

The Cisco SONA Architectural Model in Unified Communications: A Solid Foundation for the Collaborative, Innovative Enterprise

Overview

Enterprises are increasingly taking an architectural approach to analyzing their business processes, the supporting application framework, the information and data storage, as well as their IT infrastructure. The same architectural considerations must apply to a [unified communications](#) solution. A primary goal of unified communications solutions is to boost productivity and innovation by streamlining business processes—accomplished by both enabling new collaboration models and enriching traditional enterprise applications with communication capabilities. Gartner notes that the latter, described as Communication-Enabled Business Processes ([CEBP](#)), makes business processes far more effective by enabling faster response times and more accurate interactions. By eliminating communication and collaboration silos within critical business processes, a well-architected unified communications solution fulfills a vital role as a productivity and agility engine in the business. But such an ambitious objective can be achieved only if unified communications is built on a robust and open framework. The Cisco® [Service-Oriented Network Architecture](#) (SONA) provides that solid architectural foundation for unified communications and allows Cisco Unified Communications to fulfill its potential as a strategic business-transformation tool, making unified communications services reusable and thus capable of enriching innovative composite applications, as well as guaranteeing that those applications will deliver on the deterministic, predictable quality of experience that will meet user expectations.

This white paper shows how:

- To be a strategic enterprise transformation tool that combines business-critical availability with agility and fast rollout of new services, unified communications must be able to rely on robust network-based services that operate transparently end to end.
- Cisco SONA provides robust, network-based services that enrich emerging, innovative composite applications, significantly contributing to optimal alignment between technology and business processes.
- A solid architectural foundation for unified communications also allows IT managers to consider a flexible, synergistic approach that can draw from the advantages of both on-premise and on-demand resource deployment models.
- The innovative Cisco architectural approach results in improved usability for end users, enhanced infrastructure manageability for IT personnel, and enterprise-class reliability in the technology infrastructure.
- Partners, customers, and third-party developers gain the ability to quickly and easily add value on top of Cisco Unified Communications solutions and help deliver optimal integration with business workflows.

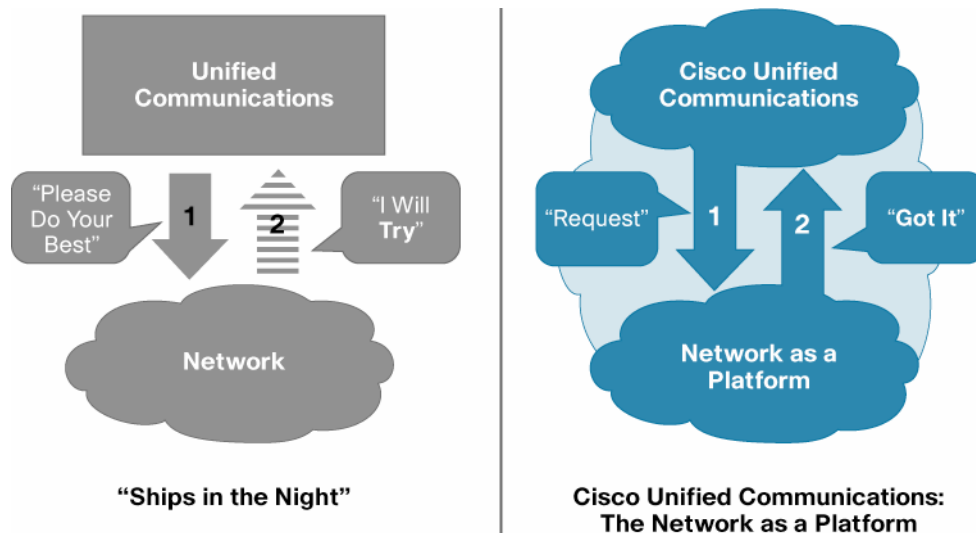
Unified Communications Architecture Introduction

A Forrester publication titled "[The Debate Is Over: Businesses Prefer Smart Networks](#)" presented a then-provocative viewpoint that challenged the widespread notion that IP networks merely had to provide exponentially increasing amounts of cheap bandwidth to the application world. Today, it is conventional wisdom because critical reusable services such as security, application delivery, virtualization, and mobility rely on the network. Now, the network also provides reusable communication and collaboration services. By enriching traditional enterprise applications with these innovative, network-based capabilities, businesses gain new tools to improve overall productivity and accelerate innovation.

Traditionally, applications were thought of as monolithic blocks with clear characteristics: they either had network dependencies (such as real-time latency and jitter requirements) or they did not. [Composite applications](#) are an emerging category of applications that integrate traditional business applications (that is, enterprise resource planning [ERP], customer relationship management [CRM], in-house-developed industry-specific applications, etc.) with real-time communication and collaboration applications. As such, they blur the former hard boundary on network dependency. These innovative composite applications depend on a robust architectural concept to be successful and be readily accepted by today's empowered users. In other words, going forward, the established approach that has produced a clear demarcation between the application and network domains may be insufficient for optimal support of many emerging composite applications. Composite applications need to become network-aware, and the network has to become application-aware.

Unified communications—when implemented on premises—has sometimes been viewed simplistically as a software application that resides on servers that use the IP network merely as “piping”, that is, a source of basic connectivity services (refer to Figure 1). This so-called “ships in the night” approach assumes that the network will provide enough resources at any point in time to handle the application request. This approach, however, inevitably creates new application stovepipes in the enterprise, because it limits the scope of the unified communications solution as a source of reusable services that composite applications can use. Instead of reusing unified communications session, media control, or other services, composite applications with more stringent availability and reliability demands than voice and video unified communications applications would have to implement their own session control services—or even worse, rely on a separate network infrastructure altogether, creating new functional silos in the enterprise.

Figure 1. Ships in the Night vs. Network as a Platform



To provide robust, reusable communication and collaboration application services, a unified communications solution can no longer view the network as a simple connector among endpoints. That approach may have worked in the past, when voice was the primary application focus within unified communications. As unified communications has evolved to integrate all collaboration and communication tools, ranging from instant messaging to business-grade high-definition video, and as new composite applications have increasingly used these collaboration and communication tools to best advantage, the requirements have changed. Now, the network must be a trusted provider of critical services that unified communications solutions and, therefore, composite applications can always rely upon. And this scenario can be achieved only with architectural integration.

From the beginning, the Cisco Unified Communications architectural vision has been based on the concept that both the underlying intelligent IP network and the unified communications applications need to closely interoperate to enable innovative composite applications that will provide significant productivity benefits to businesses. The Cisco SONA framework describes network-based services that applications can use to best advantage to deliver a range of desired business outcomes, including faster application rollout, a better user experience, and increased productivity.

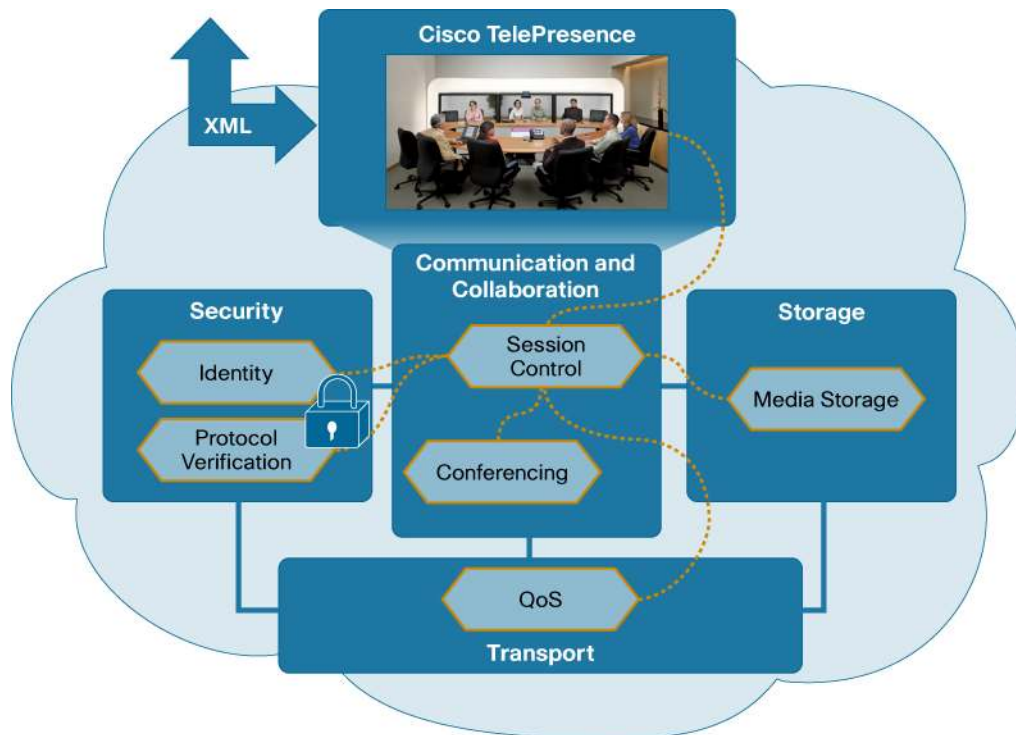
Cisco TelePresence: An Innovative Collaborative Application Facilitated by Unified Communications

Cisco TelePresence effectively illustrates the power of reusable, robust network services able to quickly facilitate a new, innovative collaborative application. Cisco TelePresence combines high-quality audio, high-definition video, and several network services to deliver an in-person meeting experience over the network.

Cisco TelePresence places high demands on the unified communications infrastructure. Not only does it have stringent bandwidth, latency, and packet-loss requirements in order to guarantee a rich, in-person meeting experience, but it also requires strict security as well as the ability to easily record and store sessions as part of governance, risk, and compliance (GRC) solutions. Other similar solutions that take the "ships in the night" approach do so by implementing TelePresence as a standalone application silo with custom, embedded, nonreusable services to control the strict video, audio, and security requirements.

In contrast, the Cisco SONA approach delivers faster, easier, and more cost-effective implementation of Cisco TelePresence (refer to Figure 2) on the already-existing communications infrastructure, simply reusing—through open interfaces—Cisco core services, including communications and collaboration, security, virtualization, and transport. Cisco TelePresence also offers its own Extensible Markup Language (XML) and other open protocol service interfaces, allowing the application to become a collaboration tool that can be integrated as part of other business applications. One such example is the [SAP GRC](#) solution, which may integrate automatic session provisioning and startup for Cisco TelePresence based on business-process rules.

Figure 2. Cisco Telepresence Relies on Reusable Network-based Services

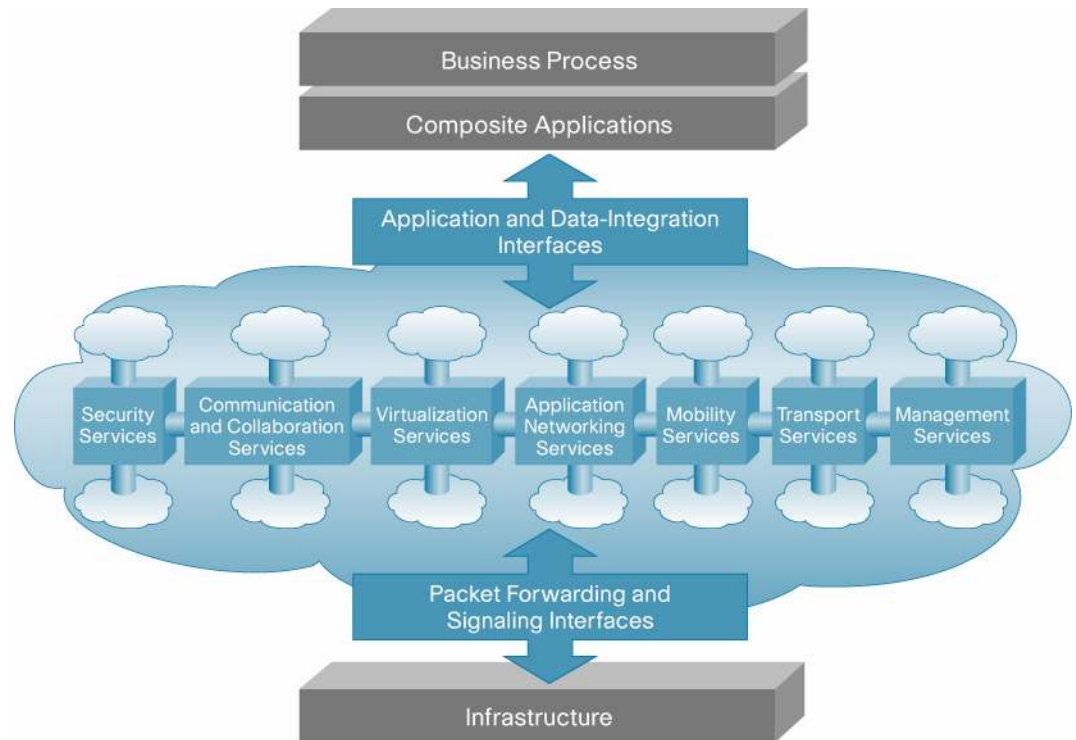


Cisco SONA: A Framework for Reusable Network-Based Services

Cisco SONA illustrates the Forrester Research study of smart networks that go well beyond simply offering ever-faster packet-forwarding interfaces.

Cisco SONA illustrates network-based services that applications use to advantage to help achieve desired business outcomes. A wide variety of network-based services offer reusable, robust, and unique capabilities that applications can employ to enrich emerging composite applications.

Figure 3. Service-Oriented Network Architecture Offers Network-based Services that Enrich Composite Applications



Cisco SONA comprises seven major core service groups that can deliver consistent and robust capabilities throughout the network (refer to Figure 3). The ubiquity of the network helps ensure pervasive services that composite applications can truly rely on for predictability and availability. Cisco SONA core service groups include:

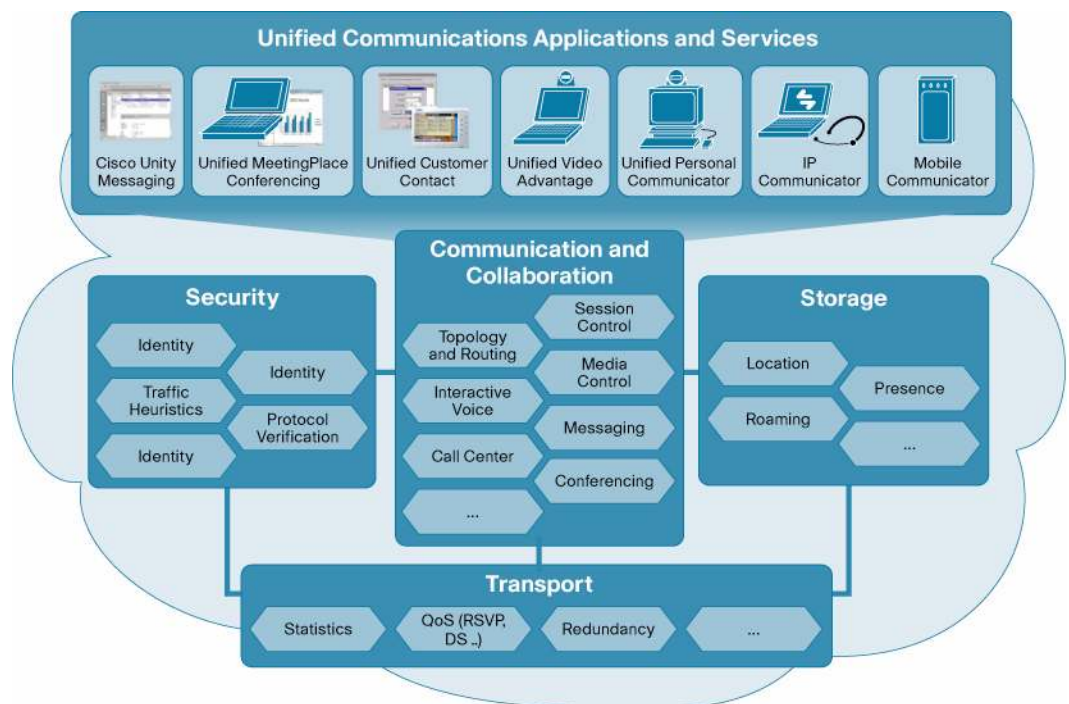
- Management Services offer configuration and reporting capabilities.
- Transport Services are concerned with resource allocation and deliver on the overall quality-of-service (QoS) requirements of the application (end-to-end availability, latency, jitter, and packet-loss guarantees), as well as routing and topology functions.
- Mobility Services offer access to location information, and also offer device- and presence-dependent services.
- Application Delivery Services are concerned with performance optimization based on application awareness; they consist of a rich set of acceleration, compression, and protocol optimization capabilities.
- Virtualization Services deliver abstraction between physical and functional elements in the infrastructure, allowing for more flexible and reliable service operation and management.
- Security Services help protect the infrastructure, data, and application layers from constantly evolving threats, and also offer access-control and identity functions.
- Communication and Collaboration Services are integral to Cisco Unified Communications solutions, offering session- and media-management capabilities, contact-center services, as well as identity and presence functions.

Cisco SONA principles are centered on application focus and reusability. Cisco SONA services use a variety of open protocols (such as Session Initiation Protocol [SIP] and XML) and published application programming interfaces (APIs) that allow developers within the IT organization as well as an [innovative community of global development partners](#) to implement these services in business applications.

Cisco Unified Communications Architecture Overview and Use of Network-Based Services

Cisco Unified Communications architectural philosophy uses critical network services to best advantage to deliver new solutions that optimally enable business processes, accelerate innovation, and boost productivity.

Figure 4. Cisco Unified Communications and Network-based Services Overview



In essence, Cisco Unified Communications consists of an application layer component that offers other business applications and clients an interface with end users or provides tools for operations and application development. It also contains a network layer component providing dependable, network-based services that are labeled as Communications and Collaboration Services. Figure 4 illustrates these functional blocks at a high level. Furthermore, the Cisco Unified Communications solution relies on a variety of security, mobility, and transport network-based services. Among other services, communication and collaboration core services include the following functions:

- **Session control:** This functional block supports the ability to establish, tear down, and modify sessions; that is, a predictable end-to-end flow between identified entities irrespective of the locally supported signaling protocol. Session control can be established with a protocol such as SIP or a variety of other legacy protocols.
- **Media control:** Very closely related to session control, media control provides the ability to optimally support heterogeneous media and make dynamic adjustments in session parameters or translate between media formats whenever required.

- **Topology and routing:** These functions dynamically maintain and distribute routing and topology information for session establishment as well as implementing advanced functions as cost-based or exception routing.
- **Call center:** Call centers are a collection of services that allow full integration of the call center with business applications. For example, all customer calls that enter the waiting queue could be downloaded from the call center and combined with existing customer records for prioritization or some other special treatment for preferred customers.
- **Voice recognition:** This function provides a very versatile and intuitive user interface.

Cisco Unified Communications greatly benefits from dependable, reusable network-based services offered by other functional blocks. Following are some of the network-based services that facilitate a highly versatile unified communications solution:

- **Security:** A strategic business resource as vital as unified communications needs to be secured from a multitude of threats. Network-based security services naturally have full visibility and pervasive reach across the enterprise, and they rely on deep packet inspection and traffic heuristics to immediately detect any threat to the infrastructure.
- **Transport:** Innovative applications that combine traditional business application elements with real-time communication and collaboration functions may have strict service-level agreement requirements that need to be consistently and reliably enforced end to end. And if unified communications is to provide services such as end-to-end QoS to enrich such innovative applications, it must closely interoperate with the network to ensure robust service-level agreement enforcement. This enforcement can be guaranteed when unified communications becomes an integral part of the “network cloud”, and consequently services provided by unified communications become part of the service portfolio offered by an intelligent network.
- **Mobility:** Location and preference information can greatly enrich a variety of business applications and enhance productivity.

Only a robust architectural approach based on the network as an enabling platform will ensure that these services are offered with functional integrity to service consumers. Only the network, with its pervasive reach, its immediacy to all users and all their devices, and its rich end-to-end traffic-processing capabilities, can offer the services that will enable future composite applications. In other words, the ability of the network to robustly, predictably, and pervasively host critical services will optimize the ability of server-based communication-oriented service components to deliver on their particular mission.

Improving Usability of Unified Communications Through a Network-Based Architectural Approach

Usability is a primary concern as communication and collaboration platforms evolve to become strategic business tools that are transparently integrated into the business process. Usability must cater to very diverse constituencies in the enterprise:

- Empowered users do not want to spend lengthy learning periods on complicated user interfaces; they expect ease of use and customization in their productivity tools of choice. Users also expect consistent functions and access to data irrespective of their location and the device they use.

- IT personnel is increasingly tasked with engineering direct business benefits through technology use, and therefore demands solutions that are easier to install and configure, trouble-free in operation, and adhere to plug-and-play principles wherever feasible.
- CIOs and enterprise architects require technology solutions that are agile and versatile enough to quickly address ever-changing business challenges.

Cisco SONA principles provide a foundation to address all of these concerns. First, by offering network services as reusable elements, the resulting functional divide promotes the clean architectural separation of the presentation layer. In other words, every device that supports Web protocols—literally meaning every device in production—can now be offered extremely consistent services, irrespective of its location or capability sets. The same Web-based interfaces will also result in tools that ease network operation for IT personnel. Finally, the service-oriented philosophy gives IT and enterprise architects the ability to compose new solutions to address changing business needs by adding new capabilities without disrupting the loosely coupled service elements already serving the business process.

Using Network-Based Services to Enable Deployment-Model Flexibility: On-Premises and On-Demand

The demand for business agility is also fostering the need to support flexible deployment models for all application services. Traditional monolithic enterprise software architectures may be very robust, but they are also slow to adapt to new business requirements. Service-Oriented Architectures ([SOAs](#)) and concepts such as Software-as-a-Service ([SaaS](#)) are both accelerated by the desire of enterprises for more agile solutions, and the overwhelming need to tailor the technology solution to optimally serve the overarching business process. An architectural discussion on communication and collaboration solutions would not be complete without discussing on-premises and on-demand deployment models. Invariably, as companies evaluate their needs for communication and collaboration services, they often wish that they could implement a hybrid model going forward.

For example, it could be very cost-effective to avoid the need to engineer the on-premises voice and video conferencing system to the largest possible expected number of participants, but rather be able to take advantage of on-demand capacity whenever required, and yet allow users of the on-premises and on-demand sessions to share the same experience, interface, and capabilities. With network-based services such as virtualization and session management, and with shared Web service-based presentation layers, deployment flexibility is easy to attain. Implementing Cisco SONA principles, the network acts as a robust, secure global delivery platform that transparently links the on-premises and on-demand solutions. Enterprises are no longer confronted with an either-or choice, but are free to exploit the benefits of either deployment model where it benefits them the most.

Conclusion

Close architectural ties are required for the technology infrastructure, meaning both applications and network, to support the type of innovative composite applications that will fuel the next wave of productivity in the enterprise. These applications will blend traditional business-application elements with communication and collaboration tools, optimally aligning technology and business process. By helping eliminate communication and collaboration silos that limit business processes, a well-architected unified communications solution fulfills a vital role as a productivity and agility engine. This ambitious objective will only be achieved if unified communications is built on a robust, open architectural framework using network-based services. The Cisco Service Oriented Network Architecture (SONA) provides the framework for network-based services and is tightly integrated with Cisco Unified Communications architecture. The Cisco pioneering architectural approach sets a foundation that organizations can take advantage of to accelerate innovation as well as offer ground-breaking usability, simplicity, and manageability to end users and IT personnel alike.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

CCDE, CCENT, Cisco Eos, Cisco Lumin, Cisco StadiumVision, the Cisco logo, DCE, and Welcome to the Human Network are trademarks; Changing the Way We Work, Live, Play, and Learn is a service mark; and Access Registrar, Aironet, AsyncOS, Bringing the Meeting To You, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, CCVP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Collaboration Without Limitation, EtherFast, EtherSwitch, Event Center, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, IQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, IronPort, the IronPort logo, LightStream, Linksys, Media Tone, MeetingPlace, MGX, Networkers, Networking Academy, Network Registrar, PCNow, PIX, PowerPanels, ProConnect, ScriptShare, SenderBase, SMARTnet, Spectrum Expert, StackWise, The Fastest Way to Increase Your Internet Quotient, TransPath, WebEx, and the WebEx logo are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0804R)