EMVCo™

EMV®

QR Code Specification for Payment Systems (EMV QRCPS)

Merchant-Presented QR Guidance and Examples

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1 Introduction

1.1 Scope

This EMV Merchant QR Guidance and Examples document is provided to assist in the clarification and explanation of certain data objects within the *EMV QR Code Specifications for Payment Systems, Merchant-Presented Mode* [EMV MERCHANT QR]*, further referred to as merchant QR Code.

1.2 Audience

The intended audience for this document consists of parties involved in planning, implementing, deploying, or supporting the EMV merchant QR Code.

1.3 Normative References

The following standards contain provisions that are referenced in this specification. The latest version including all published amendments shall apply unless a publication date is explicitly stated.

Table 1-1: Normative References

Reference	Publication Name
[EMV MERCHANT QR]	*EMV QR Code Specifications for Payment Systems, Merchant-Presented Mode, version 1.0*

1.4 Notational Conventions

1.4.1 Abbreviations

The abbreviations listed in Table 1-2 are used in this specification.

Table 1-2: Abbreviations

Abbreviation	Description
CRC	Cyclic Redundancy Check
POI	Point-of-Interaction

2 Overview

As defined in [EMV MERCHANT QR], the merchant QR Code enables consumers to make purchases using a merchant generated and displayed QR Code based on the merchant's details. That specification defines the requirements on the QR Code displayed by the Merchant, including format and content. The processing by the consumer QR application is outside the scope of EMV.

This document provides guidance on how the consumer QR application reading the Merchant QR Code should process the QR Code data objects. It clarifies the purpose of some QR Code data objects, their intended use, the expected consumer QR application processing, and the expected payment network processing.

A variety of examples outlining the consumer transaction experience are provided in order to help illustrate each consumer experience.

This document is non-normative and merely provides guidance on the intended use of the data objects described.

3   Examples

This section provides a number of examples for different scenarios in which merchant QR Codes could be used, and describes the corresponding transaction experience for each scenario.

Each example is intended to clarify how certain merchant QR Code data objects are intended to be used, how those data objects are interpreted by the consumer mobile phone, and the resulting transaction experience.

Important: *Examples after the initial base example will only describe the points in the transaction experience that differ from the base example, with one exception: the Transaction Amount is not present in the base example but may be present in subsequent examples without description. The Transaction Amount is present in many examples, so excluding its description from subsequent examples avoids unnecessary redundancy.*

Section	Example Name	Description
3.1	Base Example	A basic merchant QR Code used in simple purchases with no additional services.
3.2	Transaction Amount Provided Example	A merchant QR Code containing the transaction amount, used at merchant POIs capable of displaying a different merchant QR Code for each transaction.
3.3	Multiple Payment Network Example	A merchant QR Code containing both an EMV payment network and a non-EMV payment network.
3.4.1	Fixed Convenience Fee Example	A merchant QR Code containing a fixed value convenience fee.
3.4.2	Prompt for Tip Example	A merchant QR Code that causes the consumer QR application to prompt the consumer to input a tip amount.
3.4.3	Convenience Fee Percentage Example	A merchant QR Code containing a convenience fee calculated as a percentage of the transaction amount.
3.5	Additional Data Field Examples	Describes the data objects that are contained within the Additional Data Field template.
3.5.1	Merchant Prompts for Additional Data Example	A merchant QR Code containing a value for the Loyalty Number that causes the consumer QR application to prompt the consumer to input the Loyalty Number.
3.6	Alternate Language Example	A merchant QR Code containing the Merchant Name in an alternate language.

While some data objects appear in multiple examples, explanation of those data objects are only provided for the first occurrence of a data object in an example.

Important: *The consumer mobile phone processing shown in this document are examples and are non-normative. Additionally, the examples are primarily intended to clarify the behavior of certain data objects, and not all processing necessary by the consumer mobile phone to process a merchant QR Code is described. In the field, many of the examples described can be combined to be suited to completely new scenarios.*

3.1 Base Example

This base example describes the use of a basic merchant QR Code. A basic merchant QR Code can be used in simple purchases with no additional service, such as convenience fees or tips, in a merchant supporting one payment network. This example includes only the mandatory data objects required in the merchant QR Code.

In this example, the merchant QR code is commonly displayed on a sticker or poster, and the Transaction Amount is likely absent from the merchant QR code.

The data in this QR Code is most suitable for a merchant location or segment where interactions between the consumer and the merchant are basic, and the merchant location does not use a digital display, such as a coffee cart with relatively low traffic.

The following data objects are intended to be used and processed:

- Payload Format Indicator
- Merchant Account Information
- Merchant Category Code
- Transaction Currency
- Country Code
- Merchant Name
- Merchant City

The following table defines the data payload for this base example.

Table 3-1: Base Example Data Payload

Data Object	ID	Format	Example Value
Payload Format Indicator	"00"	N	"01"
Merchant Account Information	"02"	ans	"4000123456789012"
Merchant Category Code	"52"	N	"5251"
Transaction Currency	"53"	N	"840"
Country Code	"58"	ans	"US"
Merchant Name	"59"	ans	"ABC Hammers"
Merchant City	"60"	ans	"New York"
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.1: Base Example Transaction Experience
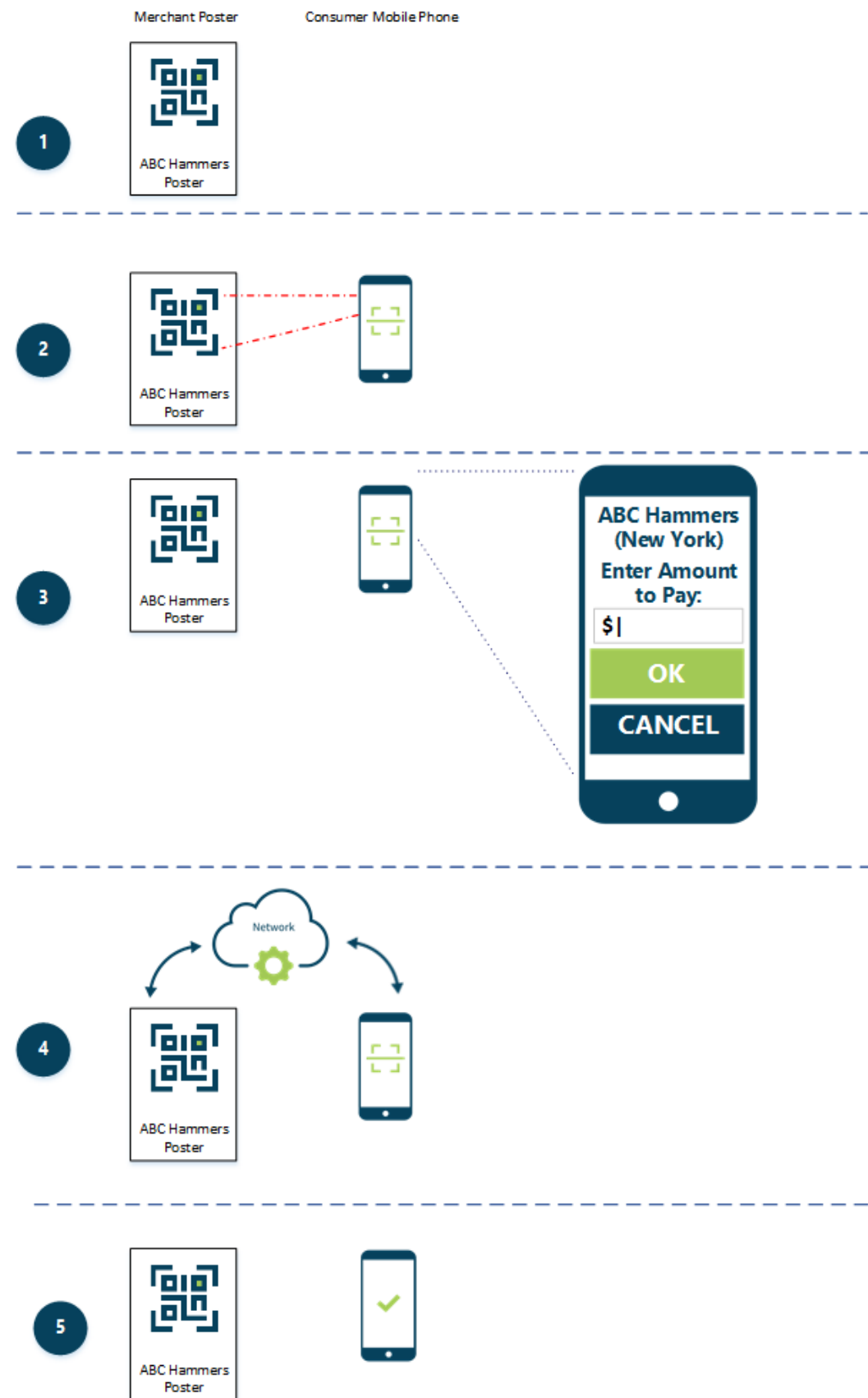
The following describes key points in the transaction experience pictured above.

1. The consumer uses their mobile phone to scan the merchant QR Code poster.

2. The consumer QR application supports the payload format indicated by the Payload Format Indicator and proceeds with recovering the data objects from the QR Code.

The consumer QR application uses the Merchant Account Information to select the payment card to be used to complete the transaction.

3. The consumer QR application displays the Merchant Name, Merchant City, and Transaction Currency to the consumer, and prompts the consumer to enter a Transaction Amount.

Important: *The consumer QR application should use the currency code read from the merchant QR Code for the transaction, and should not use any default currency code that may be present in the QR application.*

4. Once the consumer inputs the Transaction Amount and confirms payment, the consumer QR application sends the Merchant Account Information, Transaction Currency, Transaction Amount, and other data (for example, consumer payment information) to the network.

5. Once the transaction is successfully completed by the network, payment confirmations are sent to the merchant POI and the consumer mobile phone.

Important: *Network processing is outside the scope of the EMV QR Code Specifications for Payment Systems.*

3.2 Transaction Amount Provided Example

If the merchant POI includes a digital display that is capable of displaying a different merchant QR Code for each transaction, the merchant QR Code likely contains the Transaction Amount.

This enables the merchant to be in control of the Transaction Amount, improves the consumer experience, and reduces the transaction time and possibility for input error by not requiring the consumer to enter the Transaction Amount.

The following additional data object is intended to be used and processed:

- Transaction Amount

The following table defines the data payload for this example.

Table 3-2: Transaction Amount Provided Data Payload

Data Object	ID	Format	Example Value
Payload Format Indicator	"00"	N	"01"
Merchant Account Information	"02"	ans	"4000123456789012"
Merchant Category Code	"52"	N	"5251"
Transaction Currency	"53"	N	"840"
Transaction Amount	"54"	ans	"10"
Country Code	"58"	ans	"US"
Merchant Name	"59"	ans	"ABC Hammers"
Merchant City	"60"	ans	"New York"
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.2: Transaction Amount Provided Transaction Experience
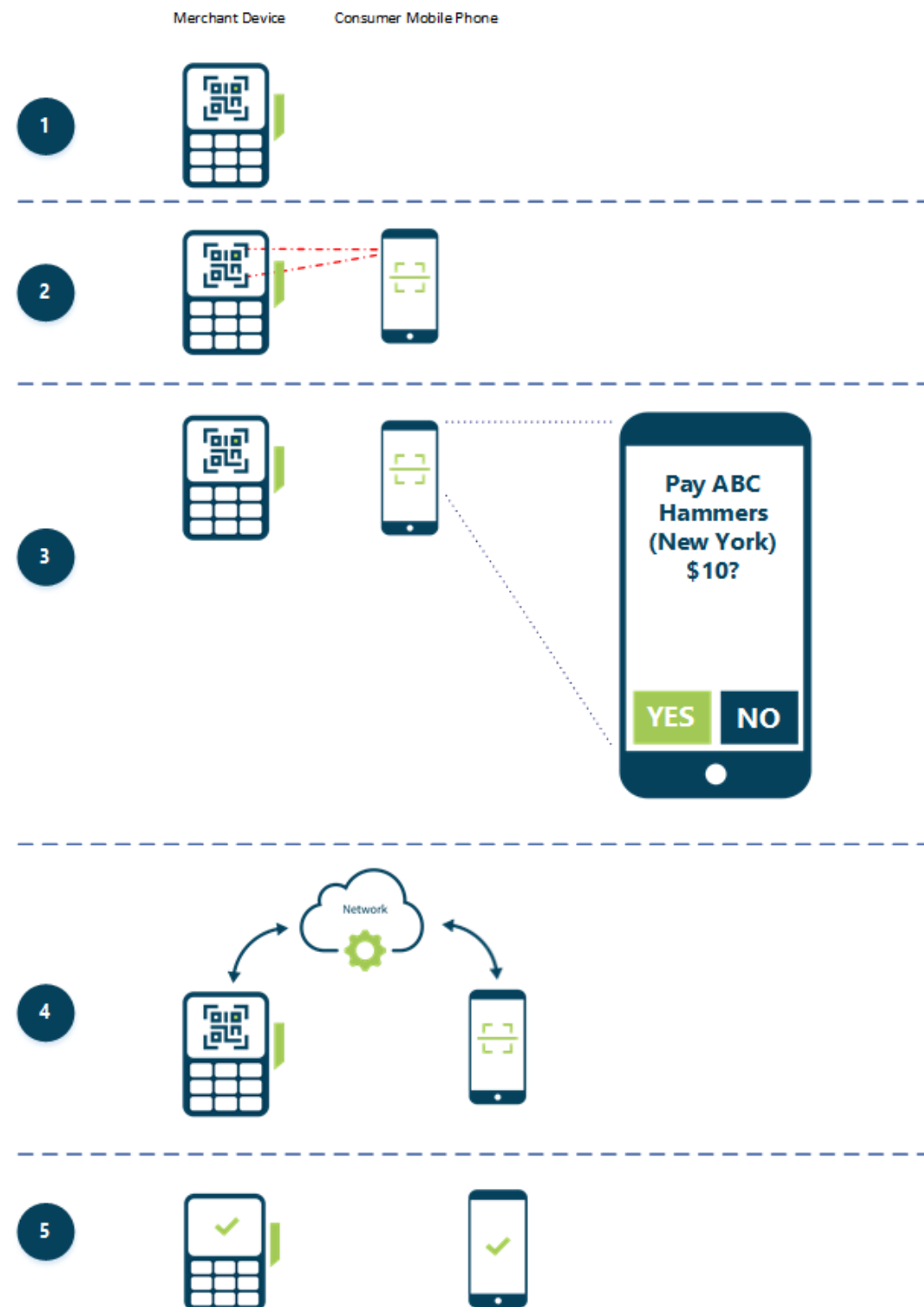
The following describes key points in the transaction experience pictured above.

1. After the consumer checks out, the merchant POI generates and displays the dynamic merchant QR Code based on the data payload defined for this example.

2. The consumer uses their mobile phone to scan the merchant QR Code.

The consumer QR application supports the payload format indicated by the Payload Format Indicator and proceeds with recovering the data objects from the QR Code.

The consumer QR application uses the Merchant Account Information to select the payment card to be used to complete the transaction.

3. The consumer QR application uses the Merchant Name, Merchant City, Transaction Currency, and Transaction Amount to display a payment confirmation prompt to the consumer.

Important: The consumer QR application should use the currency code read from the merchant QR Code for the transaction, and should not use any default currency code that may be present in the QR application.

Important: The consumer QR application should not allow the consumer to alter the Transaction Amount. If the Transaction Amount is altered, then the merchant would receive a different amount than expected.

4. Once the consumer confirms payment, the consumer QR application sends the Merchant Account Information, Transaction Currency, Transaction Amount, and other data (for example, consumer payment information) to the network.

5. Once the transaction is successfully completed by the network, payment confirmations are sent to the merchant POI and the consumer mobile phone.

Important: Network processing is outside the scope of the EMV QR Code Specifications for Payment Systems.

3.3 Multiple Payment Network Example

This example demonstrates how both an EMV payment network and a non-EMV payment network may co-exist on the same merchant QR Code. For the purposes of the merchant QR Code, a "non-EMV payment network" is one that does not have a primitive Merchant Account Information ID in the range "02" to "25".

In this example, the merchant supports 2 payment networks: one payment network with Merchant Account Information in ID "02", and another payment network with Merchant Account Information in ID "26". The second payment network may, for example, be a domestic QR program.

This example illustrates how the following data object is intended to be used and processed:

- Merchant Account Information

The following table defines the data payload for this example.

Table 3-3: Multi-Network Data Payload

Data Object	ID	Format	Example Value
Payload Format Indicator	"00"	N	"01"
Merchant Account Information	"02"	ans	"4000123456789012"
Merchant Account Information	"26"	ans	Encapsulates the ID, Length, and Value of the two data objects that follow
• Globally Unique ID	"00"	ans	"D15600000000"
• Merchant ID	"01"	S	"A93FO3230QDJ8F93845K"
Merchant Category Code	"52"	N	"5251"
Transaction Currency	"53"	N	"840"
Transaction Amount	"54"	ans	"10"
Country Code	"58"	ans	"US"
Merchant Name	"59"	ans	"ABC Hammers"
Merchant City	"60"	ans	"New York"
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.3: Multi-Network Transaction Experience
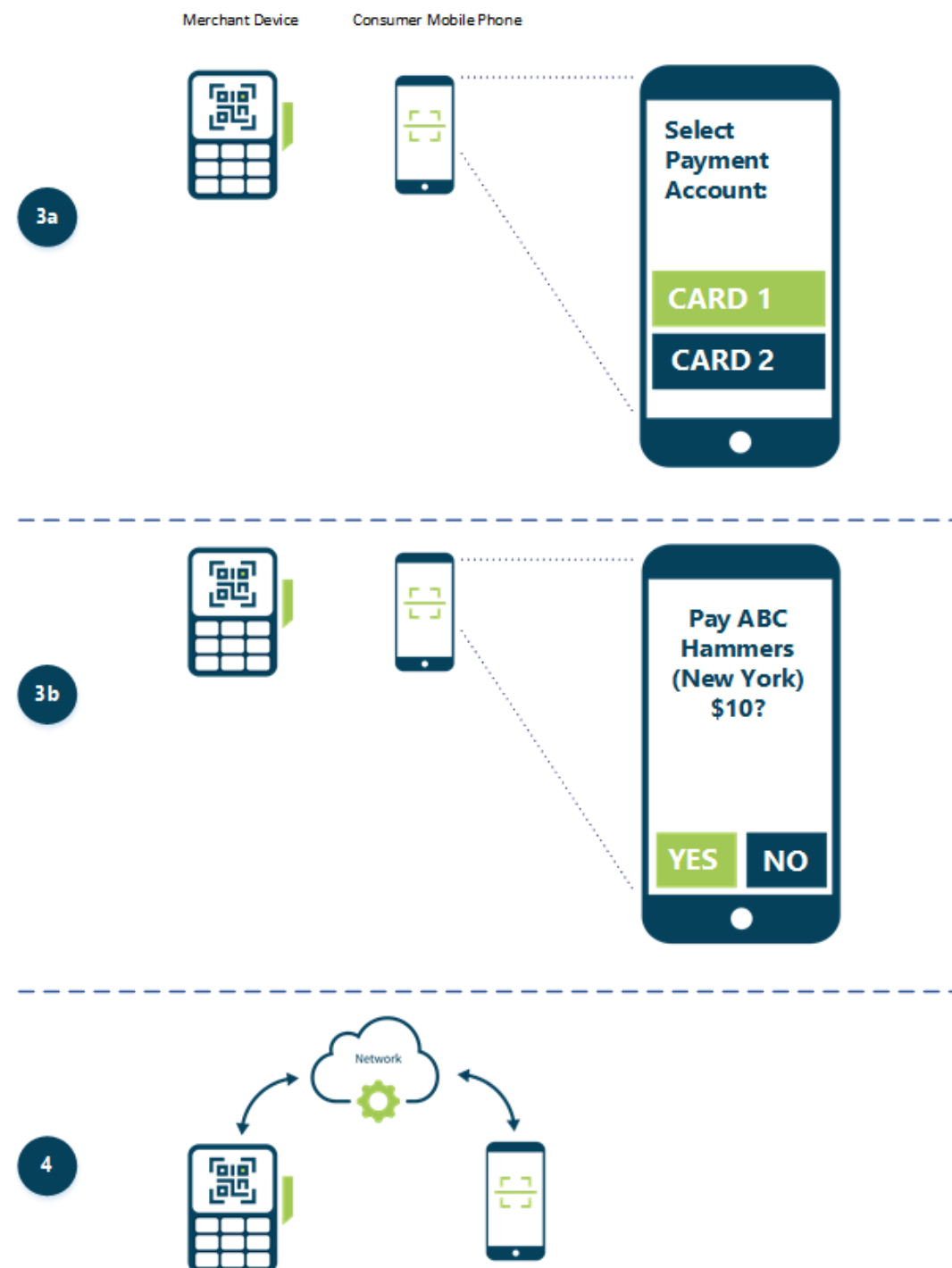
The following describes key points in the transaction experience pictured above.

3a. The consumer QR application identifies the presence of multiple – here two- instances of Merchant Account Information data objects and has payment cards for the payment networks indicated by these Merchant Account Information data objects. The consumer QR application prompts the consumer to select the payment card to be used to complete the transaction.

3b. The consumer QR application uses the Merchant Name, Merchant City, Transaction Currency, and Transaction Amount to display a payment confirmation prompt to the consumer.

4. Once the consumer confirms payment, the consumer QR application sends the Merchant Account Information*, Transaction Currency, Transaction Amount, and other data (for example, consumer payment information) to the network*.

(*) Corresponding to the payment card selected by the consumer in 3a.

3.4 Tip or Convenience Indicator Examples

This example demonstrates how the Tip or Convenience Indicator may be used in the merchant QR Code.

In some merchant environments, such as restaurants, tips are expected by the merchant. While the practicing of tipping varies by country and location, the tip amount is commonly at the discretion of the consumer.

Convenience fees may be used for a similar purpose, and may be applicable both for in-person transactions (for example, at a restaurant) and for e-commerce transactions (for example, when making a ticket purchase online). Unlike tips, convenience fees are set by the merchant, either as an explicit amount or as percentage of the Transaction Amount.

3.4.1 Fixed Convenience Fee Example

This example illustrates how the following data objects are intended to be used and processed:
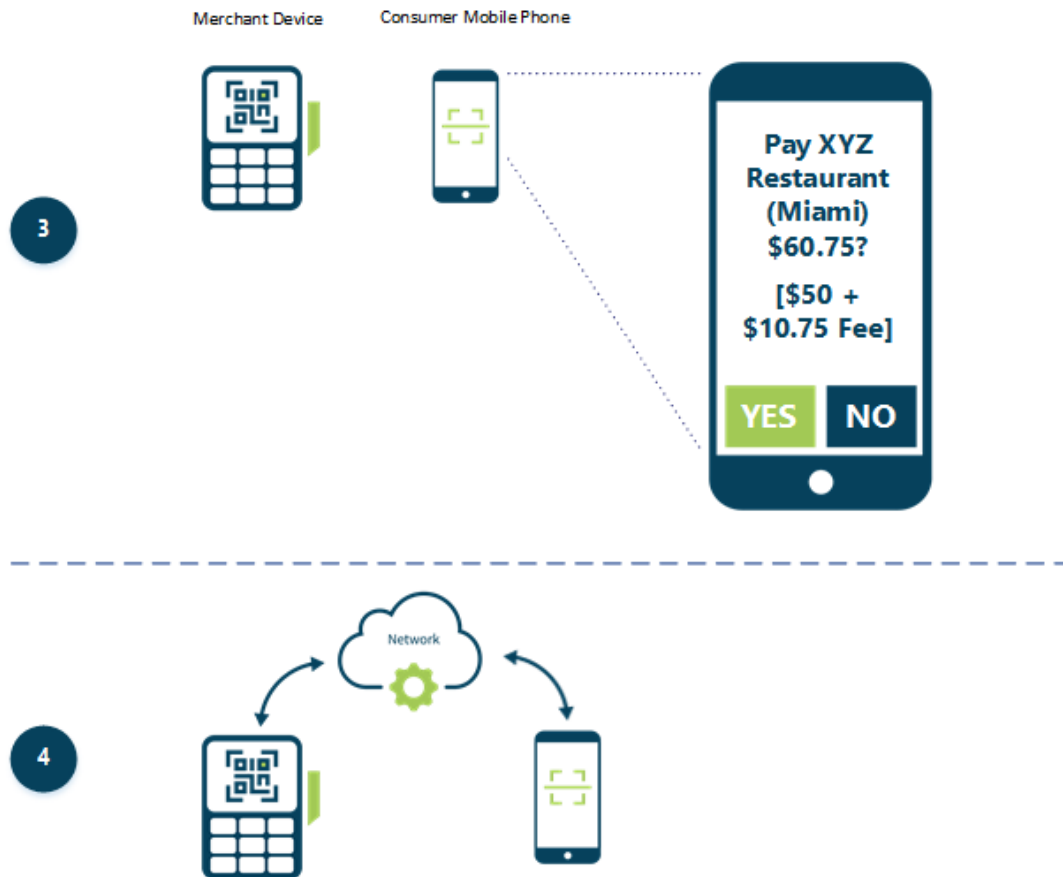
- Tip or Convenience Indicator
- Value of Convenience Fee Fixed

The following table defines the data payload for this example.

Table 3-4: Fixed Convenience Fee Data Payload

Data Object	ID	Format	Example Value
Payload Format Indicator	"00"	N	"01"
Merchant Account Information	"02"	ans	"4000123456789012"
Merchant Category Code	"52"	N	"5812"
Transaction Currency	"53"	N	"840"
Transaction Amount	"54"	ans	"50"
Tip or Convenience Indicator	"55"	N	"02"
Value of Convenience Fee Fixed	"56"	ans	"10.75"
Country Code	"58"	ans	"US"
Merchant Name	"59"	ans	"XYZ Restaurant"
Merchant City	"60"	ans	"Miami"
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.4: Fixed Convenience Fee Transaction Experience

The following describes key points in the transaction experience pictured above.

3. The consumer QR application uses the Merchant Name, Merchant City, Transaction Currency, Transaction Amount, Tip or Convenience Indicator, and Value of Convenience Fee Fixed to display a payment confirmation prompt to the consumer.

The amount displayed to the consumer ($60.75) is calculated by adding together the Transaction Amount ($50) and the Value of Convenience Fee Fixed ($10.75).

4. Once the consumer confirms payment, the consumer QR application sends the Merchant Account Information, Transaction Currency, final amount ($60.75), and other data (for example, consumer payment information) to the network.

Important: When the Tip or Convenience Indicator is present and indicates that a fixed convenience fee is to be charged, the consumer QR application should display that information to the consumer and automatically add the convenience fee to the Transaction Amount.

3.4.2 Prompt for Tip Example

This section provides an additional example for the Tip or Convenience Indicator data object. In this example, the Tip or Convenience Indicator is set to prompt the consumer to enter a tip amount.

Important: When the Tip or Convenience Indicator is present and indicates that the consumer should be prompted for a tip amount, the consumer QR application should allow the consumer to choose no tip.

The data payload for this example is as defined in Table 3-4, with the following changes:

Table 3-5: Prompt for Tip Data Payload

Data Object	ID	Format	Example Value
Tip or Convenience Indicator	"55"	N	"01"
Value of Convenience Fee Fixed	"56"	ans	NOT PRESENT
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.5: Prompt for Tip Transaction Experience
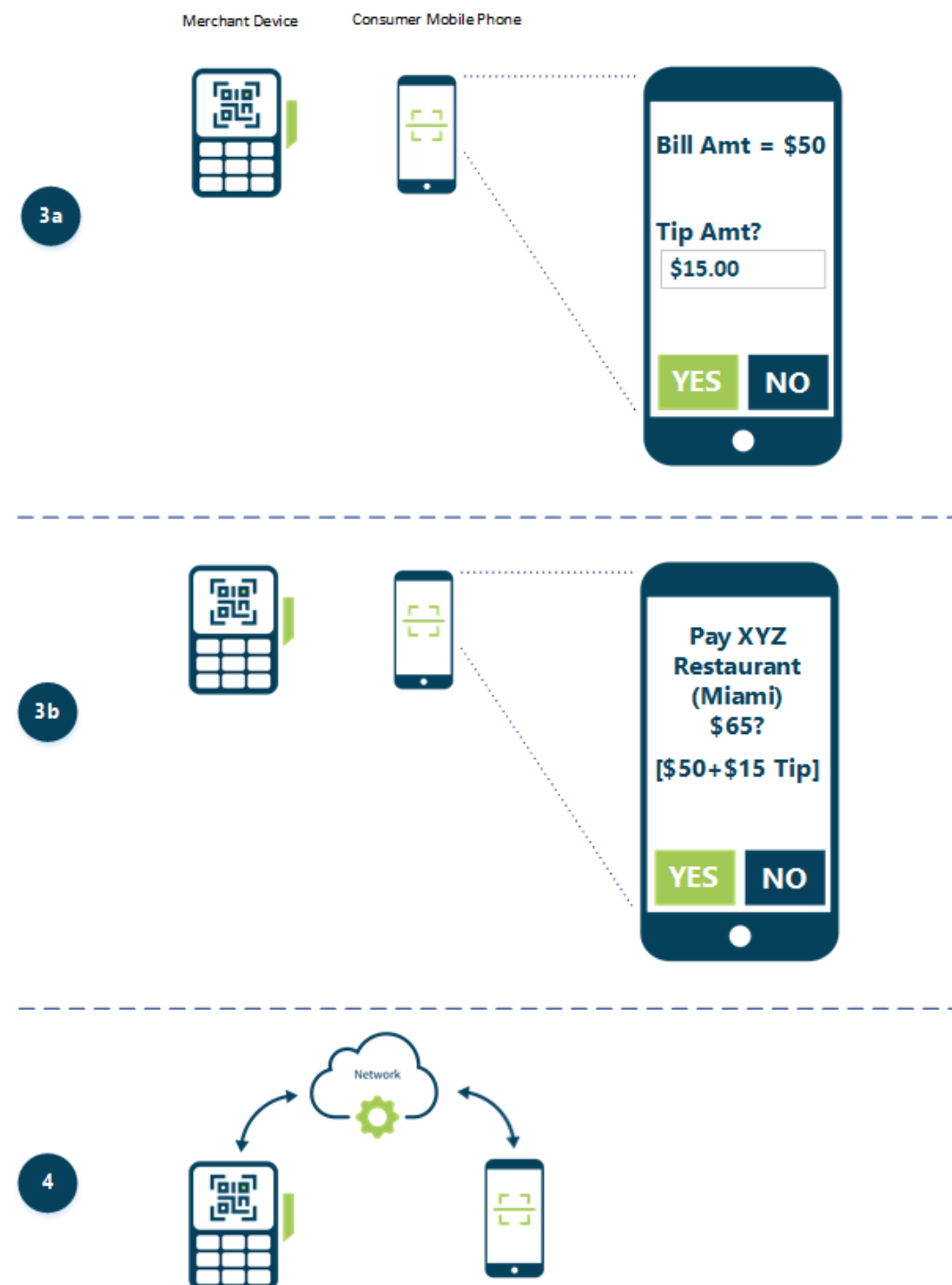
The following describes key points in the transaction experience pictured above for this example.

3a. The Tip or Convenience Indicator has the value "01", causing the consumer QR application to prompt the consumer to enter a tip amount. The consumer enters a value of $15.00.

3b. The consumer QR application uses the Merchant Name, Merchant City, Transaction Currency, Transaction Amount, and consumer entered tip amount to display a payment confirmation prompt to the consumer.

The amount displayed to the consumer ($65) is calculated by adding together the Transaction Amount ($50) and consumer entered tip amount ($15).

4. Once the consumer confirms payment, the consumer QR application sends the Merchant Account Information, Transaction Currency, final amount ($65), and other data (for example, consumer payment information) to the network.

### 3.4.3 Convenience Fee Percentage Example

This section provides an additional example for the Tip or Convenience Indicator data object. In this example, the merchant QR Code is presented on the webpage of a tax collection service and the Tip or Convenience Indicator is set to add a percentage convenience fee.

The data payload for this example is as defined in Table 3-4, with the following changes:

Table 3-6: Convenience Fee Percentage Data Payload

Data Object	ID	Format	Example Value
Merchant Category Code	"52"	N	"9311"
Transaction Amount	"54"	ans	"3000"
Tip or Convenience Indicator	"55"	N	"03"
Value of Convenience Fee Fixed	"56"	ans	NOT PRESENT
Value of Convenience Fee Percentage	"57"	ans	"3.00"
Merchant Name	"59"	ans	"National Tax Service"
Merchant City	"60"	ans	"eCommerce"
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.6: Convenience Fee Percentage Transaction Experience
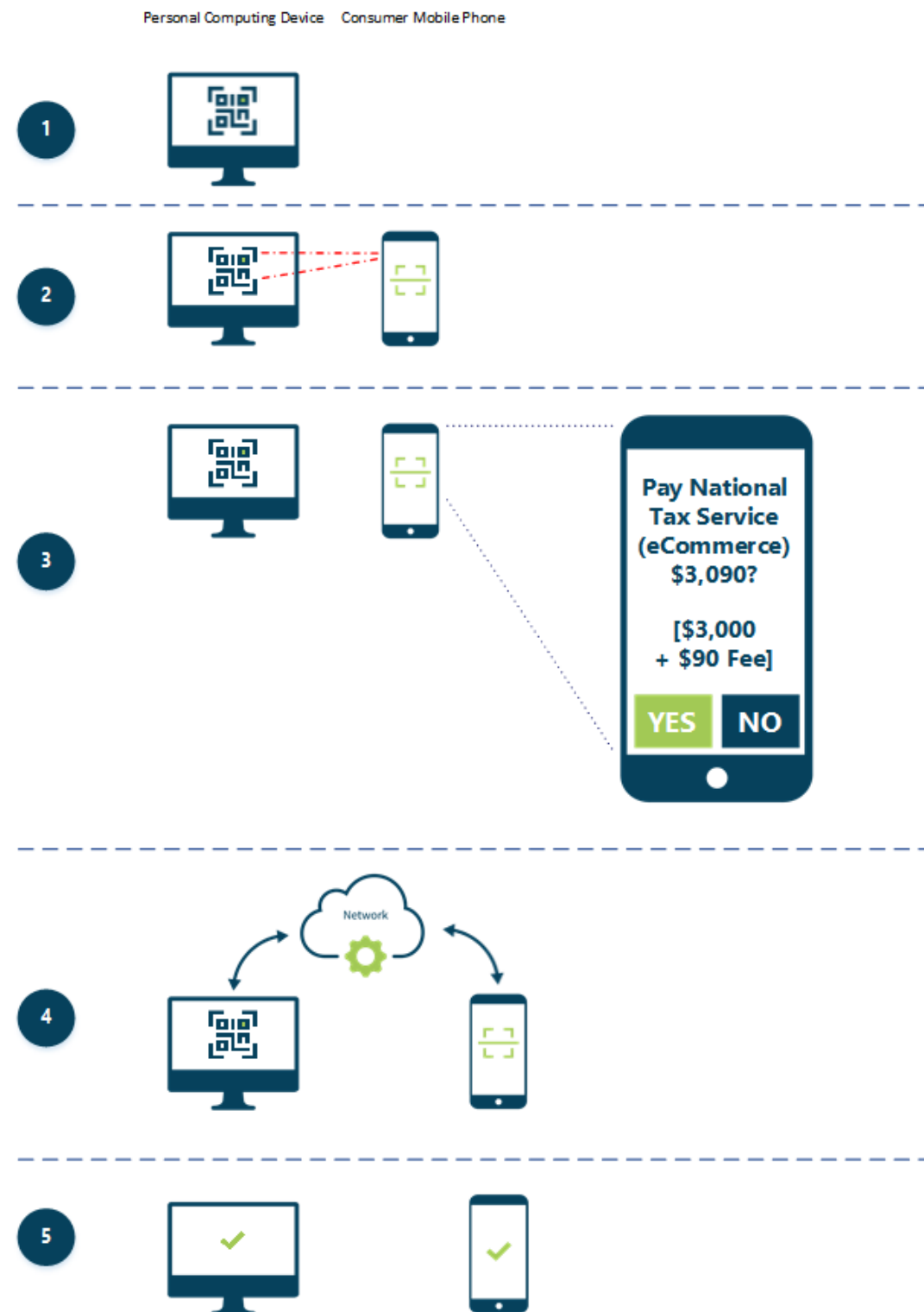
The following describes key points in the transaction experience pictured above for this Tip or Convenience Indicator additional example.

1. After the consumer checks out, the webpage generates and displays the dynamic merchant QR Code based on the data payload defined for this example.

2. The consumer uses their mobile phone to scan the merchant QR Code.

The consumer QR application supports the payload format indicated by the Payload Format Indicator and proceeds with recovering the data objects from the QR Code.

The consumer QR application uses the Merchant Account Information to select the payment card to be used to complete the transaction.

3. The consumer QR application uses the Merchant Name, Merchant City, Transaction Currency, Transaction Amount, Tip or Convenience Indicator, and Value of Convenience Fee Percentage to display a payment confirmation prompt to the consumer.

The amount displayed to the consumer ($3,090) is calculated by adding together the Transaction Amount ($3,000) and the Value of Convenience Fee Percentage ($3,000 x 0.03 = $90).

4. Once the consumer confirms payment, the consumer QR application sends the Merchant Account Information, Transaction Currency, final amount ($3,090), and other data (for example, consumer payment information) to the network.

Important: When the Tip or Convenience Indicator is present and indicates that a convenience fee percentage is to be charged, the consumer QR application should display that information to the consumer and automatically add the calculated convenience fee to the Transaction Amount.

5. Once the transaction is successfully completed by the network, payment confirmations are sent to the merchant and the consumer mobile phone.

3.5 Additional Data Field Examples

The Additional Data Field contains data objects that are typically defined and used by the merchant, for example, the merchant adds data objects to facilitate transaction matching. The Additional Data Field is not intended to contain data necessary for any payment network.

This section describes the data objects contained within the Additional Data Field.

Table 3-7: Additional Data Field – Data Objects

Data Object	Description
Bill Number	The invoice or bill number for the goods and/or services provided to the consumer.
	For example, in a multi-lane retail store, the Bill Number may be used to identify the specific payment transaction that was performed. John is purchasing hammers at counter #4 of the ABC Hammer store. The consumer QR application captures the invoice number "ABCHammers-123456-004" and passes it through the payment network to the merchant system, allowing ABC Hammers to match the transaction to the specific store and the specific counter.
	For example, in a printed or online bill, the Bill Number may be included to allow the merchant to identify the specific bill.
Mobile Number	The number of the mobile device to be topped up or credited.
	The Mobile Number should only be requested/provided when required for transaction processing, and not for the purpose of gathering consumer information.
	For example, John is adding $10 to his mobile account. The merchant QR Code includes the Mobile Number with the value "***", causing the consumer QR application to prompt John to input the mobile number to be credited.
Store Label	The distinctive name or distinctive value associated with the merchant store.
	For example, the merchant QR Code for the merchant ABC Hammers includes the Store Label with the value "ABC Hammers XYZ City".
Loyalty Number	The consumer loyalty number.
	For example, the merchant QR Code includes the Loyalty Number with the value "***", prompting the consumer to input their loyalty number to be used in conjunction with the transaction.

Data Object	Description
Reference Label	A value defined by the merchant or acquirer for the purpose of transaction matching or reconciliation.
	For example, the Reference Label may contain the merchant order number, a product serial number, a patient number for a hospital, a student ID for a university, or a membership number for a sports club.
	For example, on an e-commerce transaction, the Reference Label may contain the merchant order number. The consumer QR application captures the Reference Label and passes it through the payment network to the merchant system, allowing the merchant to match the order number to the transaction, and display a transaction confirmation on the e-commerce page.
Customer Label	A value identifying a specific customer.
	For example, a merchant QR Code for a subscription service may have a different Bill Number each month, but the Customer Label would have the same value each month.
Terminal Label	A distinctive value associated to a terminal in the store. This value could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a Terminal Label.
	For example, the Terminal Label may be displayed to the consumer on the mobile application identifying a specific terminal, or the Terminal Label may be passed through the payment system and provided to the merchant to allow the merchant to match the transaction to a specific terminal and display the transaction completion.
Purpose of Transaction	Any value defining the purpose of the transaction. This value could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a value describing the purpose of the transaction.
	For example, the Purpose of Transaction may have the value "International Data Package" for display on the mobile application.
Additional Consumer Data Request	Contains one or more requests from the merchant for additional information.
	"A" = Address of the consumer
	"M" = Mobile number of the consumer
	"E" = Email address of the consumer
	For example, the merchant may request the address of the consumer for goods delivery, and/or may request the mobile number of the consumer to coordinate goods delivery, and/or may request the email address of the consumer to deliver a digital ticket.

3.5.1 Merchant Prompts for Additional Data Example

This example demonstrates how the merchant may use the Additional Data Field Template to prompt for additional data.

This example illustrates how the following data object may be used and processed:

- Additional Data Field Template–Loyalty Number – In this example, this data object is present in the merchant QR Code with the value "***", causing the consumer QR application to prompt the consumer to enter their loyalty number.

The following tables defines the data payload for this example.

Table 3-8: Merchant Prompts for Additional Data - Data Payload

Data Object	ID	Format	Example Value
Payload Format Indicator	"00"	N	"01"
Merchant Account Information	"02"	ans	"4000123456789012"
Merchant Category Code	"52"	N	"5251"
Transaction Currency	"53"	N	"840"
Transaction Amount	"54"	ans	"10"
Country Code	"58"	ans	"US"
Merchant Name	"59"	ans	"ABC Hammers"
Merchant City	"60"	ans	"New York"
Additional Data Field Template	"62"	S	Encapsulates the ID, Length, and Value of the data object that follows
• Loyalty Number	"04"	ans	"***"
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.7: Merchant Prompts for Additional Data Transaction Experience
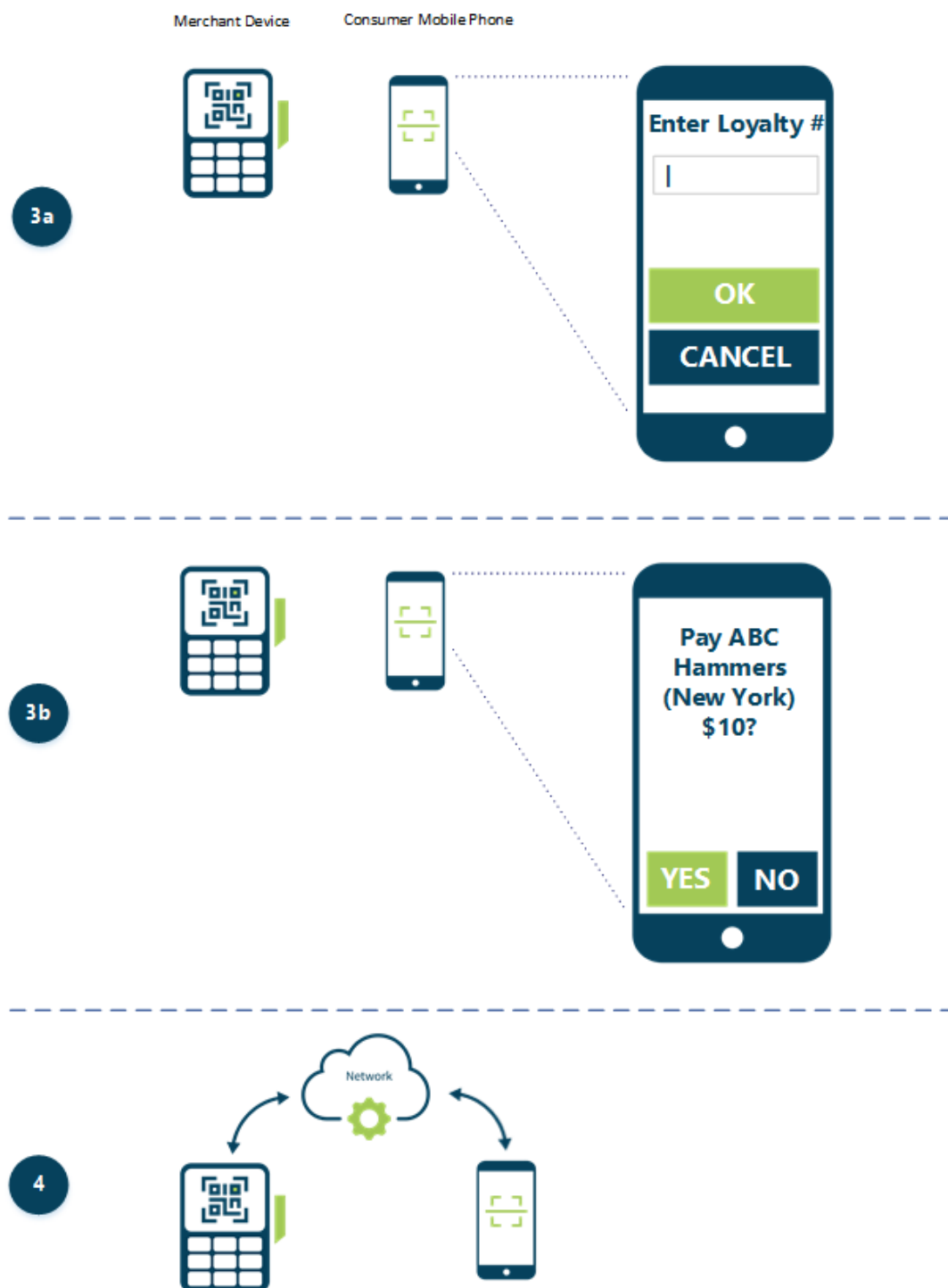
The following describes key points in the transaction experience pictured above.

3a. The consumer QR application recognizes that the Loyalty Number field in the Additional Data Field Template has the value "***", causing the consumer QR application to prompt the consumer to input the consumer's loyalty number.

3b. The consumer QR application uses the Merchant Name, Merchant City, Transaction Currency, and Transaction Amount to display a payment confirmation prompt to the consumer.

4. Once the consumer confirms payment, the consumer QR application sends the Merchant Account Information, Transaction Currency, Transaction Amount, Loyalty Number, and other data (for example, consumer payment information) to the network.

3.6 Alternate Language Example

This example demonstrates how an alternate language can be supported in the merchant QR Code.

To illustrate a cross border transaction, the consumer mobile phone is from Spain in this example.

This example illustrates how the following data object is intended to be used and processed:

- Merchant Information–Language Template – This data object may be present in the merchant QR Code when a language other than English is supported by the merchant.

The Merchant Information – Language Template is an optional data object that may be used to indicate support for displaying the Merchant Name and Merchant City in an alternate language, as some merchants and consumers prefer viewing the Merchant Name and Merchant City in a local language. This may result in a better user experience for local users, and/or facilitate easier visual matching of the Merchant Name/City on the mobile phone and the merchant's "doing business as" name.

To help provide interoperability, consumer QR applications should support displaying Merchant Name (ID "59") and Merchant City (ID "60") in English as the default language. If the Merchant Information – Language Template is present and the consumer QR application prefers the alternate language indicated, then the consumer QR application should display the Merchant Name and Merchant City to the consumer in the alternate language.

The following table defines the data payload for this example.

Table 3-9: Alternate Language Data Payload

Data Object	ID	Format	Example Value
Payload Format Indicator	"00"	N	"01"
Merchant Account Information	"02"	ans	"4000123456789012"
Merchant Category Code	"52"	N	"5251"
Transaction Currency	"53"	N	"840"
Transaction Amount	"54"	ans	"10"
Country Code	"58"	ans	"US"
Merchant Name	"59"	ans	"ABC Hammers"
Merchant City	"60"	ans	"New York"
Merchant Information–Language Template	"64"	S	Encapsulates the ID, Length, and Value of the two data objects that follow
• Language Preference	"00"	ans	"es"

Data Object	ID	Format	Example Value
• Merchant Name—Alternate Language	"01"	S	"ABC Martillos"
Cyclic Redundancy Check (CRC)	"63"	ans	Calculated using the algorithm defined in [EMV MERCHANT QR]

Figure 3.8: Alternate Language Transaction Experience
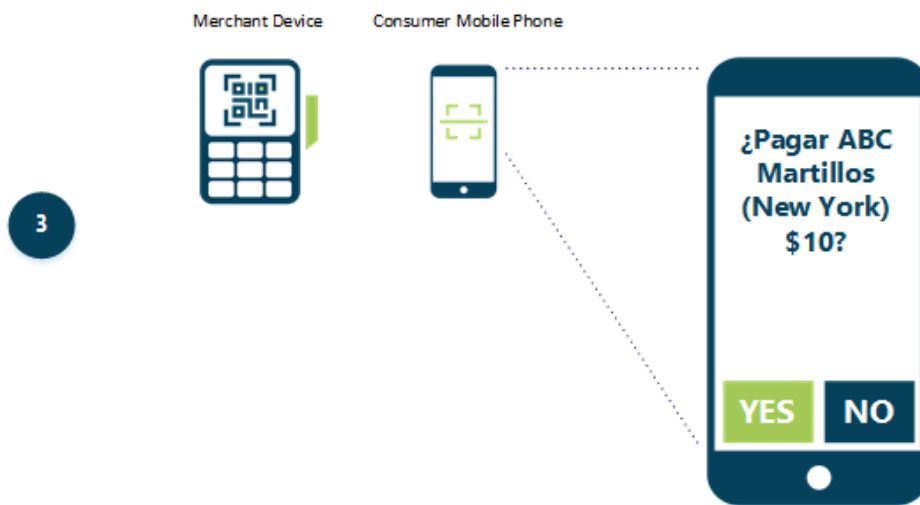
The following describes key points in the transaction experience pictured above.

3. The consumer QR application recognizes that Spanish is available as an alternate language and the consumer QR application prefers Spanish. Consequently, the consumer QR application uses the Merchant Name–Alternate Language to display the merchant name to the consumer in Spanish.

Note that the city name is displayed using the (English) Merchant City data object because the Merchant City–Alternate Language is not present in the QR Code.

4   Additional Guidance and Recommendations

This section provides guidance and recommendations for merchant QR Codes.

4.1   Payload Format Indicator

The Payload Format Indicator defines the version of the merchant QR Code template and the conventions on the identifiers, lengths, and values contained within.

If the consumer QR application encounters a Payload Format Indicator that it does not recognize, the consumer QR application should discontinue processing of the merchant QR Code.

4.2   Merchant QR Code Readability

The speed at which the consumer QR application is able to scan the merchant QR Code is dependent on a number of factors. When planning or implementing a merchant QR Code program, consideration should be given to the following:

- QR Code data and dimensions: Generally, less dense* QR Codes are more easily read by scanners, whereas denser QR Codes are more difficulty to read by scanners. Similarly, QR Codes with larger physical dimensions are easier to read than QR Codes of smaller physical dimensions. Merchant QR Codes should be optimized so that they do not carry irrelevant or redundant data, and have sufficiently large physical dimensions to facilitate easier reading.

- Mobile phone cameras: Consumer mobile phones with higher quality cameras will be able to more quickly read the merchant QR Code when compared to budget mobile phones. When planning merchant QR Code programs, a wide variety of mobile phones and mobile phone cameras should be taken into consideration when determining the acceptable speed at which the merchant QR Code can be read.

- Paper: For static merchant QR Codes, the type of paper (for example, matte paper versus glossy paper) on which the merchant QR Code is displayed plays a factor in the readability of the merchant QR Code.

- Digital display: A device displaying a dynamic merchant QR Code can be active or passive. An active device has its own electricity provisioning for screen brightness, such as an LCD or LED screen. A passive device relies on other luminous sources, such as an electronic ink screen. The contrast ratio and resolution of a digital display will influence the readability of the QR Code.

- Angle: The angle at which the consumer attempts to scan the merchant QR Code impacts the readability of the merchant QR Code. Consideration should be given to the placement of the merchant QR Code such that it is readable by the consumer mobile phone at an angle comfortable for the consumer.

- Error correction: Higher levels of error correction increase the density of the merchant QR Code. Lower levels of error correction result in a less dense merchant QR Code. An error correction level of "L" is recommended.

It should be noted that the above list is not comprehensive.

(*) "Dense" refers to the amount of information contained within the merchant QR Code.

4.3   Merchant Account Information (ID "26" – "51")

The Merchant Account Information data objects with IDs "26' – "51" are reserved for including merchant account information for additional payment networks. These data objects may be used by merchants to support payment network merchant information outside the scope of EMVCo. For example, a merchant may use Merchant Account Information (ID "33") to encapsulate the merchant information for a proprietary payment network, containing that payment networks ID for the merchant and the URL to be used for conducting merchant QR Code payment transactions with that payment network.

Important*: Merchant Account Information data objects with IDs "26" – "51" are used to identify a merchant on a specific payment network, where the value of the Globally Unique ID in the Merchant Account Information data object identifies the payment network. The same payment network may have a different Merchant Account Information data object ID for different merchants.*

4.4   Unreserved Templates (IDs "80" – "99")

Unreserved Templates are reserved for use by any entities, such as (domestic) payment systems and value-added service providers, for their own products.

EMVCo requires that the each Unreserved Template be coded in accordance to [EMV MERCHANT QR] and contain a Globally Unique ID so that consumer QR applications can unambiguously determine which entity the data in the Unreserved Templates belongs to. Specific uses of the Unreserved Templates are otherwise outside the scope of EMVCo.

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