

# SmartStack: An Integrated Infrastructure Solution from Cisco and Nimble Storage



**SmartStack™**





# If your organization needs to quickly deploy and scale applications, SmartStack™ can help you achieve your goals with reduced risk and cost.

For your business to remain competitive, your IT organization must deliver innovative products and services faster to create value. With SmartStack solutions, you can easily transform your data center infrastructure into an environment that is fast, agile, smart, secure, and cost effective. With the capability to use a combination of technologies—such as virtualization, cloud, mobility, big data, and the Internet of Things (IoT)—you can bring together people, processes, data, and things to make resources and connections more valuable to your business. With the innovative integrated infrastructure solutions described in this document, you can break down the barriers that are holding back your business and create solutions that capture the value of new connections and information.

## Fast IT

Your IT organization must become both a source and a facilitator of disruptive innovation, pivoting with your

company as it changes business models and responds to dynamic demands. SmartStack gives you the infrastructure you need to create Fast IT.

For your business to remain competitive, your IT organization must deliver innovative products and services faster to create value.

**Fast-to-deploy infrastructure:** Cisco and Nimble Storage integrate best-in-class components and management software so that your IT organization can focus on strategic business priorities and get products and services to market in less time. Your applications can run more efficiently within, between, and beyond your data center boundaries—and you can evolve to IT as a

service (ITaaS) to accelerate service delivery and increase revenue streams.

**Cloud-ready infrastructure:** Shifting workloads throughout the fabric of cloud connections require the performance and metrics to deliver highly efficient hybrid services at extremely cost-effective price points.

## Lower Total Cost of Ownership

SmartStack can help you get more work done with the same (or fewer) resources. With these innovative solutions, your IT staff can consolidate more workloads onto fewer servers using less storage so that you have fewer components to buy and manage. These solutions can also reduce rack space, cabling, power, and cooling requirements and automate routine tasks to increase productivity.

## Delivering IT and Business Advantage

SmartStack solutions are integrated infrastructure that can help you:

**SPEED** application deployment and optimize performance with prevalidated solutions

**SCALE** computing and storage performance and capacity transparently and independently to meet business needs

**SIMPLIFY** with standardized infrastructure and unified management

SmartStack delivers prevalidated best-in-class integrated infrastructure, supported by Cisco Validated Designs and Nimble Storage reference architectures for a variety of data center environments and applications.

## Integrated Infrastructure Management

Traditional management approaches make your IT environment difficult to use and scale. SmartStack breaks down these barriers so you can simplify, deploy, and maintain your physical, virtual, and cloud platforms with better visibility and control. A unified management approach lets you tie your infrastructure to your applications across virtual and physical elements. Automation, orchestration, and lifecycle management capabilities simplify deployment and help enable your IT staff to easily operationally integrate your bare-metal and virtual infrastructure resources to address complex, time-consuming, manual, and compartmentalized processes.

## Reduced Risk with Proven Solutions

SmartStack takes the guesswork out of deploying platforms that deliver Fast IT. These fully integrated and validated

SmartStack Integrated Infrastructure

Cisco UCS Director

Blade Servers Rack Servers  
Cisco UCS

Cisco Nexus Switches

Nimble Storage Adaptive Flash Platform

solutions can help your organization accelerate deployment and reduce risk. The solutions are simple, efficient, and flexible and are built on industry-leading Cisco Unified Computing System™ (Cisco UCS®) servers powered by intelligent Intel® Xeon® processors with Cisco Nexus® Family switches and next-generation Nimble Storage® Adaptive Flash storage systems.

The extensive testing and joint support model help ensure that your solution is deployed quickly and that it stays running to power your business. Cisco and Nimble have performed extensive testing across a broad range of business applications and workloads to create Cisco® Validated Designs and reference architectures using industry best practices. These validated designs and reference architectures provide easy-to-follow blueprints to help ensure successful deployment in a fraction of the time required for traditional, siloed architectures. And upon deployment of your solution, you will have a configuration fully optimized for your workload.

In addition, if problems arise, Cisco and Nimble will work together, with your IT organization, to get your system up and running quickly.

“UCS is compact, powerful and does everything we need. It gives us room for expansion and our cabling requirements are heavily reduced. Our storage is physically so tiny that it looks like a small-to-medium solution but it’s performing at an enterprise level. And the integration and automation it offers with UCS is extremely efficient.”

—James England, senior IT engineer, P&O Maritime

- You get simplified support for SmartStack aided by support engineers who work to quickly resolve your issue.
- The combination of Cisco and Nimble resources and technical expertise transparently delivers support to joint customers through a formal shared communications and escalation model.
- Support is backed by TSAnet, a global alliance framework, enabling fast-track technical support cooperation among multiple partners.
- The result: rapid, coordinated resolution of your technical issue. SmartStack support keeps your critical infrastructure up and running when you need it most.

## Choice and Flexibility

You want to be able to get the types of resources you need, when you need them—and assurance that the technologies are tested, certified, and supported. Cisco and Nimble have established a large software partner ecosystem, including top software vendors (such as VMware, Citrix, Microsoft, Oracle, Red Hat, SAP, and SUSE) and many systems management vendors to deliver optimized solutions covering the entire operational lifecycle. Collaboration and validation with partners gives you access to the newest technologies while helping your IT staff integrate innovation with your existing data center environments and IT processes at low risk.

## Delivering Integrated Infrastructure

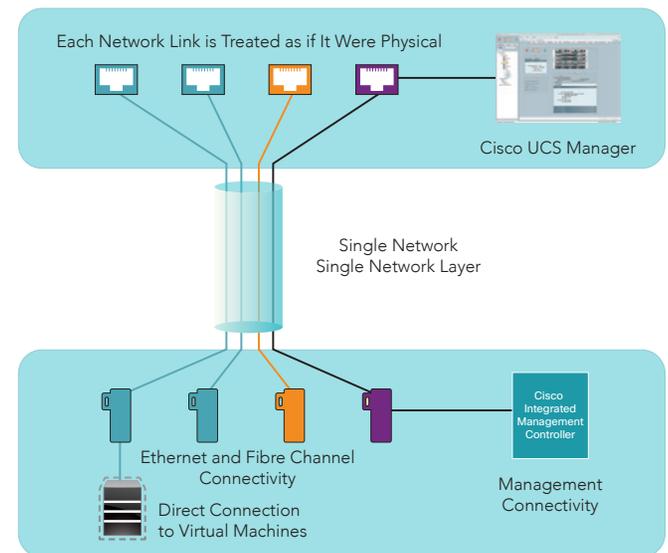
Cisco UCS is the first data center platform that integrates industry-standard, x86-architecture Intel Xeon processor-based servers with networking and storage access into a single unified system. Cisco UCS Integrated Infrastructure offers a highly secure, automated platform that is anchored by the Cisco UCS platform, Cisco Nexus switches, and Cisco UCS Manager.

All SmartStack 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. Integrated network services provide high-speed connectivity and high availability, accelerate application performance, and reduce the security risks associated with multitenant environments.

## Simplifying Connection and Management

Cisco SingleConnect technology provides an easy and 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 both blade and rack servers in the same system.



Cisco SingleConnect technology simplifies connection and management of networking resources.

## Combining Three Networks into One

Cisco fabric extender technology reduces the number of network layers by directly connecting physical and virtual

Cisco UCS with versatile Intel Xeon processors continues its industry leadership, capturing a total of more than 100 world performance records. It is no surprise that Cisco UCS has more than 46,000 customers.

—http://www.cisco.com/go/ucsatwork



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. You can manage your virtual networks in the same way that you manage your 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.

### Bringing Automation to Information Technology

Cisco UCS provides intelligent infrastructure that is self-aware and self-integrating. The system is built from the beginning 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.

### Aligning Configurations and Workloads with Policies

Using integrated, model-based management, your IT administrators can create a model of a desired system configuration and associate a model's service profile with hardware resources—and the system will configure itself to match the model. This automation accelerates provisioning and workload migration with accurate 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 failures due to inconsistent configurations.

### Going Beyond Efficiency: Making IT More Productive

Cisco UCS can help your organization go beyond simple efficiency. It can help you become more effective through

technologies that generate simplicity rather than complexity. With this flexible, agile, high-performance, self-integrating platform, your organization can reduce staff costs, increase uptime through automation, and achieve a rapid return on investment (ROI).

Your IT organization must deliver more services with speed and agility while managing exponential data growth and operating within constrained budgets. SmartStack uses Nimble's Adaptive Flash platform to help you deploy the right storage infrastructure for your physical, virtual, cloud, big data, and mobility environments while optimizing operational efficiency.

## Nimble Storage Adaptive Flash Platform

Nimble's Adaptive Flash platform has been engineered to address the industry's most pressing storage issues with cost-effective, scalable, high-performance storage and proactive management and integrated data protection. This innovative platform combines the speed of flash storage with the cost-effective capacity of a hard disk. With traditional storage solutions, performance is typically linked to the number of spinning disk drives, which leads to data center sprawl. Nimble Storage's scale-to-fit design allows you to buy what you need, when you need it. You can independently scale capacity or performance, or both. This approach protects your investment while helping you reduce the burden on your data center as you adapt to changing business requirements.

### Nimble Storage InfoSight

Nimble Storage InfoSight™ is a revolutionary analytics and storage management engine that is designed to keep Nimble Storage arrays running in peak condition. InfoSight monitors all Nimble Storage assets collectively, from the cloud, analyzing millions of data points every day to build complete insight into overall storage health. It enables a completely automated support model, with more than

“With InfoSight, Nimble Storage has enabled us to get immediately to the root cause of some pretty complex virtualization resource contention issues. Bottom line is that we’re saving 5 engineering man-hours per week.”

—Xtium

90 percent of customer support cases being opened automatically with no customer interaction needed. InfoSight also provides intelligent performance modeling at the virtual

Nimble Storage environment with a simple, intuitive process. You can configure all policies and profiles to quickly and easily get your SmartStack solution up and running.



Nimble Storage InfoSight enables proactive wellness of all your storage systems across geographic regions.

machine level, actionable capacity forecasting for future needs, and comprehensive dashboard views.

### Deployment Choices

SmartStack can be deployed quickly and easily, on day zero, using SmartStack SmartSetup™. After the initial infrastructure deployment is complete, you can use Cisco UCS Director for further infrastructure stack deployments and management.

#### Rapid Day-Zero Installation with SmartStack SmartSetup

The SmartSetup utility is designed to make installation fast and easy. Available through Nimble or authorized partners, SmartSetup will configure the complete Cisco UCS and

#### Comprehensive Orchestration and Automation with Cisco UCS Director

Simplicity in the data center is rare when applications are complex and when challenging expectations are demanded of IT. Cisco UCS Director and SmartStack enable IT staff to quickly add value to their organization to increase efficiency and better support business goals.

Cisco UCS Director is a vital companion to SmartStack, delivering holistic management through centralized automation and orchestration from a single pane. Cisco UCS Director together with SmartStack allows you to shift your focus from managing infrastructure to delivering new service

**310** is the number of Microsoft Windows 7 virtual desktops that can run on a single Cisco UCS B200 M4 Blade Server running Citrix XenDesktop.

—Based on measurements made by Cisco in its engineering laboratories



innovation. Together, these technologies deliver dramatically reduced capital and operating expenses through end-to-end management of the SmartStack platform, with real-time reporting of utilization and consumption based on trends set to customer-specific time frames.

## Optimized Infrastructure for Virtual and Cloud Deployments

Your journey to cloud computing can take several steps, from implementing server virtualization, to gaining more efficiency from your current data center, to deploying a service-based private-cloud environment. SmartStack offers purpose-built systems for the post-virtualization environment. At every level of the system's architecture, innovations in silicon are used to deliver the utmost performance. With high-performance intelligent Intel Xeon processors, large memory and storage capacities, and automated, policy-based configuration, SmartStack delivers the rapid and massive IT infrastructure scalability and business agility you need from your virtual and cloud solutions. You choose the hypervisor, the version, and the size of your desired deployment, and we give you a

prevalidated recipe for implementing your chosen solution ([see Table 1 on page 11](#)).

### Solutions for VMware vSphere

VMware vSphere software running on SmartStack can help your business easily move to server virtualization. If you need a small virtual deployment or a large services-based, consolidated environment, these presized and prevalidated Cisco Validated Designs give you confidence that you are using the right balance of computing, networking, and storage resources to support your virtual workloads. Your IT staff can efficiently provision and manage what you need—hundreds of virtual machines—with process separation that can be centrally controlled and monitored with VMware vCenter software.

### Microsoft Private Cloud

Virtualization and private cloud technologies have proven themselves in large data centers and hosting organizations. SmartStack with Microsoft Windows Server Hyper-V simplifies every aspect of a traditional server virtualization deployment as well as small and medium-sized private cloud and infrastructure-as-a-service (IaaS) environments. Whether your organization is a small company with a small IT staff or is a larger business with branch offices, these solutions can help your IT staff automate infrastructure provisioning and

**310** is the number of Microsoft Windows 7 virtual desktops that can run on a single Cisco UCS B200 M4 Blade Server running Citrix XenDesktop.

—Based on measurements made by Cisco in its engineering laboratories



configuration, reduce complexity, and simplify management while maintaining application design and implementation options. As a result, your business can improve IT efficiency while lowering operating costs.

## Desktop Virtualization

Your staff members use one or more PCs, laptops, tablets, and smartphones during the course of the day. This highly distributed approach is expensive to manage. SmartStack for desktop virtualization extends the benefits of data center virtualization to desktop delivery by centralizing desktop management, securing data, and providing an excellent user experience anytime, anywhere, and on any device ([see Table 2 on page 11](#)).

SmartStack solutions use industry-leading bootup, login, and start-work times without exhausting system resources. Because system resources can be easily and automatically repurposed, your IT staff can optimize support for business workloads and requirements. For example, you can take portions of your virtualization infrastructure offline during periods of low utilization (such as at night) and repurpose servers for testing or business analytics. The infrastructure can be brought online for desktop systems before most users arrive at work. With the capability to repurpose and provision

systems in only minutes, your organization can increase business agility and better utilize your data center assets.

## Consistent Management from the Data Center to the Edge

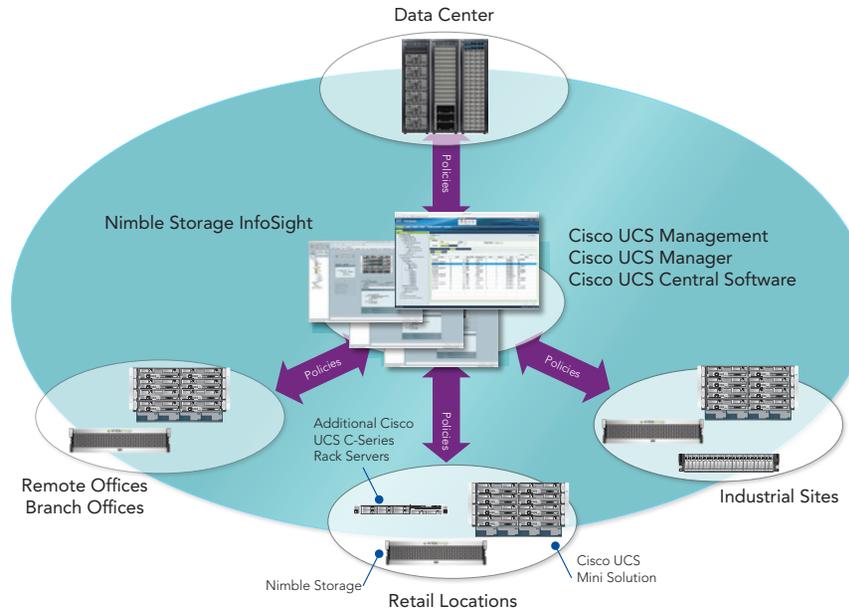
Is your company spending large amounts of money outsourcing the management and maintenance of remote edge devices such as desktops at branch offices, point-of-sale systems, and remote data collection points? With SmartStack for remote and branch offices, you can easily deploy enterprise-class IT resources and then manage those remote systems, regardless of where they are located, from your data center with the same management software.

The solutions use Cisco UCS Mini, a smaller form-factor version of Cisco UCS that has been specifically built to support smaller environments such as remote-office and branch-office (ROBO) and retail environments, medium-sized businesses with little-to-no IT staff, remote edge computing, and smaller data center needs.

Cisco UCS Central Software extends the role- and policy-based management model of Cisco UCS Manager to

Cisco and Nimble Storage were voted the top Platinum sponsors at Oracle's JD Edwards Summit in February 2015 (voted by conference attendees).

—<http://blogs.cisco.com/datacenter/cisco-voted-top-platinum-sponsor-jde-summit-2015>



Nimble Storage InfoSight and Cisco UCS Central Software deliver consistent infrastructure management from your data center to the edge.

deliver single, consistent management that spans multiple systems within a data center, across multiple facilities, and across locations worldwide. The combination of Cisco UCS Manager and Cisco UCS Central Software gives you policy consistency for your data center at the edge.

Similarly, InfoSight enables extended management and monitoring of Nimble Storage from the data center to the edge. InfoSight automates support and monitors all of your remote deployments from the cloud.

## SmartStack for Business Applications

SmartStack provides a powerful solution for business applications such as Oracle; SAP; and Microsoft SQL Server, Exchange, and SharePoint. It delivers reliable performance, high availability, and integrated data protection to fully support your business-critical applications and data.

## Oracle Database

If you use Oracle databases, consider SmartStack for Oracle Database. This prevalidated, simplified, and flexible infrastructure supports Oracle Database 11g R2 or 12c. SmartStack for Oracle delivers excellent integrated infrastructure for Oracle database online transaction processing (OLTP) and online analytical processing (OLAP) environments with Oracle Linux in both bare-metal and Oracle Virtual Machine (VM) environments. Whether you're deploying Oracle on a single Cisco UCS instance, on virtual machines with Oracle VM, or on multiple nodes running Oracle Real Application Clusters (RAC), SmartStack for Oracle is an excellent solution ([see Table 3 on page 11](#)).

## Oracle's JD Edwards EnterpriseOne

The compact SmartStack for Oracle's JD Edwards EnterpriseOne solution using Cisco UCS Mini and Nimble Storage CS300-Series is designed for midsized deployments. It enables you to rapidly upgrade to the latest version of Oracle's JD Edwards



EnterpriseOne and meet the high-performance demands of this powerful application ([Table 3](#)). By using Oracle VM templates, you can deploy the entire solution quickly and correctly the first time to accelerate your time to value.

### Microsoft SQL Server

The SmartStack for Microsoft SQL Server solution addresses the impending end of life of Microsoft SQL Server 2005, which makes the need to move to Microsoft SQL Server 2014 more urgent ([see Table 4 on page 12](#)). You also may be using Microsoft Windows Server 2003. This SmartStack solution will help you accelerate your move to the latest Windows Server 2012 R2 support. The solution is designed with Cisco UCS Mini and Nimble Storage, so you can start small and then scale to grow across small, medium-sized, and large workloads. With the speed, linear scalability, and simplicity of the SmartStack solution, your total cost of ownership (TCO) will be significantly reduced as you move toward platform consolidation and upgrade to the most current best-in-class software and hardware technologies.

### SAP HANA

The SAP recommended architecture for SAP HANA requires all SAP HANA nodes to be on the same network,

together with all the application nodes and storage nodes. SAP HANA requires integrated infrastructure. SmartStack is integrated infrastructure that combines computing, networking, storage, and management into a single cohesive system. It combines best-in-class components and open, industry-standard x86-architecture Cisco UCS Integrated Infrastructure with a unified, wire-once network and Nimble Storage solutions ([see Table 5 on page 12](#)).

## Built on a Strong Partnership

SmartStack combines industry-leading components to deliver industry-leading solutions for companies of all sizes. These solutions are prevalidated through reference architectures and Cisco Validated Designs and Nimble Storage reference architectures to provide simplified, scalable, and flexible virtual cloud, desktop virtualization, and business-critical virtual and bare-metal application environments.

Tested, validated, and documented, these SmartStack solutions reduce risk and guesswork by giving your architects

and administrators a guidebook for implementation. By following these guidelines, you can create highly available infrastructure that avoids compromise while delivering a simplified, standardized, and trusted approach for the management of your IT resources.

## Move Your Business Forward with SmartStack Integrated Infrastructure from Cisco and Nimble Storage

If you need to rapidly deploy and scale the IT infrastructure and applications used in your business, it's time to deploy SmartStack. With these integrated infrastructure solutions, you can quickly and easily deploy bare-metal, virtual, and cloud infrastructure while maintaining the same level of security and policy across environments. With the capability to easily access your IT resources, user desktops, and applications on demand, you can accelerate IT and business innovation.

Table 1. SmartStack Solutions for Virtualization and Cloud

VIRTUALIZATION AND CLOUD COMPUTING SOLUTIONS		
Hypervisor	Reference Architectures	Cisco Validated Designs
VMware vSphere	<a href="#">Virtualizing Business-Critical Applications on SmartStack</a>	<a href="#">SmartStack Design Guide with Cisco UCS Mini and Nimble Storage CS300</a>
	<a href="#">Nimble Storage SmartStack for Desktop and Server Virtualization with Cisco and VMware</a>	SmartStack Platform for Virtualized Environments with UCS and Nimble Storage CS700 (In development)
Microsoft Private Cloud Fast Track	<a href="#">Microsoft Private Cloud Fast Track with SmartStack</a>	

Table 2. SmartStack Solutions for Desktop Virtualization

DESKTOP VIRTUALIZATION SOLUTIONS		
Virtual Desktop Infrastructure (VDI) Software	Capacity (Desktops)	Reference Architectures
Citrix XenDesktop	500	<a href="#">Cisco UCS Mini, Nimble Storage, and Citrix XenDesktop 7.6 500-Seat, Mixed Workload, on Cisco UCS B200 M3 Blade Servers</a>
	1500	<a href="#">Cisco Desktop Virtualization Solution for SmartStack with Citrix XenDesktop 7.5 for 1000 Seats</a>
VMware Horizon View	500	<a href="#">Cisco UCS Mini, Nimble Storage, and VMware Horizon 6 with View Mixed Workload on Cisco UCS B200 M3 Blade Servers</a>
	1000	<a href="#">Cisco Desktop Virtualization Solution with Nimble Storage</a>
	500+500	<a href="#">SmartStack Reference Architecture for Desktop and Server Virtualization with VMware</a>

Table 3. SmartStack Solutions for Oracle Software

ORACLE SOLUTIONS		
Software	Version	Reference Architectures
Oracle Database	11g R2, 12c	<a href="#">Oracle Validated Configuration with Cisco UCS Nimble Storage and Oracle Linux</a>
Oracle's JD Edwards EnterpriseOne	9.1	<a href="#">SmartStack for Oracle's JD Edwards EnterpriseOne 9.1 with Cisco</a>



Table 4. SmartStack Solutions for Microsoft SQL Server

MICROSOFT SQL SERVER SOLUTIONS		
Software	Version	Cisco Validated Design
Microsoft SQL Server 2014	2014	In development

Table 5. SmartStack Solutions for SAP HANA

SAP HANA SOLUTIONS		
Software	Version	Reference Architecture
SAP HANA	2013 SAP HANA Solution on SmartStack	<a href="#">Nimble Storage SmartStack for SAP HANA</a>

## For More Information

To learn more about SmartStack, visit:

- <http://www.cisco.com/go/smartstack>
- <http://www.nimblestorage.com/smartstack>

To learn more about Cisco UCS, visit <http://www.cisco.com/go/ucs>.

To learn more about Nimble Storage, visit <http://www.nimblestorage.com>.



# SmartStack™



Nimble Storage, Inc.  
211 River Oaks Parkway  
San Jose, CA 95134  
[www.nimblestorage.com](http://www.nimblestorage.com)

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134  
[www.cisco.com/go/smartstack](http://www.cisco.com/go/smartstack)