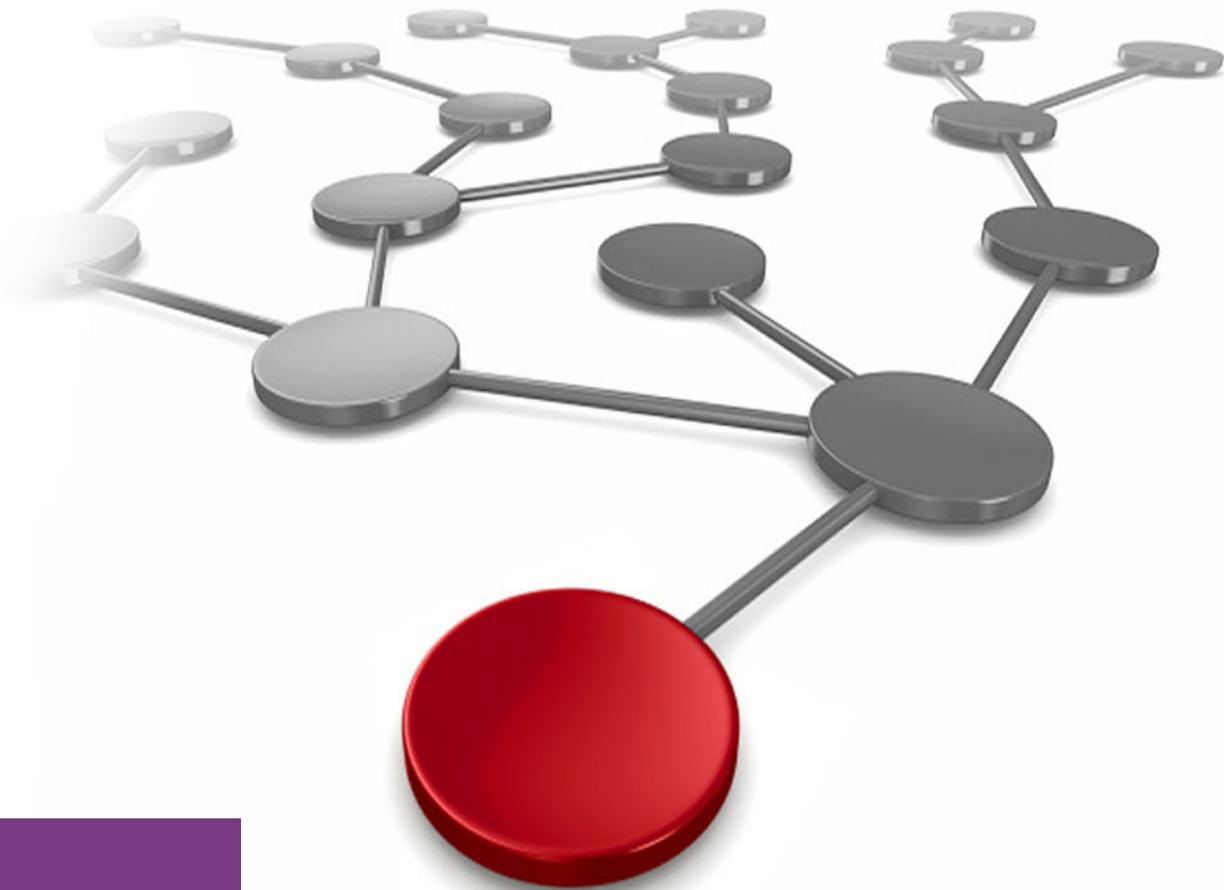


# IBM FlashSystem V9000 in a VersaStack Environment

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Storage



## IBM FlashSystem V9000 in a VersaStack Environment

VersaStack, an IBM® and Cisco integrated infrastructure solution, combines computing, networking, and storage into a single integrated system. It combines the Cisco Unified Computing System™ (Cisco UCS®) Integrated Infrastructure with IBM Spectrum™ Virtualize, which includes IBM FlashSystem® V9000 and IBM Storwize® storage offerings, for quick deployment and rapid time to value for the implementation of modern infrastructures. With comprehensive reference architectures that include Cisco Validated Designs (CVDs), IBM Redbooks® publications, sizing guidelines, and single-call support, the solution sets a benchmark to accelerate data center infrastructure deployment and to help manage information and resources efficiently amid business change.

This IBM Redbooks Solution Guide provides an overview of the VersaStack solution that uses IBM FlashSystem V9000 as an all-flash storage layer. This VersaStack solution delivers extraordinary levels of storage virtualization performance and efficiency in a networking infrastructure, and compute capabilities that are based on the Cisco UCS. This guide explains how the IBM FlashSystem V9000 all-flash storage arrays add performance by using IBM MicroLatency®, macro efficiency, superior reliability, and software-defined storage enterprise features to the cloud computing-ready VersaStack solution. This guide is intended for individuals who want to learn more about the VersaStack integrated solution.

Figure 1 illustrates the VersaStack solution with IBM FlashSystem V9000 at a glance.

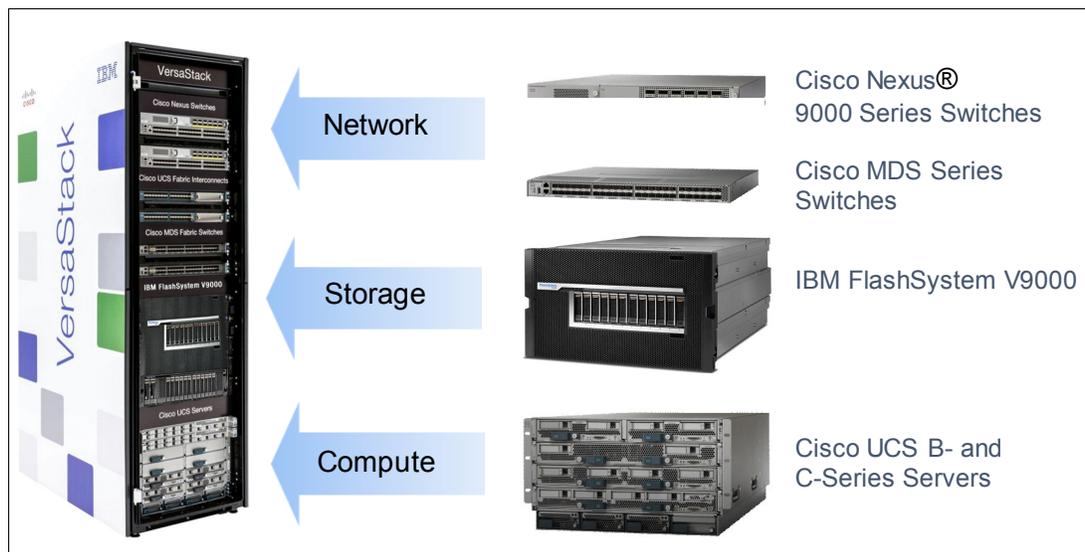


Figure 1 VersaStack at a glance

VersaStack was released initially with IBM Storwize V7000/V7000U for medium to large enterprise storage business. Now, VersaStack provides storage solution options with IBM Storwize V5000 for entry to midsize storage business options and with IBM FlashSystem V9000 to improve customer satisfaction for all types of applications, including big data and analytics, server and desktop virtualization, cloud, and more.

## Did you know?

- ▶ VersaStack is part of the Cisco® Validated Design program. It is a pretested and validated solution that eliminates compatibility issues and presents a platform with reliable features that can be deployed in an agile manner.
- ▶ IBM FlashSystem V9000 and its scalable deployment model, with the full set of IBM FlashSystem V9000 software-defined storage enterprise features, is fully supported in a VersaStack solution.
- ▶ IBM FlashSystem V9000 in a VersaStack solution delivers high capacity and performance to an enterprise data center. Being highly scalable up to 19.2 GBps bandwidth, the all-flash architecture can drive up to 2.5 million I/O per second (IOPS) with IBM MicroLatency for response times under 200 microseconds, while delivering an effective capacity of up to 2.28 PB.
- ▶ VersaStack dramatically reduces IT spending that is needed to keep data centers up and running. It more efficiently uses available compute and storage resources, while boosting business performance in a much smaller footprint.
- ▶ Comprestimator is an IBM analysis tool that calculates IBM Real-time Compression™ savings. It provides data reduction guarantees that are derived from calculated results for a client environment and is qualified for VersaStack.

Comprestimator is available from IBM at this website:

<http://www14.software.ibm.com/webapp/set2/sas/f/comprestimator/home.html>

- ▶ VersaStack provides a coordinated support model, where you will benefit from a single point of contact for support in case of any VersaStack solution issue.

Figure 2 shows the CVD cycle.

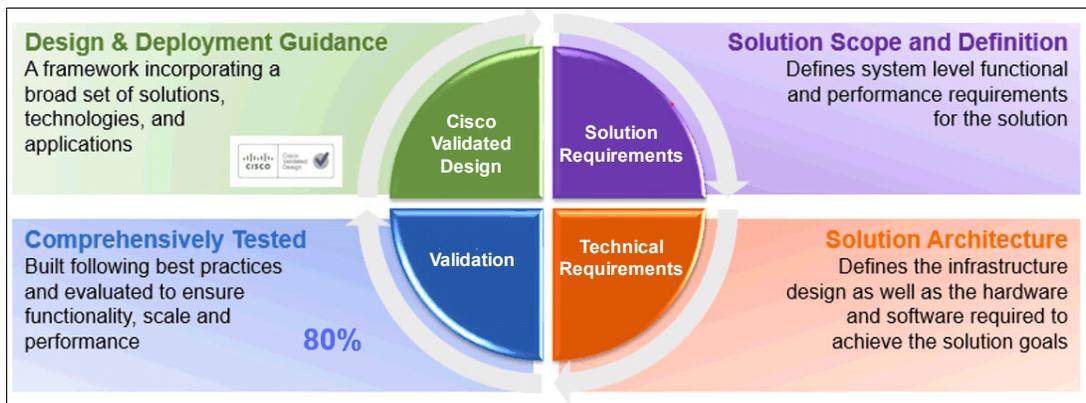


Figure 2 Cisco Validated Design cycle

The CVD for the VersaStack reference architecture with pre-validated configurations reduces risk and expedites the deployment of infrastructure and applications with the data center. Cisco Validated Designs incorporate a broad set of technologies, features, and applications to address your business needs.

Cisco engineers comprehensively test and document each CVD in collaboration with IBM engineers to help ensure faster, more reliable, and fully predictable deployment. CVDs increase the robustness and service availability of VersaStack, including failure and recovery scenarios, performance, and system accessibility.

## Business value

Solid trends in data center management support an ongoing transformation toward integrated IT solutions and cloud computing. The typical data center of today and its management will change dramatically, as the market of integrated infrastructure solutions grows rapidly over the next few years.

With IBM FlashSystem V9000, VersaStack combines the best-in-breed highly scalable storage controller with the Cisco UCS B-Series and C-Series compute servers, and Cisco Nexus and MDS networking components. Quick deployment and rapid time to value allow enterprise clients to move away from disparate layers of compute, network, and storage to integrated stacks.

Because VersaStack is a CVD, VersaStack provides reference solution architectures with bullet-proof configurations to reduce operational risk while deploying infrastructure and applications easily for cloud, big data, and enterprise applications.

### IBM FlashSystem V9000

IBM FlashSystem V9000 with IBM FlashCore™ technology drives real-time analytical insights with up to 50x faster performance than enterprise disk systems.

IBM FlashSystem V9000 delivers agile integration and superior data economics with a density that is 4x greater than other competing all-flash products. IBM FlashSystem V9000 can scale up and scale out to fulfill all business requirements for storage capacity and cluster performance.

In a VersaStack solution, IBM FlashSystem V9000 as the storage layer provides enterprise class reliability and serviceability with additional storage enterprise features, while the patented IBM FlashCore technology provides data protection and maximum system uptime.

### Scalability

A stand-alone IBM FlashSystem V9000 consists of two control enclosures (AC2) and one storage enclosure (AE2) that make up a *building block*. IBM FlashSystem V9000 building blocks can be either *fixed* (control and storage enclosures are directly cabled) or *scalable* (control and storage enclosures are cabled by using Fibre Channel (FC) switches in a private storage area network (SAN)).

VersaStack supports *scalable* building blocks by using Cisco MDS 9148S 16Gb Multilayer Fabric Switches for connectivity between control and storage enclosures.

To increase storage system capacity and performance, the initial IBM FlashSystem V9000 scalable building block can be scaled up with up to four more storage enclosures and scaled out by adding up to three more building blocks for a total of four (Figure 3 on page 4), providing the maximum IOPS and system bandwidth.

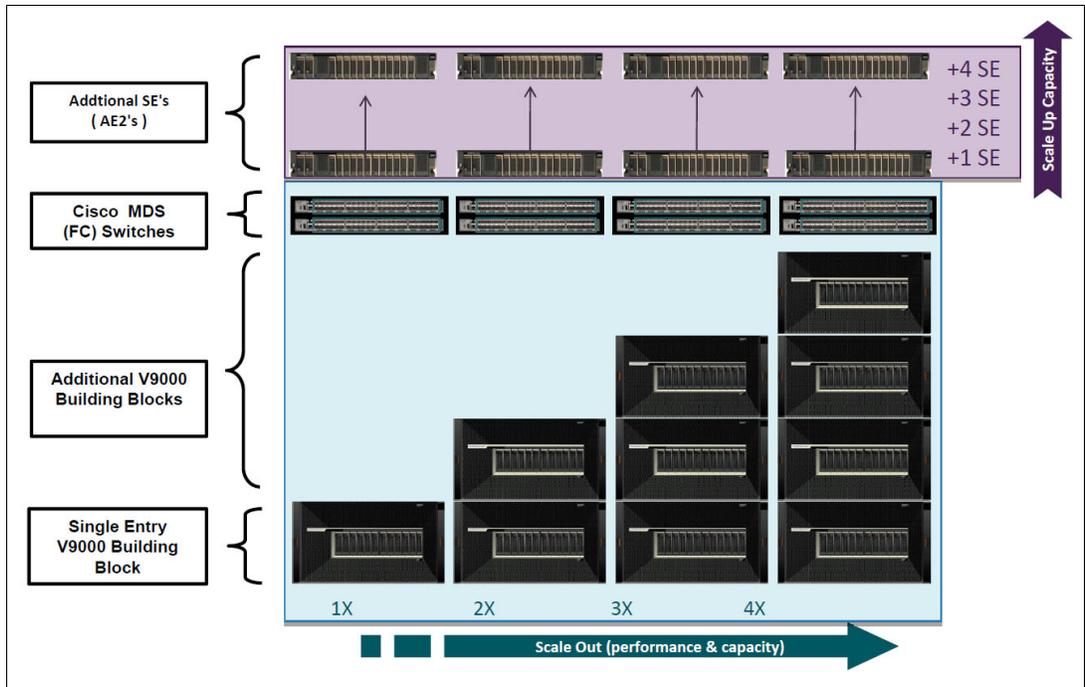


Figure 3 FlashSystem scale up and scale out capabilities

Fully scaled up and out, the potential maximum physical storage capacity of 456 TB usable capacity can provide up to 2.2 PB effective capacity by using the Real-time Compression feature and assuming compression rates of up to 80%.

### VersaStack design benefits

Before we explain the advantages and benefits of a VersaStack solution in brief, we illustrate the day-to-day challenges to clients with non-integrated IT environments.

#### Challenge

Seen historically, the deployment of new IT infrastructure to serve the demands of new businesses or projects is a recurring process that starts with the question of what infrastructure is required.

This infrastructure can be a mix of network, compute, and storage, potentially from different vendors. It requires validation, often by running a time-consuming *proof of concept* (POC) first. After the POC is completed successfully, the project resource deployment starts with the complexity in building the infrastructure, connectivity between the components, and integration into existing environments.

The need to learn new management interfaces and the general complexity of infrastructure management often are the reasons for vendor loyalty due to the requirement for fewer activities to develop new skills when you implement new solutions. After the infrastructure is deployed, management remains complex, because even a single vendor's products can include different management interfaces to provision resources to users and applications.

A final but most critical consideration is *problem resolution*. When an application does not perform as expected or stops working, who is responsible for problem determination? The application, the network, or the compute vendor, or even the storage vendor? This area is where VersaStack is beneficial to support the common goal of reducing costs and complexity while providing a more practical alternative solution.

**Solution benefits**

VersaStack with IBM FlashSystem V9000 overcomes the historical IT environment infrastructure and management complexity. It addresses the need for accelerating business performance for an entire data center in a cost-effective manner to solve business critical questions on time.

Incorporating Cisco UCS Servers with IBM FlashSystem V9000 storage for high performance within the construct of a VersaStack infrastructure greatly reduces complexity. This solution provides easy deployment to existing or new applications and business environments.

The following factors contribute to significant total cost of ownership (TCO) advantages:

- ▶ Simpler deployment model: Fewer components to manage
- ▶ Higher performance: More work from each server due to faster I/O response times
- ▶ Better efficiency: Power, cooling, space, and performance within those constraints

VersaStack is validated and tested in advance. System architects and administrators receive guidelines to save implementation time while reducing operational risk. The complexity of managing systems and deploying resources is reduced dramatically, and problem resolution is provided through a single point of support.

VersaStack streamlines the support process so that you can realize the time benefits and cost benefits that are associated with simplified single-call support. Figure 4 is an example of Cisco Solution Support Services (SSPT) for VersaStack.

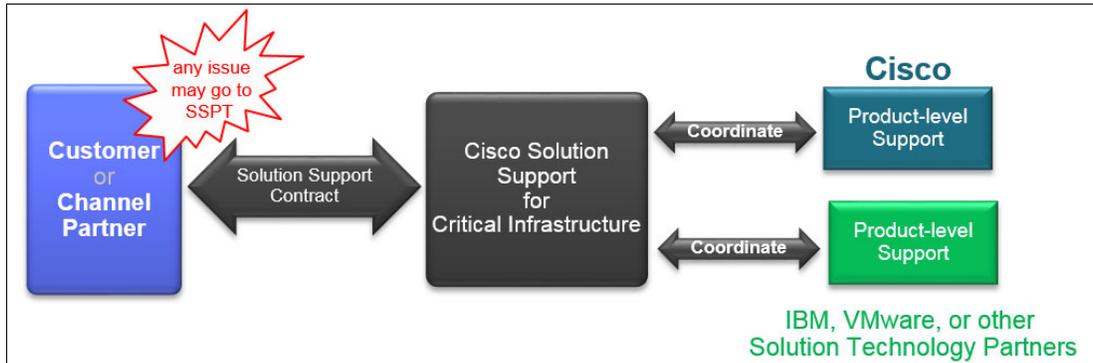


Figure 4 Cisco Solution Support Services

In the case of the Cisco example, a Cisco Solution Support team with subject matter experts (SMEs) will lead in the resolution of any issues that are identified within the supported infrastructure, providing solution expertise and coordinating the required support actions.

Similar single-call support is available through IBM and VersaStack partners.

## Solution overview

The VersaStack solution combines the innovation of Cisco UCS, Cisco Nexus switches, and Cisco MDS switches with the performance and efficiency of IBM FlashSystem V9000. IBM FlashSystem V9000 offers comprehensive an all-flash enterprise storage platform that drives up to 2.5 million IOPS with IBM MicroLatency for response times under 200 microseconds. In addition to the versatile hardware, VersaStack and the Cisco UCS Servers provide the necessary VMware hypervisor functions to host several guest operating systems.

The latest *validated* code and software levels are listed in the current VersaStack CVDs. These designs are maintained at the following website:

<http://www.cisco.com/c/en/us/solutions/enterprise/data-center-designs-cloud-computing/versastack-designs.html>

In addition to the validated code releases in the Cisco Validated Designs, IBM and Cisco provide their standard websites where you can find the current product support matrixes. For more information, see the list of “Supported platforms” on page 15.

This section provides an overview of the hardware and software components in a VersaStack:

- ▶ Cisco UCS Servers
- ▶ Cisco switches:
  - Cisco Nexus
  - Cisco MDS
- ▶ IBM FlashSystem V9000
- ▶ VMware vSphere Hypervisor

### Cisco UCS Server

The Cisco UCS Server provides the perfect foundation for VersaStack and data centers as shown in Figure 5.



Figure 5 Cisco UCS Server

With Cisco UCS, you can adjust your IT environment to the unique requirements of each application. The different model types, UCS C-Series Rack Servers, UCS B-Series Blade Servers, or any combination of both types, with the ability to adjust processing power, memory, and I/O modules, simultaneously help you to address varying workload challenges.

## Cisco switches

The Cisco Nexus switches, which are illustrated in Figure 6, build the core part of the infrastructure.



Figure 6 CISCO Nexus 9000 Series Switch

The Nexus switches provide a standard entry point into the rest of the data center network. These switches provide high performance and density, low latency, and exceptional power efficiency in a broad range of compact form factors.

The Nexus switches can be used to connect additional compute servers to VersaStack. Therefore, they enable scale-out capability for the compute and server layer of the solution.

The Cisco MDS 9000 Series switches, as shown in Figure 7, interconnect the internal VersaStack storage hardware and build a bridge to the existing SAN infrastructure.



Figure 7 Cisco MDS 9000 Series Switch

Within a VersaStack solution, the Cisco MDS switches also allow and support scalability between control and storage enclosures, supporting scale-up capacity by attaching four additional IBM FlashSystem V9000 storage enclosures or scale-out capacity for growing performance needs by assigning up to three more building blocks. In addition, the Cisco MDS switches can be used to set up cluster partnerships for remote copy relations.

## IBM FlashSystem V9000

IBM FlashSystem V9000 is a comprehensive all-flash enterprise storage solution that delivers the full capabilities of IBM FlashCore technology, plus a rich set of software-defined storage features. These features include IBM Real-time Compression, dynamic tiering, thin provisioning, snapshots, cloning, replication, data copy services, and high-availability configurations. Figure 8 shows the IBM FlashSystem V9000.



Figure 8 IBM FlashSystem V9000

IBM FlashSystem V9000 delivers agile integration and superior data economics with 4x greater density than competing all-flash products and scales up to 2.5 million IOPS with IBM MicroLatency.

FlashSystem products offer these advantages:

- ▶ Extreme Performance enables the business to unleash the power of performance, scale, and insight to drive services and products faster to market.
- ▶ IBM MicroLatency delivers response time in microseconds to accelerate critical applications to achieve competitive advantages.
- ▶ Macro Efficiency is driven by the consolidation of hardware and software, deployment speed, the efficient use of IT staff, and power and cooling savings.
- ▶ Enterprise reliability offers durable and reliable designs that use enterprise-class flash and patented data protection technology.
- ▶ Real-time Compression provides a significant reduction in the necessary storage capacity.
- ▶ Software-defined enterprise storage features offer flexibility and power.

### VMware vSphere Hypervisor

VersaStack and Cisco UCS support tight integration with the VMware ESXi Hypervisor, which runs on the system hardware directly without the need for any other software. This integration provides the necessary hypervisor functions to host several guest operating systems, such as Windows or Linux, on the physical server. The Cisco UCS virtual interface cards incorporate VM-FEX technology that provides virtual machines (VMs) direct access to the hardware for improved performance and network visibility.

Figure 9 shows an overview of the VMware vSphere Suite. The VMware vSphere Suite includes an ESXi Hypervisor, vCenter, and vSphere Client. ESXi is a hypervisor that installs on a physical server. The vSphere Client installs on the VMware administrator's notebook or desktop computer and accesses the ESXi server to install and manage VMs on the ESXi server.

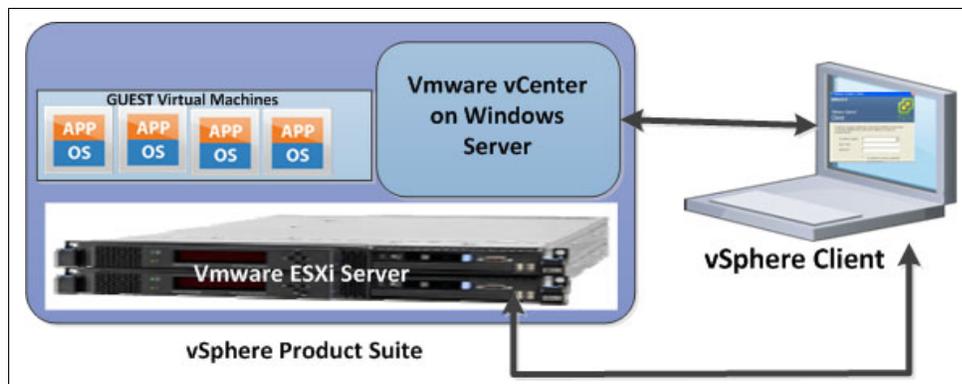


Figure 9 VMware vSphere Suite overview

### VMware vSphere Hypervisor

VMware ESXi is a hypervisor for you to abstract processor, memory, storage, and networking resources into multiple VMs that can run unmodified operating systems and applications. VMware ESXi is designed to reduce server sprawl by running applications on VMs that consist of fewer physical servers. VMware ESXi hosts can be organized into clusters. This configuration allows ESXi to provide flexibility in terms of the VMs that are running on a specific physical infrastructure.

### ***VMware vCenter***

VMware vCenter is the management software suite that is used to manage the VMs within an ESXi host. When you allocate resources, such as memory, storage, networking, or processors, to a VM, a vCenter server manages the manner in which these resources are allocated and maintained. vCenter can manage single ESXi hosts and clusters of hosts. VMware vCenter includes several features for the mobility of VMs between ESX hosts and storage. These features can add to the availability of the VMs that are run in a cluster.

## **Solution architecture**

VersaStack architecture is highly modular or point-of-delivery (PoD)-oriented. This solution architecture is a cut above the design of other architectures in two key areas:

- ▶ Flexible and redundant hardware to accommodate common infrastructure services
- ▶ Single solution management to host infrastructure as a service (IaaS) workloads

VersaStack offers sufficient architectural flexibility and design options to scale as required with investment protection. The platform can be scaled up and out by adding compute and storage resources to existing VersaStack units as described in “Business value” on page 3.

In addition, VersaStack also delivers features, such as high availability and vast performance improvements, to every implementation and area of application.

VersaStack is flexible enough so that networking, computing, and storage can fit in one data center rack, or they can be deployed according to your data center design. Port density enables the networking components to accommodate multiple configurations and scalability.

The strong cooperation and integration between Cisco and IBM and their products and technologies build a great advantage in this solution. This cooperation in products and technology delivers a rich set of features that can then be adopted and adjusted easily to nearly every business need and design layout.

In addition to its enormous scaling capability, this architecture delivers a rich set of features from both Cisco and IBM:

- ▶ All the features of previous Cisco Nexus VersaStack architectures
- ▶ All flash storage with its extreme performance and MicroLatency
- ▶ Encryption
- ▶ Thin provisioning
- ▶ Centralized control of all Cisco UCS Manager domain features through Cisco UCS Central software
- ▶ Automatic download of firmware for Cisco USC Manager
- ▶ Cisco UCS Manager service profile mapping to the ESXi server through Cisco UCS plugins for vSphere web clients
- ▶ Real-time Compression of data at high speed
- ▶ IBM Easy Tier® for automated storage tiering
- ▶ Snapshots, cloning, replication, and data copy services

## VersaStack reference architecture for IBM FlashSystem V9000

Each successful Cisco Validated Design for a Cisco solution, for example, VersaStack, results in a reference architecture. Figure 10 illustrates the VersaStack components and network connections for a configuration with IBM FlashSystem V9000 as all-flash array storage.

This CVD uses Cisco Nexus 9372 switches, Cisco UCS C-Series Rack Servers, and B-Series Blade Servers with Cisco UCS Virtual Interface Cards (VICs). Servers use Cisco UCS 6248UP 48-Port Fabric Interconnect and Cisco MDS 9148S FC switches to connect to IBM FlashSystem V9000 storage enclosures. This highly available design uses Cisco port channels (PCs) and virtual port channels (vPCs). The infrastructure is deployed to provide FC-booted hosts with block-level access to shared storage datastores. For server virtualization, the deployment also included VMware vSphere.

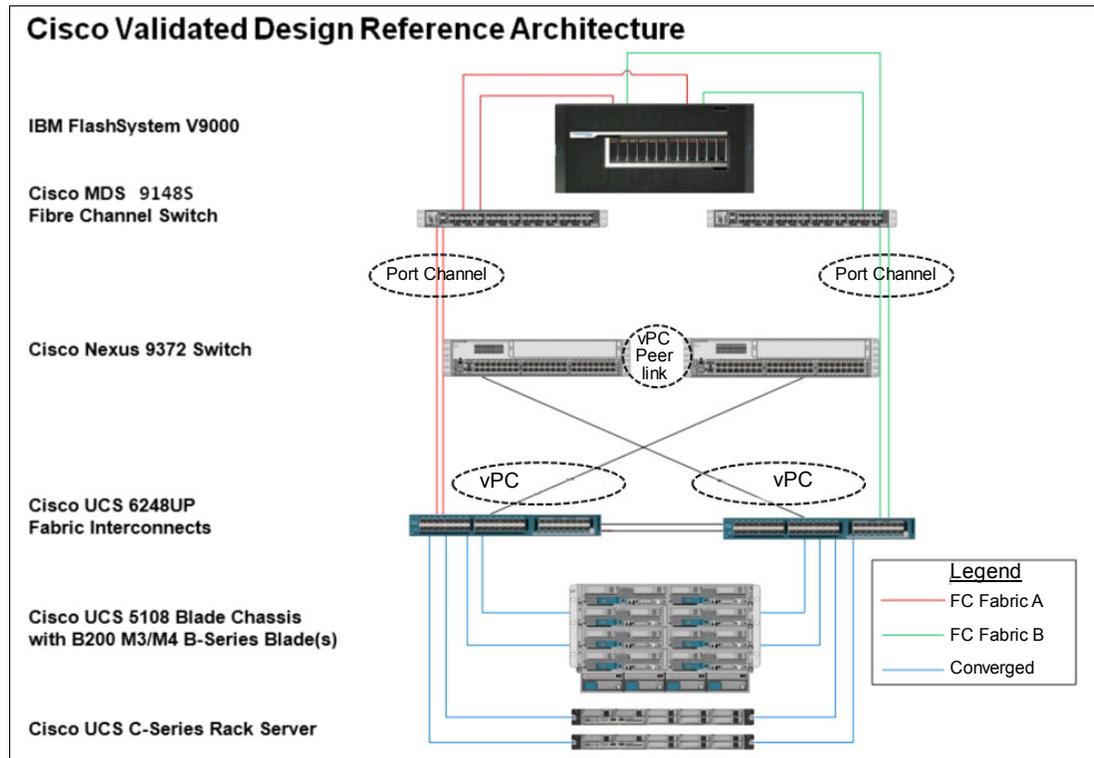


Figure 10 VersaStack reference architecture with IBM FlashSystem V9000

The VersaStack reference architecture is described in a comprehensive implementation guide that provides the required installation and configuration steps for every component of the whole solution.

Nevertheless, enough flexibility still exists in the entire hardware stack (Cisco UCS, Cisco Nexus and MDS switches, and IBM FlashSystem V9000) to allow elasticity in scaling up and out either internally or even externally for this solution. You can address your business changes that demand more compute performance easily by adding compute resource or additional storage performance and capacity to improve I/O capability and throughput.

For server virtualization, the deployment includes VMware vSphere.

The VersaStack design and the reference architecture deliver a base foundation of support. They also provide you with a hardware and software portal to manage your environment independently and to provision applications and services from a provided stack to the greatest flexibility.

## Usage scenarios

One major opportunity when you renew your data center infrastructure is to think about IT expenses and the efficiency of your current data center. Consider these related questions:

- ▶ What benefits can you get by implementing new solutions?
- ▶ How can you reduce latency for database applications, such as Oracle, IBM DB2®, or SAP?
- ▶ How will new solutions influence your private and public clouds, your Virtual Desktop Infrastructure (VDI), or big data applications?

The following two examples illustrate that VersaStack with IBM FlashSystem V9000 simplifies and accelerates the deployment of IT resources. VersaStack with IBM FlashSystem V9000 manage the infrastructure much more efficiently with fewer tools, while increasing performance and capacity in a much smaller footprint.

## Banking sector

Beyond retail banking, the classical banking account provides banking services to small and midsize businesses, usually through hundreds of branches, with special transaction centers and nationwide offices.

Database and Online Transaction Processing (OLTP) applications require transactions to be processed directly and in parallel without noteworthy delay for the banking client's demanding cloud and analytics applications. These transactions create massive amounts of data.



### ***Business need***

As in any other business, banking environments need to reduce data center costs while focusing on the optimization and management of available resources and the reduction of system downtime.

Understanding the data that requires fast access and when data requires fast access is critical to both maximizing asset utilization and making business processes run faster to deliver improved service levels.

Reducing administrative tasks, increasing placement accuracy, simplifying infrastructure management, and enhancing operating agility reduces costs and accelerates business processes.

### ***Solution implementation***

VersaStack with IBM FlashSystem V9000 can be fully implemented as a solution that provides extreme performance, reliability, and efficiency to better support the growing requirements of database environments while incorporating the following technologies:

- ▶ IBM FlashSystem V9000 for storage virtualization with the benefit of IBM MicroLatency
- ▶ Hardware-accelerated IBM System Storage® Real-time Compression technology
- ▶ IBM FlashSystem V9000 scalability options to increase performance and address capacity demands
- ▶ Cisco UCS as the computing platform
- ▶ Cisco Nexus and Cisco MDS switches for core networking

### ***Benefits of the solution***

VersaStack with IBM FlashSystem V9000 as an all-flash storage layer can increase performance dramatically and accelerate data processing with IBM MicroLatency, while increasing compute utilization and application performance.

The Cisco UCS concept of modular stateless computing by using service profiles reduces provisioning times by more than 80% while the unified fabric concept dramatically reduces cabling by more than 75%. In total, infrastructure costs with a data reduction guarantee can be reduced by more than 60%.

Improving your business environment does not depend on being wasteful with existing assets. Existing storage hardware can be integrated into a new virtualized environment easily to improve speed and optimize the utilization of IBM and non-IBM storage assets in the data center.

Versatility in scalability and growth enables this infrastructure solution at banking accounts to stay flexible and react proactively to changes in business demands.

## **Consumer products sector**

IT performance in the consumer products sector depends heavily on consumer behavior.

A growing and changing economy requires a company to be flexible about shifting brand loyalties and the uncertainty about the future popularity of products and services. These constant changes require an IT model that can react efficiently. The IT model must be scalable and versatile to fulfill the demands of the market.



### ***Business need***

When a company plans to change its data center infrastructure, it often decides to take advantage of new and state-of-the-art technology to implement the new IT landscape. This solution and its change in the infrastructure can have a major influence on several challenges that IT departments face today:

- ▶ Reduce the total IT expenses
- ▶ Increase the IT efficiency
- ▶ Provision new services faster than before
- ▶ Adapt to business needs faster
- ▶ Reduce application response time

An infrastructure change is the ideal time to take advantage of new features, such as IBM Easy Tier, Real-time Compression, and copy services.

### ***Solution implementation***

The VersaStack solution incorporates Cisco UCS as the computing system, Cisco UCS fabric interconnects and Cisco MDS and Nexus switches for core networking, and an IBM FlashSystem V9000 device to provide comprehensive storage capacity.

This integrated system offers the foundation for new technologies in these areas:

- ▶ Desktop virtualization solutions
- ▶ Private and public cloud deployments
- ▶ Enterprise applications

A possible solution with VersaStack uses Cisco UCS rack servers (C-Series) or blade servers (B-Series) as part of a system. This solution provides a highly adjustable computing architecture that can be sized and adjusted easily according to application and business needs.

The Cisco fabric interconnects are used to centralize and connect the management of network traffic and storage.

The Cisco Nexus 9000 Series Switches in this solution are used to attach the fabric interconnect switches to the IBM FlashSystem V9000.

### ***Benefits of the solution***

The client can build, deploy, secure, and maintain applications through a more agile framework. IBM FlashSystem V9000 in this VersaStack solution delivers the highest performance. IBM FlashSystem V9000 is highly scalable and delivers advanced built-in features, such as IBM Easy Tier, Real-time Compression, copy services, and much more.

New applications can be deployed more quickly with more flexibility to address all possible requirements. The solution helps clients accelerate their IT transformation and delivers dramatic improvements in operating efficiency and simplicity. Moreover, the combined solution provides the opportunity to take advantage of integrated solutions that focus on cloud, big data, analytics, and mobility environments.

# Integration

VersaStack as an integrated infrastructure solution integrates Cisco UCS compute and networking hardware capabilities and efficient system management applications with a versatile storage layer.

Integrating IBM FlashSystem V9000 into VersaStack results in a high performing and scalable all-flash storage solution with all of the capabilities of the IBM FlashCore technology, including the full set of storage virtualization features.

For server virtualization, the deployment includes VMware vSphere to manage server hardware resources with greater granularity and in a dynamic manner to support multiple host instances.

## ***IBM FlashSystem V9000***

The integration of IBM FlashSystem V9000 family functions and vendor interoperability into VersaStack provides the combination of high availability and storage performance with the advanced enterprise functions of software-defined storage for efficiency and functionality.

Supporting the idea of an efficient and versatile integrated infrastructure solution, VersaStack with IBM FlashSystem V9000 fully integrates these storage features:

- ▶ IBM MicroLatency response times to boost applications
- ▶ Thin provisioning to allocate storage “just in time”
- ▶ Storage interoperability to support and reuse 260+ different storage vendors
- ▶ IBM Easy Tier for storage efficiency
- ▶ IBM FlashCopy® for point-in-time copies
- ▶ Mirroring and copy services for data replication and protection
- ▶ Real-time Compression to place up to five times more data in the same physical space
- ▶ Advanced security for data at rest with hardware-accelerated AES-XTS 256 encryption

IBM FlashSystem V9000 supports the integration of VMware vSphere application programming interfaces (APIs) for Storage Awareness (VASA) and the vStorage API for Array Integration (VAAI) by using IBM Spectrum Control™ Base 2.1.1. This centralized server system consolidates a range of IBM storage provisioning, virtualization, cloud, automation, and monitoring solutions. This unified server platform, which provides insight and awareness to VMware and vSphere, incorporates the configurations, capabilities, and storage health and events of a storage system.

## ***VMware vSphere***

VMware vSphere is the leading virtualization platform for managing pools of IT resources that consist of processing, memory, network, and storage. Virtualization allows multiple VMs to run in isolation, side-by-side, and on the same physical host.

Integrated into VersaStack, Cisco UCS computing resources can be administered more easily and efficiently while the tight integration of IBM FlashSystem V9000 with VMware enables the following additional features:

- ▶ vCenter plugin for system monitoring and self-service provisioning within VMware
- ▶ VAAI to support hardware-accelerated VM copy and migration and VM initiation and to accelerate VMware Virtual Machine File System (VMFS)
- ▶ Site Recovery Manager (SRM) that supports automated storage and host failover, failover testing, and failback

### ***IBM Spectrum Protect Snapshot***

IBM Spectrum Protect™ Snapshot for VMware is a data management solution to streamline storage management in a VMware vSphere environment. You can use IBM Spectrum Protect Snapshot for VMware to back up and restore VMs and VMware datastores by using advanced integrated application snapshot backup and restore capabilities.

IBM Spectrum Protect Snapshot for VMware combines the snapshot capabilities of storage devices with the VMware vSphere API to protect the IT environment. IBM Spectrum Protect Snapshot for VMware supports nondisruptive, frequent, near-instant, and application-aware off-host backups for VMware VMs in a vSphere environment.

By using IBM Spectrum Control Protect Snapshot for VMware with IBM Spectrum Protect for Virtual Environments, you can offload and store VMware image backups on IBM Spectrum Protect server storage for long-term retention.

## **Supported platforms**

A VersaStack Solution is validated for specific firmware and software levels according to the CVD, but it is also supported by the following websites:

- ▶ Cisco and IBM Solution Site:

<http://www.cisco.com/c/en/us/solutions/enterprise/data-center-designs-cloud-computing/versastack-designs.html>

- ▶ Cisco Hardware and Software Interoperability Matrix:

<http://www.cisco.com/c/en/us/support/servers-unified-computing/unified-computing-system/products-technical-reference-list.html>

- ▶ IBM Interoperability Matrix:

<http://www.ibm.com/systems/support/storage/ssic/interoperability.wss>

- ▶ VMware Compatibility Guide:

<http://www.vmware.com/resources/compatibility/search.php>

## **Ordering information**

VersaStack solutions are available from IBM and Cisco joint business partners. Contact your local IBM or Cisco representative or business partner to get started.

## Related information

For more information, see the following documents:

IBM Redbooks:

- ▶ *Introducing and Implementing IBM FlashSystem V9000*, SG24-8273:  
<http://www.redbooks.ibm.com/redpieces/abstracts/sg248273.html?Open>
- ▶ *VersaStack Solution by Cisco and IBM with SQL, Spectrum Control, and Spectrum Protect*, SG24-8301:  
<http://www.redbooks.ibm.com/redpieces/abstracts/sg248301.html?Open>
- ▶ *IBM PureApplication Software Version 2.1 on VersaStack: Designing and Implementing PureApplication Software on VersaStack*, REDP-5258:  
<http://www.redbooks.ibm.com/abstracts/redp5258.html?Open>

Helpful Links:

- ▶ IBM FlashSystem V9000 product page:  
<http://www.ibm.com/storage/flash/v9000>
- ▶ IBM System Storage Interoperation Center (SSIC):  
<http://www.ibm.com/systems/support/storage/ssic/interoperability.wss>
- ▶ IBM Offering Information page (announcement letters and sales manuals):  
[http://www.ibm.com/common/ssi/index.wss?request\\_locale=en](http://www.ibm.com/common/ssi/index.wss?request_locale=en)

On this page, enter “VersaStack with IBM FlashSystem V9000”. Select the information type and then click **Search**. On the next page, narrow your search results by geography and language.

Cisco Validated Designs - Links:

- ▶ VersaStack for Data Center:  
<http://www.cisco.com/c/en/us/solutions/enterprise/data-center-designs-cloud-computing/versastack-designs.html>
- ▶ VersaStack for Data Center with all Flash Storage:  
[http://www.cisco.com/c/en/us/td/docs/unified\\_computing/ucs/UCS\\_CVDs/Versastack\\_vmw55\\_v9kflash.html](http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/UCS_CVDs/Versastack_vmw55_v9kflash.html)
- ▶ VersaStack Design (Deployment) Guide:  
<http://www.cisco.com/c/en/us/solutions/enterprise/data-center-designs-cloud-computing/versastack-designs.html>
- ▶ VersaStack for DC Center with Direct Attached Storage:  
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