



Cisco Reference Architecture-Based Solution for Enterprise VDI Scale-Out

From Cisco in Collaboration with Citrix, VMware, and EMC

Cisco Enterprise VDI Scale-Out Solution	A reference architecture-based design for virtual desktop infrastructure
Solution Objective	5000 XenDesktop VDI Scale-out
Major Solution Components	Citrix XenDesktop 5.6 built on Cisco Unified Computing System, Cisco Nexus 5500 platform, EMC VNX7500 storage, and VMware ESXi 5.0

Cisco, Citrix, and EMC deliver a linearly scalable virtualization solution for virtual desktop infrastructure (VDI).

Highlights

Reduced Risk with Investment Protection

Based on a tested and certified Cisco® Validated Design.

Is highly available and reliable, helping ensure continuous application access.

Rapid Deployment and Low TCO

Zero to 5000 Citrix XenDesktop users logged-in and working in 30 minutes

Using Cisco Nexus® switching, Cisco Unified Computing System™ (Cisco UCS®), EMC VNX storage, and VMware vSphere software, the solution provides intelligent infrastructure that is ready out of the box.

Massive Linear Scalability and Uncompromised Performance

Cisco UCS scales linearly to support up to 5000 Citrix XenDesktop users on 39 blades with N+1 fault tolerance at the cluster level. Complemented by EMC VNX7500 with four data movers, 10 200-GB SSD drives, and 124 600-GB SAS drives to easily handle all the I/O operations per second.

Challenges

Large enterprises are facing big challenges in deploying massively scalable virtual desktop infrastructure (VDI) that delivers rapid deployment of desktops and offers superior management, performance, control, and security of centralized desktops - all while reducing overall desktop total cost of ownership (TCO). Working together with desktop virtualization industry leaders EMC, VMware, and Citrix, Cisco Enterprise VDI scale-out solution delivers a portfolio of solutions that address a broad set of IT requirements. Phase 1 of the project demonstrates linear scalability of 5000 desktops with Citrix XenDesktop 5.6 running on the Cisco Unified Computing System™ (Cisco UCS®).

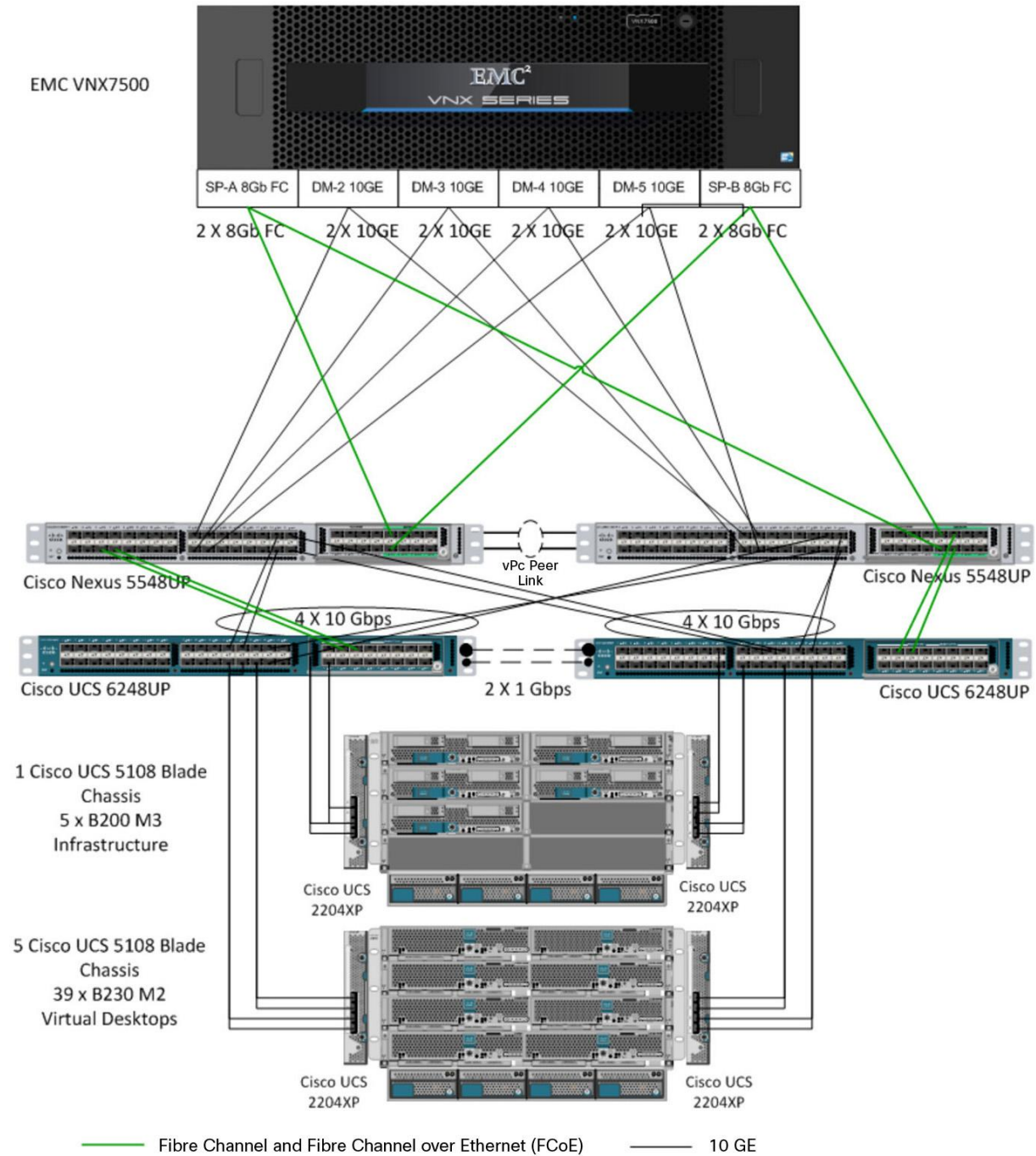
VDI with Cisco UCS, Citrix XenDesktop, and EMC VNX changes the way that IT administrators work by providing high performance and secure access for centrally managed desktops from any device on any network.

Cisco Enterprise VDI scale-out Solution

The Cisco Reference Architecture-Based Solution for Enterprise VDI Scale-Out can be deployed rapidly using Cisco UCS service profile technology to support large-scale VDI deployments and rapid addition of capacity. The solution built on Cisco UCS, Citrix XenDesktop 5.6, VMware ESX 5.0, and EMC VNX flash-memory-optimized unified storage accelerates scalable desktop virtualization with validated configurations that support interoperability, reduce complexity and risk, and increase performance for midsize and large enterprises.

The solution integrates all the components necessary to quickly deploy a massively scalable VDI solution to meet the needs of businesses. It consists of the Cisco UCS B200 M3 Blade Servers for infrastructure and Cisco UCS B230 M2 Blade Servers for virtual desktops, Cisco Nexus® 5548UP Switch, Cisco UCS 6248UP 48-Port Fabric Interconnect, VMware ESX 5.0, and EMC VNX7500 unified storage infrastructure with four data movers, 10 200-GB SSD drives, and 124 600-GB SAS drives. Figure 1 shows the solution architecture.

Figure 1: Solution Architecture



Main Business Benefits

This solution helps organizations quickly deploy the tools they need to lower TCO, reduce complexity, and improve operation efficiency.

The **Cisco Nexus 5548UP** provides high-bandwidth, low-latency, line-rate 10-Gbps unified fabric connectivity between servers and both Fibre Channel and Network File System (NFS) storage in the virtualization cluster. Cisco UCS B230 M2 blades provide outstanding desktop density and performance in a compact package using the Intel Xeon processor family.



Citrix XenDesktop is a desktop virtualization solution that transforms desktops and applications into a secure on-demand service available to any user, anywhere, on any device. With XenDesktop, you can deliver individual Windows, web and SaaS applications, or full virtual desktops, to PCs, Macs, tablets, smartphones, laptops and thin clients with a high-definition user experience.

VMware ESX 5.0 helps organizations consolidate their servers and reduce capital expenses by requiring less computing, networking, and storage infrastructure. It reduces operating expenses because there are fewer components to manage.

The **Cisco Nexus 1000V** Series Switches are a distributed virtual switching platform, tightly integrated with VMware ESXi 5, that provides advanced networking features, integrated virtual services, and a consistent operational model across physical and virtual switching environments. The Cisco Nexus 1000V Series contributes to the end-to-end quality-of-service (QoS) policies from the virtual machines through the Cisco UCS fabric interconnect to the Cisco Nexus 5500 platform access-layer switches. The Cisco Nexus 1000V Series distributed virtual switch helps achieve improved IT efficiency, increased IT control through service-level automation, a non-disruptive operational model, and increased compliance and security capabilities across physical and virtual operating environments. For more information, visit <http://www.cisco.com/go/nexus1000v>.

EMC VNX7500 unified storage delivers both SAN storage and network-attached storage (NAS) in a single platform optimized for virtualization. The EMC VNX architecture and EMC FAST Suite in combination with flash-memory technology optimize the performance of virtual desktop infrastructure environments to reduce TCO (cost per GB and cost per I/O operations per second [IOPS]). EMC VNX storage is designed for five-nines availability using redundant components throughout the array. Table 1 shows the bill of materials (BOM) for the solution.

Cisco desktop virtualization technologies, services, and best practices combine with partner offerings to deliver:

- Zero to 5000 Citrix XenDesktops logged-in and working in 30 minutes
- Open, industry-leading approach for resource efficiency and control
- Linear VDI scale-out architecture for from up to 140 Citrix XenDesktops per blade server to up to 5000 Citrix XenDesktop users on 39 blades spread over three VMware ESX clusters and providing N+1 fault tolerance per cluster
- Cisco Validated Designs that reduce the risk of moving from proof of concept to full-scale production

Table 1: Bill of Materials

Quantity	Component
39	Cisco UCS B230 M2 running VMware ESXi 5.0 Update 1 hosting 5000 Microsoft Windows 7 SP1 32-bit pooled virtual desktops
5	Cisco UCS B200 M3 running VMware ESXi 5.0 Update 1 hosting infrastructure virtual machines, including Cisco Nexus 1000V Virtual Supervisor Modules (VSMs)
2	Cisco UCS 6248UP fabric interconnects (with 16 universal port expansion modules) running Cisco USC Manager 2.0(4a)
2	Cisco Nexus 5548UP access-layer switches providing unified Ethernet and Fibre Channel connectivity including Fibre Channel zoning
1	EMC VNX7500 with 4 data movers, 10 200-GB SSD drives, and 124 600-GB SAS drives, supporting the infrastructure and virtual desktop workloads on NFS storage and using Fibre Channel boot logical unit numbers (LUNs)
3	VMware clusters, each hosting approximately 1700 virtual machines on 13 blades



Easy Ordering

The Cisco Reference Architecture-Based Solution for Enterprise VDI Scale-Out for commercial and enterprise environments is available through the Cisco Smart Play program. All hardware components are available by ordering only a single part number, enabling you to quickly deploy a powerful, secure virtualized environment in your enterprise without the expense or risk entailed in designing and building your own custom solution.

For More Information

For more information about the Cisco **Reference Architecture-Based Solution for Enterprise VDI Scale-Out**, please visit http://www.cisco.com/en/US/netsol/ns944/networking_solutions_white_papers_list.html.

For more information about Cisco Validated Designs for the Cisco **Reference Architecture-Based Solution for Enterprise VDI Scale-Out**, please visit: http://www.cisco.com/en/US/docs/unified_computing/ucs/UCS_CVDs/citrix_emc_ucs_scaleVDI.html

For more information about the Cisco Smart Play program, Please visit <http://www.cisco.com/go/smartplay>.

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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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