

Imagine Virtually Anything™



Delivering on the Promise
of a Virtualized Data Center

THE COLLECTIVE ADVANTAGE OF CISCO, NETAPP, AND VMWARE FOR DATA CENTER TRANSFORMATION

The enterprise data center is undergoing a transformation. Server virtualization technology is changing the way applications are provisioned and managed and dramatically improving cost efficiency. Extending virtualization across computing, network, and storage layers enables a comprehensive data center transformation that further improves efficiencies.

However, many data center architectures are still built around complex, heterogeneous silos of servers and storage systems that result in poor utilization and captive resources. These resources require multiple provisioning toolsets, data management processes, and teams of people to manage them. In addition, massive data growth combined with power, cooling, and space limitations exerts extreme pressure on IT responsiveness.

If this sounds like your organization, your top priorities are to boost efficiency and reduce costs. The discussion isn't about "whether" you're going to virtualize and transform your data center; it's about "when" and "how."

Fortunately you don't have to wait. By using the combined strength of Cisco, NetApp, and VMware, you can realize a virtualized dynamic data center today. Virtual infrastructure software and unified storage, server, and network technologies are available now and can be deployed to meet your unique business requirements. These technologies are integrated, interoperable, and in use at data centers around the world.

All three companies have a powerful global presence and have been working together on a shared virtualized data center vision since 2003. We have defined and tested a dynamic data center infrastructure built on a flexible, cost-effective, high-performance Ethernet framework that addresses four IT pillars: high availability, secure isolation, service assurance, and simplified management.

Together, we can help you quickly transform IT silos into a shared virtualized infrastructure. You'll be able to manage IT as a dynamic asset that reduces costs by up to 50%¹ and quickly adapts to your changing business needs. We can also reduce your risk exposure with proven, validated solutions; cooperative support; and a broad open ecosystem of best-in-class delivery partners.

BUILDING A VIRTUALIZED DYNAMIC DATA CENTER

Cisco, NetApp, and VMware believe that a virtualized dynamic data center represents one of the most effective foundations for cloud computing and the realization of IT as a service. Together we provide the primary solution components to make this happen:

- **Cisco Unified Computing System (UCS)** reduces the number of network switches and integrates compute resources around a unified I/O fabric.
- **NetApp® unified storage architecture** supports multiple protocols as well as primary, secondary, and archive storage with a single platform.
- **VMware vSphere™** provides the platform for infrastructure virtualization. VMware vCenter™ Server provides the universal hub to centrally manage all virtualized server, network, and storage resources.

A single unified architecture

The consolidation of resource silos into dynamic resource pools is the first step toward a virtualized data center. Our integrated approach to virtualization can simplify management and cut investment and operating costs across server, network, and storage infrastructure layers. A unified virtualized architecture lets you effectively run everything from mission-critical applications to enterprise-wide virtual desktops. Our methodology for data center transformation includes the following strategies:

- **Virtualization of everything:** Consolidate servers by a ratio of 10-to-1, eliminate 90% of networks ports and cables, and use 50% less storage.²
- **End-to-end Ethernet:** Reduce complexity and cost with a tested and proven 10GbE virtualized data center solution. You can support all SAN, NAS, and LAN traffic on a "single wire" without compromising performance or security.
- **Centralized management:** Manage server, network, and storage resources from a "single pane of glass" within VMware vCenter Server. All of our infrastructure components are certified to work together.

Secure multi-tenancy

A shared virtual infrastructure requires that resources for different tenants, clients, business units, or departments are securely isolated while delivering on promised service

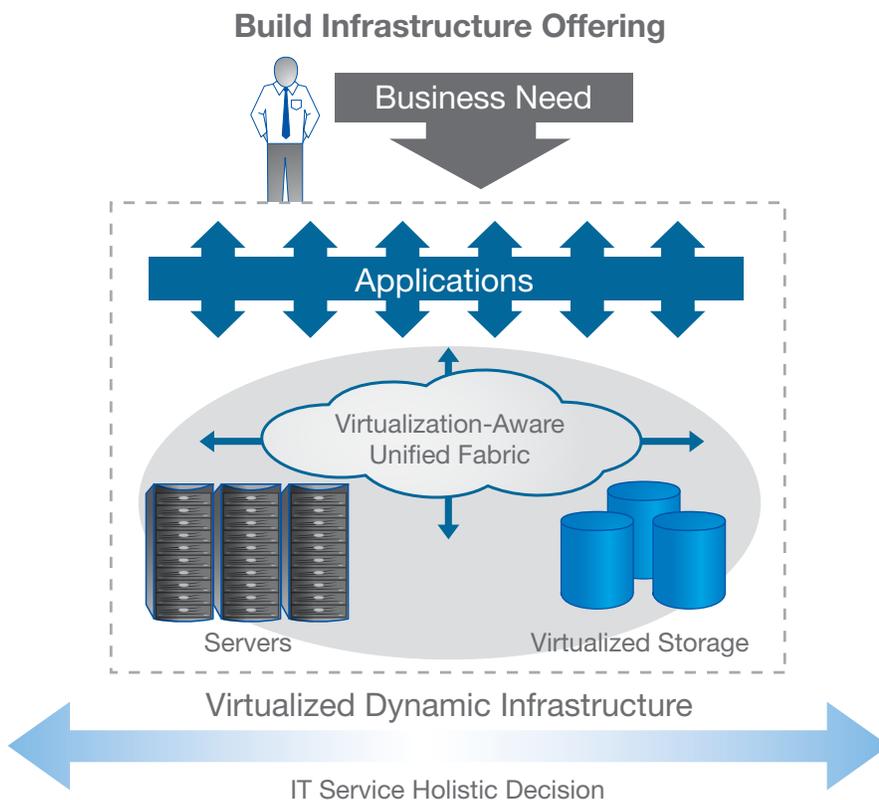


Figure 1) Virtualized data center

¹ The Alchemy Solutions Group, "Business Value Assessment Study: Managing Data Growth, Improving Performance, and Enhancing Preparedness with Storage and Server Virtualization", Nov, 2009

² See details of the NetApp 50% Virtualization Guarantee at www.netapp.com/guarantee

levels. Cisco, NetApp, and VMware have teamed up to offer the industry's first end-to-end secure multi-tenancy solution for virtual environments. This solution enables you to deliver committed levels of performance while maintaining data security by isolating server, network, and storage layers for each tenant, as illustrated in Figure 2. You can establish the appropriate quality of service for each resource layer to maintain consistent service levels for each tenant. With secure multi-tenancy, your business units and customers get better performance, availability, and responsiveness with the cost efficiency of a shared infrastructure.

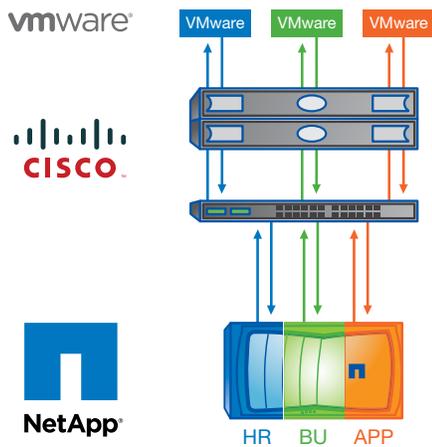


Figure 2) Secure multi-tenancy

Additional joint solutions

Cisco, NetApp, and VMware have combined our leading technologies in a joint best practice architecture for additional application environments:

- **Virtualized infrastructure for Microsoft® applications:** This comprehensive solution, architected with VMware vSphere, NetApp unified storage, and Cisco Nexus unified fabric, is specifically designed for mixed Microsoft application workloads. Now you can fully virtualize your critical Exchange, SQL Server®,

unsurpassed cost efficiency, infrastructure flexibility, integrated management, and rapid backup and DR.

- **Two-thousand-seat virtual desktop architecture:** This solution provides optimal design and best practices for running VMware View™ on NetApp multiprotocol storage and Cisco Nexus switches in a typical mixed desktop deployment scenario. The combined architecture can deliver the performance, operational agility, and data protection to maintain end-user productivity even as you scale to thousands of desktops.

DEPLOY AND OPERATE WITH CONFIDENCE

Cisco, NetApp, and VMware solutions have been jointly tested and proven so you can deploy them quickly with confidence. Our secure multi-tenancy solution, for example, is a Cisco Validated Design. The entire solution has been lab tested and qualified to help with rapid deployment and optimal functionality and is fully backed by trilateral cooperative support.

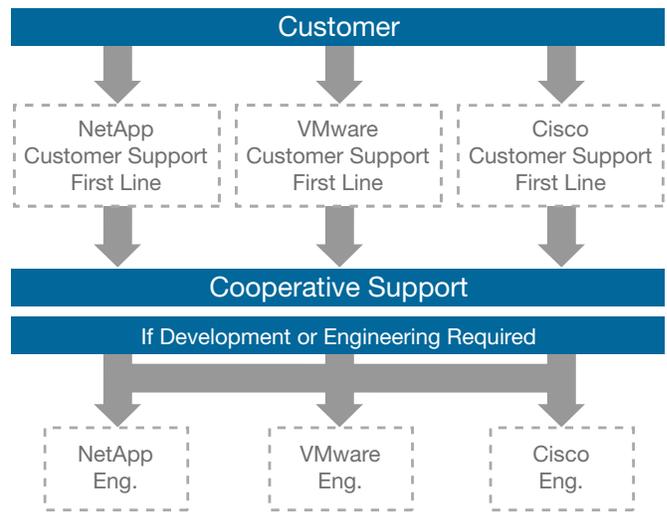


Figure 3) Simplified collaborative support

Simplified, modular design

Cisco, NetApp, and VMware take the guesswork out of the design and deployment process with validated presized configurations. Deploy virtual desktops; virtualized Exchange, SQL Server, or SharePoint environments; or any general-purpose application quickly and with the confidence that you've made the right choice.

Expert guidance and choice

You can implement your virtualized data center infrastructure using our organizations directly or select from our broad network of world-class solution delivery partners that understand your business. All solution delivery partners are certified and trained on Cisco, NetApp, and VMware technologies to deliver a more efficient and complete virtualized data center solution.

Rapid resolution

Our cooperative support model provides a direct, 24x7 contact path to experts from Cisco, NetApp, and VMware. Customers can initiate a support call with any of the three vendors. The support teams can then open cases and work directly with each other as needed to resolve issues.

**CISCO, NETAPP, AND VMWARE:
THE CHOICE FOR BUSINESS
AGILITY, EFFICIENCY, AND A
COMPETITIVE ADVANTAGE**

Deploy a virtualized dynamic data center from industry leaders in server, storage, and network virtualization. You can get the results you need to help maintain your competitive edge with an integrated, end-to-end solution from Cisco, NetApp, and VMware:

- Tremendous cost savings by virtualizing and consolidating servers, storage, and networking resources
- Simplify management by unifying infrastructure, centralizing administration, and automating routine tasks
- Quickly respond to new business and IT demands by rapidly deploying new applications and resizing resources
- Stay ahead of the competition by keeping employees productive and customers satisfied with continuous, secure data access

IT AREA	TYPICAL DATA CENTER	VIRTUAL DYNAMIC DATA CENTER
Servers	1000	100
Storage (TBs)	100	50
Racks	200	10
Cables/Ports	3000	300
Networks	2	1
Provision Time	Weeks	Minutes
Utilization	Compute: 5-8% Storage: 30-40%	Compute: 90% + Storage: 75% +
Staff	Tactical Tasks 250 TB per FTE	Strategic Tasks Up to 2PB per FTE

Figure 4) Typical improvements with Cisco, NetApp, and VMware virtualized infrastructure