ADB SAFEGATE | Jacobs

THE ELASTIC APRON

Why airports need operational elasticity at the apron in an ever-changing world

ABSTRACT

For the past two decades, airports have expanded to accommodate growth in passenger and cargo traffic. As a result, airport operations at the gate and on the apron are changing constantly.

With the coronavirus (COVID-19) pandemic, change has been about adaptability, flexibility, and resilience. Airports have to streamline their resources, consolidating gates and shutting down terminals in certain cases. Alternatively, cargo operations have increased and terminal aprons and gates have been used for parking or staging of cargo aircraft. Closures of sections of airfields and taxiways used to park unused aircraft have become a new way of operating in order to reduce energy costs. Airports and airlines could not have predicted the changes that took place in 2020 and 2021, but given the global implications of the pandemic, change had to occur. However, some requirements remain constant: safe operations are non-negotiable, an eroding passenger experience is a non-starter, and efficiency is an environmental and financial imperative.

Recovery is not likely to be a straight line of predictable growth. Traffic will be volatile for the foreseeable future. Airports and airlines must find an economical way of maintaining the minimum operational requirements through unpredictable ups and downs in demand. In short, operational processes and solutions must be elastic to address volatility. This requires technical and commercial innovation, and a rethinking of processes to enable efficient partnering between stakeholders. We call this *The Elastic Apron*, or *operational elasticity*.

In this white paper, industry experts from ADB SAFEGATE and Jacobs explore the elasticity concept and how to achieve this new and unconditional need.

Simply put, elasticity is the ability to adapt quickly and easily to unforeseen change, and return to high performance in all circumstances.

FROM SAFETY TO ELASTICITY, APRON TECHNOLOGY HAS EVOLVED

As a connector between flights and terminal operations, the apron is where most of the action is with many stakeholders working for the successful turnaround of an aircraft. Each stakeholder provides an elementary puzzle piece; one such piece is the advanced visual docking and guidance system (A-VDGS). The A-VDGS is the first and last contact for an aircraft while on the apron, starting with the docking process of the inbound aircraft and ending with the pushback for departure.

Since 1997, all technology supporting apron operations have undergone a need-evolution. For the A-VDGS, this can be split into four eras which complement and build on each other and show how the focus evolved as the technology matured over time.

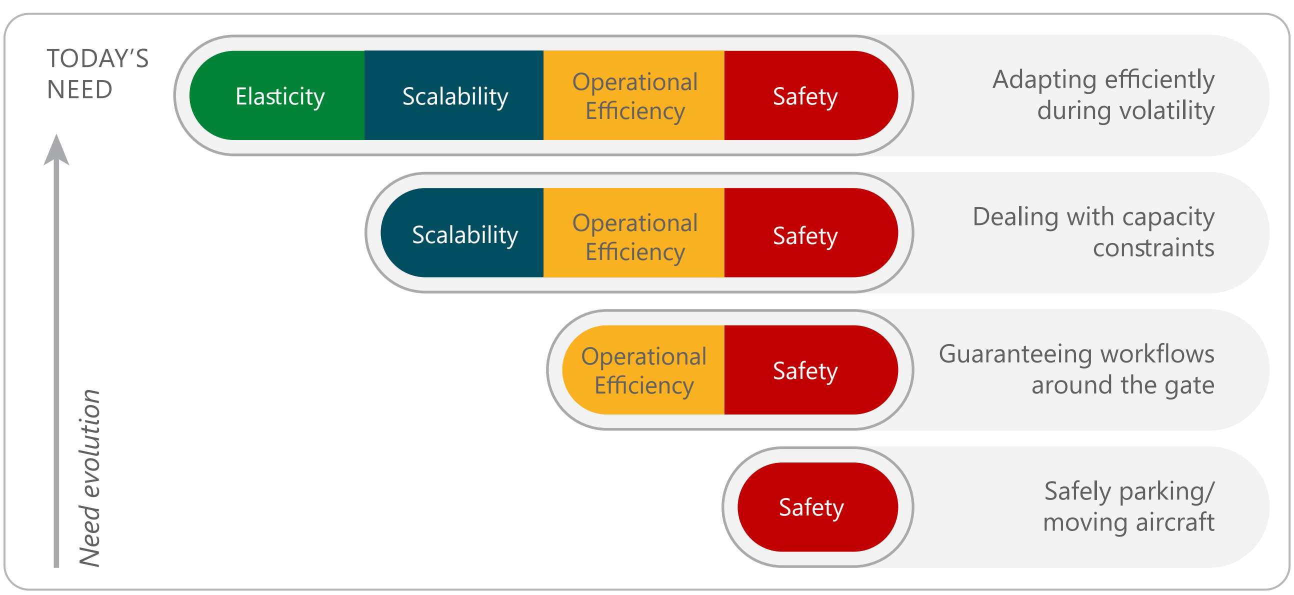
Safety was the primary factor for the rather unregulated apron area when A-VDGS technology was first deployed in 1997. The priority: park aircraft safely under difficult conditions and in tight maneuvering areas independent of pilot or ground staff training and skill level.

Operational efficiency quickly followed as a key objective, with A-VDGS allowing real estate and assets to be used more productively to increase capacity and lower operating costs, while maintaining safety. The A-VDGS evolved to provide consistency and repeatability during the turnaround and now enforces operational rules and guidelines airport-wide. The A-VDGS display also serves as the ramp information display (RIDS) to inform and guide ground staff during the turnaround whenever the aircraft is not in an active park and guidance mode.

Scalability needs followed, taking capacity management to the next level in the context of how to do more with the existing airport infrastructure. Costs aside, building more takes a long time. In certain situations, increasing capacity by constructing additional facilities was a non-starter. Automation came into focus when capacity constraints became the new operational challenge. Infrastructure optimization helped airports to gain additional slots for an increase in aircraft turnaround.

Elasticity has emerged as the need for today and tomorrow, which subsumes all previous focus areas and emphasizes the challenge of successfully managing constant change and volatility. Whereas scalability is primarily one-dimensional and capacity-oriented, elasticity is multidimensional by default and is about the ability to handle volatility and unpredictability.

Evolution of A-VDGS technology



ELASTICITY IS A STRESS BALL: ADAPTABLE, FLEXIBLE, AND RESILIENT

At the gate and on the apron area, elasticity perfectly describes the multidimensional challenge today's reality places on all stakeholders involved in aircraft turnaround.

Think of elasticity as a gel ball held in your hand that relieves stress, with your hand constantly and drastically changing the environment. Because it is flexible enough, the gel ball adapts quite easily and returns to its original shape or assumes a new shape whenever the hand defines a new environment. Safety cannot be compromised, so the ball may not leak or burst, and the transformation of the ball must not affect the fun factor. The face on the ball shows that this constant transformation, while challenging, is definitely possible if the ball is designed right.

Simply put, elasticity is the ability to adapt quickly and easily to unforeseen change, and return to high performance in all circumstances. In the case of airport operations, elasticity means the ability to maintain a consistent level of safety, productivity, efficiency, and passenger experience despite volatility, the ups and downs of traffic, or the impact of unvaccinated or partially vaccinated people on passenger flow. Elasticity thrives on challenges and positivity. In other words, elasticity allows operators to unlock the opportunities that each challenge brings with it. It mitigates against unforeseen downturns and enables a hard-to-predict recovery.

Linking back to the stress ball metaphor, the ball is flexible and can adapt to new needs. Flexibility is inherent to its design, so is resilience. It recovers from the forces and can be used again and again, adapting to an ever-changing environment.

What makes a solution truly elastic?

Adaptable

Can change and adjust as needed to meet new and changing conditions

Flexible

Allows the operation to adapt easily, quickly and cost efficiently

Resilient

Supports consistent operations, while allowing quick recovery from unexpected or difficult conditions

ELASTICITY CAN TACKLE OPERATIONAL CHALLENGES AND AID RAPID RECOVERY

The pandemic is a stark reminder that our industry is especially vulnerable to future events, from economic downturns to geo-political situations, and changing travel trends. While elasticity would have been good to have earlier, it is critical to the recovery of airports and airlines across the globe today.

Airport and airline operations must find ways to not only increase air service and ensure the necessary facilities are ready to accommodate the service, but also do this quickly and efficiently. Otherwise, the threat of losing air service and passengers is real. The idea of recovering quickly and scaling up must be tied to the existing airport and airline infrastructure and systems. For many, the thought of spending money now to add new infrastructure or systems to reduce costs is a hard pill to swallow, given the uncertainty around recovery and the potential ups and downs along the way.

In the last year or so, the need for operational elasticity at the gate and on the apron has become obvious. It is safe to assume that elasticity will become standard and the new norm. Let's look at some real-world aviation scenarios from the recent pandemic that demand elastic answers:

Staffing to manage volatility: When the pandemic spread, airports across the globe shuttered many of the facilities that were no longer supporting air service. They did so for several reasons - to reduce operating costs, perform long overdue maintenance during the operational lull and update facilities, among others. Staff was reduced as the number of flights dwindled soon after the shutdown.

Airports and airlines were forced to consolidate operational activities under their remaining teams or contracted staff to keep the infrastructure up. But in many cases, operational functions were siloed, and this resulted in high-cost structures and the inability to maximize efficiencies. Technology had been deployed for single or limited independent functions. Airports had purchased equipment and systems for one purpose, without considering how systems can be integrated to provide greater benefits and reduce costs. This could have allowed for a different staffing model with fewer specialized staff performing the same services with greater efficiency.

Also, once the first areas opened up and special events such as the Easter holiday and summer vacations were around the corner, ticket sales boomed and the airline industry was unable to satisfy the demand. Hiring and firing cannot be perceived as a resilient approach – although for many organizations it has been the only possible one.

Downscaling operations during lows: One European airport went from five operational terminals down to only three. This created the need to flexibly downscale operations by moving airlines to different gate and apron areas. Thus, airlines and airport operations had to overnight deviate from established flows, applying different procedures. This also creates a resilience challenge when bringing mothballed gates, or even terminals, back into operation. The more elastic a solution or organization is, the later they can bring resources and infrastructure back into operation. In this example, operations are still occurring at the three terminals while the traffic is back at 60% with domestic flights returning to service. The new challenge is actually the old capacity constraint.

ADB SAFEGATE | Jacobs

Restarting operations with minimal impact: In the current environment, airports are better positioned to assess what they are currently providing from a service perspective. Is infrastructure being utilized or is it shuttered? How are operations being handled? What's needed to support the growing operations? Are they struggling with limited staff? What resources are necessary to provide the required services? Can the services be provided with the resized organization and trimmed service contracts or does the staff need to be re-engaged?

If upsizing is the answer, will it be the same old way with previous staffing numbers or will they consider alternative means of conducting operations with limited staff? If it is the former, has the cost and timing of doing so been considered? Will staff be interested in returning to previous positions or will new staff need to be hired and trained? What's the right timing for this? Real world experience tells us that the ability to bring back experienced former staff who have been furloughed is difficult. Many have opted to retire, and others have found other employment opportunities.

Considering the yin and the yang, airports must think differently about how to restart operational expansion with limited staff and budgets when conditions improve. Can technology be used to support the restart, to create efficiencies that were previously achieved through staff intervention, or to use data available within systems which wasn't retrieved by staff to support operations?

Flexibility should also be considered when seeking ways to operate going forward with technological support. Technology-based systems can facilitate operational efficiencies and streamline operations without the impacts created by pandemics or similar events. System interfaces can create elasticity and minimize operational risks. The data streams being provided allow for full and rapid decision-making based on a broader amount of information to assess.

Automation to use data for quicker, accurate decision-making: Airports rely on data for decision making. For years, they would rely on reports submitted by the air carriers for determining costs to forecast revenues. This data was not real-time true data derived from air traffic control (ATC) reports or gate management systems (GMS). A GMS was initially deployed to only manage the gate schedules but eventually began to support accurate and timely billings as airports realized the data collected could be automatically pushed through to the finance departments, thus making manual tracking of gate usage obsolete. Utilizing GMS has also helped airlines and ground handling companies obtain real-time status of aircraft arrivals and departures. With manual turnaround milestone tracking becoming obsolete, waiting for an aircraft at an empty stand is a relic of the past. This has enabled better utilization of staffing resources.

Airports that rely on gate management systems to schedule gate usage often do not have immediate knowledge of the in-service status of boarding bridges unless an airport maintenance technician or a contracted service operator advises them. If reporting is manual, the opportunity for timely notifications is missed as is the opportunity to provide automatic rescheduling of gates, resulting in inefficiencies and capacity constraints.

Another example is airfield lighting. Previously, when lighting outages occurred or entire lighting systems malfunctioned, airports relied on either reports from pilots or reports prepared by airport operations personnel conducting daily inspections. At many airports, this reporting was not always timely if it did not constitute a regulatory violation. Over time, as lighting systems became smarter, each light was equipped with sensors to report outages via an independent monitoring system. The outage was corrected, but often was not logged in the airport's computerized maintenance management system (CMMS); therefore, outages were not tracked and preventive maintenance was not accounted for. If an outage occurred during a surface movement guidance & control system (SMGCS) operation, the impact to aircraft taxi routes could result in the rerouting of aircraft, resulting in longer taxi times, higher operating costs with fuel burn, and potential delays to arriving or departing aircraft.

With an interoperable system that is capable of interfacing with other systems to monitor performance and aid decision making, efficiencies are increased and staffing resources previously used to collect data manually to make decisions can be reduced. On the airfield, this means technology can be used to interface with the SMGCS lighting and automatically reprogram the SMGCS to offer the aircraft alternative routes. At the gate, an A-VDGS cannot only capture the aircraft docking data but also expand its value to the gate operation. It can collect data from the boarding bridge operating system, the lead-in line lighting, the fuel hydrant system, and apron lighting to assess a gate's readiness, as well as the operability of each piece of equipment before the aircraft taxis to the gate. Having the information readily available to support the automatic reassignment of gates optimizes capacity, reduces passenger inconvenience and lowers costs to the airlines.

There are many more scenarios- pre, during, and post-COVID, calling for elasticity. Airlines have started, stopped, and started again with certain routes. Missing routes have increased small aircraft movements, placing different demands on airports. Terminal refurbishments require stakeholders to work differently. Different passenger-flow optimizations require changes to the way processes work or, in some cases, social distancing rules demand even more staff than before to perform required functions.

Each of these scenarios is an opportunity for integration of elastic systems to provide a broader picture of the ongoing operation of the airport in real time, allowing for quicker and more informed decision making. Using technology to manage operations with elastic system interfaces offers efficiencies that allow rapid decision making while creating resource efficiency. This allows airports and airlines to ramp up or ramp down quickly with minimal staff impact.

As companies that provide technology solutions, engineering, and operational services to airports globally, ADB SAFEGATE and Jacobs know that each airport will address the same situation differently, as per their priorities, culture, labor costs, and many other factors. From a product manufacturer and service provider perspective, elasticity raises new product and service design requirements that allow for adaptability, flexibility, and resilience.

What's key to remember - elasticity works both ways, and therefore it is much more than just technology. It is about technology, systems, and even processes designed for elasticity. The point is not just to scale back up quickly as aviation recovers but also to be able to scale down just as quickly and effectively when another event occurs. The industry has seen sudden and drastic downturns in demand before, from the terrorist actions of 2001 to the great recession of 2008, and now the pandemic. Nobody knows what is next or when, but with elasticity, airports and airlines are better prepared to reduce economic losses without sacrificing safety or performance, while being prepared to ramp back up quickly during recovery. This is why innovation – both at the technical and commercial levels is imperative to achieving elasticity.

ADB SAFEGATE | Jacobs

TECHNICAL INNOVATION CAN CREATE ELASTIC SYSTEMS

Achieving elasticity can be challenging. Multiple regulatory, system or environment-specific requirements can strongly impact the design. For an industry where the long-time answer to any safety or operational improvement has been to add more people, the challenge is not just procedural and legal. It will require an aggressive push for technical innovation to create solutions that reduce the dependencies on humans without compromising safety.

At an abstract level, the technological challenge is to design and create a framework that automates operational and reporting processes and acts as a single truth for data to derive information that gives a clear picture across all levels of the solution.

To be truly elastic, such a system must be:

- *highly flexible and can adapt continuously and seamlessly*
- *core-ready to adopt innovations, i.e., easy to modify, improve, and extend*
- *resilient so that any solution can revert or adapt to new requirements.*

Here are some of the common aspects, along with real-world examples, to consider while bringing solutions to the market:

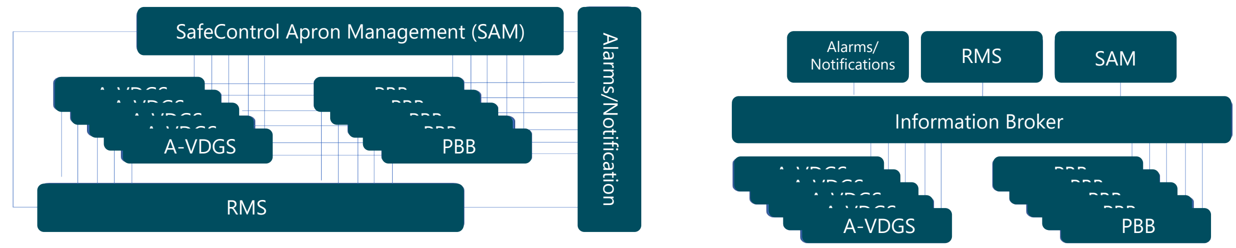
Automation: While elasticity can be achieved in different ways, automation becomes the driving factor when efficiency and productivity are complicated by the reduction of available staff. Automation implements procedures and workflows in a machine-readable and processable way. It requires that procedures are clearly worked out and established, and technology can then reproduce the same workflows continuously and consistently without error. Automation is the basis and is key for an efficient, continuous change management process. Additionally, automation provides for testing and validating each incremental change to ensure safety is never compromised.

Example: The activation of an A-VDGS can be triggered by flight plans vs. manually, or with a higher degree of integration, it can be automated based on the actual position of an aircraft provided by a surveillance system, rather than potentially outdated flight plan data. Operationally, this automation makes the gate area a restricted area at the latest moment possible and the earliest moment necessary, e.g., for vehicles operating at an adjacent gate. Additionally, more precise scheduling based on this automation increases the efficiency of ground operators. And IoT data combined with a resource management system can provide automatic guidance or decision making on the gate availability.

Data-centric integration: The sudden and unplanned changes caused by the pandemic shows how today's systems are obviously disconnected. Thus, the automation described earlier must create an end-to-end solution. The integration of different systems is key to expanding automation from individual stand-alone applications to fully integrated applications that are interfaced to communicate entire process flows and present full picture scenarios to identify any impact points within the processes. Only then can we realize the full potential of technology and drive elasticity. The drastic changes in the recent past have confirmed a trend: applications interconnected with each other in a spider network manner are neither adaptable nor flexible nor resilient. Integration must happen at the data level, i.e., the different applications coexist and are integrated to support publishing data for other applications or subscribing to data generated and published by others. Different broker, queue, or pipeline solutions exist to support such designs and are long-time proven. In other words, system A should not need to change because system B or C change.

Example: Many (IoT) assets on the apron can communicate. As there is no standard, different assets communicate in different ways using different physical layers. In a competitive market such as ours, this multiplies with the number of vendors supplying the same type of asset. There are also multiple stakeholders requiring that information, e.g., for managing the docking, bridge pre-positioning, resource planning, or the baggage routing. Integrating based on data – where all assets provide information in their way to a broker, and consumers subscribe to

Application Integration vs. Data-centric Integration



data received from the broker – creates star-wise dependencies around the broker. This can be more easily maintained than spider-network like dependencies between all assets and stakeholders.

For only two assets on the apron, the above image illustrates the difference between an application-to-application integration vs. a data-centric integration. The reduced number of interdependencies can easily be derived from the number of lines connecting the assets and applications. The SafeControl Apron Management (SAM) software and the resource management system (RMS) are only two examples, besides the alarm and notification service, that consume and provide information between the assets as well as different applications. A more complete view on the apron, including ground power units (GPUs), pre-conditioned air (PCA) systems, ground handler applications, scheduler applications, milestone trackers and many more let this challenge grow quadratically, while the data-centric integrations scale linearly with the number of assets and applications. Sure, not all applications need all data, but even to collect a single attribute, an asset or application specific integration is required.

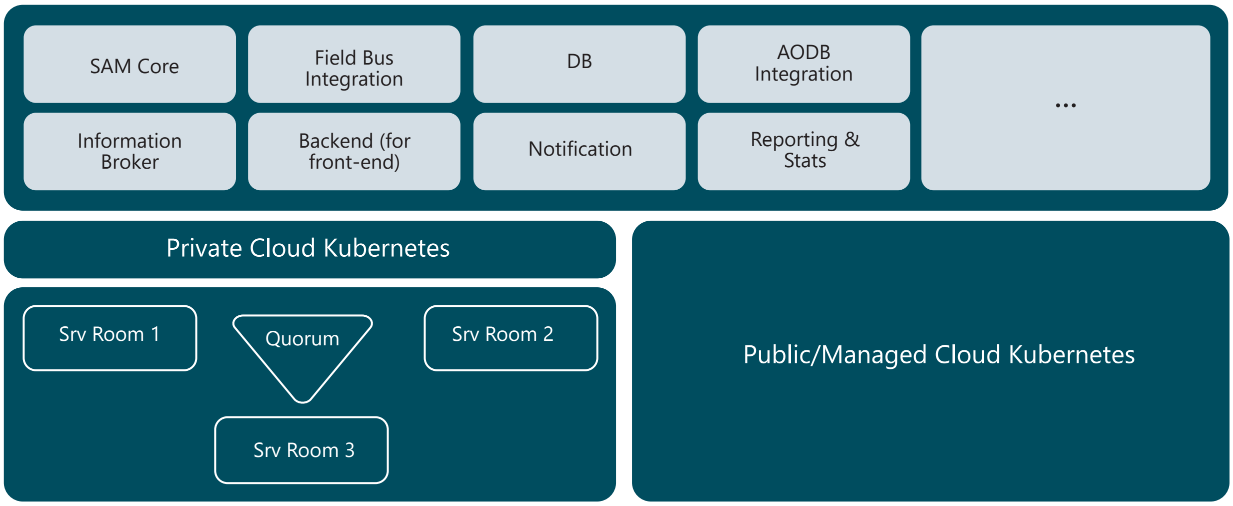
Single point of truth: The ultimate wish of any system designer. A data-centric integration strongly supports the single point-of-truth idea, as applications publish their knowledge once, while multiple consumers receive that data at the same time via their subscription. The single point-of-truth is highlighted here (even having already described data-centric integration) because the 'truth' part requires special attention.

If an environment changes continuously, it becomes even more important to understand, track, and validate where the data came from and whether it is correct. The right design decisions need to be taken, e.g., with regards to stateless and stateful services, as well as non-persistent information storage vs. persistent storage (applications that might own an outdated piece of information, e.g., after migrations or restarts). Those techniques have their rectification, e.g., in caching for performance reasons. As a general strategy, "as stateless as possible and as stateful as necessary" is recommended.

Example: The airport operational database (AODB), as data-centric storage providing a single point of truth, is a well-established example at many airports. An IoT broker or information broker as in the image above is another example. Data-centric integration, along with web-based applications utilizing a (stateless) 'backend-for-frontend', combines new technology without jeopardizing the single point-of-truth idea. And assets and applications playing back processed information to the information broker, derived from previously consumed data from the information broker, avoids stacking of applications i.e., the passenger boarding bridge (PBB) providing failure states to the A-VDGS, forwarding it to SAM, which compiles it for a notification service while in each of the steps there is a potential to deal with outdated data or conflicting information.

Cloud technology: It appears that many systems are surprisingly still sold on bare-metal servers. Perhaps, this happens for liability and product validation reasons, as well as to keep the number of stakeholders involved in the project (e.g., local information technology) limited. Technologically, there is no real reason for this anymore. Virtualization solutions are widely available and increase the harmonization of IT systems used at an airport, while decreasing the maintenance efforts along with heterogenous IT (number of faults, security breaches, etc.) as well. The next step to achieving elasticity is to move to cloud technology, without necessarily insisting on a public cloud as provided by AWS or

Kubernetes setup: Private cloud vs. public cloud



Azure. Cloud technology such as Kubernetes provides an abstraction layer from the operating systems and infrastructure provided to run the applications. Further, containerization makes updating and upgrading as simple as it was when bringing a new "*.exe" file on a memory stick to the airport. It provides commonly used and, consequently, updated security infrastructure. Integrated load balancing and high availability measures tackle volatility in connected users and systems. Choosing this path provides elasticity on the infrastructure level to any application designed for it.

Example: Both new apron management systems and resource management systems are based on cloud technology. From a purely technical perspective, they can run on private cloud infrastructure, but can also be hosted on AWS or Azure. They utilize the same technology as millions of users on the internet validate every day continuously, bringing all those proven features available in that domain to industrial airport applications. In the above image, there are three servers to the left that create a quorum-based setup, on which Kubernetes (as one of the possible cloud infrastructures) is hosted in an airport-private environment. The right also shows Kubernetes when managed by a public cloud provider such as AWS or Azure. Independently from that setup, the different functionalities are broken down into microservices.

Microservice oriented: Given the aspects above, it is a nearly obvious and natural conclusion that future applications need to be service-oriented and small, i.e., microservice oriented. Previous monolithic applications do not benefit from the capabilities of cloud technology, for example, replications of intensively used service and geo-special optimized hosting of the service close to the user (think about airlines operating at globally distributed locations, and airports under the same concession holder or civil aviation responsibility). To adapt flexibly also means to be able to change something without going for a full product regression test. And, knowing that the new status quo will be legacy tomorrow requires changes to be introduced on more fine-granular artifacts that can be validated independently.

Example: Turnaround tracking is key; this is done by multiple upcoming vendors and different technologies. Apron management and resource management systems are expected to collect and process (a subset of) milestones to contribute to a smooth turnaround. Microservices allow to abstract from vendors and solutions, react efficiently to changes and lessons learned in this growing community around automated milestone tracking, and do not put the core functionality at risk when introducing change.

Thin client oriented: In dynamically changing teams, keeping collaboration up is challenging. Systems need to be designed to ease collaboration. Thin client designs contribute to that. They do not require installations on end-user devices, nor do they usually have high requirements toward the performance and capabilities of a device. Operators can involve whom they want and how many parties they want for how long they want, and the infrastructure assures that this is not only possible but also scales as per the demand. Combined with the technology described above, this can also happen in a secure way to assure elasticity on the end-user side (not server as mainly focused above) as well.

Example: New apron management systems target a holistic view of the apron. This not only includes clients that are used by the airport (customer) directly, but also those clients with tailored content provided as a (paid) service to subcontractors such as ground operators. Thin clients do abstract from the physical hardware and operating system and can be efficiently deployed.

Reactiveness: Gaining experience with thin client applications creates an appetite for more. If it is just a website running locally, why should it not also run on a mobile device, on a terminal on the apron, or on a screen in the terminal? Of course, it comes at a price given the different rendering, readability, and scaling requirements (and potentially device performance even if it plays a minor role). However, frameworks such as Angular or React make it possible, with reasonable efforts, to deliver so-called reactive applications. Reactive applications can run by default and by design on different device types and the right frameworks make it possible – based on, and maintained by, globally available and approved technology. This contributes to elasticity on several dimensions: adapting new technology easily and without the need to revalidate an application, to adapt an existing organization efficiently to a new environment in which different technology is used (and backward) and to (cross-) utilize existing (mobile) devices of, for example, ground staff in a combined manner.

Example: Building on the previous examples, airports not only provide the clients to additional users but also different types of users, working under different conditions and with different tools. For example, the same application - SAM - with a subset of information, such as the turnaround-milestone progress or intervention requirements, should run on a tablet in a follow-me car or maintenance vehicle, and on an apron supervisor's mobile phone.

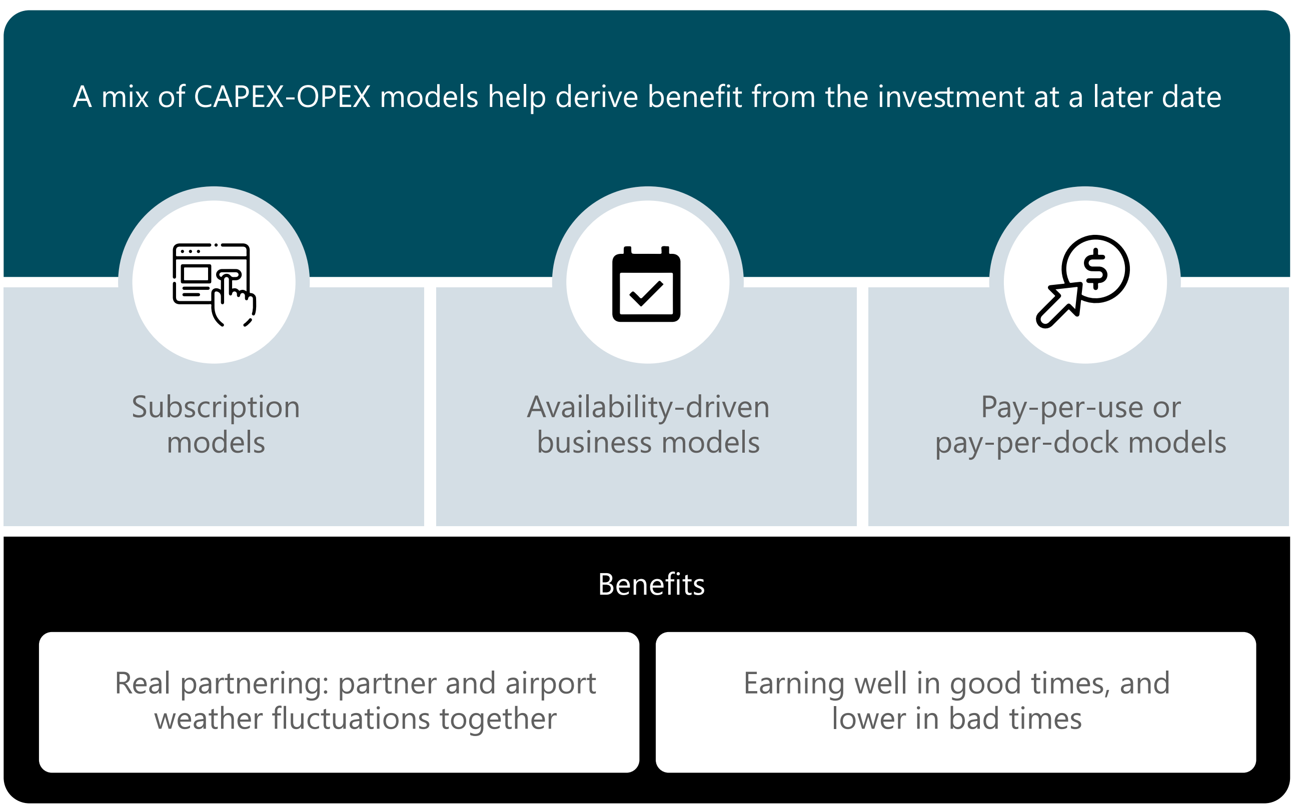
ACHIEVING ELASTICITY WITH COMMERCIAL INNOVATION

Why is commercial innovation needed if there is already a technical solution? Today's systems are more often "inelastic" or static in change – at least when looking holistically and end-to-end. For example, operating systems are systematically changing, security requirements are constantly increasing, the airport layout is continuously evolving, and regulations are also changing. This requires adaptation, but adaptations within a solution comprising multiple products create interdependencies. And, without commercial innovation, a conventional one-off purchase (even more so without aftermarket services) is highly challenging to maintain and lacks mid-/long-term technology resilience.

In an elastic environment, commercial offers must be elastic as well. This calls for commercial innovation; innovation because the benefits of these models are not yet widely understood and captured especially in the airport industry. Elastic commercial models are driven by partnering through the good and the bad times.

Partnering vs. selling forms the basis for elastic commercial models: Partnering in good and in bad times can mean that innovation needs to be brought forward in a crisis to leverage from it during high-performance periods. This is one of the reasons why airports in several countries invested in gate automation during COVID-19 even when operations were low.

When partnering, one needs to share goals, usually expressed as service-based key performance indicators. This speeds up innovation and process automation, and ensures solutions are always up to date giving users access to the newest features and functionality. And, the airport or airline can rely on experts from the service provider accessing the best and most appropriate skills as needed.



Capital expenditure (CAPEX) and operating expense (OPEX) flexibility is critical: A crisis typically puts pressure on budgets, and some airports have faced restricted CAPEX availability (budget depletions) during the recent pandemic. It is up to the airport partner and supplier to work with the airport and derive benefit from the investment at a later date. Airports and partners can consider using a mix of innovative CAPEX and OPEX business models such as the following:

- Subscription models prevalent in the software industry: By default, a subscription model includes an integrated service level agreement (SLA) and agreements for system update/upkeep. This creates collaboration and brings resilience to ensure the system is running when staffing is reduced. However, the model is decoupled from the actual operational airport-performance as it is decoupled from the traffic and the current operational need.

- Availability-driven business models for integrated hardware and software solutions: Availability can be seen as the default key performance indicators (KPI) for SLA-based models, beyond software solutions. For example, the fee for the solution is based on the systems in scope that are available for use. However, these neglect the fact that in the time of a crisis, availability might not be needed to that extent, i.e., the KPI might be shared, but it might be the wrong KPI at that moment.

- Pay-per-use models or pay-per-dock models: Here, real partnering can happen earning less together in bad times when no aircraft arrive or depart, and earning well together in good times when the industry is booming. Any kind of hybrid model can be derived through a shared initial investment or the pre-financing aspect translated into a higher usage fee that pays back under conditions with higher traffic.

Value-driven investments are the way to go: When budgets are limited, investment priorities need to be carefully chosen. Subsequently, the value proposition is under closer investigation, which then drives the dimensioning of the CAPEX vs. OPEX and potential value-sharing investments per case. From experience, if the value proposition looks promising, the often-semi-public airport customers tend to opt for a pure CAPEX deal – and usually make the necessary money available despite losing the partnership benefits.

A pure CAPEX deal is a status-quo, like it has been for decades, and lacks commercial elasticity. The downside is that the challenges described previously, i.e., coping with the permanent changes induced by elements of the solution or external factors, are not addressed. This means the solution at hand is technically flexible but commercially static and inelastic. In today's context, going elastic serves and brings value both to the airport and the supplier.

TOWARD THE ELASTIC APRON

As airports and airlines chart their recovery, they must consider the possibility of another disruption, be it another COVID-19 wave or some other event that results in a downturn or sudden peak in market demand. This is already happening in the U.S. with airlines getting more cancellations and traffic starting to decline. To be prepared, the technology and systems deployed must support the scaling up or down of infrastructure and resources as circumstances demand.

This is where elasticity comes in. Solutions that will provide elasticity are those that offer adaptability, flexibility, and resilience to manage volatility, allowing airports and airlines to maintain safety, efficiency and cost effectiveness on either side of the volatility wave.

The quest for elasticity presents additional challenges for airports, airlines and passengers. Manufacturers with deep industry knowledge and a solutions focus recognize this need and can adapt to address it. They must push the boundaries of technical and commercial innovation, and take a long-term, end-to-end, true partnership approach. This is the best way that the aviation industry can withstand and bounce back from the next disruption.

For more details, contact your local sales representative via our website:
www.adbsafegate.com/contact/
www.jacobs.com/

ADB SAFEGATE | Jacobs