



Building the Connected Airport

A joint White Paper from Cisco Systems and CNA Group



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Executive Summary

Airport operators in Asia Pacific are facing exciting and turbulent times. To thrive in a new environment that throws up as many opportunities as there are challenges, airports need new ways of operating that will differentiate themselves from the other aviation hubs in the region.

What can airports do to streamline processes within the airport environment? Can new ways be found to maximize existing assets and to obtain better returns out of every dollar invested in the airport environment? How can the traveler's experience be enhanced without compromising security requirements? The winners in the ongoing battle to be the best airport in the region will be those who do the best job in harnessing IP-based technologies in new and imaginative ways to transform airport buildings and services.

This white paper describes the challenges faced by airport buildings in the region, and the way IP networks can transform them into Connected Airports that unify disparate IT and building management systems into a cohesive and integrated infrastructure for more cost effective operations and thus create new revenue generation opportunities.

The Next Wave: Intelligent Airports

IP technology has permeated almost every aspect of our daily lives, influencing the way we live, learn, play, and work. However, today's building environments have, by and large, lagged behind in making these changes needed to support changing lifestyles. Other key trends are also driving the need for building transformation - such as globalization of the workforce, the drive for environmental and social responsibility, and a growing, worldwide population. Given the trends, real estate developers will have to include IP connectivity as the fourth utility next to the triumvirate of electricity, water and gas, in the way a building is designed. It is the former that will provide the basis of the advent of the Intelligent Building.

A good definition of an intelligent building is one in which the building fabric, space, services, and information systems can respond in an efficient manner to the initial and changing demands of the owner, the occupier, and the environment. While the real estate, design, and construction industry has been exploring the concept of intelligent buildings since the 1970s, this vision has not been fully realized, until now – thanks to the rise of integrated digital technology. With it, real estate professionals now have the capability of transforming the physical spaces of the future through technology innovation, delivering value-added, revenue generating services while streamlining the processes that create buildings and developments.

Building and managing the airport of tomorrow

No where is this more true than in the case of the airport environment. The air travel industry is undergoing rapid change in Asia, as airlines transform their business models, globalization and world trade are thriving, the Internet provides new efficiencies for passengers and airlines alike, and airplane manufacturers launch new models that will fly farther and carry more passengers, at lower costs. All of these developments will come together and significantly affect the way airport buildings are conceptualized, built, and run - well into the next decade.

The signs are pointing to an increasingly positive outlook for the air transport industry. The fundamentals of economic development, globalization, and the demand for travel in Asia Pacific is expected to generate a 6.7% growth in air travel, well above the global average of 4.4%, for the coming decade¹. And while a significant portion of the growth is driven by a global economic upturn, other factors – such as declining fares, more direct services, “open skies” policies, and decreasing regulatory burden – free airport operators to improve their operations, innovate their business models, and pursue unique strategies.

Balancing the needs of major stakeholders of the airport environment

The need for re-think and transform airports around the region has come about due to the shifting requirements of three major stakeholders that utilize airport buildings:

¹ “Current Market Outlook 2005” - Market Analysis, Boeing Commercial Airplanes

Real estate developers will have to include IP connectivity as the fourth utility next to the triumvirate of electricity, water and gas, in the way a building is designed.

- **Airlines** – These are the main customers of airports, many of whom are rapidly segregating themselves into either major international carriers focusing on premium customer service, or low cost carriers (LCCs) specializing in no-frills, point-to-point regional haulage. Both types of carriers employ significantly different operating models that support their service proposition – from arrival, transfer and departure processes to operating frequencies to aircraft types – that require significant flexibility on the part of the airports that support them. Building owners will need to ensure that their airports have the agility to support flexible requirements.
- **Ground service providers** – This category of stakeholders covers a wide gamut of organizations which provide ground handling, baggage and cargo handling, catering, cleaning and supporting services essential for turning around every aircraft landing and take-off cycle efficiently. For them, the priority is to work towards shorter turnaround times, provide better and more responsive service to their customers, and extract higher cost efficiencies from their operations. Many service provider organizations need to work together across the entire service delivery chain in order to fulfill their roles, so this will require a building infrastructure that allows unhindered information-sharing and collaboration across organizational borders.
- **Passengers** – A “one-size-fits-all” service that applies equally whatever the fare paid is no longer acceptable. Corporate travelers, who need to be productive even while on the road, want “anytime, anywhere” connectivity at the airports, and demand more flexibility and control over their traveling arrangements to accommodate possible last minute changes, such as self-service or even flexible check in times. Holidaying families want a pleasurable travel experience, and are increasingly expecting airports to provide the same pleasant retail and diversionary experiences available in the cities. First class passengers want special facilities that bypass the normal queues at check-in and customs, and even “no-frills” passengers expect a minimum standard unencumbered by delays, lost baggage, and poor service. To justify its service charges to its passengers, airports can no longer afford significant occurrences of delayed boarding, long tarmac waiting times, cancelled flights, and lack of information.



The challenge for airport operators

Increased demand will mean increased usage: many airports are now operating 24x7 cycle, creating greater pressure on the building infrastructure. Some of the major challenges can be classified as follows:

Security and health concerns

Security is one of the top priorities of airport authorities today. Traditional systems - such as video surveillance, access control, and baggage scanning -

are being augmented with emerging technologies, such as biometrics, smart cards, and explosive detection systems. However, even with the availability and sophistication of this wide range of security tools, the biggest challenge facing transportation security administrators is the lack of integration between these systems. This lack of integration limits the ability to quickly and effectively respond to today's security threats. Security managers must have the tools and technology to quickly combine, analyze, and distribute data from this diversity of security technologies to multiple audiences, using a wide range of media. Finally, while security remains paramount, it should not completely overshadow the need of a reasonably pleasant on-the-ground experience for customers within the airport environment.

In terms of health, the massive volumes of people traveling daily across borders through airports present operators with the challenge of containing the spread of contagion, or in the very least, providing health authorities with an audit trail to track possible sources of infection from arriving or departing passengers, and to inform the relevant counterparts across the region. SARS is not expected to be the last health crisis that the region will face; future viruses will appear, and they could be spread even faster. Airports will need to learn how to deal with health crises in a better way.

Growing beyond traditional services

While airports have traditionally focused on the core business of hosting companies and passengers who use their facilities, they are now looking to increase revenue through a wide range of activities connected to their main operations. For example, business passengers need to stay productive even while they are traveling, which means that they are willing to pay for the ability to stay connected to their corporate IT networks.



Another example is in retail, which is now a significant bottom line contributor to airport operators, who struggle to find sufficient floor space for the demand from retailers that want to be located there. Similarly, with the significant amount of real estate that the airport occupies, operators are looking to expand revenue-generation activities through advertising, or even further real estate development to deliver ancillary services like hotels, shopping malls or entertainment centers.

Of course, not everything has to be delivered on a large scale – simple but innovative ideas can also be incorporated into the airport mix: perhaps good, comfortable seats while passengers are waiting, or a quiet space to rest or work, a place where they can use their computers via wireless networks, television for entertainment and information, or even premium services for VIP frequent fliers who are prepared to pay for them. But burdened with outdated building infrastructure, operators are hindered from unlocking these new revenue streams.

Struggling to cope with growth and complexity

As growth in airline traffic continues to increase exponentially, thanks in large part to the success of low-cost carriers in the region, the scalability of the building infrastructure becomes an issue. Can it cope with the large numbers of people moving through its doors? Will this result in overcrowding at choke points such as immigration counters? Can the facilities handle the growth in the number of airlines and aircraft (as well as aircraft types)?

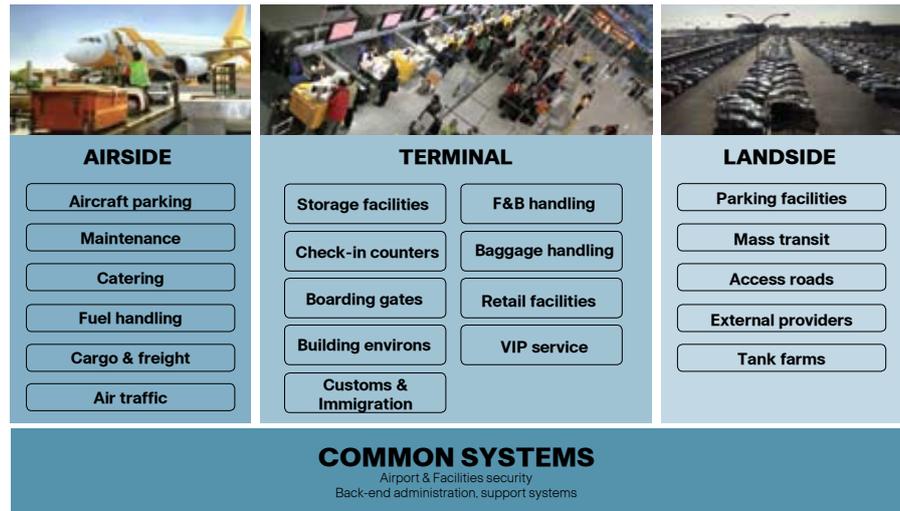


Figure 1: Tenants and systems in a typical airport environment

The challenges are compounded by the fact that airport operations have become so complex that they are sometimes compared to small cities. Airports now plan, develop, market, lease, operate and maintain multifaceted facilities, including terminals, runways, taxiways, signage, parking lots, garages, utilities, environmental features and buildings (see figure 1)

In such a complex environment, integration is easier said than done. Over years, airport operators have focused their infrastructure investments on siloed point solutions, each responding to a single or unique operational need; for example, a single solution for baggage handling, another for flight information display systems (FIDS), and yet another for check-in. It is estimated that an airport operation have, on average, at least 30 disparate systems running concurrently, resulting in an infrastructure that is highly inflexible, complex and difficult to integrate.

As passenger numbers, flight frequencies and carrier types grow, the older airport operating models will no longer be sustainable. Bottlenecks are appearing at multiple points across arrival, departure and transfer locations. Common chokepoints are highlighted below:

- **Extended customer queues at the front end** - The need to address security concerns has increased inefficiency and costs at these points, while existing limitations, such as staff shortages, space constraints and aging systems, hinder the operator from offering any practical way out of the waiting game. To the passenger paying premium prices for first class or business class tickets, such waits will be increasingly seen as a failure in service delivery.
- **No common platform for connectivity** – Not only is the connectivity essential for to allow passengers to work on the road, it can also be used to disseminate information across the entire airport value chain – from service providers to airlines to passengers - and provide the network to meet security compliance requirements such as digital CCTV and access control systems throughout the airport. And as new measures such as RFID baggage tagging become a reality, the burden on airport communication networks become heavier.

- **Workforce struggling with imperfect information** – The lack of integration across the airport ecosystem prevents the workforce from collaborating optimally. To give a typical example, if a flight parked at a terminal gate awaiting passengers receives notification from the airline engineering team of a possible delay, the information needs to be shared quickly, not just with passengers in the terminal, but also with the other handling firms who are providing cleaning, catering and cargo delivery services to the aircraft. ATC and airport authorities will also need to be informed so that the aircraft can be moved away the gate until it is ready for passengers, and be reassigned a new slot for take-off.

Typically, information dissemination takes place through a mixture of traditional means – such as teletype machines and walkie talkies - and through formal and informal channels, which means that multiple stakeholders will have to work with inconsistent, incomplete and outdated data. As a result, confusion, further delay and additional costs are incurred.

- **Disparate airport management systems** – Like any large building, the management of an airport requires the support of multiple functions, which include real estate management, climate control systems, physical security and access as well as safety systems. As with front-end processes, these back-end systems tend to be run on a “stand alone” basis, and are typically not integrated with operational systems and supporting disjointed business units. Such challenges will require airport operators to fund new investments in physical infrastructure – both airside as well as landside. Unfortunately, these investments need significant resources, and time, to be realized, which means that many airports, in the short to medium term, will need to develop innovative new ways that extract the maximum use of available assets and capacity. The bottom line is: if airports cannot build enough infrastructure, or change their pricing strategies to meet these challenges, then they must make better use of existing fixed infrastructure, mobile assets and their workforce.

A unified IP network: the fourth utility in an airport

To overcome limitations in space, and to maximize the utility of existing assets, the key is to build a converged IP network right into the underlying infrastructure of the airport. This acts as the platform supporting all other airport real estate requirements; from business processes to revenue generating occupant services and building and business utilities.

IATA’s move to simplifying the business

In 2004, members mandated the International Air Transport Association to lead an industry-wide program designed to ease the transport of passengers and freight and deliver US\$6.5 billion in annual industry savings. Five key projects were selected, each of which has a significant impact on the way airport building infrastructure will be designed:

- **E-ticketing** – Helps to reduce ticket processing charges, eliminate the need for paper and allows greater flexibility to the passenger and agents to make changes to the itinerary.
- **Bar coded boarding passes** - Enables the use of 2D bar codes and takes advantage of the efficiencies offered by the industry's conversion to 100% electronic ticketing.
- **E-freight** - Designed to eliminate the need to produce and transport paper documents for air cargo shipments by moving to a more simple, industry-wide, electronic, paper-free environment.
- **Common Use Self Service** – A shared kiosk offering convenient passenger check-in. Kiosks can be located throughout the airport to reduce congestion.
- **Radio Frequency Identification (RFID) tags** – Allows the status of an item tagged with RFID chips to be tracked within the airport environment, such as baggage tracking.

These initiatives will require the support of airports to put in place converged IP networks on which the above systems can be built upon.

The role of the Connected Airport framework

The Connected Airport framework provides airport operators with the optimal path towards achieving this vision. The framework places a unified IP network utility into the very foundation of modern airport buildings, driven by three converging market forces:

- The emergence of IP-based multi-function building automation systems that brings together separate applications such as heating, ventilation and air conditioning (HVAC), physical security and access, energy, lighting, and fire and safety
- The convergence of multimedia voice, video and data services onto unitary IP-based infrastructures that bring together separate technology-specific and proprietary networks.
- The growing importance of energy conservation and "Green" buildings where the network serves as a platform to collate information from various environmental sensors, which in turn is used to make more informed decisions in the management and control of HVAC, lighting and power systems.

The network thus becomes an intelligent building infrastructure and the foundation for change in the airport's development project. This "intelligent airport" infrastructure creates an unprecedented opportunity for improved services, enhanced processes, and cost-effective operations. This does not just include the terminal buildings, but also both landside as well as airside facilities as depicted in Figure 1.

By embedding information networks as the fourth utility - as fundamental as physical plumbing, piping and wiring – this approach provides the following benefits:

Deliver new services

Increasingly, operators around the region are building a "multi-services" airport to improve their ability to keep customers and tenants happy. Forward-looking airport operators view these non-traditional services – such as retail, connectivity and entertainment - as key components of their overall service commitment to stakeholders. Connectivity solutions running on top of a Cisco IP platform, spread across the airport environment can deliver the performance, reliability, and security to support business-class network applications, so that airports can realize the following benefits:

- **Improved passenger satisfaction** - By providing corporate travelers with the ability to access high-speed Internet and company intranet services from a gating area or food court, airport operators can transform their business into a more versatile, integrated part of the mobile professional's life away from the office.
- **Web-enabled marketing** - Customer-facing access solutions give airport retailers a powerful new channel for marketing and promotional activities. Airport operators can customize hotspot home pages to include information, promotions, and special offers from airport retailers, restaurants, and other partners.

This "intelligent airport" infrastructure creates an unprecedented opportunity for improved services, enhanced processes, and cost-effective operations.

- **New revenue streams** - Manageable, wireless LAN solutions from Cisco allows airports to offer retailers, passengers, airlines and other tenants secure access to Broadband Internet services – including logistics, wireless, voice, and customer relationship management systems. This can provide financial returns on airport network investments, by allowing the airport to become a communications service provider. Airports can also easily offer tiered service levels to meet a range of passenger needs, from basic data service to high-bandwidth multimedia communications, and can even enhance their services further by deploying Web-enabled electronic billboards in high-traffic areas and selling advertising space.
- **Foundation for other IT systems** - A high-speed Internet access solution can also serve as a platform for supporting and enhancing an airport's internal processes. The Connected Airport framework provides a highly robust and scalable platform to support voice and video traffic, and wirelessly extend airport applications to mobile security, maintenance, and operations staff.

Integrate communication systems

Until now, airports have focused on improving the utilization their assets in silos, resulting in sub-optimal impact and return on investment (ROI). For example, the services which make up a typical aircraft turnaround cycle – from landing to parking, from gating to boarding, from cleaning to inspection – extend across multiple service providers.

Establishing an integrated, end-to-end airport environment can help improve the information flow across these business units, enabling more efficient and cost-effective processes, enriching collaboration, and creating a less complex infrastructure from which to manage all mission-critical relationships – with employees, partners, suppliers, agents and customers.

The Connected Airport framework enables new levels of efficiency, productivity and profitability by combining disparate networks into a single intelligent and integrated IP architecture. It links phones, displays, printers, and cameras from the gate, to the terminal, kiosk and baggage counter. This solution supports the constantly changing business requirements of an airport – providing a highly responsive, service-centric environment that can scale as required. Integrated security, wireless features, and IP communications give airport operators the flexibility to easily deploy innovative solutions and provide each department, tenant, or airline, with voice, video, and data services over a common IP network. This improves network cost-effectiveness, and offers an additional source of revenue from provisioning new, fee-based services to tenants. Common network standards also enable airports to reduce management and maintenance overhead, as well as staff training requirements, significantly improving return on investment.

Finally, the benefits of utilizing IP networks do not end with a single property. By extending such coherent IP infrastructures not only within buildings but also between buildings spread across the airport environment, the Connected Airport framework offers new possibilities. Networked buildings can be linked

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

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 can also access 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.

together into a connected portfolio. The open standards-based building infrastructure encourages a centralized (and/or remote) approach to monitoring, maintenance and control of the building environment, where building control systems across all properties can be controlled from a single place.

Improve physical security and respond faster to potential threats

Fast threat response is critical to maintaining public confidence. To enhance safety and security, all data related to a security threat needs to be correlated and communicated to security personnel, so that they can rapidly respond in an appropriate and effective manner.

Many airport security systems are based on incompatible applications that require manual coordination between alerts and alarms. Traditional airport surveillance networks also fall short, such as in the area of video surveillance, where video and alarm data must be sent to security centers for analysis before action can be taken. What's more, disparate networks and inadequate standards for security make it difficult to ensure that sensitive information will

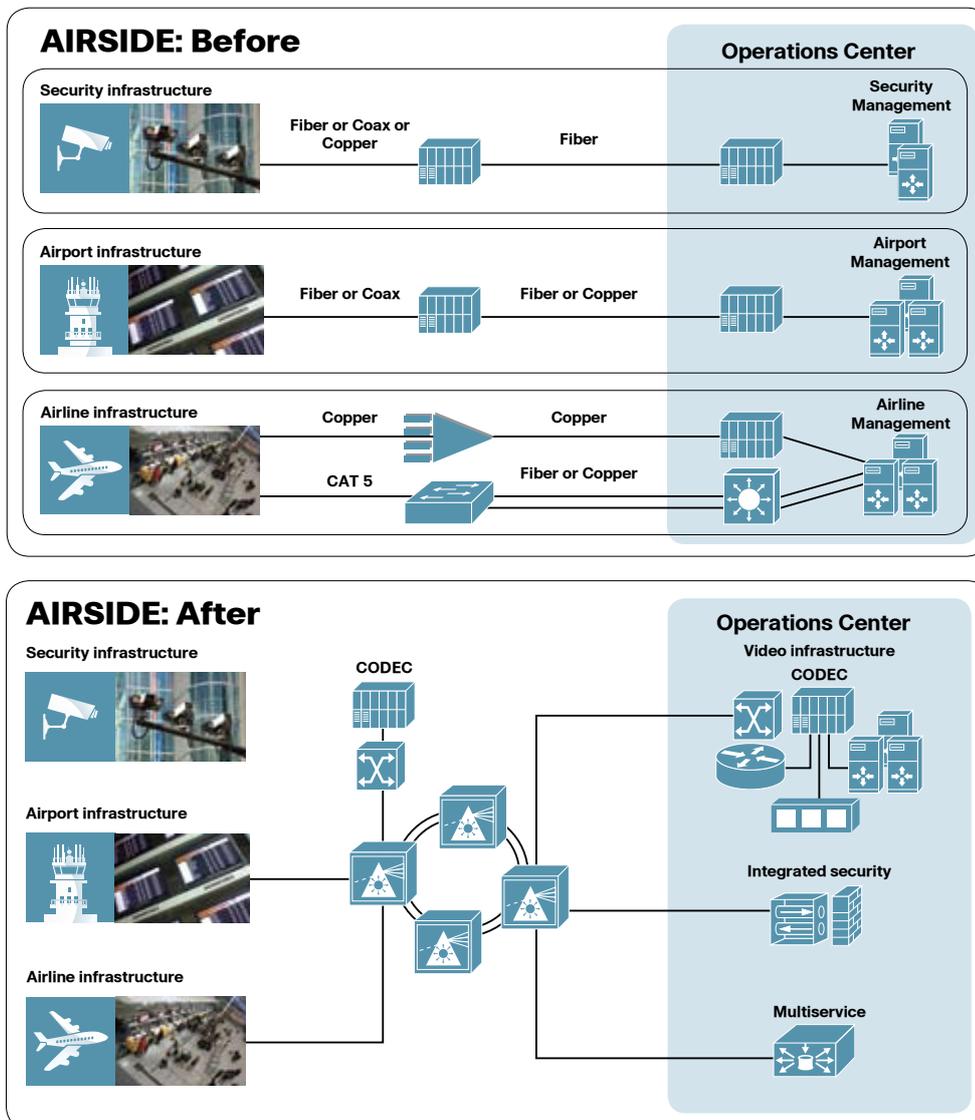


Figure 2: Airport security – before and after the implementation of a converged Cisco IP network

be distributed quickly and sent only to the people who need it, such as first responders, police, and other emergency security staff.

Connected Airport provides a robust network infrastructure that integrates existing video surveillance, other physical security devices, and devices for emergency response and communication throughout the airport. This ensures that investments in existing security systems are protected, while leveraging on a converged IP network to complement their functionalities. Vital communications - including such information as situation status updates, instructions, and threat advisories – can be delivered using converged data, voice, and video formats to desktop PCs, IP telephones, passenger information systems, roadside display systems, and public address systems.

Improve building monitoring and management technologies

The drive towards an intelligent airport is not just about providing new services and improving security for passengers and tenants – it's also about monitoring and managing building systems so that airport environments provide the optimal amount of comfort to its users, whilst minimizing wastage in terms of its resources. This is especially relevant in today's context, as "Green" initiatives become more important in the design, construction and management of buildings.

For example, how much energy would the airport save if the heating, air conditioning and power consumption were regulated according to the number of people in the building? What is the additional value that airport owners could generate if they had a more accurate picture of the way their services were being consumed, and could charge tenants accordingly? And how much more comfortable would it be for passengers and tenants alike to operate in an intelligent airport - where services could be tailored to personal preferences and instant access available to IT and communications systems?

In a nutshell, that's the promise of the Connected Airport vision. In conjunction with regional leaders like CNA (see box), Cisco offers intelligent and integrated facility management systems that monitors and manages diverse building systems in an airport in real time. These include:

- **Automated and networked HVAC systems -** This allows tenants to adjust the environment in their individual spaces, thus conserving energy and controlling costs. In addition, sensors can monitor equipment for an indication that preventative maintenance is needed.
- **Lighting control -** Lighting systems today can be accessed and computer-controlled by the building owner or by the tenant via web-based control systems. Lighting systems can now be linked to a centralized information system that shows point-in-time usage or usage patterns for either a single building or an entire portfolio.
- **Elevator control -** By network-enabling elevator systems, their operations can be monitored and optimized. Access control cards allow tenants programmable, selective access to certain floors. Interactive in-elevator terminals can stream content, ranging from news feeds to emergency instructions.

CNA makes it easier for Changi Airport to improve on manpower utilization

To maintain its operational edge, Changi Airport decided to centralize all support/helpdesk across its three terminal buildings into a single operations center.

This allowed building facilities across 3 sites to be monitored and reported to the central facilities management centre (FMC), reducing the need for operational duplication.

To ensure continuity of operations, a back-up FMC system was also put in place to ensure that each terminal could operate independently in the event of failure.

In addition, elevators can be continually monitored for performance and breakdowns to drive proactive maintenance.

- **Energy management** – Airport complexes consume large amounts of energy, and both building owners and tenants want to minimize energy wastage and utility bills. Energy management systems such as thermostats, environmental control systems, lighting, machinery and onsite generators can be network enabled. This allows airport owners and tenants to limit electricity and gas usage to the times when they are needed and reduces total energy costs.
- **Parking control** - Entry to parking areas can be controlled via access cards or other electronic identification methods. In addition to access control, parking systems can integrate with security, lighting, elevator and HVAC systems. These systems can be programmed to turn on and off for the individual tenant when they enter the parking structure. Parking costs can be monitored and accounted for electronically, reducing administrative overheads.
- **Digital signage** - By using computer controlled plasma or LCD screens, airport owners can integrate digital signage with their building automation systems to drive real time control of premises messaging content.
- **Flight information display systems (FIDs)** – Flight Information Display System & Gate Management System can be integrated with integrated facilities management systems (IFMS), so that real-time flight status (including delays) at the gates can be indicated on FIDS located throughout the terminal and the integrated facilities management system can respond correspondingly by extending the waiting lounge air-conditioning & lighting operating hours, re-scheduling the cleaning services for the waiting lounge, informing the cleaner via SMS, etc.
- **Access control** – Access control can also be managed on a granular level depending on the status of the flight. For example, cleaning crew access cards will only be activated when the aircraft has departed the gate. If HVAC, lighting or power systems at the boarding gate are faulty, data can be relayed back to the GMS to disable the use of that particular gate.
- **Baggage handling** – Building facility systems can also be used to monitor baggage systems, so that alternative belts can be scheduled in the event of downtime or maintenance.

Improve operational efficiency and reduce costs

If every tenant or airline operating at the airport had its own voice and data system, airport efficiency would nose dive. One reason is that airports cannot shift unused counters and other physical spaces to other airlines, wasting resources. Low-cost airlines that want to operate out of the airport face high barriers to entry because of the cost and delays associated with acquiring

CNA – a Cisco Systems partner for airport building management solutions

CNA provides an extensive array of services and solutions to automate, control and manage virtually every facility in the airport environment. The company's systems collect and integrate information from multiple points within the airport or across a network of buildings, to optimize the performance of critical facilities like air-conditioning, lighting, intrusion detection, access control, energy monitoring, voice, data and video communication systems.

CNA solutions are built, integrated optimized on the Connected Airport foundation, which results in lower initial costs and operational efficiencies that benefit airports.

voice, video, and data services. And tangles of physical cables complicate upgrades to the airport telecommunications infrastructure.

With a Cisco IP platform in place that unifies all communications, building and security systems, airport operators enjoy better cost effectiveness by providing a single platform for managing and monitoring all systems. Further cost savings can be achieved since airports can do away with separate networks for different systems, and consolidate monitoring and management facilities into one location for space savings. Other operational benefits include:

- Connected Airport solutions enable common-use environments that provide efficient utilization of check-in, gate, and baggage processing resources. A truly flexible common-use model depends on an intelligent, unified, IP-based network that instantly provides data, voice (telephony, public address), video (surveillance and broadcast), and other services to authorized users throughout the facility. At airport gates, a secure IP network with IP telephony enables an airline's flight manager to automatically provision the gate displays, printers, phones, and other networked devices for that flight. This gives airports the ability to create more flexible gate and check-in environments for airline tenants and provide the carriers with differentiated communications services, to meet the unique needs of each airline. The airport improves gate utilization, avoids new terminal construction, improves aircraft turnaround, and reduces airline gate costs.
- Provide access to airport and airline systems using PCs as well as wired or wireless Cisco IP phones, and scale up for new users and IP-based applications much more quickly than possible with legacy communications systems
- Integrate emerging technologies like RFID and location tracking so that operators can keep track of baggage, emergency equipment, and mobile assets such as fuel trucks, airport vehicles, or even wheelchairs.
- Reduce total cost of ownership of the network by managing and maintaining one network that unifies voice, data and building system networks. This enables self-service when devices are moved, added, or changed; and simplifies application integration.

CNA SIRIUS™ **For complete integration, management and control of airport management systems**

CNA SIRIUS™ is an integrated multi-thread and multi-tasking facilities management and control system which seamlessly integrates various airport subsystems with the airport management system to provide airport operational staff with effective, safe, easy-to-use, unified functions for efficient operation of the airport.

CNA SIRIUS™ pulls together all aspects of running an airport, manpower and equipment, security management and energy management and offers real-time data through a single management dashboard. This dashboard allows an entire range of airport operations and building management tasks to be performed at ease, including:-

- Resource allocation of workforce and mobile assets
- Automated fault reporting and management for HVAC, escalators, aerobridges, baggage belts and other airport building assets
- Security and access control
- Real-time crisis management by directing events and alarms to the relevant security experts

By running CNA SIRIUS™ over a single Cisco IP network, the airport operator can converge voice, video and data systems onto a single network, allowing a higher level of integration between different sub-system. Information can be shared quickly, thus increasing work flow efficiently. Ultimately a single network reduces operational and maintenance costs, and provides the platform for the airport operator to explore and deliver innovative solutions to improve worker productivity and provide a "hassle-free" airport environment to its customers.

- Help keep flights on time by sending automated reminders to the airline gate agent's Cisco IP phone to board a certain class of passenger at a predefined interval before take-off.

The Connected Airport framework provides airport operators with the optimal path towards achieving this vision. Ultimately, this concept will facilitate the transformation of the airport industry, by benefiting all stakeholders in the design, construction, and management of the airport, as well as the users and tenants of the final build environment.

Considerations for a Connected Airport

An airport building lifecycle comprises four main phases – conceptualizing, designing, constructing, maintaining and operating the airport, as depicted below:

- **Conceptualize** - The phase in which the airport is scoped and financed, conceptualization consumes about two per cent of the total costs of the building lifecycle.
- **Design** - During the design phase, architects and engineers plan the detailed layout and the structure of the airport
- **Construct** - In the construct phase the building is erected to its design specifications. Together, the design and construct phases account for some 20 per cent of the total costs of the building lifecycle.
- **Maintain and Operate** – This phase represents the time during which the building is used, typically 25 to 30 years in today's fast-moving environment. It accounts for 75 per cent of the total costs of the airport's lifecycle.
- **Retrofitting** – This phase occurs when various elements of the building's infrastructure need to be upgraded to cope with new demands, deliver new services, or to renew or improve the operational efficiency of outdated assets.

With three-quarters of the total expense of a building occurring during the Maintain and Operate phase, rather than as initial capital expenditure, decisions taken in the design and construct phases can have far reaching financial and operational effects. Therefore during those phases key stakeholders should carefully consider an airport's underlying network. Decisions made during the early stages can effectively create the levers that reduce ongoing operations

Cisco Unified Wireless Network Technologies Help Create One of the World's Largest Airport WLANs for the Airport Authority Hong Kong

The Airport Authority Hong Kong (AA) deployed a Cisco Unified Wireless Network Solution to replace its previous installation, creating one of the world's largest airport WLANs in terms of coverage and number of access points. The WLAN enables the AA to achieve highly efficient flow management by ensuring timely information access and exchange, and automating cargo and passenger flow at the Hong Kong International Airport (HKIA), the world's busiest international cargo and fifth busiest international passenger airport.

The Cisco WLAN has already brought enormous enhancements to customer service at the HKIA. These include the provision of the highly efficient on-demand mobile check-in service, swift and highly secure baggage tracking and reconciliation, and punctual aircraft turnaround on the apron.

costs over the lifecycle of the buildings, as well as improve the opportunity to create revenue streams in the appropriate markets.

The inclusion of a Connected Airport IP network in the building design process, and its installation as early as possible in the construction process, provides immediate gains for airport owners. The Cisco IP network reduces capital costs during the construction process, because infrastructure can be laid more easily (rather than being retrofitted with consequent cost and disruption) and the single open standards cabling infrastructure reduces the requirement for multiple closed proprietary networks and the associated costs of installing them. Secondly, by installing networks early, building owners can extract value from the network over a longer period of time, increasing overall return on investment.

The inclusion of a Connected Airport IP network in the building design process, and its installation as early as possible in the construction process, provides immediate gains for airport owners.

Conclusion

The IP network is the agent that enables the transformation into a Connected Airport, and connectivity is the critical attribute it creates. In this context, connectivity can be thought of as the ability to facilitate interaction among devices and systems to enable new services. Connectivity in airports should be thought of from two perspectives: the IT perspective and the building-systems perspective.

In the IT world, convergence combines data, voice, and video onto a common network. This network becomes the fourth utility alongside water, electricity, and gas. From the building-systems perspective, systems which include HVAC), lighting, physical security and access control, fire safety, elevator and electrical controls, and even digital signage are connected together using a single network, running on a centralized management interface. The building can be thought of as the embodiment of the network - the physical framework in which it's deployed.

As partners in delivering the Connected Airport framework, Cisco and CNA are committed to realizing the vision of a truly Connected Airport.

A worldwide leader in business networking, Cisco provides a comprehensive framework and networking solution for airport needs and offers a secure, adaptable, standards-based architecture that easily accommodates today's needs and future services while protecting network investments. CNA offers more than a decade of experience in implementing airport building management and automation solutions, and is unwavering in its focus on innovation, project execution excellence and integrity of service.

With proven best practices for deploying real estate industry network solutions, developed through close working relationships with real estate customers and industry groups, Cisco and CNA are well positioned to help airports in Asia Pacific transform themselves into airports of the future.

To find out more, visit:

The Connected Airport –

www.cisco.com/web/strategy/transportation/airports

About Cisco

Cisco Systems, Inc. is the worldwide leader in networking for the Internet. Today, networks are an essential part of business, education, government, healthcare, transportation and home communications, and Cisco Internet Protocol based (IP) networking solutions are the foundation of these networks. Cisco hardware, software, and service offerings are used to create internet solutions that allow individuals, companies, and countries to increase productivity, improve customer satisfaction and strengthen competitive advantage. The Cisco name has become synonymous with the Internet, as well as with the productivity improvements that Internet business solutions provide. At Cisco, our vision is to change the way people work, live, play and learn.

About CNA

For more than 15 years, CNA Group has played a key role in delivering vital integrated solutions converging facilities, business and IT systems to airports, buildings and industrial plants around the Asian region.

CNA provides an extensive array of services and solutions to automate, control and manage virtually every facility in the airport environment. The company's systems collect and integrate information from multiple points within the airport or across a network of buildings, to optimize the performance of critical facilities like air-conditioning, lighting, intrusion detection, access control, energy monitoring, voice, data and video communication systems.

CNA solutions are built, integrated optimized on the Cisco Connected Airport foundation, which results in lower initial costs and operational efficiencies that benefit airports.



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