WHITEPAPER

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# Digital Identity

## TOWARDS SEAMLESS, SECURE AND EFFICIENT AIR TRAVEL

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# EXECUTIVE SUMMARY

When travelling, the journey is often as important as the destination. However, the increasing numbers of travellers emphasise the need for balancing efficient passenger processing with enhanced security.

Today, many unhappy faces join long queues to check in, drop off their bags, get screened and finally board a plane. It may then be delayed if there is congestion caused by an earlier flight that had been held back because passengers were late.

The experience is, unfortunately, all too familiar. And it is expected to get worse unless the industry does something to change the situation. Global passenger traffic is set to nearly double to 7.8 billion by 2036, according to the International Air Transport Association (IATA) in 2018[1].

Facing this impending crunch, airlines, airport operators and government agencies have to find a new way to tackle the problem. Some have resorted to building new terminals and expanding existing infrastructure, often at great cost[2].

Even then, there is no way to out-build the problem by simply adding more check-in counters or security control gates. Manpower is still required to handle existing procedures, for example, to examine travel documents from passengers. This takes time and adds cost to the entire process.



1 http://airlines.iata.org/sites/default/files/Data%20spread%20dec-jan%20v5.pdf
2 https://www.channelnewsasia.com/news/singapore/changi-airport-new-fee-t5-terminal-5-passengers-9999526



The solution has to be a seamless, efficient and secure way for passengers to go through all the necessary checks before they board a flight. More must be done to enable them to be “known” or identified throughout the trip, so they can breeze through each touchpoint.

**The answer lies in Digital Identity, a digital biometrics solution that allows a passenger to securely identify himself to the key stakeholders before, during and even after a trip to the airport to catch a flight.**

Over the years, there have been improvements thanks to self-service options for checking in and baggage drop, for example, IATA’s Fast Travel. Stakeholders have to work more closely to process passenger information, reducing all the friction introduced in the current system.

The answer lies in Digital Identity, a digital biometrics solution that allows a passenger to securely identify himself to the key stakeholders before, during and even after a trip to the airport to catch a flight.

This ID will enable him to be authenticated easily, so he does not have to show his documents repeatedly to different agents at the airport, thus speeding up the process at each touchpoint. When he lands, the same ID can be extended for use by other service providers, such as for hotel stays or car rentals.

Digital Identity also smoothens many other interactions, enhancing the journey in many ways. Combined with other sensors, it can enable the delivery of personalised and customised services while balancing a rigorous safe and secure environment.

To get there, stakeholders must get together to solve the common problem facing them. Each holds a vital piece of the jigsaw that can be put together to transform air travel profoundly.

Most importantly, passengers have to buy in. A known passenger consents to using his digital ID as proof of his identity to government agencies and private companies. Always in control of his biometric, biographic and historical travel data, he can enable these key stakeholders to provide smoother, seamless access throughout his journey.

# AIR TRAVEL NEEDS A REVAMP

The biggest problem facing the air travel industry is coping with the growth in traveller numbers. This brings a number of related issues for all stakeholders

Airports have to process more travellers with limited resources, whether this is manpower or infrastructure. For government agencies, security becomes a bigger challenge with the need to screen more travellers. For airlines, the task is to make sure every passenger has a safe and pleasant flight.

In recent years, industry stakeholders have taken to digital self-service options to enable passengers to move easily through touchpoints in the airport. This has helped alleviate some of the pressure from overcrowded airports.

**74%**
of passengers used an electronic boarding pass on a smartphone over a year

Over a year, 74 per cent of passengers used an electronic boarding pass on a smartphone, according to an IATA study in 2017[3]. Among passengers, 82 per cent would use a digital passport instead of their regular paper passport, while 33 per cent said they would replace a boarding token with biometric recognition

The issue, however, is that many of these touchpoints still rely on repetitive checks. This adds friction and slows down the process. The result is long queues at multiple points along a journey. At a check-in counter, a passenger may need to scan his passport and boarding pass to register himself and drop off his bag.

As he tries to enter the secure area, he is asked again for his passport and boarding pass. He also has to identify himself at an airline lounge and later at the boarding gates before he gets on the plane. While doing all that, if he has time for shopping, he would have to produce his boarding pass at each retail store.

As a result, despite the digital initiatives rolled out in recent years, the industry still struggles to handle the higher number of people making use of the existing infrastructure today.

In trying to meet the demand, costly new terminals have been built. Indeed, as much as US$1 trillion is being spent to enhance airport infrastructure to cater to more passengers, according to research firm Centre for Aviation in Australia[4].

If processing time is not cut down at an airport, the problems are manifold. Each stakeholder will face an increasingly challenging situation as more passengers turn up for their flights in future.

Firstly, with all the time spent queuing up, passengers will not have the opportunity to shop at airports, affecting the airports' income.

Secondly, airlines are unable to provide the level of service expected of them. If they cannot verify passengers before a flight, they face delays in boarding and departure that push up cost. Without time for passengers to get through each touchpoint, airline lounges would also not be used extensively.

Thirdly, for government agencies in charge of security and immigration, the sheer number of people who need to be processed presents a real risk of human error. This makes it more difficult to find specific persons of interest, for example

Most passengers do not require comprehensive manual checks if they are carrying valid documents that are authenticated in advance. Instead, the small minority who need to be flagged should be the focus of government agencies responsible for border control.

To be more responsive and pro-active in dealing with high-security situations, all stakeholders require technology to assist them in identifying potential threats. They have to seek a solution that enables them to better collaborate and 'know in advance' the passengers travelling through an airport.

**78 per cent** of passengers say it should take no more than three minutes to drop off their bags, according to IATA.

An **extra 10 minutes** in security **reduces average passenger retail spending** in US airports by 30 per cent.[5]

In Australia, there were **282 security breaches** recorded at major airports between January 2012 and April 2014.[6]

[3] http://airlines.iata.org/sites/default/files/DAY%202.FINAL-6.pdf

[4] https://centreforaviation.com/analysis/reports/usd1-trillion-for-airport-construction-globally---but-its-not-enough-capa-database-356495

[5] https://www.sita.aero/globalassets/docs/infographics/passengers-in-focus-infographic.pdf

[6] https://thenewdaily.com.au/news/national/2016/11/24/security-warning-australian-airports/

# A SEAMLESS, EFFICIENT AND SECURE SOLUTION

Key to solving the problems today is knowing and verifying each passenger who is taking a flight. By using the information holistically, airlines, airport operators and government agencies can make the journey a lot more seamless, efficient and secure.

The way forward is to make use of a single biometric token, or Digital Identity, to allow a passenger to identify himself to each stakeholder. This allows more passengers to be processed and be on their way more quickly than today.

Most importantly, they have to be able to use this Digital Identity across the touchpoints along the journey. From booking a flight at home, through to the security screening and even after he arrives at his destination, this Digital Identity will enable him to easily identify himself and get access without fuss.

The breakthrough is possible with fast and accurate biometrics as well as an integrated system that all stakeholders can tap on to confirm that the traveller is who he says he is. This streamlined process can redefine air travel for millions of passengers.

At the centre of it is the passenger – the most important stakeholder. In control of his information at all times, he consents to its usage by both government agencies and private parties he interacts with.

With verifiable information on his identity as well as his travel records, he provides a holistic profile of who he is. This means the stakeholders can accurately identify him, perform advanced risk assessment, and give him seamless access throughout a journey.





To get started, a passenger uses his smartphone to opt in to Digital Identity. After making a booking online, he registers his face and passport along with his travel information, such as his flight number, on the mobile device. Through integration with government digital ID systems, the user is verified online to be who he says he is.

When he reaches the airport, he uses his face and passport to verify the information that was entered earlier. From here, his face becomes his Digital Identity for all touchpoints, from a bag drop counter to the boarding gate. If the passenger is a person of interest, he is asked to have further checks. Else, he is allowed through without even breaking stride.

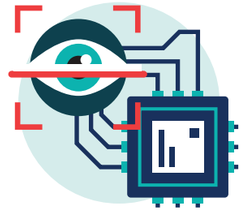
Since the airline also has his information on hand, he can enter the lounge without fumbling for a boarding pass in a bag. In the same way, purchases can be made at shops by simply scanning a face for identification, instead of showing the boarding pass and passport again.

A combination of video analytics and face recognition can identify where a passenger is and encourage him to make his way to the gate earlier to board on time.

Digital Identity can find its use even beyond the airport. Using his Digital Identity, a passenger can check into a hotel room, rent a car or enter a theme park after he reaches his destination. This is possible if the Digital Identity can be extended through secure identity management in the travel and hospitality industry.

For this to come together, Digital Identity requires a combination of various technologies, from artificial intelligence (AI) and beacons, to come into play. Each will allow the traveller to be “known” throughout his journey to each stakeholder that requires that information.

AI can assist a border control agency to assess the risk of each traveller, by using the biometric and transactional information he provided. By knowing more precisely who the person is and where he has been to, agents can focus on high-risk travellers instead of carrying out checks on all of them.



Video analytics coupled with AI can also enhance security and provide better management of passengers in a secure area. For example, if a number of those leaving on a flight that is departing soon are stuck at a touchpoint, an agent may be able to quickly assist them to move around faster to their gate to avoid missing their flight.

Wireless beacons placed throughout an airport can also detect a passenger’s movement through various areas, for example, when he is lounging at a rest area. He can be reminded of his flight or even pushed an offer for a meal or drink in between flights.

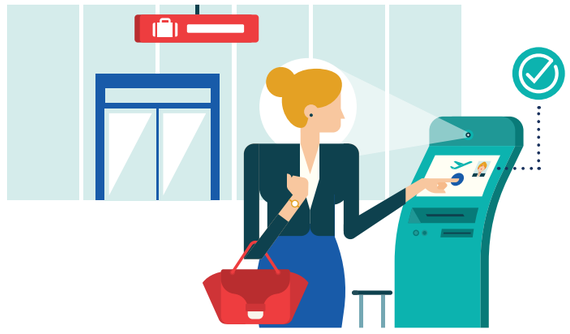
This only works if the information is relevant to the context, based on his travel and shopping history. A passenger who has indicated he is heading to Phuket for holiday, for example, may be offered a good deal for some swim gear. Someone heading to a cold country during winter can be reminded to pack warm clothing.

Tying this together is a series of sensors as well as data analytics provided by the known traveller. AI and machine learning, which will figure out his preferences and habits based on this, will be instrumental to creating a new, improved experience.

# SEAMLESS TRAVEL WITH DIGITAL IDENTITY

## 1. Getting Ready

After making a booking, a traveller gets started on her journey with her smartphone, where she opts-in to register her face and passport along with her travel information such as flight information.



## 2. Check-in

Information entered earlier is verified along with the passenger and passport using face recognition at the airport. From here, her face is her Digital Identity for all touchpoints.

## 3. Bag Drop

At a self-service kiosk, she scans her face to confirm her identity and the information is tagged to her bags, which she drops off at the kiosk.

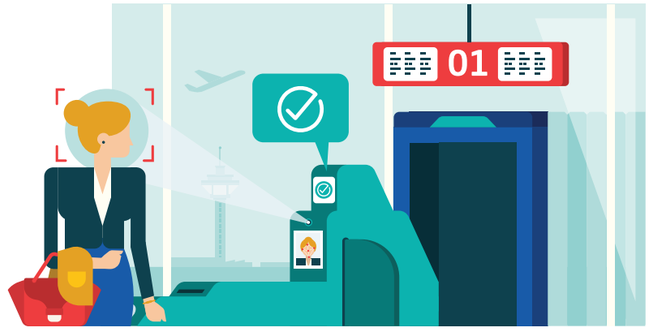


## 4. Border Control & Security

At immigration/border control, facial recognition is used to check the passenger's identity against the Government databases. Security screening is dictated by risk. Passengers can be prompted for further checks, if necessary.

## 5. Shopping & Leisure

With less time queuing, passengers can relax and enjoy their time until departure. Passenger is automatically identified when she approaches an airline lounge or retail shops, where she can receive customised service. Again, no need for documents.

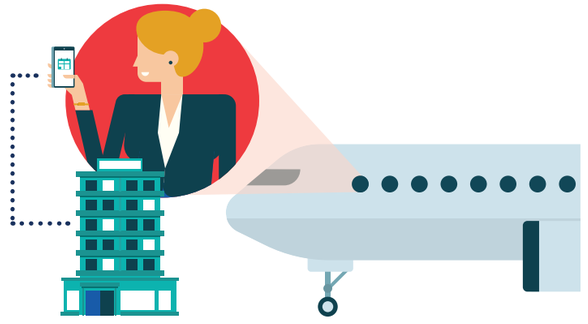



## 6. Boarding

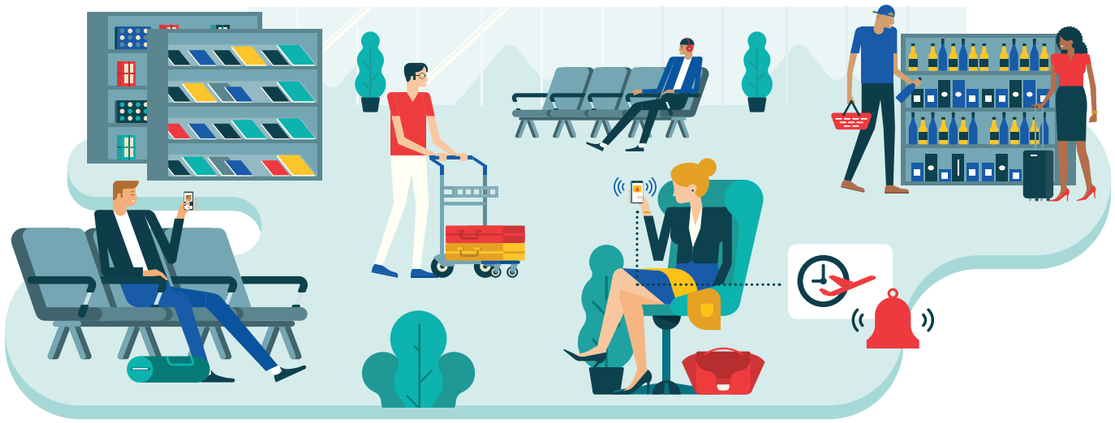
With a face scan at the gate, she gets the greenlight to board a plane. This ensures only the right passengers get on the plane.

## 7. Beyond the Airport

Once she lands at the destination, this Digital Identity can also be extended for secure identity management based on face recognition across hotels check-ins, car rental and theme park entry.



# A BETTER, MORE REWARDING FLIGHT



For all stakeholders involved, Digital Identity can dramatically change the way passengers are processed. It will not only allow them to make their way to their flights faster but also in a more secure manner because it reduces human error.

For airport operators, the technology brings enhanced security. It means travellers can have more time to shop at retail outlets, boosting revenues with increased passenger numbers. By offering a smoother travelling and buying experience, shops and restaurants will attract passengers to spend more.

Being more efficient also means airports can save on costs. They can delay or avoid costly infrastructure upgrades because existing terminals can now potentially handle heavier passenger loads with optimized manpower and resources.

For airlines, Digital Identity enables them to move passengers from the boarding gate to their seats in good time and ensure that those boarding have the right to board. This is especially important as governments hold airlines to account for transporting individuals who are not eligible to enter the country, resulting in fines and repatriation costs for the airlines.

Introducing biometric ID management and automating the process, will lessen the risks associated with manual checks by airline agents while at the same time speed up the process and improve the passenger experience. Digital Identity will integrate seamlessly into existing digital efforts in self-service provisioning.

For government agencies, the security offered by biometrics helps reduce cross-border crime such as human trafficking. By identifying each passenger travelling across borders, Digital Identity makes it harder for crime syndicates to forge identities. The same Digital Identity can also counter terrorism. Enhanced biometrics helps reduce the opportunity for a suspect to make use of stolen, lost or counterfeit IDs.

Each stakeholder will have to weigh the benefits gained against the cost of deploying new technology. However, considered holistically, it will help solve the pressing problem of overcrowded airports by making smarter use of existing infrastructure and manpower, instead of attempting to scale up finite resources by building more infrastructure, for example.

Digital Identity also brings the benefits of a digital identity to millions of travellers, especially when it comes to the area of self-service. Once he has verified his himself on his smartphone, for example, he can make use of this same digital identity throughout the trip. By becoming “known” to the various stakeholders, he also enables them to provide services that are personalised based on his travel history and preferences.

For Digital Identity to succeed, the technology available today has to be made to work together in new ways. Though there are many components that are already in play today, such as face recognition and automated border control gates, they must work coherently as a well-oiled machine to provide a seamless experience.

Key to this is the identification management technology that handles the Digital Identity of millions of passengers going through an airport. This has to be robust and reliable enough to ensure that passengers truly travel more conveniently. Delays at touchpoints caused by an overloaded IT infrastructure could end up forcing officers to manually check each passenger again.

Related to this is the consistency of process. The industry has to come together to implement an identity management system that is similar across airports and countries, so passengers have an expectation of what they have to go through. This will contribute to the smoothness of the process as well.

Standards will be important for interoperability across different domains. Different technology vendors may be involved in the setups in different airports, but they systems would have to speak to one another if governments wish to exchange information. Some of that has happened with the implementation of biometric passports, but the increased number of systems involved in the new setup will require tighter coordination and integration.

Privacy is another challenge that has to be addressed head-on. With different legislation across different countries, the data that is collected, stored and used by each stakeholder has to meet national and international requirements.

In return for their trust, passengers will demand that their data is well protected. Indeed, each stakeholder should only be able to access their own "need-to-know" partition in the identity management system so they only "see" the data they need to complete their task.

Most importantly, the passenger must be confident that he is in control of his data. He has to be able to easily access the information and know who he has been sharing it with. Transparency is key to trust.

Although an immigration authority can use the same Digital Identity as a retail shop to verify the identity of a passenger, they would not exchange data on where the person has travelled to previously or what he has bought at the airport.

Just as importantly, the technologies deployed have to be competent for the task. Unfortunately, that is not a given, as some airports have found. Unexpected costs in additional computing resources needed to run a face recognition system, for example, can hamper rollout.

Indeed, not all face recognition solutions are the same. While some promise to be fast in detecting a face, they are not accurate enough. The converse is true of some solutions that are accurate but take too long to recognise a person. Meanwhile, others require a user to stare at a screen at a certain angle before they know who is in front of them.

**Finding a competent technology partner, especially in biometrics, is crucial to a successful rollout.**

Face recognition also has another advantage – it is not intrusive. Without requiring a passenger to actively interact with a machine, it does not add additional friction or difficulty at each touchpoint. It also works quietly and seamlessly in the background.

Finding a competent technology partner, especially in biometrics, is crucial to a successful rollout. At the core of Digital Identity, after all, is the ability to identify someone through his face, fingerprint or iris, so this is one component where there should be no compromises in quality. Doing so often leads to failures in other parts of the system.





## *CHECKLIST*

# FOR A SUCCESSFUL Digital Identity ROLLOUT

1. Stakeholders to come together to utilise Digital Identity ☐
2. A robust identity management system to ensure seamless checks ☐
3. Fast and accurate face recognition or other biometrics at the core ☐
4. Opt-in and permission-based usage by passengers ☐
5. Expanding beyond the airport to hotels, car rental and theme parks ☐

# GOING WITH THE LEADER

At NEC, we have the solutions to help create a better, safer city. We have decades of experience working with governments, city planners and other public agencies in projects as varied as identification and public transport.

While bringing together the latest cutting-edge technology, NEC's team also possesses the experience and expertise to deal with projects – both private and government – on municipal and international levels.

NEC's high-quality biometrics algorithms have been proven in numerous deployments worldwide in a variety of settings. A trusted vendor, we deliver real-world performance using the latest cutting-edge technologies. NEC's solutions have been used in the aviation sector as well as government, security and law enforcement.

NEC solutions have been proven in more than 700 systems across 70 countries. As a recognised technology provider for the aviation industry, NEC has helped deploy solutions at more than 25 airports around the globe. From automated border control gates to biometric passport solutions, NEC has been at the forefront of enabling smoother, safer travel.

Collaborating with industry associations, NEC has shown global leadership as well. As a strategic partner of IATA, NEC is also a working group member of the global aviation body's efforts to provide seamless, efficient and secure air travel through its One ID vision.[7]

As an experienced integrator with advanced capabilities, NEC has deployed proven technologies in biometrics, a unified platform and AI. NEC is a values-driven company promoting a safe and secure society linked to the United Nations development goals.

Central to NEC's proven solutions is a trusted face recognition system. NEC's NeoFace is the global gold standard, recognised as the fastest and most accurate algorithm in the world by the National Institute of Standards and Technology (NIST) in the US.

Since 2009, NEC has been tops in NIST's benchmarks. In the institute's Face In Video Evaluation (FIVE) test in 2017, NEC was found to be a long way ahead of the closest rival in terms of real-world performance

In a test to simulate an airport passenger gate, various vendors' systems were tasked to recognise one individual at a time as he walked through an area without stopping or acknowledging the camera.

NEC's face recognition technology won first place with a matching accuracy of 99.2 per cent. The error rate of 0.8 per cent is less than one-fourth of the second-place rival's.

Over the years, NEC has been shown to provide the highest performance for real-time video surveillance, offline video face search and high-volume photo face search. The technology has been used in more than 100 systems in 40 countries worldwide.

In 2017, the Customs and Borders Protection agency in the US kicked off a trial using NEC's face recognition technology to scan travellers at automated gates Hartsfield-Jackson Atlanta International Airport.

It was one of several such trials using NEC's face recognition solution, which also included Dulles International Airport in Washington D.C. later in 2017. And earlier in 2016, NEC biometric technology had also been deployed at New York's John F Kennedy International Airport.

In the US, NEC is also in partnership with the Transport Security Administration and Department of Homeland Security. The cutting-edge technology has also been deployed in several other airports, such as Dallas Fort Worth International Airport, Los Angeles World Airports, O'Hare International Airport, McCarran International Airport, San Francisco International Airport, George Bush Intercontinental Airport, Houston Airports, Seattle-Tacoma International Airport, Detroit Metro Airport and Miami International Airport.

Outside of the US, NEC's face recognition technology was set up at 14 international airports throughout Brazil in 2015, to enhance customs procedures. These included the major hub of Governador André Franco Montoro International Airport (Guarulhos Airport) in Sao Paolo and Antônio Carlos Jobim International Airport (Galeão Airport) in Rio de Janeiro.

As a leader in the sector, NEC has also been working across airports globally in India, Singapore, Hong Kong, Japan, Macau, Mexico, Argentina and many more.

**To discover how Digital Identity can change the game for the future of air travel, speak to an NEC representative today.**

[7] https://www.nec.com/en/press/201703/global_20170316_01.html

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