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Three keys to building the best front-end network for virtual desktop delivery

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Executive summary

Motivated by the compelling benefits virtual desktops provide, enterprises of all types and sizes worldwide are migrating to virtual desktop technologies and techniques. Indeed, Gartner expects adoption of hosted virtual desktops alone to reach 70 million users by 2014[1]. In contrast to complex and costly traditional desktop management, deployment and management approaches, desktop virtualization promises significantly reduced operating costs, greater business agility, better data protection and improved compliance with corporate standards.

To fully achieve these business benefits, though, you need to ensure the availability, security, performance and scalability of your virtual desktop solution. That's why IT organizations have developed a best practice of implementing a dedicated service delivery solution as an optimized front-end infrastructure for desktop virtualization deployment.

This paper explains why the Citrix® NetScaler® service delivery solution is ideally suited to fulfill this role. NetScaler helps ensure that your organization fully benefits from its deployment of desktop virtualization, maximizing your business advantage by integrating an extensive set of capabilities for optimizing, securing and ensuring the delivery of virtual desktops.

Benefits of desktop virtualization

Organizations of all sizes are considering desktop virtualization. A full-featured desktop virtualization solution such as Citrix XenDesktop® helps enterprises to:

- Sustainably reduce desktop ownership and operating costs.
- Implement desktops, applications, updates and patches centrally and apply them instantly for all users regardless of location.
- Extend the service life of older applications that newer operating systems don't support.
- Support, optimize and extend the service life of all types of devices, new and old.
- Enable complete workplace flexibility, as well as workforce continuity in the event of a disaster or disruption.
- Improve security and meet compliance mandates by keeping desktops, applications and data in the datacenter.
- Increase business agility by rapidly and efficiently supporting strategic initiatives such as mergers and acquisitions, geographic expansion and dynamic partnership arrangements.
- Simplify and accelerate migrations to new operating systems, such as Windows 7.

[1] Gartner, "Forecast: Hosted Virtual Desktops, Worldwide, 2010-2014," November 2010

What to look for in a service delivery front end

The extent to which your organization can achieve the benefits of desktop virtualization depends on how well your implementation supports availability, security, a high-quality user experience and scalability.

Ensure availability. With desktop virtualization, users' desktop environments don't usually reside on their local devices. Instead, you host them in the corporate datacenter and users access them over the network. Although this approach provides a tremendous degree of location and device independence, it relies on both network connectivity and centralized infrastructure. Furthermore, numerous desktops share the same desktop delivery infrastructure, from the front-end connection brokers to the back-end servers. This means that while a failure with a conventional desktop PC only impacts a single user, a failure within the shared infrastructure of a virtual desktop deployment has the potential to impact the entire user population. This is why you need to design your infrastructure to protect not only against the failure of individual components, but also from disasters that could cause site-level outages.

Strengthen security. Robust security capabilities are especially important within a virtualized desktop environment, for several reasons. Many of your users are likely to access their desktops remotely, over insecure public networks. They've probably been demanding support for a rapidly expanding variety of client devices, each with widely varying security characteristics and profiles. Many of these devices are not owned or controlled by the enterprise. And finally, with desktop virtualization, you're giving users access to an entire desktop, not just a sliver of functionality or data. In addition to their own applications and data, users can get to all of the downstream resources their desktops are entitled to access. You need to ensure that you protect your assets against the challenges of this new environment.

Deliver a smooth and seamless user experience. Your users will insist on performance that's comparable to that of a classic desktop PC—and you'll have to win them over with seamless logons and fast response times, despite the fact that desktop access is occurring over a network. Otherwise, if users perceive or experience any shortcomings with the new environment, they might try to circumvent it—which could cause major problems for your organization.

Build in scalability. Most organizations take a practical approach to desktop virtualization, starting out small and steadily growing their implementations over time. With this kind of approach, you can scale your solution without impacting users or requiring forklift upgrades to the initial infrastructure investment.

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Optimize your virtual desktop deployment with NetScaler

Given the type and scope of these requirements, you should consider front-ending your virtual desktop infrastructure with a next-generation application delivery controller—such as Citrix NetScaler—that can deliver not only applications but also a broader array of services including on-demand virtual desktops.

NetScaler is an ideal choice for front-ending your organization's desktop virtualization infrastructure. An advanced solution for delivering both applications and services, it provides extensive high-availability, security and performance-optimization capabilities. Its powerful core features can work well with any virtual desktop products you choose, but if your organization selects the XenDesktop desktop virtualization solution, you'll also be able to take advantage of a number of more advanced features, made possible by the deeper level of integration between NetScaler and XenDesktop.

Ensuring availability

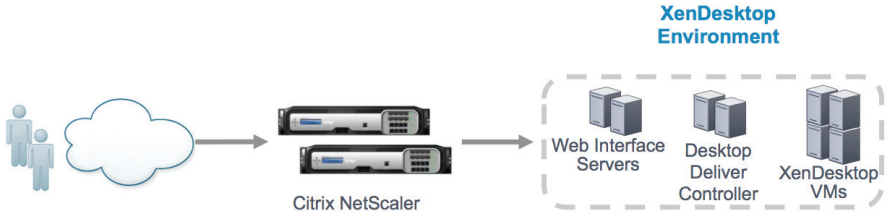
In order for your organization to gain the greatest benefit from desktop virtualization, your users must always have access essential desktop resources. NetScaler helps ensure the availability of critical components with a combination of robust server load balancing (SLB), health monitoring and global server load balancing (GSLB) capabilities.

High availability for dependable access. If a component such as a connection broker fails, core load-balancing algorithms within NetScaler dynamically route virtual desktop traffic to available services and servers. NetScaler configures and manages these as part of a pool of resources to automatically address both unanticipated failures and scheduled outages. NetScaler also helps ensure high availability of other elements in your desktop virtualization solution, including:

- Front-end components, such as web interface and security servers
- Supporting services, such as file transfer, licensing, provisioning and management servers
- Downstream components, such as the web interface and XML broker servers of Citrix XenApp™, that you can use to enable application virtualization

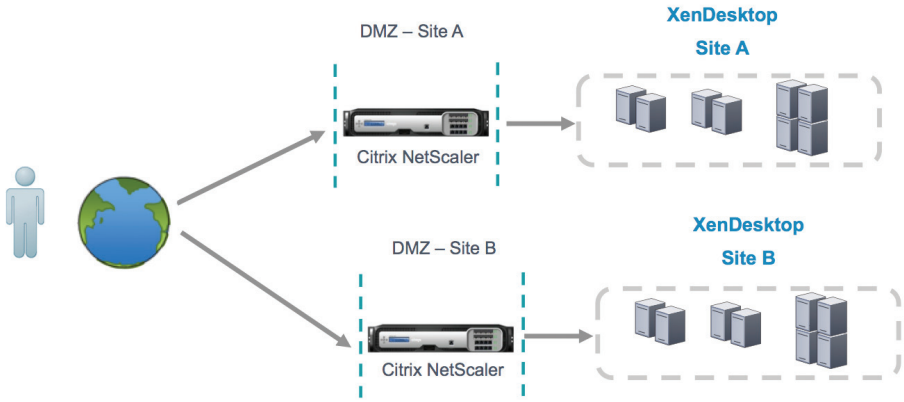
Health monitoring for proactive failure management. In conjunction with load balancing capabilities, NetScaler health checks proactively determine the status of key solution components such as the web interface and desktop delivery controller. NetScaler does more than ping servers, because pinging would only confirm whether a network connection was available and whether the underlying hardware was up and running. It wouldn't provide information about the state of higher-level services and software. This is why NetScaler includes extended content verification checks to further establish both the availability and proper operation of numerous software routines and system-level components, including ASP.net and essential logon, pool management, controller and database services.

You can also use NetScaler to carry out health checks for other products that your organization uses. Your system administrators can easily leverage the powerful and fully extensible NetScaler management framework to develop custom health checks that provide a similar degree of intelligent application-level monitoring for desktop virtualization solutions from other vendors.



GSLB for disaster recovery. NetScaler includes a robust GSLB capability that provides seamless disaster recovery for desktop virtualization. If a site becomes unavailable for any reason, NetScaler automatically directs users to an alternate datacenter, helping to ensure continuity of access to their desktops.

You can configure intelligent monitors and policies to route users to different sites based on administrator-selected priorities, such as proximity, resource utilization levels, or overall performance. As a result, your organization can fully leverage secondary facilities all the time, even during normal operating conditions, while providing users the best available performance.



Strengthening security

In addition to helping ensure availability, NetScaler delivers virtual desktop implementations additional security protection.

Secure access from any location and device. An integral component of NetScaler, Citrix Access Gateway™ is a full-featured secure sockets layer (SSL) virtual private network (VPN). As such, it provides your organization several security capabilities important to a virtual desktop operating model, without the need to deploy any additional devices.

The Access Gateway module accounts for remote users by providing an encrypted tunnel and supporting multiple methods for user authentication. This protects desktop sessions traversing public networks from eavesdropping while enabling your enterprise to leverage its existing identity infrastructure.

With Access Gateway, you can control on a granular lever which users get access to which resources based on attributes including user role, location, strength of authentication, sensitivity of the resource and ownership and security posture of the client device. If your organization is also using XenDesktop, you can take advantage of that product's intimate knowledge of virtual channels to control local printing, copy, paste, save-to-disk and other functionality.

NetScaler offers additional client-side security features that further minimize the risk of supporting a diverse population of user-owned devices. These include the ability to perform a detailed check of a device's security posture, to wipe the browser cache and delete or encrypt downloaded data upon termination of the desktop session.

Built-in infrastructure protection. A NetScaler front end includes design features that automatically protect any infrastructure. It's enhanced high-performance, standards-compliant TCP/IP stack both enforces a positive security model, dropping all traffic that is illegally formatted, and automatically thwarts many types of DDoS/flood attacks that exploit vulnerabilities in the TCP protocol and common connection handling techniques.

The proxy architecture of NetScaler provides a further layer of protection, shielding downstream components from direct connections and thus reducing their exposure to malware and other types of attacks.

Streamlining the user experience

NetScaler improves the overall usability of virtual desktops, both by optimizing overall performance and providing a uniform user experience.

Performance optimization. Leading virtual desktop solutions employ optimized display protocols to help ensure adequate performance over wide area networks (WANs). ICA, the display protocol that both XenDesktop and XenApp use, is unmatched in this regard. Still, one or more of the NetScaler performance enhancement mechanisms can improve performance further, especially if your organization is using a desktop virtualization solution other than XenDesktop.

NetScaler can deliver greater system capacity, lower packet loss rates and improved response times by using TCP optimizations to make more efficient use of server resources and available bandwidth. These optimizations include TCP buffering techniques, advanced window scaling, intelligent packet retransmit, selected acknowledgement (described in IETF RFC 2018) and enhanced congestion control (based on IETF RFC 3742). Unlike most competing solutions, NetScaler also incorporates optimizations to improve the performance of traffic streams characterized by heavy concentrations of small packets, typical with hosted virtual desktops.

Uniform, streamlined user experience. A universal client technology that is part of the XenDesktop solution, Citrix Receiver™ provides users with a single-pane-of-glass experience that features single-sign on and a self-service model for obtaining access to additional applications. When used in conjunction with the NetScaler Cloud Gateway solution, these capabilities also extend to enterprise web, SaaS and IaaS-based applications. The net result is a single, uniform and highly efficient way for users to securely access not only virtual desktops, but also web, cloud-hosted and Windows-based applications from any device, over any network.

Simplifying scalability

A virtual desktop implementation should be inherently scalable. NetScaler can increase the scalability of your deployment even further.

Server load balancing for intelligent load distribution. SLB does more than enable high availability. It also supports load distribution, which enables you to seamlessly scale up essential virtual desktop components such as connection broker, security and management servers. If your organization needs to add capacity, all you need to do is deploy another instance of the desired component, and NetScaler takes care of the rest, automatically balancing the workload among all available instances.

SSL offload for increased infrastructure capacity. SSL offload leverages purpose-built acceleration hardware to relieve downstream servers of the compute-intensive cryptographic operations that SSL requires. This frees up server resources, increases session density and improves performance, which can enable your organization to defer additional hardware purchases. This can benefit front-end servers—such as the web interface for XenDesktop and connection brokers for other desktop virtualization products—and might help other solution components too, depending on the products and their configurations.

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NetScaler: an enterprise-class solution

NetScaler provides an extensive set of capabilities for optimizing both Citrix and non-Citrix virtual desktops. It wraps these capabilities in a full-fledged enterprise-class solution that delivers a choice of platform, the flexibility to support different virtual desktop architectures and an unmatched degree of consolidation and manageability.

Choice of platform. Whereas the highly popular NetScaler MPX™ hardware appliances are ideally suited for single-instance, high-capacity use cases, the recently introduced NetScaler SDX™ platform can also support multi-tenancy requirements by running multiple, isolated NetScaler instances on a single physical device. Either one can provide you a combination of hardware and system-level software that has been constructed and optimized for service delivery.

In comparison, NetScaler VPX™ is a full-featured virtual appliance version of NetScaler that you can deploy on any hardware platform running a compatible Citrix XenServer®, Microsoft Hyper-V, or VMware ESXi hypervisor. Because there is no physical appliance to deal with, you can deploy NetScaler service delivery capabilities on demand, anywhere within your enterprise or cloud-based datacenter. A flexible, software-based solution, NetScaler VPX is ideal for:

- Smaller-scale implementations with less-demanding requirements
- Desktop virtualization development, testing and staging environments that can't easily accommodate a traditional network appliance
- Multi-tier scenarios that use both dedicated NetScaler virtual appliances for all virtual desktop delivery and high-performance NetScaler hardware appliances at the network edge for delivery tasks for the entire enterprise environment

The net result is that with NetScaler, your organization can choose the platform that best meets your requirements for scalability, multi-tenancy, flexibility and lower total cost of ownership.

Flexible support for different architectures. Although many enterprises plan to take a private cloud computing approach to desktop virtualization, others will lean toward public or hybrid configurations where an external service provider delivers all or some of the virtual desktops. NetScaler VPX offers a straightforward way to implement an identical front-end capability for cloud-hosted desktops.

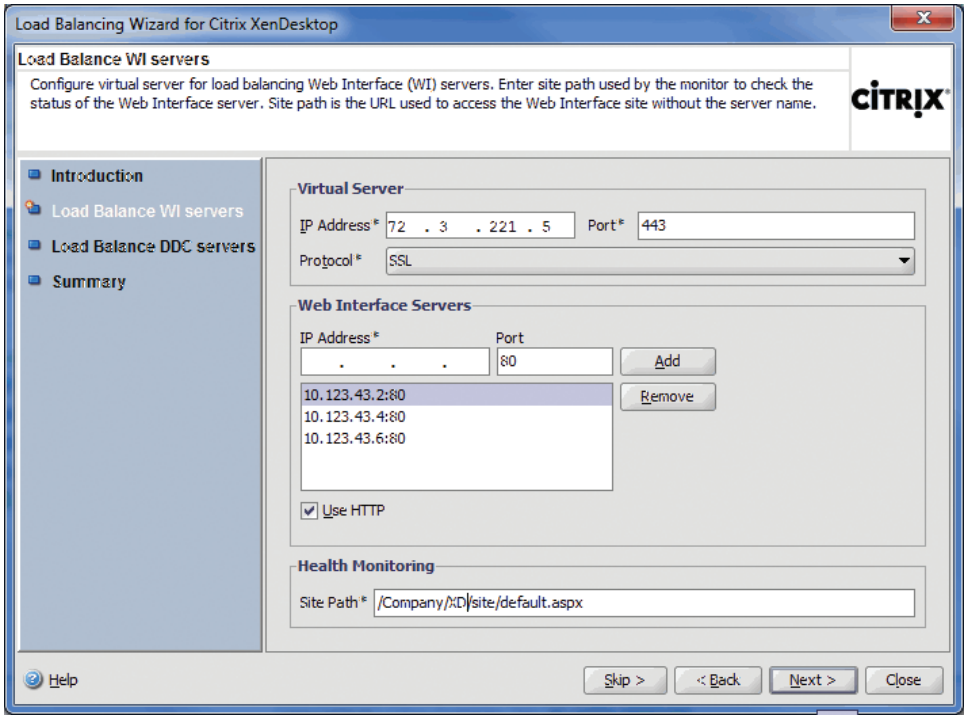
Another related NetScaler capability is NetScaler Cloud Bridge; available as a standalone appliance or integrated within NetScaler application delivery appliances. Combining WAN optimization with integral GSLB, IPSec and Layer 2 tunneling technologies, Cloud Bridge provides location, performance and network transparency for implementations that span on- and off-premise datacenters. Cloud Bridge automatically routes users to the location that will best meet their needs, preserving LAN-like performance and providing a secure channel for distributed components to seamlessly communicate with each other, all without the need for IP addressing or other network design changes.

Unmatched consolidation. NetScaler is the only service delivery solution that combines SLB, GSLB, SSL VPN and more on an integrated, flexible and highly scalable platform. Most competing solutions force organizations to purchase, implement and integrate multiple, separate products and devices to obtain a similar set of capabilities. If your organization is also using XenDesktop, you can consolidate further, hosting a full-featured version of the web interface for XenDesktop directly on NetScaler appliances. This configuration enables you to:

- Simplify network architecture, configuration and administration
- Cut IT costs by reducing server count
- Boost session performance and capacity using dedicated SSL hardware support and built-for-purpose hardware design
- Improve security by operating web interface on a hardened platform and eliminating separate firewall openings to enable communication with DMZ-based web interface servers

Simple yet powerful management. Citrix Command Center is a centralized management console that eliminates the need to administer multiple, distributed NetScaler instances individually. It features an intuitive policy framework and includes several wizards for simplifying common configuration tasks, such as SLB and GSLB setup.

Virtual desktop solution front ends typically involve complex configurations and numerous components. AppExpert Visualizer™ helps your organization manage this complexity with an at-a-glance graphical view illustrating the full end-to-end virtual desktop infrastructure, including individual NetScaler delivery capabilities and the components they support. You can easily monitor relationships, health status and configuration parameters, both for routine administration as well as analysis and troubleshooting.



"Built-in configuration wizards for easy XenDesktop deployment"

Conclusion: get the most from your desktop virtualization implementation

If your organization is one of the growing number of enterprises worldwide adopting desktop virtualization, consider implementing an advanced application delivery controller, such as Citrix NetScaler. NetScaler offers a convenient and economical way for your organization to make the most of the advantages of desktop virtualization—the lower ownership and operating costs, stronger data security and greater business agility—by helping to ensure the availability, security, usability, performance and scalability of your selected solution.

Designed to support a broad array of applications and IT services, including on-demand virtual desktops, NetScaler provides an extensive set of delivery capabilities that you can deploy on purpose-built hardware and full-featured virtual appliances. By front-ending your desktop virtualization infrastructure with Citrix NetScaler, your organization can benefit from:

- Increased availability, as NetScaler protects against both component and site-level failures
- Strengthened security that helps compensate for access over public networks and from client devices not controlled by IT
- A smooth and seamless user experience that helps ensure employees remain content and productive
- The ability to scale infrastructure without disrupting users or requiring forklift upgrades

An enterprise-class solution, NetScaler delivers a choice of platform, the flexibility to support different deployment architectures and an unmatched degree of infrastructure consolidation and manageability. Find out more about how you can use it along with your preferred desktop virtualization solution to help ensure your organization gets the maximum benefit from this new desktop delivery model. Visit www.citrix.com/netscaler.

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About Citrix
Citrix Systems, Inc. (NASDAQ:CTXS) is a leading provider of virtual computing solutions that help companies deliver IT as an on-demand service. Founded in 1989, Citrix combines virtualization, networking, and cloud computing technologies into a full portfolio of products that enable virtual workstyles for users and virtual datacenters for IT. More than 230,000 organizations worldwide rely on Citrix to help them build simpler and more cost-effective IT environments. Citrix partners with over 10,000 companies in more than 100 countries. Annual revenue in 2010 was $1.87 billion.

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