

White paper



Ensuring XenApp continuity in the face of disaster

A disaster recovery, business continuity and high availability solution

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Introduction

Disaster recovery and business continuity are hot-button topics for organizations worldwide. To understand why, one need only consider the frequency and type of events that have occurred in recent years: natural disasters, man-made calamities, health crises and a wide range of less severe disturbances. They can all impact a company's bottom line.

To achieve a comprehensive solution, organizations will need to evaluate many factors and put in place an extensive set of procedures and technologies. One of the most critical requirements is to ensure that users can always access the applications they need to do their work. IT shops running Citrix XenApp™ (formerly Citrix Presentation Server™) have a head start. They already have the means to effectively and efficiently deliver a wide variety of applications to displaced or home-bound users without worrying about the nature of the client devices being used or resorting to pre-deployment of client software.

It is important to realize, however, that XenApp alone is not really sufficient. For instance, what if the datacenter where the XenApp farm is running is impacted? What about the security implications of delivering confidential application data to displaced users who are now working in situations involving untrusted devices or networks? What about events that are less dangerous yet more common such as a hardware failure? To maintain user access to critical applications, the underlying infrastructure must be able to:

- Detect when and where failures occur
- Transparently direct requests around failed or unavailable resources
- Automatically recover failed resources as quickly as possible

This paper explores the challenges of maintaining the availability and security of applications during disasters and disruptions in order to distill the characteristics of an ideal solution. It reveals how the virtualization capabilities provided by Citrix XenServer™, in addition to the local and global server load balancing and secure remote access capabilities provided by Citrix® NetScaler®, are a complementary, logical extension to XenApp. The result is a robust solution that ensures application availability and conveys a wide range of technical and business benefits.

There's more to business continuity than meets the eye

In a disaster, the safety and well-being of the people involved always comes first. After that has been thoroughly addressed, the focus can shift to sustaining business operations and maintaining them as close as possible to normal. This is a two-part concern:

- Ensuring that essential applications are available
- Ensuring that they are secure and accessible

Each has considerations.

Availability

Having separate application instances at multiple datacenters and being able to seamlessly and intelligently failover between them is a common starting point. Seamlessly means no noticeable interruption or difference to the users and no need for intervention by operators. Someone will still need to configure everything to begin with but, from that point forward, any transitions should take place automatically. Failing over intelligently means that it happens not just if the application itself is down, but also when any other component along the end-to-end path is not functioning properly—for instance, the failure of an intermediate router, local authentication server or network link.

Two additional considerations are performance and persistence.

With regard to performance, it is important for CIOs to acknowledge that not all failures are black and white. Poor performance should also be regarded as a failure. An ideal solution should be able to account for scenarios where the user experiences slow response times—for example, network congestion or flash periods of activity. If a better experience can be achieved by using a different instance or site, then it should be used and it should be accomplished in a completely seamless manner.

The need for persistence derives from the ability for users to be vectored to alternate sites and also relates to maintaining seamless operations. The goal is to ensure that disrupted sessions or users involved with multi-step transactions are consistently returned to the instance or site where they originally connected. This avoids users having to start over or to deal with incomplete data.

The use of a cold, or non-active, site is another common starting point for a backup and recovery strategy, especially for organizations where size, financial means or criticality of IT operations do not warrant having multiple, overlapping datacenters. Seamlessness is an important characteristic but not to the same extent. With a standby site, it is expected that some manual effort will be needed to re-establish operations. However, minimizing this effort and the duration that critical systems remain offline is still a priority. An ideal solution should include the ability to rapidly spin-up fully configured and networked instances of critical applications with minimal operator involvement.

Accessibility

Accessibility is also an important facet of an overall solution. It's not enough to have one or more alternate sites to ensure application availability in the event that a datacenter goes down. You must also consider how employees will continue to work. If your employees can't get into the office because of a snowstorm, what then?

A truly effective solution for business continuity must account not just for disruptions to your application infrastructure but also for disruptions to the people who use the infrastructure. This means that a complete solution must support secure remote access. It needs to do so:

- For a population of users that normally operates locally—you can't count on them having corporate-issued laptops, complete with a pre-configured remote access capability and appropriate security software
- Regardless of where the users are located and what sort of network connectivity they have
- For all types of applications—Web-based, Windows® and client-server

A comprehensive solution for business continuity

Citrix recognizes that the ability to thoroughly and efficiently maintain the availability, accessibility and security of applications is central to a comprehensive strategy for disaster recovery and business continuity. This is why—along with the promise of significant server consolidation and associated cost savings—we recommend organizations run their XenApp components on XenServer. We also recommend that our XenApp customers implement local and global server load balancing and secure remote access by deploying NetScaler, which conveniently delivers all three of these capabilities via a single physical device.

Both XenServer and NetScaler have sophisticated capabilities to detect when resources fail or become unavailable. When it detects a failure, NetScaler automatically begins directing requests around unavailable resources, ensuring that users can continue to access the applications they need. Upon detecting a failure, XenServer ensures that the resource can be brought back online as quickly as possible. Used together, NetScaler and XenServer ensure that failures don't disrupt users while enabling the IT organization to return things to a normal state.

The role of XenApp

The thousands of enterprises worldwide that use XenApp are already familiar with its strengths. Many of you also realize that its capabilities are a good fit not just under normal operating conditions but for disaster recovery and business continuity as well. XenApp reliably delivers applications of all types, and it does so without regard for user location and type of device or network connection. Any PC can immediately become an operational workstation simply by having an Internet browser, or through the dynamic download and installation of the Citrix client software. Based on its virtualization technology and the many refinements XenApp has received over the years, performance will not be an issue even for slow network links and heavy applications.

However, none of these capabilities really matter if a disaster, disruption or hardware failure renders the organization's XenApp infrastructure inaccessible or inoperable. This is why enterprises should establish local and global high availability and secure remote access for their XenApp implementations as a high-priority objective of their overall business continuity strategy.

The role of XenServer

Citrix XenServer is open, powerful server virtualization that delivers faster application deployment, improved server utilization, simple management and accelerated application delivery.

By running XenApp on XenServer, IT managers gain dramatic server consolidation benefits and several powerful capabilities that help ensure continuity of operations and satisfactory performance:

- **XenMotion live migration** – With XenMotion™, administrators can move XenApp instances from one physical server to another without service interruption. As a result, scheduled server maintenance can be conducted without incurring any application downtime and workloads can be moved as needed to make the best use of available resources.

- **Dynamic workload allocation and provisioning** – When a virtual machine hosting a XenApp instance is reaching the limits of its underlying server hardware (e.g., due to sustained or flash periods of high utilization), XenServer automatically relocates the workload to another operating server with sufficient resources, or provisions an additional instance of the workload on an available bare-metal server (e.g., from a shared pool of inactive, backup resources). In this way, performance and capacity issues are avoided.
- **Automated high availability** – Virtual machines from a failed server are automatically redistributed and restarted on other physical servers within a designated resource pool according to priority and resource availability. Critical XenApp workloads are protected against localized faults and events, without having to implement a separate, standalone high availability product.
- **Disaster recovery** – XenServer supports using a non-active, standby facility for disaster recovery purposes. Metadata describing virtual machine configurations in resource pools can be replicated automatically along with virtual machine storage to the organization's standby facility. If the primary site goes down, administrators can then have standby XenServer systems attach to the replicated storage and quickly restore the associated virtual infrastructure, including all relevant network connections and settings.

There are several other benefits to using XenServer in conjunction with XenApp. To begin with, server virtualization technology allows organizations to run as many as four times the number of XenApp users on a single, physical server. This significantly reduces server requirements and achieves dramatic savings in IT administration, equipment, space, power and cooling—not just at a primary datacenter, but also at backup facilities. Administrative efficiency is also derived from the ability to operate an entire XenApp server farm using and maintaining a single software image.

While other server virtualization packages may support a similar set of capabilities, XenServer has one major advantage they do not: It has been tuned for XenApp. Memory management routines optimized specifically for XenApp help achieve virtualization of associated workloads with four to six times less overhead than competing solutions and result in the ability to support up to 70 percent more users per system.

Local and global server load balancing

If an event disrupts one datacenter, enterprises need the ability to seamlessly redirect users to a XenApp implementation at an alternate site. The solution must be intelligent enough to discern the impact of issues—including both failures and performance degradations—not just to entire sites, but also to any of the individual components and many of the services upon which a user's session depends. All of these requirements can be fully met by the robust set of server load balancing capabilities of NetScaler.

NetScaler includes local server load balancing (LB). A substantial layer of resiliency and responsiveness can be readily achieved by the extensive server health checks and load balancing algorithms that identify and route application sessions around any problem datacenter components.

More relevant in the event of a site-level outage, however, is the global server load balancing (GSLB) capability of NetScaler. NetScaler acts as an authoritative DNS server and provides users with the IP address corresponding to whichever site it calculates is best.

When all sites are operating normally, users will be directed to their default site. If that site becomes unavailable or overloaded—based on a wide range of configurable parameters—users are automatically directed to an alternate XenApp site without having to alter their behavior in any way. The GSLB service accomplishes this first by checking the availability and health of any existing

Citrix Access Gateway™ instance (see next section), as well as the Web Interface and XML Broker components of XenApp. If any of these elements is unresponsive, NetScaler classifies the site as down and redirects user sessions accordingly.

The GSLB of NetScaler also uses advanced health checks and policies to assess numerous factors—including application response time, application load, packet rates, available SNMP metrics and the user's geographic location—and routes users to the datacenter that will provide them with the best service. In this way, enterprises can maximize their datacenter investments even under routine operating conditions.

The net result with NetScaler LB and GSLB is greater assurance of both the availability of your XenApp infrastructure and applications, and the quality of the application experience your users will receive. An associated configuration wizard ensures that implementing GSLB for your XenApp environment is an easy, straightforward exercise.

Constellation Brands, a \$6.5 billion international producer and marketer of alcoholic beverage brands, first implemented Citrix Presentation Server (now XenApp) in 2001 to address its application delivery needs. John Dorak, Director of Infrastructure Services, later recognized the value of adding NetScaler and its global server load balancing capabilities, especially considering his need to support nearly 10,000 users in 70 locations. “We acquired NetScaler with an eye towards building a failover disaster recovery site.” The intent was to have both XenApp and NetScaler play a key role in this initiative, Dorak explained. “I can put additional NetScaler appliances in a failover center...I will have a subset of the XenApp server farm for JD Edwards, and if this datacenter goes down, my users will just sign on to that farm and continue to work.”

Secure remote access

Another extension of XenApp for disaster recovery and business continuity purposes is the ability to support secure remote access. Inevitably, some users who do not typically operate remotely will find themselves displaced from their normal work environment. Consequently, they'll have to make due with whatever computing devices and network connections they have at home or can cobble together. One obvious concern in such a situation is ensuring the confidentiality and integrity of application sessions and any sensitive information that is accessed. Even though XenApp can easily deliver the applications these users need to do their work, there is still a need to provide robust security without having to pre-install any client software, which would be impractical or impossible in a disaster situation.

This is where Citrix Access Gateway fits in. Classified as an SSL VPN, Access Gateway enables remote users to connect to XenApp, as well as to other resources, via an easy-to-use Web client. It provides a rich, desk-like experience in a standards-based, SSL/TLS encrypted session. Integrated endpoint scanning helps ensure that user devices are safe for connection to the corporate network and a persistence feature seamlessly reconnects users in the event of intermittent connectivity. In addition, fine-grained access control is rendered by the included SmartAccess and SmoothRoaming™ capabilities that:

- Determine the level of user access based on administrator-defined rules and endpoint analysis

- Control not just what data can be accessed, but what actions the user can perform—such as print, save, launch and view
- Adapt access policies accordingly as users move between locations or devices

By providing a flexible and robust set of security capabilities that can be dynamically engaged, Access Gateway enhances existing XenApp installations and further increases their suitability for business continuity scenarios. Access Gateway functionality is available as an integrated component of the Enterprise and Platinum Editions of NetScaler. This integration of Access Gateway and the local and global server load balancing functionality in NetScaler is particularly attractive for enterprises seeking to simplify management and ease network device sprawl.

The benefits of the Citrix approach

Enterprises stand to realize a wide range of benefits when they enhance their XenApp implementations with XenServer, NetScaler and Access Gateway.

From a technological perspective, these include:

- **Local resiliency and responsiveness** – Failed or poorly performing components of the application infrastructure can automatically be circumvented.
- **Global high availability** – Key applications will remain in service even during events which take an entire datacenter off line.
- **Secure remote access** – High accessibility to computing resources is essentially guaranteed, both in times of trouble and during routine operations. All types of users can be supported with minimal effort and maximum security.
- **Reduced complexity and increased flexibility** – The NetScaler platform integrates LB, GSLB, secure remote access and many other capabilities in a single, easy-to-manage device. At the same time, XenServer significantly reduces server count and the effort required to manage server images, while also providing the means to rapidly accommodate new or expanding application workloads.
- **Scalability and performance** – The combination of load balancing, content switching, application acceleration and server virtualization effectively optimizes the performance and scalability of the existing application infrastructure. In conjunction with XenApp, these features ensure high performance for the user.

From a business perspective, these include:

- **Resiliency** – Having robust application infrastructure helps ensure that critical business functions can be accomplished on a non-stop basis and that user productivity is not impeded.
- **Broad applicability** – While the solution excels during disruptions and disasters, it also delivers an optimized user experience and support for mobile employees under normal operating conditions.
- **Consistency** – By enabling XenApp to be used in all scenarios, not just during normal operations, users are provided with one familiar way of operating as opposed to having to learn multiple methods for connecting to and interfacing with key applications.
- **Agility and adaptability** – A rich and flexible feature set provides the ability to easily and rapidly accommodate changes in business plans, objectives and strategies, and to withstand the test of time.

- **Compliance** – The robust features of Access Gateway, including its granular access control and logging capabilities, help ensure enterprises stay compliant with regulatory requirements, even when they have to operate in an atypical manner due to a disaster.
- **Efficiency and cost savings** – With NetScaler, several essential capabilities can be deployed with minimal additional hardware or devices. Because NetScaler is part of a broader, comprehensive portfolio of application delivery solutions, enterprises can continue to add enhancements without having to establish and manage relationships with additional vendors. With XenServer, IT can consolidate application workloads, reduce server requirements and dramatically cut the cost of datacenter operations.

Conclusion

Modern enterprises need to account for potential disaster scenarios as well as the wide range of more common events that can impact the availability or accessibility of their application infrastructure. In this regard, XenApp has a role to play: It efficiently delivers all types of applications to all types of users and devices over all types of network connections. But what about XenApp itself? How will its availability and accessibility be guaranteed so that business operations will continue with minimal impact? The answer is straightforward:

- By implementing XenServer to provide high availability and disaster recovery for all XenApp components and to ensure that they and their hosted applications can rapidly be made available from a standby facility
- By implementing NetScaler for local and global server load balancing to route user sessions to an alternate path or a completely separate datacenter when necessary, or when doing so is advantageous for user performance
- By implementing Citrix Access Gateway as a means for achieving secure remote access to your XenApp server farms

Additional references

For further information on this topic, please refer to the following resources or contact your local Citrix representative.

NetScaler for XenApp Implementation Guide

To learn more about adding GSLB to your current Citrix infrastructure, read this guide.

http://www.citrix.com/%2Fsite%2Fresources%2Fdynamic%2Fsalesdocs%2FNS4XA_ImplementationGuide.pdf

NetScaler for XenApp Reference Architecture

To learn more about how features such as server load balancing and global server load balancing can improve an enterprise implementation of XenApp and Access Gateway, read this guide.

http://www.citrix.com/%2Fsite%2Fresources%2Fdynamic%2Fsalesdocs%2FNS4XA_ReferenceArchitecture.pdf

Case Study, Constellation Brands

To learn more about how Constellation Brands is using Citrix to deliver an enterprise application worldwide and optimize its Web site applications for consumers and retailers, read the full case study.

<http://www.citrix.com/English/aboutCitrix/caseStudies/caseStudy.asp?storyID=658551>

XenServer Resources

To learn more about the high availability capabilities of XenServer and extending the benefits of XenApp with XenServer, go to www.xenserver5.com

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