

# Industry Considerations for 8-Digit BIN Migration

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# **US Payments Forum**

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# 1. Introduction

All payments industry stakeholders should be prepared to support both 6- and 8-digit BINs by April 2022, as required by certain payment networks. While supporting 8-digit BINs may not require changes for some stakeholders, it may require development and process changes for others. Each payment network introducing 8-digit BINs, has published operating rules, best practices, and requirements that should be analyzed to determine impacts, necessary updates, and financial implications.

This document does not provide all of the answers related to BIN expansion. The goals for this document are to drive awareness of the 8-digit BIN requirement and to encourage stakeholders to review resource materials and information from the payment networks and other payment processing organizations associated with their business.

The Issuer Identification Number (IIN), which is the International Organization for Standardization (ISO) term for Bank Identification Number (BIN), is a standardized global numbering scheme to identify the institution that issues a credit, debit, or prepaid card. Currently the IIN is defined as a 6-digit number. The IIN is included in the first segment of the primary account number (PAN). The PAN is used to identify an individual accountholder, whereas the IIN may be used to route transactions in an interoperable environment. PANs can vary in length from 11 to 19 digits, with most card schemes at 15 or 16 digits in length.

The terms IIN and BIN are used interchangeably. In general, 'BIN' is commonly used by the payments industry; however, other financial institutions that are not banks also issue cards.

Available IINs are increasingly in short supply due to several factors, including the growing numbers of debit and prepaid cards, reissuance due to data breaches, tokenization, and an increasing number of issuers. As a result, ISO has extended the IIN value to be eight digits rather than six (Figure 1). The maximum PAN length will continue to be 19 digits.



#### Figure 1. 6-Digit to 8-Digit BIN Migration

ISO held planning meetings with industry representatives in 2015 to discuss concerns about the diminishing inventory of IINs. ISO announced a new 8-digit IIN standard in 2016 and published the new standard in 2017.



Prior to ISO's announcement, Discover Network had already been supporting both 6-digit and 8-digit BINs in the U.S. market. However, shortly after the ISO announcement, other global payment networks, such as Mastercard and Visa, advised their issuers to maximize efficient use of the BIN by leveraging account ranges within BINs to segment portfolios and define different product codes, as well as other designations. Using a BIN to its full potential helps an issuer avoid needing additional BINs and slows the BIN depletion issue for the payment networks.

## **1.1** BIN Length and Account Range Configuration

While BINs are historically used to identify issuers and card products, for 16-digit PANs, a 6-digit BIN holds 1,000,000,000 unique PANs and an 8-digit BIN holds 10,000,000 unique PANs. These numbers may be too high for some card programs. In order to use BINs more efficiently, "Account Ranges" are defined by the networks. Account Ranges allow issuers to define multiple card programs within a given BIN. Technical definition of an account range and which digits of the PAN can be used for that definition varies by network.

#### 1.1.1 Visa

Acquirers will continue to process the Visa account range to the 9<sup>th</sup> digit in order to read and support transactions correctly. As illustrated in *Figure 2*, issuers manage the account range for a 6-digit BIN between positions 7-9 (with up to 100 ranges available) and for an 8-digit BIN, on the 9<sup>th</sup> position only (with up to 10 ranges available).



Figure 2. Visa Account Range Position

#### 1.1.2 Mastercard

Acquirers will continue to process the Mastercard account range to the 11th digit in order to read and support transactions correctly. As illustrated in *Figure 3*, issuers manage the account range for a 6-digit BIN between positions 7-11 and for an 8-digit BIN between 9-11.





Figure 3. Mastercard Account Range Position

#### 1.1.3 Discover

Discover Network does not assign attributes, such as account range, instead using additional digits within the PAN.



# 2. Stakeholder Impacts

This document describes the impact of 6- to 8-digit BIN migration for different payments industry stakeholders. For reader convenience, Table 1 indicates the relevant sections for each stakeholder.

	Sections			
Stakeholders	1	3	3.6	4
Issuers	~		~	~
Card Personalization Vendors	~		~	~
Acquirers/Processors	~	~		~
Merchants (Including transit merchants and merchants using offline devices)	$\checkmark$	~		~
Acceptance/Terminal Vendors	~	~		~
ATM Owners	~	~		~
Debit Networks	~	~		~

Table 1. Document Sections Relating to Specific Industry Stakeholders



# 3. Impacts to Ecosystem Functional Areas and Use Cases

This section provides example guidance on how to assess changes needed to support 8-digit BINs at the point of interaction and reviews implementation considerations for several functional areas and use cases.

# 3.1 Example Assessment of 8-Digit BIN Changes to Existing BIN Management at Point of Interaction

The decision tree shown in Figure 4 is intended to be a high-level guide to help determine whether a given card-present (CP) or card-not-present (CNP) point of interaction (POI) solution will be impacted in supporting 8-digit BINs. It is NOT the only way to determine if a solution would be impacted. Instead, the example is presented as an analysis exercise from which to start modeling.

Whether changes are needed to support 8-digit BINS is unlikely to be the same for all POI solutions. The best advice would be: "Examine your solutions components and determine impact." The diagram in Figure 4 shows one approach that can be used to assess impact. The example is arranged as a series of seven 'yes/no' questions and will focus on two main solution components.

Components of the solutions considered in the diagram are the following:

- Current use of BIN/account range file/table
- PAN encryption/truncation



Figure 4. Decision Tree to Assess Impact of 8-Digit BINs on POI Solutions



The decision tree asks the following questions:

- 1. Do you use a BIN resource (e.g., BIN file or table)?
  - This is a preliminary and key question because if BIN logic is not used in the solution, 8-digit BINs will have no impact.
- 2. Does the POI solution support BINs with 8 digits?
  - This is a second key question to assess if the existing BIN resource has access to 8-digit BINs.
- 3. Confirm if 8-digit BIN logic is still needed?
  - This is a confirmation step to confirm if there is a need to access 8-digit BINs.
- 4. Is the PAN encrypted, truncated, or masked?
- 5. This question is critical. This question leads into 5 and 6.Is the PAN/BIN review-lookup performed before or after being encrypted, truncated, or masked?
  - Knowing if BIN logic occurs before or after encryption, truncation or masking can indicate whether additional effort is needed to support 8-digit BINs.
- 6. Is BIN logic based on the first six digits in an encrypted, truncated, or masked PAN?
  - If 'yes,' a deeper dive is needed to understand if the encryption/truncation process requires changes.
- 7. Can BIN logic be modified to occur before encryption, truncation, or masking? Or can BIN logic be expanded to display eight digits?
  - Regardless of 'yes' or 'no,' developer resources (e.g., third party, in-house) will need to review the BIN logic. However, if 'no,' a more in-depth review of the process may be needed. Determine the features/functions to support and consult with developers and business stakeholders.

# **3.2** Payment Card Industry (PCI) Data Security Standard (DSS)

Various PCI aspects need to be considered when migrating to 8-digit BINs.

PCI DSS allows users with legitimate business needs to see the full PAN data under appropriate controls. Data-at-rest requires that a minimum of six digits be masked or truncated when at rest.

Systems exclusively processing the online evaluation of 6-digit or 8-digit BINs can continue to be performed in a PCI DSS-compliant data center. The migration to 8-digit BINs should have little impact on the evaluation and processing of a transaction. The payment processing solution should be reviewed to assess the use of first six and last four digits in displays, reports, logs, and receipt printing to evaluate if there is any need to expand beyond six digits.

The PCI Security Standards Council (PCI SSC) has issued a FAQ<sup>1</sup> discussing truncation of PANs. The published guidance allows 12 of 16 digits to remain in the clear for 16-digit PANs (with either 6- or 8-digit BINs). However, for Discover with PANs less than 15-digits and American Express with 15-digit PANs, the guidance is to remain at 10 digits in the clear, with four or less digits being truncated (based on the length of the PAN).

Figure 5 summarizes PCI acceptable formats for truncating the PAN.

PCI SSC FAQ, "What are acceptable formats for truncation of primary account numbers?," <u>https://pcissc.secure.force.com/faq/articles/Frequently\_Asked\_Question/What-are-acceptable-formats-for-truncation-of-primary-account-numbers?q=first+six&l=en\_US&fs=Search&</u>



PAN / BIN Length	Payment Brand	Acceptable PAN Truncation Formats	
16-digit PAN (with either 6- or 8-digit BIN)	Discover JCB Mastercard UnionPay Visa	At least 4 digits removed. Maximum digits which may be retained: "First 8, any other 4"	
15-digit PAN	American Express	At least 5 digits removed. Maximum digits which may be retained: "First 6, last 4"	
<15-digit PAN	Discover	Maximum digits which may be retained: "First 6, any other 4"	



When BIN analysis can be performed on the server, the host or back office already has use cases and provisions to access the full PAN. The processing solutions that require BIN analysis locally for offline processing or other business decisioning must comply with the PCI SSC standards in Figure 5. The local terminal or POS solution will need to implement a method for determining, by payment network, whether the card uses a 6- or 8-digit BIN and then applying the appropriate truncation rules.

The solution provider or merchant's local business logic may need to conduct an initial BIN analysis, with additional logic to determine what to truncate for local storage and transmission. Changes to local card handling logic should be reviewed with internal security teams or PCI qualified security advisors (QSAs) to determine compliance with PCI DSS, PCI Point-to-Point Encryption (P2PE), PCI PIN Transaction Security (PTS), and other applicable PCI requirements.

## 3.3 Use Case: Acquirer and Payment Network Tokens

The introduction of 8-digit BINs will require industry stakeholders to evaluate how various token types are created, stored, and used. Multiple token formats are used today, such as format-preserving and non-format-preserving. For format-preserving tokens, only ten digits of the originating PAN can be preserved to comply with PCI requirements; implementations typically preserve the first six and the last four digits of the PAN (see Section 3.2 on PCI).

Considerations for implementing 8-digit BINs when payment tokens are used include the following:

• 8-digit BINs will not allow the existing format-preserving tokens to accurately preserve the full BIN. Industry stakeholders will need to identify a new means to identify, capture and store the



BIN separately from the network or acquirer token upon token generation. System updates will be needed to store and use a new field for any downstream analysis, reporting or action.

## 3.4 Use Case: Approval Rate Analysis

Many merchants across all verticals monitor authorization approval rates to ensure the highest acceptance rates and to provide the best consumer experience while transacting in digital or retail channels. Merchants and their associated payment partners analyze approval rates based on the BIN to identify any issues or areas of concern/improvement for specific issuers.

Considerations for implementing 8-digit BINs include the following:

- Analysis methods will need to be revised to account for the increase to 8-digit BINs to maintain a consistent level of analysis.
- Merchants will need to obtain and store 8-digit BINs separately, and associate the BINs with each approved or declined transaction in downstream systems used for reporting and analysis

## 3.5 Use Case: Routing

Many merchants across all verticals make informed routing decisions for authorization requests based on the BIN. Whether routing decisions are made to split credit and debit processing or route transactions to specific issuers, merchants or their payment processing partners will need to update routing logic to handle 8-digit BINs.

Considerations for implementing 8-digit BINs include the following:

- Technical changes may be needed at multiple levels (e.g., switches/gateways, acquirers) to ensure merchant routing capabilities are preserved.
- Thorough testing of end-to-end process flows needs to be performed to ensure routing choices are not impacted

## 3.6 Key Management

Issuers and payment networks use the BIN for key management for both symmetric (TDES/AES) and asymmetric (RSA/ECC) keys.

Although 8-digit BINs will likely be used with key management activities, there are no impacts with any of the payment networks that contributed to this white paper. The ability to use 8-digit BINs in any key management activity is already supported by the payment networks. For further details, consult your payment network and/or their specifications.

## 3.7 BIN Management and BIN Ranges

Today, BIN files and BIN tables are used by issuers, acquirers, and many merchants to distinguish card products and other features within a BIN range. Known as BIN management, BIN files/tables can provide instructions to help route transactions globally. For example, while data elements can vary by provider, a BIN file/table can provide information such as the following:

- Payment network
- Card product ID
  - Prepaid
  - Corporate



- Private label
- Issuer name/country
- Credit, debit, or ATM identification
- PIN/PINIess support
- Affiliated/non-affiliated networks

These data elements can aid with routing decisioning, data prompting, and feature eligibility, among other functions. For example, data elements can identify a corporate card and trigger the capture of purchase card level 2/purchase card level 3 data, when applicable.

It is important to understand that not all BIN files/tables are the same. They can be obtained from a processor, third-party BIN provider or the payment networks. Please consult with the designated provider for a review of the file specification or table layout to understand the types of information available. NOTE: Acquirers and downstream entities should be aware of supported payment network recommendations and best practices for obtaining BIN tables and associated account ranges to ensure current and accurate data is used.

Three basic types of files/tables are available for BIN information. Depending on the source, the file/table types can go by several names. For the purposes of this white paper, the following terms are used to provide high-level examples of the types of files available from each source:

1. Consolidated BIN File

A consolidated BIN file can be a compilation of BIN-related files (for example, the BIN acceptance and routing table examples described in items 2 and 3 below) from many other sources. The consolidated file can homogenize the file format, assuming the multiple sources use multiple file formats. Many acquirers and processors offer this type of file for merchant use and convenience.

2. BIN Acceptance Table

A BIN acceptance table can identify BIN ranges and account ranges that indicate the various products each would be associated with. This type of table is generally provided by the payment networks.

3. Routing Table

A routing table is different from a BIN table. The routing table can indicate the affiliated and non-affiliated networks for each BIN to enable appropriate and desired transaction delivery.

As a best practice, it is important to check for updates to any of the above tables. The risk of not monitoring these tables is a potential out-of-synch condition among merchants, acquirers/processors, and issuers. Please be sure that, regardless of file/table used, 8-digit BINs can be accommodated.

#### 3.7.1 6- to 8-Digit BIN Migration

Merchants and acquirers should be aware that many issuers will convert their existing 6-digit BINs to registered 8-digit BINs. The issuer has the option to register anywhere from one to one hundred 8-digit BINs sourced from a single 6-digit BIN. Part of the issuer process when registering with a payment network includes the issuer deciding what BIN ranges to retain versus what BIN ranges to return. The majority of issuers will likely choose anywhere from one to several 8-digit BINs based on their card account volumes and product/program segmentation needs. At some point in the future, it is possible that a returned BIN range could be licensed as an 8-digit BIN to a different issuer.



Since an 8-digit BIN may be assigned a different card product type than the prior 6-digit BIN, merchants should consider any payment products where they use special processing to identify a card product type or to add unique data elements to the transaction. This data may be used to correctly process transactions, increase approval rates, or reduce cost. Examples of special processing considerations can include Special Interest Group for IIAS Standards (SIGIS) cards (e.g., health savings account (HSA) or flexible spending account (FSA) cards), credit gift card restrictions, corporate cards, or loyalty promotions. If BIN ranges or BIN files/tables are used to identify cards for special processing, a review of these processes should be considered to ensure 8-digit BIN acceptance.

Upcoming changes due to migration activities will require more attention by merchants using their own BIN resource (BIN table/file) to ensure that they are continuously updating their data to have the most up to date BIN account range information.

### 3.7.2 Routing

With card-present EMV transactions, AIDs, including the US Common Debit AID, can be used for merchant-choice routing regardless of 6-, 8- or 6-digit converted to 8-digit BINs. The US Common Debit AID will use BIN files/tables to determine routing and will support 8-digit BIN.

#### 3.7.3 Token BINs

EMV payment token BINs should follow the same process as any other BIN to help identify potential digital-wallet-based transactions.

#### 3.7.4 Delivery

Delivery of BIN files and tables are generally done via Secure File Transfer Protocol (SFTP), application programming interfaces (APIs) or in some cases, streaming. Please check with the BIN file/table service provider and discuss delivery option availability.

#### 3.7.5 File/Table Size

BIN files/tables can vary in size depending on the source and the elements contained. Some could be as small as 576 records or 28KB, while others can be as large as 300,000 records or 75MB. As 8-digit BINs are issued and 6-digit BINs are converted to eight digits, the BIN file/table size may slowly increase.

#### 3.7.6 Mandate

It is imperative to note that, as required by certain payment networks, acquirers and merchants must be able to support 8-digit BINs effective April 2022. While the initial impact should be low, with the increased use of 8-digit BINs, a gradual increase in the number of BIN ranges and in the size of BIN files and tables is expected.

Solutions that use BIN files or BIN table lookup will need to examine the impact of checking against a full 8-digit range.

## 3.8 Testing Options for 8-Digit BINs at the Point of Interaction

Visa and Mastercard have introduced 8-digit BIN test accounts that can be used for testing at the POI. Visa has added this to their L3 test cases and this has been added to the accredited test tools. Mastercard has provided acquirers/processors with a list of 8-digit BIN test accounts.

Merchants who want to test their POI should contact their solution providers and/or acquirer/processor to confirm which accounts are set up to test 8-digit BINs in their test environments.



# 4. Conclusion

This document has attempted to describe the conditions and variables for understanding the impact of 8-digit BINs for payment ecosystem stakeholders and POI solutions. It is presented as a guide and not as an instruction manual. Each stakeholder can review this document when considering whether there may be any impact to a given solution. Stakeholders are also reminded and encouraged to consult with their applicable developers, solution providers, independent software vendors (ISVs), acquirers/ processors, payment networks, or other solutions providers to assess how a solution does or will work under these new conditions.

Appendix A: References

- Visa
  - Numerics Initiative | Visa, <u>https://usa.visa.com/partner-with-us/info-for-partners/numerics-initiative.html</u>
- Mastercard
  - 8-Digit BIN Expansion Mandate and PCI DSS Impact, https://www.mastercard.com/globalrisk/en/resources/pci360.html
  - Simplified BIN Account Range Table, <u>https://www.mastercard.us/en-us/business/issuers/get-support/simplified-bin-account-range-table.html</u>



# 5. Legal Notice

This document is provided solely as a convenience to its readers, for purposes of driving awareness of the 8-digit BIN requirement and encouraging stakeholders to review resource materials and information from the payment networks and other payment processing organizations associated with their business. While great effort has been made to ensure that the information provided in this document is accurate and current as of the publication date, this white paper is not intended to be an exhaustive description of considerations relating to support for 8-digit BINs or associated development or process changes. Additionally, each payment network introducing 8-digit BINs has published operating rules, best practices, and requirements that should be analyzed to determine impacts, necessary updates, and other implications. Accordingly, this document does not constitute legal or technical advice, should not be relied upon for any legal or technical purpose, and all warranties of any kind, whether express or implied, relating to this document, the information herein, or the use thereof are expressly disclaimed, including but not limited to all warranties as to the accuracy, completeness or adequacy of such information, all implied warranties of merchantability and fitness for a particular purpose, and all warranties regarding title or non-infringement. Stakeholders interested in 8-digit BIN are strongly encouraged to consult with their respective payment networks, processors, and other stakeholders and advisors regarding all aspects of implementation.