IMAGINE WIRELESS

Digital Transformation 2.0:
A Vision for Airport Operators

Navigating Headwinds While Seeking Tailwinds

Across the globe, airports vary widely in terms of ownership structure, physical size, passenger volume, and markets served, as well as numerous other geographic, commercial, and technical attributes. Despite the expansive variety that airports collectively represent, they are unified by a mandate to operate safely, in compliance with prevailing government regulations, and with fiscal responsibility to their respective stakeholders.

Airport operators are responsible for providing transportation services that are essential for the proper function of their societies and economies. In so doing, they face a variety of challenges that complicate their ability to fulfill their mission. Fortunately, they can also increasingly access opportunities to simplify their efforts, improve outcomes, and achieve new levels of performance.

Challenges
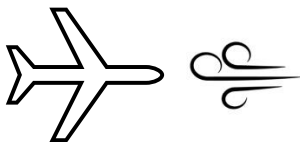
Competitive pressures from other airports

Margin compression

Advanced security threats

Regulatory compliance

Budget constraints that limit investment

Opportunities
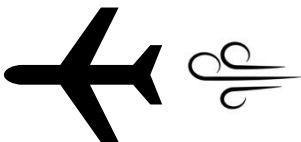
Diversifying sources of revenue

Enhancing profitability through revenue growth

Increasing process automation and intelligence

Improving customer experience

Successfully navigating these challenges and pursuing these opportunities requires the focused, coordinated activity of multiple functional teams across airport operations and extending to external stakeholders in the form of commercial and government entities. Digital technologies that produce and refine relevant insights, reduce the time and expense required to yield those insights, foster additional insight and efficiency through collaboration, and enable focused, timely, and efficient actions can simultaneously address both the challenges and opportunities facing airports today.

Value Creation through Digitization

Digitization is the act of instrumenting physical infrastructure with digital technologies in order to partially or fully automate activities. These activities are typically labeled processes or workflows, while their digitized counterparts are often described as workloads, generally in the context of enterprise software.

Digitization seeks to optimize activities across the physical environment, as well as workloads in the digital environment, with the ultimate objective of optimizing targeted outcomes. These outcomes may take the form of improved capital efficiency, reduced operating expense, or increased revenue. In some cases, digitization can generate incremental or net-new value across more than one of these factors, creating a multiplier effect in terms of profitable growth.

In an airport, activities that are candidates for digitization and digitally-enabled process optimization generally span the airport's physical infrastructure, airport operations, and commercial activities. High-capacity, high-speed connectivity is the common denominator across these dimensions, which are symbiotic and offer synergies in terms of capital investment efficiency, cross-dimensional data relevance, and value creation opportunities.
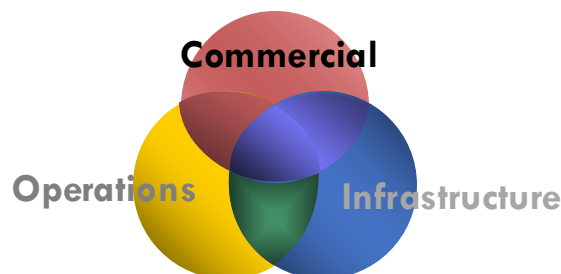
PWN: Catalyst, Accelerator, Cost-Efficient Path

Airports that have begun their digitization journeys tend to have implemented a combination of wired and wireless solutions that provide connectivity and support functionality that requires such connectivity.

Wired solutions generally rely either on fiber-optic cabling or Ethernet cabling, while wireless solutions generally consist of wireless local area network (WLAN) solutions, known colloquially as "WiFi". Some airports have also implemented larger-scale, higher-capacity wireless networks known as distributed antenna systems (DAS), which offer wireless wide area network (WWAN) connectivity that is familiar to all mobile phone users. Each of these approaches to providing connectivity has both positive attributes and drawbacks.

Wired solutions provide high-capacity, high-speed connectivity, but are expensive to deploy, repair, operate, and reconfigure. This cost barrier can lead to incomplete or inadequate connectivity and the suboptimized outcomes that come with it. WiFi is a ubiquitous technology embedded in multiple types of communications, computing, and specialized devices popular with consumers, business users, and industrial equipment manufacturers. It is based on a series of constantly evolving standards, offering increasingly higher transmission speeds but with still relatively low range and user capacity. Increasing user capacity and coverage requires the modular addition of base stations, but even a large deployment of these units does not offer sufficient capacity or consistent quality-of-service to support large numbers of users simultaneously accessing services with high bandwidth requirements. DAS, as a WWAN solution, uses the prevailing WWAN standard (today, this is 4G and 5G), and thus offers the greatest range, bandwidth capacity, capital efficiency, and operating cost efficiency for airport settings, but only if one excludes the cost of paying the mobile network operators (MNOs) that tend to own the airport-specific DAS networks.

How can airport operators make an informed decision about selecting the right connectivity option to enable full-scale digitization and value creation? Is there even a single right answer for every airport and every situation?

To properly evaluate the complete option set, it is important to consider one additional connectivity path... the Private Wireless Network (PWN). A PWN is privately-owned WWAN, which in the context of airports offers the benefits of DAS but also an additional degree of agility and cost-effectiveness, since the airport owns and operates the network equipment instead of paying a MNO to do so. The cost savings of PWN are evident immediately and accrue substantially over time.

The core benefits of PWN over wireless and wired alternatives include:

• Cost avoidance (both capital expenditure and operating cost)

• Faster time-to-value (TTV) through an abbreviated deployment cycle and ongoing operating cost efficiencies

• Lower total cost of ownership (TCO) over time

• Enhanced opportunities for revenue generation (monetization) and profitable growth through its high-speed, high-capacity transmission capabilities and lower deployment and operating costs

Together, these benefits create a powerful argument in favor of introducing PWN into the connectivity mix as the cornerstone of an airport's strategy for value creation through digitization. While the benefits of PWN are substantial, they do not imply that other wireless and wired technologies cannot play an economically viable role in an airport's connectivity strategy. Instead, an airport should consider PWN a substantial contributor to the value creation equation and overweight its presence in the network architecture accordingly.

Use Cases: Cornerstone of Value Creation

Value creation isn't simply an abstract concept or a sterile financial equation. Creating value for airports through digitization is a function of instrumenting specific activities with digital technologies and then facilitating data flows with the high-speed, high-bandwidth, cost-effective connectivity that PWN provides. The activities that hold the potential to increase capital efficiency, reduce operating costs, or generate revenue for airport operators and their tenants can be articulated as specific use cases.

The following exhibit illustrates how each use case can be classified into one of three categories, based on value creation potential.

PWN-Enabled Digital Environment

Value Creation Opportunity

Optimized

Drive competitive differentiation and profitable growth through innovation and high performance in Aviation ops, Commercial ops, and Real Estate

Expansive

Establish broad and deep portfolio of digitized processes and assets that create monetization vectors for the airport, insulate airport finances from variability in market cycles, and extend operational efficiencies

Foundational

Digitize mission-critical processes and assets to enable or improve compliance and establish baseline levels of operational efficiency

Business Objectives by Use Case "Wave"

Sophistication

	Foundational	Expansive	Optimized
Potential Business Value	Moderate to High	Moderate to Highest	Highest
Time to Implement	Short to moderate	Moderate to long	Moderate to long

PWN is fundamentally a digitization story to drive value creation. PWN offers airports an accelerated and cost-efficient path to value creation through the digital transformation of airport infrastructure, operations, and commercial activities.

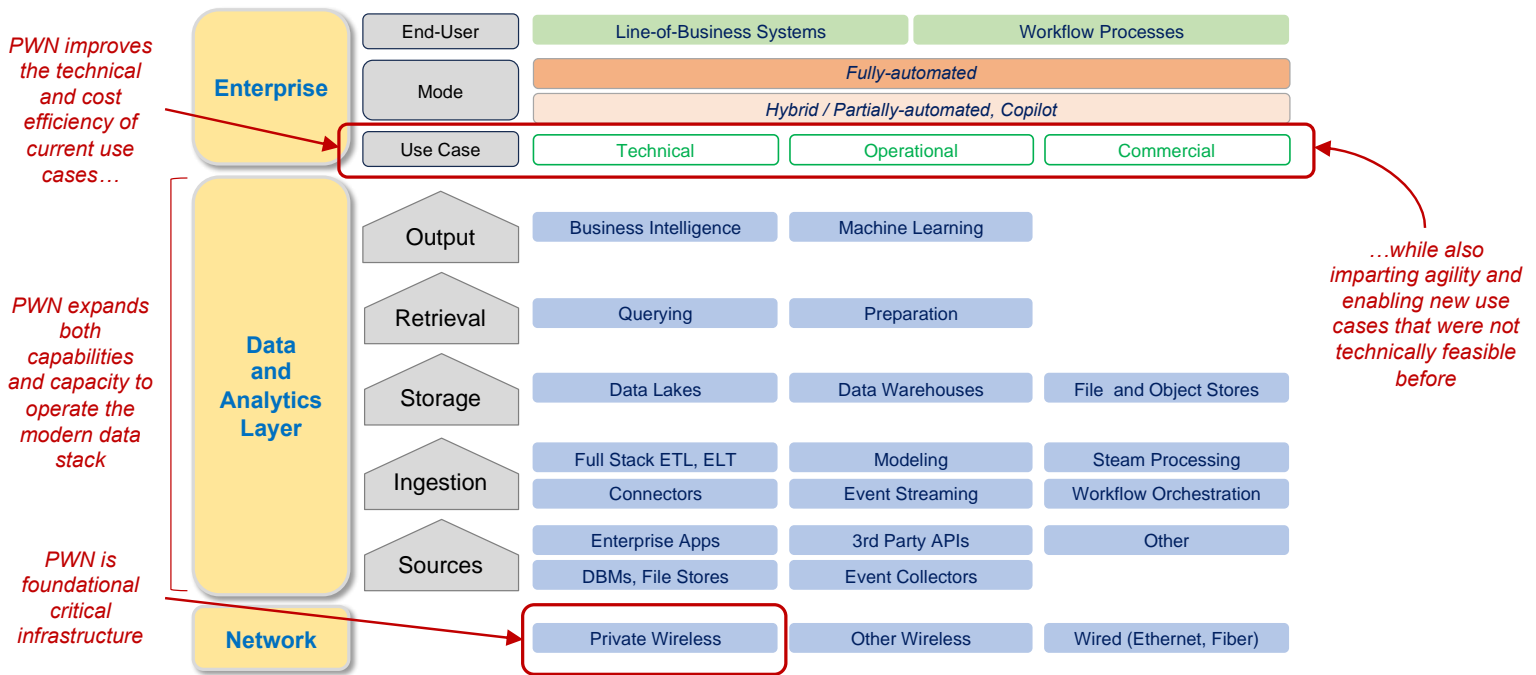# The Modern Data Stack: Key Enabler of Profitable Growth

Successful airport operators keep the aircraft running on time. They also maximize throughput, ensure world-class safety and security, optimize and continuously improve the customer experience, and deliver sound economic results in alignment with their respective charters and business models. Airports also generate vast volumes of data, and successful operators are adept at deriving insights from that data and putting those insights into action to generate recurring business value.

Modern airport operators understand the linkage between digitized architecture and infrastructure, the taxonomy of use cases aligned with key activities across the airport, how these activities orchestrate customer and process touchpoints, and how these orchestrated touchpoints represent "activated" value creation levers. They also understand the modern data stack and the critical role that PWN can play in expanding an airport's ability to optimize the value creation opportunity within its operating environment.

The modern data stack encompasses a foundational Network layer, a Data and Analytics Layer that sits atop it, and an Enterprise layer at the top. The Network layer consists of traditional wired connectivity solutions, PWN, and alternative wireless solutions. Data and Analytics comprises the process steps that align with data flows: Sources, Ingestion, Storage, Retrieval, and Output. Output from the Data and Analytics layer feeds the Enterprise layer, which consists of Use Cases, the Mode of enabling those use cases (fully automated, or hybrid / copilot approaches), and finally the End-User of the data (either a person or machine, using and enterprise application in some form).

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The Modern Data Stack

PWN improves the technical and cost efficiency of current use cases…

PWN expands both capabilities and capacity to operate the modern data stack

PWN is foundational critical infrastructure

*…while also imparting agility and enabling new use cases that were not technically feasible before*

Sources: Gartner, Imagine Wireless, Vertex Ventures.

PWN transforms the enterprise stack by enabling and accelerating a cost-efficient path to value creation through both reimagined and new use cases

World-class airport operators are in the same league as world-class commercial enterprises in terms of recognizing the value of data as an asset and proactively extracting value from data assets. They understand the relationship between data and data science, how AI/ML expands the set of value creation constructs that an airport can use to enhance profitability and create new sources of revenue, and the role that PWN plays in accelerating value creation in a cost-efficient manner. PWN, a key component of the modern data stack for airports, is an essential enabler of functionality and value creation.

PWN accelerates and expands value creation from digitization, complementing AI/ML value creation dynamics to create powerful, sustained multiplier effects

Value Creation Flywheel
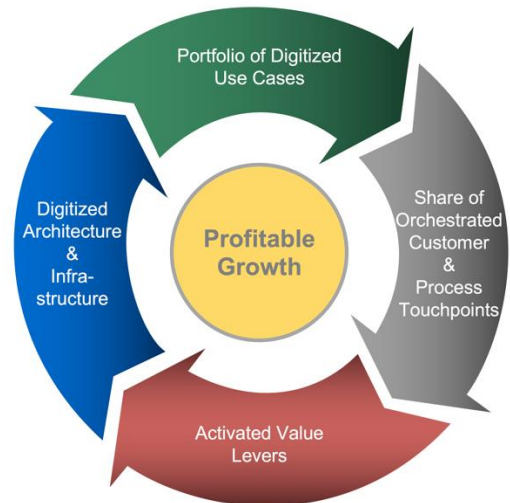
Getting Started

There is a right way to digitize the airport environment to optimize business value creation– through PWN. How can PWN help your airport achieve its strategic, operational, and compliance objectives? Let's talk and explore the possibilities.

Contact us to start the conversation. Imagine Wireless.