FlexPod for VMware

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Shared infrastructure might be the future of IT, but for many of us, the best way to get there remains an open question. The process of integrating heterogeneous server, network, and storage components into a shared infrastructure with balanced performance and high efficiency and then enabling business-critical applications on top of that infrastructure comes with some serious potential pitfalls.

Cisco, NetApp, and VMware have created FlexPod™ for VMware®—a presized, validated, standardized data center architecture design available through select channel partners—to address these difficulties. FlexPod provides a shared infrastructure built from best-in-class components designed to reduce risk, maximize data center efficiency, and enable you to provision new services or roll out new data center infrastructure quickly and easily. FlexPod is designed with flexibility in mind. You can easily scale up a single FlexPod configuration in any dimension or scale out with multiple identical FlexPod installations. FlexPod sizing and deployment processes are fully documented to further make sure of success.

This article describes the components that make up FlexPod for VMware and explores potential workloads. The FlexPod approach to open management is also discussed.

What Is FlexPod for VMware?

FlexPod for VMware creates a shared infrastructure using leading hardware and software components from Cisco, NetApp, and VMware. The baseline FlexPod configuration is illustrated in Figure 1. All FlexPod components are designed to achieve maximum redundancy and high availability.

![Diagram of FlexPod components](image)

**Figure 1**: FlexPod for VMware components.

A Roadmap for Shared Infrastructure

This issue of Tech OnTap features two articles that focus specifically on efforts by NetApp, Cisco, and VMware to simplify and improve your shared infrastructure experience.

- **FlexPod for VMware**: A presized, standardized architecture.
- **Enhanced Secure Multi-Tenancy**: This updated version of SMT delivers the security capabilities you need in a shared infrastructure environment.

Future-Ready Storage

Getting your storage infrastructure ready for the future is all about flexibility and efficiency. Last month’s issue of Tech OnTap featured articles on three technologies that will put you on the path to shared infrastructure and future-ready IT:

- **Get Future Ready with Data ONTAP 8**
- **Shared IT Infrastructure with the FAS6200 Series**
- **NetApp Data Compression: Efficiency and Flexibility**
The NetApp FAS3210A storage system used by FlexPod is a dual-controller configuration that includes 42TB of SAS storage and 512MB of Flash Cache, for intelligent caching that offers significant acceleration for server and desktop virtualization and other applications. The FAS3210A is able to achieve high levels of storage efficiency using proven NetApp technologies such as RAID-DP®, deduplication, thin provisioning, FlexClone®, and others.

On the compute side, FlexPod includes two types of compute blades: the B-Series B200 M2 Blade Server for general workloads and the B250 M2 Extended Memory Blade Server for memory-intensive workloads. The B250M2 offers more than double the memory capacity of a standard two-socket server design to meet the needs of demanding virtualization environments and large dataset applications. Cisco Unified Computing System™ (Cisco® UCS) offers the highest density for virtualization computing, consolidated wiring, and unified fabric for networking simplicity.

For networking, Cisco Nexus® 5500 series switches provide a unified, high-speed fabric for connectivity. Figure 2 illustrates FlexPod connectivity in detail and shows that all network paths are redundant.

Two networking components are specifically designed to support VMware:

- Cisco Nexus 1000V virtual supervisor module (VSM) is a software switch that runs within the VMware kernel or on the Cisco Nexus 1010 appliance to provide tight integration between the server and network environment.
- Cisco Nexus 1010 is a dedicated appliance that supports multiple instances of the Cisco Nexus 1000V VSM to offload the work from individual server blades, improving scalability and performance.
FlexPod for VMware includes VMware vSphere™ Enterprise Plus and VMware vCenter™. VMware is the leading server virtualization technology and includes capabilities such as VMotion™, Storage VMotion, and Distributed Resource Scheduler. For those that already have a VMware Enterprise license, FlexPod is available without the VMware software components.

For element management, FlexPod for VMware includes three components:

- **VMware vCenter** provides a scalable and extensible management platform that supports workflow automation.
- **Cisco UCS Manager** provides embedded management of Cisco components and integration with vCenter.
- **NetApp OnCommand Management Suite** lets you delegate storage management tasks to server or VMware admins and also provides vCenter integration.

Many data centers either have standardized on a system management stack or are planning on doing so. To facilitate integration into existing management frameworks, each layer in the FlexPod for VMware solution stack—hypervisor, network, compute, storage—provides open APIs for integration with leading orchestration products from BMC, CA, DynamicOps, HP, IBM, newScale, VMware, and others.

**FlexPod Advantages**

FlexPod for VMware makes it easy to deploy shared infrastructure. Components are integrated and standardized for fast, repeatable, consistent deployment. FlexPod eliminates much of the guesswork involved in:

- Resource procurement
- Capacity planning and data center sizing
- Operations and provisioning

You can roll out new applications or grow existing applications quickly and easily.

- **Scale out or scale up.** With FlexPod, you can easily scale out your infrastructure by adding additional pods, or you can scale up by adding components within a single pod. FlexPod is not a fixed configuration. It provides an excellent starting point for shared infrastructure for organizations running mixed workloads, but the FlexPod architecture allows different resources (compute, storage) to be scaled.

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*Figure 3* Cisco Nexus 1000V and Cisco Nexus 1010.
while maintaining the same design and implementation.

- **Resource pools.** All FlexPod components adhere to the concept of resource pools. Instead of searching for and then selecting specific resources to allocate to an application, you simply allocate resources (compute, storage, networking) as needed from pools of available resources without having to get bogged down with a lot of specific details. The ability to operate on resource pools greatly accelerates common provisioning and management tasks.

## Security and FlexPod

Security is obviously critical in shared infrastructure environments. That’s why NetApp, Cisco, and VMware rolled out their first-generation solution for secure multi-tenancy and quality of service almost a year ago. Secure multi-tenancy was recently updated to provide greater security and give you more deployment flexibility. New features include load balancing, SSL offload, and intrusion prevention and detection. The new enhanced SMT architecture is the subject of a companion article in this issue.

The architecture used by enhanced SMT is the same as the architecture used by FlexPod for VMware. (The next version of the deployment guide will refer to FlexPod as a starting point.) As a result, you are free to implement the full functionality of the enhanced SMT architecture, or you can choose and deploy just those security features that are needed in your environment.

## FlexPod Workloads

While single workloads can comfortably be deployed, the FlexPod for VMware design is based on the ability to support 1,500 users running a mixed workload consisting of VMware View 4.5 (VDI), Microsoft® Exchange 2010, Microsoft SharePoint® 2010, and Microsoft SQL Server® 2008R2. In addition, this design leaves sufficient headroom for deployment of additional applications. Initial deployment and sizing documentation is based on these mixed workloads. This is intended as a proof point to demonstrate that FlexPod can satisfy a diverse set of application requirements. Additional sizing validation documents for other applications will be added over time.

**TR-3884: FlexPod for VMware Solutions Guide** gives general guidelines for deploying these and a number of additional applications and solutions on FlexPod:

- **Development and test.** FlexPod for VMware includes the necessary storage features, such as NetApp FlexClone, and storage protocols to support development and test environments. The NetApp VSC provisioning module can be used to create space-efficient clones of production virtual machines for dev/test. Dev/test environments can be effectively isolated from production environments either by using the features of Cisco UCS server blades that can be grouped such that pools of blades can be allocated to dev/test and physically isolated from production or by putting dev/test resources into a separate VMware ESX cluster. Cisco UCS supports service profile templates, which can be easily replicated for rapid deployment of large-scale test environments. Environments can be “preprovisioned” prior to physical hardware deployment.

- **Disaster recovery.** FlexPod can also function as a recovery DR site. An ideal situation is to have one or more FlexPod configurations at the protected site with one or more FlexPod configurations at the recovery DR site. The configuration is simplified because the sites can be set up as mirror images of each other.
VMware Site Recovery Manager (SRM) and the NetApp adapter for VMware SRM are needed to automatically manage the DR plan and to implement offline tests of this plan at the recovery site. Additionally, the backup portion of NetApp VSC (previously NetApp SnapManager® for Virtual Infrastructure), NetApp SnapMirror®, SnapDrive®, and the appropriate SnapManager products are needed to back up and replicate virtual machines and virtual machine data to the DR site. This DR configuration can be applied to any of the application environments discussed earlier as needed. Refer to NetApp Technical Report 3822 for more details.

Getting Started with FlexPod

The presized, validated, and standardized architecture created by FlexPod for VMware offers significant advantages for accelerating the deployment of shared IT infrastructure. FlexPod brings together best-in-class technologies for compute, networking, storage, and virtualization into a preconfigured and easy-to-deploy solution. We’ve made significant efforts to document both the sizing and deployment of the environment to simplify the process of getting started, and we’ve focused on providing open management capabilities that will integrate with whatever tools you currently have in place.

A cooperative support model between Cisco, NetApp, and VMware provides a more streamlined response to identify and quickly solve potential issues related to shared infrastructures. This saves you valuable time and resources when requesting support.

To learn more about FlexPod for VMware, check out the following documentation:

- TR-3884: FlexPod for VMware Solutions Guide
- FlexPod Technical Specification

FlexPod for VMware is available through an ecosystem of joint partners that carry the necessary NetApp, Cisco, and VMware certifications and service offerings. This set of partners is listed here.

Got opinions about FlexPod?
Ask questions, exchange ideas, and share your thoughts online in NetApp Communities.

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