

VersaStack solutions



Highlights

- Deploy infrastructure that brings together technologies from industry-leading companies.
- Simplify your physical, virtual, and private cloud deployments with a versatile, integrated system based on Cisco UCS® Integrated Infrastructure and IBM storage systems.
- Take the guesswork out of creating shared infrastructure with a tested, validated, and documented solution.
- Scale up or out depending on the needs of your business, applications, workloads, and users.
- Store up to five times more data in the same footprint with data virtualization and real-time compression capabilities.
- Keep your business running on IT infrastructure with built-in redundancy and no single point of failure.

In today's hypercompetitive economy, your organization needs to deliver instant access to information, applications, and services or risk falling behind. If you use a traditional data center design with static resources, your IT infrastructure and staff likely can't respond in time. Why? Because traditional siloed environments are inefficient. Staffing and budget constraints further complicate the issue, hindering you from expanding the environment to handle increases in capacity and more types and instances of applications and workloads.

The problems don't stop there. The high level of maintenance needed to support poorly performing, aging infrastructure requires your administrators to constantly work around problems. And with all the risk and effort entailed in testing, configuring, deploying, and validating solutions, your IT staff has limited time to work on new projects or roll out new applications that your business need to stay competitive. You need a flexible computing strategy that supports dynamic resource allocation and increased utilization and is easy to deploy, operate, and manage.

VersaStack solutions

IBM and Cisco can help your IT organization replace disparate layers of computing, network, and storage resources with an integrated solution that delivers IT and business agility at less cost. These VersaStack solutions are built on the best Cisco® and IBM product lines to deliver innovative data center environments that can help you reduce risk.

Based on Cisco UCS® Integrated Infrastructure and IBM Storwize or IBM FlashSystem storage solutions built with IBM Spectrum Virtualize, VersaStack solutions are preintegrated, validated, and supported to deliver easy, efficient, and versatile IT infrastructure. These software-defined data center solutions include built-in server, storage, and network virtualization and are ready for integration with Cisco Application Centric Infrastructure (Cisco ACI™). As a result, you can use a policy-based automation solution that supports a business-relevant application-policy language, improves scalability through a distributed enforcement system, and increases network visibility for increased control and performance.

VersaStack brings new levels of ease, efficiency, and versatility to cloud, big data, and enterprise application deployments.



Easy

Your IT staff spends a lot of time selecting, connecting, integrating, testing, and managing components. Cisco and IBM make it easy to deploy the resources you need and add more resources when you need them. Verified, lab-tested architectures provide detailed design and implementation guidance that help reduce risk and guesswork by giving your architects and administrators detailed blueprints for implementation. By following the guidelines in these Cisco Validated Designs, you can create a VersaStack foundation that helps protect against compromise while delivering a simplified, standardized, and trusted approach for the deployment, use, and management of your infrastructure resources. And the use of a single point of management for your entire infrastructure makes the environment easy to operate, saving your administrators valuable time.

Efficient

VersaStack solutions simplify the operating model so that your organization can get more work done with fewer resources. These high-density systems combine built-in compression, automated data tiering, and data copy services to deliver optimized performance and scalable capacity in a small footprint. Built-in server, storage, and network virtualization and the capability to virtualize existing storage infrastructure allow for seamless operation and data migration from aging systems.

Unified management simplifies your deployment and provisioning processes and provides the automation you need to be efficient. Using the role- and policy-based management capabilities of Cisco UCS Manager, your IT staff can provision servers in minutes rather than the days or weeks required in traditional environments.

Versatile

Traditional IT architectures often require infrastructure modifications to support new applications and services. VersaStack provides a uniform approach to IT architecture with a well-characterized and documented shared pool of resources. This flexible and consistent approach supports a variety of service-level agreements (SLAs) and business initiatives, including analytics, private cloud, high-performance applications, scale-out data centers, and remote- and branch-office deployments.



[Learn about VersaStack](#)

Watch this short video to learn how VersaStack solutions deliver easy, efficient, and versatile IT infrastructure.

Cisco UCS Integrated Infrastructure



Cisco UCS is the first data center platform that integrates industry-standard, x86-architecture Intel® Xeon® processor-based servers with networking and storage access into a single unified system. The system is the foundation for Cisco UCS Integrated Infrastructure, a highly secure, automated platform that includes Cisco UCS, Cisco Nexus® Family switches, Cisco MDS 9000 Family multilayer switches, Cisco UCS Manager, and Cisco UCS Director.

All components are connected through a unified fabric that delivers high-performance data and storage networking to simplify deployment, help ensure the quality of the user experience, and reduce operating costs. Within the system, integrated network services provide high-speed connectivity and high availability, accelerate application performance, and reduce the security risks associated with multitenant environments.

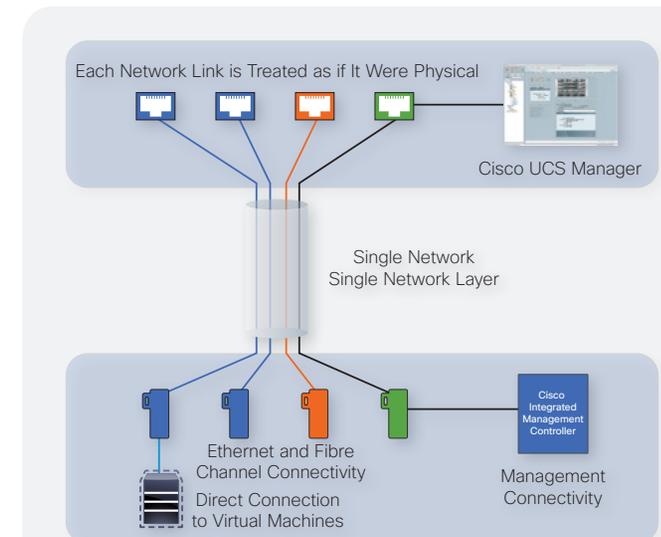
Simplified resource connection and management

Cisco SingleConnect technology provides an efficient way to connect and manage computing resources. With Cisco UCS fabric interconnects and Cisco virtual interface cards (VICs), you can have three networks—IP, storage, and management—running on a single set of cables and a single set of I/O adapters. Because Cisco UCS is form-factor independent, you can run blade and rack servers in the same chassis, simplifying your data center deployments.

Three networks combined into one

Cisco Fabric Extender Technology (FEX Technology) reduces the number of network layers by directly connecting physical and virtual servers to the system's fabric interconnects. This technology eliminates blade server and hypervisor-based switches by connecting fabric interconnect ports directly to individual blade servers and virtual machines. Your IT staff can manage virtual networks in the same way that they manage physical networks, but

with massive scalability. This approach represents a radical simplification compared to traditional systems, reducing capital expenditures (CapEx) and operating expenses (OpEx) while increasing business agility, simplifying and accelerating deployment, and improving performance.



Cisco SingleConnect technology

Cisco SingleConnect technology is a “wire once and walk away” solution that combines three network layers into one.

Cisco UCS radically simplifies IT infrastructure deployment and operation.



Policy-based approach

Cisco UCS provides intelligent infrastructure that is self-aware and self-integrating. The system is built from the foundation so that every aspect of server identity, personality, and connectivity is abstracted and can be applied through software. Servers are configured automatically, eliminating the manual, time-consuming, and error-prone assembly of components into systems. Even the number and type of I/O interfaces are programmed dynamically, making every server ready to power any workload at any time.

Integrated, model-based management lets IT administrators create a model of a desired system configuration and associate a model's service profile with hardware resources—and the system configures itself to match the model. This automation accelerates provisioning and workload migration with accuracy and rapid scalability. Your IT organization benefits from an automated, policy-

based mechanism for aligning the server configuration with the workload. The result is increased IT staff productivity, improved compliance, and reduced risk of failure due to inconsistent configurations.

Simplicity

Cisco UCS offers technologies that generate simplicity rather than complexity. This flexible, agile, high-performance, and self-integrating platform can help you improve the productivity of your IT staff, increase infrastructure uptime through automation, and achieve a rapid return on investment (ROI). As a result, your IT organization can deliver more services with speed and agility while managing data growth and operating within constrained budgets.

Scalable performance

Designed to handle demanding workloads and support requirements for massive scalability and memory and I/O capacity, the broad portfolio of Cisco UCS blade and

rack servers deliver industry-leading performance. With this broad portfolio of servers, you can accelerate your enterprise applications and handle the most complex virtualization, big data, and cloud-computing workloads.

Cisco UCS performance

Cisco UCS with versatile Intel Xeon processors continues its industry leadership, capturing a total of more than 100 world performance records.

IBM Storage



IBM Spectrum Virtualize

IBM Spectrum Virtualize™, industry-leading storage virtualization software, is the foundation of IBM disk and all-flash storage systems. It provides software-defined storage capabilities across a variety of platforms, including IBM Storwize V7000 (Unified), Storwize V5000, and FlashSystem V9000. These capabilities can help your IT staff improve efficiency and utilization while reducing complexity and cost.

All IBM and external third-party storage is virtualized, improving the use of storage capacity. Your storage devices can be organized into storage pools—and your standard, compressed, and thin-provisioned virtual volumes are created with the storage characteristics needed by your applications and workloads. As a result, your IT organization can tap into new and previously unused disk storage capacity and further optimize available storage capacity with thin-provisioning techniques.

Recognizing the complex balance of storage capacity, performance, and cost, the solution uses IBM Real-time Compression capabilities to save up to 80 percent of disk

space with no impact on system performance. Furthermore, the IBM Easy Tier feature automatically migrates data between storage tiers (dynamic tiering) based on real-time use patterns without disruption to applications. With these tools, your IT staff can optimize storage pools and avoid downtime for backup, maintenance, and upgrade operations through the use of advanced copy services such as point-in-time copy and remote replication.

IBM Storwize V5000

IBM Storwize V5000 is a hybrid system that uses solid-state disk (SSD) drives and hard-disk drives (HDDs) to deliver software-defined storage capabilities for midsize businesses. The system can scale up to 480 drives, and up to 960 drives with two-way clustered systems, and it can store up to 1.92 petabytes (PB) per system, and up to 3.84 PB with two-way clustered systems. This system offers:

- Innovative Spectrum Virtualize functions, including dual-clustering for simple scaling, thin provisioning, and external virtualization for higher storage utilization

- An optional IBM FlashCopy function that lets your IT staff create an almost-instant copy of active data, which can be used for backup purposes or for parallel-processing activities
- An IBM HyperSwap function that lets a single Storwize V5000 system support servers in two data centers, with concurrent data access; when combined with VMware vMotion, this configuration enables nondisruptive storage and virtual machine mobility between two data centers.



[Learn about VersaStack](#)

Watch this short video to learn why iVirtualize partners with Cisco and IBM to run its managed service provider (MSP) business on VersaStack.

IBM is number 1 in all-flash arrays for both unit and capacity shipments.¹



IBM Storwize V7000 Family

IBM Storwize V7000 and V7000 Unified are powerful hybrid disk storage systems that can support the massive volumes of data created by your demanding cloud, social, mobile, and data center applications. Built with Spectrum Virtualize, these Storwize systems are designed to be efficient, easy to use, and dependable no matter the size of your deployment. This efficient, enterprise-class storage system provides a 2-rack-unit (2RU) chassis and supports up to 96 terabytes (TB) of physical storage per enclosure using 8-TB nearline SAS disk drives. A control enclosure supports the attachment of up to 20 expansion enclosures with configurations of up to 504 drives and approximately 2 PB of physical storage capacity (up to 1056 drives and 7.87 PB in clustered systems). Encryption capabilities help protect data at rest.

The system is versatile and can use SAS disk drives, nearline SAS disk drives, and flash drives. It includes technologies that enhance physical, virtual, and cloud environments, with built-in software-defined functions such as industry-leading virtualization, hardware-assisted real-

time compression, analytics-based dynamic data tiering, and support for near-instant data copies for backups and application testing. In addition, the system can be clustered to support growing business needs while controlling costs.

IBM FlashSystem V9000

IBM FlashSystem V9000 is an all-flash enterprise storage solution with scalable performance, agile integration, and enduring economics. Built with IBM Spectrum Virtualize functions, FlashSystem V9000 combines the performance of the FlashSystem architecture with the advanced functions of software-defined storage, including IBM Real-time Compression, dynamic tiering, thin provisioning, snapshots, cloning, replication, data copy services, and high-availability configurations.

Designed as Tier 1 storage with impressive economic value, this all-flash-memory array delivers ultra-low (microsecond) response times through the use of IBM MicroLatency technology. The system accelerates I/O for critical applications through IBM FlashCore technology, which includes advanced flash-memory management features,

ultra-fast write buffers, and hardware-based data offload methods, while preserving enterprise resiliency through IBM Variable Stripe RAID and other unique reliability features. You can extend the capabilities of the solution to virtualized external storage capacity, managing up to 32 PB of external storage. Fully redundant, hot-swappable components, multiple RAID layers, XTS and Advanced Encryption Standard (AES) 256 encryption, and concurrent code upgrades help increase system uptime and data availability.



[Learn about VersaStack](#)

Watch this short video to learn how VersaStack makes infrastructure deployment and management easy, efficient, and versatile.

¹ [Gartner Market Share Analysis: SSD and Solid-State Arrays, Worldwide 2014, Published May 2015](#)

Complementary IBM storage software



IBM Spectrum Control Storage Insights

Complementing Cisco UCS Director, IBM Spectrum Control Storage Insights adds data and storage optimization capabilities to VersaStack solutions. Delivered as a service from the IBM cloud, the software can be deployed in minutes to deliver multisystem storage performance troubleshooting features. Your IT staff can use predictive analytics to help keep data on optimal storage tiers, improve capacity planning with recommendations for reclamation opportunities, and create application and department views of storage. A no-cost 30-day trial is available at <http://www.ibm.serviceengage.com/storage-insights>.

IBM Spectrum Protect

IBM Spectrum Protect™ provides comprehensive data protection for VersaStack environments. With this optional software, your IT staff can use a VMware vCenter management interface and provide a self-service portal. With near-instant restore operations, integrated offsite replication, and the capability to use application-aware snapshots, your organization can benefit from scalable efficiency that is delivered entirely in software, reducing backup infrastructure costs by up to 53 percent.¹

¹ Based on IBM assessments using Butterfly software

Fast facts

- IBM is the market share leader in software-defined storage.¹
- IBM Easy Tier can deliver up to three times performance improvement with only five percent of flash-memory storage capacity.²
- IBM Real-time Compression supports up to five times as much data in the same physical space.³
- CRN named IBM FlashSystems one of the 10 coolest flash-memory storage and SSD products of 2015.⁴

¹ Based on IBM MI analysis of IDC quarterly tracker data for FY 2014 and YTD 2015, as of June 2015

² IBM lab measurements, August 2010

³ IBM lab measurements, April 2012

⁴ CRN: "The 10 Coolest Flash Storage and SSD Products of 2015" <http://www.crn.com/slide-shows/storage/300078974/the-10-coolest-flash-storage-and-ssd-products-of-2015.htm/pgno/0/4>

Application acceleration



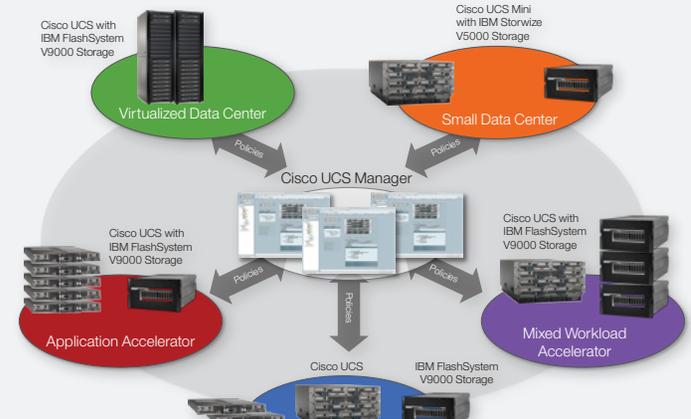
Whether you need to accelerate the performance of your entire data center or deploy solutions to support specific high-performance applications, the VersaStack solution for high performance can help you achieve your goals. With this flash-memory-based solution, you can create cost-effective data center infrastructure that delivers IT agility and helps answer crucial business questions in less time.

VersaStack solution for high performance

Based on Cisco UCS Integrated Infrastructure, the solution combines Cisco UCS blade and rack servers, IBM FlashSystem V9000 storage, Cisco Nexus 9000 Series Switches, and VMware vSphere 5.5 into a single system. This prevalidated solution delivers high performance and low-latency response times to critical applications and can be easily deployed and managed in your data center. The solution's readiness for Cisco ACI lets your IT staff build, deploy, secure, and maintain applications through a more agile framework.

- **Fast access and accelerated response:** You can get results quickly with a comprehensive all-flash enterprise storage solution with microsecond response times. The system accelerates I/O for critical applications through IBM FlashCore technology. It includes advanced flash-memory management features, ultra-fast write buffers, and hardware-based data offload methods, while preserving enterprise resiliency through IBM Variable Stripe RAID and other unique reliability features.

- **Scalability:** Depending on the needs of your workloads, you can scale the solution up or out for greater performance and capacity, add integrated systems for increased computing capacity, add flash memory capacity to support multiple applications, and scale out the virtualized storage system to increase the number of I/O operations per second (IOPS) and bandwidth. You can also integrate and manage up to 32 PB of external storage.



VersaStack solution for high performance

The VersaStack solution supports high-performance applications and is a robust foundation for physical and virtual data center environments.

Scale-out data centers



Increasing data storage requirements, IT infrastructure inefficiencies, and complex troubleshooting techniques hinder your IT organization from supporting your business priorities and meeting SLAs. Handling these growth patterns and constantly changing requirements is now a complex exercise in scaling and migration. As a result, your staff may find that supporting more workloads and getting the most from your computing and storage resources are difficult and expensive goals to achieve. Transforming your data center from siloed systems to virtual environments running on shared infrastructure can help you make better use of your computing resources and personnel.

VersaStack Solution for Data Center Scale Out

The VersaStack Solution for Data Center Scale Out is a pretested and validated solution that pools computing, network, and storage resources and allows you to easily meet demand. The solution combines Cisco UCS, Cisco Nexus 9000 Series Switches, IBM Storwize V7000 Unified system, and VMware vSphere 5.5 Update 2 into a single, integrated system. With a solution that is easy to scale, deploy, operate, and manage, your IT staff can quickly deliver the IT infrastructure that your business needs and break down the barriers that limit IT scalability and innovation.

- **Flexible scalability:** The VersaStack solution can grow and flex so that your IT staff can easily deploy, allocate, and use computing and storage resources on a moment's notice. Each layer of the VersaStack solution offers platform and resource options to scale the integrated infrastructure up or down while continuing to support the features you use and maintain best practices for connectivity. You can increase performance and capacity (adding computing, network, and storage resources individually as needed), or you can scale the infrastructure out if you need multiple consistent deployments (adding integrated systems).
- **Storage expansion:** External virtualization allows the inclusion of your existing storage resources. The system supports up to nine IBM Storwize V7000 Expansion Enclosures, providing modular and highly scalable storage solutions that range from 240 TB physical storage capacity and 480 TB of physical storage capacity in a clustered system.
- **Accelerated deployment:** The system abstracts the complexity of individual devices, hypervisors, and virtual machines and automates management processes through a unified and easy-to-use set of tools and interfaces. Automation, orchestration, and lifecycle management capabilities simplify deployment and make it easy for your IT staff to integrate IT infrastructure resources into your data center to address complex, time-consuming, manual, and compartmentalized processes. Because the system knows how objects fit together and can apply service profiles in a consistent manner, you can have confidence that the right equipment is quickly and easily provisioned for your workloads.

Remote-office and branch-office deployments



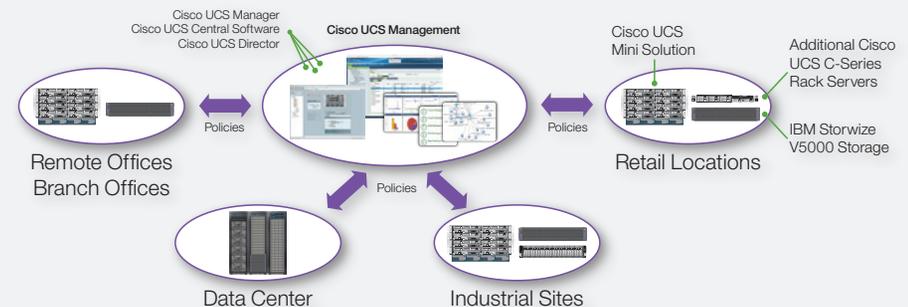
You need robust IT infrastructure to deliver business applications at your remote-office and branch-office (ROBO) and point-of-sale (PoS) locations and in small IT environments. If you use traditional IT infrastructure for these deployments, you are likely wasting floor space, power, and management resources and underutilizing your computing and storage systems.

VersaStack solution for ROBO deployments

The VersaStack solution for remote- and branch-office deployments provides the versatility, efficiency, and ease needed for your remote applications and workloads. The solution provides powerful, flexible servers and storage systems that don't need raised floors. Based on Cisco UCS Mini, the solution combines Cisco UCS B-Series Blade Servers, the IBM Storwize V5000 disk system, and Cisco UCS Central Software into a single system. This validated, half-rack form-factor solution is designed for easy, remote deployment and management. The solution's readiness for Cisco ACI lets your IT staff build, deploy, secure, and maintain your enterprise applications through a more agile framework.

- **Reduced complexity:** Cisco UCS Mini is a smaller version of Cisco UCS that eliminates the multiple layers of complex and separate networking switching and associated management. This end-to-end I/O architecture unifies LAN, SAN, and systems management into one simplified link for blade and rack servers and virtual machines. In addition, IBM Storwize V5000 is a highly flexible and cost-effective storage solution that is well suited for remote and branch offices. These versatile storage systems integrate with Cisco UCS Central Software, allowing your IT staff to manage storage from the same interface as your Cisco UCS Mini servers, reducing deployment complexity.

- **Remote management:** Cisco UCS Central Software extends the role- and policy-based management of Cisco UCS Manager to multiple domains within and outside the data center, across multiple facilities, and across locations. Your remote and branch offices can be managed centrally, consistently, and efficiently.
- **Resiliency:** Cisco UCS Mini consolidates application hosting, computing capabilities, centralized management, and virtualization in a power-, size-, and weight-optimized form factor designed for ROBO deployments. The combination of Cisco UCS Mini and IBM Storwize V5000 disk storage reduces the hardware footprint, decreases energy consumption, and improves uptime availability to deliver resilient operation with no single point of failure.



VersaStack solution for ROBO deployments

The VersaStack solution provides versatility, efficiency, and ease for remote deployments.

Cloud deployments



IT resources are often unresponsive and unmanageable, hindering businesses from innovating and outperforming competitors. As you turn to cloud computing to enhance business agility, your IT infrastructure must be easy to integrate, automate, and orchestrate.

VersaStack with Cisco UCS Director

VersaStack with Cisco UCS Director offers everything your organization needs to deploy infrastructure as a service (IaaS). Based on Cisco UCS Integrated Infrastructure, the solution combines Cisco UCS, Cisco Nexus 9000 Series Switches, the IBM Storwize V7000 Unified system, and Cisco UCS Director into a single system.

- **Self-service IT:** With the VersaStack solution, your IT organization can easily move from technology silos to a cloud model that transforms your data center infrastructure into pools of resources that can be easily allocated and repurposed. This ease is made possible by Cisco UCS Director, intelligent software that abstracts the complexity

of individual devices, hypervisors, virtual machines, and storage management capabilities into a simplified model that makes them easy to manipulate and incorporate into automated processes. Your users simply request IT resources through an easy-to-use portal, and the system provisions the underlying infrastructure resources. As a result, your applications run more efficiently within, between, and beyond data center boundaries, and your IT organization evolves to IT as a service (ITaaS) to accelerate service delivery and increase revenue.

- **Measurement and monitoring:** Cisco UCS Director enables your IT staff to easily and securely separate tenants, monitor and manage applications, provide resource consumption reports, and appropriately charge your users for the IT infrastructure resources they use. At-a-glance status panels, resource utilization tracking, and predefined reports allow your IT staff to easily monitor the status of your cloud infrastructure, identify IT resource charges, and charge users only for the resources they use.

- **Operation efficiency:** Cisco UCS Director allows your IT organization to replace time-consuming manual provisioning and deprovisioning processes for data center resources with automated workflows. As a result, your IT staff can reduce delivery time from weeks to minutes, improving consistency, efficiency, and speed within your organization.



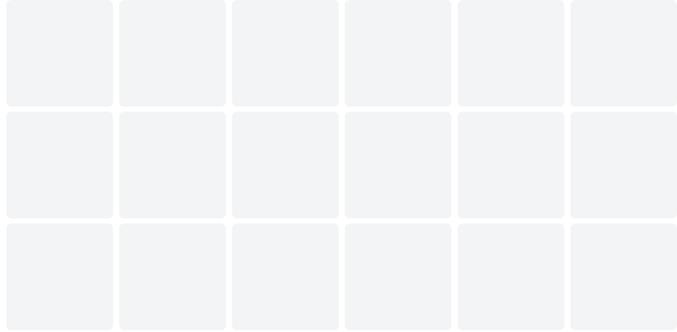
[Learn about VersaStack](#)

Watch this short video to hear what the Enterprise Strategy Group has to say about VersaStack.

Find a VersaStack solution



Solution	Cisco Validated Design	At-a-Glance
Application Acceleration	 VersaStack Deployment Guide with Cisco UCS and IBM FlashSystem V9000 and VMware vSphere 5.5	 VersaStack Solution for High Performance
Shared Data Center Infrastructure	 VersaStack Deployment Guide with Cisco UCS and IBM Storwize V7000 for Data Center	 VersaStack with VMware: Easy-to-Manage, Efficient Shared Infrastructure
Scale-Out Data Centers	 VersaStack Deployment Guide with Cisco UCS and IBM Storwize V7000 for Data Center Scale Out	 VersaStack Solution for Data Center Scale Out
Remote- and Branch-Office Deployments	 VersaStack Deployment Guide with Cisco UCS Mini and IBM FlashSystem V5000 and VMware vSphere 5.5	 VersaStack Solution for Remote- and Branch-Office Deployments
Cloud Deployments	 VersaStack Deployment Guide with Cisco UCS and IBM Storwize V7000 for IaaS with UCS Director	 VersaStack Solution for Private Cloud
Application	Solution Brief	
Oracle Database	 VersaStack for Oracle Database Acceleration	
SAP HANA	 VersaStack for SAP HANA Tailored DataCenter Integration	
Topic	IBM Redbooks®	
Accelerated Data Center Deployment	 VersaStack Solution by Cisco and IBM with SQL, Spectrum Control, and Spectrum Protect	
Middleware	 IBM PureApplication (v2.1) on VersaStack	
All-Flash Storage	 V9000 FlashSystems in a VersaStack Environment	



For more information

- For more information about VersaStack solutions, visit <http://www.cisco.com/go/versastack> and <http://www.ibm.com/versastack>.
- For more information about IBM Spectrum Control Storage Insights, visit <http://www.ibm.com/serviceengage.com/storage-insights>.

Why Cisco and IBM?

Cisco and IBM are global IT industry leaders and have a 15-year history of demonstrated joint success, with more than 25,000 shared customers. We have experience in guiding emerging technology transitions and have the breadth and capability to deliver innovative, validated solutions while helping your organization reduce risk.

Cisco and IBM together provide global delivery capabilities and deep industry expertise along with current technology offerings in data center computing, networking, mobility, collaboration, analytics, and the Internet of Things (IoT). Our solution portfolio is based on client-specific needs and strategies across industries and segments, including healthcare, banking, public safety, energy, utilities, and retail. As a result, we can offer you what you need to achieve the vision of a modern data center that delivers IT and business agility.



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