

# New EMV Initiatives: Will EMV Issuers Be Able To Cope?

Almost all of the 145 million EMV cards issued in 2005 carried only a single application and offered only simple functionality. Since EMV cards have historically lacked sophistication, most EMV card issuers have only implemented EMV data preparation software or simply upgraded their in-house card issuance systems.

Recent EMV initiatives, however, are making more use of the EMV infrastructure, expanding functionality and reducing costs. This document investigates a number of the initiatives that are encouraging issuers to regain their enthusiasm for EMV, including card scheme initiatives, the Single Euro Payments Area (SEPA) and EMVCo initiatives. An analysis of the current systems used by EMV card issuers seeks to determine whether these systems will be able to cope with the new requirements.

**white paper**



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## Section 1: Introduction

When chip cards were introduced 10 years ago, many believed that an immediate and major change would occur in the payment landscape. Some industry analysts expected chip cards to house multiple applications, which cardholders would be able to download post-issuance. Transactions would be offline, secure and fast. Issuers would receive and analyse mountains of data from chip transactions and make precise parameter changes to the card application to guard against undesired use. Cash transactions would be vastly reduced; cardholders would need only one card to hold all their applications, and new form factors would appear, enabling them to house the chip in a key fob, watch, mobile telephone or even their fingers, if so desired.

“When EMV started, there was a lot of hype around multiapplication; then banks who invested in EMV had to concentrate and deliver the main application, which was the payment,” said Guido Mangiagalli, head of the new channels unit at Visa Europe.

What has actually happened to EMV payment card issuance is not a story of large-scale innovation. The rush to combat fraud, comply with card scheme mandates and meet liability shifts meant there was no time to consider value-added solutions. Some payment card issuers are issuing EMV cards, but almost all are single-application, low functionality cards. Chip manufacturers have increased security, but at the expense of more imaginative uses of chips.

Issuers have, therefore, used relatively simple systems to manage this issuance. Generally, they have either added data preparation systems to their issuing environments or enhanced their in-house systems to add chip data to the card embossing file. A number of issuers have implemented smart card management systems, but they are in the minority.

Recently, though, some of the original EMV ideas have matured and become more affordable. Some of these business initiatives are pushing issuers to expand card functionality and explore the chip card's unexploited potential.

## Section 2: Card Scheme Initiatives

The card schemes have developed several initiatives to make better use of the EMV infrastructure, first, in card-not-present (CNP) environments and second, for contactless payments.

### Two-Factor Authentication

As more bank customers use Internet banking and debit and credit cards for Internet purchases, fraudsters are becoming increasingly clever, creating the need for stronger authentication. Traditional methods, such as static passwords, are proving vulnerable to fraud. Led by MasterCard and Visa, the card industry has introduced standards to bring two-factor authentication to the virtual world of Internet banking and shopping. The programme is based on EMV payment card technology. MasterCard originally created the chip authentication programme (CAP), which has been sublicensed by Visa to create its dynamic password authentication programme.

CAP uses the chip card's ability to validate a customer's EMV PIN. If the PIN is valid, then the chip generates an application cryptogram that acts as a dynamic, single-use password. A personal card reader is required to perform the operation and displays the dynamic password, which is then entered at the Internet banking or shopping site to authenticate both the card and the customer. The method is called two-factor authentication because it is based on two key points: something the customer has (the EMV payment card) and something the customer knows (the PIN).

In the United Kingdom, APACS has produced implementation guidelines that direct issuers to add the CAP application separately. This ensures that CAP will be issued on multiapplication cards. Other countries are following this lead.

CAP also marks the beginning of wide-scale use of EMV debit cards for functions outside payment, e.g. authentication.

"It is a tricky process [for issuers] to add new functionality," said Gijs Schreuder, head of consumer payments at Netherlands-based ABN AMRO Bank N.V. "Consumers have to adopt and understand [new applications]. Once they understand the functionality, they are ready for new ones."

The more cardholders trust and accept their cards for use in different environments, the more valuable the card becomes to both the cardholder and the issuer alike.

## Contactless Cards

In the United States, contactless cards have proven extremely popular, with more than 20 million cards already issued. Contactless EMV payments will be launched soon, and the card schemes are using them in their so-called “war against cash.” MasterCard estimates that 180 billion European cash transactions take place annually and suggests that a great number of those could be efficiently processed as contactless payments.

Outside the United States, the card schemes have decided to make use of the offline EMV infrastructure to implement contactless payments. Contactless cards interface with a card reader without requiring a card swipe or dip. Cardholders can use contactless cards to pay for goods by simply waving a card within 10 centimetres of a contactless reader. Transactions are mainly authorised at the point-of-sale (POS) terminal against limits held on the chip. Transactions below a certain value threshold, typically £10, may be made without requiring cardholder verification. Early indications from pilots carried out in the United Kingdom and France show that issuers and merchants alike are impressed at the potential of contactless cards and expect a successful mass rollout.

In the United Kingdom, a number of major banks have announced a joint launch of contactless cards beginning in the London region this year. A minimum of half a million cards are expected to be issued initially, and 1,000 merchants will be involved. Barclaycard has also announced a partnership deal to house Transport for London’s Oyster contactless ticketing application on its payment cards.

“Putting Oyster and Barclaycard together makes life even easier for Londoners and takes our customers an important step closer to fully contactless card payments elsewhere,” said Antony Jenkins, chief executive at Barclaycard.

Further pilots and rollouts of EMV contactless cards are continually appearing. LaSer Cofinoga, a French issuer of mainly private-label store cards, has launched a trial of contactless cards. In Turkey, Garanti Bank has already issued 50,000 EMV-compliant MasterCard contactless cards since rollout began in summer 2006.

Contactless EMV card payments are ready for takeoff, but the impacts to issuers are unknown. Payments made with these cards will take place in offline environments, without PINs, by a technology that is not widely understood. Initially, transaction values will be relatively low, and this will prevent issuers from becoming overly worried about levels of fraud or bad debt. The maximum transaction value is to be £10 with a possible £30 purse before a transaction is put online.

However, pressure from merchants to raise transaction limits and from cardholders to raise purse limits will eventually leave issuers with a problem: They will have to manage the risk of issuing cards that can perform, for example, transactions for £25 with a purse of £250 in offline environments without needing to check the cardholder’s identity.

Issuers will need to refocus on offline risk management around the EMV profiles and parameters that up until today have been set up as standardised values. The ability to change these profiles and parameters post-issuance will also become more important as demand grows to issue contactless cards to wider groups of cardholders.

Smart card vendors agree that contactless payments will boost chip cards and inspire issuers to adopt them. The Smart Payment Association, comprised of the four major suppliers of banking smart cards worldwide, has announced a new initiative to promote contactless, multiapplication payment cards. The association has defined an interoperable data format for contactless applications, from loyalty programmes to transit to cinema ticketing.

“Thanks to our specifications, a system will work with any card from any vendor instead of only one card,” said Jérôme Ajdenbaum, president of the Smart Payment Association.

Developments in Near Field Communications (NFC) are related to contactless payments; NFC is likely to make some issuers reconsider the form factor for the contactless application. Recently, many pilots have used mobile telephones to house the contactless chip. If mobile telephones were to take over some of the payment market, this would lead to new challenges for issuers — such as how to personalise the payment application over the air.

“We see clearly a new source of revenue for us [in mobile contactless payments],” said Mung-ki Woo, head of payment and contactless at France Telecom. A revised business model would also be required that might include the network operator, handset operator, etc. Clearly, the impacts for card issuers who do not make plans for contactless applications residing in mobile telephones could be very significant.

## Section 3: The Single Euro Payments Area (SEPA)

This paper has analysed two EMV initiatives from the card schemes. The next section investigates a powerful external influence on EMV issuing: the Single Euro Payments Area (SEPA).

The introduction of SEPA for payment cards is targeted for 2008. SEPA will force Eurozone banks to reform the patchwork of debit card networks that currently exists across Europe. These networks are anticompetitive and prevent European banks from acquiring cardholders across the Eurozone. One of the most important elements of the new European card framework is EMV compliance; however, the most generous estimates of migration in Europe indicate that only 40 percent of the task is complete.

EMV plays a key role in preventing and fighting card fraud. Fraud rates are typically low at the national level and high at the cross-border level. SEPA is intended to significantly increase card payments across the Eurozone, and it is vital that measures be implemented to prevent an increase in fraud. Therefore, the European Payments Council (EPC) has mandated that all cards issued in 2008 be EMV-compliant, with the aim that EMV will be fully implemented by 2010. Observers believe the deadline for EMV compliance is achievable subject to retailer agreement to terminal changes.

Hence, pressure exists for EMV card issuers to achieve EMV compliance in addition to the pressure from the card schemes via liability shifts.

“EMV is the key way; we gave a clear deadline of 2010 on that,” said Alfred Schmauss, chairman of the cards working group of the EPC. Furthermore, SEPA’s drive to increase competition for electronic payments will put card revenues under pressure; therefore, card issuers are more likely to try to extract added value from EMV, instead of simply issuing single-application payment cards. Issuers forced to begin EMV issuance now will find that higher-specification cards are cheaper than a few years ago, and some of the initiatives are better defined. Both of these things should make it easier for issuers to implement value-added services.

Initiatives such as contactless cards are based on a fully implemented EMV infrastructure. Pressure from SEPA will lead to this happening by 2010 at the latest. Datamonitor’s “Contactless Payment 2006” report states, “As the contactless payment programmes outside the United States require an EMV-compliant infrastructure, it is the level of migration that appears to be determining the future development of contactless in the region.”

The EPC also believes that contactless technology will benefit the Eurozone. The EPC has expressed a goal to reduce the cost of cash handling, which currently costs the EU around €50 billion a year. The cost of cash handling should be reduced by persuading more banks to implement contactless cards, thus targeting low-payment transactions.

A number of European countries within the SEPA region have also expressed fear that the emergence of a Visa and MasterCard duopoly across the Eurozone could restrict competition. For this reason, some countries are planning to maintain their domestic debit card schemes in the short term, alongside an international debit card application. This will demand that some issuers in these countries issue multiapplication payment cards and implement the supporting infrastructure.

Further impact to issuers will derive from SEPA's drive to open domestic markets to allow more cross-border acquiring. Once implemented, consumers will be able to use EMV debit cards anywhere in the Eurozone. This could impact the business case for joint retailer and card issuer loyalty schemes. A vastly expanded market in which the loyalty schemes operate will help drive these schemes forward. The general acceptance of an EMV debit card across the Eurozone could accelerate the use of the card in areas such as identification and transit.

## Section 4: EMVCo Initiatives

In addition to market changes, EMVCo has led technical developments designed to make EMV issuance more cost-effective. This section examines these initiatives from EMVCo.

To prevent issuers from having to employ distinct processing for each card scheme implementation, the card schemes investigated an EMV implementation that could be common, regardless of the scheme. EMVCo has produced common core definitions (CCD), which provide the basic EMV data definitions and the common payment application (CPA) that define the behaviour of the EMV application.

### Common Core Definitions (CCD)

CCD addresses the external data flowing between the chip card and the issuer. With these definitions, issuers receive and return chip data in one common format from Visa, MasterCard and other card brands. CCD also specifies a minimum common set of card application implementation options and card application behaviours.

### Common Payment Application (CPA)

CPA takes CCD a step further. Whereas CCD focuses on the external interface of the card to issuer data and some processes, CPA provides common functionality for the entire payment application. This allows issuers to use the same mask for cards from all payment schemes that support the CPA specifications. CPA enables a single application implementation to be personalised with the same data elements and tags, including common risk management controls. EMVCo, which owns and maintains the CPA specification, has additionally established certification procedures to streamline CPA testing.

CPA also allows more data items to be changed with EMV issuer scripts. For instance, issuer scripts can be used to maintain the value of various new accumulators and counters, as well as to control the use of risk management profiles.

CPA has the same objectives as CCD in that issuers should realise the benefits of a single back-office processing system for personalisation and card management, and ultimately a single card platform for Visa, MasterCard and other payment brands.

“CPA also enables issuers to enjoy the benefits of multiple vendors for chip cards and improved interoperability,” said Gaylon Howe, chairman of the EMVCo executive committee. “Thanks to these many benefits, CPA ultimately has the potential to lead to significant cost savings for issuers migrating to or already deploying EMV.”

## Offline Authentication

Another impact to EMV issuers concerns the type of offline authentication supported by EMV cards. With scares over static data authentication (SDA) security appearing regularly in the media, card issuers are gradually favouring the use of dynamic data authentication (DDA). Initiatives like contactless cards that make offline transactions more prevalent will push issuers in the same direction. Most importantly, the fall in the price of DDA chips makes the decision to move to DDA easier. The impact to EMV card issuers is that more cryptographic keys will be involved in the issuance process, and the personalisation process will become more complex.

# Section 5: Requirements of the New Initiatives

This section examines the impact of the new initiatives on current EMV card issuing systems. In particular, what impact will these initiatives have on issuers who have so far implemented systems designed to issue only simple EMV cards?

The new initiatives will impact issuers in the following ways:

## Contactless Cards

- ▶ Create major inroads into low-value payments
- ▶ Focus issuers' attention on dynamic risk management and product segmentation
- ▶ Lead to potentially considerable changes in how chips are issued and personalised (e.g. contactless payment applications in mobile telephones)

## CAP

- ▶ Push issuers down the multiapplication path

## SEPA

- ▶ Force the uptake of EMV in countries where it has been a low priority
- ▶ Help to establish a Eurozone-wide EMV infrastructure
- ▶ Encourage new issuers to adopt EMV at a time when chip costs are falling
- ▶ Lead issuers to distribute multiapplication cards

## EMVCo

- ▶ Enable easier card personalisation
- ▶ Allow issues to move more easily from one card vendor to another and for multi-brand issuers to issue multiple brand cards
- ▶ Allow issuers to change the way their payment applications behave post-issuance
- ▶ Highlight increased complexity of chip card issuance

The card schemes and SEPA offer issuers the means to gain more benefits from their investments in EMV. EMVCo is similarly providing issuers the means to implement EMV at less cost.

Issuers now need to investigate their EMV issuing systems and consider the following:

- ▶ How can different card products be segmented to allow issuers to allocate the correct profiles and parameter values to allow cards to be used in offline environments?
- ▶ What is the mechanism to alter risk management parameters on payment applications post-issuance? This is again important for contactless cards, or cards that will be used in offline environments.

- ▶ How can issuing systems interface to other application issuers? Importing data from multiple application issuers, especially if all the applications are not payment applications, adds to the complexity of issuing smart cards
- ▶ Can new applications be downloaded to cards post-issuance, so that cards do not have to be re-issued when new applications need to be added to a card (e.g., adding CAP to an already issued payment card)?
- ▶ How will contactless cards affect issuance? How can payment applications stored in other form factors, such as a mobile phone, be personalised?

The majority of current EMV card issuer systems have not been designed to address these complexities. As previously discussed, issuers have implemented either in-house developments or data preparation software to chip-enable their issuing systems. These in-house systems have not been future-proofed for potential developments and will require further development to support each new initiative. Furthermore, data preparation systems are designed to add payment chip data to embossing files and enable EMV payment cards to be issued quickly. They do this well because it is their focus.

Therefore, if issuer systems do not currently support these initiatives, when will EMV card issuers implement smart chip management systems that do? The main problem could be that many issuers do not understand the extent of the chip card issuing system's requirements. If issuers were to try to tackle SEPA, contactless cards and CAP requirements simultaneously while also upgrading to DDA and trying to make use of CCD and CPA, it would become obvious that their current issuance systems would not be able to cope.

Most issuers will approach these initiatives one at a time. This could result in issuers attempting to prolong the life of their current systems, whether data preparation or in-house systems. They may try to expand the current functionality piecemeal by attaching additional systems and processes, focusing on one requirement at a time. This type of development will often occur with in-house systems, as it enables the in-house IT department to demonstrate its flexibility.

On the data preparation side, piecemeal expansion is probably more difficult to achieve since data preparation systems are designed for a specific function. Unless they can be interfaced to a larger system, they may become redundant.

## Section 6: Conclusion

EMV cards are beginning to migrate from their basic, functional origins and head in the direction that some first envisaged. Surprisingly, this change has occurred slowly.

Originally, it was assumed that everything would happen overnight, in a sort of “big bang” migration. Instead, expediency has meant that EMV cards have been rolled out as secure, single-application payment cards.

In a few years, issuers will find that EMV cards have turned into multiapplication, highly complex chip cards. Furthermore, sophisticated risk management systems will perform post-issuance changes to contactless card parameters and applications.

Questions remain: Will issuers get there by piecing together various issuance systems, as the latest EMV initiative dictated, or will they take a more strategic view and implement a future-proof chip card issuing system that can take on new challenges? Will issuers have the foresight to see changes coming and make the necessary and difficult decisions to prepare their companies for the future? Do issuers think chips are their future, or just a necessary evil to fight fraud?

Financial institutions that embrace chip functionality and exploit the potential to offer cardholders greater levels of service are surely the banks that will succeed and profit from the large-scale investment that EMV requires.

