

# Fast, reliable, secure, efficient: why application delivery matters in the digital economy

A white paper for CIOs

Consumers are becoming more informed, empowered and demanding. The expectations of employees are changing, too. Increasingly, they are liberated from the office for at least part of the working week. They want instant access to the apps and data they use to do their jobs – from any device, from any location. As a result, the way you deliver applications matters more than ever before. If you can deliver applications successfully, your employees will become more productive. And satisfied customers will spend more.

However, the rising expectations of customers and employees are placing a significant strain on IT infrastructure. Simultaneously, infrastructure is becoming more complex. This combination is generating unacceptable levels of risk in terms of application delivery.

Once upon a time, application delivery was the exclusive concern of the networking team inside the enterprise. Engineers tested speeds and feeds. The CTO deployed a solution based on their recommendations.

Times are changing. Applications create the value on which businesses depend. Increasingly, the choices your organization makes in terms of application delivery will define your organization's ability to generate growth, revenue and profit.

We believe that four factors determine the quality of application delivery: performance, reliability, security and efficiency. This white paper lays out these challenges in detail. It goes on to highlight how successful organizations are tackling them.

## The age of applications

### **Those demanding customers? They're employees, too**

Consumers are increasingly informed, empowered and demanding. Price comparison and reviews have tilted the balance of information in their favour.<sup>1</sup> Smartphones tilt it further, allowing millions of consumers to make location-aware decisions about products and pricing.

Increasingly, consumers start a transaction on one platform and complete it on another, while receiving updates on a third channel. And if they're unhappy, there's no place to hide. In the UK, one in four social media users has complained via social media during the past three months.<sup>2</sup>

The same consumers who expect so much during their leisure time frequently work as employees between Monday and Friday. Expectations are changing in the workplace, too.

(1) [Ctrl-Shift, The Changing Consumer Empowerment Landscape: A Report For Ofgem](#)

(2) [The Institute Of Customer Service, Service Goes Social: How Organisations Can Deliver Customer Service Through Social Media](#)

By 2020, half of the world's workers will be Millennials. Born after 1980, most of them are digital natives. In France, the Netherlands and the UK, at least one in five professionals rely entirely on mobile apps for a substantial portion of the working week. In France and Germany, over half of professionals aged 18-50 say they dislike 9-5 working hours. Instead, they want the freedom "to work and play from anywhere at any time with no restrictions".<sup>3</sup>

### **Applications deliver value, and value generates revenue**

Working and playing. From anywhere. At any time. With no restrictions. To some, this may seem an unreasonable demand. Increasingly, we think it makes sense. Today, for example, it costs over \$26,000 a year to rent the space required for a single workstation in central London. Yet occupancy rates in the average office can be as low as 45%. (Among fieldworkers, the rate often dips below 40%). In the future, businesses will make significant savings by encouraging more employees to work remotely.<sup>4</sup>

As mobility and remote working become more popular, application delivery becomes more important. It's no longer enough to simply provide the tools that employees need to work at home or on the road. To keep them satisfied and productive, you need to deliver an excellent user experience, too. Whether it's a sales rep updating CRM on a smartphone or a customer accessing a shopping cart on a tablet, better delivery optimizes the user experience. When this happens, employees work more productively. And customers spend more money, more frequently.

## **Mobility: the shape of the future**

Mobility involves more than smartphones. Enterprises need infrastructure to provide employees with access to applications and data across networks. This is where NetScaler comes into its own, delivering applications in a way that allows you to exploit mobility – and manage the risks.

### **Increase productivity**

Office workers lose large amounts of productive time to commuting, ineffective meetings and interruptions. Mobility allows employees to claw back lost time by working from where they feel most productive.

### **Cut property costs**

Office space is expensive. But most workstations sit unoccupied for 50% of the day. Organizations can drive down costs with hot-desking, remote working and by enabling employees to work on the road (airports, cafes, public libraries and co-working spaces).

### **Get flexible**

In the EU, employment has contracted by 3% since 2008. But the number of independent professionals has risen by 17%. Self-employment is the fastest-growing segment of the labour market. Mobility makes self-employed contractors more productive.

### **Manage the risks**

Workers are voting with their feet. Forrester estimates that 61% of information work already happens outside the office. Putting the right security and compliance solutions in place means you won't be blindsided by unofficial employee workarounds.

(3) Cisco, 2014 Connected World Technology Final Report

(4) Unwork & DTZ, The Future Of The Financial Workplace

## Meet the third D: why delivery matters

### **Application delivery: too important to ignore**

Applications need to be developed, deployed and delivered. However, investing in development and deployment is pointless if delivery – the third D – is poor. Understanding how to deliver applications to end users has become a key challenge for all organizations.

All applications need to be secured. Most traverse increasingly complex networks. Many rely upon databases. In each case, the impact on application delivery can be negative. In data centers, the job of orchestrating application delivery is typically done by application delivery controllers (ADCs), which balance performance levels across servers, networks and databases.

Originally known as load balancers, ADCs have been a fixture in data centers for many years. Over time, they have evolved to take on additional tasks. To cope with the rise of the world wide web and mobile computing, for example, ADCs added the ability to block exploits that target vulnerabilities in software. They took on complex processing jobs that would otherwise overload servers and databases. Sophisticated health monitoring of servers, networks and databases became part of their remit. ADCs also started to optimize traffic depending on the devices being used at the edge of the network. (When a web site reformats itself automatically for a better user experience on your smartphone, the chances are that an ADC is working in the background.)

Today, ADCs have become a strategic control point in enterprise IT. They take the strain off servers and databases. They reduce TCO in the data center. They remain the best way of getting a real-time view of data flows and resource requirements. Above all, they guarantee the performance, reliability and security of applications.

### **Delivering applications lies at the heart of everything we do**

Citrix has been delivering mission-critical applications across networks for the past 25 years. NetScaler, our range of ADCs, embodies our accumulated expertise.

Many of the world's largest consumer-facing web sites use NetScaler to boost the speed of downloads and deliver web pages more rapidly. On any given day, we estimate that 75% of internet users will have some of their traffic optimized by NetScaler.

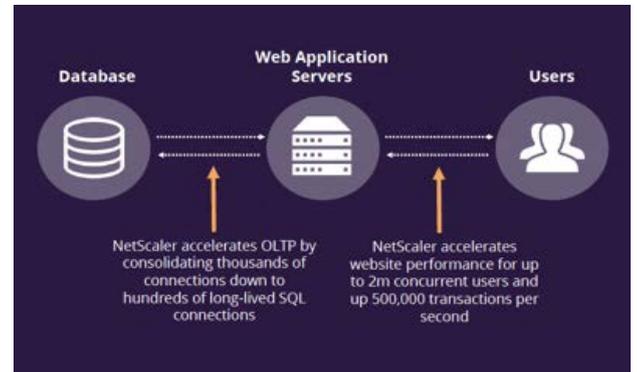
Inside the enterprise, NetScaler manages the stress that new workstyles place on traditional infrastructure. As enterprises embrace mobility, businesses need the flexibility to architect, design, deploy and publish applications to anyone, anywhere – on any device. NetScaler makes these applications fast, available and secure.

Four things matter in the context of application delivery: performance, reliability, security and efficiency. In the rest of this white paper, we'll discuss how NetScaler helps customers to deal with these challenges.

## Performance = speed + intelligence

### Speed matters

Users are conditioned to expect acceleration. Across Europe, for example, mobile broadband speeds continue to rise relentlessly. Five years ago, the average mobile user in the UK experienced download speeds of 1.5 Mbit/s. Since then, download speeds have risen tenfold.<sup>5</sup> Today, speed is the norm. In fact, Jakob Nielsen, the authority on web usability, argues that applications need to respond within 0.1 seconds to provide the user with an experience that feels seamless. When an application takes longer to respond, users start to feel that the device, or the network, is labouring to produce the promised result.<sup>6</sup> After a one second delay, users to lose any sense of “flow” in performing their task. After between five and 10 seconds, attention wanders. Employees and customers find other things to do.



**Figure 1:** How NetScaler accelerates database and website performance on behalf of 18m customers at bet365.

### How bet365 delivers high performance

Bet365, the UK-based betting web site, operates in 17 languages and handles tens of millions of transactions every day on behalf of 18m customers. The company allows customers to bet, in real-time, on sporting events that are under way. In-play betting on this scale involves delivering continuous streams of real-time data to the outside world, and receiving data in return from customers.

At bet365, time-sensitive peaks of demand are a way of life. “Our IT operations are very exposed,” says Chris Tolson, chief platform architect. “If there are problems, we can frustrate our customers and potentially lose them. Customer service is the absolute cornerstone of bet365 and our website performance has to be the very best possible at all times.”

NetScaler helps bet365 to deliver applications in two ways. First, it sits between application servers and customers, accelerating web site performance for up to 2m concurrent users or 500,000 transactions per second. Second, NetScaler works to accelerate the SQL Server databases that are crucial to delivering in-play betting in real-time. NetScaler takes the strain off bet365’s databases by consolidating thousands of connections down to hundreds of long-lived SQL connections.

(5) Ofcom, [Measuring Mobile Broadband Performance In The UK: 4G and 3G Network Performance](#)

(6) Jacob Nielsen, [Response Times: The 3 Important Limits](#)

## Reliability

### **The cost of downtime: up to \$2.5bn a year**

When you offer a service, it needs to be available. Downtime costs money. IDC calculates that the cost of unplanned application downtime among companies in the Fortune 1000 amounts to between \$1.25bn and \$2.5bn a year. The average cost of critical application failures amounts to \$500,000 to \$1m per hour.<sup>7</sup>

Managing the load on servers can be a challenge. Availability suffers when servers, datacenters or the links between them become overloaded or fail. NetScaler's load balancing and health monitoring mitigate these risks, helping you to sustain productivity and meet SLAs.

Although denial-of-service (DoS) attacks are clearly a security threat, we think of them primarily as a challenge in terms of reliability. And DoS is a growing threat. Increasingly, a new style of attack is emerging alongside the traditional noisy, high volume, exploits focused on the network layers. These newer attacks focus on the higher layers, mirroring legitimate sessions and transactions. This allows them to pass unthwarted through a wide array of defences. NetScaler is specifically designed to detect and disable these attacks at the application layer.

### Delivering high availability in the Swiss Alps

High availability matters for Rhätische Bahn (known as Rhaetian Railways to English-speaking travellers), which operates a 384 km rail network at altitudes of up to 700 metres above sea level. The longest of Rhätische Bahn's 84 tunnels extends for 19 km. Located in an area prone to heavy snowfall and avalanches, it's the world's longest narrow gauge tunnel.

In the winter months, temperatures drop as low as -15°C. At times like this, when roads are closed, Rhätische Bahn becomes a lifeline for local residents.

Rhätische Bahn uses NetScaler to deliver Citrix virtualized applications to up to 1,400 staff. "In a large region, we would prefer that everyone is out in the field, not tied to a desk," says Urs Püntener, CIO, Rhätische Bahn. "Everyone is enabled, on any device, online and offline. Their applications and data are safely with them at all times. This means now, if a situation arises, emergency teams can react instantly from anywhere. Our response time can be in seconds, not hours."

## Security

### Protecting applications and devices in a complex and mobile world

Security breaches take employees and customers offline. They cost money to put right. When a data breach accompanies an exploit, the deeply unpleasant effects on users can leave a legacy of negative perceptions. And make no mistake: the risk of breaches is increasing as IT becomes more complex. Employees, for example, are using an increasing variety of devices. Many need to access applications from outside the office over insecure public networks. A device that is compromised can be used to launch a damaging attack. Applications are increasingly exposed, too. Once upon a time, surfing the web involved a browser communicating with a web server. The range of resources involved has expanded dramatically. Today, the following all play a role in presenting web content to users:

- Cloud-hosted apps and sites
- SaaS, IaaS and PaaS
- Dynamic content assembled via API
- Mobile micro apps
- Content delivery networks



**Figure 2:** Web-based risks: increasingly, users pull content from multiple sources when they browse the web or use an app.

### The logical location for protection

In complex environments, the key consideration is the trade-off between performance and security. NetScaler achieves the optimal balance by integrating application firewall security into an appliance that is already inspecting every session and transaction at the application layer. The result? Minimal additional latency.

NetScaler also distinguishes itself with a very specific approach to security configuration. By abstracting its own underlying policy framework infrastructure -- including the object model, APIs and language syntax -- NetScaler allows administrators to work with straightforward application delivery policies such as "I want to compress this" or "I need to cache this". This helps network administrators to get the job done quicker. Both NSS Labs and Search Security's Security Readers' Choice Awards have underlined the attractions of this approach.

(7) IDC, DevOps and the Cost of Downtime: Fortune 1000 Best Practice Metrics Quantified (December 2014)

## Minimize latency, maximize security

Here's a simple thought experiment that illustrates the trade-off between security and user experience. Imagine, for a moment, what a perfectly secure network might look like. In fact, there's only one way to build it: by cutting off all outside connections. This, of course, reduces the user experience to zero.

At the other extreme, imagine a network that offers the ultimate user experience. This network wouldn't have any security measures slowing it down. But it, too, would quickly become useless. Security threats would cripple it.

What the enterprise requires is a compromise, a solution that maximizes both security and the user experience. ADCs provide this. Because they already inspect traffic at the application layer, they add minimal additional latency when they secure applications. In the case of NetScaler, the result is a tightly integrated solution that operates on a single, highly scalable, platform.

## Efficiency

### Keeping opex and capex under control

Performance, reliability and security: all play a key role in successful application delivery. But none of this means very much if the cost is too high. Application delivery needs to be efficient. Without breaking the bank, it needs to cope with all of the following:

- Steady and predictable increases in application traffic
- Spikes in application demand (e.g. seasonal)
- Permanent increases in performance requirements (e.g. a merger or other event that rapidly increases the number of users relying on a given application)

NetScaler Pay-As-You-Grow is a 100% software-based on-demand licensing model that means you aren't left to rely on additional hardware, disruptive forklift upgrades or costly over-provisioning. All it takes is a simple software license upgrade to increase performance by up to 5x.

### How consolidation liberates budget for investment

NetScaler also allows you to cut the cost of delivering applications by consolidating gateways. Enterprises often use multiple appliances from different vendors to provide load balancing, firewall, gateway and other application delivery functionality. For example, a customer-facing web site might be optimized by a pair of ADCs, with different gateways for SSL-based or mobile VPNs, SaaS applications and virtualized application delivery. Point products serve a purpose. But over time, they foster inefficiency. They make infrastructure rigid and hard to manage.

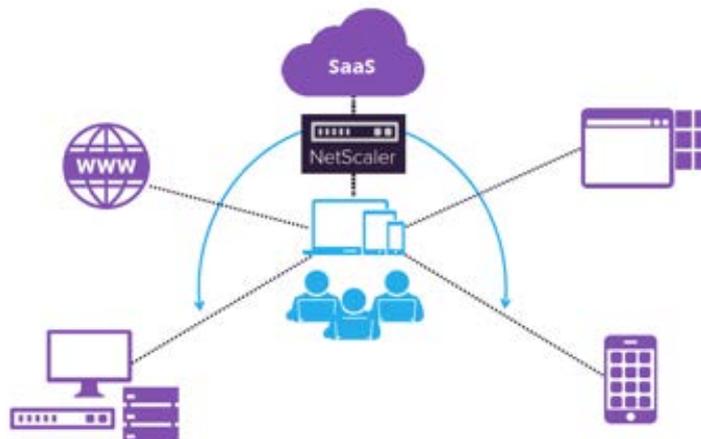
Consolidation is the answer. Shifting the jobs done by each of these appliances on to a small number of NetScalers provides the same – or better – service. And it reduces TCO significantly, freeing up infrastructure budget.

We wouldn't quite describe the results as money for nothing. But the logic of consolidation can be compelling. In a recent project with a global enterprise client, for example, we demonstrated that deploying NetScaler would deliver the following savings and benefits:

- 80% reduction in the overall global ADC appliance estate
- 70% reduction in ADC-specific cooling costs
- 70% reduction in power costs
- 80% reduction in datacentre rack space requirements
- 40% increase in current global application throughput

In this case, we predicted \$20m of savings. These will accrue over time, creating additional budget for future transformation projects.

NetScaler is a flexible and scalable next generation platform that allows you to consolidate multiple appliances on to one platform. Reducing the costs of footprint, power, cooling, maintenance and support in this way makes sense for most enterprises.



**Figure 3:** Consolidating multiple gateways makes infrastructure easier to manage and liberates budget for investment.

## Conclusion

Increasingly, all of the things that make companies successful – productivity, customer satisfaction and brand recognition – emerge from good interactions with applications and services.

Better delivery systems cut costs and boost revenues. When employees can do what they need to do, when they want, with the device that makes sense to them, productivity increases. The same logic applies to new customer-facing services, or changes you make to existing services. Whether the users are customers or employees, the aim is to maximize adoption. To achieve this, you need to deliver a superior user experience.

### To maximize the user experience, application delivery needs to be:

- Fast: offering a seamless experience, without delays or distractions
- Reliable: always available to the maximum number of user and device types
- Secure: while imposing minimal negative impact on the user experience
- Efficient: enabling appliance consolidation to liberate budget in the data center

Today, applications underpin the corporate response to the revolution of rising expectations among consumers and employees. For this reason, application delivery has become a challenge that IT cannot ignore or delegate. In the digital economy, the ability to deliver a superior user experience will define how successfully your organization creates value – now and in the future.

For more about how our customers benefit from agile next-generation datacenters, go here: [www.citrix.com/go/workbetter.html](http://www.citrix.com/go/workbetter.html) and here: [www.citrix.com/customers.html](http://www.citrix.com/customers.html)

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