

Cisco Technology Helps Keep Passengers, Plans, and Luggage on Schedule at Sydney Airport

Sydney Airport

- Opened in 1920
- Purchased by Southern Cross Airports Corporation in June 2002
- Australia's busiest international and domestic airport
 - Passenger terminals: 34 international aircraft gates, 36 domestic aircraft gates
 - Commercial terminals: three international and two domestic
- One of the area's major employers, providing 60,000 jobs
 - Generates approximately A\$6.5 billion in economic benefits to the Sydney region
 - International visitors through the airport spend more than A\$2.5 billion annually in the Sydney area alone
- Requires services of 600 businesses and organizations to meet needs of airport users
- Served 23.2 million passengers—36 percent international, 58 percent domestic, 6 percent regional between 1999 and 2000
- 254,729 aircraft movements (2002)
- Revenue of more than A\$454 million (2002)
- Earnings before interest and taxes (EBIT) of more than A\$215.1 million (2002)

As domestic and international traffic continues to grow at Australia's largest, busiest airport, an extensive wireless LAN (WLAN) is playing a central role in keeping passenger and cargo movement on schedule. Using Cisco® Aironet® 350, 1100, and 1200 series access points, the airport's wireless network expedites airport maintenance, emergency services, and taxiway management. Airport retailers are accessing the network for their applications, and airport administrators are also evaluating how the WLAN can improve other airport services, such as baggage reconciliation, Internet access for passengers, and enhanced airport security.

Background

Covering 907 hectares on the northern shoreline of Botany Bay, Australia, Sydney Airport is Australia's busiest commercial airport. Opened in 1920, Sydney Airport is one of the oldest, continuously operating airports in the world. Each year, an estimated 25 million domestic and international passengers transit Sydney Airport, and the airport's three runways accommodate more than 250,000 aircraft movements.

In June 2002, the Australian federal government sold the Sydney Airport Corporation Limited (SACL) to the Southern Cross Airports Corporation, which now is the parent company and controlling entity of Sydney Airport.

Challenge

Although Internet kiosks and voice-over-IP (VoIP) wireless technology have been deployed at the airport for several years—even before the 2000 Olympic Games were hosted in Sydney—wireless Internet access service to passengers, tenants, and airport management will become available in August 2003.

At the Airport Council International (ACI) World Assembly in 2000, a resolution was passed recommending that airport operators should assert control over the use of WLAN systems at airports—both inside and outside terminal buildings. The ACI recommended that airports provide and manage an exclusive common infrastructure for wireless technology.

This resolution came at a time when operations managers at major airports already had begun to institute changes for transforming air terminals from time-wasting stopovers into productive business environments. Airport IT departments are taking the lead by creating a unified wireless infrastructure—a WLAN—that serves this important business traveler market.

If properly designed, a common WLAN can serve public access customers as well as operational applications. This WLAN produces significant benefits, including streamlined support and maintenance that improves manageability and total cost of ownership, easier



integration of various services, and the ability to support converged applications such as voice, data, and video running over the same network. The common WLAN also prevents problems that might result from poorly coordinated multiple wireless networks, such as non-uniform coverage, dead spots with no coverage, and security problems caused by insecurely designed wireless networks that are easily accessible to hackers.

Revenue generation is another consideration in modern airports. With a unified WLAN, an airport could provide baseline services to airlines and other tenants as part of their lease agreement and could charge for applications or services that require service level agreements (SLAs). Airlines and tenants can then offer tiered services to travelers.

All of these issues—from comprehensive wireless coverage and passenger productivity to real-time security and revenue generation—were matters that Sydney Airport operators hoped to address with installation of the end-to-end WLAN.

“As the manager of IT&T at Sydney Airport, I was concerned that wireless would be treated like cabling, and that Sydney Airport would have to manage the installation of multiple wireless networks,” says SACL’s Chief Information Officer Russ Lewis. “Sydney Airport was also looking at extending its wireless use to include additional operational applications and, therefore, needed to protect the wireless spectrum across the airport,” he explains.

Solution

Using Cisco Aironet wireless technology, SACL has achieved airport-wide consistency for its wireless systems. The WLAN covers taxiways, runways, most ancillary buildings, and all terminals (with the present exception of the Qantas Domestic Terminal 3).

The wireless network is part of the airport’s overall ATM network. SACL uses two additional separate networks, both Fiber Distributed Data Interface (FDDI) rings, for baggage and baggage screening. They are integrated via routers to the ATM network. “All 802.11 infrastructure is ‘owned and managed’ by SACL,” says Lewis. “Tenants, including airlines, are strongly encouraged to use it.”

SACL’s data network runs entirely on Cisco equipment. It has an ATM core based on Cisco Catalyst® 8500 and 5500 series switches, with an IP-over-Ethernet (IPoE) edge based on Catalyst 2900 Series switches.

Cisco Aironet 350 Series access points are located in terminals and in a number of buildings near taxiways and runways. Based on direct sequence spread spectrum (DSSS) technology and operating in the 2.4 GHz band, Cisco Aironet 350 Series access points provide an Ethernet-like data rate of up to 11 megabits per second (Mbps). They are IEEE 802.11b-compliant and certified by the Wi-Fi Alliance for interoperability.

High levels of redundancy are built into both the wireless and ATM networks. “Sydney Airport provides availability of 99.6 percent for each network device with repair times of less than 60 minutes,” Lewis explains.

To reinforce the WLAN, 100 percent redundancy is built into the network at Sydney Airport’s international terminal (Terminal 1) and domestic terminal (Terminal 2), using more than 150 Cisco Aironet access points. These include Cisco Aironet 1100 and 1200 series access points. SACL is deploying Cisco Aironet 1100 Series access points internally within the domestic terminal, and Cisco Aironet 1200 Series access points to external areas such as the paved aprons outside hangars and certain other airfield structures. The Cisco Aironet 1200 Series can use external antennas.



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—Russ Lewis, Chief Information Officer, SACL

The Cisco Aironet 1100 Series has a modular design and features a single, IEEE 802.11b radio, integrated diversity dipole antennas, and an innovative mounting system for easy installation in a variety of locations and orientations. It can easily be integrated into an existing network as a wireless overlay, or can be used to create a separate, all-wireless network. The Cisco Aironet 1100 Series is field-upgradable to the new IEEE 802.11b.

With simultaneous support for both 2.4-GHz and 5-GHz radios, the Cisco Aironet 1200 Series product also preserves existing IEEE 802.11b investments and provides a migration path to both the new IEEE 802.11a and the IEEE 802.11g standards.

Both the 802.11a and 802.11g standards have data transmission rates of up to 54 Mbps, a five-fold increase on the 11 Mbps data rate of the 802.11b standard. 802.11a offers eight distinct channels, compared to 802.11b's three channels, and is immune to interference from devices that operate in the 2.4-GHz band, such as cordless phones, microwave ovens, and other 802.11b WLANs. 802.11a, however, is not compatible with 802.11b devices.

IEEE 802.11g provides the benefit of backward compatibility with 802.11b equipment, preserving users' investment in their existing WLAN infrastructure. However, because 802.11g is limited to the same three channels as 802.11b, scalability may become a factor as WLAN user density increases.

SACL is not considering using the 802.11A (5 Ghz Spectrum) standard and will wait until the 802.11G(2.4GHz) is released to make the most of the 54-Mb throughput with backward compatibility with SACL's existing 802.11b clients, according to Lewis.

“ Additionally, a wireless bridge network covers the whole airport and is used for VoIP wireless for our emergency services,” says Lewis. “ An emergency vehicle has telephones connected to a directional Yagi antenna that is tuned to the antennas on the main buildings. The service covers the entire airport,” Lewis explains. But because the mobile telephone system could get overloaded in an emergency, “ the VoIP wireless is one of the alternative means of communication,” he says.

Cisco Aironet wireless bridges operate in the 2.4-GHz band. As a result, their range and performance are not affected by physical barriers such as large buildings or aircraft, or by inclement weather.

The choice of Cisco Aironet technology for Sydney Airport's WLAN was driven by two factors, according to Lewis. “ First was our experience with the Cisco Aironet wireless bridges for emergency VoIP wireless. Products from other wireless suppliers had been tested but did not perform as well as the Cisco equipment. Since the installation of over one hundred access points, virtually no problems have been experienced.”

The second factor in choosing to work with Cisco was SACL's relationship with the networking technology company over the past several years. “ From the first implementation of ATM to the present wireless network, Cisco has provided SACL with excellent service in both sales and technical support,” Lewis explains.



Results

SACL uses wireless for maintenance management, enabling staff to track and complete maintenance jobs in the field, receive notification of new jobs as they arise, and eliminate the associated paperwork. “Wireless provides the mobility for our maintenance team and enhances productivity,” Lewis explains.

The management software used at the airport is MAXIMO, a maintenance management tool developed by MRO Software. MAXIMO works with the Sycho Smart Software package to integrate the airport staff’s handheld hardware (personal digital assistants, or PDAs) to MAXIMO.

Cisco wireless technology is also used to help in managing aircraft on the airport’s taxiways. Specially developed software is used to measure aircraft deviation off the center line on taxiways. This data is then transmitted by wireless to a central database for analysis and use in planning; the data is reported to regulatory agencies as well.

Sydney Airport’s WLAN is also available to retail tenants. One retail vendor at the airport is currently using the WLAN to manage stock, and SACL is negotiating with a number of others. Additionally, beginning in late 2003, Sydney Airport’s WLAN will be used for baggage reconciliation. This will allow the airlines to match the bag to the passenger and provide quicker access to the bag in the hold of the plane should a passenger not board the aircraft, which would require the bag to be removed from the hold.

Next Steps

Sydney Airport’s WLAN will be available to the traveling public as of August 2003. Sydney Airport is negotiating with several wireless Internet service providers (ISPs) to provide Internet access to areas in the arrival and departure lounges, retail outlets, and restaurants. Because SACL owns the infrastructure, the company will collect revenue based on a revenue sharing agreement with the ISP.

The common wireless infrastructure will deliver consistent wireless connectivity to passengers moving between different zones and among different providers at Sydney Airport, which will prevent the annoyance of dropped reception. Passengers will be able to check and send e-mail, access documents, and remain productive during layovers. It will also make it possible for business travelers to use their companies’ virtual private network (VPN) clients.

With ISP wireless Internet access, Sydney Airport’s Web page with Airport Village information will be the home page to the public, and will provide links to the various ISPs. Airport Village is a Sydney Airport commercial service providing services in retail and travel.

Sydney Airport administrators are actively investigating further uses for its WLAN. One area of special interest—particularly in the post-September 11 environment—is security. The unified wireless network can play a pivotal role, facilitating the mobilization of security forces quickly throughout the entire airport. Sydney Airport is developing a pilot program that would provide VoIP handheld telephones to duty officers for this and related kinds of purposes. “Should the wireless telephones be successful, Sydney Airport will realize considerable savings in mobile telephone costs,” Lewis says.



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