HARMAN
A SAMSUNG COMPANY

Unleashing the power
of Private Networks
**to reimagine the
Airports of Tomorrow**

WHITEPAPER

Contents

Unlock the potential of **Private Networks** to build the Airport of the Future

DIGITIZATION OF AIRPORTS

Technological evolution in the communications industry is rapidly changing many verticals and airports are definitely part of the Digital Transformation era. The airport transformation promises not only efficiency to their tenants (airlines) but also enhances passenger experience, optimizes operations and logistics, and offers significant cost savings along with some new revenue generation opportunities. Airport authorities are now looking at Private Networks with multi-access edge computing solutions to help in their transformation journey.

Airport authorities and airline companies are exploring the potential of communication technologies to modernize operations and logistics specifically for processes like touchless passenger check-in and onboarding, baggage and cargo handling, and over and under the wing operations while the plane is at the airport.

Airports across the US serve millions of customers every year and generate billions in Annual Economic Impact. With multiple terminals and over 50,000+ employees and contractors working in some of the busiest airports like Hartsfield-Jackson International Airport (ATL), Dallas/Fort Worth International Airport (DFW), Denver International Airport (DEN), O'Hare International Airport (ORD), and Los Angeles International Airport (LAX), the need for digital transformation is imperative.

Modern Airports.
Modern Challenges.

Today's airports address increasingly complex operational challenges with advanced business and technological innovations. As a part of digitization, airports are undergoing massive transformation, including designing a competitive communication and connectivity network, the backbone for next-generation, time-sensitive, low latency, and high bandwidth applications.

Before COVID, airport operators, airlines, and baggage handlers had several challenges, including above-wing and below-wing processes (apron and turnaround operations,

baggage flows, airplane maintenance, and passenger flows) that increased operational costs for each stakeholder in the aviation value chain. The COVID pandemic has added additional complexity of social distancing, CDC & Federal mandate compliance and passenger safety.

However, with new technologies and smart connectivity innovations, it is possible to streamline operational processes at airports and address the challenges mentioned above.

Bringing Next-gen technologies for
Enhanced Connectivity

Digital transformation is not just about embracing newer technologies. It is about transforming businesses to sustain in a dynamic world loaded with digital experiences. Modern airports leverage indoor geolocation, identity management, passenger flow management, data mining, AI, Machine Learning, and IoT to improve both safety and security and streamline their business and operations.

The aim is to deliver an exceptional customer experience at airports and ensure seamless integration of systems and services, including partners such as airlines, security, customs, concessions, and ground handlers.

With the evolving telecommunication sector transitioning from a hardware, wireline-driven need to a cloud driven application, service-driven market, and integrated with multiple business models, airports are looking at reliable methods to enhance passenger experience and safety while improving operational efficiency at the same time.

Imagining the airport of the future with **Interworking Technologies and Solutions**

There are multitudes of Interworking Technologies and Solutions available. But the key is to find the best options and make smart investments to achieve goals. Here are some of the technologies and solutions available today across multiple categories:

Network Connectivity

- Cellular, Wireline, Wireless – 4G, 5G, LTE
- Neutral Host, Private Dedicated Network
- WLAN, LoRAWAN, WiFi6
- Enterprise Cloud – Shared or On-Prem
- Edge Computing

Platform, Ops, Data Security

- Artificial intelligence & Machine Learning (AI/ML)
- IoT
- Blockchain
- Cognitive Analytics

Application, Emerging Technologies

- Biometrics
- Asset Tracking, RFID
- Imaging Solutions, Thermal Object Detection
- Augmented, Mixed, Virtual Reality
- Virtual Queuing
- Chatbots, Virtual Concierge, etc.

The emergence of 4G private networks and 5G in aviation can be a game- changer for early adopters to control pandemic risks and maintain safety at airports while reducing congestion and optimizing ground operations. The entire value chain can be reshaped to increase operational excellence, both now and in the post-pandemic era.

The incremental features in the application layer of 5G, such as network slicing and multi-access edge computing, are unique assets that enable connectivity excellence, reduce latency, and allow for:

01

Faster Transmission

02

Enhanced network management

03

Increased number of connectable devices

04

Improved geolocation accuracy

05

Better information

A private wireless network creates the foundation for Airport 4.0 with pervasive connectivity that makes it simpler to embrace process digitalization and paperless operations. Private wireless also allows airports to increase their operational and situational awareness to efficiently resolve any incident and minimize its impact on turnarounds.

Private Wireless Networks:
Benefiting an airport's entire ecosystem

Several airports across the globe now operate on-site business centers, hotels, large retail facilities and growing sophistication of airfreight, contract maintenance services, and aircraft refits. Each is often a business in its own right, with separate buildings and requires coordination with the central airport authority in terms of security, traffic, signage, and vehicle movements. Adopting Private Wireless Networks help the airports in several aspects:

Provides pervasive, ultra-reliable connectivity for airport workers, assets, processes, and partners

Guarantees service where it's needed while ensuring robust security

Keeps services and data on-premises, within the airport

Uses proven, high-performance LTE and 5G technologies

With growing connectivity (wired or wireless) requirements for their employees, contractors, IoT system, and other key stakeholders, here are a few key tenants:

Transportation Companies

| Airlines, both within the terminals and at hangars / warehouses and nearby offices | Shipping agents and freight forwarders | Logistics and package-delivery firms |

Services Providers

| National mobile network operators | Retailers & other concessions | Vehicle rental agencies | Bus, rail, taxi & tour companies | Caterers |
| Fuel companies | Security firms | On-site hotels, warehouses & business parks | Insurance and finance organizations | |

Operations & Public Safety

| Police & firefighters | Medical services | Airport traffic control | Power & lighting providers Construction contractors |

There is a huge opportunity to grow by building the Private Networks as it caters to several subscribers with a common need for high-network reliability and availability. Many of these tenants could potentially justify their investments in private cellular networks (as well as indoor coverage and Wi-Fi if they have dedicated buildings). An open question is whether airport authorities will deploy fully campus-wide networks or whether a diverse array of separate infrastructures will emerge organically.

HARMAN's Cloud-based Applications for Private Networks

CLOUD-BASED APPLICATIONS SOLUTION

HARMAN brings a plethora of Cloud or On-Prem hosted Application Use Cases for Private Networks across industries from end-to-end solutions for deployment of any new application Sensor to Cloud including RAN & 5G Core.

Smart Infrastructure

Smart Cities

Smart Buildings

Video Analytics & Surveillance

Smart Public Safety

Command & Control Solutions

Healthcare & Education

Remote Care

Digital Therapeutics

Elderly Care

Remote Education Platform

Transport & Logistics

Connected Fleet Management

Cargo/Asset Tracking

Traffic Management

Vehicle Telematics

CLOUD-BASED APPLICATIONS SOLUTION

Manufacturing

Mining

Remote Assets

Supply chain

Energy & Utilities

Smart Energy Management

Smart Distribution Management

Smart Lighting Management

With life gradually resuming to normalcy, airports in North America have seen a surge in the return of passengers and a more than 20% increase in the movement of cargo goods, thus creating the need to invest in digital technologies.

One of the world's busiest airports approached HARMAN to address their ongoing challenge of ensuring connectivity for their Cargo environment, which was getting compromised due to public-hosted Wi-Fi and Service Hotspots. With the demand for faster speeds, low latency, and more bandwidth to support applications,

the Airport Authority and its stakeholders decided to integrate emerging technologies such as artificial intelligence (AI), Internet of Things (IoT), automation, and ubiquitous connectivity into their service offerings for everyone, everywhere.

HARMAN's Proof of Concept aimed to test and learn how a dedicated, secured network in an airport Cargo environment could solve for connectivity gaps, host applications on a network separate from the public Wi-Fi, and streamline data communications between people and things in a Cargo environment.

The Scope of Services Design
meets 3 Objectives

01

To test and pilot the convergence of technologies that support network slicing in alignment with a private, secured network separate from the public Wi-Fi in the Airport environment.

02

Observe how the integration of multiple standards and communication enablers improve capabilities around broadband access, low latency, security, and connectivity reliability.

03

Use the PoC insights to recommend service offerings and how the airport shall provide connectivity solutions to our stakeholders via a private network business model.
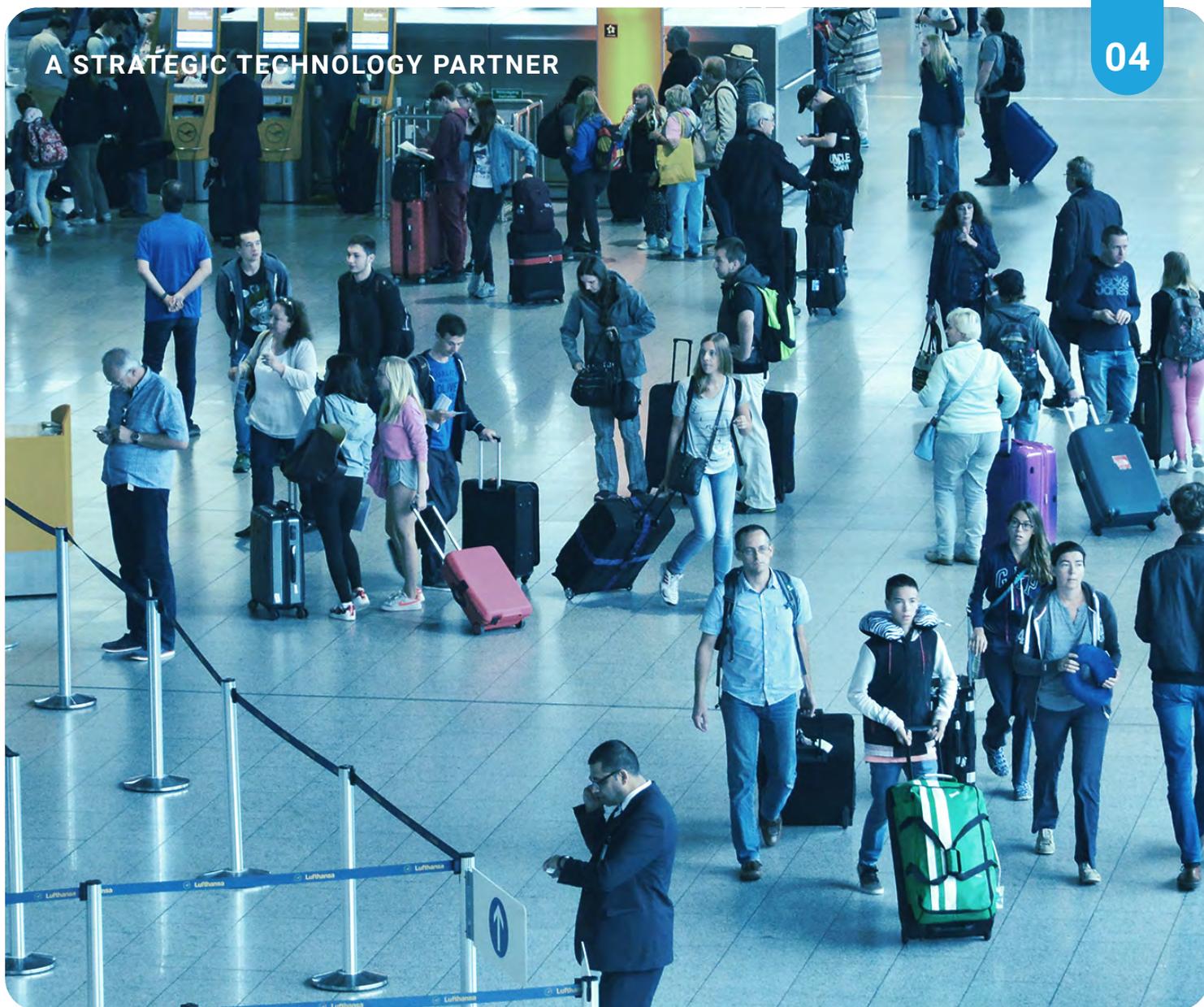
HARMAN, a strategic technology partner for the world's busiest airports

A STRATEGIC TECHNOLOGY PARTNER

HARMAN, A Samsung Company, is a strategic technology partner to the world's busiest airports for an initial Proof of Concept (PoC) to design, deploy, and demonstrate the benefits of hosted private networks in the airport environment.

For the airport Cargo PoC, HARMAN designed and developed a complete cargo movement application, for real-time tracking and reconciliation of each cargo piece across multiple checkpoints for several airlines. Real-time monitoring helps identify cargo misplacement immediately during the journey cycle itself rather than waiting for offline data collection and checking. Additionally, data on the dashboard helps identify bottlenecks and helps improve operational efficiency.
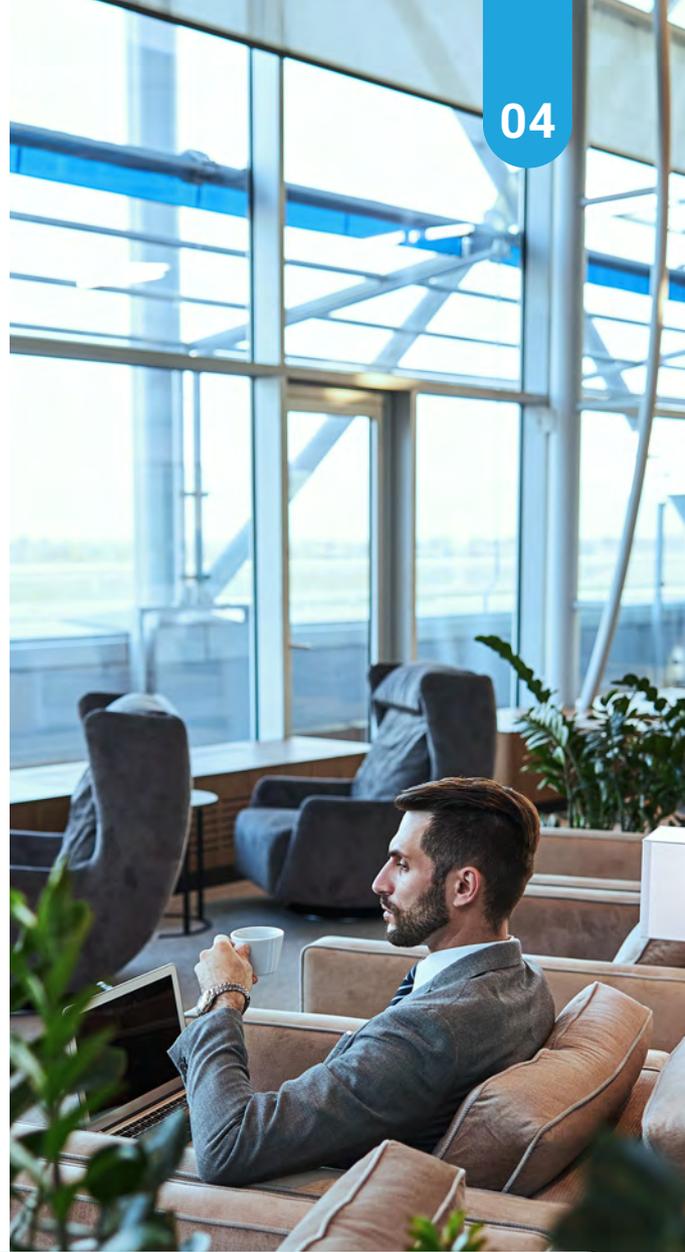
HIGH-LEVEL USER FLOW OF CARGO TRACKING

Data collection and reconciliation helps to optimize process and remove bottlenecks.

LOGIN

User logs in to the Cargo Tracking mobile application on the handheld device

SELECT POSITION

Select the position where they are scanning

MONITOR

Real time live tracking of cargo movement

01   **02**   **03**   **04**   **05**   **06**

FLIGHT SELECTION
Select the flight for which cargo is getting loaded

SCAN CARGO

Each cargo item gets scanned at every handover

REVIEW

Identify bottlenecks, review, optimize

HIGH-LEVEL SOLUTION ARCHITECTURE
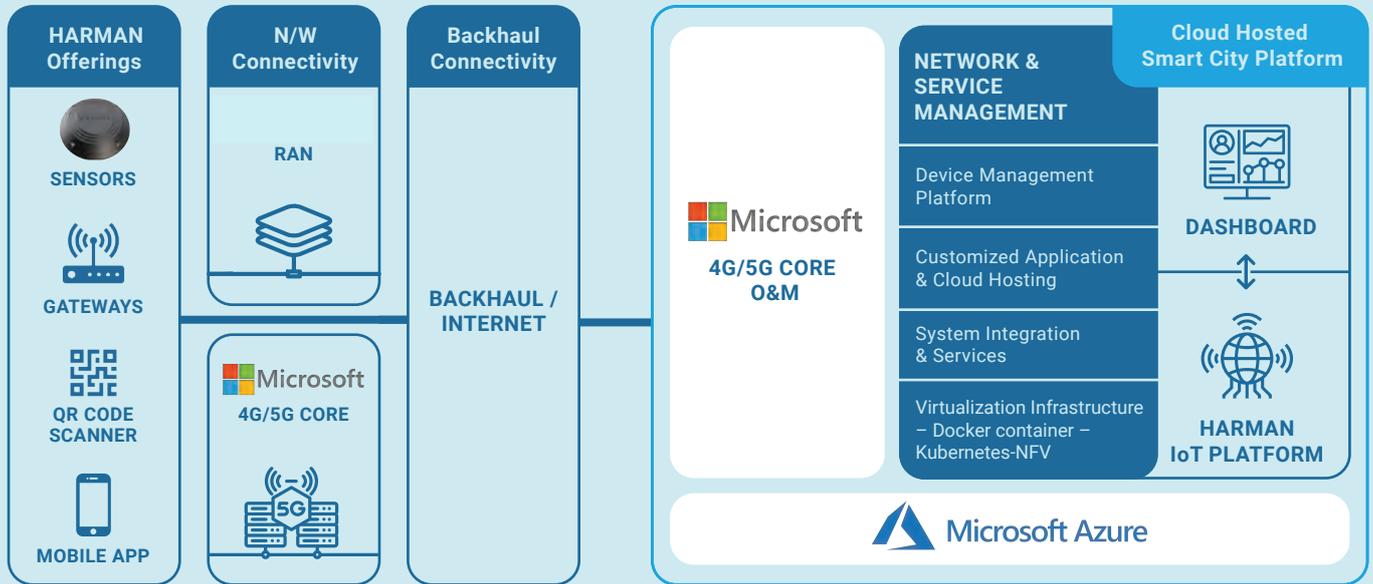
DASHBOARD

The Advanced dashboard gives a live view of the cargo tracking and data points for improving operational efficiencies.
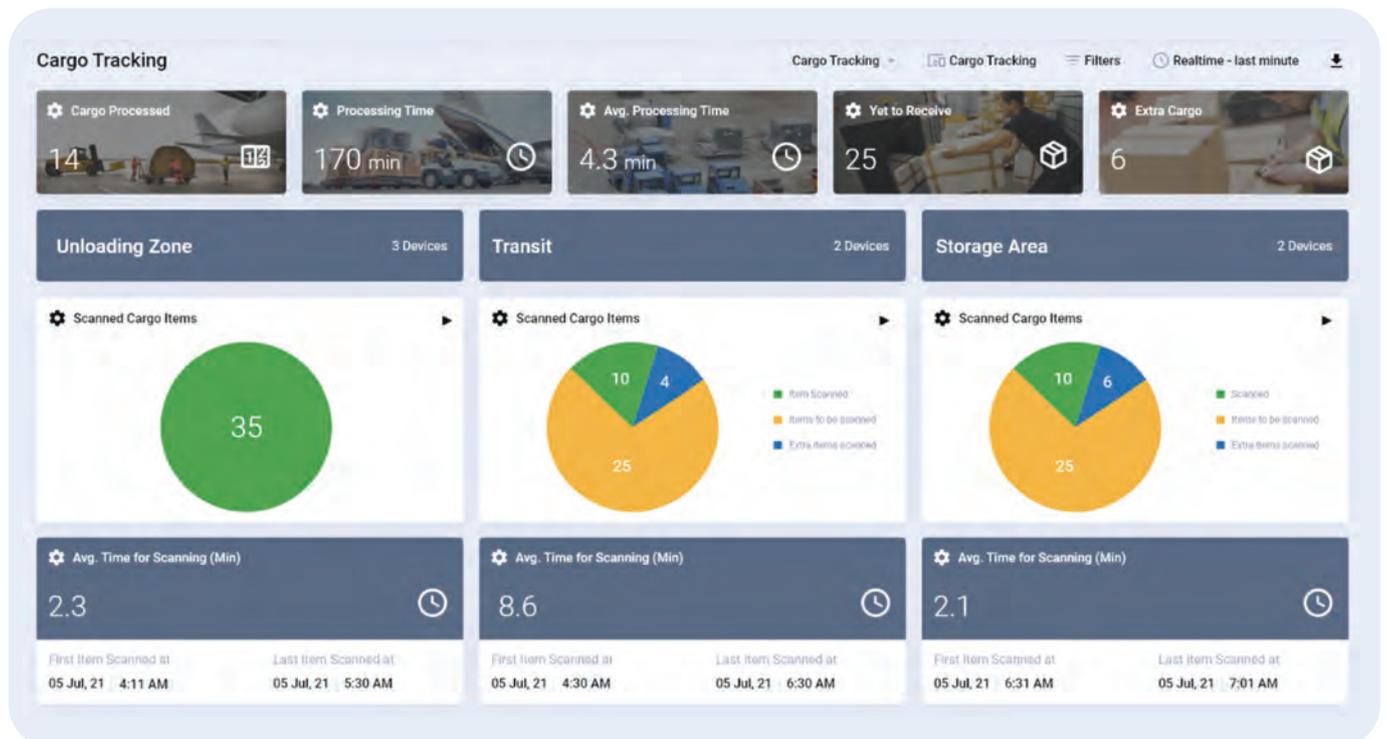
HARMAN **5G SERVICES**

Whether you are building latest 5G use cases or looking for services from Tech Consulting to Product Transformation, Development, and Device Certification for industry applications, HARMAN's 5G services expertise helps you go to market faster and efficiently.

Tech
Consulting

Product
Transformation

Product
Development

Device
Certification