

SANTANA ROW: BUILDING AN ADVANCED
NETWORKING COMMUNITY

White
Paper

Introduction

The Internet now plays a major role in day-to-day lifestyles, enhancing shopping, communication with friends and relatives, business and leisure travel, and work options. Among the communities taking the lead in this transformation is the new Santana Row development in San Jose, California.

Santana Row was developed as a master planned community combining an innovative blend of retail outlets and residences, together with parks and public spaces. The developer of the community, Federal Realty Investment Trust, envisioned Santana Row as an urban neighborhood that provides a diverse mix of shopping, dining, lodging, entertainment, and other amenities. Its 1500 foot main street offers curbside landscaping, wide sidewalks, intimate seating areas, parks, plazas, and fountains.

Santana Row has also taken great care to incorporate a rich natural landscape, including a half-acre park, hundreds of trees, and several green spaces. The 42-acre site opened in November 2002, and additional facilities are scheduled to open in early 2003.

From the beginning, Internet access and communication solutions were key considerations for the community's infrastructure. Many of Santana Row's visitors and residents are part of the technology industry that powers the San Francisco Bay Area. Federal Realty Investment Trust wanted to provide mobile technology that helped residents and guests manage life and work in their own way and on their own time, by providing secure, reliable, flexible solutions.

To meet the high expectations of these sophisticated users, Federal Realty Investment Trust conceived a dynamic environment that would offer wired and wireless high-speed Internet access, an online community portal, IP phone communications, and value-add services like digital cable television and hotel digital video on demand. When completed, the Santana Row infrastructure will serve a total of 1200 residences, 120 retail outlets, a four-star hotel, and state-of-the art cinema.

To realize this ambitious vision, the developers of Santana Row sought innovative technology leaders that could deliver a unique combination of strategic planning and deployment services, advanced networking technology, and powerful yet flexible solutions, applications, and management tools.

A Combination of Strengths: Cisco Systems and HP

After evaluating a variety of options, Federal Realty Investment Trust elected to partner with HP to devise an intelligent building solution architecture based on a converged Internet Protocol (IP) network infrastructure from Cisco Systems, Inc. Through its strategic alliance relationship with Cisco, HP is providing Federal Realty Investment Trust with a single, global resource for all infrastructure, platform, application integration, and services requirements—from design to deployment to support.

Designed to meet the demands of voice, video, and data networking, the infrastructure integrates a variety of applications to provide a range of services to the Santana Row community. By placing all of its network activity on a single unified infrastructure, Santana Row can minimize equipment costs, management tasks, and deliver better, more reliable performance. This, in turn, can provide a higher standard of service for residents, retailers, and guests.

HP, a leading provider of personal computing and access devices, imaging and printing devices, and global services, provided network design and development services, as well as Internet Portal services to facilitate communication throughout the community. Cisco Systems, the worldwide leader in networking for the Internet, supplied the end-to-end networking infrastructure necessary to support the initiative. Working in close collaboration, the Cisco and HP team created and deployed a unified set of network solutions that accentuates each company's strengths.

As a member of the Cisco Mobile Office program, Santana Row can ensure residents and guests that they are receiving secure, reliable network access and support. The Cisco Mobile Office program offers mobile business travelers a wide range of flexible options to securely access corporate resources while on the road, increasing their productivity, improving their work/life balance, and optimizing their responsiveness to co-workers and customers. By enabling instant information access and faster response to clients, the Cisco Mobile Office helps companies increase customer satisfaction and maximize their competitiveness.

For hotels and property owners, the Cisco Mobile Office program offers flexible, scalable, and secure solutions that deliver new revenue streams, increased profit potential, competitive advantages, and an enhanced guest experience.

At the heart of the Santana Row architecture is a high-speed fiber-based Fast Ethernet infrastructure. Powered by Cisco networking solutions, the network consists of a single-mode fiber backbone running throughout the campus that delivers wired and wireless Ethernet-speed Internet access in buildings, shops, hotels, and public spaces. To complete the solution, additional Santana Row technology partners, including Castle Cable, SBC Pacific Bell, and Qwest Communications, provide digital cable television, local telephone service, and long distance and Internet access, respectively. NXTV, Inc. is also providing the state-of-the-art digital video and broadband entertainment services into the Hotel Valencia.

Together, the solutions that make up the Cisco and HP architecture deliver the convenience and power the Santana Row community needs today, along with plenty of room to grow in the future.

An Intelligent Community for Residents and Retailers

For the hundreds of residents of Santana Row, Federal Realty Investment Trust sought a comprehensive network that could support a variety of communication and entertainment services. The developers envisioned an intelligent community where high-speed Internet and digital cable television were as basic as public utilities like water and electricity.

Santana Row needed a solution that would support convenient, plug-and-play Internet access, delivering the speed that its technologically savvy users expected, along with maximum reliability and security. The network would need to offer personalized service levels that enabled users to select the access plan that best fit their needs. Perhaps most importantly, the Internet service would have to be highly accessible nearly everywhere, not just to residents in their homes, but to people in public spaces throughout the development. To help foster a sense of community, Santana Row also needed a Web portal that could facilitate interaction and deliver content to guests and residents.

Robust, Convenient Internet Access

HP deployed an end-to-end converged Cisco IP network that provides 100 Mbps Internet access to every residence, retail outlet, and hotel guest via Category 5 cable. The network features Cisco switches, routers, security, and network provisioning equipment, as well as content services developed by HP. Digital cable service is provided over the IP network by Castle Communications.

To initiate an Internet connection, users simply plug their computer into the data connection at their residence, office, or hotel room and launch a Web browser. The Cisco Building Broadband Service Manager (BBSM), a public access gateway, automatically forwards users to the Santana Row Web portal to collect user login and authentication information.

Designed specifically for property owners and service providers, the Cisco BBSM provides support for multiple automated authentication and billing options, including credit cards, RADIUS, and property management systems. After the user authenticates, the Cisco BBSM provisions an Internet connection.

Because the Cisco BBSM platform lets property owners create tiered service levels, Santana Row was able to offer a variety of Internet access plans to suit several types of users. Residents choose from one of three packages—bronze, silver, and gold. These options provide varying speed rates, along with a variety of options such as personal e-mail accounts and disk space, personal space, and dynamic or static IP addressing.

Commercial tenants who use the Internet for business applications can choose between two access packages offering different access speeds, multiple e-mail accounts, and the same features provided to residents. Both residents and commercial tenants pay a monthly rate for Internet access that's comparable to what the services would cost outside the Santana Row community. However, unlike most other services, with the necessary infrastructure already installed at every building in the community, Santana Row residents can begin using their Internet connections within three days after they move in.

Key to delivering reliable Internet access and quality digital cable is the community's end-to-end Cisco network, featuring a campus switched network design. A Cisco 7206 VXR router at the network edge connects Santana Row's high-speed fiber backbone to a variable T3 Internet connection provided by Qwest Communications. The flexible, modular router features a modular design that combines flexible connectivity options, fast performance, and robust serviceability and manageability features. In the network core, a Cisco Catalyst 6506 switch complements the router and segments traffic with gigabit scalability, high-availability, and multilayer switching.

Beyond the network core at the building distribution levels, Cisco Catalyst 3508G switches provide stackable Gigabit Ethernet switching. Designed specifically for the distribution layer, the switch is easy to deploy and manage, segmenting traffic throughout the campus to ensure the best possible bandwidth and performance. Finally, at the access level, Cisco Catalyst 2950 switches deliver wire-speed 10/100 Ethernet connectivity directly to users via Category 5 cable. To provide additional redundancy at an economical cost, Santana Row has several spare Catalyst 2950 switches available and pre-configured, which can be quickly added to the network in the unlikely event of equipment failure.

Widespread Wireless Access

The developers of Santana Row sought to deliver Internet access not only to every building in the community, but throughout its open spaces and public areas as well. To enable residents and visitors to connect to the network from virtually anywhere, HP implemented a wireless LAN (WLAN) solution based on Cisco Aironet 350 Series access points.

Fully compliant with the industry-leading IEEE 802.11b standard, the Cisco Aironet 350 Series access points integrate seamlessly into the Santana Row network. Using a notebook computer or handheld device equipped with an 802.11b access card, guests and visitors can login to the network and authenticate through the Cisco BBSM just as easily as users with wired connections. The Cisco Aironet 350 Series access points provide Internet connectivity at speeds up to 11 Mbps.

Santana Row placed the access point antennae to provide coverage from many of the community's park areas, as well as several public areas in buildings, including outdoor dining areas in restaurants, coffee shops, cafes, and hotel lobbies. The antennae were fully enclosed within the buildings to maintain aesthetics, so the wireless network remains invisible. And, because the access points were positioned to provide overlapping coverage, users can wander freely throughout the community, checking mail or surfing the Web—all without losing their network connection.

The Internet Portal: An Online Community Connection

One of the most valuable resources at Santana Row is its online community portal, custom-developed by HP. The Santana Row Internet Portal is designed to provide a virtual meeting place for community information and interaction. It presents a wide range of useful information, including an events calendar, a local business directory, maps and driving directions, communication tools, merchant promotions, and facilities information. The Cisco BBSM is configured to automatically redirect users to the server running the Santana Row Community portal so that users are always kept up-to-date about the latest community news and events.

The Santana Row Community Portal also gives retail and residential users complete control over their Internet accounts through a set of account management tools. Users can view or update access plans, bandwidth requirements, static IP addresses, and billing preferences—all from the convenience of their Web browsers. Users can also access a set of personalized portal applications, including address books, calendar information, to-do lists, bookmarks, and links.

HP designed the intelligent community portal to offer a variety of interfaces tailored to specific user needs, including wired users, wireless users, network administrators, and anonymous users accessing the Santana Row network as a guest. As Santana Row continues to develop, its community Portal will be the key platform for future technology and community applications.

Security and Management

The security and integrity of the Santana Row network was of paramount concern to Federal Realty Investment Trust. To enable residents, merchants, and guests to use the network with confidence, the developers needed the ability to safeguard both wired and wireless data at every point on the network.

At the network perimeter, HP designed in redundant Cisco PIX 525 Firewalls to protect the network from unauthorized

access using stateful inspection firewalling, standards-based IP security Virtual Private Networking (VPN), and built-in intrusion protection features. Cisco PIX Firewalls give Santana Row support for a variety of security and networking services including Network Address Translation (NAT) and AAA (RADIUS/TACACS+) integration, enabling network administrators to exercise complete control over who can access the network. For wireless users, Cisco LEAP authentication provides data encryption and security that are comparable to wired networks.

To keep the network running smoothly, HP offers a set of 24x7 managed services. A Network Operations Center (NOC) provides continuous support for network and server monitoring for all HP and multivendor solution components, along with a 24x7 user help desk, security services including managed firewall, IDS services and syslog reviews, Web-based trouble ticketing, and Web-based network performance information. HP Hardware Support Services ensure that all network and server equipment is operating on a 24x7 basis, while HP Account Management services offer 8x5 operations support, monthly system reviews and quarterly solution review and consulting services, to ensure the long-term health of the network.

Hotel Valencia: Meeting the Needs of Mobile Professionals

Mobile professionals increasingly depend on network access to stay productive, and offering secure, enterprise-class Internet access from a hotel can be an important competitive differentiator. Located in the heart of Silicon Valley, the Hotel Valencia at Santana Row expects many of its customers to be technically savvy business people with a high level of expectations. To meet the needs of these demanding clients, Santana Row is extending a number of innovative network services and applications to the hotel. As a member of the Cisco Mobile Office program, the Santana Row can deploy these solutions to open up new revenue streams and experience increased profit potential.

Enhancing the Guest Experience

From the moment a new guest pulls up to Hotel Valencia, they experience the convenience and benefits of the integrated Cisco and HP solution. Guests arriving at the hotel can use a curbside check-in system, swiping a credit card into a wireless handheld device to immediately register—and avoid long lines and delays at the front-desk counter. Guests then receive a card key for room access, and walk directly to the guestroom.

The registration system connects wirelessly to the Cisco Aironet 350 Series Access Points, uploading guest information securely into the hotel's guest registration system that resides on its LAN.

In-Room Communication and Convenience

Guests at the Hotel Valencia can take advantage of a variety of networking services offered by the integrated Cisco and HP network, including advanced IP telephony, high-speed Internet access, and video on demand.

A key component of the hotel's network is the Cisco Integrated Communications System (ICS) 7750, a versatile IP telephony and services solution that combines call processing, voice applications, and multiservice IP routing together in a single chassis. The Cisco ICS 7750 serves all 210 guest rooms in the hotel, and is connected to the local phone network via 3 ISDN PRI lines. Cisco 3524-PWR-XL switches segment the hotel's Ethernet network, and deliver inline power to the phones throughout the hotel.

Within each hotel room, guests can make calls using Cisco 7940 IP phones. Designed for business users, Cisco 7940 IP phones feature a large, pixel-based LCD display and are programmable to support additional information services including Extensible Markup Language (XML) capabilities. The Hotel Valencia has also deployed Cisco 7940 IP phones throughout its meeting rooms. Because they're fully customizable, these public phones can be configured to offer personalized welcomes for convention guests, restaurant reservations, menus, and other services.

The hotel uses XML services provided by the Percipia hospitality application to activate phones when guests check in, deactivate them when guests check out, and to support features like wake-up calls and housekeeping notification messages. An InnLine 2020 voice-mail system provides support for guest and staff messaging.

To establish Internet connectivity from the Hotel Valencia, guests login and authenticate to the Santana Row network much as residents do. The Cisco BBSM provisions Internet access and automatically directs hotel guests to a customized hotel services portal developed by HP which includes extensive information on hotel services such as dining, hotel maps, and amenities. The hotel services portal also provides access to the Internet and is integrated with the Santana Row Community portal to provide access to local events, retailer info, and community pages.

Video on Demand

HP implemented an innovative, state-of-the-art IP-based digital video on demand (VOD) solution provided by NXTV. Inc. to provide guests with a rich variety of entertainment and Internet services via the television. The NXTV Broadband Entertainment System™ is a complete end-to-end solution including a proprietary digital set-top-box designed specifically for the hospitality environment, an advanced user interface called the "Interactive Program Guide" (IPG) and fully integrated Web-based transaction and system management software called NXTVue that interfaces with the hotel's property management system and allows dynamic, remote monitoring and maintenance of the system.

Using a remote control, gamepad, or wireless keyboard, guests can choose from digital movies including pause, rewind and fast forward, bookmarks and full previews, as well as video games and e-mail via the television. The IPG also provides hotels services such as folio review and check-out and access to the HP-designed hotel services portal for Internet access, information, and services. The Cisco switched Ethernet infrastructure provides the bandwidth and quality of service necessary to support even these demanding video applications.

Wireless Access for Mobile Professionals

The business guests at the Hotel Valencia will want to remain productive wherever they are, and ubiquitous Internet access is a must. To deliver network access to guests and visitors in public areas of the hotel, HP deployed a WLAN based on Cisco Aironet 350 Access Points, which connect directly to its switched Ethernet infrastructure.

Using a notebook computer with a wireless LAN access card, guests can login to the network from the hotel lobby, lounges, bars, restaurants, meeting rooms, courtyard, pool, and sunset terrace. Wireless access cards are available from the front desk of the hotel for guests and visitors who need them. For hotel guests, charges for use of the WLAN can be integrated into the hotel folio for consolidated billing.

Maintaining Network Security

To keep its network secure both for business guests and staff, the Hotel Valencia chose to set up a virtual private network (VPN), which is supported by its Cisco infrastructure. The hotel uses the VPN for internal communications with its corporate headquarters, as well as its internal property management applications. Because all data is encrypted using advanced IPSec technology, users can feel confident that sensitive business data is protected.

For guests who wish to connect to their corporate networks via the Internet, the hotel network also offers support for VPN software clients. Business professionals can establish encrypted connections with their home office to catch up on e-mail or download sales presentations with complete peace of mind.

Conclusion

The developers of Santana Row created its innovative communications infrastructure to continually grow and evolve. A number of new applications are already under consideration.

For example, by extending the Cisco IP telephony solution to residential areas, residents could enjoy the convenience of four-digit dialing within the community, along with other call handling applications.

Because physical security is an important concern as well, Santana Row plans to deploy Honeywell digital security cameras in its parking lots and residential units, which plug directly into the IP network via the Cisco Catalyst switches. Residents can view visitors at their front door via their TV, and retailers can monitor their property after hours or remotely by logging onto the network.

New applications for the Santana Row Internet Portal are also under consideration, including community forums and clubs, classified ads, and business services. With the scalable, flexible Cisco and HP solution, Santana Row is well positioned to deploy these applications and many more well into the future.

By partnering with HP and Cisco systems, the leaders in Internet technology and services, Federal Realty Investment Trust has realized its vision of creating a technologically superior residential and retail community. As the solution integrator, HP offers a unique level of strategic expertise, providing design, deployment, installation, portal services, and NOC support to the entire infrastructure. Cisco Systems offers a versatile, unified IP infrastructure together with the Cisco Mobile Office program, unlocking a compelling range of benefits for Santana Row and its guests, residents, and customers.

Together, Federal Realty Investment Trust, HP, Cisco, and their partners are ushering in the next era of innovative networked communities.

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