



# eHealth Network

Guidelines on

Validation of EU Digital COVID Certificates  
in the context of air transport

Version 1.0

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## eHealth Network

The eHealth Network is a voluntary network, set up under article 14 of Directive 2011/24/EU. It provides a platform of Member States' competent authorities dealing with eHealth.

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## 1. Introduction

### 1.1. Context

Following the entry into force of the EU Digital COVID-19 Certificate Regulation<sup>1</sup> (hereby referred as “EU DCC Regulation”), the eHealth Network Subgroup on Technical Interoperability, in cooperation with airline experts are proposing possible scenarios and technical solutions to swiftly implement the verification of EU DCC in the context of air travel.

This guidance is outside the scope of the above-mentioned Regulation and should be used mainly as a help to streamline discussions between airlines and Member States. It covers various scenarios on how and where best to check EU Digital COVID-19 Certificates (EU DCCs).

The EU DCC Regulation (and Article 10(3) specifically) allows cross-border passenger transport services operators required by national law to implement certain public health measures during the COVID-19 pandemic to process data in the EU Digital COVID Certificate (including the data included in the certificates in accordance with the Annex of the Regulation) to verify and confirm the holder’s vaccination, test result or recovery. The data processed for this purpose shall not be retained.

To facilitate the use and the verification of EU DCCs, it is important to stress that such verification should preferably take place before arrival at the airport. This to avoid having to process all passengers at the check-in desk and thus create capacity and health issues due not congestion at airports. Also, it must be reminded that having multiple checks of EU DCCs during a passenger journey does not make sense from a medical perspective. Therefore, EU DCCs should be ideally checked upon departure (more protection during the flight) and only once in the passenger journey.

This document will provide most of the possible scenarios, but Member States are strongly encouraged to choose a scenario that reduces as far as possible the possible congestion issues at airports. As a guidance, Member States are also invited to consult the recently published Aviation Health Safety Protocol by the European Aviation Safety Agency (EASA) and the European Centre for Disease Control (ECDC)<sup>2</sup>

### 1.2. Scope of the document

This document is providing different scenarios and solutions to check EU DCCs in the setting of a passenger journey in air transportation. It is intended to facilitate discussion and provide different possible solutions for airlines and Member States. However, the document does not provide guidance on how passenger can fully comply with various health measures or travel history that Member States may require for entry.

The different scenarios correspond also to specific legal situations where Member States may decide to apply strict requirements on data protection or for instance, decide not to allow airlines to check EU DCCs.

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<sup>1</sup> [https://www.europarl.europa.eu/doceo/document/TA-9-2021-0273\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-9-2021-0273_EN.html)

<sup>2</sup> <https://www.easa.europa.eu/document-library/general-publications/covid-19-aviation-health-safety-protocol>

First, a basic workflow and possible passenger interaction have been included to better understand where and how checks of DCC could happen at airports.

The document contains technical details about the following use cases:

1. Use case 1: At the airport, scan of EU DCC by a ground agent with the verifier app on the phone, and inspection of other required documents;
2. Use case 2: Before arriving to the airport, in airline web portal/mobile app - validation of DCC by airline, and collection of proof by airline that other documents are completed to MS satisfaction by traveller;
3. Use case 3: Before arriving to the airport, in web portal/mobile app implemented by MS of arrival – validation of EU DCCs and collection of other information for health assessment. Result of such collection/validation is made available as an “OK to visit MS” proof for the Member State of arrival to the traveller. Currently, this MS-OK proof is to be shown at the boarding gate where airline will only visually check the proof, with no other documentation checks being required.

### 1.3. Operational considerations

The possible scenarios and solutions should be weighed against quick implementability, logistic considerations and passenger safety and. Member States should strive for a solution that can be operational as soon as possible, preferably on or before July 1<sup>st</sup> 2021. Another important factor is the considerable rise in processing time if the validation of the EU DCC is performed at the airport. Considering also the current rise in air traffic, priority should be given to solution that will avoid congestion and the health risk this creates at airports.

The recommendations are aiming to ensure the health and safety of passengers in a coordinated manner, to avoid duplication of checking. If verification has been reliably completed prior to transit, repeated checking later in the journey serves little medical purpose, and could again lead to unnecessary queuing.

In addition, strong coordination between different Member State health services, airports, airlines and ground handling operators is needed to make the passenger journey as smooth and safe as possible, and when necessary, provide the passenger with technical assistance and information.

Finally, the Member States should ensure that their travel-related measures are communicated and coordinated at least 48 hours in advance so that other Member States, airlines and passengers can adapt to these new measures, to avoid surprises at the border.

## 2. Terminology

DEFINITION	DESCRIPTION
CoD	Country of Departure
CoA	Country of Arrival
DCC	Digital COVID Certificate “EU Digital COVID Certificate” means interoperable certificates containing information about the vaccination, testing and/or recovery status of the holder issued in the context of the COVID-19 pandemic; (Article 2 of the EU DCC Regulation <sup>3</sup> )

<sup>3</sup> [https://www.europarl.europa.eu/doceo/document/TA-9-2021-0273\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-9-2021-0273_EN.html)

MS	Member State or Member States
Issuer	The issuing organization of a DCC.
Holder	the person to whom an interoperable certificate containing information about his or her vaccination, testing and/or recovery status has been issued in accordance with the Regulation. (Article 2)
Verifier	A verifier checks or validates a DCC.
Proof	A cryptographically signed digital assertion of a vaccination, test-results or recovery status of a holder.
Validation	For the DCC, this consists of two activities: verifying the authenticity of the QR code and validating the medical information within the DCC against the MS of Arrival and the date of departure.
Travel-OK	Traveller meets all travel rules to be welcome in country of arrival Fit for Travel, acceptance for access to a MS <<term may change>>
DCC-OK	DCC presented by traveller is compliant to travel rules.
Travel rules or Business Rules	Rules of acceptance for entry into a MS.
Verification DateTime	Verification DateTime is the date+time against which the rules are checked.

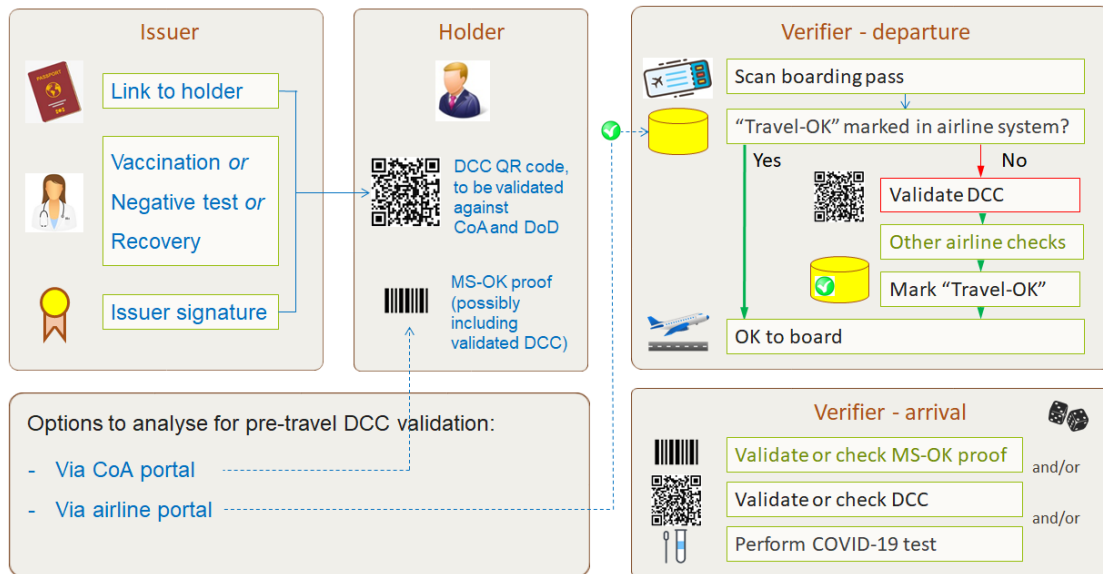
### 3. Basic workflow

In order to identify the necessary steps to check EU DCC, a basic workflow has been sketched from the issuer through to verification. Once the holder has received his or her EU DCC, it could either be checked by an airline portal, a Member State of arrival portal or directly at the airport. In the case of a Member State portal, the passenger may carry with him a proof including information that the passenger is fit to fly to the airport of arrival.

For use case 1 (validation at the airport) and use case 2 (pre-flight validation) the airline system can include a "Travel OK" information attached to the passenger record and thus be read in conjunction with the boarding pass. Of course, other means to check must also be in place, for passengers with a paper format of EU DCC or for those who are not in possession of an EU DCC but can show any other proof of health.

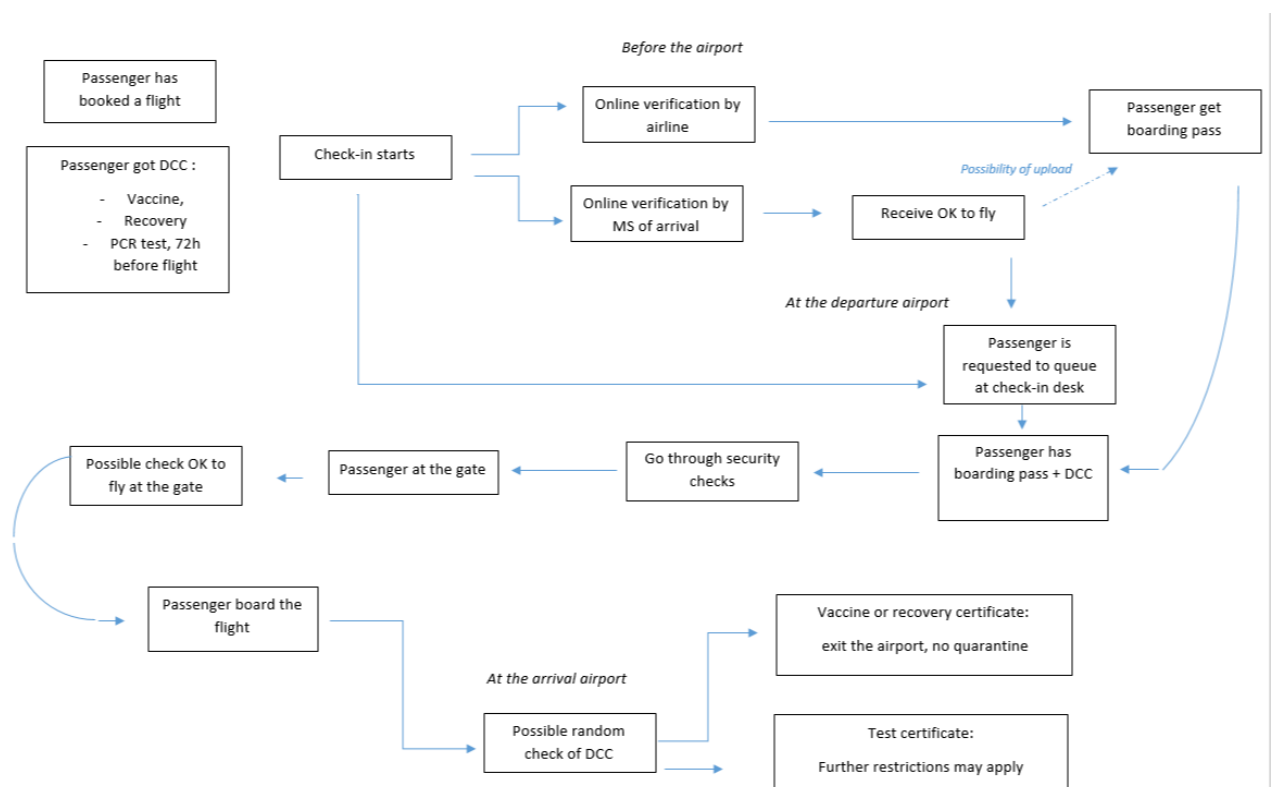
At arrival stage, Member States may decide to perform random checks to strengthen the verification of proof of health or further check passengers without EU DCC. In case the documentation of the passenger is judged unsatisfactory, authorities are encouraged to propose any suitable solution (e.g a test) in order to safely accept the passenger in the Member State.

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Schema n°1 - Basic workflow of airline use case

In view of this basic workflow, the following passenger journey could be drafted. It includes also most of possible scenarios, detailed further down below in the document.



Schema n°2 - Possible passenger journey

## 4. Use case 1 – Verification of EU DCC at the airport

### 4.1. General presentation

This solution is the simplest one from a technical perspective, however, from an operational point of view, is not ideal. Indeed, such a solution would require passengers to proceed systematically at the check-in desk which increases the processing time considerably. As the air traffic is ramping up this summer, this solution may create huge bottlenecks at airports.

If Member States are not able to choose any of the other scenarios (see use cases 2 and 3), Member States and/or airlines are encouraged to provide sufficient staff or any other organisational solution to allow checks to happen preferably before the check-in desk. When the passenger is already in possession of a boarding pass, Member States are encouraged to create several check-in points of EU DCC to spread passengers and avoid queuing. To speed up the processing of passengers, airlines may opt for a unique mark on the boarding pass, proving that the passenger has been adequately checked.

### 4.2. Workflow description

The following assumptions are made:

- Traveller presents documents to airline or ground handling agent for assessment. Except for EU DCC, most documents are visually inspected.
- EU DCC may be inspected with a verifier application approved by the Member State of the country of Departure. The verifier application is to function in accordance with eHealth guidance<sup>4</sup> and the verification and EU DCC Validation rules<sup>5</sup> it has adopted.
- The verifier application performs the validation off-line and is not allowed to store any data after the validation has been performed.
- The result of the verification should be shown in such a way that only the minimum required information is displayed to the user of the verifier app in the standard verification workflow. In case of successful verification, the information should be limited to the indication that the authenticity and validity for the destination or transit have been verified successfully (GREEN), and minimum personal details necessary to link the certificate to the holder. In case of a failed verification (RED), the app should only display the reason for the fail,
- The application could also reveal the full name and the date of birth of the person the DCC belongs to, to enable verification that the holder and the DCC belong to the same person.
- It is left to ground agent to link the EU DCC with the person and determine whether presented information collectively constitutes a proof.

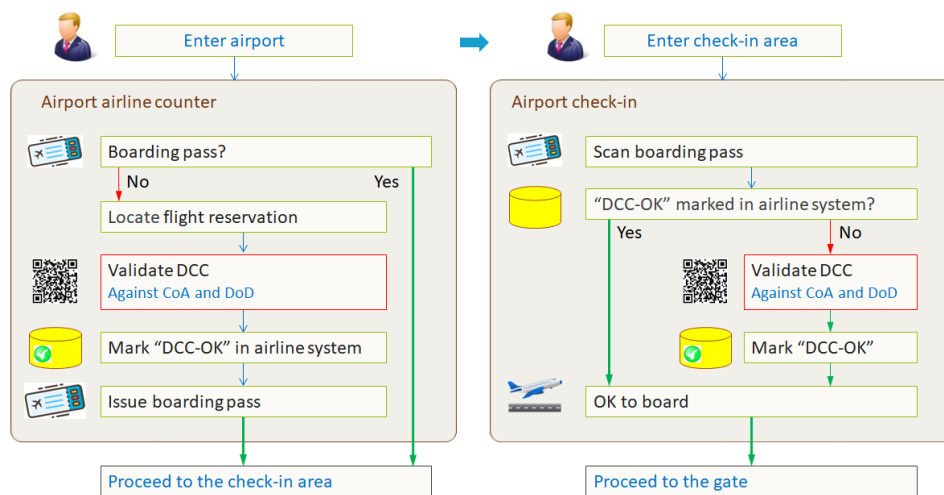
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<sup>4</sup> [https://ec.europa.eu/health/sites/default/files/ehealth/docs/digital-green-certificates\\_v4\\_en.pdf](https://ec.europa.eu/health/sites/default/files/ehealth/docs/digital-green-certificates_v4_en.pdf)

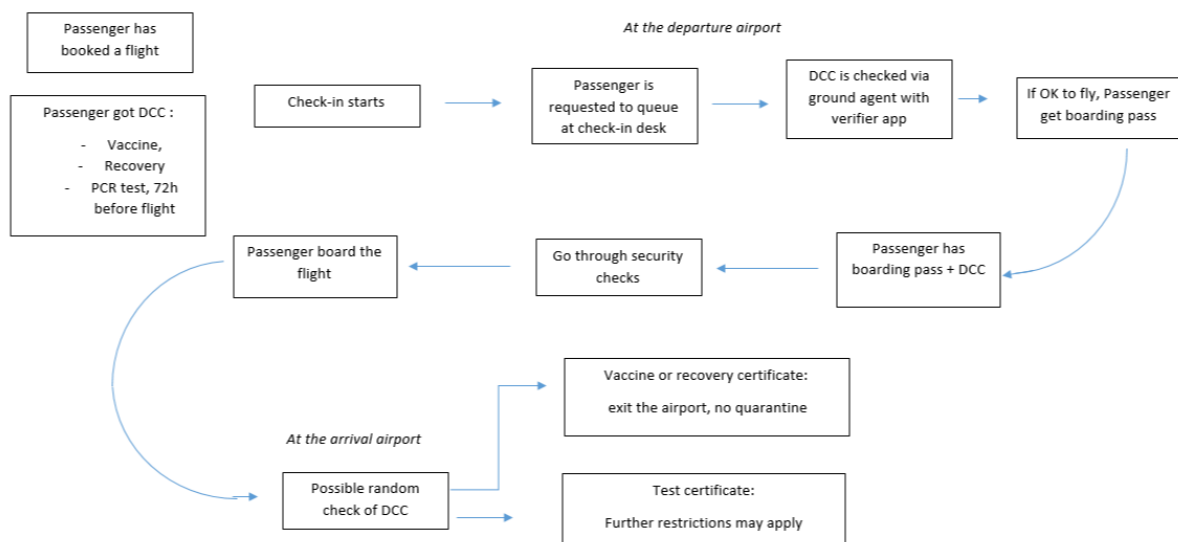
<sup>5</sup> [https://ec.europa.eu/health/sites/default/files/ehealth/docs/eu-dcc\\_validation-rules\\_en.pdf](https://ec.europa.eu/health/sites/default/files/ehealth/docs/eu-dcc_validation-rules_en.pdf)



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Schema n°3 - Use case 1 workflow



Schema n°3 - Possible passenger journey in use case 1

## 5. Use case 2 –Verification of EU DCC via airline website

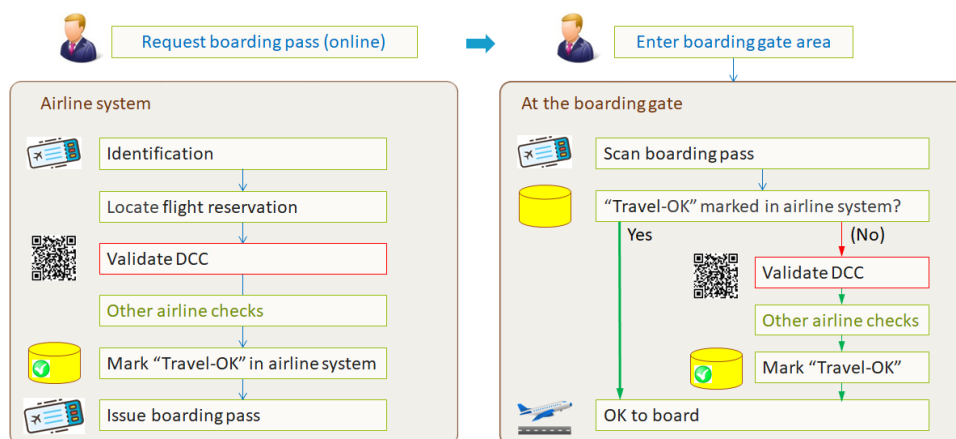
### 5.1. General presentation

This use case presents both operational advantages and does not require overly complex technical implementation. In addition, it should be reminded that the EU DCC Regulation allows transport operators to process data as laid down the Annex of this Regulation, but only if this is provided by national law. When required documents are available in digital format (such as DCC), airlines can accept a number of digital proofs and check that the set of proofs complies with travel rules of Country of Arrival.

### 5.2. Workflow description

The following assumptions are made:

- This scenario is for airline to process the DCC. This requires legal framework, and technical capability at airline.
- For processing the DCC the airline should integrate the verification and the validation process of it into its online system. A server-side version of the Verifier, compatible with the technology stack of the system in question, should be implemented and integrated with it. This component will communicate with the backend system of a Member State and will get an updated list of the public keys and the business rules in a regular basis.
  - Alternatively, for processing the QR Code of the EU DCC, MS could implement an API interface with the airline, sending a query with data to verify the EU DCC in accordance with verification rules. Special attention to implementation details of this option may needed so it will not be considered an “online validation and data processing” task.
- The European Commission and the eHealth Network are maintaining open sources libraries for processing the DCC. Reference implementations of the Verifier app are already available for several technologies.
  - <https://github.com/eu-digital-green-certificates>
  - <https://github.com/ehn-dcc-development/>
- The airline should work with the Member State of Arrival or Transit for clarifying the implementation details and setting up the related legal framework based on the national law.
- The result or the successful validation of the DCC, including its Business Rules, and the rest of the airline check is recorded as a “Travel-OK” mark in the airline system. This mark allows the issue of the Boarding Pass and is following it.
- This scenario also foresees the edge case where a boarding pass, not marked with “Travel-OK”, reaches the boarding gate. When this happens the validation of the DCC, and the rest checks take place on-site with the help of the airline system and/or a DCC Verifier app.



Schema n°4 - Workflow use case 2

See Appendix Use case 2 API-implementation as contemplated in France (but pending to a decision of the data protection authority) at page 12 as example.

## 6. Use case 3 – Verification of EU DCC via Member State of arrival portal

### 6.1. General presentation

Some Member States may decide to collect and validate passenger documentation at a web site/portal prior to check-in, and return a token (MS-OK proof) when passenger complies with all conditions for access to that Member State. This token can optionally be collected as proof that passenger meets all the Country of Arrival requirements by the airlines.

This solution is currently implemented by Spain and Greece. The aforementioned token used by Spain is an encrypted QR Code, for a unique use at arrival airport. Of course, and to avoid any confusion with the EU DCC QR Code, other technical solutions (such as 1D Barcode) could be envisaged.

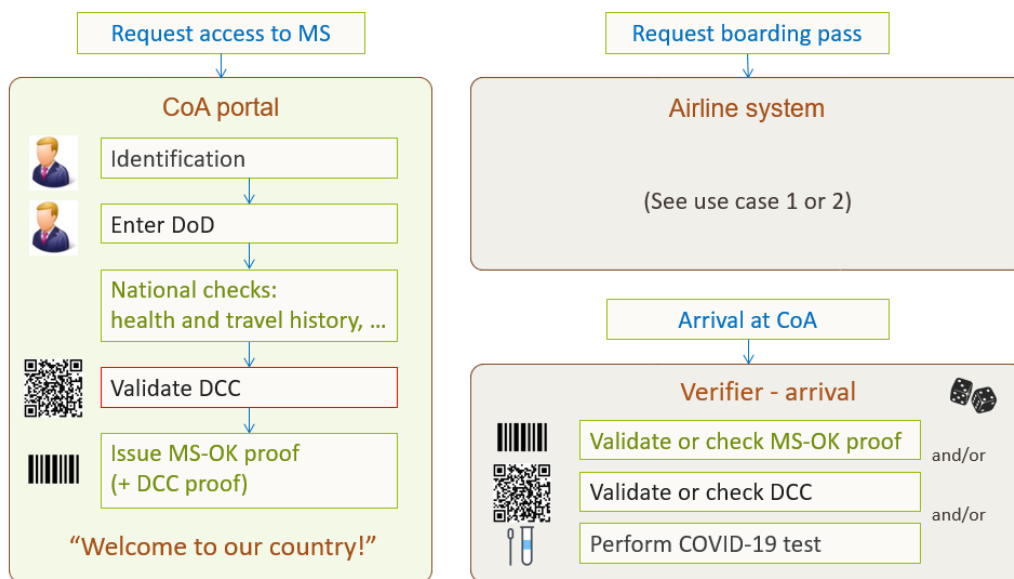
This solution relieves airlines to process data contained in the EU DCC, also it has the advantage that all other checks for entering a Member State (including a Passenger Locator Form) can be performed in advance. However, currently the “MS-OK” proofs are not standardised which makes automatic processing complex. For this option to work swiftly, aligning the content and structure of “MS-OK” proofs might require extensive development and testing time, which could lead to an implementation after the summer of 2021.

### 6.2. Workflow description

The following assumptions are made:

- Airline has to establish that “MS-OK” proof is in name of holder and is not fraudulent, this could be achieved visually,
- Member State of Arrival has the capability to collect required documents through one or more web sites (Passenger Locator Form, travel history...)
- Member State can communicate outcome of dialogue as a MS-OK certificate, a signed document, that passenger can present to transport operator as proof of compliance to travel rules,
- This certificate
  - Can be linked to the person by name and birth date (as EU DCC)
  - Expresses clearly its purpose and validity (travel to my country from there at such date)
  - Can be accounted for by an identification, an issuer and a sign (as EU DCC)

No connection with airline industry. DCC check performed only for quick processing at the arrival airport



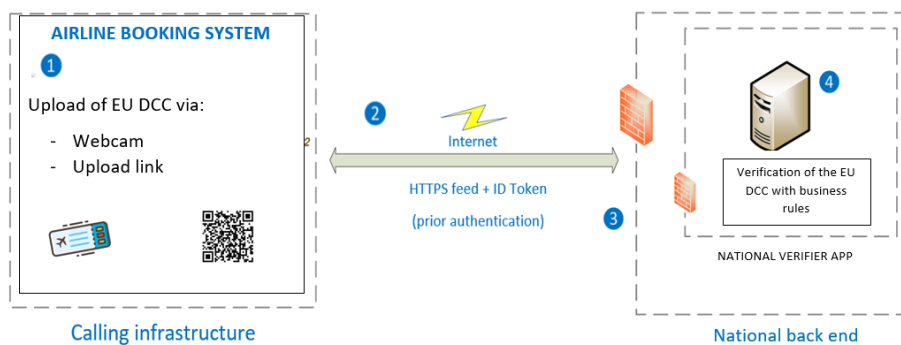
Schema n°5 - Workflow use case 3

See Use case 3 as implemented by Spain on page 13 for an example implementation.

## 7. Appendix

### 7.1. Use case 2 API-implementation as contemplated in France

This below, example of the former French project about using API



Schema n°5 - API query diagram

This diagram demonstrates just an edge case of the Use Case which may be not accurate. The browser never communicates with the national Backend. Instead, the browser communicates with the airline backend.

The airline backend could

1. Process the DCC by using keys and rules downloaded by the MS backend,

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2. Sends the DCC to a MS backend for processing (careful attention need to be made to the system to not make it as online verification)

### API query diagram:

Reading the EU DCC QR Code and prior authentication.

Query of the API with the resulting message.

The data pass through an internet in secure HTML (https). A previously retrieved ID token is required to query the API.

The API decodes the QR Code message, verifies its signature from the public certificates and check it against verification rules.

### Input data:

The COVID control API is searchable with the following input data

*Example :*

*Query*

*DC04DHI0TST11E3C1E3CB201FRF0JEAN*

*Result*

*LOUIS/EDOUARD<GS>F1DUPOND<GS>F225111980F3MF494309<GS>F5NF6110320211452<US>ZCQ5EDEXRCRYMU4U5  
U4Y QSF5GOE2PMFFC6PDWOMZK64434TUCJWQLIXCRYMA5TWVT7TEZSF2S3ZCJSYK3JYFOBVUHNQEXQMEKWQDG3A*

### Output data:

The output data which constitutes the control data are as follows:

- Type of certificate (Vaccine/Test/recovery)
- Test result (Negative test, Expired test, Valid positive test, etc.)
- Type of test (PCR test, Antigen test, etc.)
- Global status of the test

### Security

Security on access to information stored within national backend server will be implemented via:

- SSL type data exchange (https).
- Prior authentication via a service account.

## 7.2. Use case 3 as implemented by Spain

### General description

The use case is for airport and maritime border control only. After verification of the passenger travel history, PLF and EU DCC, a resulting QR Code is emitted (QR+) and is meant to be used for crossing a border by an international traveller. After this, it can be "thrown away".

Given the above, the QR+ code does not have a validity period. It only has an expected day of arrival to Spain.

Before departure, by means of a webpage (<https://www.spth.gob.es/>, hereby called SpTH and SpTH+ when EU DCC will be able to be integrated) or an iOS/Android app, the traveller fills in the data of the EU Passenger Locator Form and can also introduce a DCC which is validated by SpTH+. If the DCC is correct, the traveller is sent to "FAST\_CONTROL" on arrival in Spain, i.e. no further checks. Pursuant to art 168.7 of the ([consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union](#)) and the rest of the EU and national applicable legal framework, Spain's public health authorities may (exceptionally) introduce additional questions for epidemiological reasons.

On departure from an airport, the airlines check that the person has a QR+ code but not its contents.

*The airlines should check*

- *The traveller has a SPTH-generated form with a QR*
- *On this SPTH+ Form, the passenger name, and the flight date (appearing in a human readable form) are the same that the passenger has on his/her boarding pass*

On arrival to the airports, Spain only use authorized verifiers at the airports and soon at maritime borders. All verifiers are public sector employees or subcontractors, performing the checks on secure PCs.

On arrival to the airports, if the traveller has previously provided a DCC QR code, he is directed to FAST CONTROL in the airport (or a maritime port), i.e. no further checks.

On arrival to the airports, the Spanish verifiers can also read a DCC QR code directly, but Spain very strongly encourage international visitors coming to Spain to perform this verification beforehand through SpTH+.

Unlike in DCC QRs, the data in the QR+ codes is encrypted. There is a secure cryptographic scheme in place with daily changes of encryption keys used in QR+ codes. Only authorized verifiers with special applications installed in secure PCs in controlled environments (border controls) can read them.

#### SWOT for Spain's SpTH+ solution

- Strengths:
  - SpTH+ enables the validation of a DCC QR code in the country of origin instead of the country of arrival, thus streamlining operations as airports, maritime ports, etc.
  - SpTH+ enables a secure, simple, off-line validation by authorized verifiers only:
  - There is no public Android/iOS app for verifying QR+ codes.
    - QR+ codes are encrypted and only authorized verifiers with special applications installed in secure PCs in controlled environments (border controls) can read them.
  - QR+ do not store the contents of a DCC. They store: the administrative identity of the holder (to allow identity matching between the person holding the QR+ and the data in the QR+), the control track this person has to follow on arrival, the data of the EU Passenger Locator Form, as well as other questions which may be exceptionally set forth by Spain's public health authorities.
  - SpTH+ incorporates the data requested in the EU Passenger Locator Form.
  - SpTH+ is not connected to the information systems of the airlines and is not integrated into boarding pass generation workflows. SpTH+ thus avoids integrations with hundreds of airline system and does not become a single point of failure in all inbound air travel to Spain or equivalent challenges with maritime travel information systems.

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- Weaknesses:
  - The usage of a system similar to SpTH+ requires national legislation to be approved, in order to establish a legal basis for data processing compliant with the GDPR. This requires time.
  - The usage of a system similar to SpTH+ is likely to require a consultation with the national data protection agency. This requires time.
  - SpTH+ is not connected to the information systems of the airlines and is not integrated into boarding pass generation workflows. Thus, the person has to carry the QR+ code and physically present it to a verifier.
  - Given that QR+ codes are not stored in SpTH+, frequent fliers need to fill in the questionnaire each time they fly, even if the flight route is very similar to a previous one.

Next version of SPTH+ will allow travellers to store a validated CCD in the app, thus facilitating frequent fliers to use the same DCC in every travel.

Also, next version of SPTH+ will allow travellers to verify the validity of a CCD against the business rules of every country in EU, therefore making it easier for travellers to make sure that her/his DCC will be accepted in the destination country.