CLOUD OPERATIONS: THE SILVER LINING FOR AIRPORTS

Collins Aerospace
An **RTX** Business

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As the world emerges from the pandemic and passengers increasingly resume regular travel, airports are renewing their focus on critical innovation, especially when it comes to improving the passenger experience. According to a McKinsey & Company article, increased investment in IT and digital innovation is one of the fundamental shifts necessary for the industry to rebound. Taking a cue from other industries, airports are embracing cloud technology as part of their data transformation efforts.
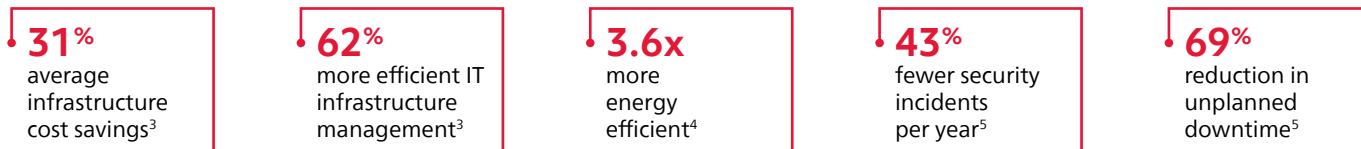
Last year, an ACI Insights survey found that 86% of airports planned to invest in cloud infrastructures. For many airports, modernizing and improving IT infrastructure are driving the decision to move to the cloud. On-premises systems require regular hardware refreshes, and new hardware investment is often necessary to cope with growth, new systems, and the increasing volumes of data. Migration can improve resiliency and security, reduce operational costs, and support seamless integration for new technologies, like self-service kiosks. In this e-book, we'll dive into four benefits of migrating airports to a cloud-based infrastructure.

1. Increase Operational Resiliency

The pandemic limited many airports from investing in new technologies and infrastructure, while forcing them to reduce the number of staff members. And as the industry recovers from the effects of the pandemic, it's now struggling to quickly increase IT capacity. Airports urgently need to become more efficient in ways that don't involve hiring more personnel. They're looking to modernize their systems and improve automation across the entire business—an effective way to do this is by migrating legacy, on-premises systems to the Amazon Web Services (AWS) Cloud. Cloud technology can help airports increase efficiency across multiple areas, from runway, baggage, and facilities security to check-in, bag drop, and off-airport processing.

Airports can migrate any workload—applications, websites, databases, storage, physical or virtual servers—and even entire data centers from an on-premises environment, hosting facility, or other public cloud to AWS. Airport management can leverage AWS's and Collins Aerospace's years of experience to build organizational, operational, and technical capabilities, to accelerate business benefits faster. Collins Aerospace can work with your airport operations team to develop a full cloud or hybrid cloud blueprint to guide your IT transformation.

Recent industry outcomes of digital transformation include:

| **31%** average infrastructure cost savings[3] | **62%** more efficient IT infrastructure management[3] | **3.6x** more energy efficient[4] | **43%** fewer security incidents per year[5] | **69%** reduction in unplanned downtime[5] |

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1. The New Digital Edge: Rethinking Strategy for the Postpandemic Era, Mckinsey Digital, 2021
2. 2021 Magic Quadrant for Cloud Infrastructure & Platform Services, Gartner Report, 2021
3. Fostering Business & Organizational Transformation to Generate Business Value with AWS, IDC, 2018
4. The Carbon Reduction Opportunity of Moving to Amazon Web Services, 451 Research, 2019
5. Guidebook to Understanding the Value of Migrating from On-premises to AWS for Application Security and Performance, Nucleus Research, 2020

Many airports are taking advantage of the speed and agility of the cloud to quickly respond to changing business needs.

Modernizing your airport IT architecture to full cloud-based or hybrid deployment can improve operational resiliency by:

- Improving agility and flexibility across systems
- Lowering on-site infrastructure and facility costs
- Reducing on-site administration requirements
- Decreasing deployment time for faster provisioning
- Creating greater scalability and resilience
- Simplifying working with third parties (such as airlines) for application updates, data sharing, and systems testing

In the past, airports have focused on upgrading their existing on-prem infrastructure, but there are several compelling reasons to choose the AWS Cloud versus on-premises:

- Airports can minimize the need for hardware and server rooms that are expensive to maintain.

- It's easier—with reduced operational risk—to push updates and upgrades to the cloud system. This means there is no need to go offline to update, which greatly lessens any business disruption.

- With the right partner, systems can be built without "one point of failure" in the system—hosting the tech stack in the cloud allows for a seamless transition to another data center if one site goes down—without the customer ever noticing. Disaster recovery happens in minutes rather than days or hours.

- As more passengers return to air travel, airports are looking for ways to decrease the turnaround time, or TAT—time between landing and takeoff for a new flight. Operating in the cloud enables airports and airlines to better collaborate on analyzing flight conditions and decision-making to optimize and reduce TAT, helping to improve aircraft utilization and reduce other ground services charges.

While most applications can be easily migrated to the cloud, some applications must be on-premises for low-latency (minimal delay) access to local systems, or they need local data processing or storage. In taking a hybrid approach to cloud you can still provide services in your own data center while optimizing cloud hosted applications.

2. Decrease the Carbon Footprint

According to the World Economic Forum (WEF), "the airline industry is responsible for nearly 3% of global carbon dioxide emissions," but "it has pledged to be carbon neutral by 2050." One of the ways the industry can do this is by using technology proven to decrease carbon emissions.

Making informed decisions is necessary to reduce the environmental effect of an IT stack when creating, deploying, and maintaining it. To build a sustainable business for customers and the environment, AWS has deployed data centers that provide the efficient, resilient service customers expect while minimizing the environmental footprint.

Most airports have at least three main data centers; two on the airport campus and one off-airport, usually in a shared datacenter location. The data centers can be expensive to maintain and often the physical location of the data centers doesn't give the geographical redundancy required for best practice operational resiliency.

Significantly Lower Carbon Emissions

Cloud-based systems like Collins Aerospace's ARINC cMUSE™ (Multi-User System Environment) remove the need for energy-intensive on-site servers, core rooms, cooling systems, and increased local technical support. This reduces energy consumption and associated emissions to help minimize your environmental footprint – something we know airlines and airports are eager to do.

At Collins Aerospace, we invest more than $3 billion in R&D to deliver the industry's most advanced products and services to our customers. We are continually looking to advance new and expanded efforts in sustainability which is why we work with AWS - together we can seize new opportunities and rise to the responsibility.

AWS data centers are also more energy efficient than enterprise sites due to comprehensive efficiency programs that touch every facet of the facility. When carbon intensity of consumed electricity and renewable energy purchases are factored in, which reduce associated carbon emissions, AWS performs the same task with an 88% lower carbon footprint.

CARBON EFFICIENCY OF AWS INFRASTRUCTURE COMPARED TO SURVEYED US ENTERPRISES
Source: 451 Research

According to a 451 Research report, AWS's infrastructure is 3.6 times more energy efficient than the median of the surveyed US enterprise data centers. More than two-thirds of this advantage is attributable to the combination of a more energy efficient server population and much higher server utilization.
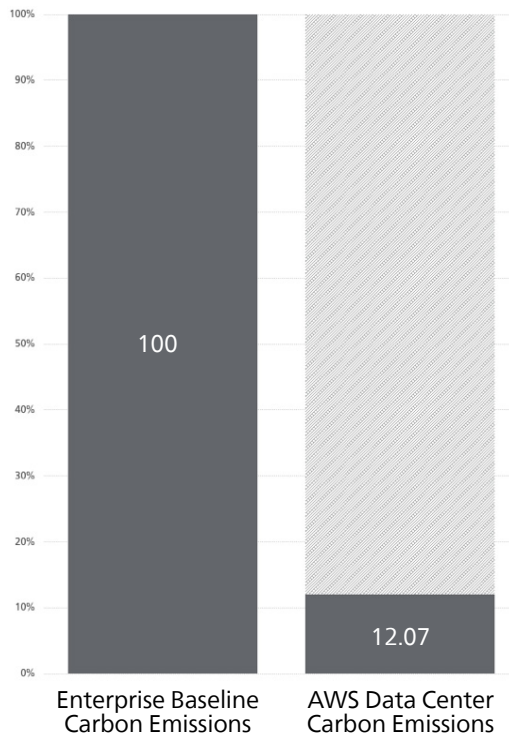
61% of carbon reduction is attributable to more efficient servers and higher server utilization.

11% of carbon reduction is attributable to more efficient data center facilities.

17% of carbon reduction is attributable to reduced electricity consumption and renewable energy usage.

AWS Carbon Footprint Tool can help track sustainability goals

- An accurate overview of the carbon emissions associated with usage of AWS Cloud services.
- A snapshot of the emissions reduction from using the AWS Cloud vs. an on-premises equivalent.
- Average savings of $100k from eliminating core server hardware
- A forecast of emissions reductions.

Working with Collins Aerospace and AWS, airports can develop a blueprint for transitioning IT architecture and workloads to the cloud to help achieve their sustainability goals. To track and report against sustainability goals, airports can calculate the environmental impact of their workloads with the AWS customer carbon footprint tool. This tool uses easy-to-understand data visualizations to provide airport management with their historical carbon emissions, evaluate emission trends as their use of the AWS Cloud evolves, approximate the estimated carbon emissions they have avoided by using AWS instead of an on-premises data center, and review forecasted emissions based on current use. The forecasted emissions are based on current usage, and show how an airport's carbon footprint will change as Amazon stays on path to powering its operations with 100% renewable energy by 2025, five years ahead of its original target of 2030, and drives toward net-zero carbon by 2040 as part of The Climate Pledge.

As if contributing to the improved health of the environment wasn't motivation enough, reducing the carbon footprint also reduces costs associated with an on-prem server. Significant resources are necessary to maintain a core server room, including the physical space, technical staff, and air-conditioning. Airports realize equipment update savings on average of approximately $100K by eliminating the hardware alone. Implementation is also expensive, costing upwards of $80K—excluding travel for the specialists.

3. Improve Passenger Experience Through Data Sharing

Passengers interface with different systems that access data from the airline's Departure Control System (DCS)– from a ticketing station or kiosk to check-in, dispatch baggage, and boarding. Airport customers include more than just passengers—airlines, retailers, and service providers all have different needs and databases. As a result, airports have lots of data and the cloud can be used to efficiently aggregate data, providing better insights into airport management and a better experience for the passenger.

The AWS Cloud enables Collins to integrate both legacy and cloud-based systems into a cloud-based common use system so passengers can retrieve data from all airlines for a seamless experience. As an example, Collins Aerospace's ARINC cMUSE™ (Multi-User System Environment) is a next-generation common-use passenger processing system (CUPPS) that allows multiple airlines to share check-in desks and boarding gate positions at an airport rather than having their own dedicated infrastructure. Collins, in collaboration with AWS, offers full or partial cloud-based deployment options, providing the additional flexibility, scalability and efficiency.

Every airline check-in process is different, but through Collins's cMUSE™, passengers can access all necessary information at one desk or kiosk, making a more streamlined experience for both airline employees and passengers.

Airports are also using the capabilities of the cloud in less visible ways, too. The safety of passengers and staff is vital for any airport, and there are often strict regulations to ensure compliance. For example, some airports have thousands of security cameras and in some jurisdictions, the video data must be kept for years. Disk storage in the airport data center is expensive and managing tape backups can be cumbersome. To free up their IT budget and resources, airports are using Amazon S3 storage, which is a lower cost and more reliable alternative.

The pace of change in airports is exciting. It's never been easier to use technology to tackle the hard problems, make journeys more seamless, and help airlines, airports, handling agents, and all stakeholders provide a better experience for their customers.

4. Drive Innovation

Airports that have transitioned to the cloud note more flexibility to innovate better and deliver value faster. Cloud technology allows organizations to take an iterative approach to refine a particular connected airport solution based on customer feedback and changing business needs – to become a more intelligent airport. Having access to on-demand computing power and storage, available globally, and only paying for what you use, gives organizations the freedom to strategically direct resources towards innovation. Services ranging from data lakes and serverless computing, to artificial intelligence (AI) and machine learning (ML), provide organizations with the ability to move faster, iterate, and quickly deliver business and customer outcomes.

Working with AWS, Collins Aerospace offers integrated solutions for passenger processing and facilitation, airport operations with several innovative solutions that help create a seamless travel experience for a high volume of passengers. Examples include:

COMMON USE CHECK-IN

cMuse™, the cloud-based check-in product from Collins supports more than 200 airlines worldwide. Airports can launch check-in services in just minutes, onsite or off, using only a PC, laptop or thin-client device with existing peripherals and a standard Internet connection.

SELF-SERVICE KIOSK AND BROWSERS

A majority of airport check-ins are now performed using self-service technology. (Source- https://runwaygirlnetwork.com/2020/09/airports-roll-out-contactless-common-use-kiosk-experiences/) And with smartphones driving how we interact with this technology, airports and airlines are looking to support passenger expectations of a seamless self-service journey through terminal touchpoints from the front door to the gate.

SELF-SERVICE BAG DROP

Self-service bag drops can mitigate long lines, create more flexibility for employees, and give passengers more control. Self-service bag drop can be easily implemented on-site or off at hotels, rental car agencies, convention centers, or even on cruise ships.

Collins enables these airports to purchase services in a bundle, allowing them to take advantage of managed services within the AWS Cloud. Moving these services to a cloud structure allows IT support to grow and shrink to meet demand.

Speed and agility are the significant focuses of migrating to the Cloud. Collins Aerospace works to help airports modernize systems more quickly and push updates out more quickly. That means more time for staff to perform updates and improvements.

FLYING INTO THE FUTURE

Collins Aerospace and AWS are collaborating to help airports to drive innovation and efficiencies by harnessing the power of the cloud. They can provide airports with a blueprint to transition from on-premises data centers to hybrid or full cloud centers, opening up the possibilities for next generation architecture.

Collins Aerospace and AWS Cloud technology can help airports become more operationally resilient, reduce carbon emissions, improve the passenger experience, and drive innovation.

Want to learn more about how Collins Aerospace can facilitate your airport's cloud migration? Visit us at https://www.collinsaerospace.com/what-we-do/industries/airports today.

ABOUT AMAZON WEB SERVICES

For over 15 years, AWS has been the world's most comprehensive and broadly adopted cloud platform. AWS offers over 200 fully featured services for compute, storage, databases, networking, analytics, robotics, machine learning and artificial intelligence (AI), Internet of Things (IoT), security, hybrid, virtual and augmented reality (VR and AR), media, and application development, deployment, and management from 84 Availability Zones (AZs) within 26 geographic regions. Millions of customers—including the fastest-growing startups, largest enterprises, and leading government agencies—trust AWS to power their infrastructure, become more agile, and lower costs. To learn more about AWS,
visit aws.amazon.com.

ABOUT COLLINS AEROSPACE

Collins Aerospace, a Raytheon Technologies business, is a leader in technologically advanced and intelligent solutions for the global aerospace and defense industry. Collins Aerospace has the extensive capabilities, comprehensive portfolio and broad expertise to solve customers' toughest challenges and to meet the demands of a rapidly evolving global market. For more information, visit CollinsAerospace.com.

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