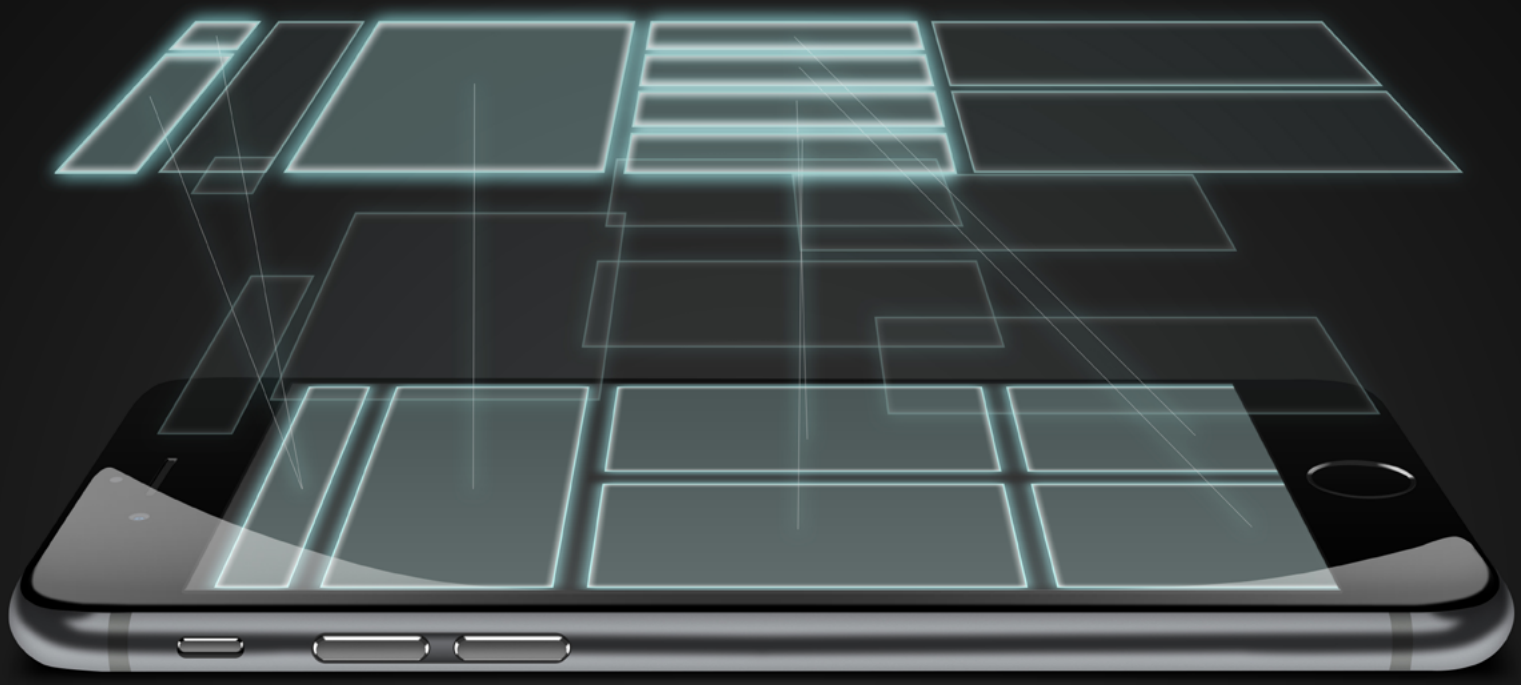
ADAPTIVE WEB DESIGN and the CHANGING MOBILE ENVIROMENT

How the changing mobile environment demands an improved approach to website delivery



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WHITE PAPER

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Executive Summary

The web has evolved. The growing popularity of mobile devices has led to a huge expansion in the number of options available to those who seek to communicate with consumers. Thus the question is no longer whether it's worth investing in cross-device and cross-platform experiences – it's how to do so.

Unfortunately, deciding how to approach creating web experiences is not easy. In this paper, several important technologies – including their history and use – are described using clear, straightforward language. The paper also addresses the challenges of building consistent and efficient mobile experiences in a marketplace where everything can change from year to year, including customer preferences, the opinions of experts, and even the nomenclature itself.

In particular, the paper will highlight adaptive web design (AWD), a new and growing method for delivering browser-based web experiences. We will explain how it compares with other methods in effectiveness, cost, and business impact, and why a number of leading organizations have chosen it for their web experiences.

The Changing Mobile Environment

The art of communicating with customers through the Internet has increased massively in complexity and sophistication. There seems to be no constant except for change. People now access websites from desktop computers, tablets, laptops, phones, and wearables, via connections that range from lightning fast to painfully slow. They may seek general or specific information, based on immediate or future needs. They may be highly competent technology users or first time smartphone users. Even time is not a constant, given that attention spans and patience levels continue to decrease as the expectations rise for fast experiences.

What is clear is the greater role being played by mobile devices. Consumers are turning to portable technologies to assist with steps in a transactional relationship, from initial information to purchase and post-sales engagement. In response, companies have raced to deliver information to their customers in the most efficient way possible, competing directly against technical issues like connection speed, device memory, and screen real estate.

The evolution of the mobile representation of digital storefronts and digital media has embraced a variety of iterations, including the mobile m-dot site, the native app, and responsive web design (RWD). Each of these provides degrees of functionality and comes with incumbent limitations. The latest of these popular iterations is a new approach called adaptive web design (AWD).

The Challenge: What Kind of Mobile Are You?

One concern in building websites that are accessible to a highly mobile customer base is that people may not turn exclusively to mobile devices just because they can. They are relying on their phones for browsing, showrooming, and shopping more than ever, but they haven't completely forsaken the desktop environment. The desktop experience must remain top-notch, and the mobile experience must be built to match it in functionality, design, and performance.

Another concern is that of context – determining and delivering what the customer will want at any given moment. Do they want the entire catalog, or simply a fast subset of offerings? How will the customer react when offered too much or too little?

The First Wave: the M-Dot Site

To better understand the current environment of customer-facing mobile experience, it is necessary to look at what preceded it. This also helps clarify some of the overlapping terminology that dominates this space.

At the dawn of the smartphone, the vast majority of websites had no mobile-specific presentation. The desktop layout was simply replicated at a smaller scale for mobile users. When relatively few people accessed websites on their phones, there was little demand for a better option. But those who did use the mobile web often grew frustrated as they struggled to view elements like large graphics, which were clearly designed for much larger screens. Worse, it was often nearly impossible to use forms and drop-down selection menus meant for full-size cursors, not fingers, thumbs, or miniscule Blackberry rollers. The excessive pinching or scrolling needed to consumer content led to dissatisfaction or site abandonment.

As mobile started to play a greater role in consumer culture – particularly after the release of the iPhone in 2007 – mobile-specific web solutions were devised. One approach to delivering website information for mobile devices was to build separate, mobile-specific versions of a website, or m-dot site (so called for the "m" subdomain used in place of "www"). This was an early and somewhat crude effort, since it involved developing and maintaining two or three separate versions of a web app in a single code bank to have the correct one ready for the receiving mobile device.

Aside from the maintenance overhead, problems arose with m-dot when designers chose to vary the mobile content and alters the customer experience depending on device. They did this for two reasons: first, they saw an opportunity to focus on what they assumed the user would need in the mobile context, and second, to minimize the amount of effort and expense required to maintain a mobile site. The results were mobile sites with dramatically rearranged and simplified navigation structure and limited access to content when compared with their desktop counterparts.

For these reasons, the m-dot sites did not succeed in improving the mobile experience for consumers. A customer who first visited a site on a desktop computer and returned on a mobile device experienced missing or altered pages or links. It was, in essence, an inconsistent site experience.

Next Step: the Native Mobile App

What is an "App," really?

The term "app" has become a catch-all and a source of some confusion. Most people think of "app" as it applies to programs run on mobile smartphones. This particular type of app is known more specifically as a "native" mobile app, because it resides internally and functions solely for a specific smartphone operating system. This is distinct from a "web app," a term that refers to code that runs in a web browser on any device. In essence, any website that includes interactive elements, even one as simple as a form, can be technically considered a "web app." As websites become more complex, members of the technology community are more often using the "app" moniker rather than "site", creating some confusion for those less accustomed to techy parlance.

As smartphones became a must-have around the world – there are countries where the number of functioning smartphones outnumbers the population – native mobile apps became common for almost every area of human interest. We all know the expression, "there's an app for that." Mobile apps are relatively easy to program and most focus on a precise and finite set of tasks. Their easy download-and-install procedure, made mobile apps a novel and popular component of the expanding collection of tools and services that could be offered to smartphone users.

Native mobile apps have a great degree of functionality and usefulness. An airline can serve its customers by offering a smartphone app that permits early check-in, confirmation of departure time, and changing of seat assignments. These are all highly specific, localized actions performed by a single customer on the move – in a taxi or walking through the airport with bags in hand. For the moment, this is what the customer wants and needs.

Native mobile apps allow the vendor to push notifications and promotional material to the user, and can deliver added value by integrating with a phone's other features, such as the accelerometer, camera, and location sensor.

While the end user experience of native apps is leading-edge, the format also presents a number of challenges. Separate apps are required for each mobile platform (iOS, Android, BlackBerry, others), along with ongoing maintenance for each. This makes even small alterations or updates to the user experience a large undertaking. Plus, users aren't always enthusiastic about downloading more apps to their phones. They take up space, are easy to forget about, and can make the phone's performance suffer. Plus, the extra step of navigating to an app store for a download is a barrier to fast access to information. There are exceptions, especially considering the massive growth in time spent on native apps like Facebook and YouTube[1]. But the average online retailer or digital media entity will have to reckon with the potential for slow adoption and low in-app engagement, after spending heavily on development.

[1] [http://www.flurry.com/bid/109749/Apps-Solidify-Leadership-Six-Years-into-the-Mobile-Revolution]

The Current Generation: Responsive Web Design

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Eventually, increasing use of the mobile web from a bevy of devices including desktops, tablets, and phones, has created a need for totally unified cross-device web experiences. This means organizations must develop web apps that could serve everyone, while also taking into consideration the particular form factors and limitations of every device.

This gave rise to two related approaches – responsive web design and adaptive web design. The technologies are complementary, since each centers on the concept of a web app using a single URL that automatically adapts for the full range of devices. As Stuart McMillan stated in Econsultancy.com, "where they differ is in the logic used to determine which devices get which content." [2]

Responsive web design sends standard code that enables websites to be displayed correctly on any screen size. The HTML code sent from the server is consistent for any device requesting the data. The layout defined by RWD is based on a grid concept, using rows, columns, and breakpoints. For screens of different sizes, the grid rearranges to match the screen area, and the images and items continue to fall in line sequentially. These changes happen on the client side, in the device itself. An example of this concept in action can be seen by going to an RWD site on a PC, and dragging the side of a web browser back and forth to watch the page adapt in real time.

The downside of RWD is that it's very difficult to design a desktop site that includes all the desired features, content, and functionality that also works seamlessly on smaller screens. Given that all the HTML, CSS, and JavaScript files of the desktop presentation – the "full payload" – will be downloaded by mobile browsers, the potential for slow performance grows. As a result, RWD sites tend to be significantly slower than their m-dot counterparts[3]. This can defeat the purpose of creating a site that caters to all users, as it simply shifts the mobile experience problem from one of functionality to one of performance. Successful RWD requires that vendors have an intimate understanding of their business, their website, and their consumers, so the app content can be highly streamlined and organized properly for optimum presentation on different devices.

[2] Charlton, Graham, What is adaptive web design (AWD) and when should you use it? https://econsultancy.com/blog/64914-what-is-adaptive-web-design-awd-and-when-should-you-use-it posted May 28, 2014

[3] [https://www.internetretailer.com/2014/06/02/ugly-truth-about-responsive-design-and-how-fix-it]

Adapt or Die: AWD

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Adaptive web design (AWD) is based on server-side customization of the user experience – the ability for the server to detect the receiving device and deliver the suitable material, rather than having the device, or client, do all the heavy lifting. The advantage of adaptive web design, when done correctly, is to optimally deliver and display pages for any combination of location, device, and network capability. It delivers better performance on mobile devices while maintaining visual consistency between the mobile and desktop sites.

Adaptive web design identifies the type of requesting device and automatically delivers a specific set of HTML, CSS, JavaScript, and media (graphics and text) that fits its hardware and operating system, whether on a smartphone, tablet, or desktop. For example, a user on an iPhone6+, which has a particular amount of screen real estate and LTE capability, will be served a differently optimized experience than a user on an iPhone4. These contextual elements are addressed in the "backend" at the point of delivery.

AWD sites may use the same grid-stacking concept as RWD to dynamically render the most basic website elements on the client side. But for images, JavaScript, and other resource-intensive elements, adaptive web design sends only the code needed for the best possible delivery and construction given the user's context. This is determined by having the server read the uploading device information (via a user agent string) along with the URL request.

As Stuart McMillan writes, "this ability to switch content (templates) based on server-side device detection is the heart of adaptive design." [4] Or to make a garment analogy: if responsive web design is like spandex, stretching to fit any body type, and native apps are like custom-tailored couture that fits only a specific individual, AWD is like having a massive wardrobe of easily interchangeable pieces in all shapes and sizes ready to complete an outfit.

[4] Charlton, Graham, What is adaptive web design (AWD) and when should you use it? https://econsultancy.com/blog/64914-what-is-adaptive-web-design-awd-and-when-should-you-use-it, posted May 28, 2014

Adaptive Equals Engagement

Adaptive web design excels in the online space through its combination of flexibility and consistency, and its intelligent selection and prioritization of page items, intended to make the customer experience straightforward, reliable, and more intuitive.

For an example, manufacturers of large household appliances like washer and dryers know that the buying public varies in the level of computer sophistication, from beginner to expert. Consumers rarely make an appliance purchase on the spur of the moment, so a mobile conversion rate is not as important as longevity – inviting the user to take the time to browse the features and benefits of the products from whichever device they happen to be using.

Thus, the technology of business is about more than e-commerce or conversion rates. It is about engagement. Vendors need to see and appreciate the data behind page views, page depth (the number of pages a user visits on the site before leaving), and the total time spent on site. This information leads to the business impact where increased goal completions and commerce conversions intersect with increased brand loyalty and satisfaction.

The retailer Avenue32 (www.Avenue32.com), profiled in Website Magazine by journalist Amberly Dressler, claims a "400 percent increase in smartphone and tablet orders, a doubling of mobile traffic, and average mobile transactions increasing by 270 percent" through the implementation of AWD.

Amazon, too, according to Dressler, "is embracing adaptive design in order to deliver their sites on mobile up to 40 percent faster than if Amazon used responsive web design. What's more, Amazon's adaptive site provides mobile users with the opportunity to use "Amazon.com Full Site" on their mobile devices, which some users prefer and [which] responsive does not offer."

Other sites worthy of review include:

- Apple.com
- About.com
- Lufthansa.com
- Usatoday.com

It is best to observe these URLs on both a desktop and a mobile device to experience the difference in functionality and consistency of experience that adaptive web design delivers.

[5] [http://www.websitemagazine.com/content/blogs/posts/archive/2014/11/20/5-surprising-sites-using-adaptive-web-design.aspx]
[6] Ibid.

More Levelling, Fewer Silos

The Top Four Challenges for Implementing Adaptive Web Design

- Developers do not always understand the customer well enough to design and implement an AWD platform.
- Client companies do not understand the different technologies and skills required to maintain the solution.
- Client companies are not fully aware of the pace and frequency by which they must innovate their web presence to remain competitive.
- Clients and developers approach the AWD process in an unstructured, unsophisticated manner.

Adaptive web design represents a development in web design and delivery that reflects the dynamics of the current marketplace. There is now an enhanced focus on analytics and on the importance of marketing to individual consumers, and a greater understanding between vendors and their customers.

These aspects roll into the idea of developing an overall customer engagement strategy, carried out as a single synergistic process, instead of being separately controlled by industry silos. In a previous generation, one group of people would create the infrastructure, another would create the product, and a third would operate the end product, while a fourth group would be involved in sales.

Today's economy comprises more united groups, due in part to the 24/7 always-connected global consumer culture, which has made it virtually impossible to maintain a siloed structure and also be nimble enough to respond to changes in the marketplace. This is reflected in certain design aspects, where a broader-spectrum adaptive serving approach allows for the same seamlessness online as in the real world. Adaptive web design has the potential to align marketing, development, and IT by removing the points of friction that previously led to frustration and protectionism within organizations.

Key Steps to Implementation

Many organizations looking to renew their commercial presence – online, real world, or strategic – may choose to repair rather than replace. The development of a mobile site may be seen as an episodic attempt rather than an opportunity to answer questions like "What are we really trying to accomplish with our brand experience?" or "What is the essential root of the problem we are trying to solve?"

The modernization of a web application requires an understanding of the goals. Who is the project trying to attract, and what are the benchmarks used to measure success? The next step is to identify opportunities for optimization, whether it's speed, user experience, or something as straightforward as the color palette.

Many companies simply go from a broken site to an optimized site, skipping the consideration portion. This leads to future time-and-cost spirals because it misses the opportunity to recalibrate and look long term. Goals should to conform to the traditional SMARTS test of project management – Specific, Measurable, Attainable, Realistic, Timely, and Signed-off. This includes understanding the existing code base, employee capability and availability, budget for external resources, testing and analysis of procedures, baseline behaviors, metrics, and performance criteria. They must be complemented by gap analyses, and the entire procedure should be repeated.

These techniques help those involved in the project implementation to keep their eyes open, keep the customer in mind, keep capabilities realistic, and deliver the best possible time to market, with the best possible odds.

Is Adaptive Web Design Right For You?

Every company should assess whether the adoption of a new technology such as AWD would be a fit, and if it would be advantageous over RWD. Ask some basic questions:

- *What are we trying to do for our users?*
- *Where and how are these users going to be interacting with us?*
- *What are our capabilities to actually implement a solution for them?*

These questions get to the heart of the AWD vs. RWD question. If your goal is to present a streamlined, simple, information-driven experience, RWD may be the best choice. As it has grown in popularity, methods and frameworks for building RWD have grown in kind, making it easier for more organizations to get in the game. It's still a huge undertaking, involving an overhaul of the entire web presence, but there are clear paths forward.

On the other hand, if you wish to push the envelope of user experiences with expanded functionality across all devices, you may be required to invest the extra time – and take on the risk – of the newer, less developed field of adaptive serving. Further, some of the key qualifying factors for using AWD would include:

- *The client user base is technically diverse – using a range of devices for a variety of actions.*
- *There are situations in which different devices actually demand different experiences (an airline booking site versus an at-airport check-in page).*
- *There is an economic advantage to offering varied templates and experiences that together offer more benefit and service than a one-size-fits-all solution.*
- *The company has the financial resources and proactive management mindset to undertake the development and delivery of different templates.*

Adaptive web design represents the most recent and flexible approach to delivering compelling content to customers whose sophistication and choice of devices have increased in recent years. Although other techniques and technologies exist, the dynamic nature of adaptive web design allows for more efficient page loads, a more relevant approach to content delivery, and heightened customer experience based on server-side intelligence.

What Yottaa Does

Yottaa optimizes browser-based web applications for increased performance, engagement, and business impact, and works with many clients who have already established a responsive web design platform. With one major customer, Yottaa demonstrated how the company could go beyond responsive web design by adding sensitivity to a device's geographic location and network speed, sending the right elements to the device based on these characteristics. Yottaa demonstrated how to effectively layer an adaptive web serving component onto a responsive design.

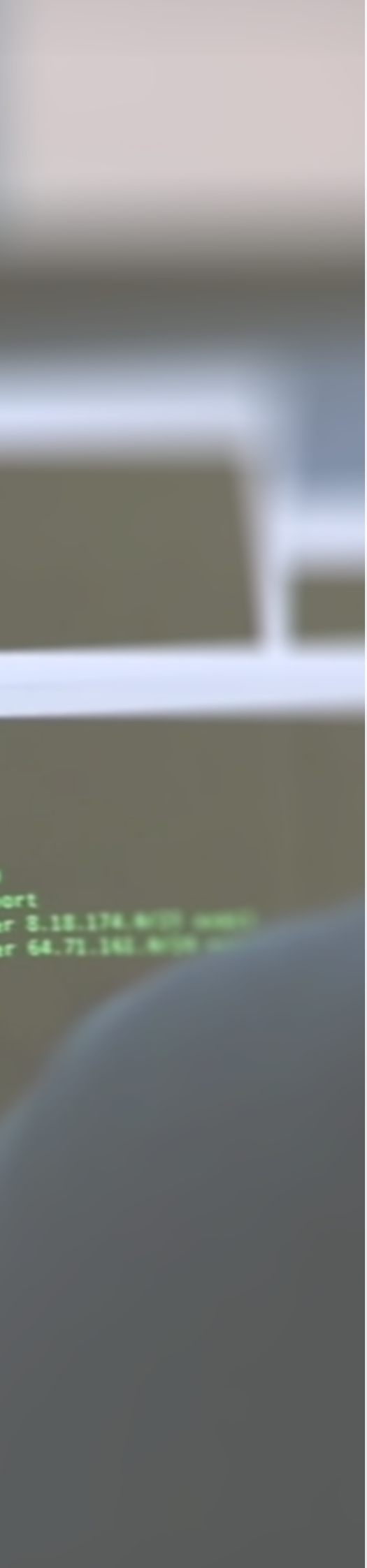
"If you are implementing responsive web design, you have to have an intimate understanding of your business, of your website, of your consumer, so that you can actually organize the data properly, so that it can be best presented on the different form factors."

– Ari Weil, VP Products, Yottaa

Yottaa provides the experience of adaptive serving by using a closed-loop architecture to recognize the characteristics of each receiving device, including the available screen real estate and network speed. Yottaa's platform selectively serves certain components, and optimizes other components such as images, compressing and resizing them appropriately. These activities improve initial page performance to help decrease bounce rate, and eliminate gaps in the user experience, since every page loads as quickly as possible, and every individual asset is automatically transformed on every page to be uniquely optimized for that condition.

These types of actions are at the heart of adaptive web design, but they are difficult and costly to implement in-house. Yottaa acts as a SaaS resource – cloud-based and constantly optimizing and maintaining resources, all with no code changes required.

Yottaa also provides its customers deep insight by integrating with existing business analytics software, to show in real-time how users are responding to the user experience. This helps Yottaa's customers to better understand their users, and also identify uneqivocally the business impact and ROI achieved with the solution.



About Yottaa

Yottaa is a SaaS solution to manage, optimize and secure digital experience delivery.

Yottaa accelerates online and mobile performance, maximizes end user engagement, and delivers instant, actionable insights to drive business results via an intelligent, automated cloud platform. Our ContextIntelligence™ platform is purpose-built to deliver the power and flexibility required by IT organizations to exceed SLAs for uptime, performance, scalability and security, paired with patented technologies that accelerate the delivery of innovative features and products to improve online and mobile channel execution.

For more information, please visit

WWW.YOTTAA.COM

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