boldyn NETWORKS

GATEWAYS TO WIRELESS: ADVANCED CONNECTIVITY FOR AIRPORTS

Network solutions that support your airport’s digital transformation

The airport of the future is here

Airports across the globe are transforming. Once just a space for travelers to pass through, many are becoming exciting destinations in their own right, offering unique shopping, dining and entertainment experiences.

Some have developed into full-fledged aerotropolises, with hotels, malls and business parks, meeting and leisure facilities, flexible workspace and seamless integration with public and private transit systems.

The commercial potential of the transformed airport extends far beyond flight capacity, unlocking many new opportunities for revenue generation and financial growth.

But to be successful, it must work for everyone—from travelers to operational activities and security of the airport.

New technology investments are driving airport transformation

A crucial element of a successful transformation is the technologies that underpin every operation. In 2024, Amadeus found that 94% of airport leaders were planning new technology investments, with nearly half planning to spend ‘aggressively’.

Planned investments range from biometric check-in, contactless payment and immersive entertainment options to automated baggage handling, predictive equipment maintenance and AI-powered surveillance. They support strategic initiatives including improving the airport user experience, boosting efficiency and sustainability, and keeping people and assets safe.

Why connectivity is critical to airport transformation

Transformative technologies can't function without adequate connectivity—the wired and wireless networks that enable the fast, secure and reliable transfer of data. As airports invest further in automation, Internet of Things, AI and immersive experiences, its connectivity infrastructure must transform too.

60% **annual increase in data usage among airport travelers**

That's why forward-looking airports are working with expert partners to design and build resilient, scalable and secure networks that support today's transformation initiatives and tomorrow's.

How connectivity can support airport operations day-to-day

For the passengers

Check in, boarding pass, bag check, purchase concessions, reliable connectivity in high density areas, and walking from one part of the airport to another with seamless hand off and more reliable connectivity.

For airport operations

Ticketing, bag check, analytics (better signal better coverage yields more data), toilet cleaning response, clean up response, maintenance operations and location/mobile scanners.

For tenants and concessions within the airport

Support club services, merchandise scanners/PoS, customer self-order, and seamless connectivity experience between spaces.

From Wi-Fi to dark fiber: Network solutions to support your airport transformation

In this paper, we'll dive into the network solutions that support, accelerate, and optimize airport transformation initiatives—from next-gen Wi-Fi networks that keep workers and travelers connected, to private wireless that keep sensitive airport data flowing securely.

We'll also home in on a key feature of many modern airport networks—neutral host infrastructure that brings different carriers' LTE and 5G networks into the airport environment in an economical, energy-efficient and unobtrusive way.

Finally, we'll look at the benefits of working with an expert partner to design, build and manage a network infrastructure that supports the airport's transformation goals now and into the future.

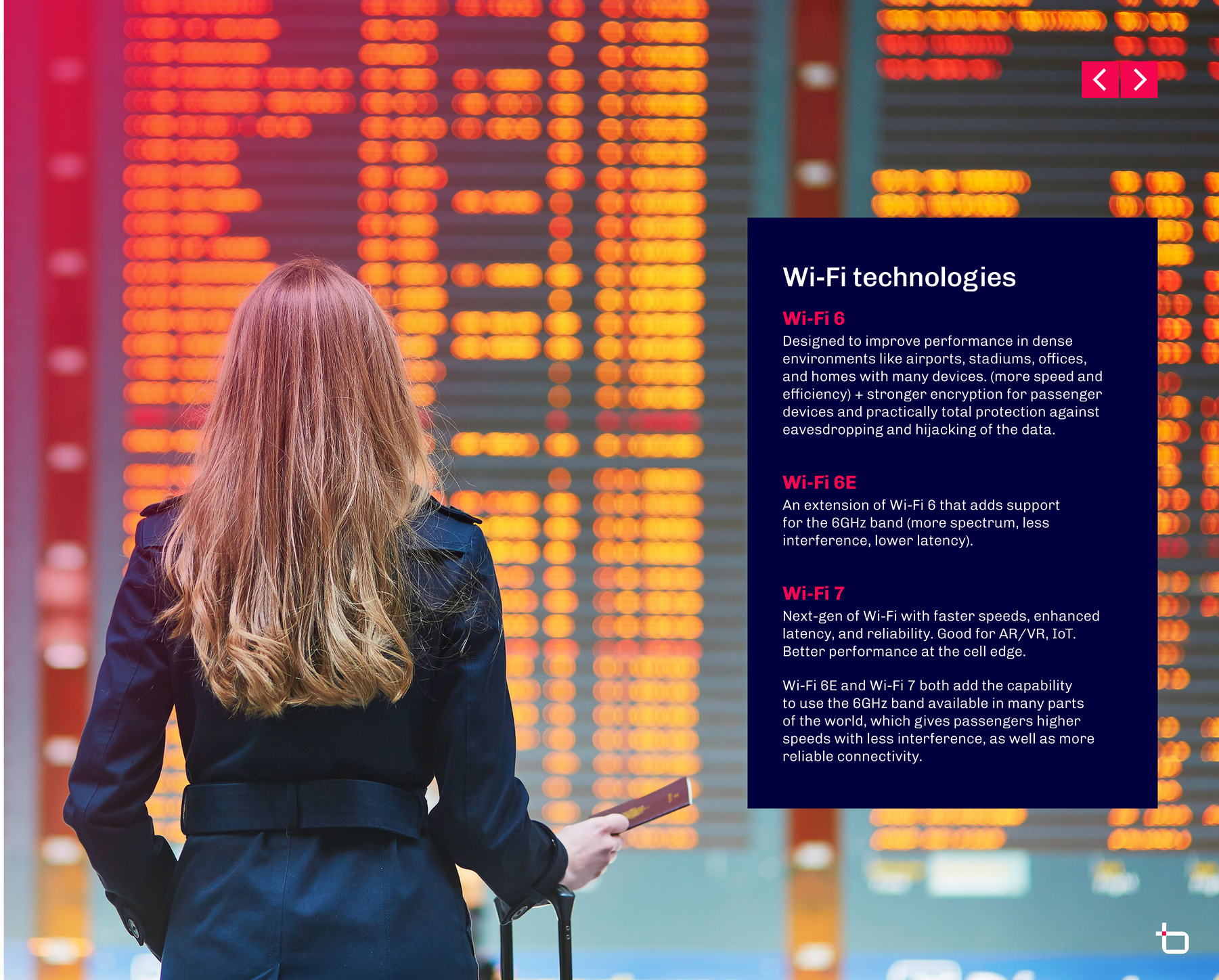
Wireless networks

Next-generation Wi-Fi

Connectivity is a key part of the traveler experience, whether they're uploading a finished presentation from an airport café, watching streaming video as they wait for their flight, or holding a videoconference in the executive suite. There's a fundamental expectation that the airport's public Wi-Fi will provide fast, glitch-free coverage for all of these activities.

Wi-Fi is essential behind the scenes, too, connecting check-in desks, employee laptops, digital signage and points of sale to servers, printers and cloud platforms. And onsite Wi-Fi services are fast becoming an important revenue stream for aerotropolises with conference facilities.

For airport operators, a wealth of analytical insight can be gleaned from Wi-Fi use—something that's not possible with third-party operators' cellular networks. Understanding where, how and why people connect to the airport Wi-Fi can provide insights into footfall, dwell and wait times, space utilization and digital habits that can all feed into strategy and planning.



Wi-Fi technologies

Wi-Fi 6

Designed to improve performance in dense environments like airports, stadiums, offices, and homes with many devices. (more speed and efficiency) + stronger encryption for passenger devices and practically total protection against eavesdropping and hijacking of the data.

Wi-Fi 6E

An extension of Wi-Fi 6 that adds support for the 6GHz band (more spectrum, less interference, lower latency).

Wi-Fi 7

Next-gen of Wi-Fi with faster speeds, enhanced latency, and reliability. Good for AR/VR, IoT. Better performance at the cell edge.

Wi-Fi 6E and Wi-Fi 7 both add the capability to use the 6GHz band available in many parts of the world, which gives passengers higher speeds with less interference, as well as more reliable connectivity.

Wi-Fi network design is critical

With a need for fast, reliable and secure Wi-Fi both inside and outside the airport, network design is key. Key considerations include:

- **Speed and capacity:** The latest Wi-Fi 6e and Wi-Fi 7 technologies can operate in the higher-frequency 6GHz band, delivering a massive boost to Wi-Fi speed and capacity and future-proofing the network for new demands and growing data loads.
- **Availability and continuity:** Identifying the best places to site access points is essential for providing the coverage that airport users expect, as is building adequate redundancy into the network to ensure continuous Wi-Fi availability.
- **Security:** Providing public Wi-Fi to airport users means millions of unknown devices connecting to the network. Securing the network with the latest authentication and encryption technologies is non-negotiable.
- **Monetization:** Tiered Wi-Fi services can be significant revenue-generators for aerotropolises with conference, exhibition and workspace facilities. Partitioning the network to deliver different tiers of service is key to any Wi-Fi monetization strategy. Other monetization strategies include advertising and sales promotional activities using online services.

CASE STUDY

Seamless Wi-Fi connectivity at Nashville International Airport

An airport-wide network in Nashville is set to provide ubiquitous connectivity throughout the airport's terminals, concession stands, gate areas, garages, and ridesharing spaces.

Boldyn worked with the airport to design and build a Wi-Fi network that delivers superior connectivity from the moment people set foot in or touch down in Music City. Multi-layered redundancy and advanced monitoring delivered from our Network Operations Center (NOC) provide unmatched security, reliability, and optimization levels for speed and performance.

Read the full story

Private LTE and 5G networks

When critical airport operations rely on fast, seamless connectivity, a private LTE or 5G wireless network is an ideal solution.

Private wireless networks offer the same speed and capacity benefits as MNOs' public networks, but in a closed environment, managed by an expert partner, and accessible only to authorized devices. This means private wireless can provide guaranteed, secure bandwidth for business-critical and safety-critical applications across the airport, with low risk of disruption or outages.

93%

of private wireless early adopters achieved ROI within 12 months

GlobalData, Nokia Industrial Digitalization Report 2024

CASE STUDY

Private LTE transforms operations at Finavia Helsinki Airport

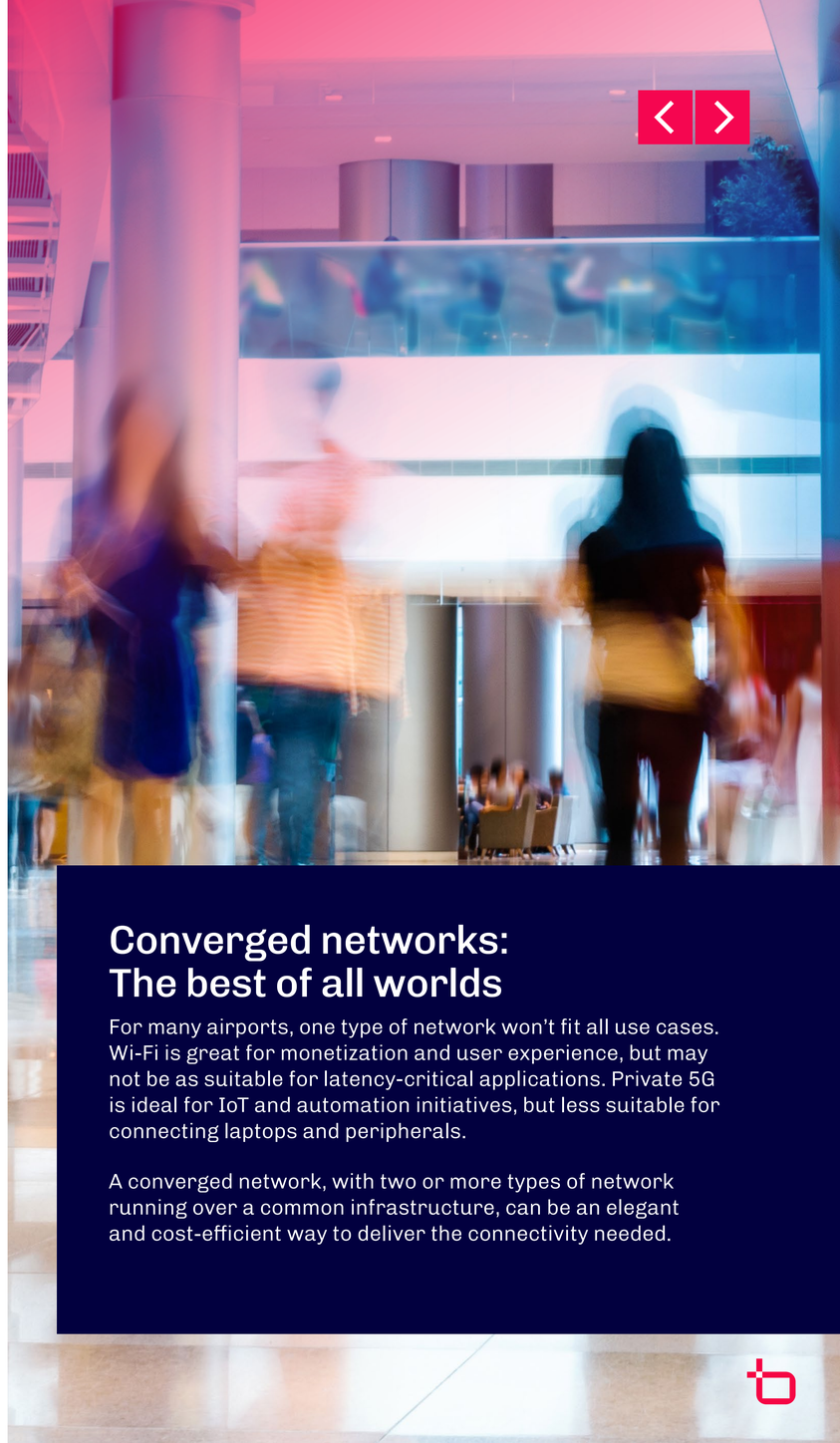
Finavia Helsinki Airport in Finland was experiencing major connectivity issues across the site. Boldyn implemented a private LTE network with guaranteed high-speed, high-bandwidth connectivity for use cases including machine vision for maintenance vehicles and real-time video streaming for the onsite fire department.

Read the full story

While it might seem like a significant investment, ROI on a private wireless network can be achieved within 12 months, and the operational benefits for airports are far-reaching, including:

- **Support for IoT strategies:** For airport applications that rely on the Internet of Things—like building management systems and predictive maintenance—a private wireless enables glitch-free real-time data collection from thousands or millions of sensors, supporting operational efficiency and sustainability initiatives.
- **Connected operations:** A private wireless can support any connected technology—from eGates connecting to cloud databases for biometric identification, to AI-powered analysis of streaming video from perimeter surveillance drones.
- **Large-scale asset tracking:** The airport environment carries a high risk of items getting lost, subject to theft, or being moved to the wrong place. Asset tracking via electronic tagging is an effective solution, and a private wireless provides the secure, guaranteed connectivity needed to keep constant track of baggage, equipment, and vehicles.
- **Low latency for automation:** A private wireless can provide the reliable, low-latency connectivity needed for the safe operation of automated and autonomous equipment. From baggage-handling robots to self-driving shuttles and perimeter surveillance drones, private 5G can help to maximize the efficiency and cost-saving benefits of automation and autonomy.
- **Expanded network coverage:** Private LTE or 5G networks can extend coverage into spaces where it's not economical to install fixed Wi-Fi access points. In particular, 5G's use of higher frequencies means it can provide reliable coverage in spaces containing equipment or materials that can block lower-frequency Wi-Fi signals.

Overall, a managed private wireless can accelerate and maximize the value delivered by airport transformation initiatives, ensuring a faster return on investment in new technologies.



Converged networks: The best of all worlds

For many airports, one type of network won't fit all use cases. Wi-Fi is great for monetization and user experience, but may not be as suitable for latency-critical applications. Private 5G is ideal for IoT and automation initiatives, but less suitable for connecting laptops and peripherals.

A converged network, with two or more types of network running over a common infrastructure, can be an elegant and cost-efficient way to deliver the connectivity needed.

Neutral host infrastructure

Airport users expect to be able to connect to their chosen cellular network wherever they are in the airport—from the parking garage to the departure gate.

At the same time, ubiquitous cellular coverage is essential to many airport transformation use cases—like downloading e-tickets, notifying travelers of gate changes or special offers, and personalized digital signage.

A key challenge is that the signal from mobile network operators' (MNOs) masts often doesn't reach every corner of the airport—and even when it does, the network can quickly become congested. But if the airport partners with individual MNOs to extend coverage into the airport, it can cover more areas and combine into a single neutral host network infrastructure.

CASE STUDY

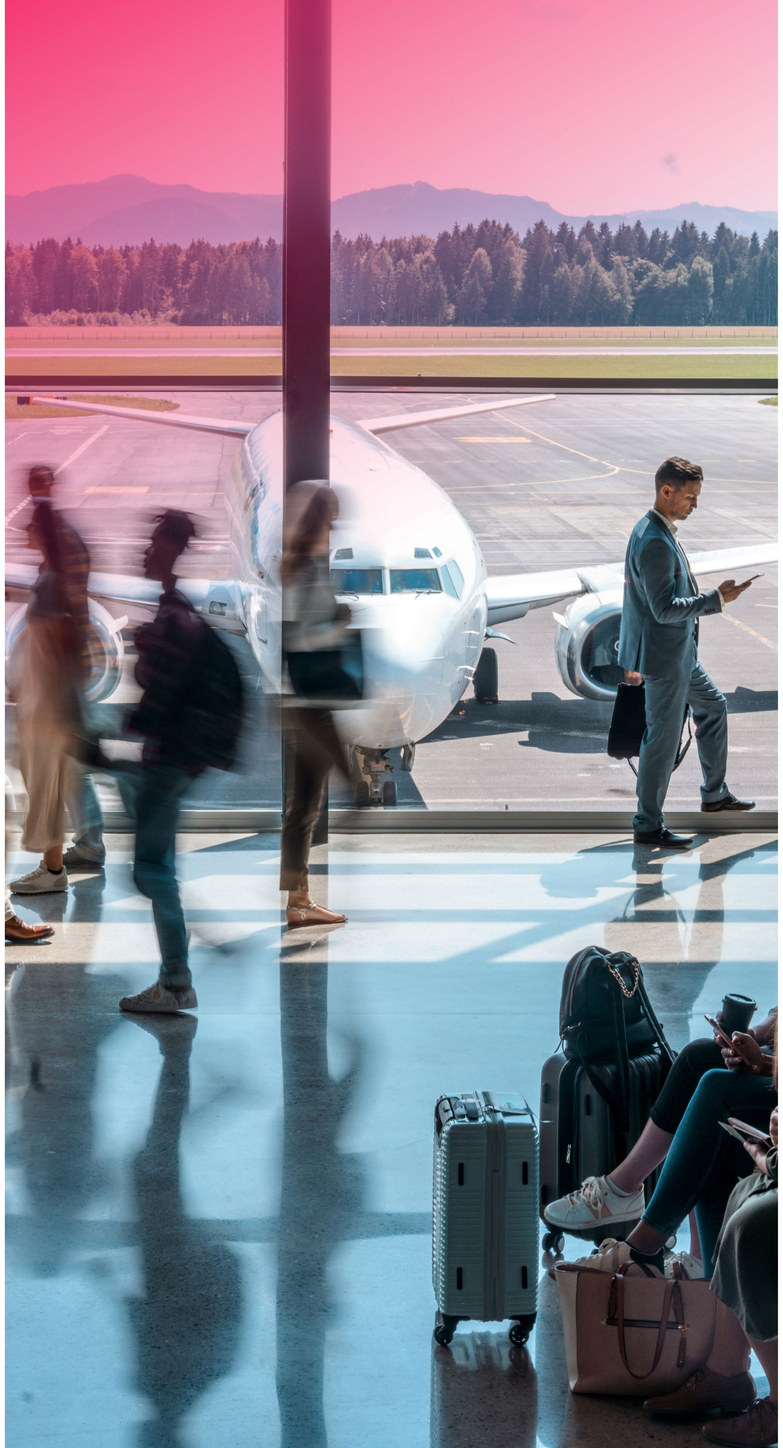
Asheville Regional Airport connects millions of travelers with 5G DAS

Asheville Regional Airport connects millions of travelers with 5G DAS.

Asheville Regional Airport, NC, is one of the fastest-growing airports in the U.S., surpassing 2 million annual passengers for the first time in 2023. It's now developing a state-of-the-art passenger terminal designed to elevate the overall travel experience.

As part of that project, Asheville Airport engaged Boldyn to install a 5G DAS that will give millions of travelers, vendors and nearby businesses the connectivity they need—making journeys more enjoyable, productive and safe.

Read the full story



Cost-effective, airport-wide cellular coverage

An effective solution is to work with an expert partner to install neutral host infrastructure—carrier-neutral hardware that can be shared by multiple MNOs—throughout the airport.

The hardware can then be leased to MNOs, saving them the cost of building out their own infrastructure in the airport, minimizing footprint and power consumption, and creating a valuable new revenue stream for the airport operator.

Neutral host infrastructure solutions for airports come in two main forms—distributed antenna systems (DAS) and small cells. Let's have a quick look at each.

Distributed antenna systems

DAS extends public mobile signals both indoors and outdoors using a network of antennas. It's effectively a miniature cellular network, boosting coverage in large, high-footfall sites.

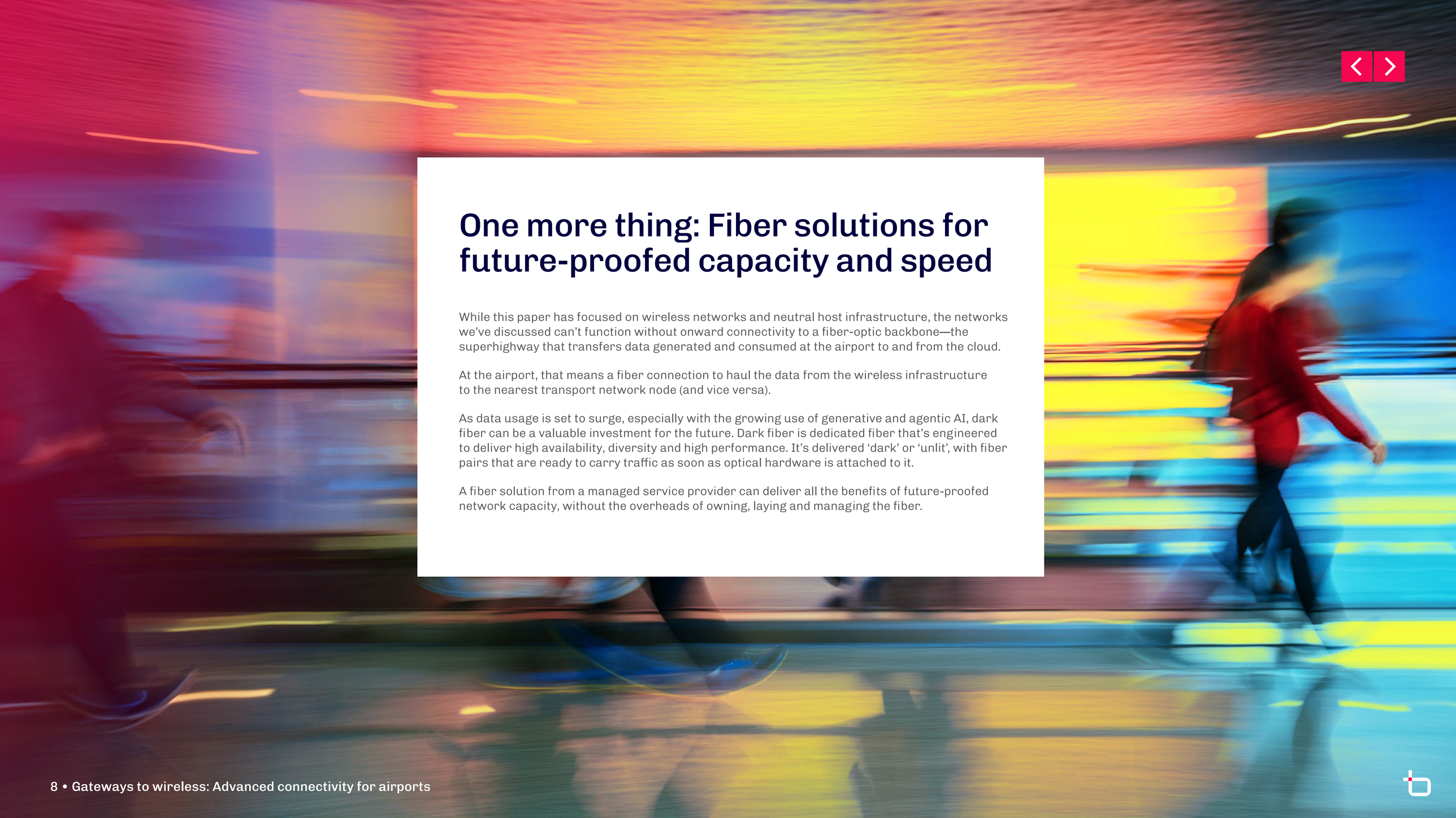
DAS solutions typically use high-speed copper or fiber-optic cabling to connect antennas that are distributed across the airport, enhancing 4G and 5G delivery from multiple MNOs' networks.

A neutral host DAS removes the need for individual MNOs to install their own equipment, reducing costs for the MNO and reducing complexity and power consumption for the airport operator. Leasing the DAS to MNOs can also be an attractive revenue-generator for airport operators.

Small cells

Small cells enhance mobile connectivity in busy spaces by boosting the coverage and capacity of public mobile networks. They provide a strong wireless signal across a short range (usually 5 –15,000 square feet), with secure backhaul to the MNO's network via fiber-optic cable. The range can be increased by using small cells in conjunction with DAS.

Small cells can be installed indoors, improving floor-by-floor coverage in taller buildings. However, some outdoor small cell solutions use millimeter wave spectrum, which can't penetrate buildings. In that case, a solution like DAS is required to enhance mobile network coverage and capacity indoors.



One more thing: Fiber solutions for future-proofed capacity and speed

While this paper has focused on wireless networks and neutral host infrastructure, the networks we've discussed can't function without onward connectivity to a fiber-optic backbone—the superhighway that transfers data generated and consumed at the airport to and from the cloud.

At the airport, that means a fiber connection to haul the data from the wireless infrastructure to the nearest transport network node (and vice versa).

As data usage is set to surge, especially with the growing use of generative and agentic AI, dark fiber can be a valuable investment for the future. Dark fiber is dedicated fiber that's engineered to deliver high availability, diversity and high performance. It's delivered 'dark' or 'unlit', with fiber pairs that are ready to carry traffic as soon as optical hardware is attached to it.

A fiber solution from a managed service provider can deliver all the benefits of future-proofed network capacity, without the overheads of owning, laying and managing the fiber.

The importance of working with an expert partner

As we've seen in this paper, the latest wireless network technologies and neutral host infrastructure solutions can enable, accelerate and optimize airport transformation initiatives.

The greatest value comes from working with an expert partner who can design, build, operate, monetize and evolve the network on the airport's behalf.

We connect over 6 billion trips every year, making journeys more enjoyable and productive through seamless connectivity.

For a growing number of airports around the world, that partner is Boldyn. We deliver the wired and wireless infrastructure behind the world's most demanding airports and transit hubs, connecting over 6 billion trips every year in high-capacity airports, train stations and seaports.

Working hand in glove with our airport customers, we design and build networks that perform under pressure, scale with demand, and align to evolving operational and passenger needs.

And we're not just here for the build stage. As a partner for the long-term, we also operate and maintain the network, with 24/7/365 monitoring to ensure seamless coverage everywhere.

What we do

- Assess your infrastructure and understand your connectivity requirements
- Plan and design all aspects of your solution
- Deploy everything needed to deliver the connectivity required
- Integrate with our US-based network operations centers (NOC) for ongoing monitoring and support
- Optimize your network with proactive maintenance, testing, and more

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Boldyn Networks is one of the world's largest neutral host providers and a leader in wired and wireless connectivity infrastructure, delivering the advanced shared network infrastructure needed for a smart, inclusive, and sustainable future. It brings together the combined scale and expertise of industry-leading companies with a single purpose: to unlock the power of an interconnected future. From interconnected transit, venues and enterprises, smart cities, next-generation and bespoke private wireless, to smart campuses, Boldyn enables new possibilities in the way people live, work and play.

Bringing connectivity to the most complex environments. Our portfolio is harnessing fiber, accelerating 5G, and looking beyond to the next breakthroughs.

Our global operations span North America, Europe, and Asia.
Boldyn Networks. Reimagine tomorrow. Transform today.

To learn more visit **boldyn.com**