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IT makes sense to share:

Making the case for the cloud in Common Use airport technology

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FOREWORD

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Airport operators face a wide range of business challenges today. There is constant pressure to delay and reduce capital expenditure in order to do more with existing assets as government support for airport infrastructure is typically falling globally. The highly competitive airline industry operating environment continues to apply downward pressure on landing slot margins meaning there is a requirement to increase revenues from non-aeronautical sources. Whilst managing these two significant challenges airports and airlines must work more closely together to improve the traveller experience at the airport as the entire air transport sector faces intense competition.

Common Use technology offers a range of benefits that can help to address each of these aforementioned challenges. Our industry has come a long way since the days of dedicated check-in desks for agents from a single airline. Today's airports enable passenger processing in a more flexible, shared environment that allows a greater flow of travellers whilst making better use of IT assets within the airport.

However, technology has been advancing at a fast pace over the past 5-10 years. It is now our responsibility to step back as an industry and ask if today's approach remains fit for purpose and is delivering the highest possible value for the businesses that rely on it. The adoption of cloud computing[1] has proliferated across many sectors from banking to manufacturing. Indeed the airline industry has embraced the principles of cloud computing with many critical applications now hosted, managed, and delivered far from an airline's own property.

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[1] Cloud computing refers to the practice of using a network of remote servers to store, manage, and process data, rather than a local server or a personal computer.

FOREWORD

At Amadeus we believe it is fundamental to discuss and debate how future technology trends can best improve the operational and commercial performance of the air travel industry. We are fortunate that over twenty senior IT leaders from the industry have shared their views on the issues contained within this short insight paper, and we thank them both for their interest and time.

We hope this paper will prove informative and stimulate discussion. We look forward to continuing the conversation with you in the weeks and months ahead.

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THE EVOLUTION OF COMMON USE TECHNOLOGY

Common Use refers to an airport platform on which all passenger processing can take place

Common Use refers to an airport platform on which all passenger processing can take place. Typically, airlines will have their own check-in applications but share a physical desk and IT infrastructure at airports with other airlines. By allowing airlines to share physical space and IT resources, airports are able to free up more space for initiatives that can drive revenue growth such as commercial or retail ventures. Common Use also helps travel providers – airports, airlines, and ground handlers – maintain flexibility and reassign check-in counters and gates easily.

Back in 1984, IATA created the Common Use Terminal Equipment (CUTE) standard for passenger check-in and boarding. This common-use standard was originally developed to support high demand from the Olympic Games in Los Angeles: airlines and airports knew there would be an influx of travellers and they wanted to reduce duplication and allow for the sharing of desks and terminals between airlines. This would permit airlines and their handling agents to serve higher volumes of passengers efficiently.

The CUTE system proved useful and quickly spread throughout the world, especially in international terminals used by multiple airlines. While CUTE worked well as a common-use standard, it has had some drawbacks.

CUTE does not include a detailed technical specification. This means any supplier that is able to meet certain requirements can provide a CUTE platform and that can be very costly for airlines. For every supplier, airlines need to manage a different variation of their passenger processing applications. This means airlines need to both invest in and undergo a different certification process for each supplier.

CUTE can also have implementation challenges, particularly in terms of updating systems. Airlines have to develop their applications separately from the platforms. If the airlines and platform suppliers choose to update the CUTE platform, but airlines have not updated their applications, the update cannot fully take effect throughout the system.

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In 2004 IATA realised the drawbacks and began the process of developing the Common Use Passenger Processing Systems standard, or CUPPS. From a technological perspective, it is much more clearly defined: airlines can now have one application that runs on any CUPPS certified platform. It is simpler to install and provide support for passenger processing operations, which means lower costs for airlines and airports. It is designed to ensure product and service consistency across the network. Moreover, as Al Venslovaitis, Chief Information Officer at Toronto Pearson Airport, notes, "airlines have considerable flexibility in making use of alternative check-in counters or gates."

Migrating to a new system requires a lot of care and planning, particularly in the case of airports. CUPPS needed to work with CUTE legacy applications in order to support airlines which had not yet developed CUPPS applications. As a result, CUTE has never been fully retired and CUPPS never took off the way it was hoped. Even today, it is estimated that more airports are using CUTE than CUPPS.[2]

CUPPS was approved in 2008 and made available in 2009. Technology has naturally developed since then, and virtual platforms and other advancements may have been inadvertently ruled out of CUPPS. Additionally, as one anonymous airport noted, "CUPPS and CUTE are both contractually inflexible. It is difficult to renew the technology associated with these systems, and impacts the passenger experience."

Further, neither CUTE nor CUPPS allow for true location-independent passenger processing – they are not fully cloud based. Travel providers are bound to particular infrastructures and technologies within the airport itself. Peter Kruszynski from the Aviation Competence Center in Zurich Airport, which handles about 30 different airline terminals, notes that they have a common platform they use within Zurich, but it is not standardised to conform to other locations' platforms. It is time to break the chain and move to the cloud, allowing airlines and airports the flexibility to adjust their systems according to their needs.

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[2] http://www.iata.org/whatwedo/workgroups/Pages/common-use-news.aspx

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TECHNOLOGY TRENDS: ENABLING THE CLOUD

Technology develops at a rapid pace, and the technology most widely used has changed since CUPPS was first implemented in 2009. Application virtualisation, improved networks and security, as well as new devices have all contributed to a changing technological landscape

APPLICATION VIRTUALISATION

Application virtualisation refers to decoupling applications from hardware. Applications accessed remotely from a different location look and behave the same as locally-held applications, but allow airlines and airports to centralise their computing. When applications are installed locally, if an airline wants to make a change, it needs to make the changes on each individual work-station or server at all stations that it flies into. Some provider platforms have elements of virtualisation today, but they are usually site-specific and airlines and airports need to handle updates at each airport. Some airlines change applications several times per year – so updating applications globally adds up to a lot of manpower costs and complexity. By centralising computing and hosting Common Use infrastructure for all an airline's work stations in the cloud, airlines can have the cloud provider update or install applications at all supported sites simultaneously. Decoupling applications also puts less demand on the workstations and means they can be run as thin clients.

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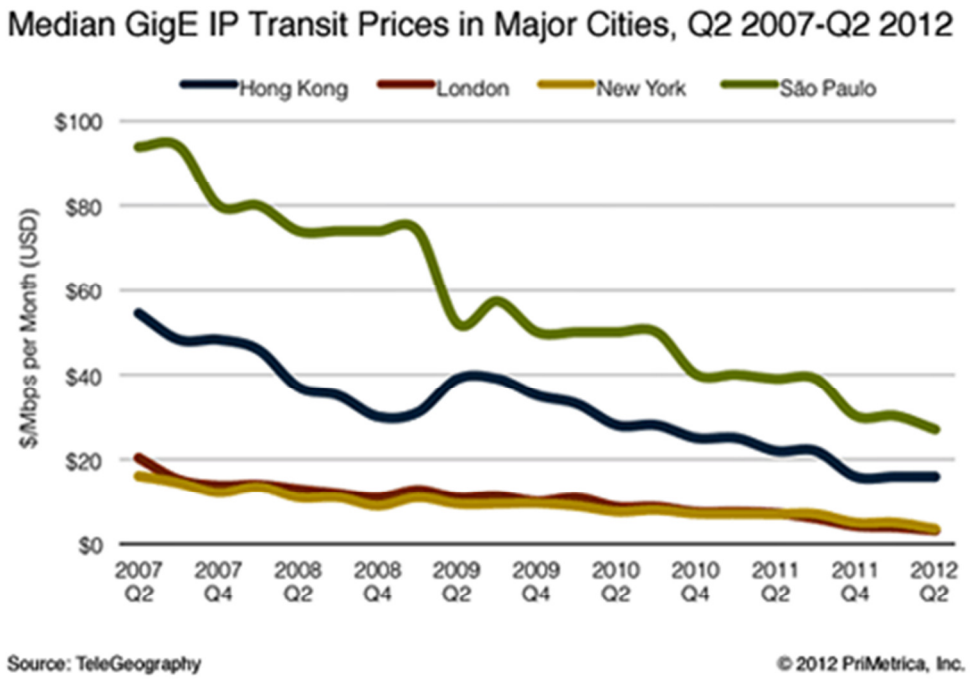
IMPROVED NETWORKS

Networks have improved both in terms of capacity, or bandwidth, and speed. New technologies mean networks are better able to cope with the increasing demands placed upon them from cloud computing as data is transferred from remote data centres where applications are increasingly hosted. New network technologies are being rolled out with high bandwidth capacity. Fibre and optical network links, transferring data at the speed of light, are more prevalent. Mobile connections, too, are getting faster: 4G is growing at a compound annual growth rate of 64%.[3] These networks are faster and cheaper than ever before. The cost of a gigabit Ethernet, used to transmit data at a rate of a gigabit per second, in London has dropped 57% to $3.13 per Mbps. The same port in New York City has dropped 50% year over year to $3.50 per megabit.[4] It is now possible to centralise applications at remote data centres and cost-effectively move large amounts of data over networks.



[3] http://www.gsmamobileeconomy.com/GSMA%20Mobile%20Economy%202013.pdf
[4] http://gigaom.com/2012/08/02/guess-what-bandwidth-is-getting-cheaper/

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NEW DEVICES

While the aforementioned trends are technologies that directly relate to moving to the cloud, new devices provide an added value to this shift. The public is more comfortable with using tablets and mobile phones to conduct business than ever before, so it is easy to shift public-facing business strategies to mobile. The ability to use tablets and other portable screens anywhere means staff can be more flexible with location as long as they can connect to a network. Check-in agents can temporarily relocate to hotels, rail stations, or even the sidewalk outside the airport to prevent large queues from forming inside the terminal.

Some of these technologies have combined to lead to new developments. Michael Ibbitson, from London Gatwick Airport, points to the rise of self-service as an example of a trend that arose from new devices and application virtualisation:

"There are an increasing number of passengers arriving at airports already having checked in to their flights via mobile apps instead of doing so locally. People seem to prefer managing the process themselves and, as a result, London Gatwick is investing in technology that supports this, such as self-service bag drop. Our system is common-use and works for all passengers, regardless of which airline they are flying with. It was developed with a focus on the user interface, so that passengers need to press only 4 buttons on the touch screen versus the typical 20+ touches formerly required."

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EXAMINING THE BUSINESS CASE FOR COMMON USE CLOUD

Most airports – including London Gatwick, says Mr. Ibbitson – run a traditional common-use model. This includes a traditional supplier and onsite IT infrastructure with hardware including servers, desktop computers, bar code readers, and scanners. It is an investment-heavy setup and requires airlines to directly integrate.

Mr. Ibbitson notes: "This setup is reliant on 1950s-era technology and is not really embracing the revolutionary capability of the internet. Each airline using our CUPPS system needs to build integration locally, on-site. The aviation industry has tried to address the problem with the development of CUTE and CUPPS standards but, in doing so, seems to have reinforced the existing structure rather than instigate change. It is time to embrace technology as quickly as possible, and develop a fundamental shift in aviation IT."

Copenhagen Airport is fixed to physical on-site hardware, and Christian Poulsen notes this means "the end user flexibility is not there. For example, we would like to have iPads so staff can be mobile. We also need to be able to scale the system to handle peaks. Our goal is to find a way to unite disparate systems to create a single information flow."

Cloud computing is a fundamental shift in the model of how IT is provided. In Nicholas Carr's *The Big Switch*, he compares the development of cloud computing to the evolution of the modern electric utility grid 100 years ago, when companies moved from locally generated electricity within factories and regional areas to centralised generation and distribution. This instigated a chain reaction of economic and social transformations leading to today's modern world.

A similar revolution is now under way in IT, thanks to the cloud. This migration is facilitating a shift in the mind-set of travel providers. It is the first wave of web-based, utility services and products. And it is not just that the technology is ripe for a movement to the cloud; there are a number of economic benefits to a centralised model. While each airport is different in terms of their unique priorities, many of these benefits can be applied to airports across the board.

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REDUCED HARDWARE COSTS

By switching to the cloud, travel providers need one IT infrastructure for Common Use in a dedicated data centre versus multiple servers in a local server room in the airport. This in itself brings down costs but, due to economies of scale, a dedicated cloud provider is typically able to obtain and operate a server with the latest technology at a much lower cost than airports or airlines. Travel providers can increase or decrease servers as necessary based on need, rather than spending to maintain a potentially unnecessary number of servers. Airports using the current Common Use systems need to replace equipment every three to five years or as printers and other hardware break down. This requires a full installation of the system on the new hardware, and also involves risk. With airlines and airports needing to constantly replace and update elements of their infrastructure, the ease of updating hardware in the cloud is a huge benefit to all. Additionally, switching to the cloud means providers can use thin client machines at check-in desks, which are a less costly initial investment, and require replacements half as often as traditional PCs.[5]

REDUCED IT MAINTENANCE COSTS

With the current CUTE/CUPPS setup, airports need to maintain a number of specially trained IT employees on site (or travelling between airports). They can incur travel costs and, should these specialised local staff members leave, put business continuity at risk. These employees need to be available at all times should there be a system failure or a need to update. This can put a lot of pressure on a typically small staff. London Gatwick Airport, for example, has one full time and one part-time IT security manager on its payroll who, Mr. Ibbitson notes, "are managing Cyber Security and waiting for issues to arise." Copenhagen Airport has about 70 people managing "hundreds of systems" and, says Mr. Poulsen, "we need to simplify them."

A specialised data centre can spread the cost of people focusing on security and threats across a larger number of systems and customers. By switching to the cloud, travel providers can put the weight of maintaining an IT department on the shoulders of the cloud provider and can maximise the efficiency of local IT staff, redeploying them to manage new strategic IT programmes, rather than infrastructure. If an update is needed, it can be handled in minutes from the

[5] On average. Source: *Environmental Benefits of Thin Computing – A Comparison of the environmental impacts of conventional desktop and thin computing – CanyonSnowConsulting, March 2009*

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data centre, rather than paying for the time of numerous employees at different locations to deploy an update. It can take 15 minutes to update to all workstations run on the cloud, versus days or weeks to update equipment at a single locally-installed site.

REDUCED NETWORK COSTS

Instead of managing links to potentially hundreds of airport locations – which Yeo Kia Thye at Singapore Changi Airport and Mr. Kruszynski at Zurich Airport have noted is a time consuming and expensive task, respectively - each airline is connected via a single, redundant link to a cloud provider, which then manages connections to airport locations. "Simplifying and quickening the ability to make connections to the airlines and standardising processes to improve efficiency is vital for airlines and airports to stay competitive and keep costs down," adds Münster Osnabrück International Airport's Christoph Stegemann.

Companies are realising it is less costly to use the internet, and are combining the internet with Multi Protocol Label Switching (MPLS) networks. A cloud-based approach to Common Use requires airlines and airports only pay for a single, redundant connection to the central data centre. It is now possible to deploy a highly encrypted, secure connection, allowing airlines and airports to take advantage of the cost efficiencies that internet based networks offer. Overall, the topography of the network needed to support Common Use in the cloud is far more streamlined than the spaghetti of links we see airlines having to manage and fund today.

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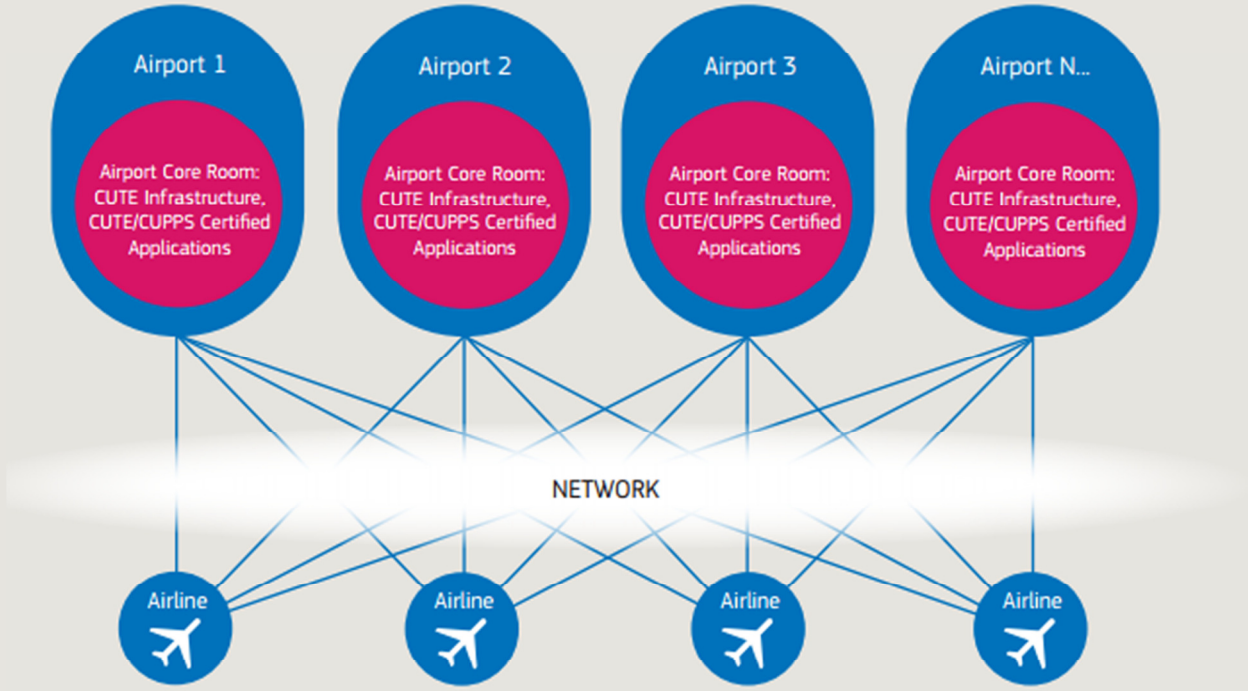
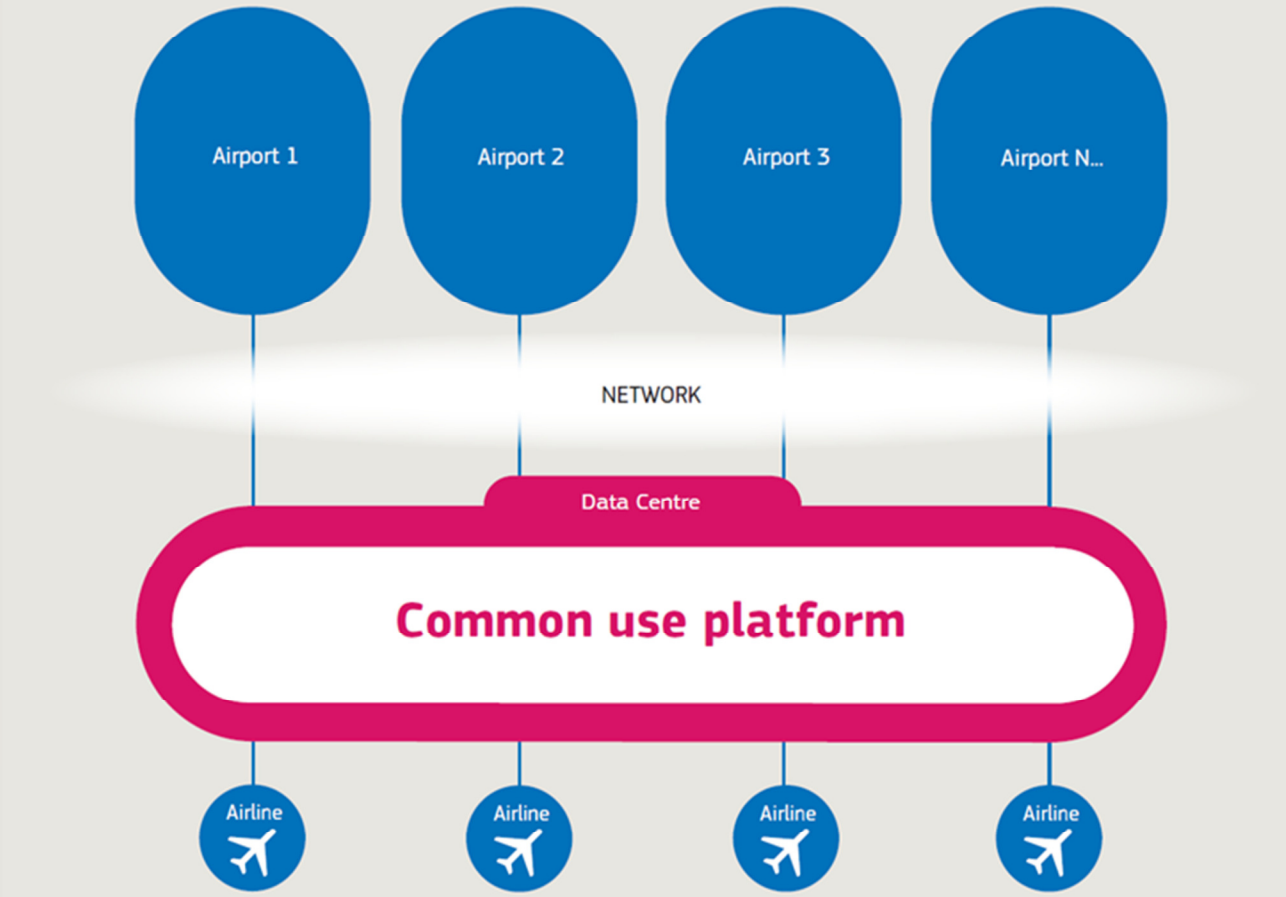
Traditional Common Use infrastructure



New cloud-based Common Use



ENERGY EFFICIENCY

By migrating to the cloud, travel providers push their computing requirements to the central data centre allowing the use of thin clients. These simple machines are best described as viewing platforms that allow agents to use a Passenger Services System (PSS) but they consume less energy than PCs, in part because they have far less moving parts. The use of thin clients combined with a reduction in the number of airport servers and hardware equipment required results in less electrical power needed and, indirectly, a reduction in CO_2. As an example, if 75% of the workstations at a 300-workstation airport switched to thin clients, the organisation would save the equivalent of more than 148 tonnes of carbon dioxide emissions over a five-year period. This amount of energy would allow a VW Golf TDI to circle the earth 27 times.[6] While the numbers will differ for each airport, locations can potentially reduce energy usage by 30% compared to traditional Common Use solutions. Overall, switching to the cloud is a more efficient use of energy than trying to run computers on-site via server rooms and local data centres.

PHYSICAL SPACE

Space is a valuable commodity at airports. The less space taken up by servers, the more space that can be dedicated to business processes such as servicing passengers or retail, thereby improving the passenger experience. By removing servers on-site, travel providers can maximise revenue potential.

EASE OF CERTIFICATION

Because CUTE and CUPPS allow for different system providers, an airline needs to make sure its PSS can interface appropriately with each passenger and anytime an airline wants to open a route in a new location, it needs to make sure its PSS is certified on the local provider's system. Vendors need to survey each airport to ensure the hardware and software are compatible and certified according to their standards and to the CUTE/CUPPS standards. If one airline's system is not properly certified, it could potentially affect the way the system works for other airlines. A cloud-based system means a one-time certification is needed to ensure it will run on all locations that meet minimal hardware requirements. Streamlining the certification process combined with the increased simplicity of provisioning a cloud system can assist airlines as they seek to open

[6] *Environmental Comparison of the Relevance of PC and Thin Client Desktop Equipment for the Climate, 2008 - Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT*

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new routes quickly to an airport. This is an added benefit of moving to the cloud that is particularly important for airports that seek to provide airline customers the flexibility they need to rapidly adjust their business strategies.

This flexibility also applies to airports themselves. London Gatwick Airport wanted to install a multi-language, automated public announcement system, which would take weeks to certify on the three traditional Common Use platforms. The certification process would also triple the cost of the project meaning the business case no longer stacked up. "On the cloud, you are less dependent on the setup of a PC and can roll out updates and new additions quicker and cheaper," says Mr. Ibbitson.

LOCATION FLEXIBILITY

It used to be that customers needed to go to the airport and check in at the desk. Now, travellers can use their mobile phones to check in on the go and board a plane by scanning a barcode on the screen. Travellers want the convenience of checking in to their flights where and when it suits them. The cloud is very flexible in terms of location, and can meet these growing needs. Airline employees can check in passengers remotely, using tablets and mobiles. If a terminal is unexpectedly unusable (perhaps due to flooding or an unattended suitcase) operations can easily be moved, as a cloud Common Use system is location independent – all it needs is a working network connection. If there is suddenly a large queue in one location, another desk can be opened to accommodate the rush. Similarly, if there is a one-time peak in customer numbers, such as for a sporting event or conference, temporary desks can be opened to accommodate this – or, if airlines recognise many of their customers come from a particular hotel or rail location, they can have staff checking in flyers from there. This flexibility can drastically cut down on delays and waiting time, thereby improving the customer experience.

Mr. Ibbitson also observes there can be significant IT flexibility with a cloud approach "If the cloud is set-up well then we can login, administrate and make changes happen instantly. In the old world we would need to raise a change with a supplier and it could take a long time to filter through."

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DISPELLING THE MYTHS

Cloud computing has been around for over 10 years

DISPELLING THE MYTHS

Cloud computing has been used for over ten years and brings with it a range of benefits. But whenever a new industry begins to consider cloud adoption, there are natural hesitations surrounding a new approach. Mr. Venslovaitis expresses his opinion about moving to the cloud: "With regards to Common Use, to my knowledge, there is no stable cloud solution in the marketplace yet. We are not averse to it, but we would like to see it thoroughly exercised on a trial basis before we consider its adoption."

In the vast majority of cases, however, concerns have been overcome. The cloud is prevalent in industries with critical operations such as banking, the stock market and retail. "A significant amount of critical aviation operations (like airline CRS, GDS and DCS) are already on a hosted environment similar to the cloud and working seamlessly for many years," said Abraham Kuruvilla, from Bangalore International Airport. "Cloud based CUS will benefit from more integration if it joined the cloud, including being more efficient, allows easier deployment and is cost effective in the long run."

"Increasing the use of cloud in our airports is a strategic decision," says an anonymous airport. "By not using the cloud, we believe we are wasting bandwidth which we are not utilising. Using the cloud leads to lower costs, ease of operations, and a strong IT infrastructure. As a result, I believe everything will eventually be integrated with the cloud under one platform."

While each travel provider needs to look at its own business and determine the best solution for its own situation, there are a number of misconceptions surrounding the movement to a cloud-based system that may be preventing providers from making the best possible decision. With that in mind, below are some of the commonly cited fallacies surrounding the cloud.

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IF THE CONNECTION TO THE CLOUD GOES DOWN, ALL PROCESSES MUST STOP

If the connection to the cloud goes down, all processes must stop.
"Resilience is key when using the cloud", says Marc-André Bédard of Quebec City Jean Lesage International Airport. Cloud providers have made resilience a priority. With the proliferation of backup connections, multiple physical network links and redundancy, an issue is extremely unlikely. The cloud also allows for the flexibility of using mobile and 4G networks to transfer data – something which London Gatwick Airport may have had in mind when it installed 4G access across its site.

From a physical perspective, data centres are often better able to come back online following power cuts or natural disasters. The redundancy and backup methods intrinsic in today's cloud systems mean an outage at the data centre has limited impact on the continuity of services. From a security standpoint, this redundancy also allows cloud providers the option of creating logical redundancy – using different layers of defence against cyber-attacks.[7]

ALL CLOUDS ARE PUBLIC

There is a general concern that when a server is not in a nearby physical location, you lose some privacy. Travel providers are worried that by communicating over longer distances, the server becomes known to the outside. This misconception may stem from the popularity of cloud service offerings from companies such as Amazon and Google, which are public by design. However, many large organisations are using a private cloud for critical processes.

A 2012 Gartner Data Center Conference poll showed that 90% of respondents were using or planning to use a private cloud within the company.[8] Private clouds offer dedicated IT infrastructures to their users with complete data separation, dedicated security, and stringent Service Level Agreements. At London Gatwick Mr. Ibbitson and his team have adopted a hybrid approach to cloud computing "We take a view that it really depends on the sensitivity of the data and the type of business process as to which type of cloud provider is right for each job. A lot of the information we handle is flight schedule information and it is not critically sensitive – that's fine to be hosted on Amazon Web Services for example."

[7] European Network and Information Security Agency, *Critical Cloud Computing,* December 2012
[8] http://www.forbes.com/sites/oracle/2013/06/11/the-top-10-myths-about-cloud-computing/

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LOCAL SERVERS AND IT INFRASTRUCTURE OFFER GREATER CONTROL

Mr. Stegemann of Münster Osnabrück International Airport notes, "The organisation and infrastructure of a cloud-based airport system must be able to take on critical operations. One of our biggest concerns in moving to the cloud is passing this responsibility elsewhere, thereby losing control."

This is a common concern. But while a locally-held server offers the perception of greater control through proximity and visibility, it also means there must be a constant presence at the airport of specially trained IT staff. This puts business continuity at risk, should these local staff members leave.

Additionally, it can be difficult to find local staff. Copenhagen Airport's Mr. Poulsen says: "We find it challenging to recruit skilled people, and the 'own employee' model is more expensive than the cloud approach in many cases." A cloud-based system with centralised servers means airports can outsource this IT management to a team trained to deal with the specific infrastructure. Being able to make a call to the cloud provider can actually be preferable and achieve change faster than needing to handle everything onsite.

Mr. Poulsen adds "there remains a feeling that, if you can touch the servers, then they must be more easily recoverable if there is a failure. However, the right vendor's capabilities are far beyond what we at Copenhagen Airport can provide in terms of scalability and recovery."

IT IS RISKY TO MIGRATE TO THE CLOUD

It does take time and effort to move to a new system. But moving to a cloud-based system means it needs to be set up once, and then it can be used from any location. Switching to the cloud is a relatively quick and inexpensive prospect. The actual migration process limits risk as much as possible: locations are migrated gradually following extensive lab testing. Both systems can run simultaneously and the older system is not turned off until the new system is up and running to ensure everything is working properly so that business processes continue as normal.

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THE CLOUD IS NOT SECURE

Security concerns can be a source of anxiety around moving to the cloud. But moving to the cloud does not mean increasing the risk of a security breach. London Gatwick Airport's Mr. Ibbitson notes that data centres at airports can be compromised to make room for other business processes such as baggage belts and passenger needs, "inevitably if we setup some secure servers onsite then at some point we will be asked to move them to accommodate a passenger related service and we need to consider security all over again". Companies offering cloud computing in a purpose-built centre do not have this issue. They generally provide firewalls, security codes, and other practices to mitigate the risk of a breach. Having a dedicated staff with cloud expertise means there are more resources to keep abreast of the latest security technologies. The cloud is already being used in other industries, such as finance and retail – as well as by many travel providers – to conduct transactions via the internet and networks. Mr. Ibbitson adds, "The recent Heartbleed bug was a perfect example for us, our cloud service providers were able to resolve the issue in hours, some of our onsite systems took a few days up to a week, due mainly to resource availability."

The debate surrounding the suitability of a cloud model for critical business processes continues but each year we see a different industry put in place the IT that supports yet another business process in the cloud. Slowly but surely there are an increasing number of responses to commonly held concerns as the discipline matures and doubts fade away.

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CLOSING REMARKS

At Amadeus we have witnessed our airline partners investigate, consider, challenge, and then widely adopt a cloud philosophy to support their most critical IT applications. We believe it is now time for the industry as a whole to embrace the transition

"Five years ago," says Mr. Kruszynski, "Zurich Airport would not be interested in a cloud common-use solution. But we are beginning to change our minds and consider this as an option, in part because the market is changing so fast and we need to keep up."

A spokesperson for one airport who chose to remain anonymous notes, "Giving good service to the passenger is our core business, and I believe switching to the cloud will help pave the road to this objective. Furthermore, the mobility and convenience offered by the cloud gives travellers more freedom and time at the airport to explore new areas such as retail. When there is an option to run by cloud, we prefer it."

"Cloud computing has the same economic and service flexibility attractiveness to airports as to everyone else," notes Mr. Venslovaitis. "Some airports have moved elements of their lower-tier computing and storage into the cloud and have realised significant benefits. It's probably only a matter of time before conditions will be right for airports to move operationally critical systems, such as CUPPS, into the cloud as well."

On a similar note, Mr. Bédard, from Quebec City Jean Lesage International Airport, says "if we are on one common platform with airlines, we hope there will be more transparency and collaboration to improve airport operations and the whole travel experience." Copenhagen Airport's Mr. Poulsen agrees the cloud can support greater innovation: "In a world where airports are free from IT infrastructure considerations, we could all build new apps and innovate." A cloud model will allow for growth and differentiation.

The innovations allowed for by sharing IT infrastructure and resources will fundamentally improve the operational and commercial performance of the air transport industry. Mr. Kruszynski, from Zurich Airport, suggests a common infrastructure could lead to a common standard in self-service bag drop and, as a result, more convenience for the traveller: "More and more people are checking into flights at home. A common standard in self-service bag drop would

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allow people to print luggage tags at home, improving efficiency for both the traveller and travel provider."

As Mr. Ibbitson identifies, the move to the cloud is already well underway for a range of applications "At London Gatwick Airport, our A-CDM (Airport Collaborative Decision Making) solution is built around cloud integration. Airlines don't want 160 instances of A-CDM at all their airports, they want one data feed heading back to the headquarters from the cloud so they can make better operational decisions." Mr. Ibbitson sees the cloud as likely to develop at a rapid pace in the air transport industry providing the cost base is attractive. "As long as the new wave of cloud-based solutions are cost effective they will see rapid adoption. In our industry we tend to roll out innovations quickly when the business case is clear."

True examples of cloud computing do not currently exist when it comes to Common Use technology at the airport. Instead, airports and their customers are relying on outdated technology to support their Common Use Passenger Processing activities.

Technology has advanced rapidly in recent years and now allows for the development of more flexible, cost-effective, and simpler Common Use systems. Cloud computing has spread through many critical industries from banking to manufacturing, and is used by increasing numbers of consumers in their private lives. Harnessing the cloud for Common Use within the airport offers the chance for 'anywhere' check-in operations, enhanced mobility - at a lower cost than today's approach. Ultimately the cloud will lead to a more resilient, flexible and traveller-driven approach to passenger processing.

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