Nokia Optical LAN for Airports
Sustainable and scalable connectivity for advanced digital operations
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Powering the digital airport

Airports have always been at the forefront of advances in technology driven by their commitment to provide an efficient, enjoyable and safe travel experience for passengers. Today they are embracing Industry 4.0 digital technologies such as industrial IoT, artificial intelligence and machine learning to expand their operational awareness, automate processes and improve their end-to-end efficiency.

As the digital sophistication of the airport increases, the airport local area network (LAN) has to expand to provide secure, high-bandwidth and reliable connectivity for gate operations, baggage systems, ticketing, security systems, biometrics, surveillance cameras, paging, digital signage and phone and video sub-systems.

The network must also provide connectivity to stakeholders providing services from restaurants and shops, to travel agencies and ground transportation support. It should deliver robust support for wireless systems including Wi-Fi for passengers and private wireless for airport operations, as well as critical communications for police and first responders.

The Nokia Optical LAN solution provides a cost-effective, scalable and flexible LAN that can support all of your airport sub-systems and grow with you as you adopt new digital applications and services in the future.
The rapid growth in bandwidth requirements over the years has likely led you to make multiple upgrades to your airport LAN. This may take the form of running new copper cabling or adding new generations of switches and routers. Whether contemplating new builds or upgrades, you need a more scalable and sustainable approach to the airport LAN.

Passive optical LANs (POL) leverage the tremendous bandwidth capacity of optical fiber, as well as its ability to cover large distances without the need for intermediate electronics — up to 20 km of distance between the central switch and the end device. The reduced need for intermediate electronics, enables you to gain space that can be used for concessions or retail.

Most airports today have deployed CATx-based LAN networks. These networks are distance restricted and require a closet or equipment room no more than 90 meters away from the end device. These wiring closets and rooms take up space that cannot be monetized, as well as introducing additional costs such as HVAC and fire suppression. The space gained with POL can be used for concessions or retail — valuable non-aeronautical revenue generation for the airport.

Fiber’s ability to support terabits of bandwidth also provides investment protection for the airport. Copper-based CATx cabling has bandwidth limits that will make it unable to meet the ever-growing bandwidth hunger of passengers and digital operational processes in the future. The costs associated with upgrading a passive CATx cable infrastructure are significant. With its much larger capacities, a POL solution avoids these costs and provides you with the wireline LAN foundation to fully support your digitalization journey.

The Nokia Optical LAN is rooted in the telecommunication industry, meaning, it is designed to support service availability up to 99.999% of the time (five 9s). Airports have many sub-systems with a range of service availability requirements. Nokia’s Optical LAN solution fully supports this mix of service requirements for all of your airport sub-systems and is able to scale as your needs expand. Nokia’s Optical LAN solution is very flexible, supporting from tens to tens of thousands of ports. Currently, it supports 10 Gbit/s to the device (ONT), with a 25 Gbit/s solution coming soon.
Airport optical LAN infrastructure
The Nokia Optical LAN solution

Nokia’s Optical LAN solution for airports uses a fiber-based LAN technology to address the shortcomings of today’s copper-based LANs and meet the requirements of Airport 4.0. The lightweight and space-saving LAN solution uses fiber optic cabling and splitters, thus avoiding the power and cooling costs associated with traditional CATx LAN infrastructure.

Nokia’s POL solution has a simple, flat architecture. The central switch, or Optical Line Terminal (OLT) is typically installed in the main IT room of the airport. Optical Network Termination units (ONT) terminate the fiber and provide Ethernet connections to the airport subsystems or end devices, with the option to support Power over Ethernet (PoE).

The connection between the OLT and ONTs is based on single mode fiber. A passive optical splitter in between the OLT and the ONT allows the OLT to support tens of ONTs per OLT port. There are different optical splitter variants, such as 1 to 32 split (1:32), which would provide 32 fiber connections from a single OLT port.

The OLT also provides the connection to the airport campus core network. The complete Nokia Optical LAN network is managed by the POL Command Center (PCC).

1. Management
   PCC = POL Command Center

2. Central Switch
   OLT = Optical Line Terminal

3. Optical Splitter
   passive equipment, no power

4. GPON Terminal Equipment
   ONT = Optical Network Termination

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Take control of your operations

The Nokia Optical LAN network is managed by the POL Command Center (PCC). The PCC is an advanced management solution optimized for performance and usability in enterprise environments such as an airport. As part of the Nokia Optical LAN solution, Nokia’s PCC provides a highly intuitive, simplified environment for configuration, automatic service activation, fault reporting, troubleshooting and maintenance. Despite the growing scale and number of connections within your airport LAN, Nokia’s PCC removes the complexity from airport IT operations, helping you to better serve your clients’ and partners’ connectivity needs and increasing your non-aeronautical revenue.

A few highlights of Nokia’s PCC management system are:

Service offering
The PCC simplifies management of the network, with quick and easy rollout of new services. Activation of new services is facilitated with pre-defined service definitions tailored for specific uses. In addition, the PCC verifies your service level agreements (SLAs) using graphed metrics.

Maintenance
The PCC provides easy navigation to network elements and their physical locations in the terminal using a realistic network view based on your specific floorplan.

Automation
The PCC supports many automated capabilities such as the use of predefined services. In addition, it simplifies network growth with automated ONT discovery and activation.

Security
The PCC supports role- and resource-based access control. This ensures that IT staff can only access those parts of the network to which they’re allowed based on pre-defined roles such as admin, designer, observer, etc. The Nokia Optical LAN solution also comes with built-in military grade AES-128-bit data encryption.
The benefits of going optical

The Nokia Optical LAN solution introduces several benefits to your airport. The three main ones are described below.

**Saving space**
Nokia’s solution removes the need to use airport closets or equipment rooms that hold racks for switches, MDF and HVAC. The space gained can be used for retail, concessions or other use cases, thus improving the passenger experience as well as the ability for the airport to generate more non-aeronautical revenue.

**Cost efficiencies**
The costs associated with the Nokia Optical LAN solution are significantly lower than CATx solutions. In addition to lower CAPEX and OPEX, additional cost benefits include reduced power consumption, reduced HVAC investment and reduced footprint (for new builds). From a pure solution hardware and software perspective, Nokia Optical LAN demonstrates up to 50 percent total cost of ownership (TCO) over a similarly scaled CATx solution.

Fiber is an investment protection for the airport that anticipates the ever-growing data needs of passengers, partners and airport operations and avoids the costly replacement cycles that passive CATx cable infrastructure imposes.

**CO₂ reduction**
Nokia Optical LAN is a proven “green” solution and the power consumption of Nokia Optical LAN is much lower compared to a CATx solution. CATx solutions use a lot of intermediate switches, which consume a significant amount of power. Optical LAN power savings vary a lot depending on network configuration and size and can be as much as 40%.
Nokia and aviation

Nokia has extensive experience serving the Aviation Transport Industry (ATI) with a client base including ANSPs, airports, airlines, aircraft manufacturing and MRO companies. Nokia has been engaged in a number of optical LAN projects within the aviation industry. With respect to airports, Nokia has been involved with greenfield and brownfield projects connecting various airport subsystems to the POL network.

In addition, Nokia Optical LAN has been deployed at airport admin buildings and airport hotels.

Nokia has also been involved with aircraft maintenance, repair and overhaul (MRO) companies connecting their hangars and providing surveillance networks. Globally, Nokia has deployed more than 300 Optical LAN networks with a multitude of enterprises, service providers and the public sector.

Nokia is well placed to build the essential fabric of the digital airport, providing the reliable broadband connectivity — wired and wireless — to connect all people, processes and systems and create benefits for passengers, airlines and partners.

Sample Customers

- Helsinki Airport
- Vienna International Airport
- Brussels Airport
- Berlin Brandenburg Airport
- Berlin Schönefeld Airport
- Hamad International Airport
- ENAV
- Skyguide
- Avinor
- Irish Aviation Authority
- International Airlines Group
- Lufthansa Technik

Memberships

- Civil Air Navigation Services Organization
- Airports Council International
- Air Traffic Control Association
- EUROCONTROL
- International Civil Aviation Organization
- Seamless Air Alliance
- Aerospace Industries Association

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About Nokia
We create technology that helps the world act together.

As a trusted partner for critical networks, we are committed to innovation and technology leadership across mobile, fixed and cloud networks. We create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Adhering to the highest standards of integrity and security, we help build the capabilities needed for a more productive, sustainable and inclusive world.

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