

Cisco Service Provider **Business Voice Solution**

Service provider managed voice services, based on Cisco IP Communications, delivered over a common infrastructure to enterprises and small and medium-sized businesses (SMBs)

Executive Summary

Service providers are actively seeking new, high-margin revenue streams, both to capitalize on their packet networks and to reduce customer churn. The most profitable voice and data services share two attributes. One is a “success-based” capital expenditure (CapEx) model, which accelerates return on investment (ROI) because the service provider makes the majority of capital investment after acquiring the customer, instead of committing to a significant investment before realizing any revenues. The other attribute is a quality of service (QoS)-enabled IP infrastructure that the service provider can use to deliver multiple services, thereby increasing revenue per customer over time with little incremental investment.

To address these new business imperatives, Cisco Systems® has developed the Cisco Service Provider Business Voice Solution. It provides Cisco IP Communications products that service providers can use to deploy a voice-over-IP (VoIP) infrastructure that delivers a portfolio of revenue-generating, managed business voice services to subscribers. By providing managed services, service providers can transform a business customer’s transition to IP telephony from a complex technology decision to a simple business decision.

The Cisco SP Business Voice Solution consists of a VoIP network infrastructure, several customer premises equipment (CPE) deployment options for enterprises and small and medium-sized businesses (SMBs), and network management solutions. Service providers can tailor the solution to individual customer needs by offering a choice of deployment options for call control, applications, and management for various company locations. For example, call control and applications servers can reside either at the customer premises or in the service provider’s data center or central office, and the customer can either out-task management or manage voice services in-house.

The service provider revenue opportunity from managed business voice services is significant—industry analysts project more than \$10 billion of service provider revenues in the United States, and up to 7.4 billion euros in Europe, by 2007. And not only are business voice services a source of new revenue streams, but they also present an opportunity for service providers to enter new markets. For example, traditional voice service providers can use the Cisco SP Business Voice Solution to begin providing converged voice and data



network services to their enterprise customer bases. Managed IP data network service providers can overlay managed voice services onto their QoS-enabled networks. And system integrators and outsourcing organizations can add voice services to their outsourced services portfolios.

This solution overview explains the market drivers contributing to the business voice services opportunity, a description of business voice services, the benefits of the solution to service providers and their enterprise and SMB customers, and the solution architecture.

Market Drivers for Out-Tasked Voice Services

The current business climate makes business voice services an attractive business strategy for enterprise customers and, therefore, a profitable service opportunity for service providers. The following trends are spurring the adoption of out-tasked business voice services.

Growing Enterprise Adoption of IP Telephony

IP telephony is gaining popularity while traditional private branch exchange (PBX) and key systems are in decline. With a compound annual growth rate (CAGR) exceeding 35 percent, IP PBXs are projected to exceed one-half of all PBX line shipments by 2004¹. The increase in IP PBX deployments is influencing the carrier VoIP network market. For example, by 2005, enterprise VoIP traffic will exceed both wholesale and consumer markets in terms of total minutes². This explosion in enterprise demand for IP telephony deployments creates an incentive and opportunity for service providers to implement VoIP technologies at both the customer edge and within their network core.

The surging rate of adoption of IP telephony in the enterprise is primarily attributable to two reasons. IP telephony increases productivity by enabling new converged voice and data applications such as corporate directory, unified messaging, IP call-center applications, and extension mobility.

Cost reduction is the second important driver. In a Meta Group survey, more than 70 percent of enterprise customers said they expected that converging their voice and data networks would enable them to realize moderate to substantial savings. Specifically, customers indicated that IP telephony reduces costs by:

- Enabling inter-site toll bypass
- Consolidating previously separate WAN links and wiring for voice and data
- Simplifying moves, adds, and changes
- Increasing the ease of remote site support
- Reducing real-estate costs by making it possible for more employees to telecommute

1. Phillips InfoTech, 2002

2. Frost & Sullivan, 2002



Growing Interest in Out-Tasking

Though enterprises recognize the compelling business benefits of a converged network for IP telephony and data, some have hesitated to migrate because of initial investment costs and perceived technical complexities. Those who hesitate typically cite the following investment concerns with implementing their own IP telephony solutions:

- Telephony is a tool, not the company's core competency—Why invest time and money in specialized resources to support new technology outside the core business?
- Unwanted CapEx—Why take on the economic burden of owning an IP telephony system instead of continuing current TDM PBX leasing or Centrex service subscription practices?
- Fear of obsolescence—How can the company keep up with rapidly changing technology while protecting its investment? Why continuously invest in staff retraining?
- Unpredictable operational expenditures (OpEx)—Why shoulder the costs of owning and maintaining the telephony system instead of enjoying predictable monthly costs and “pay as you grow” scalability?

These roadblocks to a “roll your own” IP telephony solution have created a significant opportunity for service providers to use their core business strengths to meet the needs of motivated customers. The service provider relieves business customers of technical concerns by making the required investments in network infrastructure and customer support to deliver services in a scalable, manageable, highly available, and flexible “utility-like” fashion.

According to research conducted by Ovum, Gartner Group, and Probe Research, the total available market for managed business voice services is expected to exceed \$10 billion by 2007 in the United States alone. Analysys Research forecasts the European market for IP voice services could reach 7.4 billion euros by 2007.

Cisco validated these forecasts by surveying more than 500 enterprise customers in the United States and Europe about their network service priorities. More than 50 percent planned to adopt IP telephony, and 28 percent of those customers said they planned to out-task IP telephony management to a service provider. Enterprises routinely cite the following reasons for out-tasking:

- Freeing existing resources to focus on the company's core competencies
- Eliminating the risk of obsolescence
- Reducing OpEx by avoiding hiring specialized resources
- Trading variable telecommunications costs for predictable monthly costs and “pay as you grow” scalability
- Simplifying and reducing risk in migration to IP telephony

Service Provider Opportunity

The combination of surging enterprise demand for IP telephony and the interest in out-tasking creates a significant revenue opportunity for service providers. By offering managed business voice services, service providers can capitalize on their customers' business needs and generate new revenue streams.

The opportunity fits service provider needs, as well. As simple voice transport becomes a commodity, service providers need high-margin, “sticky” services such as business voice services to sustain profitability and differentiate themselves. The need has become urgent as carriers continue to experience a decline in Centrex and other traditional sources of voice revenue. For example, Probe Research found that when a major university implemented an IP PBX solution, its incumbent carrier saw monthly Centrex revenue decrease from \$40,000 to \$6,000. Leading service providers are looking to managed voice services as a counter-measure to eroding transport revenues.



The revenue opportunity for service providers likely will grow with time because IP telephony offers service providers the potential to provide out-tasked services not possible with legacy TDM PBXs. These include advanced IP application services such as unified messaging, IP conferencing, and IP call-center services. By offering advanced IP application services, service providers can earn higher average revenue per user (ARPU) and improve customer retention.

Business Voice Services

The Cisco SP Business Voice Solution enables service providers to capitalize on enterprise adoption of IP telephony by offering managed business voice services to multiple business customers over a shared infrastructure. The solution enables service providers to offer a comprehensive portfolio (Table 1).

Table 1 Business Voice Services Portfolio

Business Voice Services Description
Business phone Provides IP subscriber and group calling features, such as paging, intercom, three-way conferencing, hunt groups, call forwarding, and call transfer on a range of CPE, including Cisco CallManager, Cisco CallManager Express, remote IP phones, and even legacy TDM PBXs with a VoIP CPE gateway.
Site-to-site voice Enables a subscriber to use the service provider's VoIP infrastructure for toll bypass among its distributed sites and branches. With this service, an enterprise can preserve its custom dial plans and acquire new features such as abbreviated extension dialing.
Public switched telephone network (PSTN) Access Connects all enterprise branches and sites to the PSTN, either using the service provider's VoIP infrastructure or a VoIP gateway on the customer premises.
Unified Communications Delivers unified messaging services (voice mail, e-mail, fax, and find me/follow me) as managed services, allowing end users to decide how they choose to receive messages. The solution can be deployed at the customer premises or reside in the service provider's network.
Remote Network Operations Provides management of customers' IP telephony CPE and networks, including remote fault monitoring; performance management; configuration; and moves, adds, and changes.

The service provider can offer any combination of business voice services to meet the needs of customers that range from single-office small businesses to highly distributed enterprises. The flexibility of the Cisco SP Business Voice Solution architecture will also enable service providers to capitalize on emerging revenue opportunities from managing enhanced IP applications. These include custom IP phone Extensible Markup Language (XML) applications and IP customer contact services, IP conferencing, and others.



Service Provider and Enterprise Benefits

The Cisco SP Business Voice Solution delivers measurable benefits to enterprise customers and service providers.

Enterprise Benefits

Enterprises adopt IP telephony to reduce costs and increase productivity; they out-task to focus on the core business, reduce costs, and gain access to specialized expertise and support. Service providers can attract customers for their business voice service offerings by emphasizing the following benefits:

- Frees in-house staff to focus on core business—By out-tasking, the enterprise customer avoids the need to manage equipment and add operations staff, freeing in-house staff to focus on strategic projects.
- Reduces total cost of ownership (TCO)—Reductions in capital and operating expenses result from:
 - Reduced staffing and equipment requirements
 - Savings on inter-site and PSTN long-distance calls
 - Reduced network expenses related to WAN and application management
 - Simplified vendor management for multiple network services
 - Faster deployment of new IP-based applications
- Enhances productivity—All locations—headquarters as well as remote offices—can take advantage of the same productivity applications and features, including integrated IP applications and a uniform dial plan.
- Increases flexibility and scalability—Companies can take advantage of the inherent scalability and geographic reach of the service provider's infrastructure to add any number of users, at any number of sites (up to thousands), at any time.
- Increased reliability—Enterprises can use the service provider's carrier-grade network, which is designed for resilience and superior voice quality, and supports guaranteed service-level agreements (SLAs).

Service Provider Benefits

The Cisco SP Business Voice Solution helps service providers become more profitable in the following ways:

- Offers TDM-based business subscribers a migration path to IP—Increasingly, enterprise customers require that their service providers offer a migration path from TDM to IP so that they can take advantage of converged voice and data services. Because the Cisco SP Business Voice Solution supports legacy TDM PBX interworking with IP telephony, service providers can attract customers by offering them the option to migrate to IP telephony at the rate they choose, and on a site-by-site basis. The service provider can address the needs of different size companies; the Cisco SP Business Voice Solution supports multiple IP telephony CPE deployment options.
- Differentiates from the competition—By offering business voice services, carriers can differentiate themselves from other service providers, reduce customer churn, and attract new customers.
- Generates increasing ARPU over time—Revenue per user tends to actually increase over time, because satisfied customers are likely to subscribe to additional business voice services as well as to out-task additional IP data networking services to the service provider. For example, a customer that initially opts for voice VPN services for intra-enterprise call routing might later outsource full fault, configuration, accounting, performance, and security (FCAPS) management of its Cisco CallManager application, as well as its IP telephony LAN infrastructure. The service provider can further increase ARPU by delivering additional managed enhanced IP application services such as unified messaging and IP call center services.



- Provides high margins and rapid ROI—The solution represents a “success-based” CapEx model. The service provider accelerates ROI by making the majority of capital investment after actually acquiring the customer—not in anticipation of future revenue streams. Furthermore, the service provider is capitalizing on ongoing investments in IP telephony by its enterprise customers.
- Provides investment protection—The solution provides investment protection by supporting multiple standards-based protocols, such as H.323, Session Initiation Protocol (SIP), and Media Gateway Control Protocol (MGCP). This flexibility enables the service provider to adopt new technologies as business needs evolve. In addition, the modularity of the solution enables the service provider to add new services as they become available, using the same infrastructure for continually increasing revenue streams.
- Opens doors to new markets—Because it combines voice, IP, and management services, the Cisco SP Business Voice Solution gives any service provider with a core competency in one of these three areas a foothold into the others. A carrier with a core competency in TDM voice services can use the Cisco SP Business Voice Solution as an entry into other Internet and data services. Managed data network service providers can introduce IP telephony services as an overlay option. IP carriers can begin offering voice in addition to data. Telecommunications service providers can use business voice services to establish themselves as trusted IT partners and to expand their packet-based services portfolios. Traditional out-tasking organizations can branch out into IP telephony, and IP data providers can begin offering voice services.

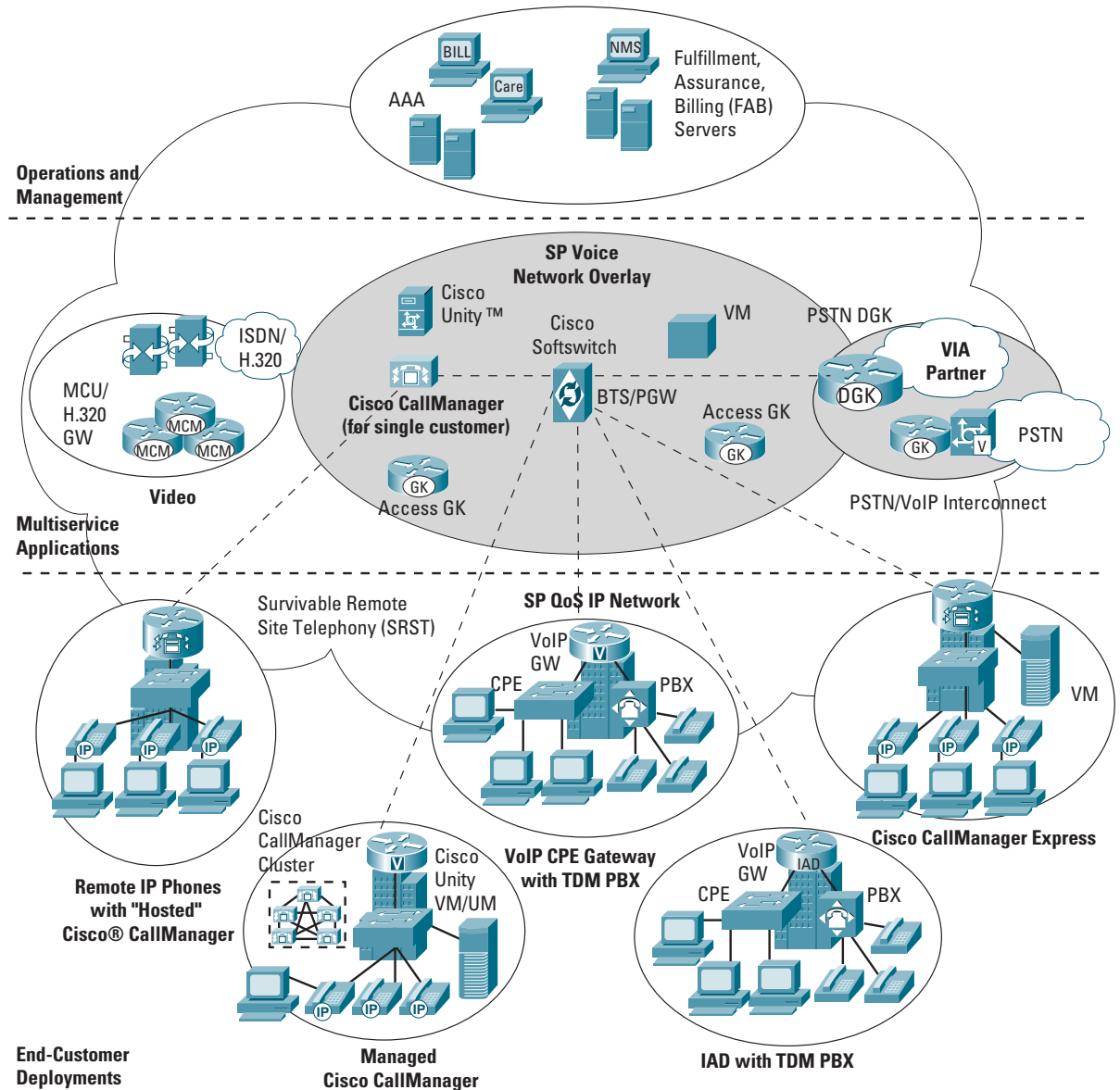
Cisco SP Business Voice Solution Architecture

The Cisco SP Business Voice Solution architecture provides a single infrastructure for the service provider to deliver business voice services to SMBs and large enterprise customers. The solution architecture uses either an IP or Multiprotocol Label Switching (MPLS) core network and comprises the following (Figure 1):

- A set of end-customer deployment options
- Network-based multiservice applications
- A comprehensive portfolio of operations and management tools providing fulfillment; assurance; billing; authentication, authorization, and accounting (AAA) security services; and interfaces to operations support system (OSS) applications



Figure 1 Cisco SP Business Voice Solution High-Level Architecture



End-Customer Deployment Options

The Cisco SP Business Voice Solution provides flexible customer deployment options to meet the widely varied needs of both SMB and enterprise customers. To provide a stepped migration from a legacy TDM PBX to an IP infrastructure, the service provider can deploy a VoIP gateway for TDM-to-IP conversion. When the customer is ready to swap out the TDM PBX for Cisco CallManager, the service provider can continue to use the VoIP gateway in the new, all-IP infrastructure.



Whether for legacy PBX replacement or “greenfield” installations, the service provider can deploy either Cisco CallManager or Cisco CallManager Express:

- Cisco CallManager—Cisco CallManager is recommended for company headquarters or large branch offices with more than 100 stations delivering IP telephony services to employees. Cisco CallManager can be managed by the service provider, and deployed either on the customer premises or within the service provider’s data center and dedicated to a single customer. Whether deployed at the customer site or the service provider’s network, the Survivable Remote Site Telephony (SRST) feature of the Cisco IOS® Software on the customer router provides network resiliency. If connectivity is lost between an enterprise site and the centralized Cisco CallManager cluster, the SRST-enabled router at the remote site assumes control, providing telephony services to IP phones as well as local connectivity to the PSTN.
- Cisco CallManager Express—Cisco CallManager Express provides voice features comparable to an IP key system, and is recommended as a turnkey, bundled voice and data offering for offices with fewer than 120 users. The deployment consists of a data access router with the Cisco CallManager Express feature enabled, Cisco IP phones, and Cisco LAN switches with in-line power. In many cases, customers that previously used an access router for data connectivity can upgrade it with Cisco CallManager Express to support managed voice services as well. If an SMB customer or a small site of a large enterprise initially deploys Cisco CallManager Express and then later outgrows it, the customer can redeploy the Cisco CallManager Express router as an SRST router. This flexibility provides investment protection for the service provider and the end customer.

IP Transport

IP connectivity is required between the service provider and the end customer. Depending on the customer type, service providers can deliver IP connections using either MPLS or “IP in the clear.” The Cisco SP Business Voice Solution allows service providers to deploy services using either or both of these models. Some features require the IP network to support the delivery of multicast traffic. Using Cisco’s extensive experience in transporting IP traffic, the Cisco SP Business Voice Solution provides the necessary carrier-grade features to allow service providers to meet SLA requirements with customers. End-to-end QoS guarantees that delay-sensitive signaling, voice, and video traffic will not be affected by delay-insensitive data traffic.

Multiservice Applications

With the Cisco SP Business Voice Solution infrastructure in place, the service provider can deliver any combination of voice, video, and data applications. To deliver voice services, a Cisco softswitch performs call routing between enterprise locations and between enterprise locations and off-net resources. The primary function of the Cisco softswitch is to support private and abbreviated dialing plans that potentially overlap between different business subscribers. Therefore, when routing calls, the softswitch first identifies the source of the call, and then applies the appropriate routing table to determine the final destination.

In addition to providing call routing, the Cisco softswitch platform also provides call control and signaling interconnectivity to the PSTN for the service provider. The softswitch is modular—functions can reside on a single platform or be distributed throughout the network. Capitalizing on the widely deployed, field-proven Cisco Voice Infrastructure and Applications (VIA) architecture, the Cisco SP Business Voice Solution supports channel associated signaling (CAS), Primary Rate Interface (PRI), and Signaling System 7 (SS7) signaling types on T1, E1, and T3 connections for global PSTN connectivity.



The service provider can offer voice mail and messaging either as a managed customer-premises solution or a network-based solution.

Operations and Management

The operations and management function of the Cisco SP Business Voice Solution enables the service provider to provision, monitor, maintain, and troubleshoot voice applications for its enterprise and SMB customers, taking advantage of tools and applications from Cisco and its partners. A comprehensive, off-the-shelf network management portfolio provides service fulfillment, assurance, billing, and AAA security services:

- Service fulfillment includes provisioning of dial plans and other voice-related features, network device inventory, configuration file management, and device image management.
- Service assurance for IP telephony services includes monitoring IP telephony network faults and threshold crossing alerts, troubleshooting network and device problems, collecting performance statistics for historical reporting and trend forecasting, and data collection for measuring compliance with SLAs.
- Billing and mediation applications are provided by Cisco billing partners. Billing plans can be time- and destination-based, flat rate, or a combination.
- Cisco delivers a comprehensive portfolio of advanced network security solutions for secure connectivity, including extended perimeter security, intrusion protection, identity management, and security management.

In addition, standard interfaces allow integration of the Cisco SP Business Voice Solution with customer-relationship-management systems, trouble-ticketing systems, and other OSS applications.

Carrier-Grade Attributes

The value proposition of top service providers around the world includes high QoS metrics guaranteed by SLAs, security of the network and its traffic, and overall network availability and fault tolerance. The technology to achieve these goals must be integrated into different aspects of the solution. Network resiliency, for example, requires the proper combination of topology, platform, traffic engineering, and protocols.

The Cisco SP Business Voice Solution delivers network and service reliability with the following design attributes:

- Component redundancy—Ensures availability in the event of component failure with backup or duplicate hardware, as well as operational processes such as keeping spare components on hand.
- Network link redundancy—Provides alternate physical pathways through the network in case one pathway fails. With smaller customer deployments, where redundant IP links may not be cost effective, local PSTN connections can be used for voice backup and E911.
- QoS—Ensures that delay-sensitive traffic receives priority through the use of class of service (CoS), low-latency queuing (LLQ), Weighted Random Early Detection (WRED), traffic shaping, and Network-Based Application Recognition (NBAR). Eliminates customer concerns about voice and data bandwidth contention on a converged network.
- Security—Addresses security issues for IP-based voice and data services, including Network Address Translation (NAT) and firewall issues, intrusion detection and denial-of-service (DoS) attacks, theft of service and identity, and secure access to the voice-mail server and management applications.



- Manageability—Simplifies manageability for the service provider with features such as fault monitoring and problem detection, troubleshooting, ongoing dial plan management, low-touch deployment for remote sites, and performance monitoring. Provides flexible options for billing, logging, and reporting, to integrate with the service provider’s current accounting practices.

Solution Components

The Cisco SP Business Voice Solution consists of a tested and validated combination of the market-leading Cisco AVVID (Architecture for Voice, Video and Integrated Data) IP telephony solutions, service provider carrier-class packet voice products and solutions, and solutions from key Cisco Ecosystem Program partners. Table 2 lists the solution components.

Table 2

Location	Component	Cisco Products
Customer premises	Customer edge routers	Cisco 1751-V*, Cisco 1760*, Cisco 2600XM*, Cisco 2651*, Cisco 2691*, Cisco 3600* Series, Cisco 3700* Series, Cisco 7200 Series, or Cisco 7500 Series routers <i>*Routers marked with an asterisk, except Cisco 3620, support Cisco CallManager Express</i>
	Enterprise call processing	Cisco CallManager software for large enterprises, residing on the Cisco 7800 Series Media Convergence Server Cisco CallManager Express, a Cisco IOS Software-based telephony service for SMBs with less than 120 phones Cisco Survivable Remote Site Telephony (SRST), a feature of Cisco IOS Software that provides backup if the WAN link to the remote Cisco CallManager goes down
	Voice gateway	Cisco Catalyst® 6000 Series, Cisco Catalyst 4000 Series
Central office	PSTN gateways	Cisco AS5350, AS5400, and AS5850 universal gateways Cisco MGX® 8000 Series voice gateways Cisco 3660 routers
	Edge routers	Cisco 7200 and 7500 series routers
	Call routing and PSTN signaling	Cisco PGW 2200 Softswitch Cisco BTS 10200 Softswitch



Table 2

Location	Component	Cisco Products
	Management tools	Fulfillment: Cisco Packet Telephony Center VS Cisco Voice Services Provisioning Tool Cisco Packet Telephony Center Monitoring and Troubleshooting Partner-based Cisco CallManager activation and provisioning Assurance: Cisco Info Center NetIQ Vivinet Manager Cisco CNS Performance Engine Billing: Primal Access IM Mind CTI MEIPSs Cisco Billing and Measurement Server (BAMS)
	Security	Cisco PIX® firewalls Cisco IOS Firewall

Why Cisco?

The leader in IP telephony, Cisco offers a complete end-to-end solution that enables service providers to profitably deploy business voice services. Cisco offers service providers the following advantages:

- Market leadership in enterprise converged networking—More enterprise customers have built their LAN networks with equipment from Cisco than from any other vendor. These existing Cisco customers can easily upgrade their LAN infrastructures to support IP telephony. Synergy Research reports that Cisco is first in worldwide IP phone and LAN telephony revenue, and Infotech ranks Cisco CallManager as first in IP PBX shipments. Therefore, service providers that deploy the Cisco SP Business Voice Solution gain access to the largest available market—not only for business voice services, but also for other high-margin managed voice and data services that can be deployed on the same infrastructure.
- Technology leadership—The Cisco SP Business Voice Solution offers an unmatched feature set, scalability and high availability, and legacy TDM and IP interworking—and complies with open standards. Service providers can base their managed service offerings on a platform that helps them remain competitive. Cisco has deployed the largest and most complex VoIP networks in the world at more than 6,000 customer sites over the past five years. And Cisco has deployed IP communications internally to its global workforce of 35,000 employees.
- Reduced risk— The Cisco SP Business Voice Solution was explicitly designed to reduce risk. Business voice solutions:
 - Are delivered via a tested and validated combination of Cisco AVVID IP telephony solutions, service provider carrier-class packet voice products and solutions, and Cisco Ecosystem Program partners
 - Provide a greater return on CapEx than traditional TDM voice services; several revenue-generating, enhanced services can be deployed on a common IP network infrastructure

- Commitment to managed services—Cisco has gained invaluable experience and expertise by offering IP telephony and converged services to enterprise customers. Now Cisco is using its unique knowledge base to create new revenue opportunities for its service provider partners.
- Ready access to skilled resources—Cisco’s extensive sales and support staff and its reseller channel for converged voice and data solutions give service providers access to an unparalleled skilled resource base for accelerated market penetration. Cisco IP telephony reseller partners can help the service provider extend its sales reach, and also support the installation and configuration of the service provider’s business voice services.

- Comprehensive product portfolio—Service providers that choose Cisco can work with a single source to obtain all necessary enterprise and carrier network solution components.
- Proven solution—Cisco has validated the capability and performance of the SP Business Voice Solution with multiple service provider partners—not just in the lab.

To learn more about the Cisco SP Business Voice Solution and other managed services solutions, visit:

<http://www.cisco.com/go/telephony>



Corporate Headquarters
 Cisco Systems, Inc.
 170 West Tasman Drive
 San Jose, CA 95134-1706
 USA
www.cisco.com
 Tel: 408 526-4000
 800 553-NETS (6387)
 Fax: 408 526-4100

European Headquarters
 Cisco Systems International BV
 Haarlerbergpark
 Haarlerbergweg 13-19
 1101 CH Amsterdam
 The Netherlands
www-europe.cisco.com
 Tel: 31 0 20 357 1000
 Fax: 31 0 20 357 1100

Americas Headquarters
 Cisco Systems, Inc.
 170 West Tasman Drive
 San Jose, CA 95134-1706
 USA
www.cisco.com
 Tel: 408 526-7660
 Fax: 408 527-0883

Asia Pacific Headquarters
 Cisco Systems, Inc.
 Capital Tower
 168 Robinson Road
 #22-01 to #29-01
 Singapore 068912
www.cisco.com
 Tel: +65 6317 7777
 Fax: +65 6317 7799

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