ICMI LEARNING

EMV

(Europay Mastercard & Visa)

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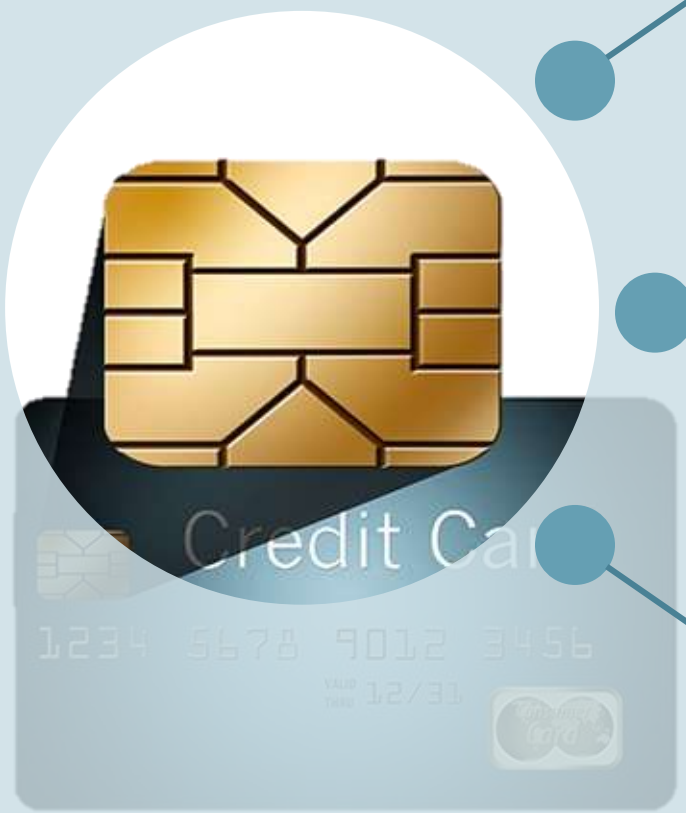
It is a global standard for credit and debit card payments

Uses embedded microchips to secure transactions

EMV (Europay Mastercard & Visa)



EMV technology has been around for over two decades

A more secure alternative to traditional magnetic stripe cards

EMV has become a crucial tool in protecting consumers

EMV (Europay Mastercard & Visa)

The first specifications were published in 1995

First EMV cards were rolled out in Europe in 1999

EMV has been adopted by banks and payment networks in many countries around the world

Helping to reduce card fraud and increase security for both merchants and consumers

The EMV Company and Specifications

The EMV Company and Specifications

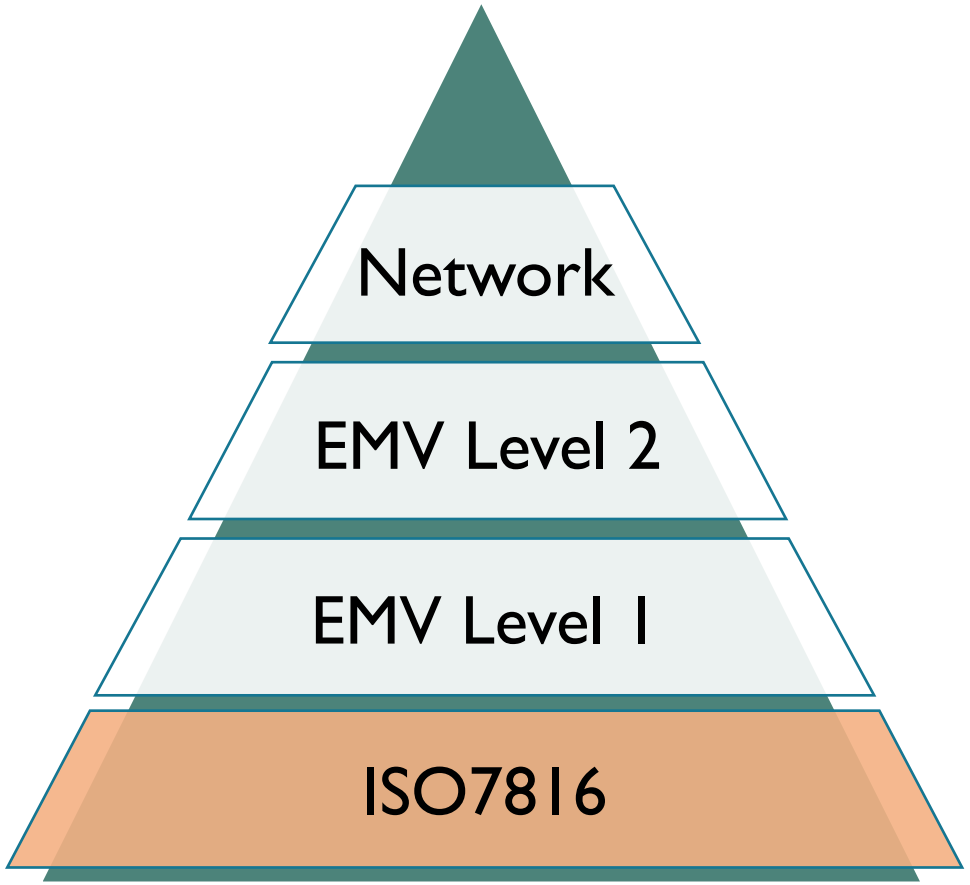
Global technical body, manages and maintains the EMV specifications

Interoperability and compatibility with the global payment industry

The EMV Company and Specifications

The specifications for EMV transactions are defined based on several different standards. Here is a brief overview of each of these specifications:

The EMV Company and Specifications

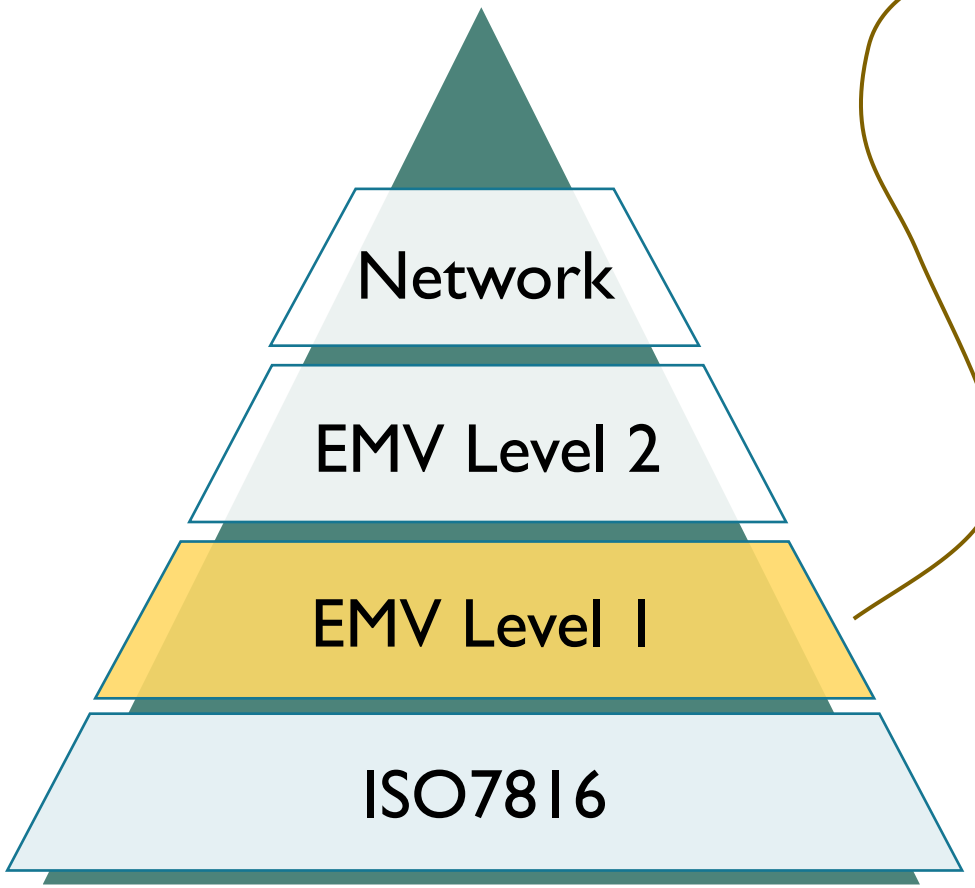


Defines how chip cards work at the **electronic level**

Chip's interface with the terminal and the commands that can be sent to the chip

The basic software functions common to all chip cards

The EMV Company and Specifications



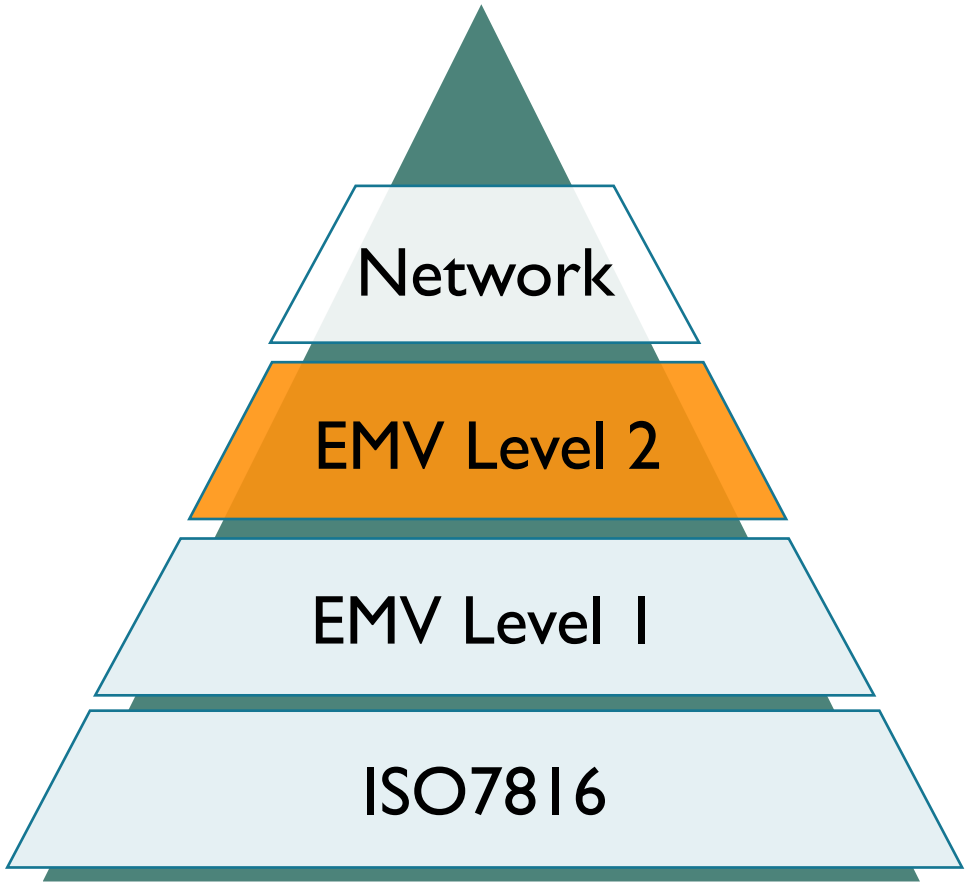
Packet level

Defines electrical and physical characteristics of cards, design and layout of card's chip

Includes voltage levels, timing requirements, and signal encoding

Defines the mechanical and contact arrangements for the physical interface between the card and terminal

The EMV Company and Specifications



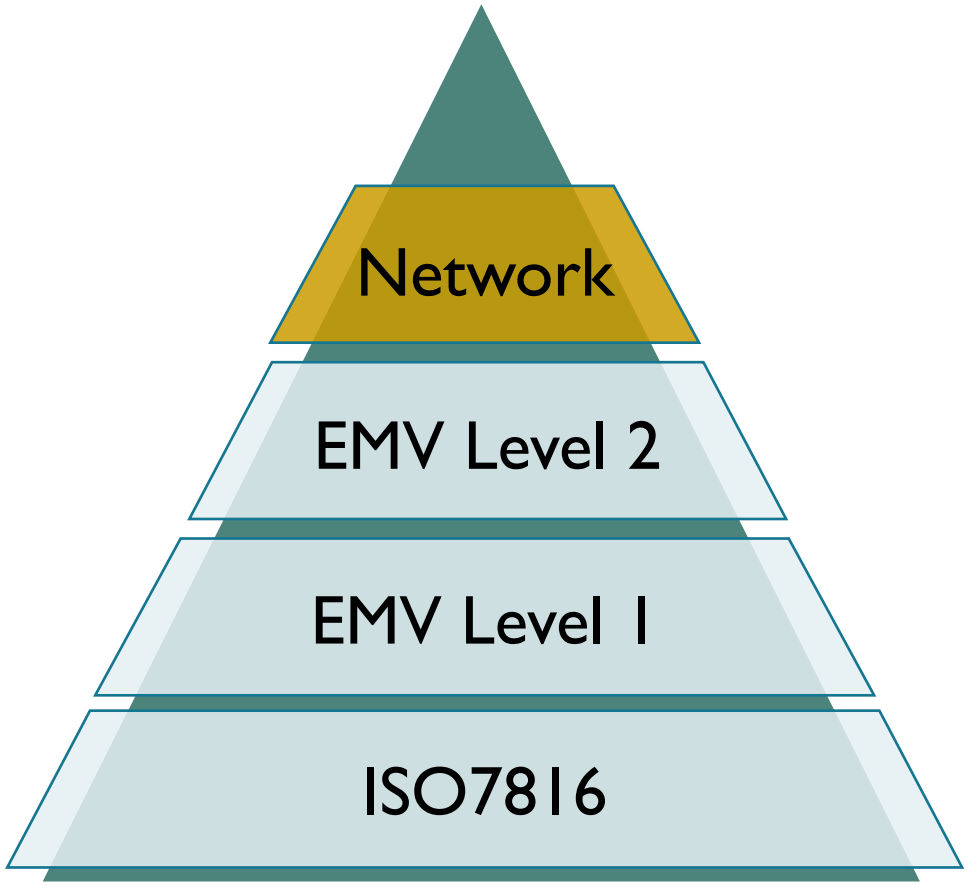
Application level

Ensure interoperability between various payment networks

This defines the software requirements for payment applications that run on payment cards

Includes the card's user interface, transaction processing, and security features

The EMV Company and Specifications

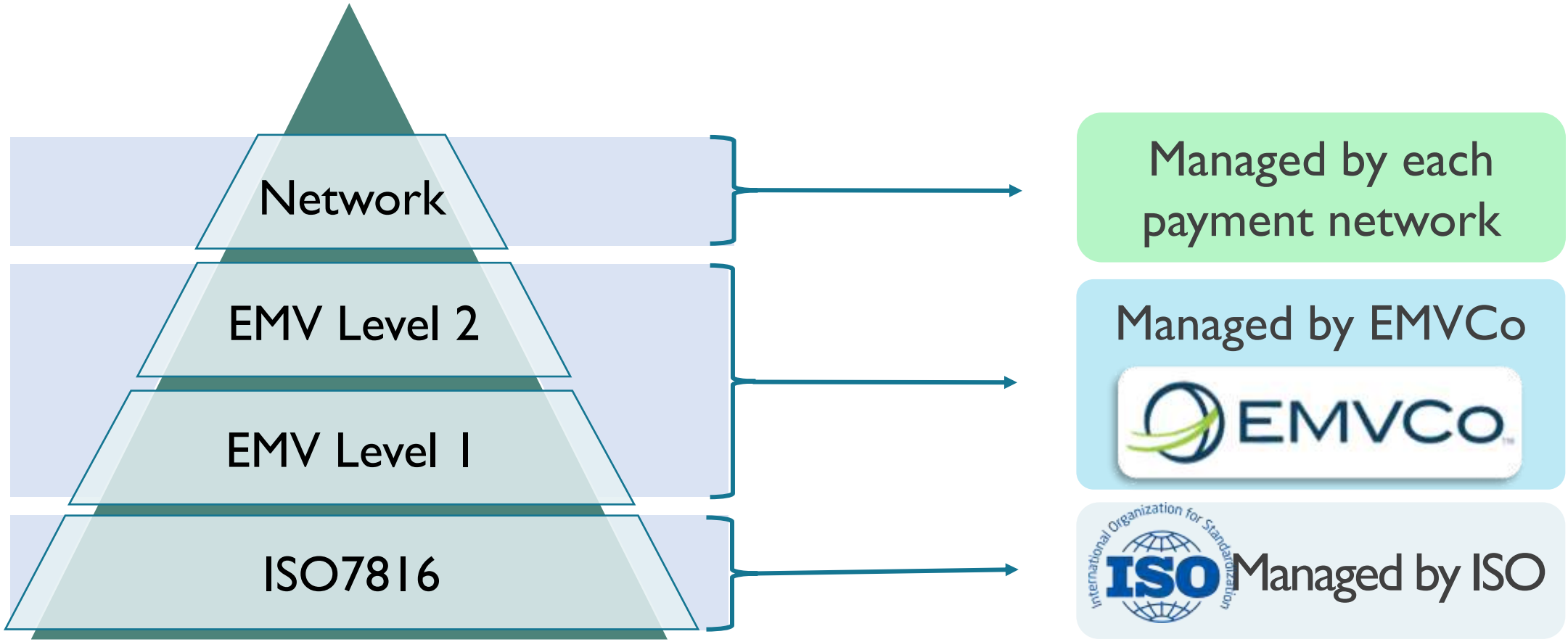


Network-level specifications

Payment network can have differentiated applications, offer personalized features

They also define the protocols for message formatting, data exchange, and authentication

The EMV Company and Specifications



The EMV Company and Specifications

To download these, we are required to be members of the vendor programs offered by these networks

Visa Integrated Circuit Card Specification

M/Chip 4 Card Application Specifications

The EMV Company and Specifications

Current EMV chip contact specifications is version 4.4, released in October 2022.

New security features and support for new payment technologies

EMV chip contact specifications will be used when a transaction is made by inserting the card into the terminal

EMV chip contactless specifications will be used when a transaction is made by tapping the card on the terminal

The EMV Company and Specifications

Current EMV chip contact specifications is version 4.4, released in October 2022.

New security features and support for new payment technologies

EMV chip personalization specifications will be used while the card is being manufactured

The EMV Company and Specifications

Current EMV chip contact specifications is version 4.4, released in October 2022.

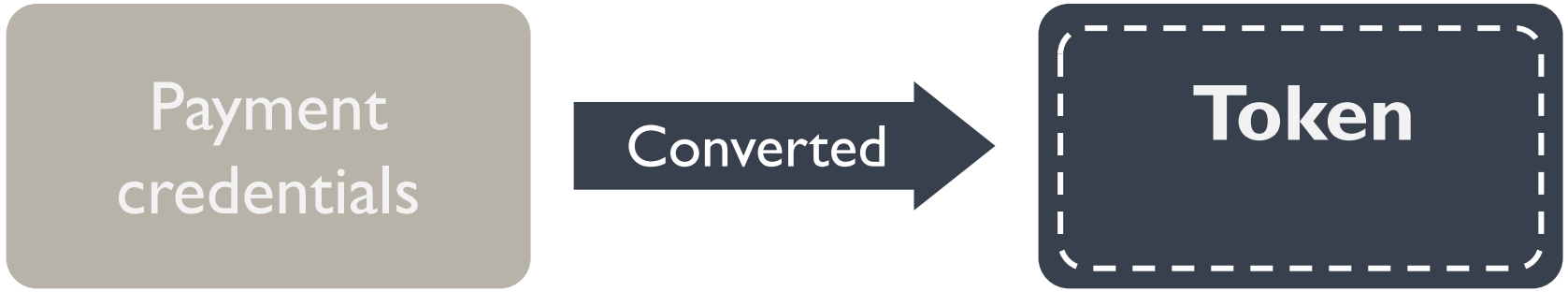
New security features and support for new payment technologies

EMV mobile specifications, define the technical requirements for enabling contactless payments using a mobile device

Key features of the EMV specifications for a mobile device

1 Tokenization

Payment credentials are replaced with a token. Which is unique to the mobile device, transaction, and payment network.



If a token is intercepted, it cannot be used for any other transaction

Key features of the EMV specifications for a mobile device

1 Tokenization

The merchant can apply the token ID to retain records of the customer

The token is then transferred to the payment processor, who de-tokenizes the ID and confirms the payment.

Key features of the EMV specifications for a mobile device

2 3-D Secure

This requires the user to enter an additional password to verify their identity before a payment can be completed

Key features of the EMV specifications for a mobile device

3 Quick Response Code

It is a two-dimensional barcode that contains payment-related information

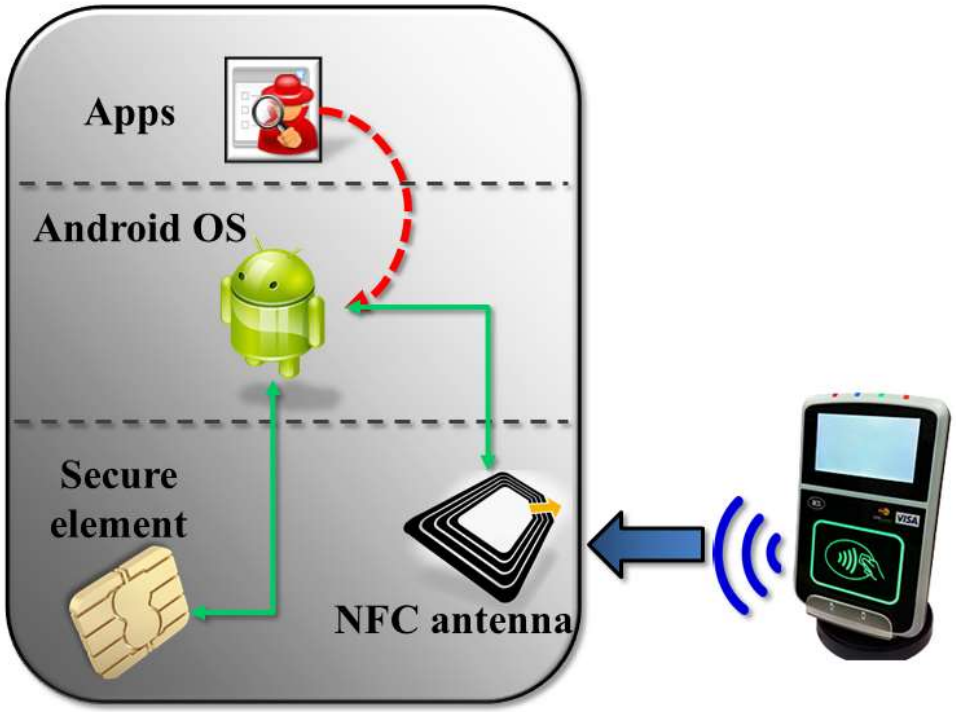
- Merchant identification number
- Transaction amount
- Other relevant details

Key features of the EMV specifications for a mobile device

4 Secure Element

Contactless payments require a secure element to store and protect the payment credentials

This can be a hardware component within the mobile device or a cloud-based solution.



The EMV Company and Specifications

Key features of the EMV specifications for a mobile device

1 Tokenization

2 3-D Secure

3 Quick Response Code

4 Secure Element

Segregation of EMV standards and technologies

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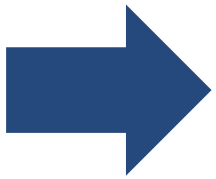
EMV standards and technologies are available for three categories

- Face-to-Face Transactions
- Remote transactions
- Authentication of the customer

Segregation of EMV standards and technologies

EMV standards and technologies are available for three categories

Face-to-Face Transactions



- EMV contact specifications
- EMV contactless specifications
- EMV mobile based specifications
- EMV QR code specifications
- Wearable device specifications

Segregation of EMV standards and technologies

EMV standards and technologies are available for three categories

Remote transactions

e-commerce websites

EMV Secure Remote Commerce specifications

Authentication of the cardholder

EMV 3-D Secure specifications

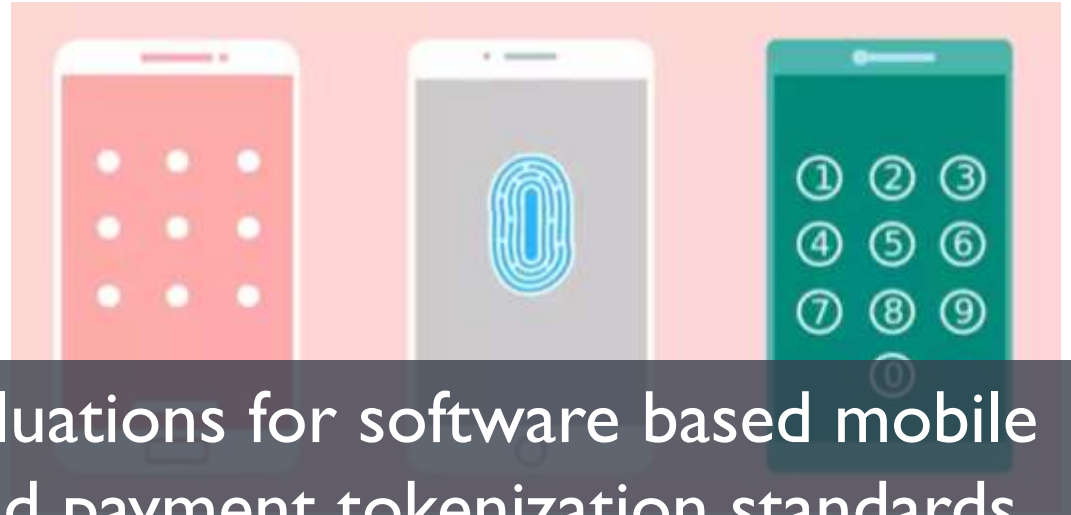
Segregation of EMV standards and technologies

EMV standards and technologies are available for three categories

Authentication of the customer

CDCVM

(Consumer Device Cardholder Verification Method)



Security evaluations for software based mobile payments and payment tokenization standards

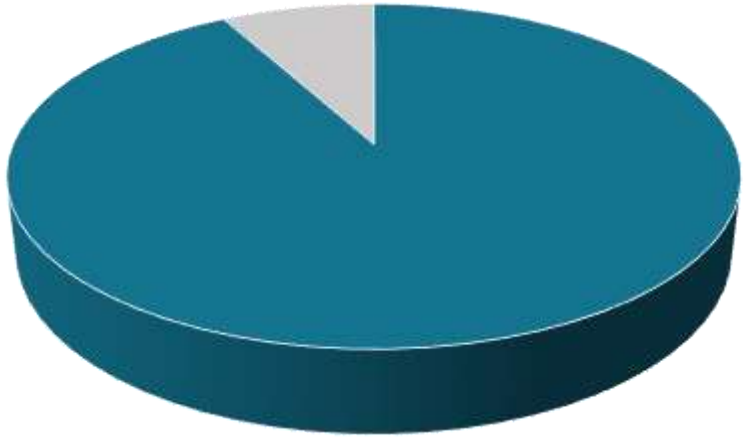
Adoption of EMV: The Statistics

Adoption of EMV: The Statistics

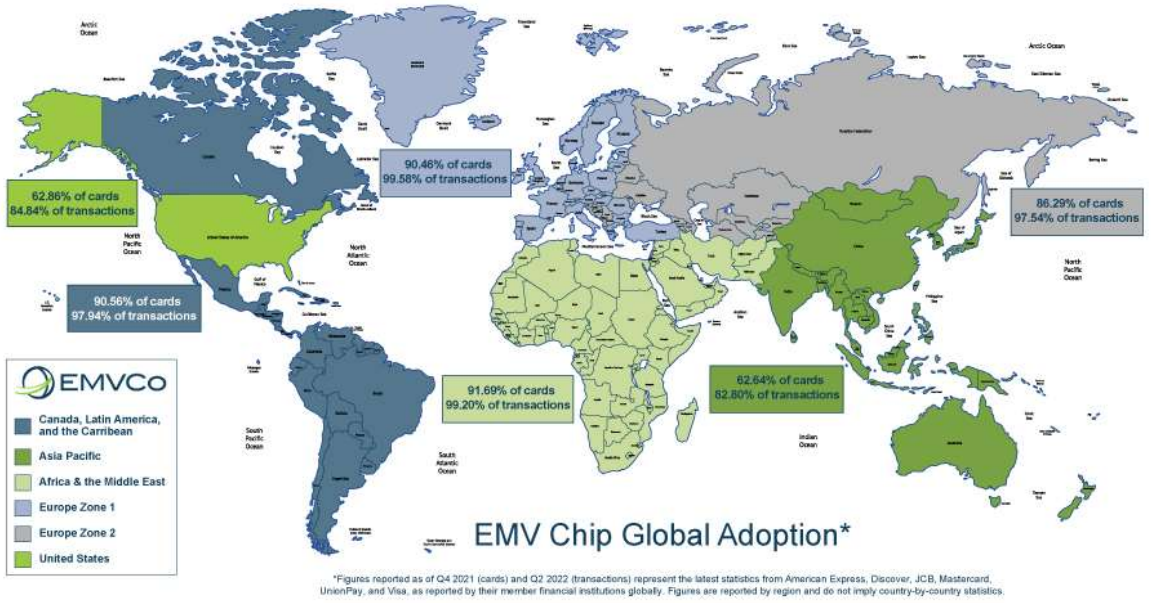
The adoption of EMV chip card technology continues to grow

Worldwide, EMV chip cards now account for over 91.94% of card-present transactions

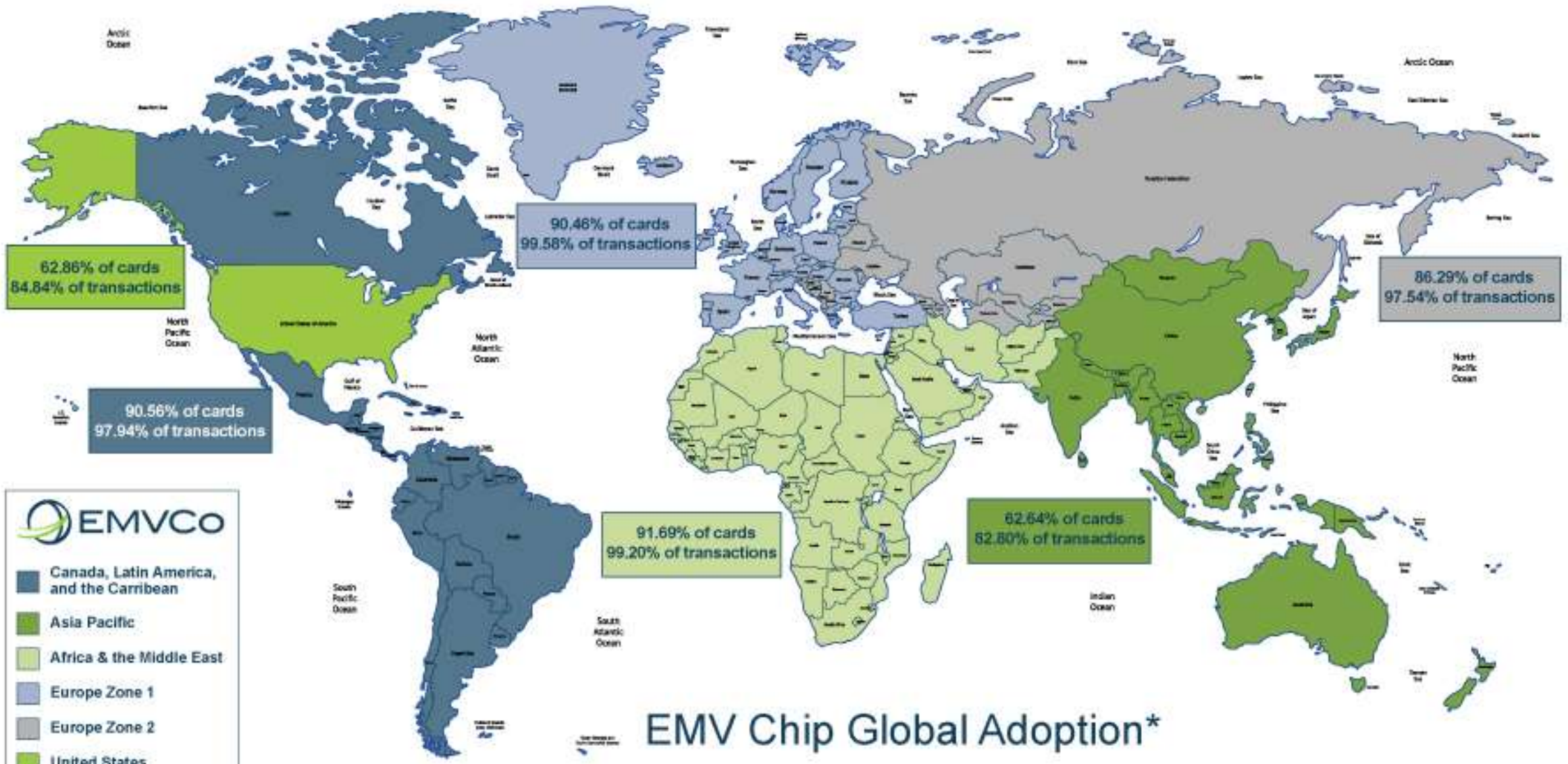
Card Adoption



■ EMV Cards ■ Other Cards



Adoption of EMV: The Statistics



*Figures reported as of Q4 2021 (cards) and Q2 2022 (transactions) represent the latest statistics from American Express, Discover, JCB, Mastercard, UnionPay, and Visa, as reported by their member financial institutions globally. Figures are reported by region and do not imply country-by-country statistics.

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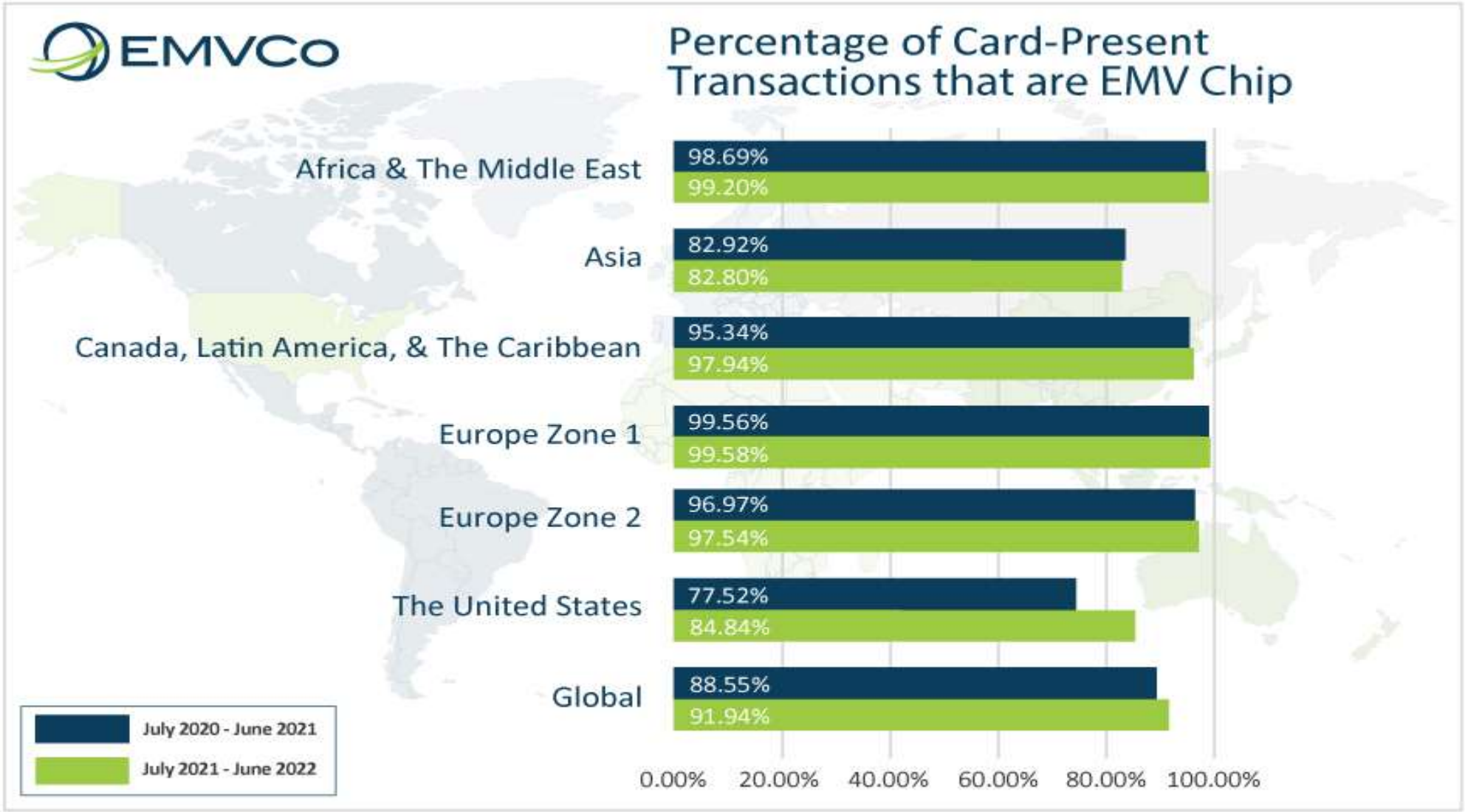
Adoption of EMV: The Statistics



Data represents the most accurate possible data that could be obtained by American Express, Discover, JCB, Mastercard, UnionPay and Visa for transactions processed by them during the noted period. The transaction data reflects an average of 12 months' data as reported by all members to take into consideration seasonal variations. To qualify as an 'EMV chip transaction', both the card and terminal used during a transaction must be EMV chip-enabled. Data is reported from the acquirer perspective. These figures may not include offline transactions, 'on us' transactions (defined as a transaction handled exclusively by another processor) and/or transactions processed by non-EMVCo member institutions, such as national payment netw

Adoption of EMV: The Statistics

Worldwide EMV Chip Card Deployment and Adoption*

	2019		2020		2021	
Region	EMV Cards	Adoption Rate	EMV Cards	Adoption Rate	EMV Cards	Adoption Rate
Africa & the Middle East	312M	89.4%	339M	90.4%	375M	91.69%
Asia Pacific	6,226M	58.1%	6,885M	60.9%	7,528M	62.64%
Canada, Latin America, and the Carribbean	923M	86.7%	1,023M	90.7%	1,222M	90.56%
Europe Zone 1	1,040M	85.9%	1,073M	86.5%	1,192M	90.46%
Europe Zone 2	318M	80.7%	335M	84.1%	379M	86.29%
United States	1,074M	60.9%	1,161M	63.0%	1,282M	62.86%
Global	9,893M	63.8%	10,816M	66.4%	11,981M	68.16%

*The statistics show worldwide EMV Chip Card deployment figures as of Q4 2019, 2020, and 2021. The figures represent the latest statistics from American Express, Discover, JCB, Mastercard, UnionPay, and Visa, as reported by their member financial institutions globally.

Why not magnetic stripe cards?

Why not magnetic stripe cards?

Why we need to move to EMV chip cards. Is it only to reduce fraud and increase security?

Magnetic stripe

Before EMV chip, all the transactions were done using the magnetic stripe, which has multiple issues

Why not magnetic stripe cards?

No processing capacity	Magnetic stripe cards have no processing capacity and cannot generate dynamic codes
	EMV chip cards have a microprocessor, allows them to perform processing tasks and generate dynamic code
Limited data storage	Magnetic stripe cards have limited data storage capacity
	EMV chip cards can store much more data and can be used for a variety of purposes

Why not magnetic stripe cards?

Lower security	Magnetic stripe cards are much less secure than EMV chip cards
	EMV card generates a unique transaction code for every purchase
Poor signature verification	Magnetic stripe cards rely on a signature as a form of verification
	EMV card uses digital signatures to authenticate the card

Why not magnetic stripe cards?

Poor signature verification	Magnetic stripe cards rely on a signature as a form of verification
	EMV card uses digital signatures to authenticate the card
Limitation of the issuer approval process	Transactions exceeding the merchant floor limit, which is a pre-defined amount set on a merchant, can only be authorised by the issuer approval process
	EMV chip cards have a more streamlined and automated approval process, which can significantly reduce the time

Additional benefits of using an EMV chip card

Additional benefits of using an EMV chip card

Design flexibility and enhanced security

Offline capabilities

Risk reduction parameters

Better card authentication

Additional benefits of using an EMV chip card

Design flexibility and enhanced security

EMV cards do not require to be in a fixed design like magnetic stripe cards

It can even be taken out and put in the SIM slot of our mobile phones, and the phone can be used as a card

Additional benefits of using an EMV chip card

Offline capabilities

It have the ability to process transactions offline, useful in areas where there is no reliable network

In offline mode, the card uses data stored on the chip to authenticate the transaction

Additional benefits of using an EMV chip card

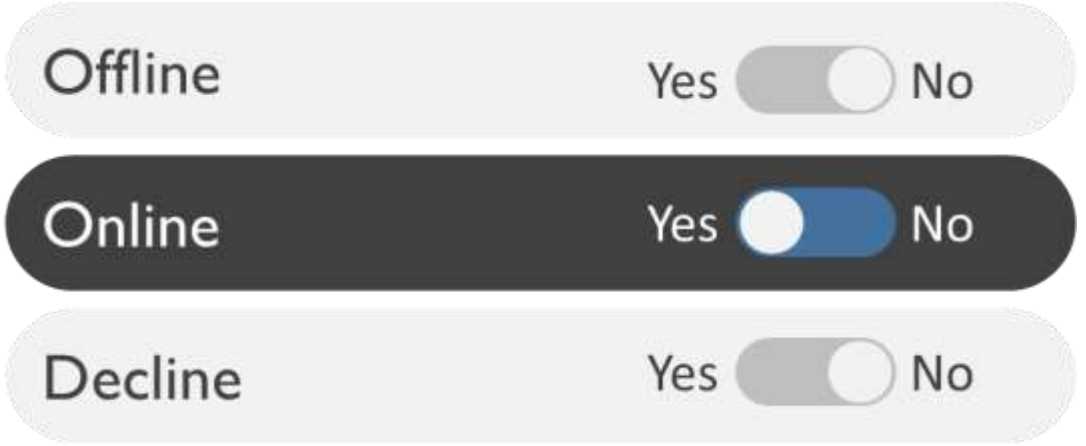
Risk reduction parameters

EMV chip cards provides, the issuer as well as the acquirer, the tools to manage risk in card payment transactions

Manage risk associated with the card

- Issuer action codes
- Terminal action codes

Assist the chip card and terminal in determining: ***How to process a card payment transaction?***



Additional benefits of using an EMV chip card

Better card authentication

EMV chip cards use a combination of cryptographic techniques and digital signatures to authenticate the card