Solution Overview

Smoothing the Transition to IP Communications

Converged networks that use IP to send data, voice, and video across a single network channel help enable greater collaboration, simplify network management, and reduce operating costs. For users, converged communications hold the promise of greater productivity, flexibility, convenience, efficiency, and network security, at lower cost. IT organizations, while recognizing there are substantial cost and convenience benefits, are more cautious about embracing these new technologies when they consider their resource load, the complexity of the integration tasks, and the risk.

IT managers must maximize return on capital investments and minimize operating expenses while delivering fundamental business productivity services. Network consolidation tends to make managing and deploying converged communications services easier and simpler. The migration process, however, can overwhelm already scarce capital and human resources. In the face of this challenge, organizations are increasingly turning to service providers with expertise, infrastructure, and resources that can be used to reduce deployment time and complexity.

The purpose of this document is to inform technical decision makers about alternatives that can help smooth the transition to IP Communications technology.

Reducing Deployment Time to Accelerate Benefits

Challenge

In today's fast-paced business environment, technology executives must do more and better with less. Lowering the total cost of ownership (TCO) is critical. They are also concerned about serving their lines of business more effectively, maximizing the value of their current investments, and helping the organization meet its strategic goals.

Technology executives and their organizations face the following challenges:

- Stringent resource and budget constraints
- Rising expectations to deliver 24-hour reliability to a worldwide user and customer base

IT managers developing strategic vision are skeptical whether newly emerged infrastructure solutions, processes, and tools have been put to the test of keeping converged networks up and performing day and night on an enterprisewide basis. Their areas of concern include:

- **Quality of Service (QoS)** – This refers to the capability of the network to provide better service to selected network traffic over various technologies, including Frame Relay, ATM, Ethernet and 802.1 networks, SONET, and IP-routed networks that use any or all of these underlying technologies. The purpose of QoS technologies is to provide traffic priority including dedicated bandwidth and controlled jitter and latency, which are required by some real-time and interactive traffic, while maintaining the integrity of traffic on the other paths. QoS technologies control and predictably service a variety of networked applications and traffic types for converged business applications in campus, wide-area, and service provider networks.

- **Reliability** – Network reliability, availability, and serviceability are more important than ever in today's 24-hour, global business environment. The cost of downtime, even planned downtime for maintenance, can be prohibitive.

- **Network security** – The central challenge for most IT organizations is to extend and optimize their existing security environment to provide more comprehensive, integrated, and cost-effective protection. Network security used to require just a firewall as a perimeter line of defense to keep trusted users on the inside and untrusted users on the outside. But in today's business world, with a mobile workforce, a growing population of teleworkers, and the need to expand services and support flexible and secure business transactions over the Internet, the network perimeter is more difficult to define and secure, while the numbers and types of attacks, viruses, worms, and hackers continue to rise. Consolidating and strengthening network security solutions is an essential component of this effort.

- **Technical complexity** – Architectural complexity can make it extremely difficult to build a converged network. The IT infrastructure in most organizations has evolved to include multiple infrastructures to offer a range of communications services. There may be dedicated, connection-oriented voice services (for example, T1/E1), network-based Layer 2 VPNs (such as ATM or Frame Relay), and so on.

- **Phased deployment** – IT managers need solutions and processes that allow them to migrate to IP telephony at their own pace and on a site-by-site basis while still preserving consistent communications across the enterprise.

The evolution of IT infrastructure in most organizations has produced a technically dense collection of hardware and software that provides the critical services the organization relies upon, but because of its evolutionary nature, is increasingly difficult to support and maintain. Its complexity also makes it fragile.

Difficulties with existing infrastructure include the following:

- Disproportionately high maintenance time is caused by multiple servers with different configurations

- Scaling infrastructure as the business grows is expensive

- Supporting remote users with communications systems equivalent to those in the office is labor- and time-intensive

- Multiple channels need multiple network security approaches, which can be costly and can lead to gaps that are vulnerable to attack

- Network support effort consumes resources that could otherwise be focused on the business's strengths

Solution

To overcome these difficulties, organizations are increasingly seeking to transition their physically separate voice and data networks onto a single, shared transport infrastructure. The challenge is to design an economical means to unite multiple platforms, yet do so without compromising quality of either voice or data traffic.

Many successful companies now use Internet business solutions to provide superior customer service, enable market-share growth, and reduce operating costs. Voice over IP (VoIP) allows voice calls, including the digitization and packetization of the voice streams, to be carried over the same IP network as data traffic. IP telephony uses the VoIP standards and offers higher-level features such as advanced call routing, voice mail, contact centers, and so on.

Business Benefits

In addition to greatly reduced complexity, which leads to indirect cost savings through greater flexibility, increased reliability, and enhanced network security, converged networks also deliver direct cost savings.

Depending on specific customer characteristics, a significant reduction in support costs can be realized by replacing outmoded private branch exchange (PBX) environments with IP telephony technology. Traditional PBX customers usually pay providers for system hardware and software per location and per system, plus management fees and onsite fees for configuration changes (such as employee moves, adds, and modifications). IP telephony increases system deployment and support options that typically reduce total cost of ownership. They include options to effectively centralize IP telephony platforms, consolidate internal support efforts, and significantly simplify system operations including employee moves and adds that are accomplished at a fraction of the cost using an IP telephony network. Platform deployment options

can consolidate IT support requirements, providing the option to reallocate or reduce IT resources required for system support, thereby lowering overall costs.

Benefits of an IP telephony deployment include the following:

- Reduced telecommunications costs, connectivity charges, and calling charges for voice traffic within the enterprise

- Increased productivity through quick and secure access to vital business data and communications

- Increased deployment and configuration flexibility

- Simplified management and deployment of new services

- Easy scalability, suitable for all sizes of companies

- Reduced infrastructure, management, and monitoring costs

- Reduced costs for teleworkers

- Lower TCO

Options for Implementation

Organizations need a migration solution that increases productivity and is transparent to network users. They require flexibility when doing the following:

- Deploying converged communications – Organizations require options that allow the solutions to be tailored to meet an organization's unique network topology and business requirements.

- Managing converged communications solutions after deployment – They need options that allow them to scale the burden of managing the network from solely using internal resources to partially or completely integrating a managed service portfolio offered by service providers.

Managed services for IP telephony enable the enterprise to optimize system performance and offload ownership of monitoring and technically supporting applications, freeing customers' support staffs to focus on high-value projects while greatly reducing overall costs. Depending on the level of managed service that an organization decides to adopt, in-house IT resources can spend less time monitoring the network and restoring service when troubles occur and can instead focus on the strengths of the business. In addition, during the implementation phase, service providers collaborate with your IT staff to design and integrate converged network platforms and policies, further reducing or avoiding costs. Relying on a highly qualified service provider can give organizations a level of IT nimbleness and agility that can greatly enhance their competitive stance. For example, an organization can optimize its network by using a service provider's systems and expertise to ensure greater efficiencies in satisfying user demands.

Providing a phased migration from a traditional time-division multiplexing (TDM) PBX to an IP infrastructure, the service provider may deploy a customer premises equipment (CPE) VoIP gateway for TDM-to-IP conversion. When the customer is ready to exchange the TDM PBX for an IP PBX such as Cisco® CallManager, the service provider can continue to use the VoIP gateway in the new, all-IP infrastructure.

Where a traditional PBX or Key Telephony System (KTS) is being replaced, the service provider can deploy either Cisco CallManager or an "IP Keyswitch" platform such as Cisco CallManager Express. Cisco CallManager is recommended for company headquarters or large branch offices with more than 120 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. 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 customer site assumes control, providing telephony services to IP phones at the branch, as well as local connectivity to the public switched telephone network (PSTN).

Cisco CallManager Express (Figures 1 and 2) provides voice features comparable to an IP Key switch, and is recommended as a comprehensive, bundled voice and data offering for offices with fewer than 120 phone users. The deployment consists of a data-access router with the Cisco CallManager Express feature enabled, Cisco IP phones, and Cisco LAN switches with inline power. In many cases, customers who previously used an access router for data connectivity can upgrade it with Cisco CallManager Express to support managed voice services as well. If a small- or midsize-business (SMB) customer or a small site of a large enterprise initially deploys Cisco CallManager Express and then later outgrows it and migrates to Cisco CallManager, the customer can redeploy the Cisco CallManager Express router as an SRST router. This flexibility provides investment protection for the customer.

Alternatively, service providers offer network-hosted VoIP business service based upon the sophisticated IP softswitch technology integrated with Cisco IP phones such as the Cisco IP Phone 7960. The softswitch provides sophisticated and personalized Web portal capabilities and support for local and long-distance voice services along with the most commonly used features and functions of traditional voice telephone systems for establishing, maintaining, routing, and terminating voice calls. This service provides options for customers who want service providers to deliver network-hosted, VoIP business service.

Figure 1

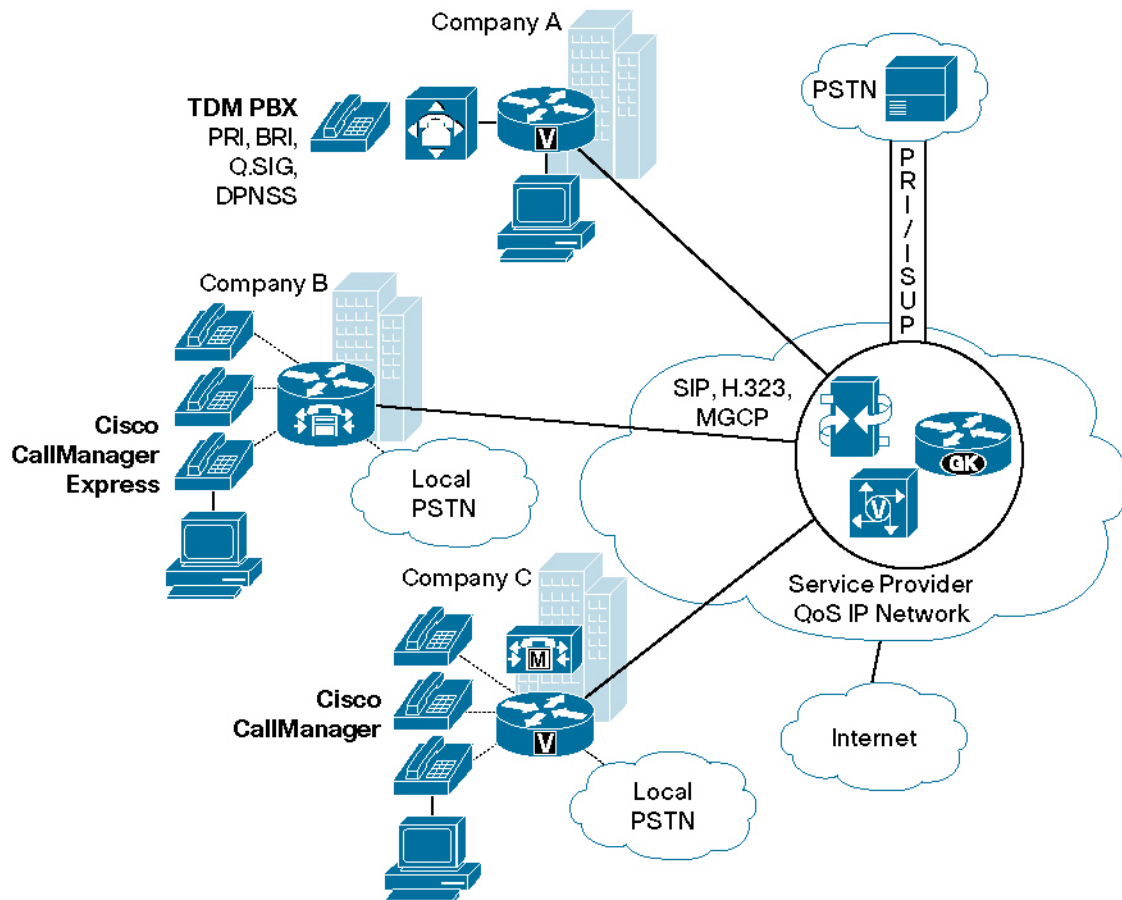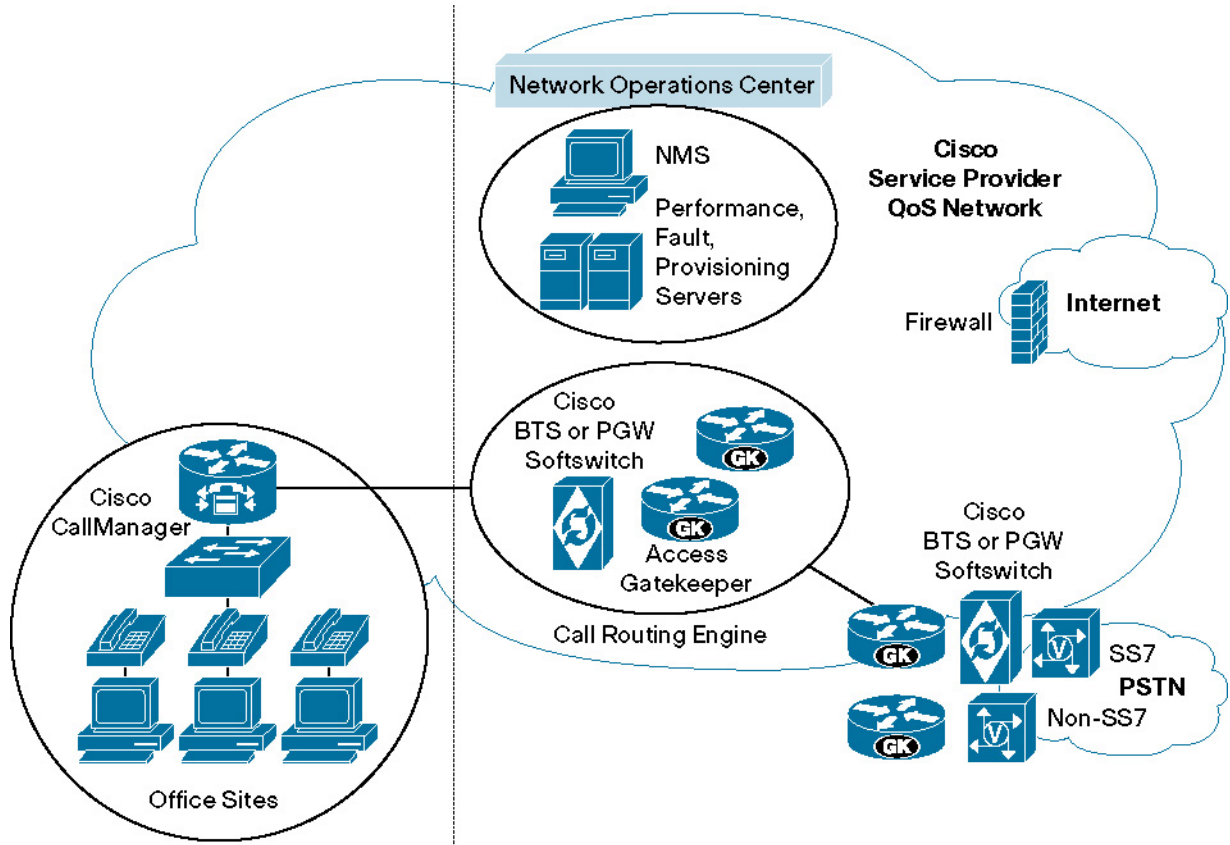Cisco CallManager and Cisco CallManager Express on Campus

Figure 2

CPE-Controlled Cable Modem and Cisco CallManager Express in a Service Provider Network

Decision Tree

To develop a deployable migration solution that maximizes existing investments and accelerates benefits, IT managers need to assess important technical factors and current communications expenses (Table 1).

Table 1. Assessing Business Requirements

Requirement	Description
Current voice communications infrastructure	• PSTN • PBX • IP PBX
Current data communications structure and usage	• T1 • ATM • Frame Relay • Layer 3
Extent of communications conducted outside of main office	• Number of remote offices • Number of mobile workers and telecommuters • Need for national and global communications • Significant usage of more than one communication medium (data, voice, and video)

Requirement	Description
Amount of business-critical information being transferred over communications networks	• Light security and monitoring required • Heavy security and monitoring required
Primary communications expenditures	• Infrastructure • Maintenance • Monitoring and management • Security • QoS • Toll charges • Service fees • Supporting offsite workers
Required service areas	• Communications (including unified communications) • Deployment and maintenance • Remote management • Planning and migration

Managed Services

Managed services that provide monitoring and management of a customer's IP Communications system allow an organization to focus its workforce, infrastructure, and IT resources on core business capabilities and strategic initiatives, while taking advantage of the expertise and advanced technologies that a reliable managed service provider can deliver. Managed services for IP Communications allow IT managers to shift their attention from solving support challenges to optimizing ongoing operations. Highly skilled and costly staff can be relieved of routine tasks such as monitoring routers and application servers, responding to system problems, or resolving carrier circuit issues, turning their attention instead to such strategic objectives as service quality, employee mobility, and new technology integration. IP Communications managed services augment managed transport networks that provide robust and monitored service 24 hours per day for greater reliability and availability, with service-level agreements (SLAs) promising availability. Managed services also allow organizations to deploy IP-based business voice services by sharing the risk and complexity with the service provider.

Benefits of Managed Services

A service provider can offer the following benefits:

- Provide access to technical resources that might otherwise be prohibitively expensive. Service providers tend to deliver an overall better quality of IT support because they have larger, more experienced IT staffs specializing in these tasks.

- Help ensure reliable 24-hour network monitoring and support.

- Provide predictable costs for technology and support.

- Reduce the risks associated with introducing new technology.

- Control capital and operational infrastructure costs.

- Equip customers for fast and effective problem resolution.

- Reduce IT tool and personnel support costs.

- Reduce risk of service impairment or downtime by using expertise to avoid failures.

- Take advantage of service provider's expertise, infrastructure, and labor resources.

- Boost return on investment (ROI).

- Create economies of scale.

- Provide "pay-as-you-grow" scalability.

Managed Service Strategies

Developing a managed service strategy requires determining the level of managed service that is appropriate for the organization (Table 2). An organization can choose to out-task nearly all business voice services and managed network services or to scope the out-tasking more narrowly.

Table 2. Managed Service Strategies

Customer Environment	Strategic Goals	Managed Services
Single-site SMB	• Benefit from converged communications • Achieve healthy ROI • Shift full-service support	• IP Communications with local and long-distance voice services • Service provider's comprehensive managed services for business voice and network equipment system support
Multiple-site medium-sized or large business	• Simplify communications infrastructure and support • Reduce expenditures: lower implementation and support costs • Increase deployment flexibility • Integrate transport services • Use on-net long distance	• Managed services for IP telephony and access network equipment
Large business with many branch offices and teleworkers	• Deploy advanced IP-based applications • Centralize deployment model • Consolidate internal support efforts	• Network VPN • Centralized PSTN access • Managed service on IP telephony and branch access equipment
Highly distributed global enterprise	• Deliver on-demand, secure integrated communications (voice, data, video) to all workers everywhere • Build robust, resilient converged network • Deploy IP Communications as a strategic initiative	• All services in large business • Custom IP applications and services • Managed services on critical business voice platforms

Single-Site SMBs

Deploying IP Communications for single-site SMBs typically includes the following products:

- One of the following:

  – Cisco CallManager Express (less than 120 users)

  – Cisco CallManager

  – Service provider-hosted Cisco softswitch with customer premises Cisco IP phones for converged voice and data services
- VoIP gateway for PSTN access

- Cisco Unity® voice mail

Multiple-Site Medium-Sized and Large Businesses

Deployment options for multiple-site medium-sized and large businesses typically include the following products:

- Centralized Cisco CallManager (on the customer premises or hosted by a service provider)

- VoIP gateway for PSTN access

- Cisco Unity voice mail

- Site-to-site calling over a leased line, such as ATM or T1, or a Multiprotocol Label Switching (MPLS) network

Large Businesses with Many Branch Offices and Teleworkers

IP Communications deployment options for organizations with many branch offices and a large population of mobile or remote teleworkers typically include the following products:

- Centralized Cisco CallManager (either located on the customer premises or hosted by a service provider)

- VoIP gateway for PSTN access

- Cisco Unity voice mail

- Site-to-site calling over a leased line, such as ATM or T1, or an MPLS network

Highly Distributed Global Enterprise

Deployment options for highly distributed global enterprises typically include the following products:

- Cisco CallManager

- VoIP gateway for PSTN access

- Cisco Unity voice mail

- Site-to-site calling over a leased line, such as ATM or T1, or an MPLS network

- Cisco IP Contact Center

Managed Business Voice Services

Business Phone Services (IP PBX, Key, Centrex)

IP telephony business systems are rapidly overtaking traditional voice equipment as the choice for today's communications solution in companies of all sizes. Companies often look to a strong business partner to effectively plan, design, implement, and provide ongoing support for an IP Communications network. A company that requires a full-featured IP PBX would use a Cisco CallManager solution. A small business can meet its needs through Cisco CallManager Express services, providing a solution similar to a Key switch. Alternatively, customers can continue using an existing PBX by deploying a Cisco voice gateway, with the option of migrating to IP telephony slowly over time.

Site-to-Site Voice

Site-to-site voice allows an enterprise to call from one of its sites to another site using the service provider's VoIP infrastructure, thus reducing long-distance costs. The enterprise can maintain its own private dial plan, including support for abbreviated extension dialing.

PSTN Access

Cisco CallManager and Cisco CallManager Express services offer PSTN connectivity that can be activated locally using a customer premises VoIP gateway or centrally with a service provider's network. Central PSTN access provides economies of scale and reduces cost for both the end user and the service provider.

Unified Communications

Cisco Unity Unified Messaging provides users with the ability to access and immediately respond to voice or fax messages, use "find me/follow me"[1] technology, and send e-mail messages from any phone or computer within the enterprise, reducing the time associated with accessing multiple devices. Unified messaging on a converged network supports a universal inbox that can contain all three types of messages.

Enhanced Services (XML, IP Conferencing, IP Contact Center)

Many combinations of business voice services exist to meet the needs of businesses ranging from single-office small businesses to highly distributed enterprises. The flexibility of the Cisco Business Voice solution architecture helps service providers to capitalize on emerging revenue opportunities from managing enhanced IP applications. These include the following:

- Custom IP phone Extensible Markup Language (XML) applications. Examples of how Cisco Systems® partners and other companies have taken advantage of XML application capability with IP phones include:

  - Intranet Publishing System – Publishing system for IP telephony developed by iCom Vision that allows you to dynamically publish information stored on your corporate intranet or extranets to IP phones.

  - IP-WatchDOG – An application developed by Stein that transmits pictures from a Web camera to the display of an IP phone or mobile phone.

- IP customer contact center services.

- IP conferencing. Organizations can take advantage of the XML programming language to easily download critical information and customized applications to a user's phone. Service providers can deliver customized, revenue-generating, premium XML applications to their business voice services customers.

Selecting a Service Provider

Choosing the right service provider is vital. Use the checklist in Table 3 to help organize your discussion.

Table 3.   Assessing a Managed Service Provider

Requirement	Description
Network Quality of Service	- Ability to manage voice, video, data, and multiple applications - Low latency and packet loss - Performance metrics 24-hour support - Accurate billing and reporting
Network Uptime	- Network redundancy - Fast reroute and convergence in event of failure - Network recovery transparent to users and applications - Traffic engineering
IP Communications Management	- Performance management - Fault management - Carrier resolution - Services - Flexible adds, removals, and changes

1 Find me/follow me, also known as multinumber hunting, allows one phone number to call multiple phone numbers in a specific order to try to locate the follow-me subscriber. If located, the subscriber can accept or reject the call based on caller ID or calling-party name preferences. If the subscriber is not located, the system defaults to a voice mailbox.

Service providers with the Cisco Powered Network designation supply reliable, industry-leading outsourced services that help enable advanced applications based on Cisco end-to-end network equipment and technology. About 400 of the most successful service providers around the world are members of the Cisco Powered Network program. Situated in more than 60 countries, these program members offer a wide range of services, over networks built with Cisco products and solutions, for small and large businesses alike. Cisco service providers have proven expertise in making managed services work for businesses to provide the high quality, reliability, interoperability, network security, industry-leading technology, and agility that can help an organization remain focused on its business strengths.

For More Information

Take the business voice services e-tour at: http://www.cisco.com/go/managedservices.

Look for Cisco overviews on the following managed services that use Cisco products and solutions at: http://www.cisco.com/go/managedservices.

- Security services

- Managed VPN services

- Metro Ethernet access services

Other Resources

The Business Case for Governments to Migrate to IP Communications, Cisco Systems, Inc., 2004
http://www.cisco.com/application/pdf/en/us/guest/strategy/strategy/c644/ccmigration_09186a008023761f.pdf.

Proof of Profitability: The Business Case for Managed Services, Cisco Systems, Inc., 2002
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