INTRODUCTION TO EMV

EMV technology and new U.S. regulations are bringing radical changes to the payment card industry.

A Brief Introduction

EMV—which stands for Europay, MasterCard, and Visa— is a global standard for payment cards equipped with computer chips and the technology used to authenticate chip-card transactions. EMV is regulated by EMVCo whose current active members (American Express, Discover, JCB, MasterCard, UnionPay, and Visa) are responsible for the EMV approval process and compliance testing.

As the U.S. payment industry transitions to EMV technology, the following terms might be used for the new payment cards:

Chip card

Chip-enabled smart card

Chip-and-PIN

Chip-and-Signature

EMV smart card

EMV card

Smart card

Industry Directives

The U.S. has started to migrate to EMV chip technology. The plans include a series of incentives and policy changes for card issuers and merchants.

The global payment brands set October 2015 as the date for the payment liability shift, at which point the responsibility for fraud resulting from an EMV card swipe payment transaction will shift to the party using the least secure technology. The liability shift date for ATM operators and retail petroleum outlets are 2016 (MasterCard only) and 2017 (all other payment brands), respectively.

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→ **THE APRIVA GATEWAY™ IS ALREADY EMV-READY AND SUPPORTS EMV TRANSACTIONS WITH END-TO-END ENCRYPTION (E2EE) OR POINT-TO-POINT ENCRYPTION (P2PE).**

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EMV Benefits

Unlike magnetic-stripe cards, every time an EMV card is used for payment, the card chip creates a unique transaction code that cannot be used again. As such, EMV provides several significant benefits:

Security
Counterfeiting and skimming of cards is more difficult than with existing magnetic stripe cards.

PIN Required
Lost and stolen cards cannot be used as EMV cards if the card requires a PIN to be used successfully, though not all cards in the US will be issued PINs.

Online Approvals
Transactions can be approved offline if the EMV card issuer personalizes "floor limit" card parameters to allow it. In the US to start, most cards will be set to a floor limit of zero, and therefore not allow offline approvals.

International Acceptance
Global interoperability as U.S. companies who issue EMV chip cards provide their cardholders with greater convenience and less friction at the point of sale when they travel internationally. The stronger authentication by using the EMV cryptogram allows U.S. issuers to confidently authorize EMV transactions made using EMV chip cards and approve more cross-border transactions, reducing the impact on traveling cardholders.

Mobile Convergence
Mobile convergence as contactless EMV can be delivered via key fobs, microSD memory cards, adhesive stickers, and NFC-enabled smart phones.

The first round of EMV cards—many of which are already in consumers' hands—will be equipped with both chip and magnetic-stripe functions so consumer spending is not disrupted and merchants can adjust. If a consumer is unsure whether to dip or swipe their card, the terminal will walk him or her through the process.

Other common EMV options include contact v. contactless, PIN v. signature, online v. offline authorizations, and integrated v. standalone POS as introduced below.

Contact v. Contactless

The interface with the EMV reader can require physical contact or be contactless. EMV cards are either contact cards, contactless cards, or dual-interface cards which can support both types of communication.

Contact Cards
Contact cards communicate through a contact plate on the card chip. The plate must come into contact with the terminal contacts, usually through a reader into which the card is inserted (or "dipped"). The card must remain in the reader for the duration of the transaction.

Contactless Cards
Contactless cards contain an antenna and communicate over a radio frequency (RF) using near-field communication (NFC) whereby the card is simply tapped against a terminal scanner. The embedded antenna is not visible on most contactless cards; however, many contactless cards display a symbol indicating that they have contactless capability.

Dual-interface Cards
Dual-interface cards combine both interface techniques, using a single chip. A dual-interface card contains a contact plate and a hidden antenna.

→ **THE APRIVA GATEWAY SUPPORTS CONTACT OR CONTACTLESS EMV TRANSACTIONS.**

PIN v. Signature

Depending upon the verification method tied to a particular EMV card, and the capabilities of the payment terminal, contact cards may require a personal identification number (PIN) or a signature to accompany each transaction. Cards requiring a PIN are typically called "chip-and-PIN" cards while cards requiring a signature are typically called "chip-and-signature" cards.

Chip + PIN
Chip-and-PIN cards operate like checking account debit cards, currently used by U.S. consumers. Some chip-and-PIN cards will allow signature if a PIN pad is not available.

Chip + Signature
Chip-and-signature cards operate much like magstripe credit cards, where consumers sign at the point-of-sale (POS) terminal.

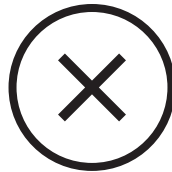→ **THE APRIVA GATEWAY SUPPORTS CHIP-AND-PIN AND CHIP-AND-SIGNATURE TRANSACTIONS.**

Online v. Offline

When authorizing an EMV transaction, the transaction must first be sent to the card chip for an authorization decision. The card chip has three options:
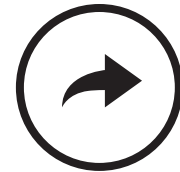

Approve the transaction   OR   Decline the transaction   OR   Request the transaction be sent to the issuers host for authentication

If the EMV chip approves or declines the transaction, it is considered an "Offline" transaction. If the terminal does not support "Offline," the chip's decision to approve offline will be ignored and some decline situations will be sent online for approval.

If the EMV chip requests the transaction be sent to the issuer's host for authorization, it is considered an "Online" transaction. Even if a transaction is sent for online authorization, the issuer authorization decision returned will be sent to the card chip for a final authorization decision by the card.

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Fully-Integrated v. Semi-Integrated v. Standalone POS Solutions

Integrated POS solutions generally have an Electronic Cash Register (ECR) directly connected to an external PIN pad which provides the EMV and contactless functionality. The smartcard reader, PIN entry capability and EMV kernel all reside within the external PIN pad. Two common configurations:

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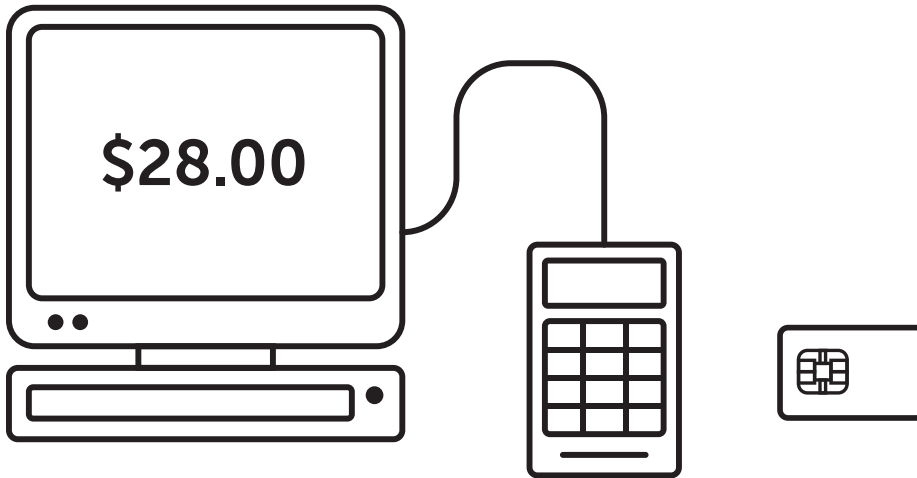
Fully Integrated
The ECR interfaces with the PIN pad for EMV functionality only

- ECR builds the processor authorization message and parses the processor response message — giving the developer the most control of the transaction process

- PCI is in scope for the ECR as the ECR handles the card track data (PCI scope may be reduced or eliminated if Point To Point Encryption and tokenization are implemented)

- An EMV certification is required for the complete solution

Semi-Integrated
The ECR interfaces with a PIN pad (or terminal) for EMV functionality

- PIN pad provides the processor host interface and stores the authorization data —eliminates much of the ECR development as the ECR does not build the authorization message

- ECR is not in PCI scope as the ECR does not see the card data

- An EMV certification of the complete solution is not required as the PIN pad contains the full payment application

Standalone POS solutions consist of a terminal that utilizes a PIN pad to provide the EMV and contactless functionality. The smartcard reader, PIN entry capability and EMV kernel all reside within the PIN pad and the device is totally managed by the service provider, acquirer, or processor. All standalone solutions must adhere to PCI requirements and require a full EMV certification. Standalone solutions can have internal or external PIN pads.

→ **THE APRIVA GATEWAY SUPPORTS FULLY-INTEGRATED, SEMI-INTEGRATED, OR STANDALONE POS SOLUTIONS FOR EMV TRANSACTIONS.**

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