



A seamless travel experience

TRAVEL

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How identity management can secure and facilitate the passenger journey

At a time when air traffic is returning to pre-pandemic levels and set to exceed them in the very near future, there is an urgent need to smooth passenger journeys through airports. The challenge is to increase security while smoothing passenger flow. This calls for standardized, automated processes – along with advanced technologies – to ensure a seamless travel experience.

Today's passenger journey

Do you have a trip coming up? If so, that journey looks a little like this: first you'll need to book a flight. The reservation is made with an airline, possibly via a tour operator. The information you provide to the company is used to cross-check your travel history and **assess risk prior to travel**—but more on that later. A few hours before departure, you will be able to check in online or directly at the airport. Once checked in, you'll have your boarding pass in-hand or on your smartphone, then you can check your luggage. Once you've checked your luggage, you head off to the airport security line where you and your carry-on luggage will be carefully screened by airport staff—a critical step for security reasons. Once you're safely through security, it's the turn of immigration authorities to verify your identity. Then it's off to the boarding area!

Once in the boarding area, you can purchase items from the duty-free shop, where you may need to provide ID again for age-restricted items. Then, just before boarding, the airline will perform a final identity check and match you to your boarding pass before you can take your seat and enjoy the flight. But that's not all. Upon arrival at your destination, you will go through local immigration before you can collect your luggage.

Feeling tired already? Fortunately, advanced biometrics and identity management can streamline these various steps. **New technology juggles the need for security with a seamless travel experience.**

How to enhance passenger flow while meeting security requirements?

Seamless travel is important for us as individuals, but also for society as a whole. **Transportation is a key economic vector**. The easier business and leisure travel becomes, the more visitors, as well as people at their destinations, will benefit from the resulting wealth and job creation.

However, an **increasing number of checks needs to be performed** in record time. The air travel sector (i.e., airports, airlines, national and international authorities, the security industry) is confronted with some challenging requirements. It must:

- ➡ provide a smooth experience for low-risk passengers,
- ➡ step up checks in response to potential threats,
- ➡ keep costs down, and
- ➡ offer contactless processes.

An additional level of complexity is added by the fact that **infrastructure can vary greatly from one location to another**, and passenger flow systems need to factor in every type of airport layout while integrating and adapting the technology used at checkpoints, given that in most cases physical infrastructure cannot be expanded. Despite these challenges, self-service and automation can reduce the time required for passenger processing at the airport—IATA's 2019 Global Passenger Survey revealed that **immigration clearance is 74% faster with eGates than with regular manual checks**.

Border checks are currently performed on all travelers, both at departure and arrival. This means **unnecessary time spent checking low-risk travelers** and even bigger bottlenecks. Border guards must be able to assess risks prior to arrival in order to **focus on potentially risky passengers** while streamlining checks for low-risk travelers, resulting in a smoother travel experience for the latter. The benefits to these low-risk travelers are:

- ➡ less time standing in line,
- ➡ less stress,
- ➡ more time to shop in the duty-free shops.

So how can airports improve security and streamline processes at the same time? There are four vital ingredients:

- 1 - Reliable ID documents
- 2 - Efficient pre-travel risk assessment
- 3 - Automated and passenger-autonomous checks
- 4 - Single identity tokens

All four must be deployed to achieve a truly seamless travel experience.

How is a person's identity verified during their journey?

Everything starts with identity verification by the airline, airport, or local customs authorities. They all need to know *who* is traveling and whether it is for business, leisure, migration or other reasons. In most places, the easiest way to verify a person's identity has long been to **check an ID document**—usually a passport, a national ID card or a driver's license.

The passport: the cornerstone of traveler ID

Passports are not new; an identity document that allows the bearer to cross borders has been used since the Middle Ages. **Over the centuries, passport formats have evolved a great deal**—from clay tablets and a passport scroll to the current ISO format. Passports were initially reserved for the elite and were not widely used until the 1990s with the democratization of air travel. As air traffic took off due to economic growth and globalization, more and more travelers applied for passports. However, **new challenges to international security emerged**, most notably terrorist threats. Authorities soon came to consider that early versions of ISO-format passports were not secure enough. These versions could easily be stolen, copied or used fraudulently. Consequently, this led to the **development of the electronic passport (ePassport) in the early 2000s**.

An **ePassport includes an electronic chip** with the same information as the paper document (name, date and place of birth, gender, eye color, height, nationality, address, dates of issue and expiry, and passport number). In addition, biometric data—a photo and either fingerprints or iris—are added to provide greater security. As biometric data are unique to each individual, they **provide assurance that the passport holder is actually who they claim to be**. All biographical and biometric data contained on the chip can be read quickly, securely, and “contactlessly” thanks to Near-Field Communication (NFC) technology. This makes today’s biometric passports both more secure and easier to check. In this regard, they are **a very reliable indicator of identity that government agencies can trust**, and are essential for reliable identity verification.

Modern travelers have grown accustomed to having everything available at their fingertips from a smartphone, setting even higher expectations for convenience. **The next step on the path to a seamless journey is digitization**, but trust in the physical passport book is so high that digitization faces a stiff challenge. This is where DTC comes in.

Digitizing identity documents and border passes: DTC

The Digital Travel Credential (DTC) is an **exact representation of the biometric passport** or any other electronic machine-readable travel document (eMRTD). It includes the holder’s personal details such as a facial image and security features, is securely **stored on the holder’s device** using Public Key Infrastructure (PKI) encryption, and may only be shared with the holder’s consent. DTC aims to ensure a level of security equivalent to the physical document, which requires a reliable process for acquiring personal data, particularly biometric data.

The digital credential can deliver a seamless travel experience: you create your DTC from the comfort of your own home using your country’s national mobile ID application to scan your passport data page. Thanks to the DTC, combined with biometrics and travel information, the check-in app creates **a temporary unique identifier** for your journey **that replaces both your passport and a boarding pass**.

Once at the airport, you use this unique identifier **at the multiple identity verification checkpoints** by simply presenting your smartphone to a contactless reader or by just looking at a facial recognition device—a crucial benefit at a time of heightened health and hygiene concerns.

The electronic visa: fast and convenient

A passport can be digitized, but what about a visa—that stamp or sticker that allows us to brag about which countries we have been to? The same digital developments are happening in the visa space.

Visas were developed at the same time as passports, allowing authorities to check **who was entering the country, for how long, and for what purpose**. They may take the form of a stamp on a passport or a full-page sticker, indicating how long it is valid, the reason for the trip, the issuing authority, and the dates. You need to apply for a visa from the relevant authority in your country of origin, and in some cases appear in person for an interview. The process is long, cumbersome, and often costly.

The time it takes to obtain a visa can be greatly reduced by using an **electronic visa or e-visa**. This allows applicants to apply online using their passport and plane ticket with the visa being issued just a few days later. If the traveler benefits from a visa waiver for a given destination country, an eVisa can be replaced with an **Electronic Travel Authorization (eTA)**, which can also be applied for online, providing a seamless travel experience for the traveler and a sufficiently high level of security for the destination country.

Pre-travel risk assessment

How is a traveler’s eligibility to fly determined? Why should one person be allowed to travel and not another? The criteria may differ from one country to another, raising a certain number of practical issues as there are so many

travelers and so many criteria to take into account. It is not enough merely to collect data; the data needs to be processed and analyzed. This may be done in a number of ways, such as the use of **smart analytics** or creating **registered travel programs**.

Collecting and analyzing traveler data: API-PNR

Just like the electronic Travel Authorization (eTA) and eVisa, API-PNR data let government agencies know **who is arriving, departing, and transiting** the country in order to assess whether or not they pose a threat. API and PNR are two types of traveler data collected by airlines when you book your flight. “API” stands for **Advanced Passenger Information**, and includes full name, date of birth, gender, nationality, type of travel document (along with country of issuance and expiry date). “PNR” stands for **Passenger Name Record**, and contains trip-related details such as travel dates, itineraries, dietary requirements, contact details and/or payment information, and may be used to **identify suspicious travel patterns or connections between individuals**. The data gathered for the risk assessment process are transmitted through secure networks to several government agencies from the countries of departure and arrival for security clearance purposes. They are cross-checked against national databases and other external databases such as those maintained by INTERPOL.

Using smart analytics for efficient risk assessment at borders

It is critically important that government agencies manage API-PNR data. The vast volume of data makes it **impossible to collect and cross-check all information manually**, making smart analytics for comprehensive traveler data risk assessment a must. The process is comprised of four steps:

- 1 - Data collection and processing of PNR
- 2 - Data collection and processing of API (or rather iAPI, i.e., interactive API: a system that allows border control authorities and the carrier to exchange electronic messages about each passenger in real time)
- 3 - Smart data analysis
- 4 - Alert management

The challenge lies in the ability to **collect data originating from multiple sources in different formats**. Traveler data must also be filtered to **comply with both local regulations and privacy rules**. The normalization of consolidated data facilitates standardized checks to detect persons of interest and suspicious patterns. If a positive match occurs with a wanted person or following a risk-based analysis outcome, an alert management process is triggered. These faster, more secure **API-PNR services** enhance both passenger flow and secure border management.

Developing Registered Travel Programs

In the wake of the 9/11 terrorist attacks, countries around the world implemented heightened security measures at airports even as passenger numbers continued to increase. To facilitate passenger flow, some countries developed Registered Traveler Programs. The idea is to create a **trusted traveler population** to free up time to focus on higher-risk individuals at control points. It also provides an incentive for frequent travelers to join the program and enjoy **shorter checkpoint waiting times**. This type of program does not circumvent controls, but simply supports risk assessment by eliminating those who do not pose a risk. One of the oldest and most successful Registered Travel Programs is the TSA PreCheck® program in the United States.

What is TSA PreCheck® and how does it provide a seamless travel experience?

This program was launched by the Transportation Security Administration (TSA) in 2011 to pre-screen individuals over the age of 12. TSA PreCheck® was created to provide low-risk travelers with a smoother experience at airport security checkpoints. The program is open to U.S. citizens and lawful permanent residents, as well as members participating in

Trusted Traveler Programs like Global Entry, NEXUS and SENTRI. TSA PreCheck® is a **great option for frequent travelers** looking to save time during the airport security process.

It provides travelers with a hassle-free experience and exclusive access to dedicated screening lanes at over 200 U.S. airports. There is no need to remove shoes, laptops, 3-1-1 liquids, belts, or light jackets. Families are welcome, with kids aged 12 and under allowed to tag along with parent or guardian members for free. Travelers' time is valuable and most TSA PreCheck® passengers spend **less than five minutes waiting in line**.

Travelers can pre-enroll in TSA PreCheck® online and schedule an appointment for an in-person **enrollment that takes less than 10 minutes**. The enrollment process includes taking fingerprints and photos for the TSA background check. On average, most travelers receive their Known Traveler Number (KTN) within three to five days.

How do automation and biometrics streamline passenger flow?

Automation and biometrics can help border guards and security personnel perform traveler clearance—i.e. data acquisition as well as identity checks—in a timely manner while providing the highest level of security.

Automated border control with self-service kiosks

Automated border controls ease border guards' workload and enable them to focus on higher-value tasks. These automated processes are tracked using **eGates**, or semi-automated set-ups. The latter rely on **pre-check kiosks**, where travelers can capture data and perform first-level checks in self-service mode before completing the process at a manned counter or an eGate. Travelers may also be asked to use specific processes depending on their category (i.e., nationals or visitors, TSA PreCheck® travelers, etc.).

The development of eGates is **made possible by ePassports**. To clear border controls, a passenger simply places their ePassport on the eGate reader and looks at the camera. The chip contained in the ePassport and the datapage are read in the blink of an eye. The country's signature is examined and the traveler's face is compared with the portrait on the chip—biometrics add an **extra layer of security**. Data can be checked against INTERPOL's database as well as national and international watchlists. As soon as facial recognition matches, the passenger can pass through the eGate and the border.

These solutions have already proven their efficiency as well as their popularity. According to the 2019 Global Passenger Survey conducted by the International Air Transport Association (IATA), nearly three-quarters of passengers (74%) consider speed as the main benefit of using automated immigration gates/kiosks. A similar number (72%) gave the overall automated immigration processing experience a thumbs up.

Such a seamless travel experience relies on **secure, reliable, and efficient identity verification processes throughout the airport** with biometrics as the key enabler.

Automated passenger identity verification with biometrics

Biometrics constitute the safest, most accurate means of verifying a person's identity. Whether it is face, iris or fingerprints, human physical features are unique, permanent, and measurable. Biometrics is therefore robust, extremely reliable, and offers an unrivaled level of security perfectly suited to border controls.

The use of biometrics creates ideal conditions for a more digitalized and convenient travel experience, where passports remain an important part of the process but no longer constitute the only means of verification. On top of that, passengers actually favor biometric technology to speed things up at the airport. According to the 2023 Global Passenger Survey conducted by IATA, **75% of passengers prefer to use biometric data rather than passports and**

boarding passes¹.

One of the great value propositions of biometrics is its ease of use, creating the perfect solution to deliver both security and rapid identity verification. **Walk-through, touchless, at-a-distance systems** permit fast, reliable, and hygienic identity checks. But how do we choose the most appropriate biometric system for an airport? Each process has its pros and cons; and both risk factors and the friction created must be taken into account. In addition, not all travelers are tech-savvy. This means that equipment adapted to the infrastructure, environment, and population as well as **staffed counters** continue to be necessary. For a biometric system to be effective for border and travel operations, the **quality of the data captured**, the **reliability of the equipment** and the **accuracy of the algorithms** must be top-notch. The best biometric devices need to be:

- ➡ Secure, with the latest “anti-spoofing” capabilities;
- ➡ Fast, to avoid bottlenecks and deliver as close to a walk-through experience as possible;
- ➡ Accurate, to avoid high false rejection or false acceptance rates
- ➡ Fair: ethnic, age, and gender-proof;
- ➡ User-friendly, by minimizing the effort needed by the passenger;
- ➡ Multi-biometrics friendly (i.e., face, iris, fingerprint) to accommodate even the most demanding use cases.

All types of biometrics are used in airports around the world and the preferred application must balance user acceptance with cultural preferences.

Fingerprints

Fingerprint biometrics have **long been favored** and widely used by the air transportation industry. They are, for instance, a mandatory feature on biometric passports used by European Union countries. Fingerprints vary from person to person and remain *identical* over time, making them suitable for border and access control—provided they are not damaged by injuries, burns, or intensive manual work. Fingerprint devices may be with contact or contactless; the latter is preferred in order to mitigate hygiene concerns. With **contactless devices**, travelers simply wave their hand over the sensor. The best systems can read four fingers simultaneously with accuracy and speed and create a 3D model in a fraction of a second. Although fingerprints remain a key biometric solution for border control authorities, they are increasingly being **replaced with facial recognition** by airports and airline companies for verifying identity at other stages of the passenger journey.

Face

Facial recognition offers another great solution for **verifying the identity of people on the move** without slowing them down, making it increasingly popular. It is very reliable and contactless by nature. Accuracy and user experience, however, rely entirely on the quality of the equipment used to capture data—they must be capable of recognizing a person who has cut or dyed their hair, grown a beard, gained or lost weight or undergone surgery, and be fast and wide-angled. Only **state-of-the-art facial recognition devices** guarantee both accurate recognition and a fast frictionless travel experience.

Iris

The iris is the most accurate biometric identifier with a strong resistance to false matches and **more resistance to the effects of time** than facial biometrics and fingerprints. An iris scan can be used as an alternative or a complementary solution to facial recognition. For the moment, the use of iris recognition is **still not widespread, except in tech-savvy countries** like Singapore and the UAE. The main reason for this is the initial cost of the technology, but its use could grow, especially since iris capture improves the user experience as it can be performed both at a distance and on the

move.

Advantages of multimodal biometrics

Border controls are high stakes situations where certainty matters. Authorities need to achieve the **highest level of confidence regarding a traveler's identity**. Government agencies define what level of assurance is adapted to each use case, e.g., to get through security to the boarding gate, to get onto the plane, to cross a border, etc. If the required assurance level cannot be achieved with one solution, a secondary one may be necessary. Hence, multimodal biometrics that combine several types of biometric data to further increase the certainty over a person's identity.

Traveler data privacy and security

Data privacy is of the utmost importance, especially when it comes to what is most intrinsic to us: our biometrics. Many countries are shaping legislation to protect personal data, and organizations have **access to passenger data on an authorized, need-to-know basis only**. When stored in a database, biometric data must be erased as soon as the flight departs or, in some cases, upon completion of the return flight. Passengers can be quickly identified at every step of their journey, while being confident that their privacy is respected. Most importantly, **passengers have a choice**: they may share their biometric data and send it to a centralized database or keep the data in their possession—on a smartphone, for example.

The airport of tomorrow already exists...

... and it's located in Singapore! The Singapore Changi Airport has been ranked as the world's best airport by travelers for several years. Harnessing state-of-the-art multimodal biometric recognition technologies, the airport has achieved many world-firsts—such as the first **terminal-wide implementation of an automated boarding solution** in 2017 at Terminal 4. More recent deployments in Terminal 1, 2 and 3 combine biometric data capture with automated immigration clearance processes. Biometric technology is used to eliminate the need for manual identity verification at various stages of the passenger journey. It helps increase passenger throughput without compromising on security, delivering a safer, flexible and more efficient passenger processing experience.

Face match technology is also used to increase air passenger security and simplify boarding at **Los Angeles International Airport (LAX)**, one of the world's busiest airports. All airlines operating out of the Tom Bradley International Terminal utilize e-Gates to provide a face-only, seamless boarding process. More recent deployments in Terminal 1, 2 and 3 combine biometric data capture with automated immigration clearance processes.

With fast, accurate, and contactless identity verification, a seamless boarding experience is a reality for passengers, airlines, and airports alike.

How to manage passenger identity verification more effectively with a single token

To take identity management one step further and ensure seamless travel, the most advanced stakeholders advocate an innovative solution: moving from a document-centric to a **people-centric approach**. This strategy is underpinned by a single token based on traveler biometrics. Unlike the ePassport or DTC—long-term credentials used as a “root of trust”—the single token is a **single-use credential for one trip only**.

What is a passenger trusted digital identity token?

Using biometrics and travel document verification, a trusted digital identity token is created ahead of the journey. The traveler's identity from their biometric passport (physical passport or the DTC) is matched with a live capture of their biometrics and combined with the travel data on their boarding pass. Naturally, strong verification of the traveler's data and identity is crucial. The **token may be created remotely** by travelers using their smartphones, or **at the airport**, for example at self-service kiosks and self-bag drops.

The resulting token or unique identifier may take the form of a **mobile or paper boarding pass** or it can be fully dematerialized and linked to the passenger's biometrics, in compliance with privacy regulations. This token contains secure information that cannot be forged, exchanged, or modified. It contains all the information needed at every step of the journey:

- ➡ Passenger biometrics
- ➡ Passenger travel document information
- ➡ Passenger boarding pass information

Passengers may opt to use only their biometric data and enjoy a **paperless journey** without any hard-copy documents, in which case their biometric data would have to be temporarily and securely stored in the airport/airline system. Or they may prefer to have their biometrics encrypted in a bar code so they have a physical document but still enjoy a stress-free journey with a trusted digital ID.

In a nutshell, the token provides travelers with a trusted ID that can be used throughout the journey at all airport touchpoints, all while keeping their passport safely inside their pocket or handbag.

What are the advantages of a single token strategy?

This token is used as a unique identifier, allowing the traveler to proceed through all airport touchpoints without having to present multiple documents several times along the way.

The traveler needs only **enroll remotely** prior to arrival or upon entering the airport, using their passport information and flight details. Then, as they move through the airport, biometric checkpoints allowing **in-motion identification** provide a seamless travel experience. Travelers can be identified as they walk at their own pace, with no need to slow down, stop, or line up for identity verification. Only high-risk passengers and travelers who have not enrolled upon entering the airport will be flagged for additional security checks.

The benefits of a single token are numerous:

- ➡ **Automated airside zone access:** With their single token, passengers are automatically recognized and authorized to enter the restricted area.
- ➡ **Lounge access:** Frequent and business class passengers can access the lounge with just a single look or wave of the hand to enjoy VIP services until departure.
- ➡ **Easy payment at duty-free:** No need to show a boarding pass to pay at the duty-free, the token on a phone is enough.
- ➡ **Simplified boarding:** Passengers can experience speed and convenience through the boarding process.
- ➡ **Identification of lost luggage:** Technology will make it easier to identify the owners of luggage using detached tags. The proportion of luggage with lost tags is very low (around 0.07%) however, with 4 billion pieces of luggage travelling on airlines every year, the savings in human and financial resources are by no means negligible.

Biometric Experience by VINCI AIRPORTS: the first “travel companion” app

At Lyon-Saint Exupéry Airport in France, the single identity token takes the form of a “travel companion” app that guides users throughout their journey. Before travelling, passengers can register for the Biometric Experience (BE) proposed by the airport on VINCI AIRPORTS’ MONA app². From the comfort of their homes, travelers register their flight details, then take a photo of their passport and a selfie. Once at the airport, passenger ID verification is only required once. Subsequently, passengers simply show their face at the various checkpoints (check-in, security, boarding).

The Biometric Experience at Lyon-Saint Exupéry Airport was a world’s first when it was initiated in October 2020. Just over two years of trials later, this remote, smartphone-based biometric enrollment project has proved its worth in the field—attracting a growing number of volunteers from amongst passengers, providing them with a seamless, contactless experience from ID enrollment to boarding, and reducing boarding times significantly.

The outcome: a seamless journey

Technology is a key enabler for offering a more secure and pleasant journey to all passengers while easing the tasks of airport and airline personnel as well as immigration and security officers.

Forget bottlenecks...pre-security checks, biometrics, automated controls, and single identity tokens can now **streamline the travel experience**. According to IATA’s 2023 Global Passenger Survey³, travelers continue to prioritize speed and convenience, and are increasingly turning to biometrics and off-airport processing to deliver it. The survey results reveal many insights, including:

- ➡ **Passengers expect to move through airports faster than ever.** They look for streamlined processes and minimal wait times.
- ➡ **Confidence in biometric identification is growing.** Passengers are eager to use biometrics to expedite the process: 46% of passengers have used biometrics at the airport, up from 34% in 2022
- ➡ **Passengers want to complete more processing before they arrive at the airport.**

Single identity tokens unlock the full potential of a seamless biometrics-driven travel experience. With reduced gridlock and greater schedule predictability, passengers enjoy a stress-free journey and have more time to spend in restaurants or shopping. **Less queues, more time. Less stress, more pleasure ... Welcome aboard**

¹ <https://www.iata.org/contentassets/d3451d73970142e3b938ed435c60893f/gps-2019-highlights-infographic.pdf>

² <https://www.passengerterminaltoday.com/features/interview-pascal-deborde-project-manager-at-lyon-saint-exupery-airport-reveals-how-the-airports-experimental-biometrics-will-further-improve-the-passenger-journey-in-2024.html>

³ <https://www.iata.org/en/pressroom/2023-releases/2023-10-25-01/>
