



# VersaStack Solution for High Performance

## Cisco Integrated Infrastructure with IBM FlashSystem V9000 Storage



Your business is being asked to deliver instant access to information and services. 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.

### Scalable Performance

With the VersaStack solution, you get powerful, flexible servers and flash-memory storage systems that perform at scale. Based on Cisco UCS® Integrated Infrastructure, the solution combines Cisco Unified Computing System™ (Cisco UCS) blade and rack servers, IBM® FlashSystem® V9000 storage, and Cisco Nexus® 9000 Series Switches 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. Solution readiness for Cisco® Application Centric Infrastructure (Cisco ACI™) lets your IT staff build, deploy, secure, and maintain applications through a more agile framework (Figure 1). With the VersaStack solution you can:

- **Get results quickly:** The solution uses IBM FlashSystem V9000 storage, an all-flash-memory array with ultra-low response times. Designed to replace Tier 1 systems with slow disk drives, IBM FlashSystem V9000 storage can function as a software-defined storage layer that virtualizes all managed storage for easy access.
- **Deliver extreme performance:** 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.

- **Scale up or scale out:** You can scale your environment up if you need greater performance and capacity (adding computing and network resources individually as needed), or you can scale it out if you need multiple consistent deployments (adding integrated systems). You can add flash-memory capacity to support multiple applications, and you can scale out the virtualized storage system to increase the number of I/O operations per second (IOPS) and the bandwidth.
- **Increase external storage capacity:** When you need more storage capacity, you can extend the capabilities of the solution to virtualized external storage capacity. Each IBM FlashSystem V9000 array can manage up to 32 petabytes (PB) of external storage.

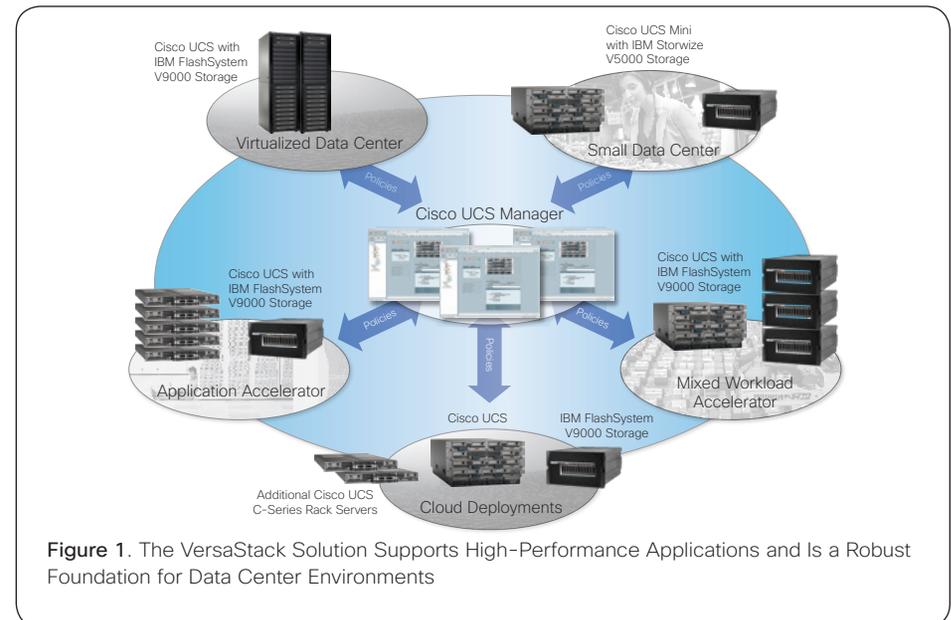


Figure 1. The VersaStack Solution Supports High-Performance Applications and Is a Robust Foundation for Data Center Environments

## Quick and Reliable Deployment

This VersaStack solution, based on a Cisco Validated Design, simplifies and accelerates the deployment of IT resources to your high-performance applications and environments.

- **Pretested and validated:** Unlike other solutions that simply overlay software, the VersaStack solution is pretested and validated by Cisco engineers to deliver a solution that pools your computing, network, and storage resources. With a guidebook for implementation, your architects and administrators don't have to spend a lot of time integrating components into a workable solution, reducing time, risk, and guesswork.
- **Rapidly provisioned:** Unified management simplifies 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.

## Improved Operation Efficiency

By deploying this VersaStack solution, your organization can do more with less. Your IT staff can perform more tasks with less effort, manage infrastructure better with fewer tools, and increase performance and capacity in a smaller footprint.

- **High density:** Comprehensive infrastructure density—with servers, switches, cabling, storage, and management in a single system—reduces the cost per rack unit at the solution level and increases operation efficiency at the data center level.
- **Optimized storage resources:** The system includes technologies that enhance high-performance environments with built-in functions such as IBM Real-time Compression®, thin provisioning, highly available configuration, and data copy services.



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Your IT staff can centrally manage storage volumes from a single point, migrate data without disruption to applications, and avoid downtime for backup, maintenance, and upgrade operations.

- **Simplified operations model:** Based on Cisco UCS Integrated Infrastructure, this VersaStack solution can help you get more work done with the same (or fewer) resources. You can run more high-performance applications on fewer servers, so you need to buy and manage fewer components. The solution can also reduce cabling, power, and cooling requirements and automate routine tasks to increase productivity.

## 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.

## For More Information

Learn more about VersaStack at <http://www.cisco.com/go/versastack> and <http://www.ibm.com/versastack>.

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# VersaStack Solution for Private Cloud

Built with Cisco UCS Integrated Infrastructure and IBM Storwize V7000 Unified Storage



## Deploy the Right Cloud Foundation

Every day, businesses perform a delicate balancing act: working to outperform competitors with IT resources that often are unresponsive and unmanageable. 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 offers everything you need to deploy infrastructure as a service (IaaS). This unified, pretested, and validated data center solution is built on a flexible and secure shared IT infrastructure using leading technology from Cisco and IBM.

## VersaStack Solution for Cloud Deployments

Many IT departments have large sets of hardware and software components and spend a lot of time integrating them into a workable solution. Unlike other solutions that simply overlay software, the VersaStack Solution for Private Cloud is a pretested and validated solution that pools your computing, network, and storage resources and enables you to easily deliver IaaS. Based on Cisco UCS Integrated Infrastructure, the solution combines the Cisco Unified Computing System™ (Cisco UCS), Cisco Nexus® 9000 Series Switches, IBM® Storwize V7000 Unified system, and Cisco UCS Director into a single system. With a solution that is easy to deploy, automate, and manage, your IT staff can quickly deliver the infrastructure services your business needs to increase IT and business agility.

## Deliver Easy, Efficient, and Versatile IT Services

When computing and storage capacity is added in an ad hoc manner, your IT staff spends a lot of time selecting, connecting, integrating, testing, and managing components. Cisco and IBM enable you to easily deploy the resources you need and add more resources

when you need them. Verified, lab-tested architecture provides detailed design and implementation guidance that helps reduce risk and guesswork by giving your architects and administrators guidebooks 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 shared infrastructure resources and cloud environments.

## Deliver Self-Service IT

Your users expect continuous operation and easy access to resources, so IT can't take a long time to add new servers or repurpose idle ones. Based on a Cisco Validated Design, this VersaStack solution lets you 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. Your applications can run more efficiently within, between, and beyond your data center boundaries—and your IT department can evolve to IT as a service (ITaaS) to accelerate service delivery and increase revenue.

Self-service access to cloud resources is easy to provide. Cisco UCS Director abstracts the complexity of individual devices, hypervisors, and virtual machines into a simplified model that makes them easy to manipulate and to incorporate into automated processes. Users simply request the resources they need through an easy-to-use, secure, self-service portal, and the system provisions the underlying infrastructure resources. Your cloud infrastructure layers are synchronized and optimized, helping ensure that IT resources are available on demand. Because this intelligent 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 the workload that you need it to support.

## Optimize Storage Footprint, Capacity, and Performance

The solution uses IBM Storwize V7000 Unified, a virtualized, flash-memory-optimized, enterprise-class storage system that provides efficient storage infrastructure for cloud data. The system includes technologies that enhance virtual and cloud environments, with built-in functions such as data virtualization, real-time compression, and IBM Easy Tier, which automatically migrates data between tiers based on real-time use patterns, for extraordinary levels of performance and efficiency. In fact, Easy Tier can deliver up to 3x performance improvement with only 5 percent of the flash-memory storage capacity.<sup>1</sup> Your IT staff can centrally manage storage volumes from a single point, migrate data without disruption to applications, and avoid downtime for backup, maintenance, and upgrade operations.

## Measure, Monitor, and Charge for Use

Cisco UCS Director helps you securely separate tenants, monitor and manage applications, provide resource consumption reports, and charge appropriately for IT infrastructure use. With at-a-glance status panels, resource utilization tracking, and predefined reports, your IT department can monitor cloud infrastructure status, show IT resource charges, and charge users only for the resources they use. In addition, the capability to replace time-consuming, manual provisioning and deprovisioning of data center resources with automated workflows helps your IT staff reduce delivery time from weeks to minutes and improve consistency, efficiency, and speed within your organization.

## Scale Your Cloud and Lower IT Costs

You need the flexibility to scale your cloud without sacrificing cost control. The system uses a unified fabric that results in fewer network interface cards (NICs), host bus adapters (HBAs), cables, and upstream switch ports and eliminates the need for a parallel Fibre

Channel end-to-end network. Traditional chassis-resident switches are replaced by a low-cost, low-power, zero-management fabric extender that enables the entire system to scale across multiple chassis without any addition of management points. All hardware and software components are managed through unified, embedded management to improve operation efficiency. With fewer components to buy and manage, you can scale your data center at less cost.

## 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 ability 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.

## For More Information

Read the Cisco Validated Design at [VersaStack for Data Center with Cisco UCS Director](#).

Learn more about VersaStack at <http://www.cisco.com/go/versastack>.

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<sup>1</sup> IBM Lab measurements



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# VersaStack Solution for Remote- and Branch-Office Deployments

Cisco Integrated Infrastructure with  
Cisco UCS Mini and IBM Storwize V5000

You need IT infrastructure at your remote-office and branch-office (ROBO) locations, point-of-sale locations, and small IT environments to deliver your business applications. If you are using traditional IT infrastructure in these locations, you are likely wasting floor space, power, and management resources and underutilizing your computing and storage systems. The VersaStack Solution for remote- and branch-office deployments provides the versatility, efficiency, and ease you need at the edge of your data center.

## Simplicity at the Edge

With the VersaStack Solution, you get powerful, flexible servers and storage systems that don't need raised floors or local technical support. Based on Cisco UCS® Mini, the solution combines Cisco Unified Computing System™ (Cisco UCS) blade servers, IBM® Storwize V5000 disk system, and Cisco UCS Central Software into a single system. This validated, half-rack form-factor solution is specifically designed to be easily deployed and managed remotely with the rest of your data center infrastructure. Solution readiness for Cisco Application Centric Infrastructure (ACI) lets your IT staff build, deploy, secure, and maintain applications through a more agile framework.

## Optimized Storage Footprint and Capacity

Built with IBM Spectrum Virtualize™ software, IBM Storwize V5000 is a virtualized and modular storage system that delivers innovation, flexible storage capacity, and responsiveness in a compact form factor. A single IBM Storwize V5000 can scale to 480 drives and 1.92 petabytes (PB) of storage capacity, or up to 960 drives and 3.84 PB with two-way clustered systems.

Included technologies enhance the management of storage infrastructure for remote- and branch-office deployments, with built-in functions such as data virtualization, clustering, replication, snapshots, and IBM Easy Tier, which automatically migrates data between tiers based on real-time use patterns, for high performance and efficiency. Your IT staff can



centrally manage storage volumes from a single point, migrate data without disruption of applications, and avoid downtime for backup, maintenance, and upgrade operations.

## Accelerated and Reliable Deployment

This VersaStack Solution, based on a Cisco® Validated Design, simplifies and accelerates the deployment of IT infrastructure to your remote- and branch-office locations (Figure 1).

- **Pretested and validated:** Unlike other solutions that simply overlay software, the VersaStack Solution is a pretested and validated solution that pools your computing, network, and storage resources. With a guidebook for implementing the solution, your

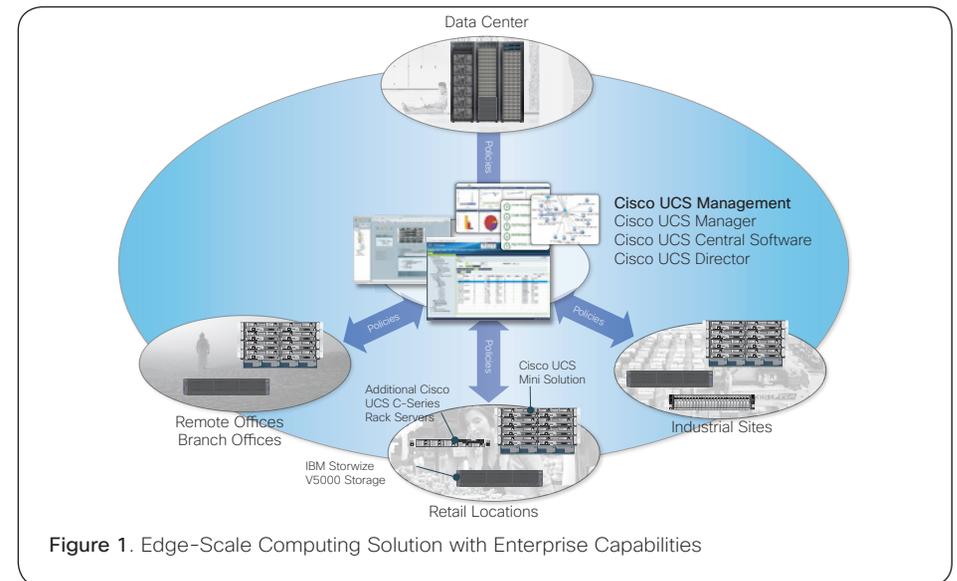


Figure 1. Edge-Scale Computing Solution with Enterprise Capabilities

architects and administrators don't have to spend a lot of time integrating components into a workable solution, reducing time, risk, and guesswork.

- **Rapidly provisioned:** The solution is managed through Cisco UCS Manager, providing unified, embedded management of software and hardware components across multiple chassis, servers, storage, and virtual machines. Using a model-based approach, your IT staff can associate a logical model with a physical set of resources. This model, called a service profile, is a self-contained description of server identity, configuration, and connectivity that can be applied quickly to get IT resources up and running.

## Low Total Cost of Ownership

The VersaStack Solution reduces costs by efficiently managing information and resources while maintaining your capability to adapt to business change.

- **Remote management:** You can use Cisco UCS Central Software to extend the role and policy-based management of Cisco UCS Manager to multiple systems within your data center, across multiple facilities, and across locations. As a result, you can manage all your remote and branch offices centrally, consistently, and efficiently.
- **Less complexity:** A simple solution helps you reduce costs. Cisco UCS Mini is a smaller version of Cisco UCS that eliminates the multiple layers of complex and separate Ethernet and Fibre Channel switching and associated management with Cisco SingleConnect technology. 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. IBM Storwize V5000 systems integrate with Cisco UCS Central Software, allowing you to manage storage from the same interface as your Cisco UCS Mini servers, simplifying deployment complexity.



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- **Resiliency:** Cisco UCS Mini consolidates application hosting, computing capabilities, centralized management, and virtualization in a power-, size-, and weight-optimized form factor designed for remote and branch offices. The combination of Cisco UCS Mini and IBM Storwize V5000 disk storage reduces the hardware footprint, lowers energy consumption, and improves uptime availability to deliver resilient operation.
- **Reduced support costs:** The solution can be managed remotely, by your data center staff, with efficiency and consistency. This capability can significantly reduce the total cost of ownership (TCO) of remote- and branch-office servers.

## 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 ability 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.

## For More Information

Learn more about VersaStack at <http://www.cisco.com/go/versastack> and <http://www.ibm.com/versastack>.

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# VersaStack Solution for Data Center Scale Out

Built with Cisco UCS Integrated Infrastructure  
and IBM Storwize V7000 Unified Storage



## Business Innovation Relies on IT Scalability

Does your data center run in traditional siloed environments? If so, your IT department is likely spending up to 73 percent of its budget to keep your data center running.<sup>1</sup> With rapidly increasing data storage requirements, IT infrastructure inefficiencies, and complex troubleshooting techniques, your IT staff can have difficulty supporting business priorities and meeting service-level agreements (SLAs). When handling growth and change turns into a complex exercise in scaling and migration, supporting more workloads and getting the most out of your IT resources is difficult and expensive to achieve.

## VersaStack Solution for Data Center Scale Out

Transforming your data center from siloed systems to virtual environments running on shared infrastructure can help you make better use of IT resources. The VersaStack Solution for Data Center Scale Out is a pretested and validated solution that pools your computing, network, and storage resources and allows you to easily meet demand. Based on Cisco UCS® Integrated Infrastructure, the solution combines the Cisco Unified Computing System™ (Cisco UCS), Cisco Nexus® 9000 Series Switches, IBM® Storwize V7000 Unified system, and VMware vSphere 5.5 Update 2 into a system. With a solution that is easy to scale, deploy, operate, and manage, your IT staff can quickly deliver the IT infrastructure you need and break down the barriers that limit IT scalability and innovation.

## Get Easy, Efficient, and Versatile IT Scalability

When computing and storage capacity are added in an ad hoc manner, 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 architecture provides detailed design and implementation guidance that helps reduce risk and guesswork by giving your architects

and administrators detailed guidebooks 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.

## Accelerate Deployment

As the pace of business continues to accelerate, your VersaStack solution can grow and flex, allowing your IT staff to easily deploy, allocate, and use resources on a moment's notice. Cisco UCS Integrated Infrastructure 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 enable your IT staff to easily integrate your IT infrastructure resources to address complex, time-consuming, manual, and compartmentalized processes. Because this intelligent 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 the workload that you need it to support.

## Scale IT Capacity to Support Demand

You need the flexibility to add computing and storage capacity to support more workloads and users. Doing so shouldn't require fundamental changes to your solution architecture. 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. For example, you can scale your environment up if you need greater performance and capacity (adding computing, network, and storage resources individually as needed), or you can scale it out if you need multiple consistent deployments (adding integrated systems).

## Optimize Storage Footprint, Capacity, and Performance

The solution uses IBM Storwize V7000 Unified storage, a virtualized, flash-memory-optimized, enterprise-class storage system that provides efficient storage infrastructure for file and block data. The system includes technologies that complement and enhance virtual environments with built-in functions such as data virtualization, real-time compression, and IBM Easy Tier, which automatically migrates data between tiers based on real-time use patterns, for extraordinary levels of performance and efficiency. In fact, Easy Tier can deliver up to 3x performance improvement with only 5 percent of flash-memory storage capacity.<sup>2</sup> Your IT staff can centrally manage storage volumes from a single point, migrate data without disruption to applications, and avoid downtime for backup, maintenance, and upgrade operations.

## Scale Higher While Lowering Total Cost of Ownership

The simplicity of the VersaStack Solution for Data Center Scale Out allows you to scale your data center infrastructure and capacity in a cost-effective way. The system uses a unified fabric that results in fewer network interface cards (NICs), host bus adapters (HBAs), cables, and upstream switch ports and eliminates the need for a parallel Fibre Channel end-to-end network. Traditional chassis-resident switches are replaced by a low-cost, low-power, zero-management fabric extender that enables the entire system to scale across multiple chassis without any addition of management points. All hardware and software components are managed through unified, embedded management to improve operation efficiency. In addition, IBM Real-time Compression in Storwize V7000 Unified delivers

higher performance for compressed data than traditional systems offer for uncompressed data, enabling greater space efficiency and reduced infrastructure cost. With fewer components to buy and manage, you can scale IT at less cost.

## Why Cisco and IBM?

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## For More Information

Read the Cisco Validated Design at [VersaStack for Data Center Scale Out](#).

Learn more about VersaStack at <http://www.cisco.com/go/versastack>.

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<sup>1</sup> Gartner—Cisco IT, Data Center Cost Portfolio

<sup>2</sup> IBM Lab measurements



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