

# Standardisation and governance of QR-codes for Instant Payments at the Point of Interaction (IPs at the POI)

EPC212-21 / 2021 Version 1.1 / Date issued: 22 November 2021

Public

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## Executive Summary

The ERPB invited the EPC in their Statement (ERP/2021/012), published in June 2021, to coordinate further work on the standardisation and governance of QR-codes for Instant Payments at the Point of Interaction (IPs at the POI), beyond what had already been set out in the report of the ERPB working group on an Interoperability Framework for IPs at the POI of November 2020 (see ERP/2020/026 [10]), hereby involving relevant stakeholders and standardisation bodies.

Subsequently, the EPC requested the Multi-stakeholder Group on Mobile Initiated SEPA (Instant) Credit Transfers (MSG MSCT – see Annex 3) to execute this work. The MSG MSCT extended their work-stream on technical interoperability for this purpose per suggestion made by the ERPB (see Annex 4).

In the context of this document an IP at POI is an instant payment transaction based on a SEPA Instant Credit Transfer (SCT Inst)<sup>1</sup>, by a consumer to a merchant at the POI which may be for example a Point-of-Sale (POS) in a store or a payment page on an e-or m-commerce website.

For the development of this document, the MSG MSCT leveraged next to ERP/2020/026, their work undertaken over the past months which is reflected in the MSCT IG (EPC269-19 [7]), but took also into account the recently received answers from the EBA on Q&A 2020\_5476 and 2020\_5477, regarding the content of the QR-code.

The present document consists of two main parts: the specification of a QR-code standard for IPs at the POI, both for a merchant-presented and a consumer-presented QR-code (Chapter 4), and the governance aspects related to the usage of QR-codes for IPs (Chapter 5), which should become part of the overall Governance of an Interoperability Framework for IPs at the POI (see ERP/2020/026). The latter involves also the establishment of a so-called Registration Authority for the issuance of IP service provider identifiers. Annex 1 provides illustrative examples of process flows for IPs based on QR-codes while Annex 2 describes the options for minimum data sets for consumer-presented QR-codes that currently have not been retained<sup>2</sup> and for which further guidance from the EBA has been sought.

Having developed this document, the MSG MSCT wishes to make the following recommendations concerning the further steps to be undertaken:

#	Addressee	Rationale	Recommendation	Deadline
A	MSG MSCT <sup>3</sup>	To develop a generic QR-code standard for all MSCT payment contexts that is widely adopted by the market	<ul style="list-style-type: none"> <li>Extend the current QR-code standard specifications to a “generic QR-code standard” for MSCTs that covers also all other MSCT payment contexts (P2P, B2C, B2B and invoices) and both SCT Inst and SCT.</li> </ul>	Dec. 2021

<sup>1</sup> Note however that the content of this document remains valid for any (instant) account-based payment.

<sup>2</sup> In light of the EBA answer to Q&A 2020\_5476.

<sup>3</sup> Subject to the approval of the Extension of the mandate of the MSG MSCT by the EPC Board in November 2020.

			<ul style="list-style-type: none"> <li>To launch a public consultation on this “generic QR-code standard” for MSCTs.</li> <li>To prepare and publish a final version of the “generic QR-code standard” following this public consultation.</li> </ul>	<p>Q1 2022</p> <p>Q1 2022</p>
<b>B</b>	EPC	To ensure that the generic QR-code standard becomes a recognised International Standard available for wide market adoption	To submit the final version of the “generic QR-code standard” in an appropriate format through a fast track procedure to an International Standardisation Body such as TC 68 SC 9 or CEN	Q2 2022
<b>C</b>	The to be established Interoperability Framework for IPs at the POI	Adoption of the QR-code standard and governance by a dedicated Interoperability Framework for IP at POI solutions.	The proposal is that the QR-code standard specified in this document is adopted by a “to be established” Interoperability Framework for IPs at the POI and that the related governance of IP service providers become part of the overall Governance of this Interoperability Framework.	In due time (2022 <sup>4</sup> )

<sup>4</sup> Pending ERPB decision on the Interoperability Framework for IPs at the POI

## 1. Document information

### 1.1 Structure of the document

This document contains a number of chapters and annexes, as follows:

- Executive Summary;
- Chapter 1 includes the document information;
- Chapter 2 provides an introduction to the document;
- Chapter 3 briefly discusses the interoperability model for IPs at the POI
- Chapter 4 specifies the QR-code formats for IPs at the POI
- Chapter 5 defines the governance requirements related to the usage of QR-codes for IPs at the POI with a focus on the registration of IP service providers;
- Chapter 6 provides the conclusions with recommendations on the way forward;
- Annex 1 contains examples of IP interoperability process flows for illustrative purposes;
- Annex 2 lists the options for consumer-presented QR-codes that currently have not be retained<sup>5</sup>;
- Annex 3 lists the participants to the MSG MSCT Plenary;
- Annex 4 lists the participants to the work-stream on technical interoperability of QR-codes.

### 1.2 References

N°	Title	Issued by
[1]	EBA/GL/2019/04: EBA Guidelines on ICT and security risk management	EBA
[2]	PSD2: Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC	EC
[3]	Commission Delegated Regulation (EU) 2018/389 of 27 November 2017 supplementing Directive (EU) 2015/2366 with regard to regulatory technical standards for strong customer authentication and common and secure open standards of communication (also referred to as "RTS")	EC
[4]	General Data Protection Regulation (GDPR): Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC	EC
[5]	eIDAS: Regulation (EU) No 910/2014 of the European parliament and of the Council of 23 July 2014 on electronic identification and	EC

<sup>5</sup> In view of the EBA answer to Q&A 2020\_5476, for which further guidance from the EBA has been sought.

	trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC	
[6]	EPC004-16: SEPA Instant Credit Transfer Scheme Rulebook	EPC
[7]	EPC269-19v1.14: Mobile Initiated SEPA (Instant) Credit Transfer Interoperability Guidance (MSCT IG) – <i>under public consultation</i>	EPC
[8]	EPC302-20v1.0: 2020 Payment Threats and Fraud Trends Report	EPC
[9]	EPC 014-20: SEPA Request-to-Pay (SRTP) Scheme Rulebook	EPC
[10]	ERP/2020/026 ERP Final report on an Interoperability Framework for Instant Payments at the POI (IPs at the POI)	ERP
[11]	ISO 12812: Core banking - Mobile financial services - Parts 1-5	ISO
[12]	ISO 13616: Financial services - International Bank account number (IBAN) -- Part 1: Structure of the IBAN	ISO
[13]	ISO 18092: Information technology - Telecommunications and information exchange between systems -- Near Field Communication - Interface and Protocol (NFCIP-1)	ISO
[14]	ISO 20022: Financial Services – Universal Financial Industry Message Scheme	ISO
[15]	ISO/IEC 18004: Information technology -- Automatic identification and data capture techniques -- QR-code bar code symbology specification	ISO
[16]	ISO/IEC 14443: Identification cards - Contactless integrated circuit(s) cards - Proximity cards – Parts 1-4	ISO
[17]	ISO/IEC 15417: Information technology — Automatic identification and data capture techniques — Code 128 bar code symbology specification	ISO
[18]	NFC Controller Interface (NCI) Specifications NFC Forum	NFC Forum

Table 1: Bibliography



## 1.3 Terminology

Term	Definition
<b>Account Servicing Payment Service Provider (ASPSP)</b>	A PSP providing and maintaining a payment account for a payer (see Article 4 in [2]) or a payee.
<b>Alias</b>	See Proxy
<b>Beneficiary</b>	See Payee.
<b>Bluetooth Low Energy (BLE)</b>	A wireless personal area network technology designed and marketed by the Bluetooth Special Interest Group aimed at novel applications including beacons. Compared to classic Bluetooth, BLE is intended to provide considerably reduced power consumption and cost while maintaining a similar communication range.
<b>Collecting Payment Service Provider (CPSP)</b>	A payment service provider according to PSD2 that collects the payment transactions on behalf of the merchant (the ultimate beneficiary) and as such is the beneficiary of the IP at POI transaction.
<b>Consumer</b>	A natural person who, in payment service contracts covered by the PSD2, is acting for purposes other than his or her trade, business or profession (see Article 4 in [2]).
<b>Consumer Device</b>	An internet capable device used by the consumer to conduct an instant payment. Examples include a mobile device or a personal computer (PC).
<b>Consumer Device UVM (CDUVM)</b>	A user verification method (UVM) entered by or captured from the consumer (user) on the consumer device (e.g. a mobile device).
<b>Consumer-presented data</b>	Data provided by the consumer at the merchant's POI.
<b>Credit transfer</b>	A payment service for crediting a payee's payment account with a payment transaction or a series of payment transactions from a payer's payment account by the PSP which holds the payer's payment account, based on an instruction given by the payer (see Article 4 in [2]).
<b>Credit Transfer instruction</b>	A payment instruction given by an originator to an originator ASPSP requesting the execution of a credit transfer transaction, comprising such information as is necessary for the execution the credit transfer and is directly or indirectly initiated in accordance with the provisions of [2].
<b>Credit Transfer Transaction</b>	An instruction executed by an originator ASPSP by forwarding the transaction to a CSM for forwarding the transaction to the beneficiary ASPSP.
<b>Customer</b>	A payer or a beneficiary which may be either a consumer or a business (merchant).
<b>CustomerID</b>	In the context of this document, an identification of the payer (consumer), issued by their ASPSP for access to (a) customer facing user

	interface(s) (e.g. their on-line banking system), as required in the PSD2 API.
<b>2D barcode</b>	A two-dimensional barcode is a machine-readable optical label that contains digital information. They are also referred to as matrix barcodes. Examples include QR codes and tag barcodes.
<b>Digital wallet</b>	A service accessed through a consumer device which allows the wallet holder to securely access, manage and use a variety of services/applications including payments, identification and non-payment applications (e.g., value added services such as loyalty, couponing, etc.). A digital wallet is sometimes also referred to as an e-wallet.
<b>Electronic identification</b>	The process of using personal identification data in electronic form uniquely representing either a natural or legal person, or a natural person representing a legal person.
<b>EMVCo</b>	An LLC formed in 1999 by Europay International, MasterCard International and Visa International to enhance the EMV Integrated Circuit Card Specifications for Payments Systems. It manages, maintains, and enhances the EMV specifications jointly owned by the payment systems. It currently consists of American Express, Discover, JCB, MasterCard, Union Pay and VISA.
<b>Funds</b>	Cash, scriptural money or electronic money as defined in (see Article 4 in [2]).
<b>HUB</b>	An infrastructure ensuring connectivity between IP service providers. The term HUB is meant to be agnostic to the way it might be implemented – logically or physically - different models may be possible, but it should at least cover (a kind of) routing service. As an example, this could be a direct connection amongst IP service providers through a dedicated API.
<b>Instant(ly)</b>	At once, without delay.
<b>Instant Payment</b>	Electronic retail payment solutions available 24/7/365 and resulting in the immediate or close-to-immediate interbank clearing of the transaction and crediting of the payee's account with confirmation to the payer (within seconds of payment initiation) (see [6]).
<b>International Bank Account Number (IBAN)</b>	An internationally agreed system of identifying bank accounts across national borders to facilitate the communication and processing of cross border transactions (see [12]).
<b>Instant Payment (IP) Application</b>	A set of modules (application software) and/or data (application data) needed to provide functionality for an Instant Payment (IP) as specified by the IP service provider in accordance with the SEPA Instant Credit Transfer scheme.

<b>Instant Payment (IP) Service Provider</b>	A service provider that offers or facilitates a payment service to a consumer and/or merchant based on an SCT Instant transaction. This may involve the provision of a dedicated application for download on the consumer's device or the provision of dedicated software for the merchant POI. As an example, an IP service provider could be a PSP (e.g. an ASPSP or any party acting as a PISP under PSD2) or a technical service provider supporting a PSP.
<b>Merchant</b>	A beneficiary within a payment scheme for payment of the goods or services purchased by the consumer. The merchant is a customer of their PSP. A merchant may also be referred to as payee.
<b>Merchant-presented data</b>	Data provided by the merchant's POI to the consumer.
<b>Mobile code</b>	An authentication credential used for user verification and entered by the consumer via the keyboard of the mobile device.
<b>Mobile device</b>	Personal device with mobile communication capabilities such as a telecom network connection, Wi-Fi, Bluetooth, etc.  Examples of mobile devices include mobile phones, smart phones, tablets, wearables, car on-board units.
<b>Mobile Network Operator (MNO)</b>	A mobile phone operator that provides a range of mobile services, potentially including facilitation of NFC services. The MNO ensures connectivity Over the Air (OTA) between the consumer and their PSP using their own or leased network.
<b>Mobile payment service</b>	A payment service made available by software/hardware through a mobile device.
<b>Mobile service</b>	A service such as identification, payment, ticketing, loyalty, etc., made available through a mobile device.
<b>Mobile wallet</b>	A digital wallet accessed through a mobile device. This service may reside on a mobile device owned by the consumer (i.e. the holder of the wallet) or may be remotely hosted on a secured server (or a combination thereof) or on a merchant website. Typically, the so-called mobile wallet issuer provides the wallet functionalities but the usage of the mobile wallet is under the control of the consumer.
<b>NFC (Near Field Communication)</b>	A contactless protocol for mobile devices specified by the NFC Forum for multi-market usage. NFC Forum specifications (see [18]) are based on ISO/IEC 18092 [13] but have been extended for harmonisation with EMVCo and interoperability with ISO/IEC 14443 [16] .
<b>Originator</b>	See Payer.
<b>Payee</b>	A natural or legal person who is the intended recipient of funds which have been the subject of a payment transaction (see Article 4 in [2]), (examples include merchant, business).

<b>Payee Reference Party</b>	A person/entity on behalf of or in connection with whom the payee receives a payment.
<b>Payer</b>	A natural or legal person who holds a payment account and allows a payment order from that payment account, or, where there is no payment account, a natural or legal person who gives a payment order (see Article 4 in [2]).
<b>Payment account</b>	An account held in the name of one or more payment service users which is used for the execution of payment transactions (see Article 4 in [2]).
<b>Payment Initiation Service Provider (PISP)</b>	A payment service provider pursuing business activities as referred to in Annex I.7 of [2].
<b>Payment Request</b>	Set of rules and technical elements (including messages) that allow a payee to claim an amount of money from a payer for a specific transaction. As an example see [9].
<b>Payment Request message</b>	Message sent by the payee to the payer, directly or through agents. It is used to request the movement of funds from the payer account to the beneficiary account.
<b>Payment Service Provider (PSP)</b>	An entity referred to in Article 1(1) of [2] or a natural or legal person benefiting from an exemption pursuant to Article 32 or 33 of [2].
<b>Payment Service User (PSU)</b>	A natural or legal person making use of a payment service in the capacity of payer, payee, or both (see Article 4 in [2]).
<b>Payment scheme</b>	A technical and commercial arrangement (often referred to as the “rules”) between parties in the payment value chain, which provides the organisational, legal and operational framework rules necessary to perform a payment transaction.
<b>Payment system</b>	A funds transfer system with formal and standardised arrangements and common rules for the processing, clearing and/or settlement of payment transactions (see Article 4 in [2]).
<b>Payment transaction</b>	An act, initiated by the payer or on his/her behalf or by the payee (beneficiary), of placing, transferring or withdrawing funds, irrespective of any underlying obligations between the payer and the payee (see Article 4 in [2]).
<b>Personal data</b>	Any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person (see [4]).

<b>Physical POI</b>	A POI that is a physical device and consists of hardware and software, hosted in acceptance equipment to enable a consumer and/or merchant to perform an MCST. The merchant-controlled POI may be attended or unattended. Examples of POI include Point-of-Sale (POS), vending machine.
<b>Point of Interaction (POI)</b>	The initial point in the merchant's environment (e.g. POS, vending machine, payment page on merchant website, QR-code on a poster, etc.) where data is exchanged with a consumer device (e.g., mobile phone, wearable, etc.) or where consumer data is entered to initiate an instant credit transfer.
<b>Proximity Payment</b>	A payment where the consumer and the merchant (and/or their equipment) are in the same location and where the communication between the mobile device and the Point of Interaction device takes place through a proximity technology (e.g., NFC, 2D barcodes, BLE, ultrasonic, etc.).
<b>Proxy</b>	Data required in order to retrieve a payment account identifier (e.g., mobile phone number, e-mail address, etc.). This is sometimes referred to as an "alias". As an example, a proxy could be used to replace an IBAN which will be referred to as IBAN-proxy in this document.
<b>QR-code</b>	Quick Response-code [15], see also 2D barcode.
<b>SEPA Instant Credit Transfer</b>	The SEPA Instant Credit Transfer is the payment instrument governed by the rules of the SEPA Instant Credit Transfer Scheme for making instant credit transfer payments in euro throughout the SEPA from payment accounts to other payment accounts (see [6]).
<b>Single Euro Payments Area (SEPA)</b>	The countries and territories which are part of the jurisdictional scope of the SEPA payment schemes  (see <a href="https://www.europeanpaymentscouncil.eu/document-library/other/epc-list-sepa-scheme-countries">https://www.europeanpaymentscouncil.eu/document-library/other/epc-list-sepa-scheme-countries</a> ).
<b>Tokenisation</b>	Process of substituting payment account, PSU identification data or transaction related data with a surrogate value, referred to as a token.
<b>Token</b>	Tokens can take on a variety of formats across the payments industry. They generally refer to a surrogate value for payment account (e.g., the IBAN), PSU identification data (e.g., CustomerID) or transaction related data. Payment Tokens must not have the same value as or conflict with the real payment account related data. If the token is included in the merchant-presented data it might be referred to as a merchant token; if the token is included in the consumer-presented data it might be referred to as a consumer token.
<b>Token Requestor</b>	An entity requesting a token to the Token Service
<b>Token Service</b>	A system comprised of the key functions that facilitate generation and issuance of tokens and maintain the established mapping of tokens to the related data when requested by the token requestor. It may also

	include the capability to establish the token assurance level to indicate the confidence level of the payment token to the related information binding. The service also provides the capability to support token processing of payment transactions submitted using tokens by de-tokenising the token to obtain the actual related information (see also the definition of Token).
<b>Token Service Provider (TSP)</b>	An entity that provides a Token Service.
<b>Trusted Third Party (TTP)</b>	An entity which facilitates interactions between stakeholders of the ecosystem who all trust this third party (examples are SE provider, common infrastructure manager...).

**Table 2: Terminology****1.4 Abbreviations**

<b>Abbreviation</b>	<b>Term</b>
<b>an</b>	alphanumeric
<b>ASPSP</b>	Account Servicing PSP
<b>API</b>	Application Programming Interface
<b>BLE</b>	Bluetooth Low Energy
<b>CDUVM</b>	Consumer Device UVM
<b>CEN</b>	European Committee for Standardisation
<b>CPSP</b>	Collecting Payment Service Provider
<b>CSM</b>	Clearing and Settlement Mechanism
<b>2D barcode</b>	Two dimensional barcode
<b>EBA</b>	European Banking Authority
<b>EC</b>	European Commission
<b>ECSG</b>	European Cards Stakeholders Group
<b>EPC</b>	European Payments Council
<b>EPI</b>	European Payments Initiative
<b>ERP/</b>	Euro Retail Payments Board
<b>GDPR</b>	General Data Protection Regulation
<b>IBAN</b>	International Bank Account Number
<b>ID</b>	Identifier
<b>IP</b>	Instant Payment
<b>ISO</b>	International Organization for Standardization

<b>MNO</b>	Mobile Network Operator
<b>MSCT</b>	Mobile Initiated (Instant) SCT
<b>MSCT IG</b>	Mobile Initiated SEPA (Instant) Credit Transfer Interoperability Guidance
<b>MSG MSCT</b>	Multi-Stakeholder Group for Mobile Initiated (Instant) SCT
<b>n</b>	numeric
<b>NFC</b>	Near-Field Communication
<b>PISP</b>	Payment Initiation Service Provider
<b>POI</b>	Point of Interaction
<b>POS</b>	Point of Sale
<b>PSD</b>	Payment Services Directive
<b>PSP</b>	Payment Service Provider
<b>PSU</b>	Payment Service User
<b>QR-code</b>	Quick Response-code
<b>RTS</b>	Regulatory Technical Standard
<b>SCT Inst</b>	SEPA Instant Credit Transfer
<b>SEPA</b>	Single Euro Payments Area
<b>SP</b>	Service Provider
<b>TC</b>	Technical Committee
<b>TSP</b>	Token Service Provider
<b>TTP</b>	Trusted Third Party
<b>URL</b>	Uniform Resource Locator
<b>UVM</b>	User Verification Method

**Table 3: Abbreviations**

## 2. Introduction

This document has been developed by the Multi-stakeholder Group on Mobile Initiated SEPA (Instant) Credit Transfers (MSG MSCT) on the request of the EPC, as follow up of the ERPB request specified in their Statement (ERP/2021/012) published in June 2021. This request reads as follows:

*“The ERPB took note of the work conducted by the MSG MSCT on the recommendations stemming from the November 2020 report on an interoperability framework for instant payments at the POI. Taking into consideration the progress of the work at MSG MSCT level, ongoing market developments and the fact that the feedback is yet to be received to the EBA Q&A tool, the ERPB will assess whether to conduct further work on the remaining elements of an interoperability framework during its November 2021 meeting. In the meantime, the ERPB has agreed to conduct further work on the development of a QR-code standard beyond what had already been set out in the report of the ERPB working group of November 2020, covering the requirements for such a standard as well as its governance and the process for future updates. In this regard, the EPC was invited to coordinate this work, involve relevant stakeholders and standardisation bodies, and report back to the ERPB’s November 2021 meeting. This work could thereafter be broadened to other technologies such as NFC or BLE”.*

In line with this request by the ERPB, the MSG MSCT (see Annex 3) has extended their work-stream on technical interoperability of MSCTs to conduct the work on the QR-codes with additional members from relevant stakeholders and (industry) standardisation bodies. The composition of this extended work-stream may be found in Annex 4.

As requested, the MSG MSCT started from the QR-codes defined in the document ERP/2020/026 [10] and further specified the technical details of the QR-code format but also analysed the interoperability and governance aspects for these QR-codes. More in particular, the identification and registration of the IP service providers is covered which is an important aspect for routing purposes to support the interoperability of the QR-codes for IPs at the POI. During the development of this document, the MSG MSCT took also into account the recently received answers from the EBA on the Q&A questions 2020\_5476<sup>6</sup> and 2020\_5477<sup>7</sup>.

The document also provides suggestions for further international standardisation of the QR-code formats and briefly describes the interoperability of the QR-code standard specified in this document with, amongst possible others, the QR-codes defined by Alipay, EMPSA, EMVCo and EPI. The document further discusses the establishment of a registration authority for the issuance of an identifier for the IP service providers. Governance aspects related to the IP service providers, including their eligibility for registration, should become part of the overall Governance of an Interoperability Framework for IPs at the POI, as specified in ERP/2020/026 [10].

Note that this document is now a standalone document but the aim is to “generalise” the QR-code standard (Chapter 4) for QR-codes for MSCTs for all payment contexts (P2P, B2C, B2B and invoices), to conduct a public consultation on the “general” QR-code standard and subsequently, submit it to an International Standardisation Body (see section 4.7) and integrate it into the next release of the MSCT IG (EPC269-19, [7]).

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<sup>6</sup> See [https://www.eba.europa.eu/single-rule-book-ga/qna/view/publicId/2020\\_5476](https://www.eba.europa.eu/single-rule-book-ga/qna/view/publicId/2020_5476)

<sup>7</sup> See [https://www.eba.europa.eu/single-rule-book-ga/qna/view/publicId/2020\\_5477](https://www.eba.europa.eu/single-rule-book-ga/qna/view/publicId/2020_5477)

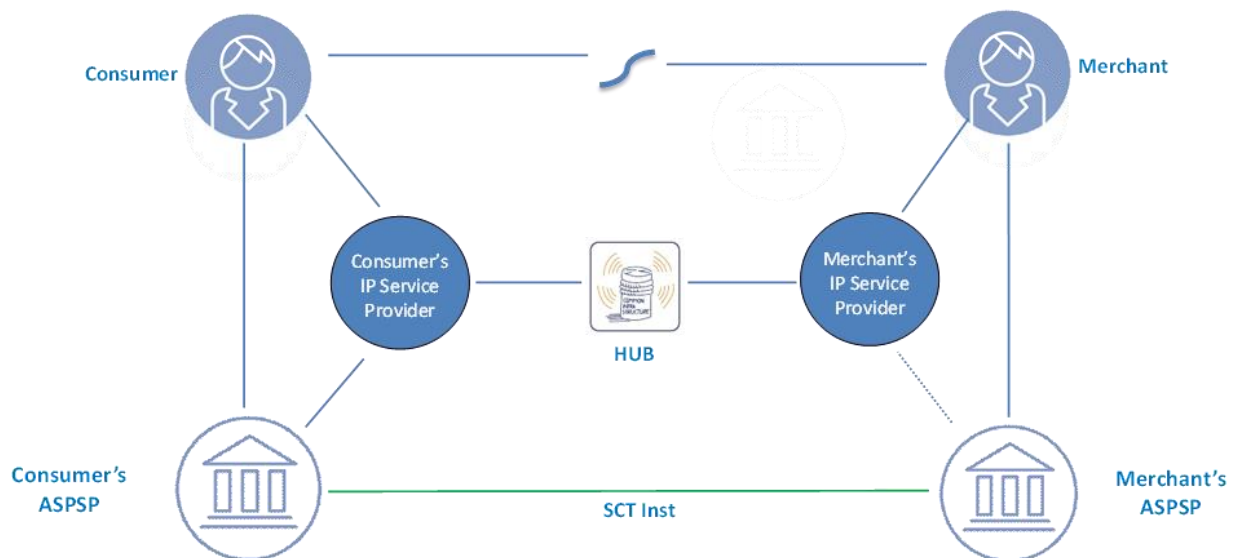


### 3. Interoperability of IPs at the POI

Instant Payments (IPs) at the POI are initiated directly (by the consumer) or indirectly (by an IP service provider at the request of the consumer) in compliance with the PSD2 (see [6]), using a consumer device. IP at POI solutions are offered by so-called IP service providers which are service providers that offer or facilitate a payment service to a consumer and/or merchant based on an SCT Instant transaction. As an example, an IP service provider could be a PSP (e.g. an ASPSP or any party acting as a PISP under PSD2) or a technical service provider supporting a PSP.

IPs in Euro are based on the existing SCT Instant Scheme rulebook [6] in the so-called “inter-PSP space” and are therefore using in that space the existing payment infrastructure. They typically use an IP application or a browser on the consumer device to initiate or at least authenticate and authorise the SCT Instant transaction, besides some features of the consumer device such as the support of CDUVM (e.g., a mobile code or biometrics on the mobile device), the consumer device screen to display transaction information, etc.

For the analysis of the interoperability requirements for the Framework for IPs at POI, the following generic 4-corner model was used in the ERPB report developed in 2020 [10]. Hereby it is assumed that both consumer and merchant have different ASPSPs that are SCT Inst scheme participants (see section 5.4 in [6]), while the entities assuming the role of IP service provider are depicted as separate entities that are different for the consumer and the merchant. Obviously, if the role of IP service provider would be assumed by an ASPSP the model below would simplify. Alternatively, multiple PSPs (such as a PISP licensed under PSD2 or a CPSP) could be involved between the consumer/merchant and their respective ASPSP; these models have been studied in Annexes 1 and 2 of ERPB 2020/026 [10].



**Figure 1: Generic 4-corner interoperability model for IPs at POI**

As depicted above, the consumer’s IP service provider is linked to the consumer’s ASPSP, and the merchant’s IP service provider may be linked to the merchant’s ASPSP (this linkage may include both technical and contractual aspects).

The IP at POI ecosystem involves some other new stakeholders in the value chain compared to the ones described in the SCT Instant Scheme rulebook [6] including a so-called Token Service Provider

(TSP) who is a TTP involved if tokens are used in IPs as surrogate values for the transaction data (including the merchant/consumer IBAN, merchant/consumer identifier, transaction amount or merchant transaction identifier). The TSP manages the generation and issuance of tokens, and maintains the established mapping of tokens to the related transaction data. For simplification it is assumed in this document that the role of the TSP is assumed or is under the control of the IP service provider (and hence the TSP is not depicted in the figure above)<sup>8</sup>.

To achieve interoperability for the generic basic 4-corner model, the concept of a HUB was introduced to interconnect the respective IP service providers as shown in the figure above. Hereby the term HUB is used to indicate an “infrastructure” that enables interconnectivity between IP service providers but it is meant to be agnostic to the way it might be implemented – different implementation models may be possible (centralised or de-centralised (e.g. a direct API)).

The technical interoperability requirements between IP service providers have been analysed and defined in detail in Chapter 5 of ERP/2020/026 [10]. One of the interoperability aspects is the exchange of (transaction) data between the consumer and merchant to enable the initiation of an IP at the POI. The usage of QR-codes for this data exchange will be treated in the next chapter.

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<sup>8</sup> The same is valid in case of usage of a proxy. The role of the provider involved is assumed or is under the control of the IP service provider.

## 4. QR-codes for IPs at the POI

### 4.1 Introduction

This chapter is devoted to IPs at the POI whereby a QR-code (see ISO 18004, [15]) is used as proximity technology for the data exchange between the consumer and the merchant to enable the initiation of an IP at the POI. Hereby, as defined in ERP/2020/026 [10], two modes may be distinguished:

- IPs based on merchant-presented data: in this mode the data refers to merchant identification data and transaction data;
- IPs based on consumer-presented data: in this mode the data refers to consumer identification data.

### 4.2 Minimum data set and QR-code format for merchant-presented QR-codes

#### 4.2.1 Introduction

This section considers the exchange of data (merchant identification data and transaction data) via a QR-code displayed by the merchant POI and read by the consumer device. For the purpose of this document, the following three cases with respect to the type of merchant-presented data are considered:

- All transaction data is exchanged between the merchant and the consumer through the QR-code.

In this case a distinction needs to be made whether

- The merchant-presented data includes a “(merchant) token”: in this case, a de-tokenisation process needs to take place such that all the data (merchant (identification) and transaction data) can be derived from the token and provided to the consumer via their IP service provider. This generally requires the support of the merchant’s IP service provider (see Information Request/Response messages in Figure 5 below) prior to the initiation of the IP transaction.
  - The merchant-presented data includes all data in “clear”<sup>9</sup> (e.g. the merchant’s name, trade name, IBAN of the merchant’s account, transaction amount, etc.). This enables the immediate initiation of the IP transaction.
- Only part of the data is exchanged in clear (e.g. merchant-presented data contains a proxy for the merchant (identification) data. In this case the complete data needs to be provided

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<sup>9</sup> Obviously in this case additional measures should be taken to ensure the security of the data exchanged (for some guidance see [7]).

by the merchant's IP service provider upon request from the consumer's IP service provider (see Information Request/Response messages in Figure 5 in Annex 1) prior to the initiation of the IP transaction.

Next to this data exchanges also an identifier of the merchant IP service provider is needed for routing purposes by the HUB for the exchange of messages between the respective IP service providers.

Note also that in the last two cases described above, appropriate security measures need to be taken to ensure the integrity of the data and the confidentiality as appropriate<sup>10</sup>.

#### 4.2.2 Minimum data sets

The minimum data set to be exchanged between the merchant and the consumer, will rely on the IP transaction feature, as described above:

1. If the merchant-presented data provided to the consumer contains a (merchant) token, the minimum data will consist of both routing info and the token as payload. The minimum data will be forwarded in a Transaction Information Request message through the HUB from the consumer IP service provider to the merchant IP service provider for de-tokenisation into the transaction data (see Annex 1).
2. If the merchant-presented data provided to the consumer contains only part of the transaction data in clear (e.g., contains a proxy), the transaction data will need to be further completed by the merchant's IP service provider. The minimum data set will consist of both routing info and the available transaction data (e.g. the proxy). The minimum data will be forwarded in a Transaction Information Request message through the HUB from the consumer IP service provider to the merchant IP service provider for completion of the transaction data.
3. If the merchant-presented data provided to the consumer contains all transaction data "in clear" (e.g. in clear in QR-code), the minimum data set will consist of both routing info and all necessary payload data.

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<sup>10</sup> See section 9.2.2 in ERP/2020/026 [10] and the EBA Q&A 2020\_5477.

Therefore the minimum data sets for the merchant-presented QR-code, covering the three cases described above are as follows:

Merchant-presented QR-code
<p><b>Merchant-presented QR-code includes a token:</b></p> <p>[Version]+[Type]+ [Merchant IP Service Provider ID] + [(merchant) token]</p>
<p><b>Merchant-presented QR-code contains a proxy for the merchant:</b></p> <p>[Version]+[Type]+ [Merchant IP Service Provider ID] + [proxy] + [a clear-text name/value string]</p>
<p><b>Merchant-presented QR-code includes all transaction data “in clear”:</b></p> <p>[Version]+[Type]+ [Merchant IP Service Provider ID] + [a clear-text name/value string]</p>

**Table 4: Minimum data sets for IPs based on merchant-presented QR-code**

The reader is referred to section 4.4 for an explanation of the “Version” and “Type” in the Table above.

### 4.3 Minimum data set and QR-code format for consumer-presented QR-codes

#### 4.3.1 Introduction

To achieve interoperability of IPs based on consumer-presented data, at least consumer identification data (which enables the consumer’s IP service provider to identify the consumer) and an identifier of the consumer’s IP service provider are needed.

The *consumer identification data* is defined by the IP service provider and may take a variety of forms and may be static or dynamic. However, this consumer identification data has no impact on the interoperability between IP services. This consumer identification data will need to be transferred as part of the Payment Request message from the merchant to their IP service provider and further to the consumer’s IP service provider to enable the identification of the consumer (see Figure 6 in Annex 1).

In the ERPB report ERPB/2020/026 [10], originally three cases were distinguished with respect to the consumer identification data. In view of the answer received from the EBA on Q&A 2020\_5476<sup>11</sup>, the options containing the CustomerID in “clear” do not seem to be allowed<sup>12</sup>. Therefore, this document considers only one case, namely the consumer identification data is a (consumer) token. But the minimum data set could also include an additional cleartext value string to support value-added services (e.g. loyalty). However, further guidance will be sought from the EBA concerning the inclusion of the CustomerID (in cleartext) in a consumer-presented QR-code, which is not generated by a PSP. This may result in the addition of more options for the consumer-presented data (see Annex 2).

The *identifier of the consumer’s IP service provider* is needed by the merchant’s IP service provider and subsequently by the HUB to know where to route the Payment Request message.

#### 4.3.2 Minimum data set

The minimum data set to be exchanged between the consumer and the merchant included in the consumer-presented QR-code is as follows:

Consumer-presented QR-code
<p><b>The consumer-presented QR-code includes a token:</b></p> <p>[Version]+[Type]+[Consumer IP Service Provider ID]+[(consumer) token]+ [a clear-text name/value string]</p>

**Table 5: Minimum data sets for IPs based on consumer-presented QR-code**

The reader is referred to section 4.4 for an explanation of the “Version” and “Type” in the Table above.

<sup>11</sup> [https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020\\_5476](https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020_5476)

<sup>12</sup> ETPPA tabled a dissenting opinion on the impact of the EBA answer. In their view the EBA answer does not allow the removal of these options, because a) any non-PSP – including payers themselves – would still be allowed to provide the CustomerID in clear text, b) PIS@POS could not work without, because PSD2 APIs require the CustomerID in clear text as well, and c) tokenisation can never be mandated, because the introduction of a tokeniser brings an unnecessary gatekeeper into the process, which adds cost, complexity and competition issues.

## 4.4 Standardised format of QR-codes for IPs at the POI

### 4.4.1 Introduction

To enable IP interoperability across SEPA, for the data exchange between the merchant and consumer, IP QR-codes formats have been standardised in ERP/2020/026 [10] based on the minimum data sets defined in the previous section.

The standardised merchant-presented QR-codes should be adopted by all SEPA-based IP service providers and supported by the IP apps in the consumer's device, either in the IP app (direct reading of the QR-code by the IP app) or via a link between the IP app and the QR-reader on the consumer device, to achieve interoperability across SEPA.

The standardised consumer-presented QR-codes should be adopted by all SEPA-based IP service providers and supported by the merchant's POI.

### 4.4.2 Principles for development of IP QR-codes

For the development of a standardised QR-code for IPs at the POI, based on ISO /IEC 18004 [15], the following four assumptions have been made:

- Mobile wallets will often support multiple payment methods. The wallet user will often select and set a default payment method;
- Merchants will often support multiple payment methods. The merchant could set a preferred (prioritised) payment method for IPs based on merchant-presented QR-code
- Need to avoid any special actions from merchant personnel at POI (e.g. in a store - all extra actions generate friction, such as asking what kind of wallet or what kind of payment instrument the consumer would like to use);
- Need to avoid any special actions from the wallet user at the POI (more in particular in stores- e.g. swiping through a POS-menu to find a specific wallet generates friction).

When following the assumptions above, a QR-code format for IPs for data exchange between the merchant and the consumer has been defined based on the following preconditions:

- Make a generic routing/payload data-exchange at the POI between the merchant and the consumer;

- Routing goes directly or via (a) HUB(s) between IP service providers;
- Enable to avoid having specific details about merchant, consumer and transaction in the data exchanged in order to
  - Reduce privacy/security concerns;
  - Reduce maintenance concerns related to QR-code distribution;
  - Increase readability of the QR-code.

#### 4.4.3 IP QR-codes format

The QR-codes format for IPs at the POI have been specified in ERP/2020/026 [10] and are URL based with a recognisable structure. A URL-based QR-code offers different advantages, as it can not only be processed when scanned within a dedicated app but when scanned with the native camera app or clicked when displayed during m-commerce, too. The second option occurs, if the consumer shops online using the mobile device, they generally would use to scan a QR-code with. Per default, if no app can be accessed directly, the URL could lead to a general landing page. Depending on local settings/arrangements, browser redirection can open defined apps directly on the smart phone. This functionality is available on android as well as on iOS and would for example open the local app of an IP service provider directly, without showing the “landing page” to the consumer.

The structure of the QR-code for IPs at the POI has been defined as follows:

- A URL based on https:// structure
- First part of the URL: ordinary domain structure
- Second part of the URL: version
- Third part: type (this may refer to the payment context)
- Fourth part: routing information
- Fifth part: payload information<sup>13</sup>.

/HTTPS://<Domain name>/<Version>/<Type>/<merchant IP service provider ID/<Payload>
---

**Table 6: Merchant-presented QR-code**

<sup>13</sup> For consumer-presented QR-codes this would be the consumer identification data.



<code>HTTPS://&lt;Domain_name&gt;/&lt;Version&gt;/&lt;Type&gt;/&lt;consumer IP_service provider ID/&lt;Payload&gt;</code>
---

**Table 7: Consumer-presented QR-code**

The **Domain name** refers to the IP interoperability framework (see Chapter 5).

The **Version** refers to the specification version of the QR-code and allows future updates to the QR-code.

The **Type** refers to

- for merchant-presented QR-codes it refers to the different payment contexts (e.g. mobile payment at the POI):
- for consumer-presented QR-codes it is for future, e.g. it could enable to add other services<sup>14</sup>.

The **IP service provider identifier** is used in the interoperability space for routing purposes, therefore a standardised coding of this data element is necessary (see section 4.5).

The Payload is at the discretion of the IP service provider or the Payload issuer and shall contain the minimum data as defined in section 4.3. In addition the Payload shall contain the identification of the entity issuing the content of the Payload – the so-called Payload issuer.

#### 4.5 Coding of the QR-code data fields

In view of the interoperability of QR-codes for IPs at the POI, the coding of the different data fields in the QR-code shall be standardised as defined in the sections below. Note that the Payload is at the discretion of the Payload issuer. The only constraint is that the parameters have to be structured so that the URL in its entirety is a valid URL according to the URL specification (<https://www.w3.org/Addressing/URL/url-spec.txt>).

##### 4.5.1 Domain\_name

The domain name refers to the interoperability domain for IP service providers for IPs at the POI and shall refer to the “IP at POI interoperability framework” or “an IP at POI scheme or participant” operated under the IP at POI interoperability framework. The exact coding of this field needs to

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<sup>14</sup> An example may be a refund.

be defined by the Interoperability Framework of IPs at the POI, once established (e.g. qr.INTFRM.org).

#### 4.5.2 Version

A version number shall support further updates to the QR-code.

/1/ refers to the first version.

#### 4.5.3 Type

*For merchant-presented QR-codes:* the type indicates what kind of payment context is expected.

The pre-defined payment context could also determine what kind of query parameters will be allowed in the Payload. For example, because of security issues, a QR-code use at the POI would not allow clear text data.

The following coding shall be applied:

/m/ mobile payment at the POI

/e/ reserved for e-commerce payment

/i/ reserved for invoice payment

/p/ reserved for person to person payment

/w/ reserved for opening a URL in a webview (e.g. virtual POI)

*For consumer-presented QR-codes:* the type is reserved for future use.

#### 4.5.4 IP service provider ID

An identifier needs to be assigned to every IP service provider for routing purposes. This will require an eligibility checking and registration of the IP service provider under a so-called “interoperability framework for IPs at the POI” which are further analysed in the next chapter.

The coding of the IP service provider ID can be specified by the so-called Registration Authority (e.g. 3 characters alphanumeric (an)).

4.5.5 Payload

In the tables below, the Payload data for the three cases defined in section 4.2.2 for merchant-presented QR-codes and for the unique case defined in section 4.3.2 for consumer-presented QR-codes are listed with the coding. In the Payloads below, the different fields shall be separated by a delimiter, i.e. a “/”.

Payload for merchant-presented QR-codes for IPs			
QR-code content	Attribute	Purpose	Coding
QR-code contains a token	Payload Issuer	Entity responsible for issuing the content of the Payload	3 an
	Token	Token for the merchant identification and transaction data	1 to 70 an
QR-code contains a proxy <sup>15</sup>	Payload Issuer	Entity responsible for issuing the content of the Payload	3 an
	Proxy	Proxy for the Payee identification data	1 to 70 an
	Proxy	Proxy for the Payee Reference Party identification data	1 to 70 an
	MCC	Merchant Category Code	4n

<sup>15</sup> This use case represents an example of usage of a proxy. All data that is not represented by the proxy shall be present “in clear” in the Payload.

	Type of payment instrument	SCT or SCT Inst	3 to 4an
	Purpose of credit transfer (includes e.g. merchant transaction identifier)	Data for reconciliation purposes at merchant – is included from initiation through entire transaction payment chain	1 to 4 an
	Remittance information structured or Remittance information unstructured (O)	Information supplied by the Payer in the SCT Inst Instruction and transmitted to the Payee in order to facilitate the payment reconciliation	1 to 35 an
	Currency		1 to 3 an
	Transaction amount		1 to 12 n
<b>QR-code contains all data “in clear”<sup>16</sup></b>	Payload Issuer	Entity responsible for issuing the content of the Payload	3 an
	Name Payee (account holder)		1 to 70 an

<sup>16</sup> Note that hereby the EBA answer to Q&A 2020\_5477 shall be taken into account on the protection of the IBAN outside the inter-PSP space, see [https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicid/2020\\_5477](https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicid/2020_5477).

	Trade name merchant		1 to 35 an
	Name of Payee reference party		1 to 70 an
	Trade name of Payee Reference Party		1 to 35 an
	IBAN Payee		1 to 34 an
	MCC	Merchant Category Code	4 n
	Type of payment instrument	SCT or SCT inst	3 to 4 an
	Purpose of credit transfer (includes e.g. merchant transaction identifier)	Data for reconciliation purposes at merchant – is included from initiation through entire transaction payment chain	1 to 4 an
	Remittance information structured or Remittance information unstructured	Information supplied by the Payer in the SCT Inst Instruction and transmitted to the Payee in order to facilitate the payment reconciliation	1 to 35 an
	Currency		1 to 3 an

	Transaction amount		1 to 12 n
--	--------------------	--	-----------

Table 8: Coding of Payload data for merchant-presented QR-codes for IPs

Payload for consumer-presented QR-codes for IPs			
QR-code content	Attribute	Purpose	Coding
QR-code contains a token	Payload issuer	Entity responsible for issuing the content of the Payload	3 an
	Token	Token for the Payer identification data	1 to 70 an
	Additional data for value-added services	Clear text	1 to 70an

Table 9: Coding of Payload data for consumer-presented QR-codes for IPs

#### 4.6 Interoperability with other QR-code initiatives for mobile payments

##### 4.6.1 EMPSA

EMPSA's goal is to create interoperability between already established, currently only locally or regionally operating European mobile payment solutions, similar to the roaming model of the MNO providers. Customers should be enabled to pay with their familiar mobile payment solution (contained e.g. in a wallet) within other payment solutions throughout Europe.

In addition, EMPSA also wants to create compatibility with other payment systems that are not members, so that merchants at the POI can offer their customers a wide variety of payment methods via a uniform infrastructure. For this purpose, EMPSA defined a very flexible code format

for merchant-presented data, called the UMAMI code (Universal Mobile Alliance Message Interoperability).

The merchant-presented UMAMI QR-code has the following structure:

```
https://hostname/version/usecase/routing/?query=...
<--(sub)domain--> <-- operation --> <- payload ->
```

**Table 10: UMAMI merchant-presented QR-code**

The structure of the code only has to correspond to the general specifications for URLs and certain parameters such as version, use case, routing and payload have to be found in a predefined position within the URL. The domain or the payload itself can largely be designed freely by the issuer of the QR code.

The structure of the URL is largely identical to the specifications developed in this document (section 4.5) and in the MSCT IG [7]. In addition, the UMAMI specifications provide the possibility of including information required for SCT Inst within the Payload. "Extended parameters" are already prepared in order to be able to map information such as amount, payee, IBAN, etc.

In this way, merchants who have concluded an acceptance contract with an EMPSA partner and offer merchant-presented data should be enabled to display a uniform QR-code that can also support instant payments such as SCT Inst.

#### 4.6.2 Alipay

Alipay and their partners, including acquiring partners and mobile payment partners, are using so-called "CGCP (Contactless Gateway Code Protocol) code" for cross-border payments. A similar code format is also used for domestic payments in China, with some variations regarding the length and the payload part of the code. In Alipay's portfolio of code-scanning payment products, the following products are designed for in-store payment scenarios:

1. *User-presented code*<sup>17</sup>:

Code Issuer ID	Consumer Identification Number
----------------	--------------------------------

Table 11: Alipay consumer-presented code

Code Issuer ID is an indicator of the code issuer, i.e. Alipay or their mobile payment partners. Consumer Identification Number is generated by the Code Issuer, and randomised for single usage.

All the characters are numeric. The length of the code varies from 17 to 32 digits. Codes with the length ranging from 25 to 32 digits are reserved for future use.

The code is symbolised into one-dimensional Code 128 (as in ISO/IEC 15417 [17]) as well as two-dimensional QR code (as in ISO/IEC 18004 [15]), to suit different merchant devices.

Due to hardware constraints and legacy reasons, many Chinese merchants acquired by Alipay can only read one-dimensional Code 128 no longer than 24 digits. Therefore, the Consumer-presented QR-code as in Table 7 is not recognisable for these merchants. The other way around, the EU merchants which adopt the Consumer-presented QR-code as in Table 7 do not have hardware constraints to support the Alipay user-presented code as in Table 11.

2. *Merchant-presented code*, including Order code and Entry/Store code:

HTTPS://<DOMAIN_NAME>/<optional fields>/	<PAYLOAD to identify an order>
--	--------------------------------

Table 12: Alipay merchant-presented code: order code

HTTPS://<DOMAIN_NAME>/<optional fields>/	<PAYLOAD to identify a merchant>
--	----------------------------------

Table 13: Alipay merchant-presented code: entry/store code

<DOMAIN\_NAME> is an indicator of the code issuer, i.e. Alipay or their acquiring partners. <PAYLOAD> is generated by the code issuer. <optional fields> in between are reserved for future use. The code is symbolised into two-dimensional QR code (as in ISO/IEC 18004 [15]).

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<sup>17</sup> User refers here to the consumer.



The Alipay merchant-presented code as in Table 12 and Table 13 adopt similar format with the Merchant-presented QR-code as in Table 6. These codes are read by the consumer payment apps, and the users who have subscribed to the code-scanning payment services usually do not have hardware constraints to support such code format. If the code contains enough information to be distinguishable from other URL-based QR codes, and a so-called “bridge” would be implemented between the HUB of the Interoperability Framework of IPs at the POI and the Alipay backend, interoperability between these two kinds of merchant-presented codes could be achieved.

#### 4.6.3 EMVCo

EMVCo develops and maintains the EMV<sup>®</sup> QR-Code Specifications that include the Merchant-Presented Specification (MPM) and the Consumer-Presented Specification (CPM). The definition and clarity provided by the EMV<sup>®</sup> QR Code<sup>™</sup> Specifications enable merchants to accept QR-code payment solutions from various providers in a standardised manner, using a single QR-code.

The following tables illustrates different implementation choices to support payload for merchant-presented QR-codes for IPs. Note: a “default” / “dummy: value of “0” for unused mandatory data fields defined in the EMV specifications is included; another clearly defined default value may be used.

Data Object	ID	Format	Value
Payload Format Indicator	"00"	n	"01"
Merchant Account Information	"26"	ans	As defined by MSCT
	Globally Unique ID	"00" ans	As defined for MSCT provider, for instance, "com.provider.msct"
	Payload Issuer	"01" an	
	Token	"02" an	
Merchant Category Code	"52"	n	"0"
Transaction Currency	"53"	n	"0"

Transaction Amount	"54"	ans	"0"
Country Code	"58"	ans	"0"
Merchant Name	"59"	ans	"0"
Merchant City	"60"	ans	"0"
Cyclic Redundancy Check (CRC)	"63"	ans	"####"

Table 14: EMVCo mapping of Payload of IP QR-code containing a token

Data Object	ID	Format	Value
Payload Format Indicator	"00"	n	"01"
Merchant Account Information	"26"	ans	As defined by MSCT
	Globally Unique ID	"00" ans	As defined for MSCT provider, for instance, "com.provider.msct"
	Payload Issuer	"01" an	
	Proxy Payee	"03" an	
	Proxy Payee Reference Party	"09" an	
	Remittance information structured or Remittance information unstructured	"04" an	
	Type of payment instrument	"07" an	SCT or SCT Inst

Merchant Category Code	"52"		n	
Transaction Currency	"53"		n	
Transaction Amount	"54"		ans	
Merchant Name	"59"		ans	As defined for Name payee (account holder)
Additional Data Field Template	"62"		s	
	Purpose of Transaction	"08"	ans	As defined for Purpose of credit transfer (includes e.g. merchant transaction identifier)
Country Code	"58"		ans	"0"
Merchant Name	"59"		ans	"0"
Merchant City	"60"		ans	"0"
Cyclic Redundancy Check (CRC)	"63"		ans	"####"

Table 15: EMVCo mapping of Payload of IP QR-code containing a proxy

Data Object	ID	Format	Value	
Payload Format Indicator	"00"	n	"01"	
Merchant Account Information	"26"	ans	As defined by MSCT	
	Globally Unique ID	"00"	ans	As defined for MSCT provider, for instance, "com.provider.msct"
	Payload Issuer	"01"	an	
	Remittance information structured or Remittance	"03"	an	

	information unstructured			
	Trade name	"05"	an	
	IBAN Payee	"06"	an	
	Type of payment instrument	"07"	an	SCT or SCT inst
	Name of Payee reference party	"08"	an	
Merchant Category Code	"52"		n	
Transaction Currency	"53"		n	
Transaction Amount	"54"		ans	
Additional Data Field Template	"62"		s	
	Purpose of Transaction	"08"	ans	As defined for Purpose of credit transfer (includes e.g. merchant transaction identifier)
Country Code	"58"		ans	"0"
Merchant Name	"59"		ans	"0"
Merchant City	"60"		ans	"0"
Cyclic Redundancy Check (CRC)	"63"		ans	"####"

Table 16: EMVCo mapping of Payload of IP QR-code containing all data "in clear"

Data Object	ID	Format	Value
Payload Format Indicator	"00"	n	"01"
Merchant Account Information	"26"	ans	As defined by MSCT

	Globally Unique ID	"00"	ans	As defined for MSCT provider, for instance, "com.provider.msct"
	URL	"07"	Ans	As defined by MSCT for accessing provider
Merchant Category Code	"52"		n	"0"
Transaction Currency	"53"		n	"0"
Transaction Amount	"54"		ans	"0"
Country Code	"58"		ans	"0"
Merchant Name	"59"		ans	"0"
Merchant City	"60"		ans	"0"
Cyclic Redundancy Check (CRC)	"63"		ans	"####"

**Table 17: EMVCo mapping of URL for retrieving payload from server**

The mapping shown in the tables above could potentially be used in the future if EMVCo QR-code based card payments would be supported by merchants throughout SEPA and there is a business incentive to combine multiple mobile payment solutions (e.g., IPs at the POI and card-based payments) in a single (EMVCo) QR-code.

#### 4.6.4 EPI

The European Payments Initiative (EPI) is currently specifying a solution for card and account-based payments. For proximity payments at the POI, they consider the usage of QR-codes, both in merchant-presented and consumer-presented modes, which are URL based. However, currently, there is no further information available on the format and coding of these QR-codes.

#### 4.7 International standardisation of QR-codes for IPs at the POI

It would be beneficial in view of a wide usage and market adoption of the QR-codes for IPs that the QR-code specifications for IPs undergo a public consultation and afterwards become an International Standard.

As a first step, the QR-code standard should be generalised to cover all payment contexts (C2B, P2P, B2B, invoices). Next, an 8-week or 3-month public consultation on the QR-code standard should be held in Q1 2022. This could be set up through the EPC website.

After processing the comments received through this public consultation, a final version of the QR-code standard should be prepared by the MSG MSCT and published on the EPC website, subject to EPC Board approval in Q2 2022 and also integrated into the MSCT IG.

Next, the final QR-code standard should be submitted to an International Standards Body such as ISO TC 68 – Financial services or CEN.

Both standardisation organisations have a so-called “fast track procedure” which enables a quicker standardisation process. Note also that ISO TC 68 is already developing a standard on “Code-scanning payment security”, which includes the usage of QR-codes for payments.

An overview of the different milestones in the proposed process for the standardisation of QR-codes for IPs at the POI is shown in the figure below.

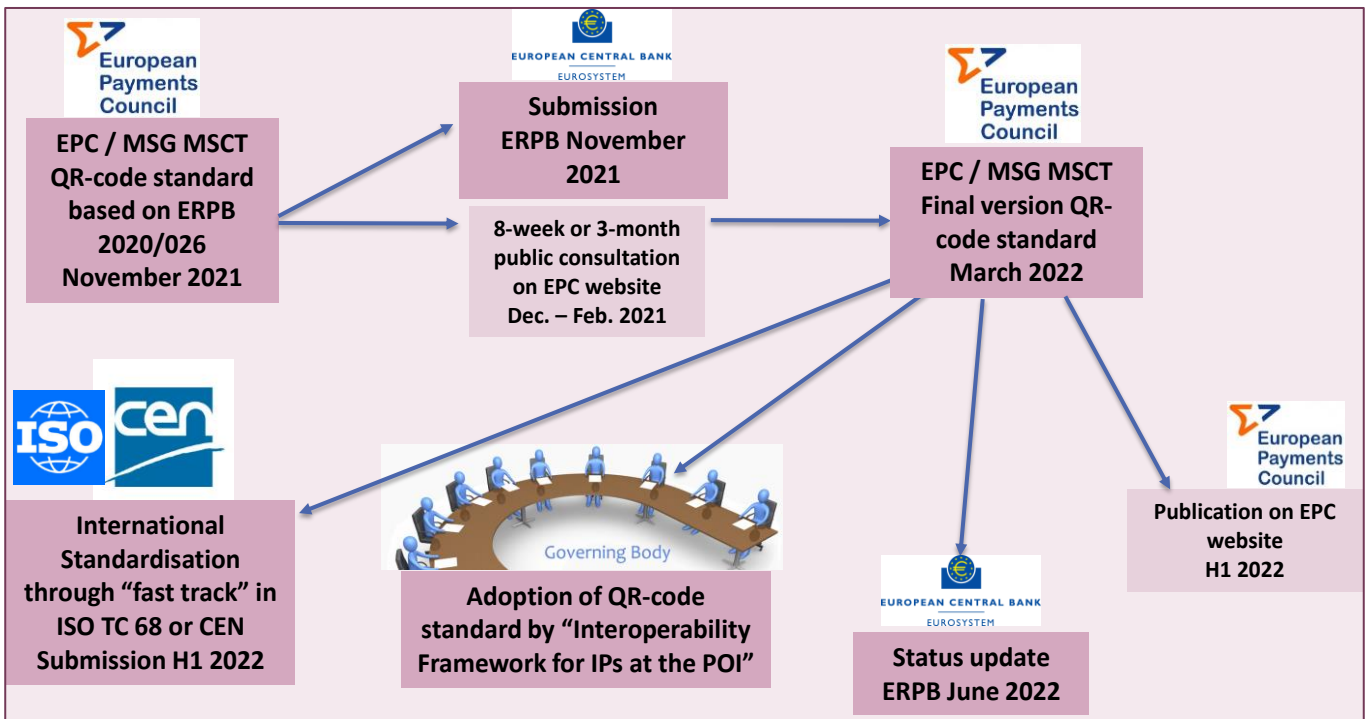


Figure 2: Standardisation process for QR-codes for IPs at the POI

## 5. Governance requirements for IP service providers in the context of QR-codes for IPs at the POI

### 5.1 Interoperability framework for IPs at the POI

The report ERP/2020/026 [10] developed by the ERP WG on an Interoperability framework for IPs at the POI identifies, next to the technical and security requirements related to interoperability based on the generic model depicted in Figure 1, also the need for the establishment of a Governance Body for this Interoperability Framework. The document even included a description of a possible model for the framework governance as shown in the figure below.

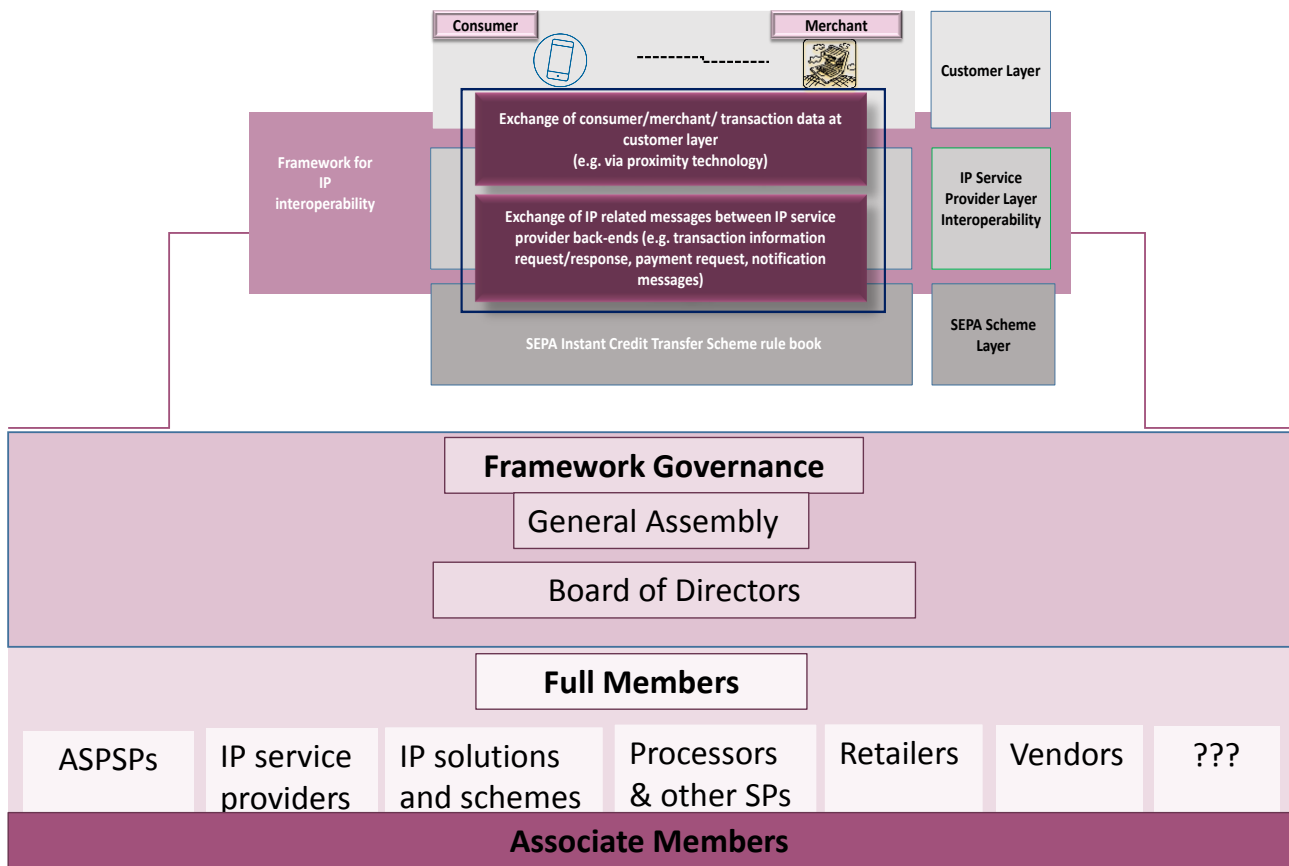


Figure 3: Possible model for Governance of Interoperability Framework for IPs at the POI

The next sections concerning the governance requirements for IP service providers in the context of the usage of QR-codes include several references to this Interoperability Framework Governance Body.

### 5.2 Registration of IP service providers

In order to assign an IP service provider ID to operate under the Interoperability Framework as specified in Chapter 4, there is a need for registering these IP service providers and maintaining a dedicated directory of these registrations and IDs issued. Since these IP service providers need to adhere to the requirements specified in the document ERPB/2020/026 [10], an eligibility check needs to be done before IP service providers that would be entitled to apply for a registration. This eligibility check should be governed as part of the overall Governance, including rights, obligations, liability and dispute handling, of the Interoperability Framework for IPs at the POI, operated by a so-called Governance Body. After a positive eligibility check, the Governance Body of the Interoperability Framework for IPs at the POI would issue an “Approval for registration” to the IP service provider. Next, the IP service provider needs to register with this “Approval for registration” to the Registration Authority for receiving an IP service provider ID. The Registration Authority, responsible for the issuance of the IP service provider IDs, could be operated by an independent body (see section 5.3). The figure below depicts the different steps that would be involved in the registration of IP service providers and the issuance of an IP service provider ID.

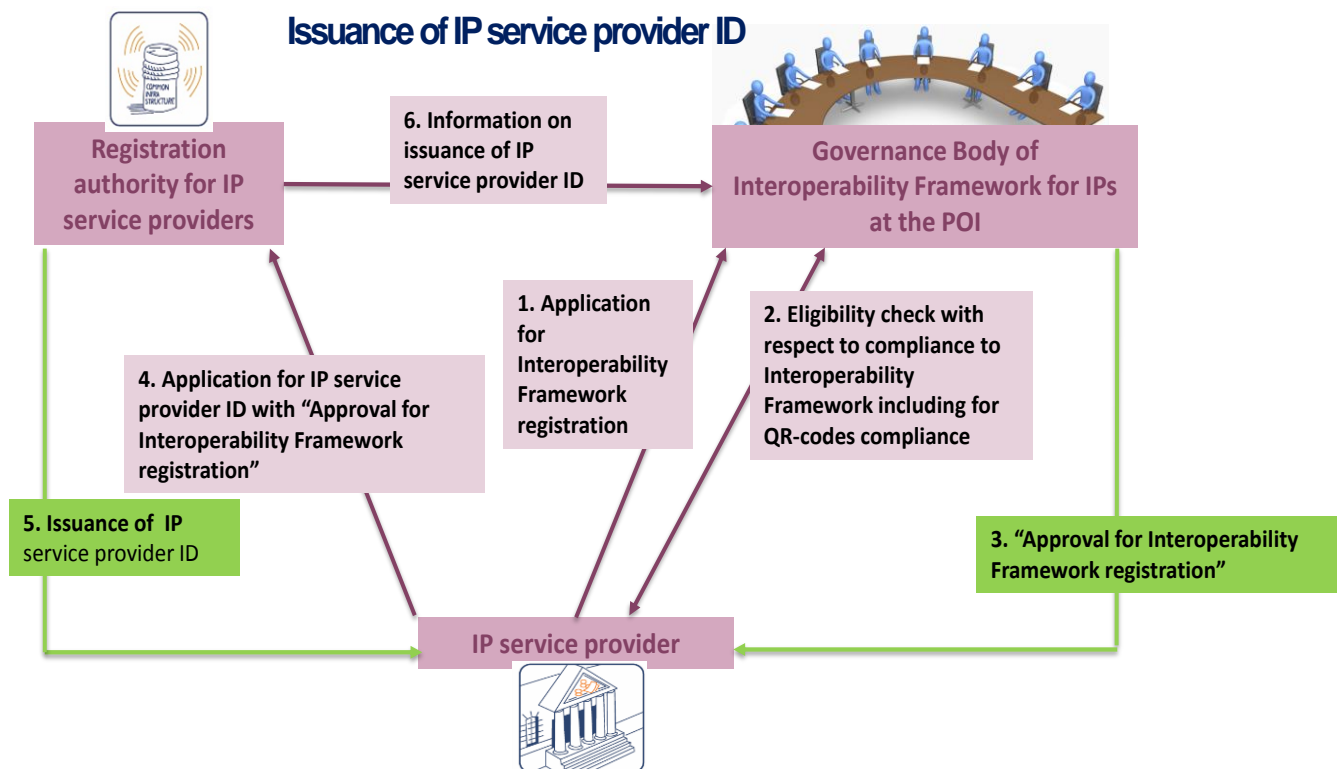


Figure 4: Governance and registration of IP service providers



### 5.3 Establishment of Registration Authority for IP service providers

The registration authority responsible for the issuance of the IP service provider ID and the management of the registry could be operated by an independent body, a so-called third party. This body could either be contracted by the Governance Body of the Interoperability Framework or could be a body nominated by an International Standardisation Body such as ISO TC 68 or CEN.

### 5.4 Eligibility criteria for IP service providers

The requirements for IP service providers would need to be defined under the Interoperability Framework for IPs at the POI and shall be based on this report, the document ERP/2020/026 [10] and the additional interoperability requirements for unsuccessful and R-transactions specified in the 2nd release of the MSCT IG (see EPC269-19v1.14 [7]). Those IP service provider requirements include, next to technical and security requirements, also adherence to IP interoperability rules and procedures.

These requirements shall form the basis for the specification of the eligibility criteria for IP service provider under the Interoperability Framework for IPs at the POI.

## 6. Conclusions and recommendations

This document specifies a QR-code standard for IPs at the POI, hereby covering two modes: merchant-presented QR-codes and consumer-presented QR-codes, to contribute to the interoperability of such payments. The standard is based on ERPB 2020/026 [10] and the MSCT IG [7], but takes into account the EBA answers on Q&A 2020\_5476<sup>18</sup> and 2020\_5477<sup>19</sup>. It further contains a brief description of the governance aspects related to the usage of QR-codes, which should become part of the overall Governance of an Interoperability Framework for IPs at the POI. The latter involves also the establishment of a so-called Registration Authority for the issuance of IP service provider identifiers.

The MSG MSCT wishes to make the following recommendations regarding the next steps for the standardisation of QR-codes for IPs at the POI:

#	Addressee	Rationale	Recommendation	Dead-line
A	MSG MSCT <sup>20</sup>	To develop a generic QR-code standard for all MSCT payment contexts that is widely adopted by the market	<ul style="list-style-type: none"> <li>Extend the current QR-code standard specifications to a “generic QR-code standard” for MSCTs that covers also all other MSCT payment contexts (P2P, B2C, B2B and invoices) and both SCT Inst and SCT.</li> <li>To launch a public consultation on this “generic QR-code standard” for MSCTs.</li> </ul>	Dec. 2021  Q1 2022  Q1 2022

<sup>18</sup> See [https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020\\_5476](https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020_5476)

<sup>19</sup> See [https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020\\_5477](https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020_5477)

<sup>20</sup> Subject to the approval of the Extension of the mandate of the MSG MSCT by the EPC Board in November 2020.

			<ul style="list-style-type: none"> <li>To prepare and publish a final version of the “generic QR-code standard” following this public consultation.</li> </ul>	
<b>B</b>	EPC	To ensure that the generic QR-code standard becomes a recognised International Standard available for wide market adoption	To submit the final version of the “generic QR-code standard” in an appropriate format through a fast track procedure to an International Standardisation Body such as TC 68 SC 9 or CEN	Q2 2022
<b>C</b>	The to be established Interoperability Framework for IPs at the POI	Adoption of the QR-code standard and governance by a dedicated Interoperability Framework for IP at POI solutions.	The proposal is that the QR-code standard specified in this document is adopted by a “to be established” Interoperability Framework for IPs at the POI and that the related governance of IP service providers become part of the overall Governance of this Interoperability Framework.	In due time (2022 <sup>21</sup> )

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<sup>21</sup> Pending ERPB decision on the Interoperability Framework for IPs at the POI

## Annex 1: Examples of interoperability process flows

This annex provides two examples of process flows when QR-codes are used for IPs at the POI:

- The merchant-presented QR-code contains a (merchant) token;
- The consumer-presented QR-code contains a (consumer) token;

which have been described in detail in the report ERP/2020/026 [10].

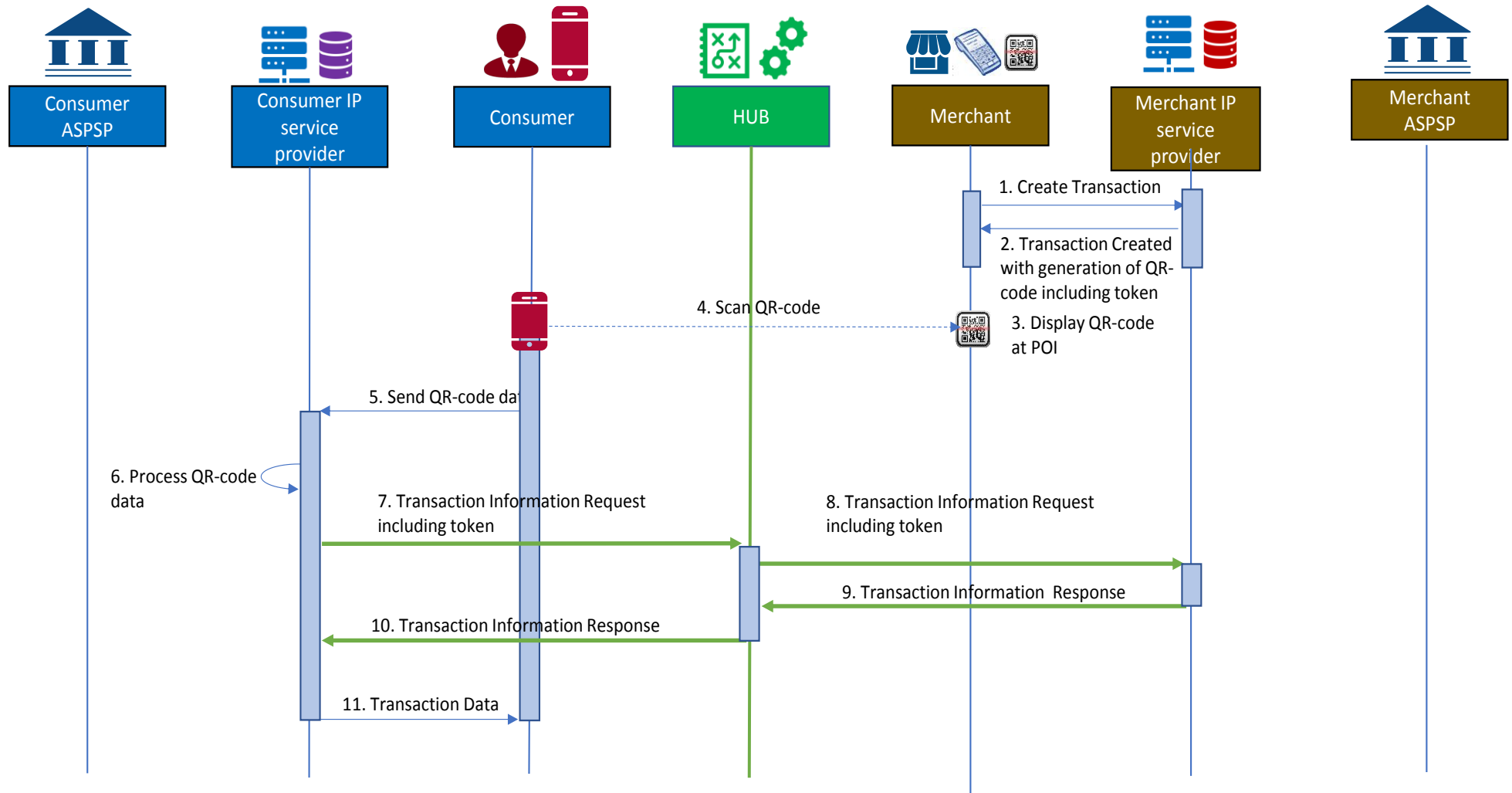
These examples are intended to illustrate the process flows between the different actors involved in the payment transaction. Examples covering some other cases with respect to the QR-code content specified in Chapter 4 may be found in the report ERP/2020/026 [10].

### A1.1 Process flow for merchant-presented QR-code containing a token

The detailed process flows between the different actors involved in this IP transaction are shown in the next figure. Hereby the token contained in the merchant-presented QR-code is sent by the consumer IP service provider to the merchant IP service provider (over the HUB) in the Transaction Information Request message to obtain the merchant and transaction data to enable the initiation of the IP. Note that it is hereby assumed that the merchant IP service provider fulfils the role of Token Service Provider for the merchant. The merchant IP service provider ID (retrieved from the merchant-presented QR-code and contained in the Transaction Information Request message) is used by the HUB to route the Transaction Information Request message to the merchant IP service provider.

A detailed description for each of the steps may be found in section 6.1 in ERP/2020/026 [10].

Note that if the merchant-presented QR-code would contain all the merchant-presented data “in clear”, steps 7 to 10 would be omitted.



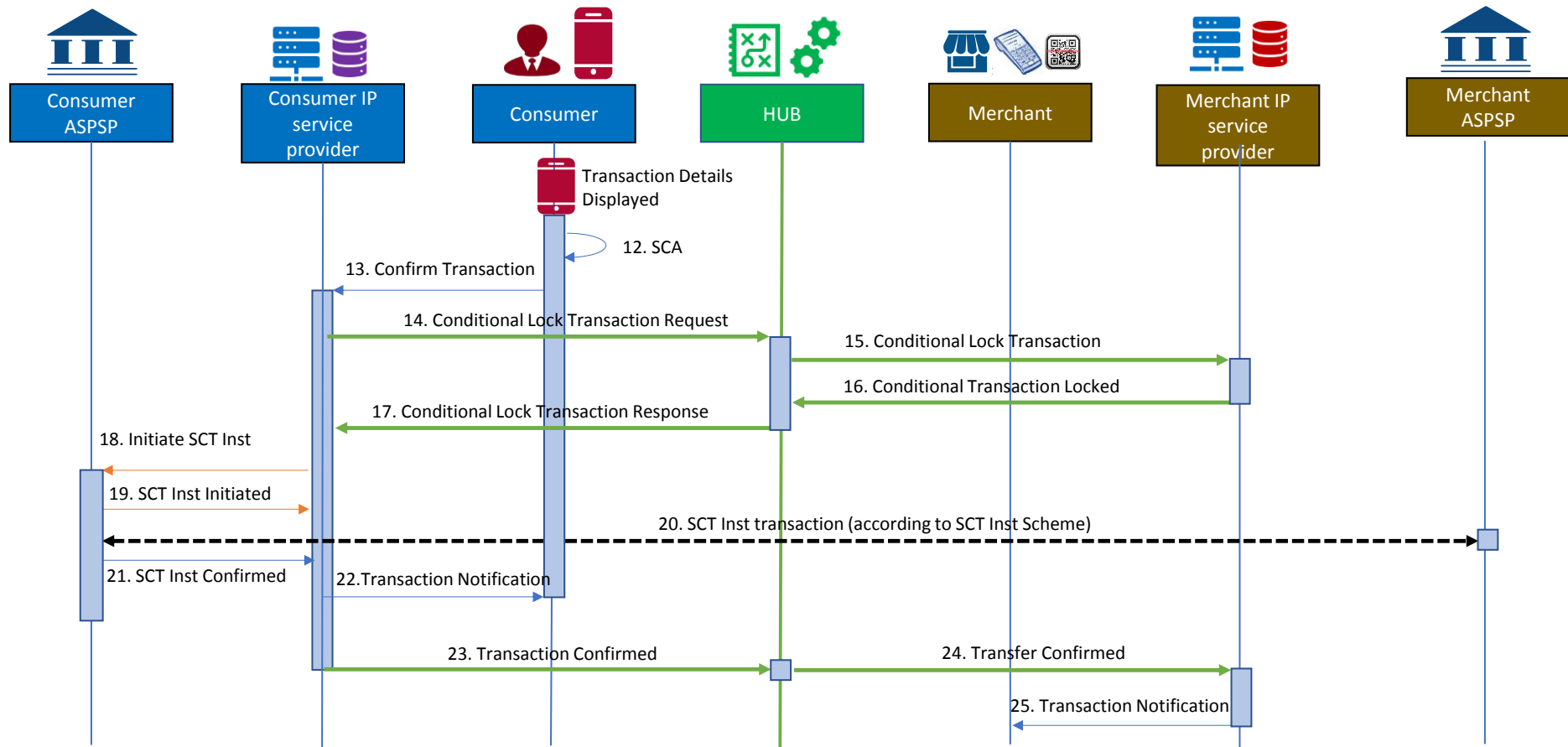


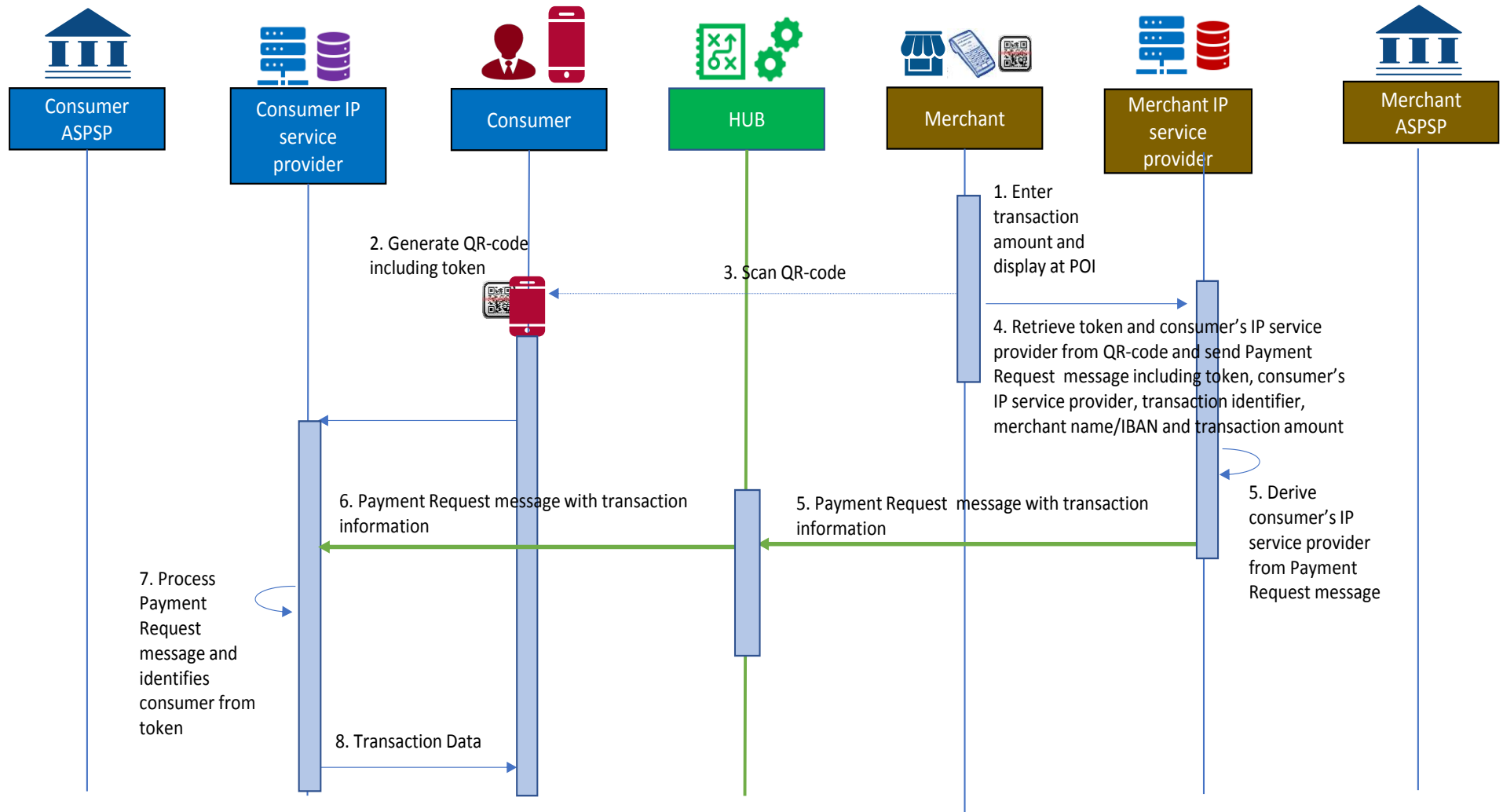
Figure 5: Process flow - Merchant-presented QR-code with token

### A1.2 Process flow for consumer-presented QR-code containing a token

The detailed process flows between the different actors involved in this IP transaction are shown in the next figure. Hereby the token contained in the consumer-presented QR-code is sent by the merchant IP service provider to the consumer IP service provider (over the HUB) in the Payment Request message, with the merchant and transaction data, to retrieve the consumer identification data to enable the initiation of the IP. Note that it is hereby assumed that the consumer IP service provider fulfils the role of Token Service Provider for the consumer. The consumer IP service provider ID (retrieved from the consumer-presented QR-code and contained in the Payment Request) is used by the HUB to route the Payment Request message to the consumer IP service provider. A detailed description for each of the steps may be found in section 6. in ERP/2020/026 [10].

A detailed description for each of the steps in this process flow may be found in ERP/2020/026 [10].

Note that if the consumer-presented QR-code would contain all the consumer identification data, these data would be put in clear in the Payment Request message but the different steps in the process flow below would remain the same.





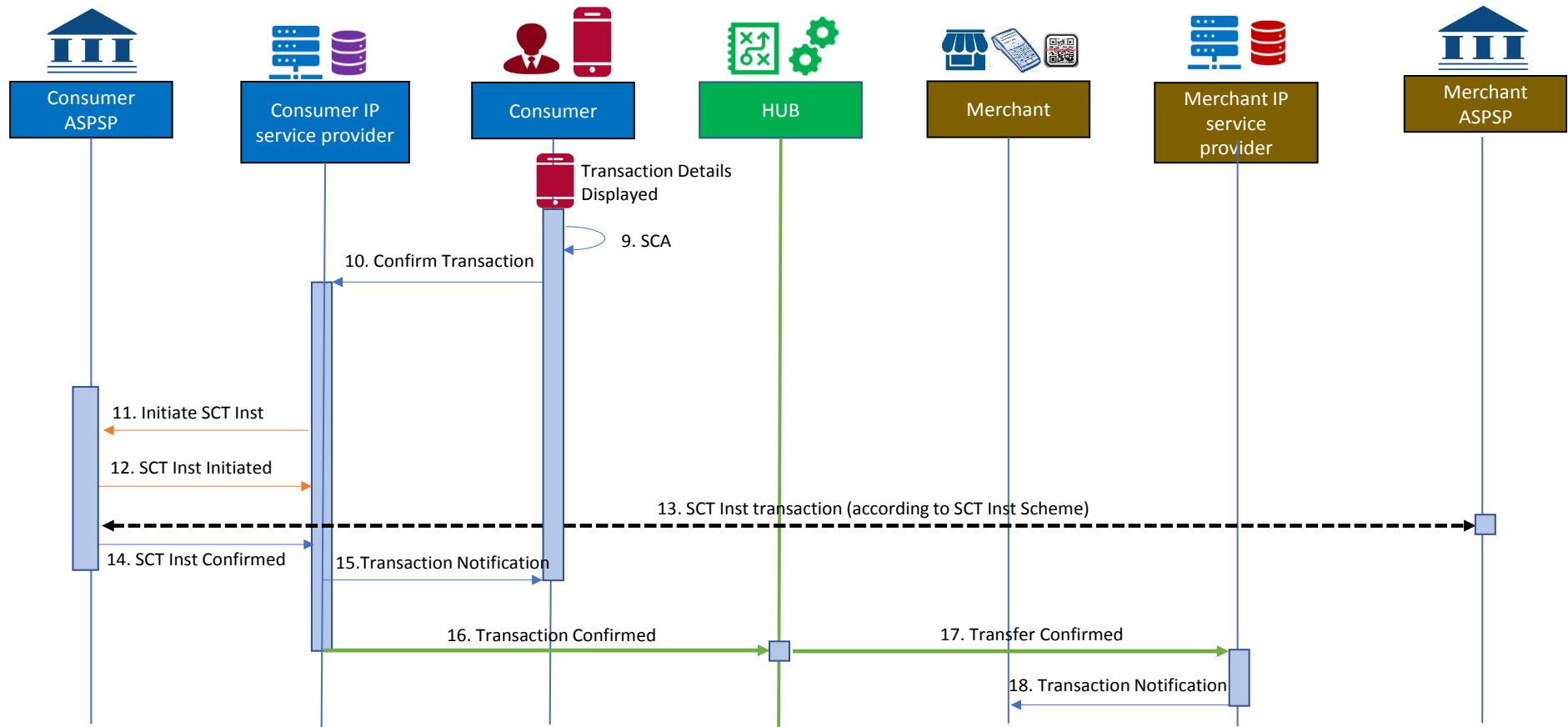


Figure 6: Process flow - Consumer-presented QR-code with token

## Annex 2: Potential additional options for consumer-presented QR-codes

The ERPB document on an Interoperability Framework for IPs at the POI (ERP/2020/026 [10]), included three options for the minimum data set for consumer-presented data to be included in the QR-code: a token as specified in section 4.3 in this document and the following two options:

- The consumer identification data consists of a CustomerID and IBAN;
- The consumer identification data consists of a CustomerID and IBAN-proxy.

Those resulted into the following options for the consumer-presented QR-code:

Alternative options for consumer-presented QR-code
<p><b>The consumer-presented data contains the CustomerID “in clear” and a proxy</b></p> <p>[Version]+[Type]+[Consumer IP Service Provider ID]+[CustomerID + IBAN-proxy] + [a clear-text name/value string]</p>
<p><b>The consumer-presented QR-code contains the CustomerID and IBAN “in clear”</b></p> <p>[Version]+[Type]+[Consumer IP Service Provider ID]+[CustomerID + IBAN] + [a clear-text name/value string]</p>

**Table 18: Alternative options for minimum data sets in consumer-presented QR-code**

However, those two options have been removed in this document in section 4.3, since the MSG MSCT<sup>22</sup> interpreted the EBA answer to question Q&A 2020\_5476<sup>23</sup> that states: “the

<sup>22</sup> With one diverging opinion by ETPPA, see footnote 12.

<sup>23</sup> See [https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020\\_5476](https://www.eba.europa.eu/single-rule-book-qa/qna/view/publicId/2020_5476)

*Customer ID cannot be included in a cleartext in a payer-presented QR-code for the initiation of credit transfers at the point of interaction without any security measures (e.g. encryption, tokenisation, transport layer security) ensuring its confidentiality during the QR-code lifecycle”, as applicable to all consumer-presented QR-codes, no matter who would generate them.*

However, further guidance on the interpretation of this EBA answer has been sought with the EBA, which may result in the future adoption of additional options for the minimum data set for consumer-presented QR-codes for IPs at the POI.

### Annex 3: List of participants to MSG MSCT Plenary

The following organisations have contributed to the development of this document through their participation in the Plenary of the multi-stakeholder group Mobile initiated SEPA (instant) Credit Transfers (MSG MSCT).

AIB on behalf of Banking & Payments Federation Ireland (BPMFI) - representing EPC
Bankin' - representing European Third Party Providers Association (ETPPA)
BEUC - European Consumer Organisation
BlueCode
BP
Carrefour - representing EuroCommerce
Circle K
Colruyt - representing EuroCommerce
Crédit Agricole - representing EPC
Crédit Mutuel - representing EPC
DnB Bank – representing EPC
EACT - European Association of Corporate Treasurers
EquensWorldline
Estonian Banking Association- representing EPC
EMPSA - European Mobile Payment Systems Association
Fiserv
Getswish
Huawei
Idemia - representing Smart Payment Association
IKEA - representing EuroCommerce
Intesa Sanpaolo on behalf of Italian Banking Association (ABI) – representing EPC
La Banque Postale - representing EPC
Mastercard
Millennium bcp – representing EPC
Monei

National Clearing House KIR
nexo
Nordea
OpenWay
Orange - representing GSMA
Payconiq
PPRO - representing European Third Party Providers Association (ETPPA)
Rabo bank - representing EPC
SIA S.p.A.
TAS Group
Thales – representing Smart Payment Association
Tink – representing European Third Party Providers Association (ETPPA)
Vipps
Visa
W3C
Eurosystem – as observer
European Central Bank (ECB) – as observer
European Commission – as observer

Table 19: The MSG MSCT Plenary

## Annex 4: List of participants MSG MSCT Work-Stream technical interoperability of QR-codes

The following organisations have contributed to the development of this document through their participation in Work-Stream technical interoperability of QR-codes of the multi-stakeholder group Mobile initiated SEPA (instant) Credit Transfers (MSG MSCT).

BP
BEUC - European Consumer Organisation
BlueCode
CEN
Crédit Mutuel - representing EPC
DnB Bank – representing EPC
EMPSA - European Mobile Payment Systems Association
ETTPA - European Third Party Providers Association
EMVCo
EPI – European Payments Initiative
Getswish
Idemia - representing Smart Payment Association
IKEA - representing EuroCommerce
Mastercard
Monei
nexo
Nordea
OpenWay
PPRO - representing European Third Party Providers Association (ETPPA)
SIA S.p.A.
Thales – representing Smart Payment Association
Tink – representing European Third Party Providers Association (ETPPA)
Vipps
Visa

Table 20: The MSG MSCT Work-Stream technical interoperability of QR-codes

The multi-stakeholder group further wishes to thank Alipay for their contributions delivered as input to this document.

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