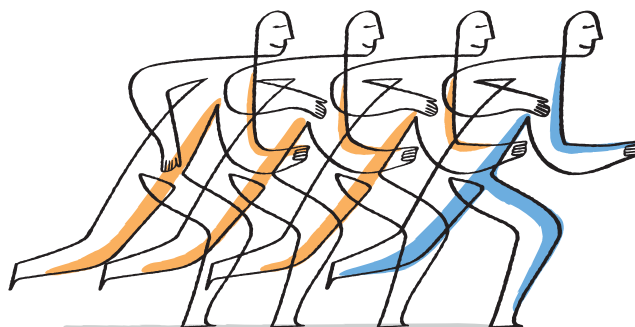**NetApp®**

CITRIX®

CISCO™

Solution Brief

Citrix XenDesktop Built on FlexPod

Desktop virtualization from NetApp, Cisco, and Citrix for on-demand growth

KEY BENEFITS

Why FlexPod™ is a leading solution for Citrix desktop virtualization:

- Reduces risk and TCO with preconfigured, validated design
- Offers balanced CPU, memory, I/O, storage capacity for optimized performance
- Lets you rapidly clone and provision desktops in minutes
- Offers an easily expandable modular design for on-demand growth
- Lets you scale your desktop infrastructure out or up

The Challenge

The trend toward adoption of virtualization and cloud computing continues to build. As part of that adoption trend, desktop virtualization is playing a more prominent role in the IT strategy that is required to support an organization's critical business goals.

Virtualizing traditional desktop environments—either as an enterprise solution or as a step in the journey into the private cloud—is becoming increasingly more popular due to a number of business drivers such as improving security and compliance, increasing flexibility, simplifying desktop and application management, lowering the total cost of ownership (TCO), and streamlining upgrades such as migration to Windows® 7.

In order to fully embrace desktop virtualization, businesses demand an end-to-end solution with flexibility and agility to accommodate future growth, availability to provide continuous access to thousands of desktops, and a price tag that won't break the bank. Unless that solution delivers a user experience that is as good as or better than the traditional PC experience, desktop

virtualization risks being rejected by desktops users. The fact that today's workers are more mobile and require access to their desktops anywhere in the world, any time, and on the latest devices only adds to the challenge.

In order to support such a dynamic business environment, where needs and requirements change frequently and often on short notice, IT needs the flexibility and agility to expand and contract infrastructure at a moment's notice.

The Solution
Unified, pretested, and validated shared infrastructure to simplify your data center and desktop transformation

To meet the challenges of today's IT organizations, NetApp and Cisco have collaborated to create the FlexPod data center solution. FlexPod is a proven, long-term data center solution built on a flexible, shared infrastructure that can scale easily and be optimized for a variety of mixed application workloads. It can also be configured for virtual desktop or server infrastructure, secure multi-tenancy, and cloud environments.

> "With the NetApp, Cisco, and Citrix infrastructure stack we were able to significantly accelerate our deployment time for XenDesktop 5 and other Citrix solutions. The preconfigured, validated, and repeatable architecture of FlexPod provides a flexible foundation to scale out and up, easily manage our virtual desktop deployment, and support additional workloads as we continue to expand our business around the Virtual Desktop Alliance Architecture."

Jed Ayers
Senior Vice President, MTM Technologies

FlexPod is a validated configuration that delivers a virtualized data center in a rack composed of leading computing, networking, storage, and infrastructure software components. It differs from other virtualization offerings by providing:

- Validated technologies from industry leaders in computing, storage, networking, and server virtualization

- A single data center platform that lets you scale to meet the largest data center requirements without disruption or architectural changes in the future

- Integrated components that enable you to centrally manage all your infrastructure pools

- An open-design management framework that integrates with your existing third-party infrastructure management solutions

Citrix XenDesktop Built on FlexPod

The FlexPod data center solution brings the power of the FlexPod concept to Citrix customers by providing an easy-to-deploy, self-contained virtual desktop solution in a rack. XenDesktop on FlexPod is a preconfigured and validated desktop architecture built on a flexible and secure shared IT infrastructure using leading technology from NetApp, Cisco, and Citrix.

The solution is optimized for XenDesktop deployments and combines NetApp's unified architecture, advanced data protection, and provisioning technologies with the Cisco® Unified Computing System™ and Cisco Nexus switches to provide a secure and robust platform for virtual desktop environments.

The architecture, although configured for virtual desktop deployments, also offers secure multi-tenancy capabilities that deliver the security and efficiency of a shared IT infrastructure, enabling the virtualized desktop environment to be isolated from other mission-critical application workloads.

The solution is built on virtualization that encompasses desktop OS, applications, compute, network, and storage components that have been validated to reduce risk and optimized to lower the total cost of ownership. Data protection and disaster recovery are integrated across the entire stack to increase the availability of virtual desktops, applications, and data. The solution design is completely modular, providing XenDesktop customers with the flexibility to transform their infrastructures at their own pace and dictated by their needs.

Citrix XenDesktop built on FlexPod provides:

- An easy-to-deploy, self-contained virtual desktop solution in a rack; integrated backup, data protection, and disaster recovery for continuous access to desktops, applications, and data

- Near-instantaneous cloning and provisioning of desktops and the flexibility required for dynamic on-demand expansion

Investment protection with standardized, flexible IT

Together, NetApp, Cisco, and Citrix provide a unified flexible architecture that is ready for virtualized environments today, yet is agile enough to let you grow at your own pace to a fully private cloud. The Ethernet-based FlexPod framework fits right into your current infrastructure, eliminating the cost of replacing your existing technology. FlexPod components are integrated and standardized to help you achieve timely, repeatable, consistent deployments and eliminate guesswork from the sizing process.

FlexPod can support hundreds to thousands of virtual desktops, depending on workload profile, and can also be configured to support a number of additional workload environments, such as Microsoft® Exchange, Microsoft

SharePoint®, and SQL Server®, with built-in headroom for expansion. FlexPod comes with a sizing guide that shows you how to flex the solution to meet your specific requirements for desktop virtualization, either as a standalone workload or with other workloads if performance and operational requirements permit.

Best-in-class components and features

Core components from Citrix, Cisco, and NetApp include:

- Citrix XenDesktop, with either Citrix XenServer and XenCenter, VMware® vSphere™ and vCenter™, or Microsoft Hyper-V™ and System Center Virtual Machine Manager

- Cisco Unified Computing System and Cisco Nexus family switches

- NetApp® FAS storage system and complete software bundle

The benefits of the integrated solution

- Performance-matched stack optimizes infrastructure resources

- Step-by-step deployment guide enables fast implementation

- Detailed application profiling and sizing guide protects against oversizing or undersizing the infrastructure

- Support for multiple classes of computing and storage in a single FlexPod system provides flexibility for deployment

- Centralized management in XenDesktop on vSphere environment: VMware vCenter with Cisco Unified Computing System and NetApp FAS plug-ins, XenServer environments with XenCenter, and Hyper-V environments with SCVMM simplify desktop administration

- Nexus 1000v or the Nexus 1010v and Virtual Services Gateway provide enhanced policy control and security functionality for a multi-domain or multi-tenant virtual desktop environment for VMware implementations

NetApp: Unified Storage Architecture and storage efficiencies amplify the benefits of XenDesktop

Traditional storage solutions for virtualized infrastructures force you to buy separate systems to accommodate the different storage needs typically encountered in a virtual desktop environment. NetApp addresses those same needs with a single multiprotocol unified architecture by accommodating desktop, application, and user data on the same platform. Additionally, NetApp reduces storage costs and increases performance for

XenDesktop—without adding disks—through deduplication of redundant desktop, application, and user data. The use of Flash Cache and the built-in efficiencies in the Data ONTAP® OS provide read and write IOPS optimization for desktop environments. NetApp's near-instantaneous cloning and provisioning of desktops provide the flexibility required for dynamic on-demand expansion, and the centralized and automated space-efficient backup of desktop, application, and user data, along with cost-effective disaster recovery, provides the high availability, data protection, and security that customers demand.

Cisco: The Cisco Unified Computing System provides unified computing for simplified connectivity

The Cisco Unified Computing System (UCS) is a data center platform specifically designed for virtualized environments. UCS unites computing, networking, and storage connectivity and virtualization into a single cohesive system that is ideally suited to meet the unique demands of desktop virtualization. It's designed to eliminate time-consuming manual integration, reduce total cost of ownership, and dramatically increase business agility.

The Cisco United Computing System integrates computing resources with Cisco Nexus switches and a unified I/O fabric that provides an intelligent method for identifying and handling different types of network traffic, including storage I/O, streamed desktop traffic, management, and access to enterprise applications. You can consolidate all traffic onto a single high-performance, highly available 10-Gigabit Ethernet network to greatly simplify network management and reduce costs.

Cisco UCS addresses the unique requirements of Citrix XenDesktop by providing a scalable, flexible, and simplified infrastructure that reduces the cost and complexity of virtual desktop deployments. The FlexPod validated design uses the flexibility of Cisco UCS to host XenDesktop Hosted VDI and Hosted Shared desktop delivery models in the most flexible and scalable manner. The Cisco UCS extended memory architecture enables higher densities of virtual desktops, resulting in lower compute, network, space, and power costs.

The Cisco Unified Computing System Manager interface also provides service profile templates that let you automate large-scale desktop, server, and application deployments based on predefined policies to deliver a stateless computing environment.

Citrix: Setting the standard for desktop virtualization

Citrix XenDesktop transforms Windows desktops to an on-demand service for any user, any device, anywhere. XenDesktop quickly and securely delivers any type of virtual desktop or Windows, Web, or SaaS application to all the latest PCs, Mac® computers, tablets, smartphones, laptops, and thin clients—all with a high-definition user experience, bringing unprecedented flexibility and mobility to your workforce. XenDesktop unlocks the full productivity and creativity of every worker while helping the entire organization adapt rapidly to new challenges and opportunities.

To put the best talent to work for your organization, you need to be able to deliver their desktops, application, and data wherever they are in the world—and wherever they go—any time they need them. With XenDesktop, your users can take advantage of virtual work styles such as teleworking and home sourcing to integrate computing more seamlessly into their lives, and never become less productive just because they're away from the office. Today's workers are more savvy than ever when it comes to the latest mobile devices. XenDesktop empowers them to use smartphones, tablets, personal laptops—any device they choose—as a seamless part of their corporate desktop experience.

By transforming complex, distributed desktops into a simple, on-demand service, XenDesktop frees you from the costs and constraints of traditional computing architectures. Centralized delivery, management, and control of virtual desktops bring new levels of efficiency to your IT organization while streamlining security and compliance. Self-service application provisioning, simplified helpdesk support, and support for mobile and virtual work styles give you a foundation to leverage a new generation of IT models and strategies.

Accelerate time to value in XenDesktop environments

The FlexPod data center solution fits right into your current infrastructure, eliminating the cost of replacing your existing technology and protecting your investments. The modular solution design allows flexible starting points. You can start small and add additional desktops or workloads later. The solution is designed to scale securely to any size. And it paves the way for future growth.

Cooperative support for rapid resolution

The cooperative Cisco-NetApp support model provides a streamlined process to rapidly resolve issues for FlexPod. Our support model provides a similar response from Cisco, NetApp, and Citrix to identify and rapidly resolve other issues.

Proven partnership

As industry leaders in storage, networking, and desktop virtualization, respectively, NetApp, Cisco, and Citrix have a global presence and have been working together on solutions for virtualized data centers. Our collaboration has resulted in more efficient virtualization and cloud computing solutions and numerous jointly validated reference architectures. Together we have helped thousands of mutual customers improve agility and lower costs.

No one knows networks and applications on networks better than Cisco and Citrix.

Open delivery ecosystem

You can choose from a broad network of world-class solution delivery partners to implement FlexPod. These partners understand your business requirements and are all certified and trained on NetApp, Cisco, and Citrix as well as complementary technologies to deliver a complete enterprise or cloud solution that fits your business needs.

Getting started

To learn how FlexPod enables you to build a flexible and efficient shared infrastructure today as your foundation for future-ready IT, contact your local data center partner.

About NetApp

NetApp creates innovative storage and data management solutions that deliver outstanding cost efficiency and accelerate business breakthroughs. Discover our passion for helping companies around the world go further, faster at *www.netapp.com*.

Go further, faster®

NetApp®