

INTERNAP®

IT | IQ

ENTERPRISE IP BUYER'S GUIDE

What's Your Return on Performance?

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Executive Summary.

We are all aware of the impact performance can have on the bottom line. In a study conducted by Bing, a page delay of only two seconds resulted in a 4.3% drop in revenue. For Google, a 400-millisecond delay caused a 0.59 percent drop in searches and the same delay resulted in a five to nine percent decrease in site traffic for Yahoo.¹ Organizations are increasingly choosing Website Performance Optimization (WPO) technologies to boost reliability, availability and their bottom line.

This eBook will help you:

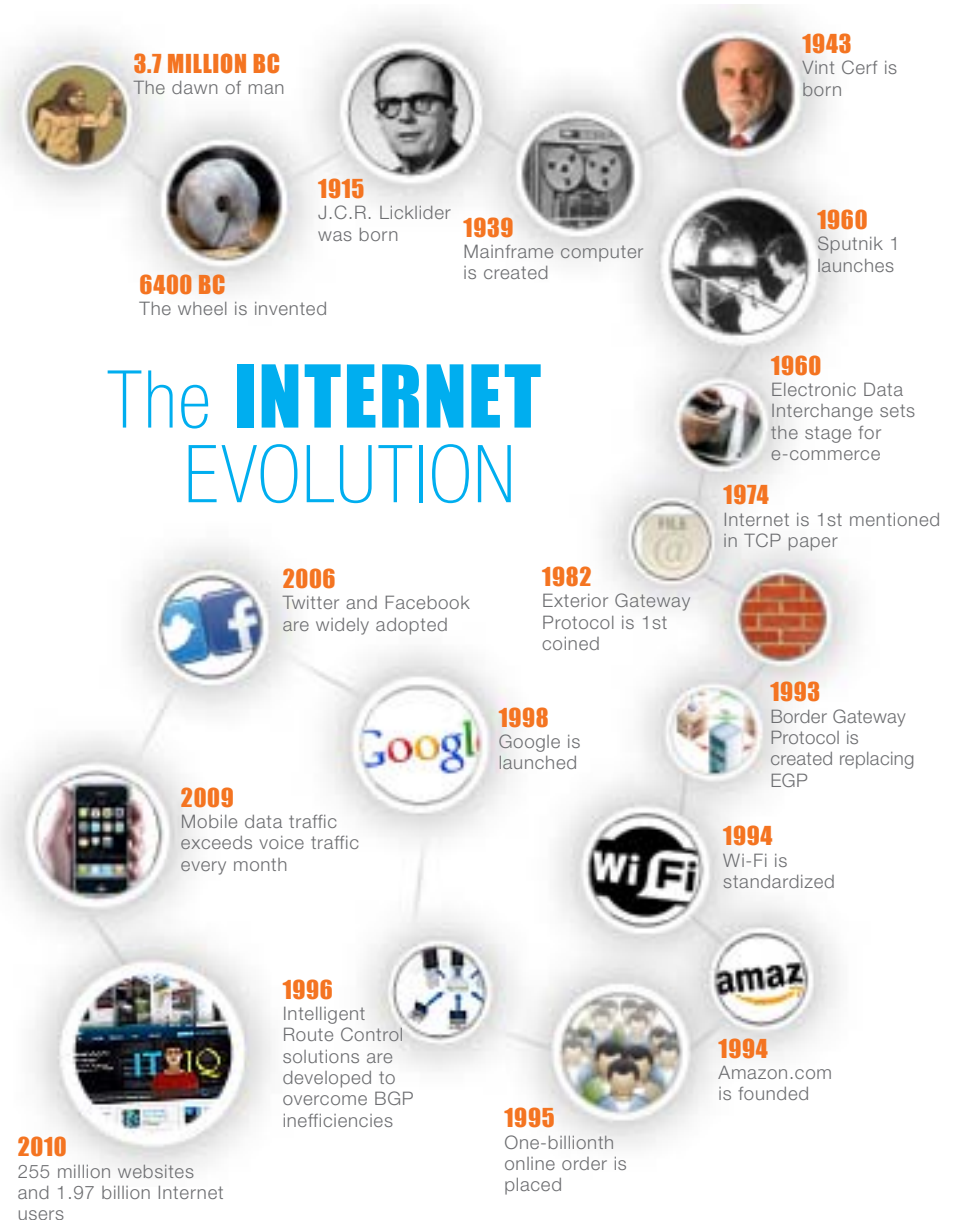
- Learn the benefits of WPO technologies
- Decide if you are a good fit for a WPO solution
- Determine which WPO technologies can help enhance your Internet performance
- Discover what to look for in a prospective provider

INTERNET 101.

It all began with a man by the name of J.C.R. Licklider who introduced the concept of an ‘intergalactic network’. He was appointed the head of the Defense Advanced Research Project Agency (DARPA) after he developed an idea for a global computer network that would allow users to access information from anywhere in the world. Vinton G. “Vint” Cerf continued the research started by Licklider and co-designed the TCP/IP protocol suite with Bob Kahn in the 1970’s.

“The Internet? We are not interested in it.” - Bill Gates, 1993

Just 20 short years after its invention, there are over 2 billion users on the web², with the number of online transactions in the US totalling 1.3 billion for 2010 and online sales reaching \$210 billion.³ In a world never imagined by our predecessors, global politics is now driven by the influence of online communities.



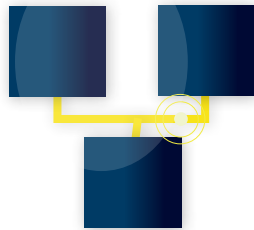
DOES THIS SOUND LIKE YOU?

Businesses, no matter what the size, face challenges managing their IT Infrastructure. At each stage of a company's life cycle, a new hurdle presents itself. **Do you find yourself in any of the following situations?**



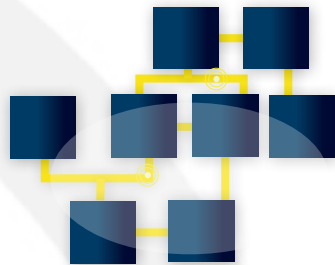
START-UP

As a start-up your first impression is critical since you are competing with established brands. You've just launched your first product and need to make an impact. You're cost conscious but know that a delay of even a few milliseconds can have a direct impact on your new company's reputation. **What type of solution is going to give you the biggest return on investment?**



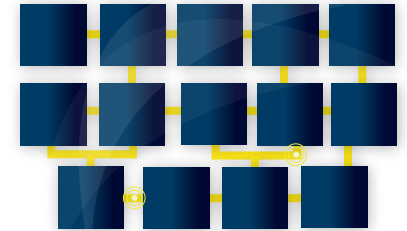
SMB

Your online business is booming. Your application usage is through the roof and customers can't get enough of your product. Everything seems to be going exactly as planned, but behind the scenes you know you are taking a risk by being single-threaded with only one Internet Service Provider (ISP) or by using unreliable network connections. **What is the best option for your business?**



ENTERPRISE

Whether your business is processing millions of transactions, delivering business-critical software or relying on the Internet for day-to-day transactions, you need your IT to be powerful enough to help you capture opportunities the second they arise. Expanding your network infrastructure or contracting with multiple high-speed Internet access providers adds complexity, diverts resources from your primary business and comes with a huge price tag. You've looked into multi-homing your network, seeking visibility to improve performance and availability, however the costs are overwhelming. Without the ability to measure or intelligently manage your network, performance can unexpectedly suffer. **What solution will meet your challenges today and help you win tomorrow?**



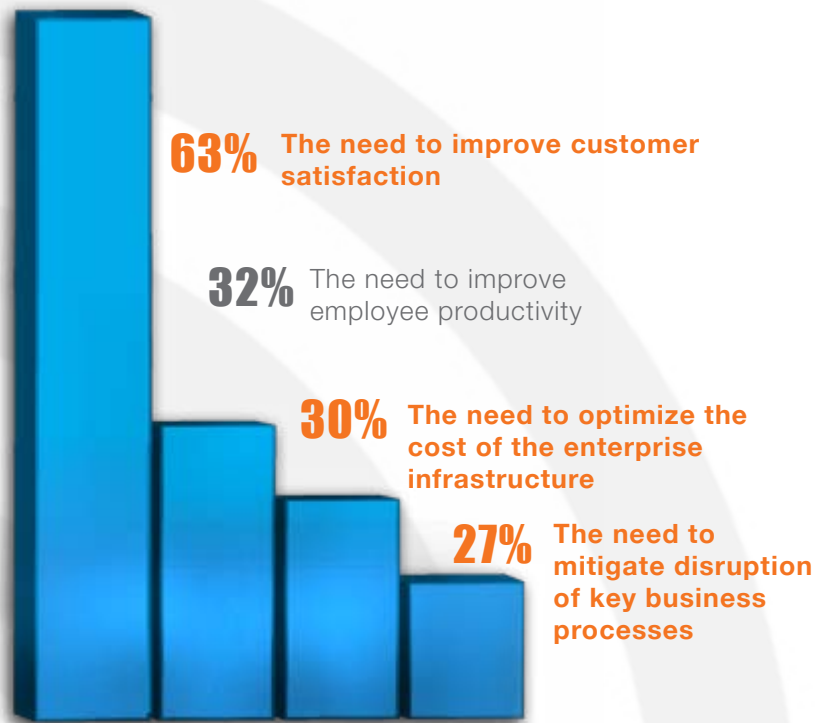
DRIVERS & CHALLENGES.

Internet performance is often measured in small numbers — but the impact of poor performance can be significant. For the typical website, **thousands of bits of information** delayed by even a few milliseconds adds up to a large cumulative impact. A **one-second** delay in website performance can mean a **7% loss in conversions, 11% fewer page loads and a 16% decrease in customer satisfaction**. In dollar terms, this means that if your site typically earns \$100,000 a day, in one year **you could lose \$2.5 million in sales.**⁴

DRIVERS

According to an Aberdeen Group study, 63% of organizations cited the need to improve customer satisfaction as their top driver for adopting technology solutions to optimize the performance of web applications.⁴

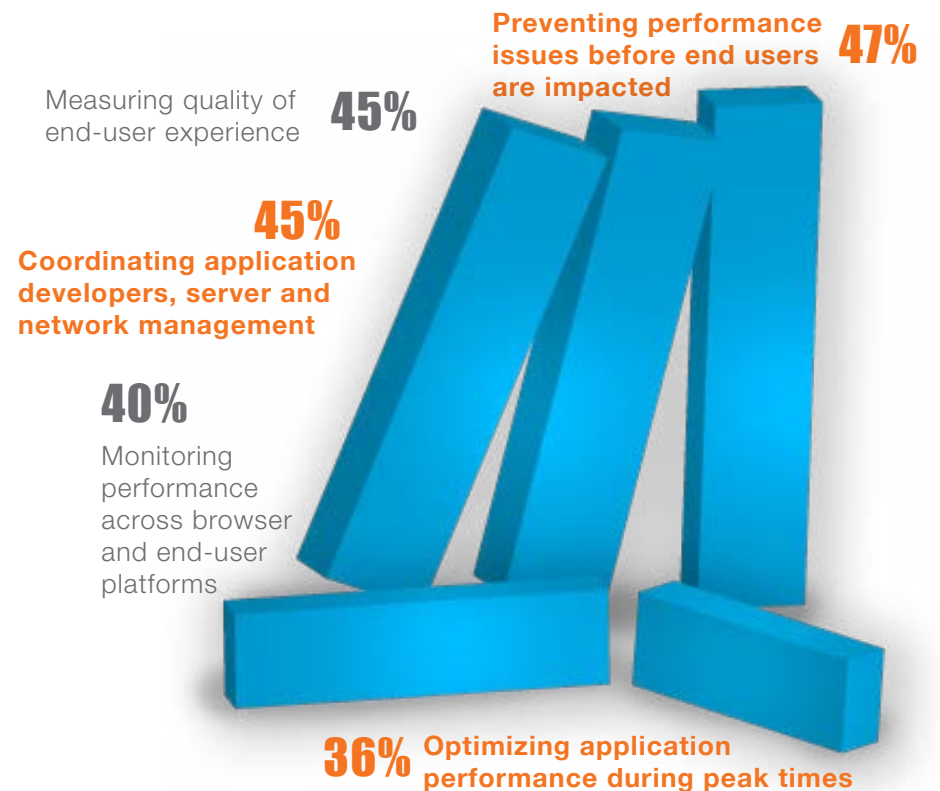
Top pressures for adopting technology solutions for optimizing the performance of web applications



CHALLENGES

Aberdeen's research concluded that the inability to prevent performance issues before end users are impacted is one of the top challenges facing the industry today.⁴

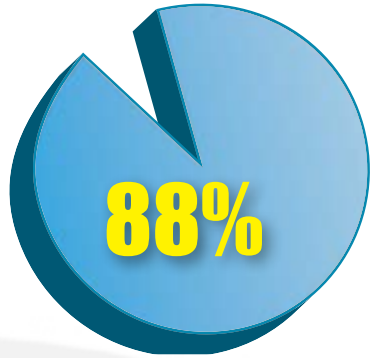
Top challenges for managing the performance of web applications



Can you afford not to enhance your **INTERNET PERFORMANCE?**

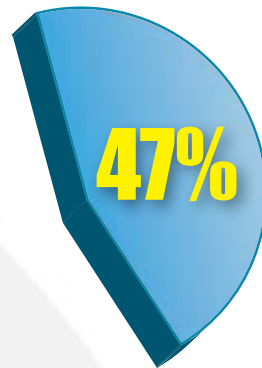
With the rapid growth of networks and network-based applications, the Internet has become the most **important media delivery platform today**. The economic value of online service delivery can be **measured in billions of dollars** and any disruption to this delivery model has real and measurable costs. What strategic action is your organization planning or taking to prevent a decline in customer satisfaction?

The Cost of Poor Website Performance

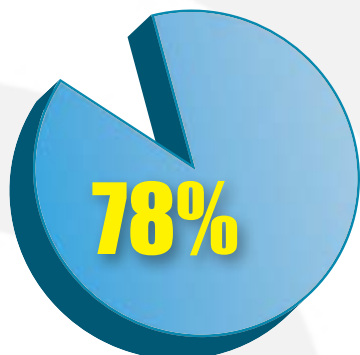


are **LESS LIKELY TO RETURN** to a site after a poor experience⁴

have a **NEGATIVE PERCEPTION** of the company⁴



of end users **WILL GO TO A COMPETITOR'S** site due to poor performance⁴



As high-speed network access improves and expands globally, customer demand for high performance and feature-rich web applications increases exponentially. **End users are 88% less likely to return to a site after a poor experience** and 47% more likely to have a negative perception of the company. In the end, **78% of end users are more likely to turn to a competitor's site due to poor performance.**⁵ Many companies are already taking strategic actions to provide more information, creative content, faster performance and better access to increase their customer base. This creates multiple pressures for enterprises, application developers, IT staff and their stakeholders to provide customers with **highly available, feature-intensive and error-free applications to grow and retain customers.**

Understanding BGP and TCP.

Why is good performance so difficult to achieve? The Internet was designed to be robust and distributed, but not necessarily efficient. Moreover, the **application content has started to become more complex** at the same time that **end users expect better performance**.

No single ISP is the best path to all destinations. Relying on a single ISP reduces connection reliability and eliminates routing options. Furthermore, distances from the end user and antiquated routing protocols can result in relatively poor performance.



BGP

The navigation system of the Internet is called **Border Gateway Protocol (BGP)**, which directs how data is transported from a source to a destination. BGP was implemented to allow for a decentralized Internet routing scheme, replacing Exterior Gateway Protocol, which routed based on a tree-like network topology.

WHAT IS BGP?

BGP's sole purpose is to determine the route or path that data is to take over the Internet; BGP chooses routes based on the shortest path available. This approach is decreasingly effective as network load continues to grow and the **shortest route is not often the best route**. As a result, the shorter distance route translates into higher latency (**slower**) and increased packet loss (**less reliable**) leaving your end users

frustrated and often driving them to abandon your site for a competitor.

THE BOTTOM LINE

- BGP is **outdated** and **lacks control, causing inefficiencies in trafficking data**
- BGP's lack of insight into path performance creates **latency and packet loss** by sending traffic down paths that have route oscillations, black holes or routing loops
- BGP has no verification policy, leaving addresses vulnerable to incorrect routing selection decisions, thereby **slowing traffic considerably**

 **What if there was a better way to route traffic that took performance into account?**

TCP

When **Transmission Control Protocol** (TCP) was introduced nearly 40 years ago, it was designed to facilitate reliable communication between two hosts. However, networks now operate at **much higher speeds** and **regularly span much larger distances** between the application origin and the end user. Today's media-intensive Internet applications include content that is chock-full of graphics, videos and audio files. To quickly transmit this rich content to end users, many companies want to **move beyond the limits of standard TCP** for **faster** and **more consistent** data delivery.

WHAT IS TCP?

TCP, by design, sacrifices performance to ensure the reliable transmission of content. TCP throttles back the delivery rate of IP traffic as the distance between the content or application source and the end user increases. In normal TCP transmission, the distance between the end user and the data's origin is a factor in how quickly the website can be viewed.

In today's business environment, with users working from remote distances, slow transmission is a big problem. What does all this mean? **Your organization's communications can slow to a crawl.**

THE BOTTOM LINE

- TCP's inability to quickly transfer data and terminate the connection limits its performance capability
- TCP inherently creates latency issues, slowing the speed of your application and impacting the end-user experience
- TCP's conservative approach slows traffic significantly at the slightest detection of packet loss, leading to a poor end-user experience, less revenue capture and lower customer retention

 **What if there was a better way to reliably deliver your traffic with much higher throughput rates?**

Which WPO IS RIGHT FOR YOU?

Now that you have your foundation, it is time to **take it to the next level.** Website Performance Optimization (WPO) technology can boost performance, enhance visibility, expand your user base and increase revenue. WPO technologies include: Intelligent Route Control, WAN Acceleration, TCP Acceleration and many more.

 **What are you doing to accelerate your website performance?**

WHY WPO?

- Measure real-time performance characteristics of the Internet
- Identify problems and shift traffic quickly without waiting for slow BGP convergence
- Gauge path stability and avoid sending traffic down paths that are problematic due to route oscillations, black holes or routing loops
- Mitigate risk by adding intelligence to multi-homed routing decisions
- Measure service levels and alternate paths
- Obtain performance, distribution and economic reports that enable you to validate and fine-tune policies

Now that you see the benefits of deploying a WPO solution, you may be wondering which solution is right for your organization. The following pages outline the benefits of Intelligent Route Control, WAN Acceleration and TCP Acceleration.

INTELLIGENT ROUTE CONTROL

Intelligent Route Control (IRC) mitigates risk by adding intelligence into multi-homed routing decisions. IRC technologies allow multi-homed networks to dynamically select outbound links based on performance measurements.

Why IRC?

- Reduce latency by monitoring performance over multiple backbone connections; actively distribute traffic over the best performing routes, enable predictable performance in line with specific application requirements
- Provide better reliability with end-to-end redundant architecture and uptime while avoiding major network events
- Leverage multiple providers, use less overhead

TCP ACCELERATION

TCP Acceleration overcomes the limitations of TCP by issuing a series of routing techniques which achieve increased throughput without modifying the user's application.

Why TCP Acceleration?

- Reduce latency and improve application performance between geographically remote sites
- Eliminate hardware costs and accelerate application and content delivery, regardless of geographical location
- Speed delivery of applications in the range of 1.5x to 4x, ultimately improving the end-user experience

WAN ACCELERATION

Wide Area Network (WAN) optimization improves TCP data-transfer efficiencies (i.e. throughput, bandwidth requirements, latency, etc.) across WANs through the use of a hardware-based device or virtual machine.

Why WAN Optimization?

- Proven to increase the speed of delivery two-fold or more in many cases
- Designed for point-to-point architectures
- Accelerated delivery for enterprises communicating over the Internet between fixed branch locations

What are the critical **PERFORMANCE METRICS?**

WPO technologies can significantly improve network performance and reduce overall network costs. You are able to continually **monitor your network for latency, packet loss, route stability and congestion.**

Availability and speed are critical performance metrics for the connectivity services which underpin virtually every online application or service.



Availability, one of the most critical success metrics for an online application, is usually described in terms of the **percentage of time** that a network is available to support its primary networking function. In this case, more is clearly better since availability for an online business directly translates to additional revenue by **enabling a customer's ability to transact**.

According to an Aberdeen study...

Best-in-class companies typically experience = **99.85% average availability for web applications.**⁶

Although it may not seem like much, the difference between **99.99% availability** and **99.85% is tremendous.**⁶

0.14% Less network availability = **172 SECONDS more downtime every day or 88 minutes more downtime a month**⁶

Microsoft's Bing found that a...

2 SEC. = **3.75%**
delay in website performance **reduction in clicks**

This delay also resulted in more than a **4% loss in satisfaction** and, most importantly, a **4.3% loss in revenue per visitor.**⁶






By comparing the difference in availability and the **impact on revenue** generated online the benefits of higher levels of availability realized by website performance optimization solutions such as IRC are clear.

Network speed also impacts performance. **Faster networks** are able to **support greater transaction efficiencies** and have a direct impact on user experience, which in turn is reflected in metrics like **website abandonment and conversion rates, churn rates and customer retention rates**. Internet-deployed applications often make multiple hops across networks. For these applications, a low latency network is even more critical, particularly if the site is transactional in nature.

A Strangeloop study on website performance tested both an e-commerce and a media site, dividing their **14,000 visitors into two test groups**: half viewed an optimized site and the other half viewed a non-optimized site.⁷

As you can see in the table below, there were significant changes in customer behavior.

Performance Optimization Chart

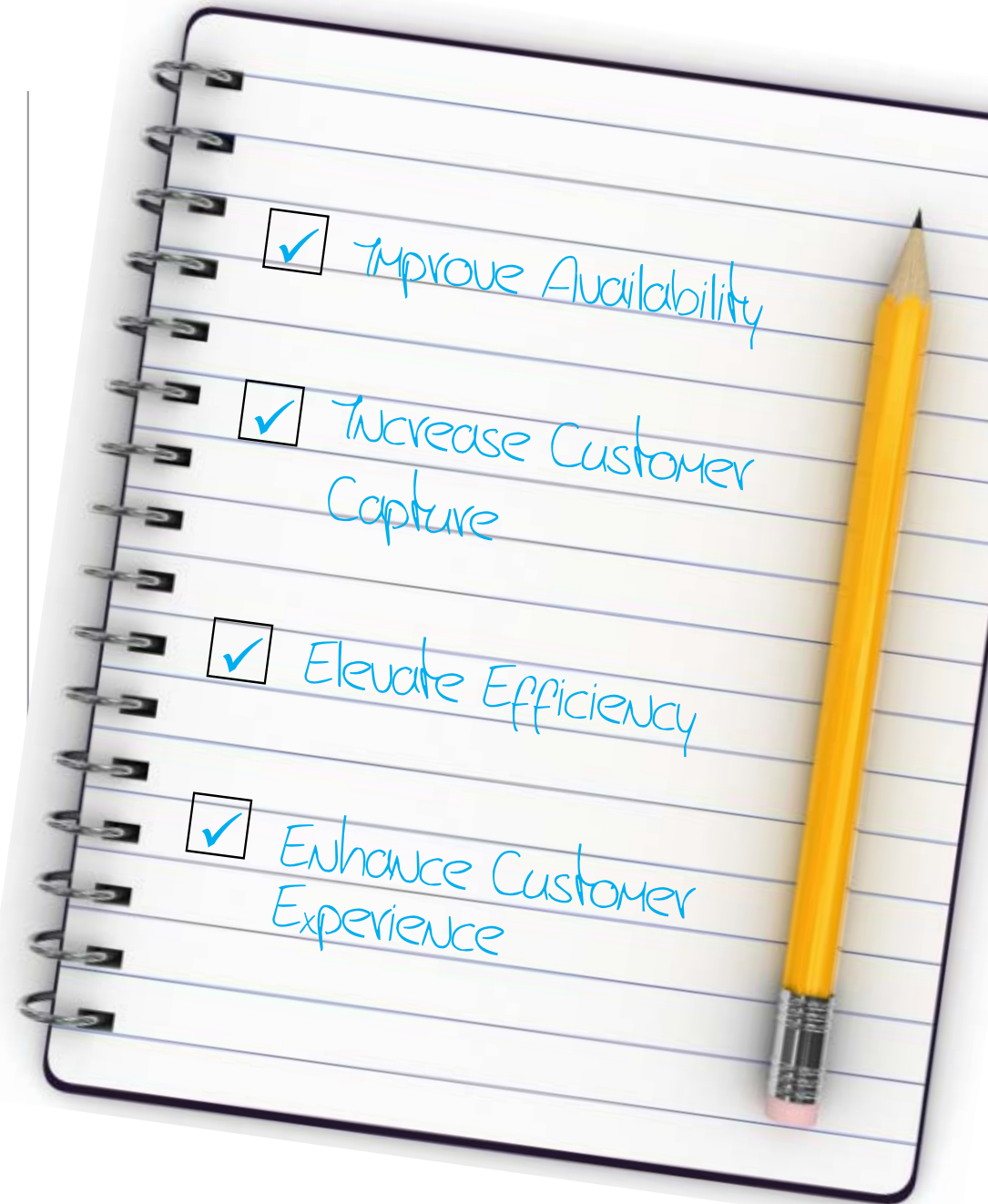
	Optimized Site	Non-optimized Site
 BOUNCE RATE	13.38%	14.35%
 PAGES PER VISIT	15.64	11.04
 AVG TIME ON SITE	0:30:10	0:23:50
 AVG CONVERSION RATE	16.07% improvement	
 ORDER VALUE	5.51% improvement	

Not only did the visitors view more pages per visit on the **faster loading sites**, but the **site's overall "stickiness"** improved as well. Improving the speed of the website had an enormous impact on its business effectiveness.

The relative value of **online performance** options can be **measured in dollars and cents** by evaluating the impact on revenues, site abandonment rates and customer retention. In comparing the **incremental revenue driven** by a **high-performing connectivity solution**, you can begin to quantify the **return on your investment**.

Key considerations when selecting a **WPO PROVIDER.**

WPO technologies offer multiple benefits that meet many businesses short lists, including **improving availability, increasing customer capture, elevating efficiency** and **enhancing the overall customer experience.**



With so much at stake, price cannot be the only factor. These are the key considerations in selecting your enterprise Internet provider and WPO solution.

PERFORMANCE

High-performing connectivity providers should not only offer rock-solid performance to a broad range of geographic locations, but should also have the ability to **dynamically analyze network paths** from end-to-end, ensuring that the best possible path is always taken. To accomplish this, a provider will need to utilize all major Tier 1 Internet backbones, continually measuring performance to select the most optimal path for your Internet traffic. As a result, customers are less likely to abandon your site for your competitor and more likely to return in the future. Better customer retention contributes to improved revenue capture.

TOTAL COST OF OWNERSHIP

IRC allows for specification and implementation of customer-defined bandwidth usage policies, enabling more cost-effective use of existing bandwidth. By leveraging multiple providers, you **have less overhead and more purchasing power**. In addition, you have greater visibility

into traffic performance and usage across all service providers, giving you the data you need to perform ongoing provider selection and contract negotiation.

SPEED

Designed to eliminate constraints placed by TCP, TCP Acceleration technologies deliver content up to **4x faster**, improving the end-user experience. Accelerated web content and applications **deliver a superior end-user experience**, as dynamic content is presented faster and files are downloaded sooner. Faster content delivery contributes to revenue capture and customer retention.

INTERNET KNOWLEDGE

A knowledgeable connectivity partner should understand the limitations of the Internet such as poor BGP routes and throughput limitations provided by TCP. BGP makes decisions about how to route information between locations purely based on “hop” count. Internet traffic statistics show that any single carrier **provides the best-performing network route only 18% of the time.**⁸ If you connect to your customers, shareholders and employees over the

Internet, this means 88% of the time you serve up a suboptimal experience. Search for a provider who can enhance the limitations of TCP by expanding the geographic reach of your applications so you don't have to deploy costly hardware or manage an additional data center footprint. Your selected provider should be aware of these inherent connectivity issues and have the knowledge to overcome them.

AVAILABILITY

Availability is usually expressed as a percentage of uptime in a given year. Many providers will state their availability as a percentage such as 99.999 or 99.9. The difference? Two fewer nines means an average of 86 seconds more downtime every day, or **43 minutes more downtime every month.**⁸ If you are an online broker and you measure money in milliseconds, 43 minutes is an eternity. Your business requires a provider with a proven history of providing at least 99.999 percent uptime.

COST EFFICIENCY

It is critical for connectivity customers to evaluate the provider's ability to offer you predictable IT costs — even during periods of growth. Your provider should be able to **minimize the time and money spent** on troubleshooting connectivity issues and dealing with multiple providers by offering a solution that leverages multiple Internet backbones.

WORLD-CLASS SUPPORT

Make sure your provider offers the level of support your organization requires. **Support centers should be staffed 24/7** and all technicians should be reachable by e-mail and phone in the event of any problem. **Avoid automated e-mail attendants** and make sure your tickets are immediately sent to a human being who is physically able to look at your equipment and **quickly identify the cause of your problem.**

Results: how real companies derive a **POSITIVE ROI.**

WPO technologies help organizations improve application performance during peak times and enhance their ability to **support more site visitors**. Organizations deploying WPO technologies are also more likely to avoid **an increase in the total footprint** of their enterprise infrastructure,

thereby **saving money**. Here are just a few examples of customers who derived a positive ROI from deploying WPO solutions like IRC, TCP Acceleration and WAN Optimization.



Added **FLEXIBILITY** to deployment platforms and **INCREASED SPEED.**

A cloud-based collaboration services company added flexibility and increased speed, allowing customers to instantly connect and receive files.

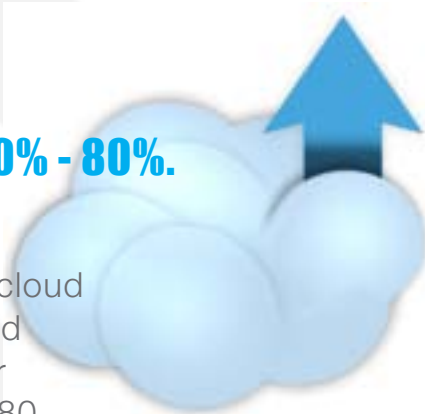


GAINED ABILITY to download 13GB in **HOURS** instead of days.

A company in the multi-screen video delivery and cable industry gained the ability to download 13GB of customer data using 5 parallel downloads in hours instead of days.

Increased **PERFORMANCE 50% - 80%.**

After deploying TCP Acceleration and Intelligent Route Control solutions, a cloud platform company increased performance 50 percent for North American users and 80 percent for European users, with those in more remote areas such as South Africa and South America, enjoying even greater increases of up to 140 percent.



Improved **REMOTE DESKTOP PERFORMANCE** 300-400 KB per sec.

A company in the hosting and professional services market increased its remote desktop performance 300 to 400 percent from their previous carrier after moving to an IRC system.



Increased **FILE TRANSMISSION** by **300-500** KB per sec.

Using a web accelerator, a global leader in the Platform-as-a-Solution industry, increased file transmission speeds 300 - 500 kilobits per second.

CONCLUSION.

Research by Aberdeen shows that best-in-class organizations are experiencing **99.8% availability** of web applications, **273% improvement in application response** times and the ability to prevent performance issues before end users are impacted 83% of the time.⁶

WPO technologies offer companies, aiming to achieve the highest level of performance from their web-based applications, the ability to **demonstrate higher levels of network availability** and access to all major Internet backbones from a single site. By leveraging WPO solutions, companies also gain access to viable

network paths at all times and the ability to identify and route customer traffic on the best performing route available at any given time. **WPO solutions allow you to maximize availability and minimize performance issues for users, giving you more repeat customers and increasing your bottom line.**



Why **INTERNAP?**

TRANSFORM YOUR IT INFRASTRUCTURE into a competitive advantage with IT IQ from Internap, **intelligent IT Infrastructure solutions** that enable customers to **focus on their core business**, improve service levels and lower the cost of IT operations. Our enterprise IP, CDN, colocation, managed hosting and cloud solutions are differentiated by unparalleled levels of performance, availability and support. Only Internap combines the superior performance of our Managed Internet Route Optimizer™ — which leverages multiple network connections for performance — with the **rock-solid reliability of our 100% network uptime guarantee**. Since 1996, thousands of enterprises have entrusted Internap with the delivery and protection of their online applications.

INTERNAP ENTERPRISE IP

- The strength of multiple providers and innovative route optimization
- Up to 4 times faster delivery of content through our Accelerated IP (XIP™) service
- The power to deliver digital assets through our global content Delivery Network (CDN)
- Unparalleled performance and availability at competitive pricing
- 100% Network uptime Service Level Agreement
- Rock-solid service combining technical expertise, direct engineer access and proactive notification



Click here to **FIND OUT** more
about Internap's **INTERNET CONNECTIVITY**

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