

Smarter Solutions for Government: **Intelligent** Networks that Protect and Serve

**Municipal, regional, and national governments:
In the public sector, today's networks enhance freedom and security.**

“The first session with Cisco opened our chief officers’ eyes to the full potential of the Internet in terms of cutting costs and improving the Council’s services to the community. It was a very powerful message and generated a great deal of interest among the management team.”

—John Mabey, Controller of Financial Services, London’s Camden Council

Today, government agencies and institutions face great challenges. From rural townships and provinces to sprawling national bureaucracies, government organizations are providing more services to more people than ever before. Fortunately, this is also a time of great opportunity, as advancements in technology provide simple, cost-effective ways to relieve the strain of these new demands and empower public servants to accomplish more.

In particular, innovations and refinements have made intelligent networks simpler to manage and more affordable to own, so even organizations with limited expertise and resources can deploy sophisticated solutions to the challenges they face.

As this guide illustrates, governments around the world are using technologies such as intelligent switching, Gigabit

Ethernet, wireless connectivity, and IP telephony to bolster security, improve communications, streamline operations, reduce paperwork, and better serve the public.

Cisco Systems has helped numerous government organizations develop standards to deploy networking solutions tailored to their needs. These networks have helped safeguard classified information, automate administrative procedures, accelerate research projects, free personnel to focus on core responsibilities, and extend access to public information and services across the Internet. Cisco offers end-to-end solutions that are designed to expand and evolve, allowing organizations to incrementally grow their networks as requirements change or new technologies emerge. Nowhere is this future-proof approach to networking





“The challenge is that we’ve got an \$11 billion public-sector organization that needs to run like any of the best private-sector companies. We want to become the most tech-friendly environment in the world by using the Internet to save our citizens’ time, our taxpayers’ money, and to unleash Colorado from the boom-or-bust cycle that has plagued our economy for too long.”

—Bill Owens, Governor of Colorado

more evident than in the Cisco Catalyst® family of stackable and chassis switches. Offering basic connectivity or the power of Gigabit Ethernet, they instantly boost network capacity to accommodate today’s bandwidth-hungry applications, with plenty of room to grow tomorrow. That means any network, whether it’s based on old copper telephone wires or the latest fiber-optic lines, can deliver the productivity and efficiency benefits enjoyed by leading corporations.

Yet Cisco Catalyst switches offer more than raw speed—they extend intelligent services from the core of the network to the edge, where the users are. This provides the advanced quality of service (QoS), high availability, and enhanced security needed to ensure everything operates efficiently, reliably, and securely as the network grows.

These industry-leading features clear the way for new opportunities, such as wireless networking and IP telephony, for even greater efficiency and productivity in the quest to serve the public.

With Cisco Systems, it’s Easy and Affordable to Make the Move...

...From Hubs to Switches:

To accommodate today’s applications and demand for bandwidth, it’s critical to replace any 10 megabits per second (Mbps) hub in the wiring closet with 100 Mbps Fast Ethernet or 1000 Mbps Gigabit Ethernet switches.

Unlike a hub, which forwards data packets to all connected ports, a switch forwards packets only to the port that matters—the one leading to their final destination. This reduces the overall volume of traffic on the network and enhances security, because packets are restricted to their designated ports.

Besides offering more bandwidth, Cisco Catalyst switches deliver intelligent services that enhance security and maximize network uptime. They also provide QoS features that identify types of traffic and prioritize how each packet is handled. This ensures that time-critical applications like voice and video transmissions—where delays can seriously affect quality—function properly.

Depending on the infrastructure in place, migrating from hubs to switches may be as simple as unplugging one and plugging in the other. Cisco Catalyst switches can integrate broadband into any network infrastructure, whether it uses Category 1, 2, or 3 copper telephone wire, Category 5 copper cabling, or fiber.

...To Gigabit Ethernet:

The performance advantages of full Gigabit Ethernet switching are becoming increasingly essential for municipal, regional, and national agencies on the cutting edge of technology. The reason is simple. With every increase in traffic or introduction of a more demanding, bandwidth-hungry application, the network comes under greater stress.

At speeds of 1000 Mbps, Gigabit Ethernet provides the bandwidth that networks need to evolve and meet new demands, alleviating bottlenecks, boosting performance, and increasing the return on existing investments in infrastructure.

As the industry leader in LAN switching, Cisco makes the transition to Gigabit Ethernet faster and easier with standards-based solutions for both fiber-optic and copper cabling. Cisco products can also be deployed in stages for a more gradual migration to Gigabit Ethernet, starting at the core and moving on to the wiring closet.

Agencies can use Cisco Catalyst switches to extend Gigabit Ethernet to the desktop, simply and affordably, to support today's powerful computers, sophisticated applications, and high traffic volumes. Delivering up to 10 gigabits per second (Gbps), the range of solutions offered by Cisco will satisfy even the most bandwidth-intensive requirements, including interagency and campus connectivity.

...To Converged Networks:

Maintaining separate networks for voice, video, and data is no longer necessary—and is just plain inefficient. Merging all three services over a single network—known as convergence—is the obvious answer. And it is widely accepted and acknowledged by the communications industry and analysts that the Internet Protocol (IP) will become the standard way of delivering them.

Supporting everything from Web and e-mail access to telephone calls and videoconferencing, converged networks offer several benefits, including simplified administration, increased reliability and redundancy, and significant cost savings in terms of both IT resources and long-distance telephone charges.

The greatest demand today is for IP telephony, also known as voice over IP, an application that allows telephone calls to be carried over networks originally designed for data. The cost benefits of merging voice and data services onto one network can be dramatic. This is particularly true in government, since even the largest agencies are often forced to hire outside contractors to manage separate networks.

Cisco Catalyst switches provide the advanced QoS features needed to support IP telephony, and are available with inline power support for Cisco IP phones, so separate power outlets aren't required in each room.

Cisco Systems is a recognized leader in network convergence. When appropriate, Cisco AVVID (Architecture for Voice, Video and Integrated Data) provides an open, standards-based foundation that makes it easy to roll out IP telephony services and other Internet-based applications.

...To Wireless:

Though much has been made of the freedom and mobility of wireless connectivity, its benefits go well beyond the basic luxury of "anytime, anywhere" network access. In some situations, this technology offers a simpler and more cost-effective alternative to traditional wired connections. In other cases, such as in historic buildings or areas where asbestos poses an environmental hazard, it may be the only viable means of extending high-speed network access.

The Cisco Aironet® family of wireless products sets the standard for reliable, secure, high-speed wireless connectivity. A range of equipment is available to meet different needs, including access points and client adapters for indoor wireless connectivity, and wireless bridges for long-range outdoor links between buildings. Wireless bridges deliver several times greater throughput than T1/E1 lines, eliminating the need to install fiber-optic cable or pay for leased line services.

Within buildings, Cisco Aironet access points provide constant access to network resources virtually anywhere these products are deployed. This not only gives network users the ability to roam freely throughout an extended area while maintaining uninterrupted network access, but saves organizations the time and expense of rewiring. Changes in the size or location of workgroups can be accommodated simply by adding or moving access points, further lowering facilities costs.

Providing secure wireless solutions is critical. The Cisco Aironet family of products and the Cisco Wireless Security Suite provide a variety of security solutions to meet even the most demanding government requirements for security. Options range from III-DES encryption coupled with Cisco VPN solutions to 802.1x-based solutions, providing integrated security architectures based on standard security models. These solutions can be designed quickly and easily, affording users the most complete security offerings in the industry.

Cisco Aironet access points leverage the same management tools used for wired networks, and are designed for simple, rapid deployment. Inline power support, for example, enables the access points to draw their operating power from Cisco Catalyst switches via Ethernet ports. Where no switch is available, inline power can be provided via a power injector. This eliminates the need for separate power sources, such as a wall outlet, greatly reducing the cost of installation.

Cisco Aironet wireless solutions deliver proven increases in productivity in most environments. By providing unfettered access to information and mobility to users, organizations are able to gain greater efficiencies through the use of wireless technologies. With wireless technologies organizations have immediate access to information without being restricted to primary work spaces. This increase in mobility translates to lower costs and greater productivity for organizations of all sizes.

The Cisco Catalyst Family



- **Cisco Catalyst 2950 Series Switches** make it easy and affordable to deploy basic or intelligent services at the network edge with standalone, fixed-configuration, and stackable models that provide wire-speed Fast Ethernet and Gigabit Ethernet desktop/access connectivity. Catalyst 2950 Series Intelligent Ethernet switches can be paired with a Catalyst 3550 Series Intelligent Ethernet switch to enable IP routing from the core of the network to its edge.



- **Cisco Catalyst 3550 Series Switches** are a new line of enterprise-class, stackable, multilayer switches. With a range of Fast Ethernet and Gigabit Ethernet configurations, this series can serve as both a powerful access layer switch and as a backbone switch for small government networks. For the first time, customers can deploy network-wide intelligent services—including IP routing—while maintaining the simplicity of traditional LAN switching. For converged networks, the Cisco Catalyst 3524-PWR XL switch offers inline power, eliminating the need to connect Cisco IP phones and Aironet Access Points to a wall outlet or other power source. In addition, the Catalyst 3524-PWR XL switch offers advanced QoS fully integrated with Cisco IP phones and high-availability network features.



- **Cisco Catalyst 4000 Series Switches** extend control from the backbone to the network edge with intelligent network services and other features, including advanced QoS, scalable performance, comprehensive security, and simplified management. Their modular, high-density, high-performance design supports 10/100/1000 switching in the LAN, packet telephony, enhanced security, and integrated WAN capabilities for converged networks.



- **Cisco Catalyst 6500 Series Switches** offer industry-leading scalability, flexibility, and performance, supporting the industry's widest range of interface densities and services modules. They are designed to address the growing need for security, gigabit scalability, high availability, rich services, and multilayer switching in backbone, distribution, and wiring closet topologies as well as data center environments, including support for 10 Gigabit Ethernet interfaces and WAN connectivity up to OC-48 speeds.

The Cisco Aironet Series



- **Cisco Aironet 1200 Series Access Points** deliver maximum security, manageability, and reliability wireless connectivity, while also providing investment protection and a smooth path to future high-speed wireless LAN technologies. This series of IEEE 802.11b-compliant (Wi-Fi™) access points supports data rates of 11 Mbps today, and enables a seamless migration to the emerging IEEE 802.11a standard. A modular design supports both single- and dual-band configurations, and allows for additional field upgrades as requirements change and technologies evolve.



- **Cisco Aironet 350 Series Access Points and Wireless LAN Client Adapters** offer the advantages of wireless networking in a cost-effective and easy-to-manage solution. These products support data rates of 11 Mbps, and are compliant with the IEEE 802.11b (Wi-Fi) standard. Cisco Aironet 350 Series Access Points are available in two versions: standard and rugged. The standard model has a plastic case and integrated antennas. The rugged model features a metal case and external antenna connectors for auxiliary antennas, and is designed to operate in an extended temperature range. Cisco Aironet 350 Series Wireless LAN Client Adapters are available in PC Card and PCI Card models.



- **Cisco Aironet 350 Series Wireless Bridges** enable high-speed building-to-building links of up to 25 miles (40.2 km). Supporting several times greater throughput than T1/E1 lines at a fraction of the cost, wireless bridges are ideal for data-intensive, line-of-sight applications, such as connecting hard-to-wire sites, campus settings, satellite offices, and temporary networks. They can be configured for point-to-point or point-to-multipoint applications, allowing two or more sites connect into a single LAN and/or share a single high-speed Internet connection.

Cisco IP Telephony Solutions

- **Cisco IP Telephones** are next-generation intelligent communication devices, providing toll-quality audio anywhere on a local- or wide-area network, without requiring companion PCs. The latest models of Cisco IP



phones are fully programmable to support changing needs and preferences. When used in conjunction with inline power models of Cisco Catalyst switches, Cisco IP phones can draw their power from the network, eliminating the need for separate outlets. Models include Cisco IP phone 7910G/7910G+SW, 7940G, 7960G, IP expansion model 7914, and IP Conference Station 7935.



- **Cisco IP SoftPhone** is a Windows-based application that takes voice-and-data convergence to the next level. With Cisco IP SoftPhone running on a laptop you can receive calls wherever you are connected to the corporate network. Even dial-up connections can be used to check voicemail and place calls. Integrated directories and drag-and-drop controls can simplify any call. Conference call participants, for example, can be invited by dragging and dropping directory entries onto the user interface to create a virtual conference room. Once a voice conference is established, you can share applications running on your desktop with others by selecting them from a list or dragging documents into the virtual conference room.



- **Cisco CallManager** is the software-based call-processing component of the Cisco IP telephony solution. This software extends enterprise telephony features and functions to packet telephony network devices such as IP phones, media processing devices, voice-over-IP (VoIP) gateways, and multimedia applications. Additional data, voice, and video services such as unified messaging, multimedia videoconferencing, collaborative contact centers, and interactive multimedia response systems interact with the IP telephony solution through Cisco CallManager's open telephony application programming interface (API). Cisco CallManager is installed on the Cisco Media Convergence Server 7800 series and the Cisco Integrated Communication System 7750.

Leading the Way

Rural areas, towns, major cities, even military institutions turn to Cisco Systems for efficient, reliable, secure networking solutions. Here are a few reasons why:

- **Increased productivity** Cisco solutions make it easy for agencies to enhance network access and deploy leading productivity applications, improving communication, streamlining operations, and extending the reach of network resources so employees and constituents can accomplish more.
- **End-to-end solutions** Cisco offers end-to-end solutions for a variety of applications, from basic connectivity to high-speed wireless access and edge-to-core IP telephony.
- **Greater return on investment** Cisco has a record of protecting customer investments by supporting new features across several generations of Catalyst switches, Aironet wireless devices, and IP telephony products.
- **Simplified management** Cisco Catalyst switches provide tools that simplify all aspects of network management, from deploying new devices to configuring edge-to-core intelligent services. The CiscoWorks2000 family of Web-based tools offers a proactive approach to network planning, monitoring, and troubleshooting, including support for Simple Network Management Protocol (SNMP) and Remote Monitoring (RMON). Cisco Cluster Management Suite (CMS) Software, embedded in Catalyst 2950 and 3550 switches, further simplifies network management by enabling the simultaneous configuration of up to 16 clustered switches using any standard Web browser.
- **Gigabit Ethernet connectivity** Cisco Catalyst 2950, 3550, 4000, and 6500 Series switches provide a complete Gigabit Ethernet switching solution, from the core of the network to the edge.
- **Unparalleled performance** The Cisco Catalyst family provides industry-leading performance, functionality, scalability, and flexibility, which delivers valuable enhancements to your network operations.
- **Cisco IOS® Software** Cisco Catalyst network platforms run on the Cisco IOS Software, which creates a unified system and provides a solid foundation for building Internet applications. Extending common services and interfaces across the network also reduces training, management, and troubleshooting costs.

Advanced Features to Support a Range of Needs

Cisco Systems offers solutions to challenges confronting agencies at every level of government. Common scenarios include:

Situation 1 *Workers are taking advantage of the network more than ever, not only in the office, but also from home and other remote locations. As a result, productivity is on the rise—but so are concerns about hackers and other security threats gaining access to sensitive data.*

Solution As the number of users grows, so does the need to protect sensitive data and areas of the network from unauthorized users. Cisco Catalyst switches provide multiple levels of security against internal and external threats, supporting advanced features to safeguard administrative passwords and configuration information, restrict users to certain areas of the network, prevent unauthorized users from gaining access even if they plug directly into the network, and tighten security in numerous other ways. The Cisco Wireless Security Suite provides industry-leading encryption and authentication for Cisco Aironet wireless solutions, protecting the integrity of sensitive data being transferred over a wireless link.

Situation 2 *Security isn't the only issue getting pushed to the forefront—productivity is also becoming more important. Workers must be able to access network resources the moment they need them, or productivity grinds to a halt.*

Solution Cisco Catalyst switches and Cisco Aironet wireless products ensure maximum network uptime and deliver proven increases in productivity. On the switches, an array of advanced features and technologies increase availability. Spanning-Tree Protocol (STP) enhancements, for example, provide faster uplink failover recovery, while Per-VLAN Spanning-Tree Protocol Plus (PVST+) allows for load sharing across uplinks, effectively doubling the available bandwidth. Productivity can be further enhanced with Cisco Aironet wireless solutions, enabling workers to leave their desks and retain immediate access to network resources. Load balancing and hot-standby features provide maximum throughput and network redundancy for wireless clients.

Situation 3 *As network traffic increases, so does congestion. As a result, critical applications are getting tied up in data bottlenecks. These delays are hurting productivity—and frustrating constituents.*

Solution Congestion frequently becomes a concern as organizations add users or deploy new applications. Migrating from hubs to switches—or from Fast Ethernet to Gigabit Ethernet connectivity—will dramatically improve network performance and alleviate bottlenecks. Cisco offers performance options all the way up to 10 Gbps, providing enough bandwidth to connect multiple agencies or an entire campus. Intelligent networks also utilize advanced QoS features to prioritize and direct traffic, which minimizes congestion and ensures applications are allotted the bandwidth they need. Cisco Catalyst switches extend intelligent services from the network core to its edge, where the users are. This means data traffic can be classified and marked at the source, allowing both upstream and downstream traffic to be

prioritized so time-sensitive applications, such as IP telephony or videoconferencing, take precedence over something less critical, such as Web browsing.

Situation 4 *Constituents frequently call for information and service, requiring workers to spend considerable amounts of time determining the most appropriate way to route calls. Meanwhile, an impatient public is forced to wait.*

Solution Agencies can converge voice and data onto a single network, which not only reduces the costs of telephone service, but also simplifies network management and accelerates response times for employees and callers alike. When calls are received using Cisco voice-over-IP technology, the Internet-enabled system automatically forwards them to the most appropriate destination. Routing is so seamless and transparent, callers will not even realize when they've been transferred to another site. The Cisco Catalyst family includes switches with network-based inline power support for IP phones, eliminating the need for separate electrical outlets. Cisco voice gateways can be used to connect IP telephony systems to legacy equipment, easing the migration to converged networking from conventional TDM services.

Situation 5 *There never seems to be enough time or personnel to keep pace with the workload. Paperwork keeps piling up, the phones keep ringing, and there aren't enough resources to hire additional staff.*

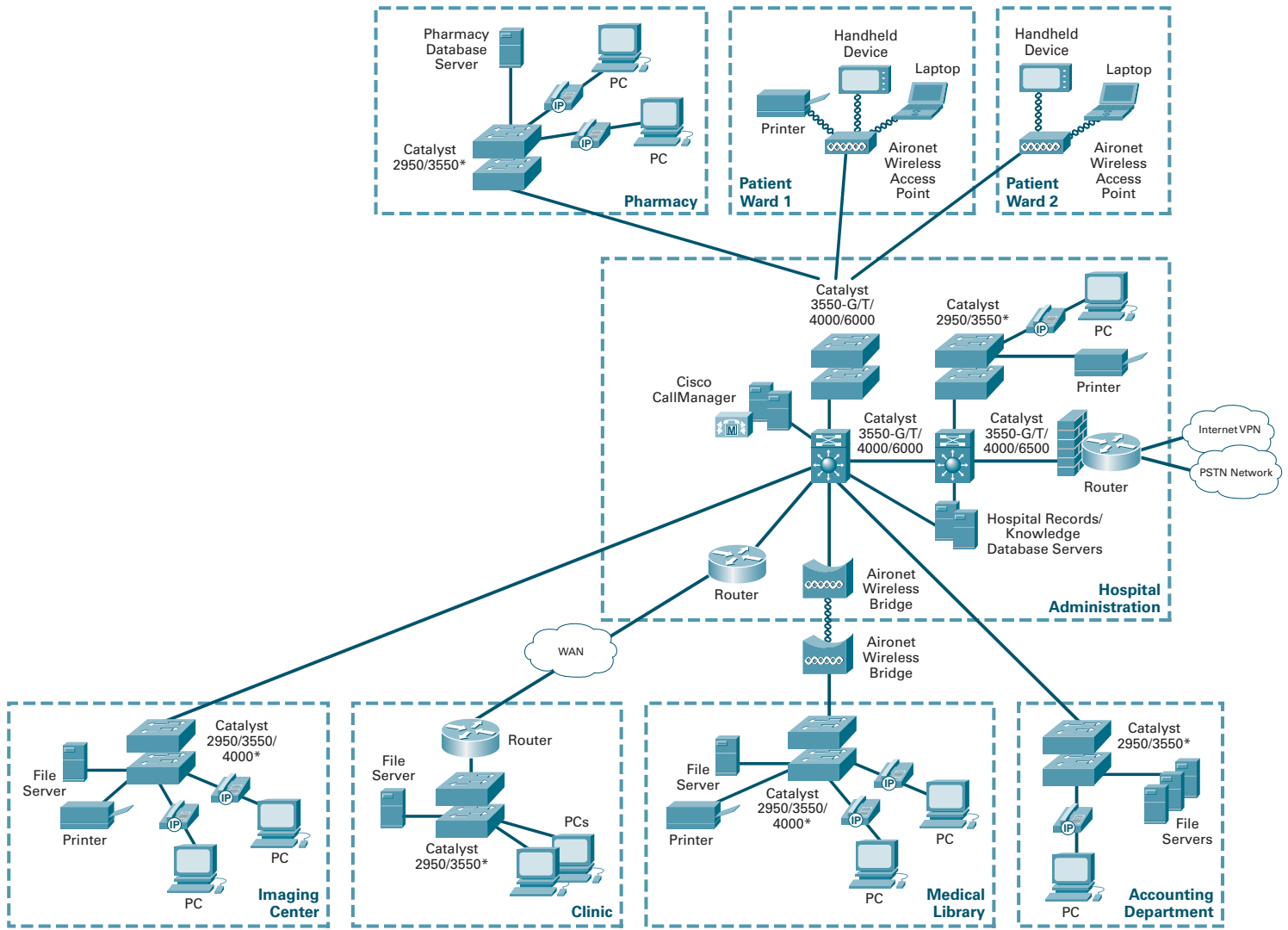
Solution Many agencies have used networks to automate repetitive and time-consuming tasks. Adding a Web portal allows the public to fill out forms, pay fees, or request services directly over the Internet, freeing workers to focus on other things. Motor vehicle agencies, for example, have successfully automated the vehicle registration and permit process. Simply posting routinely requested information on the Web can produce dramatic results, reducing the burden on workers responding to telephone and in-person inquiries from the public.

Situation 6 *There's a growing awareness that agencies must be prepared to relocate in an emergency, without causing a major disruption in their operations and services. The question is, How?*

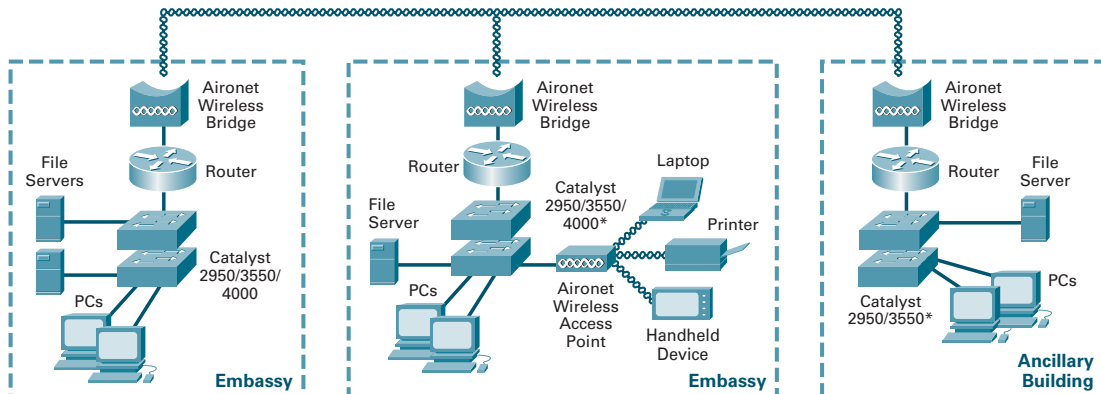
Solution Cisco offers a variety of solutions that make it easy for organizations to quickly and efficiently relocate to another site and get back to business, often in a matter of minutes. For example, a Cisco Aironet wireless access point lets you extend network access to everyone in a room, without needing to add more cables. Meanwhile, Cisco IP phones can preserve continuity in communications, since they can be plugged in anywhere on a local- or wide-area network and their extensions will remain the same. This would be next to impossible with conventional PBX telephone systems, which require manual database adjustments or wiring changes in order to move extensions.

Sample Network Designs

1. Sample Network Design for Government Veterans Administration Hospital



2. Sample Network Design for Wireless Embassy



* For implementations that require inline power for IP telephones or wireless access points, Catalyst 3524-PWR XL switches can be deployed as an alternative to Catalyst 2950 and 3550 switches. Catalyst 4000 and 6500 support inline power, and remain ideal choices in such situations.

For more information

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