices to achieve high performance from your web-hosting environment, however, requires a different technology approach than what has been traditionally used to serve desktops. And due to the rapid pace of innovation and speed of adoption in the mobile platform, firms will need to move with speed and agility to design the right architecture to deliver the

responsiveness their customers require. Three key recommendations for optimizing the performance of RWD-based sites include:

- Measuring site performance from the user's point of view, particularly time-to-first-rendering and time-to-first-interaction
- Optimizing front-end delivery, including code and code delivery
- Reach agreement among development team members and internal stakeholders regarding the performance standards your organization needs to achieve and maitain.[7]

These steps can help a firm find solutions that reduce website and infrastructure complexity, enable a faster end-user experience and better support a wide variety of mobile strategies, whether adopting RWD or working to improve its performance.

Scalability

Whether e-commerce firms have an aggressive growth strategy or are simply attempting to better manage the unprecedented growth in online and mobile platforms, scalability is critical to success. Scaling to meet an increase in business volume requires technology strategies and architecture that allow faster data access and faster application performance—even as data and applications increase. Firms must provide capacity on demand to meet peak web traffic. This can be a particular challenge with lower-processing power mobile devices. Results are typically best achieved with the power and scale of a robust platform. In the corporate culture, it's important to improve mobile performance of web environments as more and more data is accessed via mobile devices instead of desktops.

Rather than simply adding hardware, storage and network capacity to existing architecture, a growing number of organizations achieve web scaling through optimization services.[7] Whether the organization is seeking to seamlessly scale across

its growing business, or across platforms and devices—including mobile—many find they can optimize performance with capabilities such as:

- **Caching:** Speed can be increased by continuously pulling and caching fresh content onto servers that are closest to end users.
- **Advanced offload:** The user experience can be improved with a granular and intelligent caching of dynamic and personalized content based on user segmentation.

Ultimately, effective scaling solutions can deliver rich, fast and engaging web experiences across devices, networks, browsers and locations.

Availability

Avoiding site failure is essential to delivering fast, responsive online experiences that meet or exceed user expectations. To meet this need, highly available hosting solutions can keep an organization's website available even when other sites are experiencing outages.

When exploring solutions for ensuring availability, organizations should look for comprehensive capabilities including:

- Monitoring the availability of the origin infrastructure
- Rerouting requests when the origin is not available

The superior level of protection that these capabilities provide not only ensures continued access to web content, it also provides a critical advantage in the competitive e-commerce environment—keeping your online environment open for business to meet your customers' needs.

Intelligence

Improving the e-commerce experience is not simply about overcoming the physical limitations of systems—it also relies heavily on understanding and meeting the requirements of user devices and the particular conditions surrounding a given connection. To optimize the user experience on a scenario-by-scenario basis, today's e-commerce firms need a way to leverage device and network intelligence for valuable insight into their audience's mobile consumption—as well as the characteristics and capabilities of the devices being used.

To improve the user experience, organizations need consistent and reliable visibility into the performance their customers encounter, across browsers, networks and devices. The right intelligence solution—delivering sophisticated knowledge about each data request, including information about device characteristics and real-time network conditions—can enable content providers to provide a differentiated experience for each end-user request. It also can reduce the cost and complexity of keeping up with a continually changing landscape of devices and their capabilities. The intelligence gathered can provide valuable consumer insights that enable strategic business decisions.

Security

As the online channel continues to grow, security threats increase as well. Enterprise organizations are being hacked, causing havoc across their entire customer base. The loss in business revenue and deterioration of the brand image are enormous concerns—driving organizations to adopt new technology solutions to ensure that transactions and data are protected. Customers require a safe online experience; one negative experience can significantly impact a firm's customer base and brand loyalty.

Conclusion

Measuring an e-commerce firm's performance profile, taking a new look at its approach to web scaling, ensuring availability, providing a targeted user experience and protecting online transactions are critical steps not only to surviving but also to thriving in today's e-commerce environment.

IBM® Edge Delivery Services offers the benefits and proven technologies needed to meet these challenging demands. With a tightly integrated, comprehensive suite of web delivery, acceleration and optimization technologies, Edge Delivery Services can simplify increasingly complex web delivery and enable a faster website experience—one that is highly available, secure and scalable to meet peak capacity demands with power and scalability.

As organizations seek to harness the potential of the mobile platform, partnering with a provider that can help overcome online and mobile challenges can be an important step. Edge Delivery Services delivers performance from first mile to last, intelligently applying optimization layers tailored to the unique context of each request. Unlike point products that address only a small piece of the puzzle and may quickly become obsolete, Edge Delivery Services supports a broad range of mobile strategies, enabling organizations to move with the agility and responsiveness critical to succeed in this rapidly evolving and highly-competitive landscape.

For more information

To learn more about IBM Edge Delivery Services solutions for e-commerce enterprises, contact your IBM representative. You can also consult with your IBM Business Partner, an authorized expert who understands your business and is ready to deliver the right solutions and maximize the return on your investment. Or visit: **ibm.com**/EdgeDeliveryServices

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