Collaboration Design Overview

SMART BUSINESS ARCHITECTURE

February 2013 Series

Preface

Who Should Read This Guide

This Cisco® Smart Business Architecture (SBA) guide is for people who fill a variety of roles:

- Systems engineers who need standard procedures for implementing solutions
- Project managers who create statements of work for Cisco SBA implementations
- Sales partners who sell new technology or who create implementation documentation
- Trainers who need material for classroom instruction or on-the-job training

In general, you can also use Cisco SBA guides to improve consistency among engineers and deployments, as well as to improve scoping and costing of deployment jobs.

Release Series

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

The Release Notes for a series provides a summary of additions and changes made in the series.

All Cisco SBA guides include the series name on the cover and at the bottom left of each page. We name the series for the month and year that we release them, as follows:

month year Series

For example, the series of guides that we released in February 2013 is the "February Series".

You can find the most recent series of SBA guides at the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel

Comments and Questions

If you would like to comment on a guide or ask questions, please use the SBA feedback form.

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What's In This SBA Guide

Cisco SBA Collaboration

Cisco SBA helps you design and quickly deploy a full-service business network. A Cisco SBA deployment is prescriptive, out-of-the-box, scalable, and flexible.

Cisco SBA incorporates LAN, WAN, wireless, security, data center, application optimization, and unified communication technologies—tested together as a complete system. This component-level approach simplifies system integration of multiple technologies, allowing you to select solutions that solve your organization's problems—without worrying about the technical complexity.

Cisco SBA Collaboration is a design incorporating unified communications, video collaboration, and web conferencing. By building upon the hierarchical model of network foundation, network services, and user services, Cisco SBA Collaboration provides dependable delivery of business applications and services.

Route to Success

To ensure your success when implementing the designs in this guide, you should first read any guides that this guide depends upon—shown to the left of this guide on the route below. As you read this guide, specific prerequisites are cited where they are applicable.

About This Guide

This *design overview* provides the following information:

- An introduction to a Cisco SBA design
- An explanation of the requirements that shaped the design
- A description of the benefits that the design will provide your organization

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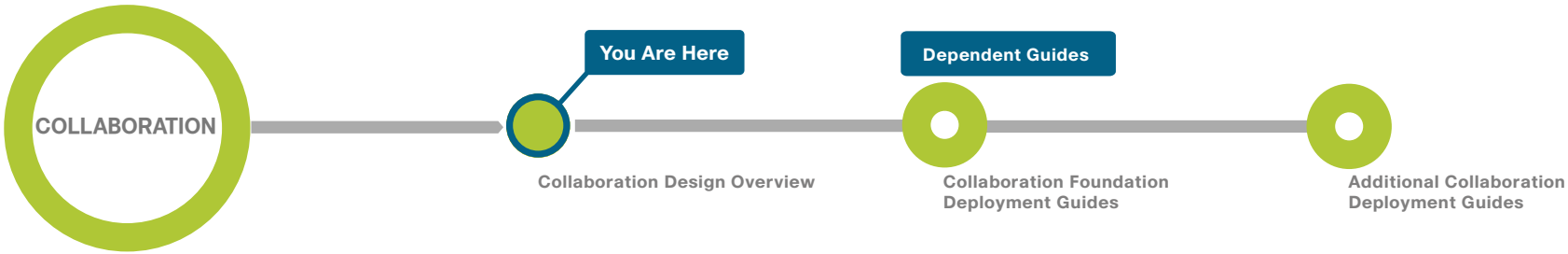


Introduction

The Cisco Smart Business Architecture (SBA) incorporates LAN, WAN, wireless, security, application optimization, server load-balancing, and unified communications technologies to provide complete solutions to an organization's business challenges. This collaboration design overview focuses on unified communication, video collaboration, and web conferencing. These three elements make up the vast majority of the collaboration use cases for an organization. This overview is also designed to help IT and business leaders understand the impact of IP video applications and the benefit of Cisco Medianet technologies, which are a best practice network approach for video and collaboration. Allowing your employees to be in constant contact with each other and making the most efficient use of your underlying network foundation are key to the success of the solution. A solution-level approach simplifies the system integration normally associated with multiple technologies, which allows you to select the individual components that solve your organization's problems rather than worrying about the complex technical details of an overall collaboration solution.

Notes

Business Overview

Collaboration is two or more people working together to achieve a common goal. Teams that work collaboratively can obtain greater resources, recognition, and reward when facing competition for finite resources. Collaboration has always been the life blood of an organization, and in today's global economy it has never been more important to stay in touch in many different ways. The methods people use to communicate over the years have changed, but the ability to work with others inside and outside your organization has always been essential to the success of a business. Technology allows organizations to choose many different modes of communication, from a simple instant message to a fully immersive experience that includes high-definition video, spatial audio, and real-time data sharing.

The immersive video-collaboration experience is a perfect example of using technology to bring people together. Try to imagine just five years ago, when "meeting" someone for the first time over video was not a good experience. The equipment was difficult to operate with cumbersome remote controls, and the audio and video quality was poor. You could see and hear the people on the other end, but their image was smaller than real life and their voices sounded as though they were coming from an old AM radio. At the end of your video conference, you might have gotten some benefit from seeing the people you were talking with, but you hardly felt as though you had met them in person.

Fast-forward to today and consider the way you can talk with someone across the world as easily as if you were both sitting in the same room. The vivid expressions on their full-size images are very clear, their body language tells you a lot about what they are thinking, and their voice comes from the side of the room on which they are sitting. There are no remote controls or complicated procedures for starting a meeting. You just sit down and work together without technology getting in the way. After meeting with them, you feel as though you have met them in person because the experience was very life-like. This is the reality of collaboration with a Cisco solution.

The following are business benefits for implementing Cisco SBA Collaboration:

- A standardized design that has been tested and supported by Cisco to reduce capital outlays and operational costs
- Optimized architecture for organizations with up to 10,000 users and 500 remote sites
- Flexibility to allow easy migration as the organization grows
- Seamless support for quick deployment of wired and wireless voice, along with room system video
- Faster decision-making and time to market
- Immediate access to experts and productivity gains
- Travel expense reduction and lower carbon footprint
- Improved work/life balance for employees
- Deployment and operation completed by IT workers who have a CCNA certification or equivalent experience
- Cisco enterprise-class reliability in products designed for organizations

Architecture Rationale

A variety of factors determine whether a user has a good experience with an application or endpoint running over the network. Consider the various components and services that have to work together to make a simple IP-based video call. The device plugs into the network and uses numerous services to find the remote endpoint. When everything works as designed, the person you called is presented as a clear video image, with natural sounding audio. Three specific layers need to function seamlessly to provide the user with a consistently positive experience:

- A highly available network foundation for the network services and user traffic
- Network services that operate in the background, improving and enabling the experience without direct user awareness
- The applications or endpoints with which a person interacts directly, known as user services

Without all three layers working in harmony, users will quickly become frustrated with the level of service they are receiving. They may choose alternate methods to contact the person, or they may have to travel to meet with them.

A further illustration of the importance of the layers can be made with the phone system. Imagine making a phone call with no ringing or busy tones, or figuring out for yourself how to make the connection between the various switching points separating you and the person you want to call. We take all this for granted when we use the telephony service at our homes or at work. We pick up the phone and hear a dial tone that confirms the network is ready. We dial the number, and the network automatically routes the call to our destination. The phone rings at the far side, or we are presented with a busy tone, and the network provides us with audible feedback on the progress.

The network is critical to the operation of organizations in which workforce productivity is based on nonstop access to communications. Using a layered approach to build your network with a tested, interoperable design allows you to reduce risks and operational issues while increasing the speed of deployment.

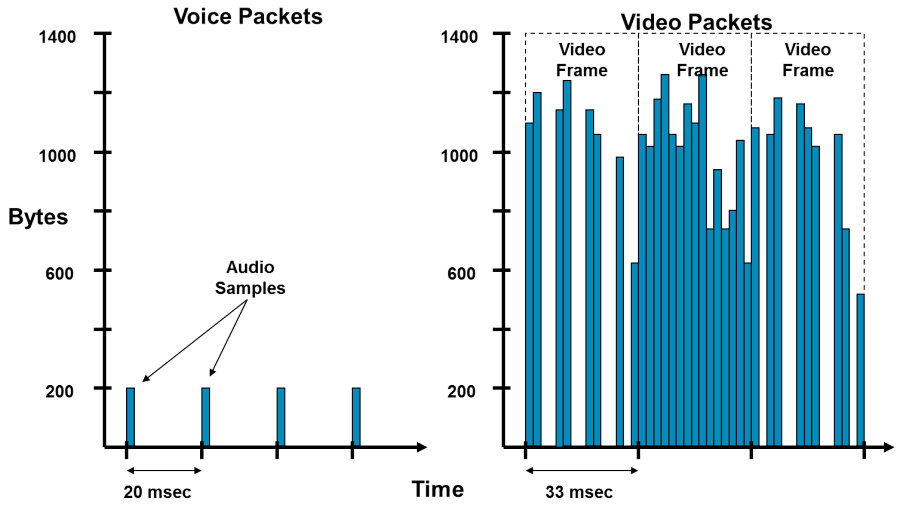
Providing a good quality experience for users can quickly become complex and costly if you consider that organizations often deploy different collaboration applications and endpoints from different vendors at the same time and in the same infrastructure.

Table 1 compares voice and video applications, and illustrates their differences. The characteristics of voice applications are predictable and consistent when compared with video applications, which have different bandwidth requirements because the traffic is bursty, unpredictable, and highly compressed. Video is often transmitted in a variety of form factors from different vendors.

Table 1 - Voice and video traffic characteristics

	Voice	Video
Bandwidth	8 Kb to 64 Kb	384 Kb to 15 Mb
Data type	Well behaved and consistent; lightly compressed	Bursty and unpredictable; highly compressed
Form factor	Voice	TelePresence, desktop video surveillance camera, streaming video
Session type	Dedicated phone moving to softphone	Room system, desktop PC, dedicated appliance, tablet, smartphone

Figure 1 - Voice and video traffic at the packet level



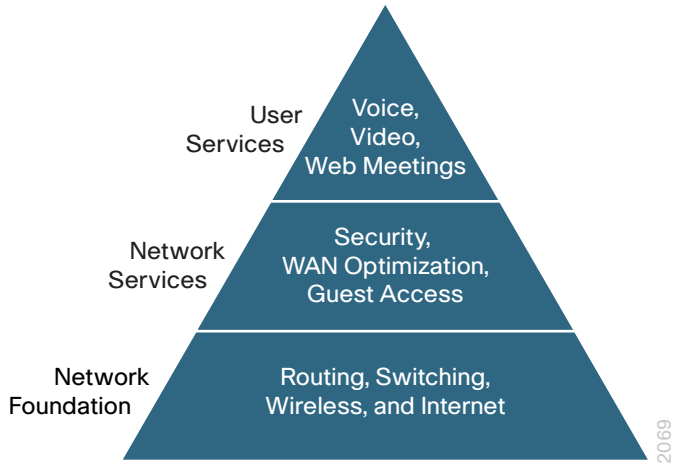
The inconsistency in video application characteristics increases complexity for IT organizations when deploying and managing many types of media from different vendors and devices. The IT challenges are exacerbated if you consider shrinking budgets and increasing end-user quality expectations as video becomes pervasive.

Cisco Medianet helps your organization deal with these challenges by simplifying network operations, lowering the risks, cutting costs, and improving the quality of your video and collaboration deployments.

Architectural Overview

As a process, architecture is the activity of designing and constructing buildings and other physical structures, primarily to provide shelter. A wider definition often includes the design of the environment, from the macro level of how a building integrates with its surrounding landscape to the micro level of the construction details and, sometimes, furniture. Architecture in its broadest sense is the action of designing a complete system that provides a useful service to the consumer.

As such, Cisco SBA Collaboration is a system that was created using a structured process to safeguard the stability of voice, video, and web conferencing for business processes and assets. The system can be broken down into three primary modular, yet interdependent, components for your organization. They are the network foundation, network services, and user services, which have a hierarchical interdependency as shown in the following illustration.



Network Foundation

The key to the architecture is the network foundation. Similar to the concrete foundation of a building, the network foundation provides a platform on which everything else relies. As a standalone layer, the network foundation ensures information is sent dependably from one device and received at another. How this is accomplished is completely abstracted from the average user; all they know is that when they pick up the phone, they hear a dial tone. When they place a call and the other person answers, the audio is clear, and they have a normal conversation. It just works, and they do not have to think about how the call gets from one point to another.

Intelligent infrastructure devices from Cisco—such as switches, routers, gateways, session border controllers, and wireless access points—are what make this possible in the background.

Network Services

Network services sit on top of the network foundation. Network services are like the doors, windows, and walls of the building. A building without these components is just a box. Adding these services turns the infrastructure into a workable structure, providing reliability, security, and availability of the organization's assets. Some users are aware of the value that network services provide, but do not directly interact with those services. An example of this would be using a business phone from a home office. The user needs to be behind their VPN router, use a phone proxy service for a hard phone, or use a Secure Sockets Layer (SSL) VPN client for a soft phone in order to access business resources. The user does not know or care exactly how the network services operate. As long as they can make their voice and video calls from wherever they are at the time, the network services layer is working as expected.

User Services

And finally, user services sit on top of the network services. User services are like the utilities of the building: water, electricity, phone, Internet, and cable TV services. A user needs direct access to these services all day long. In the morning, the lights turn on, air conditioners cool, televisions play content, phones ring, and water is available for morning beverages. As the day progresses, common utilities are what make the building a comfortable place to work. General user services for a network include business application software, CRM systems, email, and instant messaging. User services specific to Cisco include unified communications with voice, web, and video collaboration.

Cisco Medianet

Cisco Medianet technologies are the recommended approach for video and collaboration deployments. They span across the three layers and extend the network boundary to include the endpoints. The network works together with the endpoints in order to scale, optimize, and enhance the performance of collaboration components.

The idea behind this approach comes from the realization that the endpoints and applications are the place in the network where most information is stored. The endpoints communicate with the network, making the network media-aware and armed with important information that you can use to make intelligent decisions. The endpoints also become network-aware and are able to request intelligent network services for troubleshooting.

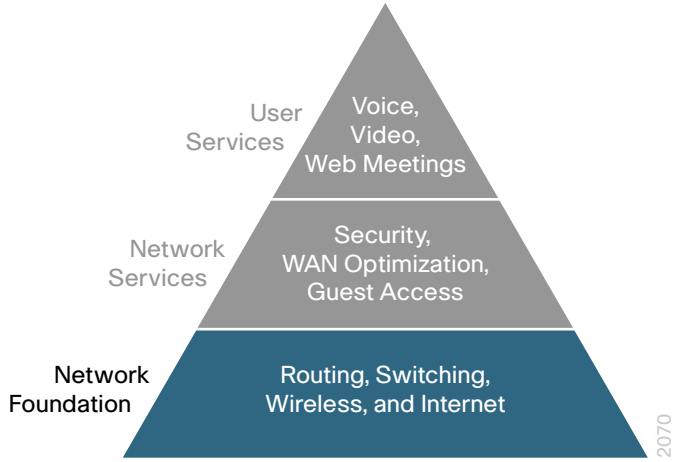
The Media Services Interface (MSI) that is embedded in Cisco endpoints and collaboration applications enables the medianet functionality. MSI provides a set of APIs that use medianet network services, and they also send valuable information about the media flows to the network devices.

If video is critical your business, Cisco Medianet provides you with a framework to help you simplify deployment, and troubleshoot and manage all of your video applications.

Notes

Network Foundation

Most users perceive the network foundation as a simple transport utility to shift data from one point to another as fast as possible; many sum this up as "speeds and feeds". In reality, the network affects all traffic flows and must be aware of end-user requirements and the services offered. Even with unlimited bandwidth, time-sensitive applications such as voice and video can be affected by jitter, delay, and packet loss. As the transport for all session information, the design and operation of this layer is crucial to all services, and its role is vital to the success of the network or the user service placed upon it.



The network foundation provides an efficient, fault-tolerant transport that differentiates between applications to allow each a fair share of the resource, yet still maintains a desired service level. Within the architecture, wired and wireless connectivity options provide advanced prioritization and queuing mechanisms as part of the integrated quality of service (QoS) to help ensure optimal use of the resource.

The LAN

The core layer of the local area network (LAN) at the headquarters site is the communications hub of the network. It aggregates client access and provides the backbone connectivity for the wide area network (WAN), server room, and Internet edge, making it a critical component in the network. The LAN needs to be highly available to support mission-critical applications and real-time media. In the past, high availability meant paying for links that were redundant and sat unused. With Cisco SBA, all network connections are active and carry real traffic.

The following are the benefits of a Cisco SBA-designed core LAN:

- Resilient for very fast failure recovery for real-time media traffic
- Reduced configuration complexity with easier troubleshooting
- Full use of all network links with no links sitting idle in a redundant configuration

The access layer of the LAN also provides automated services such as Power over Ethernet Plus (PoE+), QoS marking, and VLAN assignment for IP phones in order to reduce operational demands. The Cisco Discovery Protocol automatically recognizes endpoints and places them in the proper VLAN without using additional address space from the data VLAN. Video endpoints have their own set of QoS requirements, and they work in conjunction with the voice services in order to use the bandwidth as efficiently as possible. Using Cisco Medianet technologies, the endpoint works together with the network to signal information about its flows, allowing the deployment of true end-to-end QoS.

The LAN design improves network speed and availability, reduces complexity, and makes the network easier to troubleshoot and manage. This means less downtime, and fewer network administrators are required to operate the network.

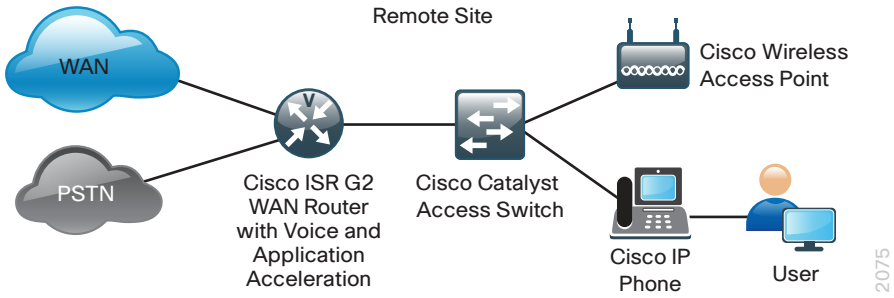
The WAN and Remote Sites

Organizations require an uninterrupted flow of information in and out of the corporate network at the headquarters location. Cisco SBA delivers a robust WAN with the same technology used by some of the largest networks stay to operational on an ongoing basis. A highly available WAN helps the flow of business information proceed without interruption.

The key component in the WAN architecture is the Cisco Integrated Services Router (ISR). It provides the following benefits to Cisco customers:

- Reduces operating expense through integrated services within a single platform, such as voice, video, and data
- Protects investment with a flexible, modular design, allowing voice and video to be added when an organization needs them
- Supports all major service-provider WAN connections, public switched telephone network (PSTN) signaling, and ISDN types
- Can carry large amounts of voice and video traffic while maintaining the other core services
- Accelerates troubleshooting and enhances the assessment of the impact of each application in your network

The primary function of the WAN router is to move data between remote sites and headquarters. Cisco ISR Generation 2 (ISR G2) provides the platform to deliver the growing number of services and increased performance requirements common in remote sites.

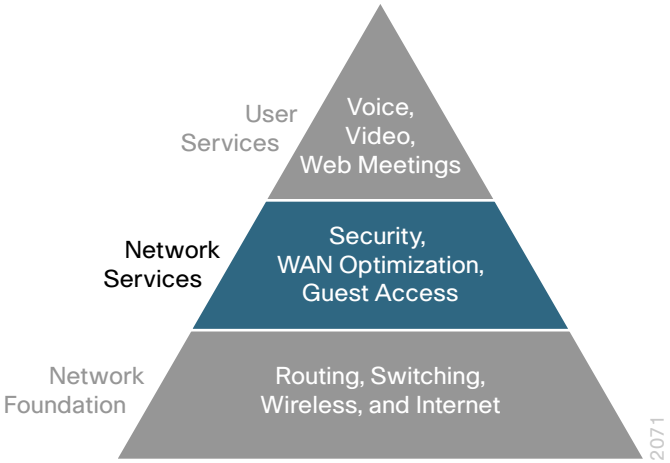


Users need seamless access, both locally and across the WAN, to network services. Call control servers are centralized at headquarters, reducing the number of devices needed at each location. In the event of a WAN outage, the remote site router takes over the call processing duties until the connection can be restored. QoS prioritizes business-critical and latency-sensitive traffic so that voice and video performance is protected and lower-priority traffic does not interfere with critical business functions.

Notes

Network Services

Network services operate behind the scenes and allow the user services to function or improve reliability and efficiency. In some cases, the network may become unusable without specific services. Consider the example in this guide of the phone system. The IP phone obtained a network address by using an automatic addressing service, such as Dynamic Host Configuration Protocol (DHCP). The phone converted a server name, like CUCM_Pub1.cisco.local, to a network address by using the name resolution service, Domain Name System (DNS). The network security services helped to guarantee that the signaling and media information was encrypted, and malicious traffic was removed or prevented from reaching its intended target.



Within the architecture, there are many network services—including virtualization, DHCP, DNS, various forms of security, and media resources—that are used by the call control applications and the network-based voicemail system.

Virtualization

Virtualization technologies can help your organization treat all IT resources as a set of shared services that can be combined and recombined to improve efficiency and scalability.

Cisco SBA creates a foundation for virtual services. In this design, virtual LANs (VLANs) are used to create logical, secure, and reliable segmentation between voice, video, data, wired, wireless, and management functions on the network. The design also supports virtual servers and storage in the server room/data center. Cisco Unified Communications Manager (Unified CM) and Cisco Unity Connection can be installed on virtual servers and managed using the same VMware tools as other critical business applications.

Unified communications server virtualization with Cisco Unified Computing System (UCS) provides the following benefits:

- Consolidated workloads, raised utilization levels, and reduced operating, capital, space, power, and cooling expenses
- Accelerated unified communications rollouts
- Ability to move workloads dynamically within a virtualization pool for greater flexibility
- Optimized performance and service levels
- Capability to scale existing applications or deploy new ones by creating more virtual machines from an existing pool of resources
- High-availability and disaster-recovery features

Security

Security is an integral part of every network deployment. With the need to have secure and reliable networks, protect information assets, and meet regulatory compliance requirements, an organization needs to deploy security services that have been designed into the network rather than added on as an afterthought. With most networks connected to the Internet and under constant barrage from worms, viruses, and targeted attacks, organizations must be vigilant in protecting their network infrastructure, user data, and customer information.

Cisco SBA provides secure remote access for phones and video endpoints via a software or hardware client. SSL VPN offers maximum flexibility, offering secure connectivity for employees and partners back to the internal network, even from assets outside the organization's control. If you deploy

an existing remote access solution, the Cisco SBA architecture is flexible and can support traditional IPsec VPN clients. A hardware client that allows for an always-on connection can support teleworkers so that home users have the same voice and video experience that they would have in the office.

IP Network

Cisco recommends running your collaboration traffic over a private IP network rather than a shared public network. Using an IP network allows you to expand the communication channels beyond the traditional voice and low-quality video to include features like presence, high-definition video, and spatial audio. If you already have an IP network in place for data, your natural next step will be to deploy high-quality voice and video over IP. Many organizations run voice and video systems in a mixed environment as they move from older systems to newer ones based on the IP protocol. As you move off of older systems that use time-division multiplexing (TDM) and ISDN solutions, you can realize significant quality improvements and cost savings.

An IP-based solution offers lower costs, easier management, remote monitoring, and control from across the network. It also provides higher bandwidth for calls, enabling superior audio and video quality while offering tighter integration into the corporate IT mainstream.

With an IP network based on Cisco SBA, the ongoing costs of running voice and video calls are minimal because you are only paying for maintenance and technical support. When return on investment (ROI) for the initial deployment is met, any additional calls are essentially free. Because there is no incremental cost involved, employees are more likely to use the technology. As usage goes up, returns increase, further boosting the ROI.

Cisco Medianet

The Cisco Medianet technologies include features in routers, switches, and endpoints working together to provide capabilities such as media monitoring and media awareness.

Cisco Medianet monitoring capabilities provide increased visibility for the network operations staff. This enables proactive management of network resources and can help the overall user experience remain positive. Medianet media awareness helps organizations differentiate business critical applications for service assurance, consistency, and optimal quality of user experience—end-to-end.

The benefits of Cisco Medianet to an organization include:

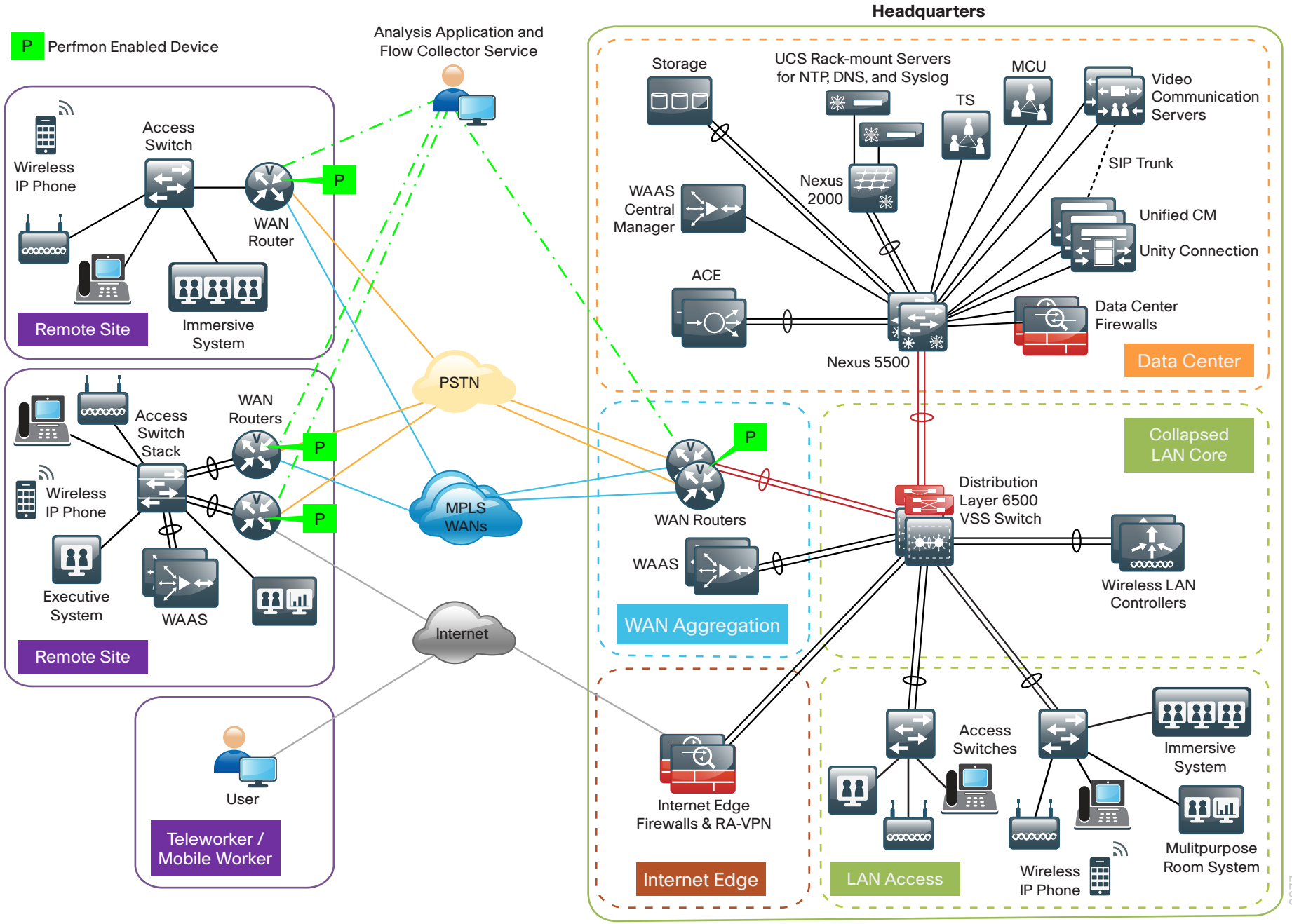
- Reduced operating costs
- Simplified installation and management of video endpoints
- Faster troubleshooting for voice, data, and video applications
- Better investment decisions to meet business objectives: ability to assess the impact of video, voice, and data in your network
- Service-level agreement (SLA) assurance and negotiation: Ability to gather key metrics for the service provided
- Ability to differentiate business-critical applications, determine the importance of a session based on its business value, and provide end-to-end QoS
- Faster end-user adoption of rich-media applications through a high quality, positive user experience
- Increased confidence for network and application operators with pre-deployment assessments

Cisco Medianet includes three complementary media monitoring technologies that operate as network services:

- Performance Monitor—Allows network operators to quickly find and identify problems, including fault location, that impact the quality of video, voice, and data. Operators can create application class-specific threshold crossing alerts for monitoring the business critical applications. In Cisco SBA this feature runs in the Cisco routers, but it is also available in Cisco switches.
- Mediatrace—Discovers Layer 2 and Layer 3 nodes along a flow path. Mediatrace implicitly uses Performance Monitor to provide a dynamic hop-by-hop analysis of media flows in real time to facilitate efficient and targeted diagnostics.
- IP SLA Video Operation (VO)—Generates realistic synthetic traffic streams that are very similar to real media traffic. It can be used in conjunction with Mediatrace to perform capacity planning analysis and troubleshooting even before applications are deployed.

Performance Monitor and Mediatrace enable the network operations staff to quickly and cost effectively respond to any video conferencing quality issues. These features allow the organization to maintain a reliable and high quality service for their video conference attendees. The IP SLA VO capabilities allow an organization to plan for future growth in size and provided services, as well as validate deployments after fixes and updates.

Figure 2 - Cisco Performance Monitor in Cisco SBA Foundation with UC and video



Cisco Medianet media awareness consists of the following technologies:

- **Flow Metadata**—Manages and transfers application attributes to the network, allowing appropriate policies to be applied at each hop, end-to-end
- **Media Services Interface (MSI)**—Resides on endpoints, and explicitly signals application context attributes (flow metadata) to the network
- **Media Services Proxy (MSP)**—Uses lightweight, deep-packet inspection techniques to snoop standard-based signaling protocols in order to produce flow metadata attributes that can then allow appropriate policies to be applied at each hop, end-to-end

Cisco SBA only utilizes MSI in this release. The other media awareness technologies will be added in subsequent releases.

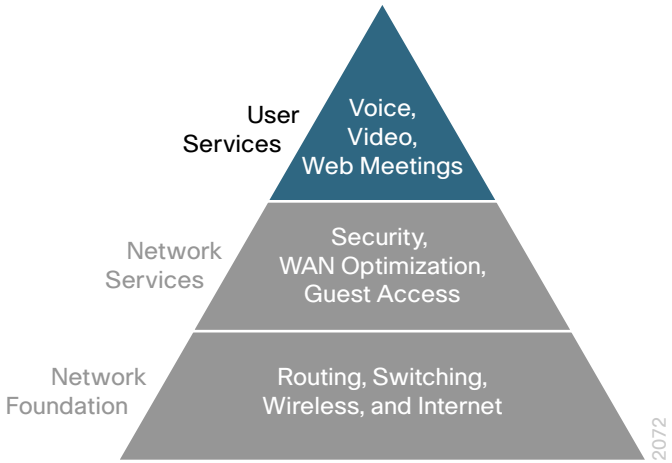
Voice and video applications are raising new requirements in terms of higher bandwidth, lower latency, and predictable jitter. The Cisco SBA platform components are uniquely positioned to understand the source and destination of voice and video streams, as well as the ever-changing capacity characteristics of the connection.

The Cisco SBA collaboration solutions are tested over the borderless network foundation network, and they use the recommended QoS and bandwidth control settings. The conference and scheduling resources are centralized in the data center. The endpoints and video applications, access, WAN, and campus networks are medianet-enabled, using highly available designs and localized services, such as Mediatrace and Performance Monitor, in the branches whenever possible. Features such as Flow Metadata can be used with QoS in order to create more flexible policies that reflect the organization's business objectives. The advantage of bringing collaboration technologies to the Cisco SBA–validated blueprint is that the initial foundation work remains intact because the architecture was originally designed with voice and video communication in mind.

Notes

Design Details

User services compose the layer everyone is familiar with. These are the services or applications we use every day and interact with directly, from picking up the phone to sitting down to an immersive video-collaboration session using a high definition, three-screen system. The end-user experience starts here. The application or product design affects how intuitive and easy it is to use. How a user service interacts with the network foundation impacts how the service performs.



Businesses around the world are struggling with escalating travel costs. The high price of travel is reflected in growing corporate expense accounts, but it also takes a toll on the well-being of employees and their families. Organizations are under increasing pressure to reduce the amount of time it takes to make informed decisions concerning their business operations. Work-at-home programs can save money by reducing the amount of office space required, but some managers prefer to see their staff on a regular basis. From an employee's perspective, remote workers often feel isolated from their departments because they do not spend enough face time with their peers and they feel disconnected from the decision-making process.

To solve these types of business-related problems, the collaboration architecture provides phone and voice messaging services as part of the initial user services options. It also supports video collaboration, web meetings, and a simple help desk as base features to allow organizations to communicate beyond a basic telephone call. Seeing the person as if they were sitting right across from you and sharing data among multiple sites during an interactive training session are two of the many ways the collaboration solutions offered by Cisco can benefit the employees within your organization.

The Media Services Interface (MSI) that is embedded into Cisco's collaboration solutions enable a tight integration of the applications with the network and help organizations:

- Reduce costs of deploying and managing video endpoints.
- Quickly troubleshoot issues and cut operational costs.
- Detect network issues while they occur for immediate remediation and improved user experience.
- Enable the network to accurately apply network services to enhance user experience.

Cisco Unified Communications

Cisco Unified Communications products deliver high-quality voice and video communications that scale from a few people to tens of thousands. Organizations select the features and functions to meet their specific needs, from simple dial tone and voicemail to complex call centers.

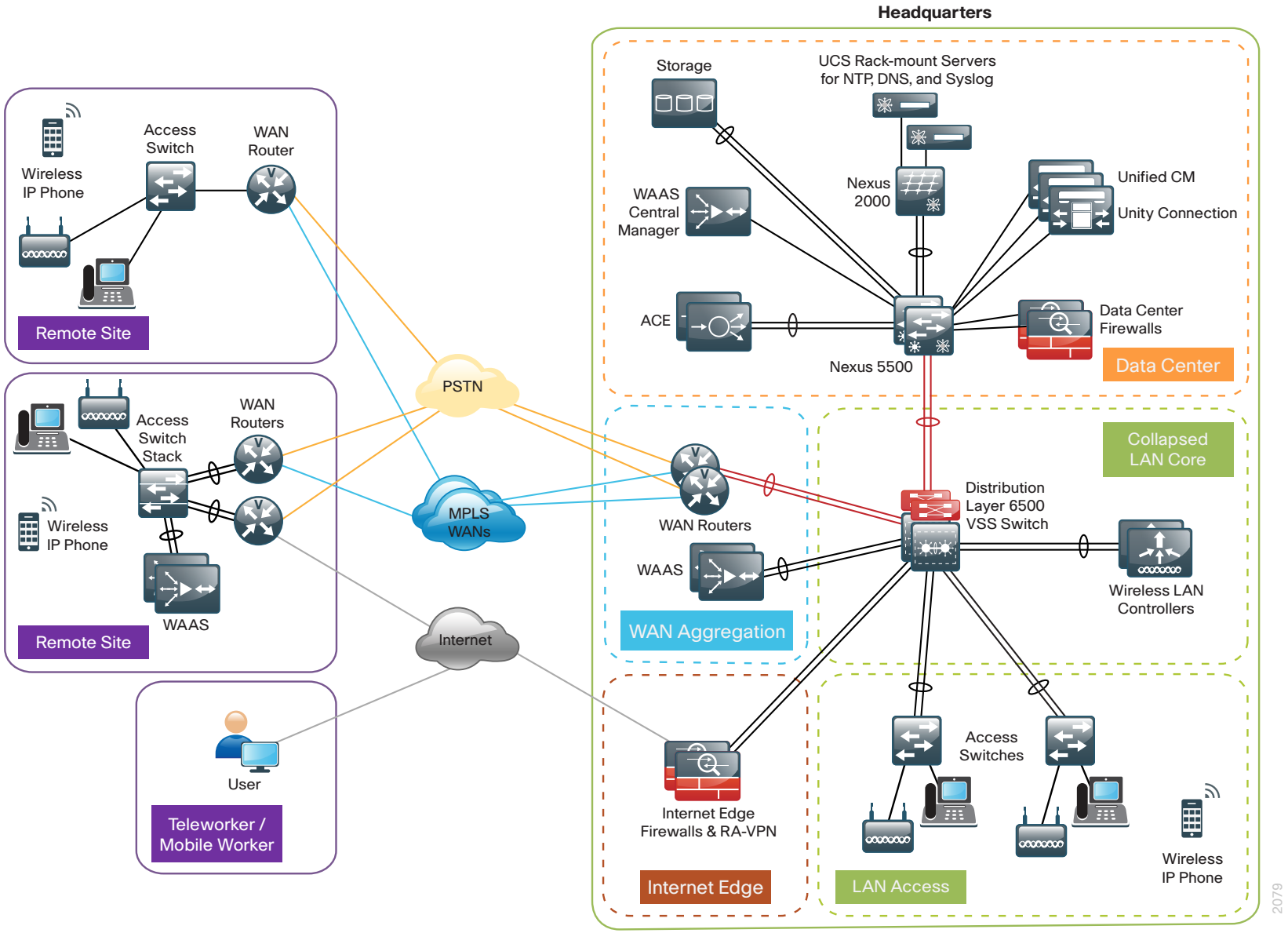
The following are benefits of using Cisco Unified Communications services:

- Scales as the organization grows, from 10 to 30,000 users
- Can be tailored to suit the needs of your organization, from basic call functions to complex call centers with video agents
- Builds on your current messaging systems, creating a platform for collaboration
- Supports single-line voice endpoints all the way up to multi-screen, high-definition video endpoints

Cisco SBA supports up to 10,000 users, and they can be located at headquarters, regional sites, or a remote site. It also supports teleworkers or mobile workers in wired and wireless configurations. The solution integrates the benefits of voice and video communications with messaging into a

modular architecture. Consolidating these services on a single network creates a cost-effective solution that is simple to set up, manage, and use, thereby helping to lower the total cost of ownership (TCO) and providing a foundation for other service and business process integrations.

Figure 3 - Network architecture baseline with unified communications deployed



Cisco Unified Communications encompasses many products and features, which include the following:

- Cisco Unified CM for call control
- Cisco Unity Connection for voice messaging
- Cisco ISR G2s for PSTN and conference bridge resources
- Cisco Unified Survivable Remote Site Telephony (SRST) for remote site survivability
- Cisco Unified Contact Center Express (Unified CCX) for contact center
- Cisco Unified Communications Manager IM and Presence (Unified CM IM and Presence) for instant messaging and presence

Cisco Unified CM

Cisco Unified CM supports the world-class, media-processing (voice, video, and mobility) engine, which extends telephony features and capabilities to packet telephony network devices, such as IP phones, voice over IP (VoIP) gateways, and multimedia applications. Additional services—such as multimedia conferencing, collaborative contact centers, and interactive multimedia response systems—are made possible through the open telephony application programming interfaces (APIs) in Cisco Unified CM.

Organizations can save money, reduce power consumption, and use less rack space by reducing the number of private branch exchanges (PBXs) to a centrally deployed system that has survivability built into the remote-site router, to assist in recovery in the event of a WAN failure. Deploying fewer PBXs saves money on maintenance, electricity, and cooling, and it saves space in the equipment room, wiring closet, or data center. In addition to saving money, using less power also supports an organization's green initiatives and goals for protecting the environment.

Integrated Call Admission Control within Cisco Unified CM helps to protect the voice and video QoS, already implemented in the LAN, so it is also maintained across WAN links. Now organizations can save significant costs by using their IP WAN connections for their site-to-site calling instead of using more expensive PSTN trunks for voice or ISDN for video.

Cisco Unity Connection

Cisco Unity Connection is the unified messaging application for Cisco SBA. Unity Connection transparently integrates messaging and voice-recognition functions to provide continuous global access to calls and messages. Unity Connection also provides robust automated-attendant functions, including intelligent routing for incoming calls and easily customizable call-screening and message-notification options. Using advanced capabilities, employees can personalize communications options to increase individual and team productivity. The flexible user interface makes messaging more efficient for both intensive and occasional voicemail users. For example, the telephone user interface and touch-tone mappings for each user can be customized to make migration from traditional voicemail systems much easier. Users can also use the web administration interface to define and manage personal call-transfer rules in order to customize the delivery of incoming calls based on caller, time of day, or calendar status.

Optionally, Cisco Unity Connection offers an integrated messaging option, bringing voice messages to your Internet Message Access Protocol (IMAP) desktop email inbox. Building on your existing messaging infrastructure and IMAP email clients, Unity Connection provides simple, native access to voicemail from nearly any email client.

Voice Gateways

Voice gateways provide connectivity to networks outside of the organization, conferencing resources, and remote survivability. The combination of these voice services into a single platform offers savings over the individual components. The voice services can be integrated into an existing WAN router, or they can be deployed in a standalone router for additional capacity and redundancy.

Voice gateways provide the following embedded services from Cisco Unified Communications as part of Cisco SBA:

- Gateway service for connectivity to the PSTN
- Media resources for conference bridges
- Backup call control with SRST in the event of lost connectivity with the central site

Cisco Unified SRST

Cisco Unified SRST is a critical component in Unified Communications. Cisco Unified CM, located at headquarters, provides centralized telephony services for all sites. However, because it is centralized, it is susceptible to WAN interruptions, which could disrupt service to remote-site users. SRST provides telephony backup services for remote sites should they lose communications with headquarters. Further lowering support costs, no IT staff are required at the remote sites to manage the SRST application.

The enhanced reliability provided by SRST as an embedded service in Cisco ISR makes Cisco Unified CM a cost-effective solution and helps safeguard telephony operation for users in the remote sites.

Cisco Unified Contact Center Express

Cisco Unified CCX is an optional "contact center in a box" for both formal and informal contact centers. Cisco Unified CCX was designed for the mid-market customer who requires a sophisticated customer interaction solution. It is easy to deploy, and it provides comprehensive contact management capabilities with integrated presence and a powerful automatic call distributor feature. The *Cisco SBA—Help Desk Using Cisco UCCX Deployment Guide* covers the details of how to configure Cisco Unified Contact Center Express in a Cisco SBA environment.

Cisco Unified Communications Manager IM and Presence

Cisco Unified CM IM and Presence is on on-premises solution for instant messaging and presence that works with Cisco Jabber clients. Cisco Jabber is a Cisco Unified Communications application for laptops, desktops, Macs, tablets, and smartphones, which allows you to be more productive from anywhere on any device. You can easily find the right people, see if and how they are available, and collaborate using your preferred method of communication. The *Cisco SBA—On-Premises IM Using Cisco Jabber Deployment Guide* covers the details of how to configure Cisco Unified CM IM and Presence in a Cisco SBA environment. It also goes into detail about how to configure Cisco Jabber for Windows, Cisco Jabber for iPad, and Cisco Jabber for iPhone soft phones on Cisco Unified CM.

Scaling the Solution

The Cisco Unified Communication System can scale from 10 to 30,000 users. The Cisco Unified CM architecture enables a group of physical servers to work together as a single call processing entity or IP PBX system. This grouping of servers is known as a cluster. A cluster of Unified CM servers may be distributed across an IP network, within design limitations, allowing for spatial redundancy and resilience to be designed into the Unified Communications System.

Within a Cisco Unified CM cluster, there are servers that provide unique services. Each of these services can coexist with others on the same physical server. For example, in a small system it is possible to have a single server providing database services, call processing services, and media resource services. As the scale and performance requirements of the cluster increase, many of these services are moved to dedicated physical servers.

The Cisco SBA platform has been built and tested for up to 10,000 users and 500 remote sites with all of the necessary hardware and software components. Additional servers, voice gateways and phones can be added to the base system to accommodate future growth.

Table 2 - Unified CM scaling options

	Unified CM BE 6000	Unified CM
500 users	Yes	Yes
1000 users	No	Yes
2500 users	No	Yes
5000 users	No	Yes
10,000 users	No	Yes

Video Collaboration

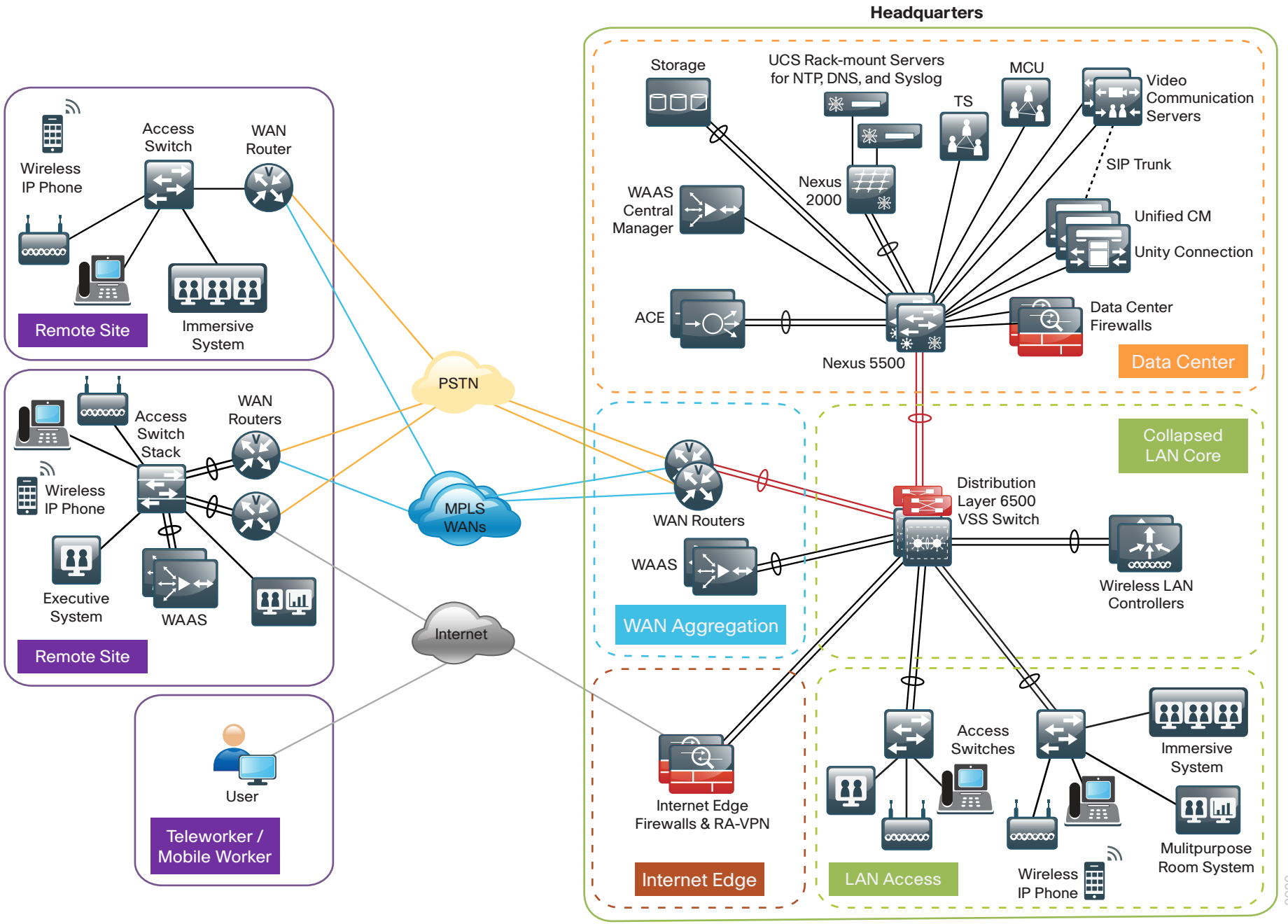
Video collaboration allows your organization to reap the budgetary and productivity gains that a remote workforce allows—without compromising the benefits of face-to-face interaction. The adoption of a comprehensive video collaboration strategy will affect the way business is conducted across an organization.

The following are benefits of video collaboration in a work environment:

- Make decisions faster
- Provide immediate access to experts
- Bring employees in remote offices closer together
- Interview job candidates remotely
- Enhance employee reviews
- Improve telework programs
- Get real-time feedback from suppliers directly to the manufacturing floor
- Record training sessions and executive messages for later playback over the corporate network
- Improve work/life balance for employees and their families

An end-to-end video-collaboration solution incorporates a full suite of endpoints, infrastructure components, and centralized management tools. You can expand it even further by integrating with external devices, digital signage, and productivity tools.

Figure 4 - Network architecture baseline with video collaboration and unified communications deployed



Video Endpoints

A complete video collaboration solution includes some or all of the following endpoint products:

- Immersive telepresence—Immersive telepresence creates the most realistic in-person meeting experience and provides an ideal platform for communication and interaction. Meeting participants feel as though they are having a conversation with a colleague right across the table, even though they may be miles or continents apart.
- Multipurpose room systems—These high-quality systems are designed to be used in meeting rooms, boardrooms, auditoriums, and other shared environments. High-definition, multipurpose video collaboration solutions can offer the same clarity of picture and sound as immersive telepresence systems, and they are great for team meetings and collaborating in groups.
- Desktop, personal, or mobile solutions—These systems are designed for personal use and include video telephony and executive telepresence systems. They are optimized for the office, workstation, and home office. PC- and Macintosh-based mobile video applications, such as Cisco TelePresence Movi, enable visual access to mobile workers at home or at their local coffee shop.
- Peripherals and accessories—A wide range of peripheral equipment can enhance your visual communication environment. High-definition and wide-angle cameras, along with upgraded speakers and microphones using spatial audio techniques, can enhance the visual and audio experience. With document cameras, you can transmit drawings and other detailed images through video channels. Handheld wireless cameras allow you to bring video of an immediate problem to experts around the world in real time. You can also connect your video systems to DVDs, VCRs, whiteboards, and multimedia applications through your PC.

Infrastructure Components

Your end-to-end solution also includes some or all of the following infrastructure products:

- Centralized management and scheduling tools—Management systems enable you to control complex communications environments without decreasing the level of service or increasing associated support costs. With a centralized management system, you can perform remote diagnostics and system upgrades, control associated resources, link to third-party communication tools, generate usage reports, and calculate your ROI.
- Conferencing—With multipoint control units (MCUs) you can join multiple video and voice participants into a single conference. Cisco MCUs can offer high-definition continuous presence so you can see all of the people in your conference on the screen at the same time. Cisco MCUs are highly scalable media services engines that grow with your business demands.
- Call control—When video adoption in your organization grows to include multiple sites and advanced functions, you may require additional network infrastructure to support your solution. Intelligent infrastructure components—such as the Cisco TelePresence Video Communication Server (VCS) and the Cisco Unified CM— can make your network more reliable by helping ensure that all calls are routed properly, converting IP addresses into directory entries for one-click dialing, and allowing your video units to interoperate with phones and other devices and applications.
- Media services—By adding a content recording server to your video collaboration solution, you can record and stream video meetings, such as organization-wide announcements, training sessions, and meetings, to be shown to a wide audience at a time that is most convenient for viewers. You can also use your video endpoint as a recording solution to share video messages with staff and customers.

Cisco recommends running your video collaboration traffic over an IP network rather than a public ISDN network as another way to efficiently use the resources of the existing network foundation. A properly designed and engineered IP network can reduce the operating costs of an organization when additional technologies are successfully deployed.

Video Endpoint Design Models

The Cisco SBA collaboration design includes several video endpoints that are used within your organization. Depending on your endpoint choice, there are different video applications that are used.

If your organization has immersive endpoints, it is recommended that you use the following video applications:

- Unified CM for call control
- Cisco TelePresence Server for conferencing
- Centralized deployment model

The immersive endpoint configuration details are covered in *Cisco SBA—VCS and UCM Video Integration Deployment Guide*.

If your organization has multipurpose endpoints, it is recommended that you use the following video applications:

- VCS Control for call control
- Codian MCU for conferencing
- Centralized deployment model

The SIP multipurpose endpoint configuration details are covered in *Cisco SBA—SIP Video Using VCS Deployment Guide*. The H.323 multipurpose endpoint configuration details are covered in *Cisco SBA—H.323 Video Using VCS Interworking Deployment Guide*.

Table 3 - Video endpoint design models

	Immersive	Multipurpose
Unified CM	Yes	No
TelePresence Server	Yes	No
VCS Control	No	Yes
Codian MCU	No	Yes
Centralized	Yes	Yes

Web Conferencing

In the global economy, organizations require new ways of doing business. It is simply not feasible to travel to all locations to meet prospects, customers, fellow executives, and colleagues. It is inefficient and expensive, and it hampers productivity. Many organizations are global operations, with distributed workforces, worldwide clients, and around-the-clock customer support. When the workday ends in one part of the world, it is just beginning on another continent. Increasingly, workers are trading cubicles at headquarters for remote offices, mobile workplaces, and virtual rooms. Travel budgets continue to shrink while the need to work collaboratively with global teams continues to amplify. These new global realities can be challenging, but they also bring tremendous opportunities.

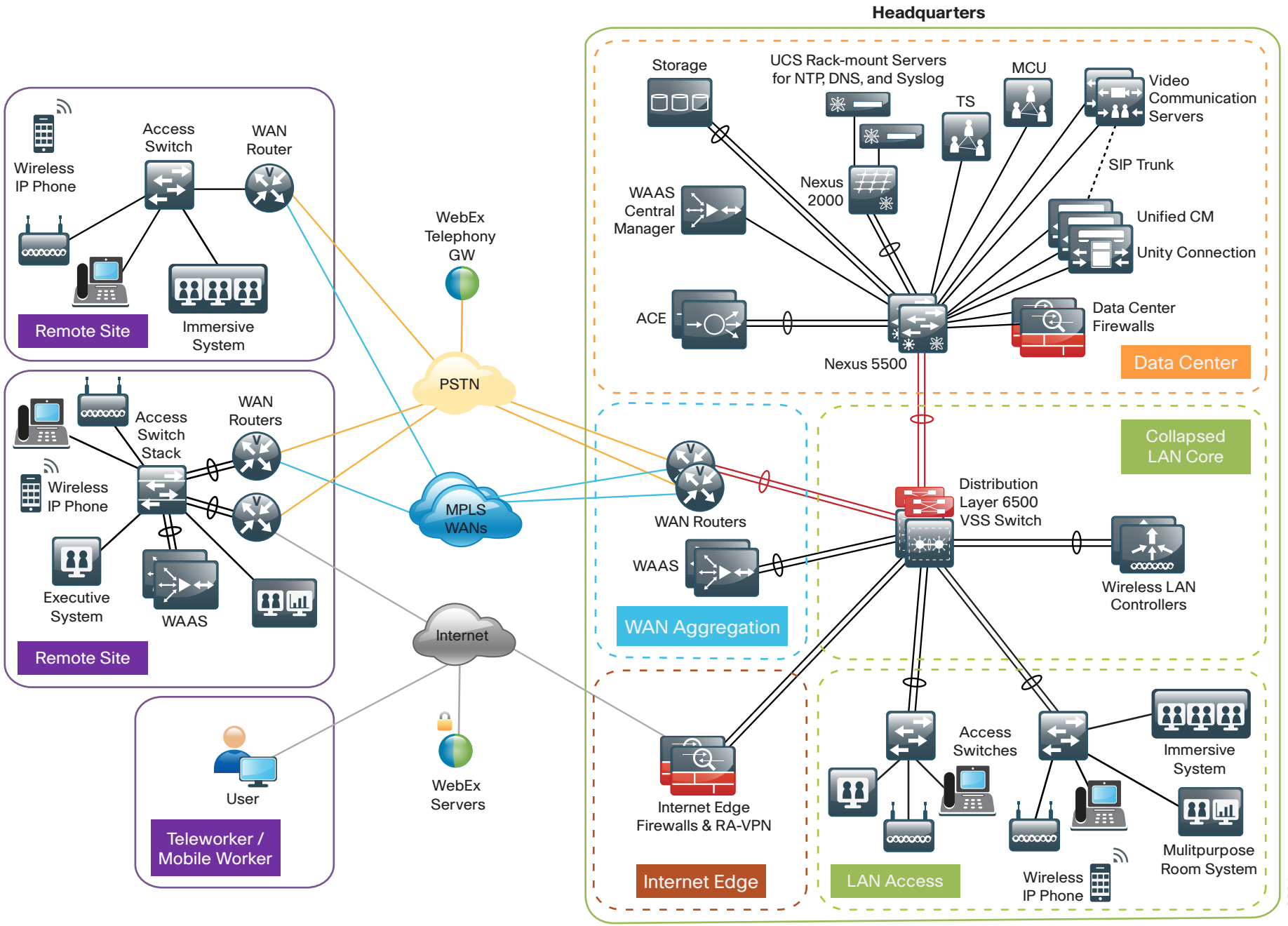
Cisco WebEx conferencing technology enables people to share and collaborate on content in real time over the Internet. Cisco web conferencing applications include interactive features that allow the meeting to function similarly to traditional in-person meetings.

The following are benefits of using Cisco WebEx conferencing technology:

- Scalable on-demand from two to thousands of attendees
- Accessible internally and externally to the organization
- Available over large geographic regions
- Cost-effective
- Easy to use and does not require special equipment or training

Cisco WebEx solutions are delivered on-demand as software as a service (SaaS). Cisco hosts, maintains, upgrades, and supports these applications on its own infrastructure. To access and use Cisco WebEx web conferencing, all you need is a browser and an Internet connection. SaaS delivery gives you the ability to build a full-scale collaboration strategy with minimal IT investment, reducing the workload on your operations team, maximizing ROI, and lowering the cost of ownership. SaaS also makes it easy to scale Cisco WebEx to as many sites, projects, or lines of business as necessary.

Figure 5 - Network architecture baseline with Cisco WebEx, video collaboration, and unified communications deployed



Cisco WebEx Architecture

To allow access to web meetings from almost anywhere, the Internet provides the "first-mile/last-mile" connection to Cisco WebEx online meetings. However, after that connection is made, the Cisco WebEx Collaboration Cloud manages synchronous real-time interaction. The WebEx Collaboration Cloud is a purpose-built, global, carrier-class network that carries only WebEx user traffic. Because it overlays the public Internet, the WebEx Collaboration Cloud optimizes performance, delivering real-time media traffic in the most efficient manner possible.

The Cisco WebEx Collaboration Cloud determines which point of presence has the lowest latency and offers the best performance. Cisco also provides a backup site physically located in a geographically distant Cisco WebEx data center. In the unlikely event that a customer's primary site is unavailable, Cisco WebEx Global Site Backup (GSB) automatically and transparently switches all meeting activity to the backup site. Cisco WebEx GSB also provides full availability during planned events, such as maintenance windows or service updates. This helps to ensure the highest service availability and makes it possible for Cisco WebEx services to operate continuously without affecting customer meeting activity.

Cisco WebEx Meeting Center

Cisco WebEx Meeting Center is the all-around web-meeting application solution that fits the needs of the majority of organizations. WebEx Meeting Center allows you to meet online with customers, partners, and suppliers as easily as if you were face to face. It allows you to schedule meetings in advance or start an instant online meeting and invite people to join you by email, text message, or IM. Also, it allows you to deliver presentations or share anything on your screen with remote colleagues or customers.

With Cisco WebEx Meeting Center, not only can you conduct meetings, but you can also provide training and conduct events. You will reach more people in less time and save the travel and costs associated with traditional on-site training and events. However, you may need additional capabilities that are not provided in Meeting Center. Cisco WebEx Training Center and Event Center provide all the capabilities of Meeting Center, plus additional features to accommodate training or events.

Cisco WebEx Training Center

Cisco WebEx Training Center allows for up to 1000 participants to attend the training, with integrated registration and support for payments. It has break-out sessions, hands-on lab functionality, and integrated testing. WebEx Training Center also supports learner registration, tracking, and reporting, along with Cisco Prime LAN Management Solution integration.

Cisco WebEx Event Center

Cisco WebEx Event Center can scale up to 3000 attendees. Because events are more unidirectional, WebEx Event Center's interfaces are simplified for attendees and presenters to have more capabilities to control audience participation. Leads from the event can be tracked, and integrated payment support is included. It supports a simplified attendee view, and attendees can be kept anonymous. For large events, it features threaded Q&A, prioritized Q&A, attention indicator, private chat, and instant feedback icons.

Reader Tip

For a more detailed comparison of Cisco WebEx products, see the following:
http://www.cisco.com/en/US/prod/ps10352/product_comparison.html

Design Guide Summary

Whether it is voice, video, or data, information is a critical asset that determines how well an organization runs. In the past, organizations have struggled with networking products because they were complex and difficult to deploy, use, and manage.

Cisco SBA is composed of three primary modular, yet interdependent, layers. They are the network foundation, network services, and user services, with the interdependency being hierarchical—each component relies on the component below. For dependable delivery of business applications and services, both internal and external to an organization's physical location, these three layers must work in a cohesive manner. If they don't work smoothly, voice, video, and data can be compromised, placing the organization's communication at risk.

Cisco SBA offers a prescriptive design. The following collaboration guides are available:

- The *Cisco SBA—Collaboration Telephony Using Cisco UCM Deployment Guide* and *Telephony Using Cisco UCM Configuration Files Guide* provide step-by-step guidance and instructions for deploying telephony solutions.
- The *Cisco SBA—Collaboration SIP Video Using VCS Deployment Guide*, *H.323 Video Using VCS Interworking Deployment Guide,* and the *VCS and UCM Video Integration Deployment Guide* provide step-by-step guidance and instructions for deploying video solutions.
- The *Cisco SBA—Collaboration Help Desk Using UCCX Deployment Guide* provides step-by-step guidance and instructions for deploying contact center solutions.
- The *Cisco SBA—Collaboration On-Premises IM Using Cisco Jabber Deployment Guide* provides step-by-step guidance and instructions for deploying instant messaging and presence solutions using Cisco Jabber clients for Windows, iPad, and iPhone.

Most of the work is done for you. Cisco has simplified the process while maintaining the intelligence built into every product; each specifically selected and tested for your organization. Deploying the Cisco SBA platform helps provide a stable, secure, and scalable network services infrastructure to safeguard the future health of your business.

Notes

Appendix A: Changes

This appendix summarizes the changes to this guide since the previous Cisco SBA series.

- We added scaling options for Unified CM.
- We added design models for video endpoints.
- We added information on Cisco Unified CM IM and Presence.
- We added information on Cisco Jabber.
- We updated the medianet sections.

Notes

Feedback

Please use the feedback form to send comments and suggestions about this guide.

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