



**Case study:
Erickson Retirement
Communities**

Building a stable, scalable
IP telephony network

Building an IP telephony network for the business needs of today and tomorrow

The telephone is the most critical piece of technology in play for many businesses. That's why a Maryland-based developer and manager of continuing care retirement communities deployed a new robust IP telephony network using Cisco technology.

The challenge ❖❖

With a 20 percent annual growth rate, Erickson Retirement Communities is well aware how crucial a stable, scalable and efficient telephony network is when it comes to keeping its business up and running. The Maryland-based developer faced a big decision when it came to standardizing on a specific technology solution: whether to continue with its existing private branch exchange (PBX) system or move to an emerging industry-standard approach.

The solution ❖❖

Mapping out a telephony network is no quick or easy task. The first step is evaluating new technology options and developing an in-depth network design that incorporates all business and user requirements. Erickson Retirement Communities undertook those tasks, as well as its new network deployment, with the help of Presidio Networked Solutions, a provider of advanced technology infrastructure solutions.

The results ❖❖

The company, leveraging internal IT expertise and working with Presidio Networked Solutions, moved to a centralized IP telephony network infrastructure built on Cisco call cluster technology. The new network provides expected network performance and scalability, as well as strong economies of scale. The cost of the legacy PBX setups was \$200,000, now a new location network hookup costs \$130,000.



Company: Erickson Retirement Communities
Location: Catonsville, Maryland
Profile: The nation's leading builder and manager of moderately priced, continuing care retirement communities currently has 16 locations, with several more planned for 2007, and employs more than 11,000 people.
Revenue: \$1.2 billion



As Erickson Retirement Communities continues to expand nationwide, building campus-style communities for those 62 years old and older, the company understands that a stable, robust, national IP telephony network is critical for its current 16 locations and 11,000-plus employee ranks. With two additional communities in planning for 2007, network scalability is a crucial business issue as well. In fact, availability, scalability and support capabilities are all equal elements in mapping out a strategic approach to IP telephony.

With the help of Presidio Networked Solutions, an East Coast- and Gulf Coast-based provider of advanced technologies, Erickson Retirement Communities set out to build a scalable and highly available IP network plan that would not only provide needed telephony headroom for today and the future, but also establish a standardized process for deploying telephony systems as the company continues to expand.

Erickson Retirement Communities had relied on a series of preferred technology reseller partners in the past decade, and Presidio, a subsidiary of parent company Presidio Inc., came on board as a partner a few years ago. The Greenbelt, Maryland division focuses on the design, development, deployment and management of advanced technologies such as unified communications (including VoIP), security, wireless, optical, telepresence, storage, as well as supporting network architecture and Microsoft infrastructure solutions.

It is exactly this level of expertise and knowledge that the company wanted on hand to begin the technology evaluation process as well as the IP network design plan.

The need for IP telephony

As Chief Technology Officer (CTO) Scott Erickson notes, the telephone is the single most important technology asset on a desk. "It's far more important than the computer, the keyboard, the mouse or any other piece of technology," he says. "Obviously, you need to be very careful when you are making these decisions."

Telephony, he adds, is also the most expensive individual technology asset that goes into a new Erickson Retirement community.

The company had historically used PBX technology to provide digital phone service across traditional twisted copper wiring for a new community site or corporate office need. Erickson Retirement Communities currently operates 12 large PBXs.

Prior to the new telephony network effort, Erickson Retirement Communities' internal IT team was often stressed in trying to meet new community IP network needs and frazzled by the chaotic deployment process that came into play as new communities were built.



Scott Erickson, CTO

In addition, the real cost of cabling phone and data jacks at a new location represented a substantial business cost — between \$1M and \$1.5M — and a prime telephony goal was to reduce that cost. Erickson believes he's saved approximately \$1M from each project by running one set of cables to the desk instead of two.

As Scott Erickson explains, he decided to investigate IP telephony options as new technologies offered some unique benefits and options. In 2004, Erickson began evaluating IP-based telephony solutions and launched two pilot programs to evaluate the legacy vendor solution and Cisco solutions.

A legacy vendor PBX was deployed at the company's Linden Ponds campus in Hingham, Mass. The campus handsets connected to the data drop at each desk instead of the telephone drop, with the PC connecting to the telephone. At the same time, Erickson ordered a Cisco IP phone system running Call Manager 4.0 for the corporate headquarters location. Architecturally, according to Erickson, the Cisco system is similar to the legacy vendor solution except that the Cisco PBX is purely a set of servers compared with the legacy vendor's chassis approach.

In conducting the pilot telephony programs, Erickson says he learned several lessons. The first is that the more formal the structure, the better the results. "I would also be a little more deliberate about how I was going to measure success or failure. I would write down more detailed requirements in terms of testing as well," he advises.



Erickson continued to deploy legacy vendor systems to new campuses launched in 2005. At the corporate location, the pilot evaluation delved into call center functionality available through Cisco's IPCC. As Erickson explains, industry research indicated that IP telephony had arrived as a corporate standard, with IP solutions significantly outpacing Time Division Multiplexing (TDM) solutions for 2005 for net-net corporate telephony deployments.

Given those trends, and aiming to open three new communities in the summer of 2006, Erickson realized he needed to make a decision on which telephony technology to use as a standard. The choice, he says, was Cisco for more than a few reasons.

The Cisco solution benefits

While both the legacy vendor and Cisco offered similar levels of availability, the fact that Cisco's solution provided a centralized approach was a compelling factor. The legacy vendor solutions are distributed by construct with each location receiving its own PBX. Cisco's technology requires just a router and phones at each location, which is also home to a call manager cluster. Though both solutions can scale well, Cisco's technology provides efficiency and economy when it comes to scalability, says Erickson.



While the Cisco solution had a higher up-front price tag ... the savings and return on investment (ROI) were clear as telephony requirements for future campuses could be added for just the cost of an additional router, phones and licenses.



In terms of IT support requirements, the legacy vendor's distributed architecture means more PBXs to own and operate. Another critical aspect, given the IT talent crunch taking place, is that the skill sets necessary to support the legacy vendor's solutions are very different than the skill sets of on-site support engineers. As Cisco

technology requires only a router and phones, there was just incremental internal IT support needed at the community level.

In addition, Erickson already had a team of Cisco engineers responsible for supporting deployed devices. That meant integration projects with call tracking systems, such as Touchpaper for help desk, and customer relationship management systems, such as Siebel, would be much easier to deploy and manage.

In terms of cost, while the Cisco solution had a higher up-front price tag of \$750,000 when compared to the legacy vendor's initial costs of \$450,000, the savings and return on investment (ROI) were clear as telephony requirements for future campuses could be added for just the cost of an additional router, phones and licenses.

Moving forward, each additional campus will enjoy a considerably smaller initial investment to implement their telephony solution, says Erickson.

"In the long run, this higher-fixed cost, lower-incremental cost approach will deliver savings to the development pro formas due to economies of scale," he says.

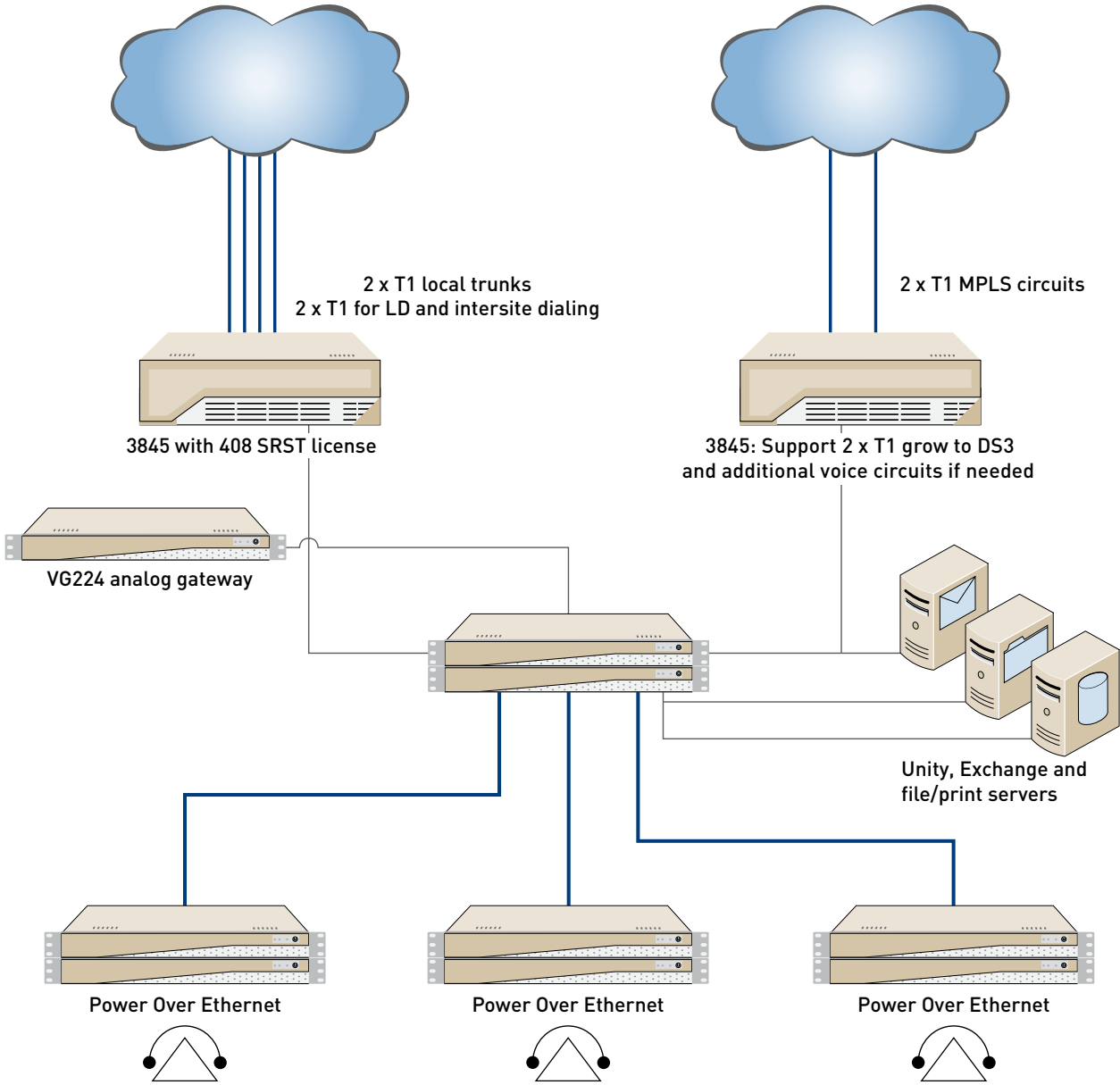
Building out a network design

While the company had decided which IP telephony solution to standardize on, Erickson's technology team required help in making actual deployment and integration efforts more efficient and less chaotic.

An enterprise network design was launched in the spring of 2006 with Erickson's technology team embarking on a series of meetings with Presidio, as well as with Cisco representatives. The initial meetings focused on identifying the current and future requirements of the IP telephony network. Data on the number of locations, geographic location of sites, data network capacity and telephony feature requirements were gathered to finalize the core design.

As Presidio Senior Systems Engineer Scott Hardesty explains, it was a two-stage enterprise design effort that also included intense sessions focused on technology requirements and network expectations.

Erickson standard remote IP telephony site



Note: Design to support approximately 400 phones. DSP resources are allotted to support PSTN termination up to four T1 circuits and to provide conference resources for 20 sessions and MTP for 10 sessions. Designed for G711 ONLY.



"We were building a cookbook for future network deployment efforts," explains Hardesty, adding that other issues such as management need must be incorporated into the design map as well.

"Many companies consider these issues after the design process or after the network is built, and that's not good planning. These issues must be addressed in the planning stage," he says.

Once the design was completed, it was time to decide on specific hardware needs. This meant determining how many Cisco call manager clusters would be required to service the entire IP telephony system. Factors such as the geographic distribution of the telephony users, the enterprise's wide-area network (WAN) needs and features played a big part in hardware decision making.

An important goal, Erickson says, was to provide necessary telephony headroom for future needs. The network design had to incorporate today's needs as well as what will be necessary three to five years in the future.

The final network planning steps also included creating a standard when it came to remote site deployments. The company's IT team needed to be able to react quickly to building changes and community activations. With a standard to follow, the IT team can quickly determine requirements and employ a simplified deployment process. Equipment standardization focused on voice gateways, data gateways, Ethernet switches and IP telephones. Even the approach to analog station connectivity for fax machines and courtesy phones was standardized, says Erickson.

The technical design

Once the enterprise network design was completed, the next task was testing and configuration of the designed system. Due to time constraints, Erickson shipped all the equipment to Presidio's lab, where the partner staged the entire environment. The Erickson Retirement Communities' technology team did the switching and routing infrastructure at the same time as the telephony infrastructure.

"There are phenomenal dependencies between the two," explains Erickson. "If you are going to be planning,

it's hard to plan one without the other. So you want to design the network at the same time in conjunction with the telephony solution." Once the Erickson Retirement Communities' technology team set up the switching and routing infrastructure, Presidio stepped in to complete the configuration.

Presidio built a West Coast call manager cluster in Texas, an East Coast call manager cluster in Maryland and then began migrating sites onto each call manager cluster.

The call manager clusters are connected via a gateway that keeps them in sync and, in the unlikely event of a full cluster failure, phones can be manually homed to the remaining cluster. Each cluster provides N+1 redundancy and physical path diversity with each call manager server supporting 5,000 phones. The two servers that comprise the cluster are located in different data centers. When either cluster reaches 5,000 phones, the company will add another call manager server to ensure redundancy in the event of a hardware failure.

In addition to this redundancy aspect, each voice gateway at a campus or branch office can operate indefinitely without access to the call manager servers assuming it has access to the Public Switched Telephone Network (PSTN), either directly or across the WAN.

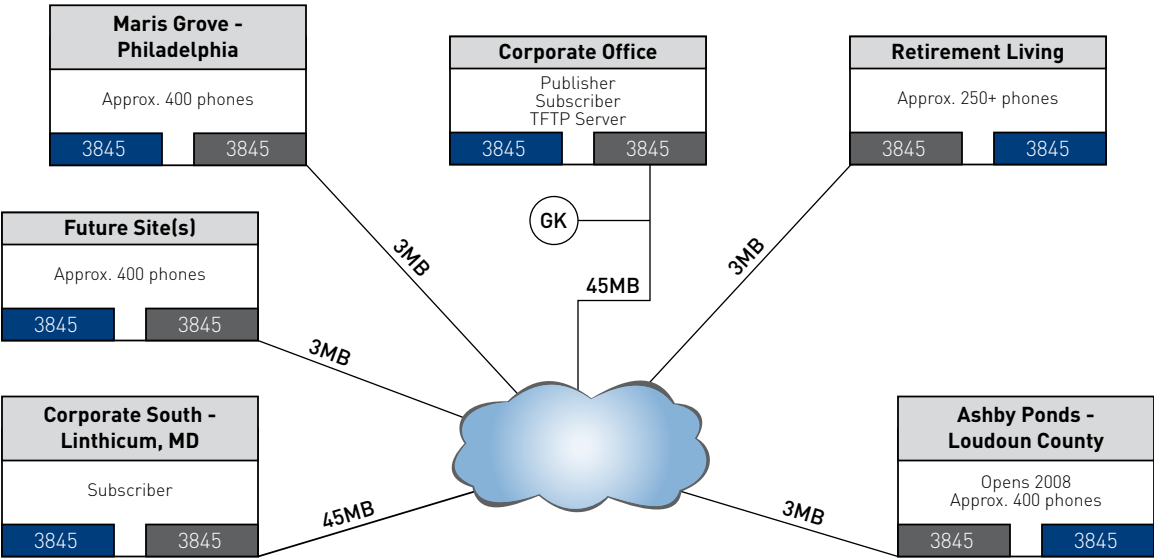
Communities all receive Cisco 3800 series routers for their voice gateway, which is the same model router that Erickson Retirement Communities uses for its WAN. These routers feature numerous hardware redundancies and can serve as a backup in an emergency circumstance. The standard switch infrastructure at each campus is Power over Ethernet (PoE) switches connected to a rack-mounted uninterruptible power supply (UPS) system that is powered off a circuit on the emergency power grid for the community. This means that as long as a generator is operating for the campus, the phones will continue to function in the event of a power loss.

Since Erickson Retirement Communities has a backup data circuit to the Internet that connects back to the WAN via a virtual private network (VPN), it can maintain phone service at a location when the telephone services go down. Locations that have fixed point wireless Internet connections are able to maintain some level of phone service even when the feeds to the campus have been severed.

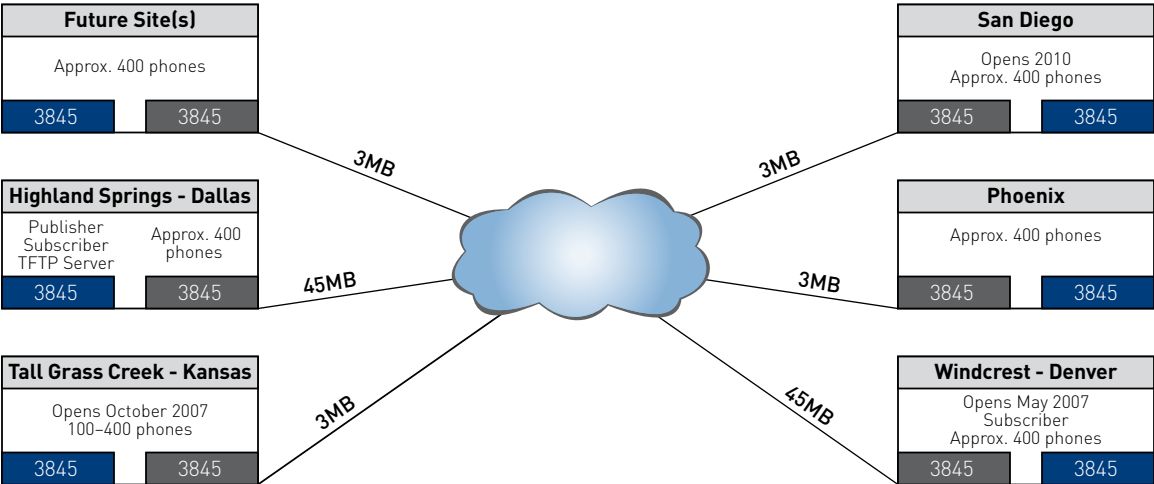
Design overview

Erickson East Coast Cluster

3845 Voice Router
3845 Data Router



Erickson West Coast Cluster



Additionally, the Cisco PoE switches power the company's standard for wireless networks, thus eliminating the need for a separate power run to each Wi-Fi access point.

The company's enterprise approach to clustering provides the most scalable IP telephony solution available today, says Erickson, as each cluster can have eight call managers providing theoretical capacity for 60,000 phones and real-world capacity for 35,000 phones. Once a cluster reaches eight call managers, Erickson Retirement Communities will stand up a new cluster, providing limitless capacity for phones.



Above all, IT leaders should give as much time as possible to both the design planning and telephony deployment before moving ahead.



The Cisco 3800 series routers at each campus are the standard because of the hardware redundancies incorporated into the chassis. Their sizing provides capacity for up to four cards, each of which could take four spans for a total of 16 spans that could provide 400 simultaneous direct connections to the PSTN.

In terms of network support and administration, the CTO has one engineer focused on architecture and long-run planning for the Cisco telephony environment, another engineer focused on the day-to-day support of the environment and a third tasked with Cisco phone deployment as new communities go up. This approach, says Erickson, creates a redundancy in knowledge, both internally and with Presidio, in the event of a need for emergency support or flex capacity.

Advice and lessons learned

In looking back at his team's IP telephony overhaul and infrastructure standardization effort, Erickson says he's learned more than a few good lessons that will prove valuable in future technology projects.

The first is that every technology effort requires good planning structure and in-depth evaluation.

"You need to write down what exactly it is that you are going to look at and what you are going to test. We didn't do that and I ended up making the final solution decision on more of a gut level than a technical level. We didn't resource the evaluation or the production implementation as appropriately as we should have, so we were really struggling with existing pilot deployments when we made our decision," he recalls.

In undertaking a network design project, a technology team also needs to outline growth requirements, he adds. IT leaders need to assess the redundancy requirement, high availability requirement and even physical geography issues.

"The design planning session was very intense. We went through a number of different options. You have logical decisions to make about how you want to organize the different technology pieces and you have physical decisions to make about the actual makes and model of equipment," he relates.

Above all, IT leaders should give as much time as possible to both the design planning and telephony deployment before moving ahead.

"Even once we got the full solution up and running, we had a Herculean effort in migrating all the one-off systems into the new enterprise cluster. That was pretty painful. There's a saying that you should measure twice, cut once and that absolutely applies. The more planning and thinking and design work you can do, the better off you are going to be and the more satisfied you will be with your implementation."

All of the hard work on the part of Erickson Retirement Communities, Presidio and Cisco, resulted in an enterprise network design and standardized deployment that gives the company a robust, scalable IP network that can meet new community needs as they arise, including plans for videoconferencing and electronic health-care applications. ■■

Product information



The **Cisco 3845 Integrated Services Router** provides the following support:

- Wire-speed performance for concurrent services such as security, voice and advanced services at full T3/E3 rates
- Enhanced investment protection through increased performance and modularity
- Enhanced investment protection through increased modularity
- Increased density through High-Speed WAN Interface Card Slots (four)
- Enhanced Network Module Slot
- Support for over 90 existing and new modules
- Support for majority of existing AIMs, NMs, WICs, VWICs and VICs
- Integrated GE ports with copper and fiber support
- Optional Layer 2 switching support with PoE, supports the 36-port Cisco EtherSwitch module (NMD-36ESW)

Security

- On-board encryption
- Support of up to 2,500 VPN tunnels with the AIM-HP11-PLUS Module
- Antivirus defense support through Network Admission Control (NAC)
- Intrusion Prevention as well as stateful Cisco IOS Firewall support and many more essential security features

Voice

- Analog and digital voice call support
- Optional voice mail support
- Optional support for Cisco CallManager Express for local call processing in stand alone business for up to 240 IP Phones
- Optional support for Survivable Remote Site Telephony support for local call processing in small enterprise branch offices for up to 720 IP phones



The **Cisco 3825 Integrated Services Router** is part of the Cisco 3800 Integrated Services Router Series that complements the Integrated Services Router Portfolio. This router provides the following support:

- Wire-speed performance for concurrent services such as security, voice and advanced services at up to half T3/E3 rates
- Enhanced investment protection through increased performance and modularity
- Enhanced investment protection through increased modularity
- Increased density through High-Speed WAN Interface Card Slots (four)
- Enhanced Network Module Slot
- Support for over 90 existing and new modules
- Support for majority of existing AIMs, NMs, WICs, VWICs and VICs
- Integrated GE ports with copper and fiber support
- Optional Layer 2 switching support with PoE, supports the 36-port Cisco EtherSwitch module (NMD-36ESW)

Security

- On-board encryption
- Support of up to 2,000 VPN tunnels with the AIM-EP11-PLUS Module
- Antivirus defense support through Network Admission Control (NAC)
- Intrusion Prevention as well as stateful Cisco IOS Firewall support and many more essential security features

Voice

- Analog and digital voice call support
- Optional voice mail support
- Optional support for Cisco CallManager Express for local call processing in stand alone business for up to 168 IP Phones
- Optional support for Survivable Remote Site Telephony support for local call processing in small enterprise branch offices for up to 336 IP phones



Product information (continued)



The **Cisco Media Convergence Server (MCS) 7845 Unified CallManager Appliance** is a powerful and highly reliable high-level rack-mounted server solution that is equipped with two Intel Nocona Xeon 3400 MHz processors, up to six hot-swap SCSI hard disks, RAID 1/0 controller, redundant hot swap fans and redundant hot swap power supplies. The server appliance is preinstalled with an operating system and the Cisco Unified CallManager 5.0 application.



Cisco Unified IP Phones are simple to use, functional and fully featured next-generation communications devices. Cisco Unified IP phones give customers an exciting new user interface that offers display-based access to features, productivity enhancing applications, value-added services and the industry's first Gigabit Ethernet IP phone. From the company lobby to the desk of the busiest of managers, from the manufacturing floor to the executive suite, at home, on the road or from a branch site or commercial location — whatever device you want, there is a Cisco Unified IP phone designed to meet every need.

Only Cisco offers a complete portfolio of true IP business phones. With their distinctive look, they provide a unique, positive communications user experience to all devices and applications, superior audio quality, increased accessibility to people with disabilities, exciting physical design and ergonomics, advanced services, and applications and capabilities that are available only with a real IP solution.

Cisco Unified IP Phones

With display-based access to features, the business class of Cisco IP phones delivers value-added services and productivity-enhancing applications in a stylish and easy-to-use desktop phone.

The **Cisco Unified IP Phone 7940G** continues to address the communications needs of a transaction-type worker in a basic office cubicle environment who conducts a medium amount of telephone traffic. The phone has access to two telephone lines or a combination of one line and one direct access to a telephony feature.

The **Cisco Unified IP Phone 7960G** continues to address the communications needs of the professional worker in an enclosed office environment with a large amount of phone traffic. It has access to six telephone lines or a combination of lines and direct access to telephony features. Cisco business IP phones offer the Cisco pre-standard PoE as well as a local power option through a power cube. High-quality, hands-free speakerphone capability and built-in headset connectivity are included in all these business sets. The large pixel-based display supplies important communications information and ease of feature usage, as well as access to many productivity-enhancing applications with XML capabilities. XML-based services can be customized to provide users with access to a diverse array of information such as stock quotes, employee extension numbers or any Web-based content.

The **Cisco Unified IP Phone 7941G and IP Phone 7961G** provide enhanced functions for those needing additional capabilities. The phones have a higher-resolution, graphical 4-bit grayscale display (320 x 222), which further benefits XML application developers, and supports double-byte characters and Unicode. These phones support IEEE standard 802.3af inline power, in addition to supporting traditional Cisco power. The Cisco Unified IP Phone 7941G and IP Phone 7961G are standards-based for interoperability and deployment flexibility, providing a gateway to the future.

Product information [continued] 

The **Cisco Unified IP Phone 7970G** is a prestigious device showing off the latest technology and advancements in IP telephony. This phone both addresses the needs of the executive and brings network data and applications — in full, vivid color — to users without PCs. It is a state-of-the-art instrument, which includes a color touch-sensitive display for easy access to features and functions. Eight telephone lines, or a combination of lines and direct access to telephony features, a high-quality, hands-free speakerphone and built-in headset connection are included. Both Cisco standard PoE and IEEE 802.3af PoE are supported. The large color pixel-based display provides communications information, access to applications, and easy-to-use features. Users can create their own productivity-enhancing applications using XML, or take advantage of the many Cisco partner applications that use the unique color touch-screen capabilities of the Cisco Unified IP Phone 7970G to retrieve information such as stock quotes, employee extension numbers, or any Web- or server-based content.

With the **Cisco Unified IP Phone 7914 Expansion Module**, the Cisco Unified IP Phone 7960G, 7961G, 7970G and 7971G-GE become the perfect administrative aides to monitor or answer additional calls. Each of the 14 illuminated buttons can be programmed as a line appearance or a speed dial.

[Industry's First Gigabit Ethernet IP Phones](#)

The gigabit switch capabilities of the **Cisco Unified IP Phone 7971G-GE** extend the pass-through benefits of the Cisco Gigabit Ethernet-enabled network to the desktop. The Cisco Unified IP Phone 7971G-GE has a high-resolution, color touch screen and a new four-way navigation key to enable a host of innovative productivity-driven applications to boost employee productivity, improve customer satisfaction and greatly enhance business processes.

The **Cisco Unified IP Phone 7941G-GE and 7961G-GE** not only provide Gigabit Ethernet to the desktop, but also have a higher-resolution, graphical 4-bit grayscale display (320 x 222), that further benefits XML application developers, and supports double-byte characters and Unicode.

Call 1-800-4LAN-WAN for more information about Presidio solutions and technologies.



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Presidio Networked Solutions addresses the complete technology lifecycle — plan, design, integrate, operate and optimize — of networking and system solutions and services for the commercial and government markets. Presidio's comprehensive portfolio comprises unified communications, wireless, advanced security, storage and systems infrastructure solutions. Presidio Networked Solutions also offers customers an extensive range of financing solutions, including leasing.

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- Cisco Gold Certified Partner
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- IBM Premier Partner
- NetApp Premier Partner
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- Sun Strategic Technology Integrator