

WHITE PAPER

# EMV ADOPTION

## Executive Overview

As of 2014, there were more than two billion Europay, MasterCard, Visa and Discover (EMV)-compliant chip-based payment cards in use worldwide. Visa, MasterCard, American Express and Discover have placed a timeline for U.S. adoption, in the form of liability shifts, which has elevated this issue from conceptual to imminent. While credit unions aren't required to act immediately, the proverbial writing is on the industry wall. The time to formulate an adoption strategy is now. While the U.S. lags behind the rest of the world, the global brand liability shifts and the recent merchant data breaches have propelled the U.S. forward on the path to EMV.

Even with the "Network of Four" pushing for adoption, the Durbin Amendment (Regulation II) network exclusivity clause stalled the adoption of EMV on debit cards. Standard EMV implementation used in other parts of the world is not compliant with the two non-affiliated networks clauses of Durbin. Until this problem of network neutrality was resolved, coupled with the high cost, issuers and merchants alike were reluctant to enable EMV. With no terminals and no cards, the stalemate continued while the industry grappled with how to arrive at a fair and harmonized solution for all.

The Target breach in late 2013 once again put pressure on the industry to find a solution to the debit conundrum. Although EMV issuance for financial institutions may not have reduced

the fraud associated with those breaches, it has directed more focus on EMV adoption by all parties. A breakthrough occurred in February 2014 when Visa announced that they were offering a free perpetual license of their EMV Application Identifier (AID) to open up the proprietary stronghold on EMV deployment in the U.S. MasterCard followed shortly thereafter. With most debit networks having signed with Visa and the expectation that MasterCard agreements are not far behind, a U.S. solution for debit, compliant with Durbin, was struck.

This white paper was developed to inform credit unions on the plethora of issues related to EMV adoption. While it is certain that challenges will be encountered, this report addresses the topics already mentioned, as well as discusses why financial institutions and merchants should be educated on the various impacts of EMV, a soon-to-be industry-accepted new payment ecosystem.

## The Global Outlook

While EMV technology was first introduced in 1994, Europay, MasterCard and Visa later co-founded the public corporation EMVCo LLC, which provides guidance, standards and protocols on EMV. At that time, many financial institutions, mainly foreign, recognized the benefits of a chip-based payment platform. Additionally, they saw the need for international standards to further global interoperability. Today EMVCo is jointly owned by American Express, Discover,

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JCB, MasterCard, Union Pay and Visa. EMVCo publishes specifications for contact chip cards, contactless cards and EMV contactless mobile payments. The specifications are free and can be downloaded from [www.emvco.com](http://www.emvco.com).

To date, EMVCo finds that approximately 2.4 billion EMV cards have been issued globally. The organization reports that 36.9 million POS devices accept EMV cards, representing 47.2 percent of the total payment cards in circulation and 84.6 percent of the POS devices installed globally.<sup>1</sup>

### How Prevalent Is EMV Globally?

According to EMVCo, the majority of the world, sans the U.S., is or is in the process of migrating to EMV chip technology for debit and credit payments. NCR Corp. reported that France was the first country to launch EMV and has since experienced an 80 percent decline in fraudulent activity. Today, virtually 100 percent of European ATMs are EMV compliant.<sup>2</sup>

"It is still early in the adoption process for the U.S., with a small but growing percentage of issuers using EMV," said Michelle Thornton, Manager - Core Products, CO-OP Financial Services. "The U.S. has a different payment landscape and is online all the time which is different than the European model. There were also more considerations such as the impact of the Durbin Amendment and specifically how EMV would affect debit card transactions, which significantly slowed EMV in the U.S."

In 2014, EMVCo released worldwide EMV statistics, and as Thornton noted, U.S. adoption rates were still considered so low that the paper listed U.S. findings as "not reported." In Africa and the Middle East, for example, 77 million cards were issued with a 38.9 percent adoption rate. The number of EMV terminals was listed at 699 thousand with an 86.3 percent adoption rate. In Europe Zone One (SEPA countries), 749 million cards were issued with an 81.6 percent adoption rate. The number of EMV terminals was the highest at 12.2 million as well as having the highest adoption rate, 99.9 percent.<sup>3</sup>

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## Africa & Middle East

Cards Issued:	EMV Terminals:
<b>77M</b>	<b>699K</b>
Adoption Rate:	Adoption Rate:
<b>38.9%</b>	<b>86.3%</b>

## Europe Zone One (SEPA countries)

Cards Issued:	EMV Terminals:
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Adoption Rate:	Adoption Rate:
<b>81.6%</b>	<b>99.9%</b>

### The U.S. Timeline

In an attempt to be forward-looking, on August 9, 2011, Visa set the EMV adoption rate pace by announcing that it would accelerate its migration to contact chip and contactless EMV in the U.S. This proactive initiative included a migration roadmap supporting the exponentially growing mobile payment market. MasterCard, Discover and American Express soon followed Visa's lead.

Effective October 1, 2015, the four networks will institute a U.S. liability shift for domestic and cross-border counterfeit card-present POS transactions. Liability will be assessed to the party that did not enable the chip-to-chip (EMV) transaction. In the case of issuers, this applies if cards are not EMV chip-enabled. For merchants this applies if terminals are not EMV chip-enabled. Fuel-selling merchants will be provided an additional two years for compliance before a liability shift takes effect for transactions generated from automated fuel dispensers. Currently, POS counterfeit fraud is largely absorbed by card issuers at a rate of approximately three cents per swipe.

As mentioned earlier, debit adoption was stalled in the U.S. because standard EMV implementation does not support the



option for merchants to route to two unaffiliated networks. The solution forged between the stakeholders is in the process of being deployed, but there is still work on the terminal side of the equation. Just as EMV in the rest of the world didn't support the complicated multi-network environment in the U.S., global EMV terminal deployment specifications are not configured for the U.S. market either. Terminal manufacturers and acquirer processors are swiftly writing and testing code for the terminal to ignore standard EMV rules and enable the acquirer to choose the Common AID or set it as the default in a PIN debit transaction.

### How EMV Works

This nearly 20-year-old global standard for inter-operation of integrated circuit cards (IC cards or "chip cards"), chip-card-capable point of sale (POS) terminals and automated teller machines (ATMs) was developed to advance payment-security practices.

Chip cards are essentially miniature computers with an operating system, multiple interfaces and applications that process information through the use of an embedded microprocessor and a gold- or silver-colored contact plate mounted on the front of the card. EMV cardholders insert a card into the reader, spurring dialogue between the card and terminal that validates the card, terminal and issuer through the exchange of secure cryptograms, enabling a more secure transaction.

As is the case with the adoption of new technologies, a learning curve is required with EMV. For example, referring to "Chip and PIN" is often misleading. EMV currently supports four cardholder verification methods (CVMs). These are based on issuer preference and different terminal capabilities. First, there is signature verification, which compares the cardholder signature on the receipt to the signature on the back of the card. Second, there is Online PIN encrypted and verified online by the card issuer. Third, there is Offline PIN (rarely supported in the U.S. at this time), which is verified offline by the EMV card and only passes along the result of the transaction. And finally, there is no CVM option, which typically occurs with low-value transactions or for transactions at unattended POS locations. From the cardholder perspective the personal preference for using PIN or signature will continue to be supported for the foreseeable future in the U.S.

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<i>Signature Verification</i>	Compares the cardholder signature on the receipt to the signature on the back of the card.
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There are also different authorization methods. Online authorization of the transaction can be completed using any one of the four CVMs. With offline authorization, the microprocessor in the card validates the PIN and authorizes the transaction without connecting to the host. This "stand-in processing" capability of the chip card is what initially attracted European interest in EMV. At the time, it was deemed that telecom was too expensive, with many transactions conducted in a batch mode. It was later determined that deploying a mini-processor to authorize transactions using various issuer-chosen parameters, such as velocity and limits, would significantly reduce fraud. As such, it is not surprising that France realized dramatic reductions in fraud. However, in the U.S. transactions and authorizations at almost all terminals are online, real-time, eliminating much of the fraud that European countries were facing. Offline authorization is slowly being eliminated around the world with very few pockets remaining where online authorization isn't the norm. In fact, the four global networks either prohibit or discourage offline authorization on U.S.-based cards and terminals.

EMV places significant prominence on the actions of the chip. All parameters and choices are driven by software that is loaded on the chip. The software, called a "payment application," dictates how a payment is acquired and processed. Moreover, the application determines how to communicate with the terminal through the use of encrypted keys that must be loaded at the terminal and by the downstream participants in the payment authorization. The AID mentioned earlier acts as a "doorway" into the application, providing the terminal with the information that it needs to properly format communications with the applications on the chip, assist in determining transaction routing and to communicate with the application on the chip.



"EMV is replacing a magnetic strip with a computer," said Thornton. "This is a big leap that requires considerable development and a steep learning curve."

### Fraud Tool and Global Interoperability

EMV provides strong transaction security features in card present transactions that are not possible with traditional magnetic stripe cards. CO-OP estimates that approximately 50 percent of fraud is due to counterfeit cards created from skimming.

"For EMV adoption, there are more parallels to Canada than Europe as the Canadian model is more like the U.S.," said Thornton. Fraud statistics in Canada post-EMV adoption are telling. For example, in 2009, Canada's Interac debit fraud loss was \$142 million. Since deploying EMV technology, that number dropped to \$70 million in 2011. "There is no question that EMV adoption will reduce fraud, but keep in mind that at the same time that EMV was reducing card-present fraud, card-not-present (CNP) fraud rose," said Thornton. This is similar to what happened in other markets and it is expected that CNP will increase in the U.S. as EMV is adopted.



Yet many U.S. travelers are inconvenienced when traveling abroad (approximately 70 million international trips are made each year by Americans). In recent years, as more countries have migrated to EMV chip card technology for their payment systems, U.S. magnetic stripe cardholders have encountered more acceptance issues when travelling abroad. Although the vast majority of POS terminals worldwide will accept magnetic stripe payment cards, there remain unmanned terminals and kiosks that require an EMV chip card and some merchants are not familiar with how to process a magnetic stripe card. This can lead to the impression that a magnetic stripe card cannot be used.

The above issues were among the reasons that United Nations Federal Credit Union (UNFCU) became the first U.S. EMV adopter. And while the credit union's international member base makes EMV a logical choice, the success rate is a positive indicator. With 100,000 members and \$3.7 billion in assets, the beta rollout went to 8,000 member accounts enrolled in a frequent flyer card program. As of June 2012, UNFCU had roughly 40,000 credit card accounts worth more than \$130 million. While member response was positive, there were additional fees for the card at a rate of approximately 25 to 40 percent higher than magnetic stripe cards.<sup>4</sup>

"For a successful early rollout like this, it was best to have a large segment of cardholders living overseas, so this made a lot of sense for UNFCU," said Thornton. "In other cases, some organizations are willing to pay a high premium to be the first ones in the market with the technology."

### Impact to the Payment Ecosystem

Certain industry analysts are cautiously concerned about this migration to a new payment ecosystem as there exist numerous opportunities for failure. In its April 2012 report, MasterCard concedes that this perspective holds certain truths. Without considerable cross-industry investment in EMV standards (e.g., POS and associated infrastructure), adoption rates could be slower than expected. MasterCard alone, for example, contracts with over 8,000 payment-handling banking institutions in the U.S.

Due to the complex nature of EMV, all stakeholders in the payment chain will need to make changes to support EMV. This includes terminal manufacturers, merchant acquirers, merchants, EFT processors, networks, issuers, card manufacturers, card personalization bureaus and core data processors. Each of these entities must code to the specifications for every EMV payment application in order to continue to support the payment ecosystem as it is today. Merchant terminalization is a critical component of EMV deployment.

"For terminals, both POS and ATM, it is not only a question of new hardware, but new software. While many newer terminals have the hardware to accept a chip card, it does not have the software to read the chip," said Thornton.

A 2013 MasterCard report bears this out: "The degree of coordination in migrating to EMV has varied country by country. In Canada and the U.K., a structure of committees



and working groups was established and backed by a large PMO.<sup>5</sup> One answer to that issue here in the U.S. was the formation of The EMV Migration Forum (EMF) in 2012. The EMF is an independent, cross-industry organization promoting broad cooperation and coordination across over 140 companies in the payments space in order to successfully introduce secure EMV contact and contactless technology in the United States.<sup>6</sup> Another response was the formation of the Debit Network Alliance (DNA), an industry group made up of 10 of the key PIN debit networks to represent the PIN debit networks in the EMF and other industry forums. CO-OP is a founding member of this organization, and Thornton represents the company on its Board of Directors.

What market leaders agreed on is that in order for the migration to be successful, a broad agreement between stakeholders was required as to how and when national deployment occurs. This includes aligning messaging with financial institutions, merchants and consumers as well as testing of interoperability.

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Manager Core Products, CO-OP Financial Services

## The Debit Durbin Issue

October 2014 will mark the three-year anniversary of the addition of the Durbin Amendment to the highly debated Dodd-Frank Act. While the Amendment was designed to reduce debit card swipe fees, which in turn would allow retailers to pass savings on to consumers, skeptics think the reduced fees were more like profit centers for retailers.<sup>7</sup> But Durbin also "...prohibits an issuer or payment card network from restricting the number of payment card networks on which an electronic debit transaction may be processed to fewer than two unaffiliated networks, regardless of the method of authentication." As Nick Holland of Javelin Strategy & Research writes, "Nothing wrong with this in the context of introducing the means for competition at the checkout. Just

one problem though. EMV was never designed to do this."<sup>8</sup> The Smart Card Alliance describes the problem in the context of the proprietary nature of a network's chip application—EMV is designed so that transactions only go to the network specific to that chip on that specific card, there is no room for choice. One chip, one network, using a single Application Identifier (AID).

With 18 PIN debit networks in the United States, a U.S. EMV implementation gives rise to a host of legitimate concerns shared across the industry. The Debit Network Alliance underscored that the current international standards for chip technology did not consider the competitive, newly federally regulated, real-time payment infrastructure in the U.S. The Durbin Amendment requires that U.S. issuers support at least two unaffiliated brands of debit cards in order to provide merchant routing choice. This concern reaches across the payment ecosystem and was echoed with great concern in the merchant community.

"Deployment of a single interoperable chip and PIN solution for PIN debit should put in place one of the biggest remaining puzzle pieces to spur the U.S. payment industry toward adoption of chip technology," the SRPc (later the DNA) noted in a 2012 news release.<sup>9</sup>

Through industry groups like the EMF and the DNA, it became clear that EMV as deployed internationally would not work in the U.S. Negotiations and discussions continued for 18 months until the public outcry after the Target breach spurred action with Visa's offer of the free Common AID solution.

The "Common AID" solution in the U.S. requires two AIDs on a global branded debit card, such as Visa or MasterCard. That card will also have the global brand's standard or global AID and the global brand's proprietary EMV application. So, a Visa debit card will have the Visa VSDC EMV application plus two AIDs, the Visa standard AID and the Visa U.S. Common AID. Conversely, a MasterCard debit card will have their MasterCard standard AID and their common AID (named the Maestro AID) paired with the MasterCard Mchip application. In general, PIN transactions will invoke the Common AID, which gives the merchant or ATM owner the option to route that transaction to any of the PIN networks who have signed a license agreement with that global brand. Signature and international transactions will invoke the standard/global AID and the merchant will route to the global brand, similar to how magnetic stripe transactions are routed today.



This solution fulfills a number of the requirements of the industry; routing neutrality and choice for merchants; one application on the card lessening complexity for issuers and acquirers alike; level playing field for networks without crippling fees and routing restrictions; the ability for issuers to change networks without reissuing cards, and chip capabilities such as online PIN, no CVM and contactless.

## EMV at ATMs

The forward movement on debit has also increased the interest and planned adoption timelines for EMV at ATMs. Accepting EMV cards at the ATM machines in a credit union's fleet will be like assembling a puzzle with multiple pieces. Sections of the puzzle will include hardware, software, operating systems, payment networks and the associated vendors and partners, along with testing. Once all the pieces have been assembled EMV can be enabled.

Early planning for EMV at the ATM should include developing an implementation plan that factors in which machines will need hardware updates, including card readers, in addition to the software updates.

Some credit unions are reportedly taking this opportunity to evaluate their self-service channel strategy as well. "It makes sense to look at your ATM fleet and plan EMV updates based on ATM locations, traffic and resources," said Thornton. "While some institutions are upgrading their entire fleet at once, others are spreading out the deployment over a period of months or years."

EMV at the ATM works like EMV on cards with cryptograms, applications and AIDs. ATMs only use one CVM, online PIN. But just as point of sale terminals will need to change to accommodate chip cards, ATMs will need to be upgraded. And code development will need to be done on ATMs as well as POS terminals in order to support the new U.S. Common AIDs. The terminal must be able to recognize the presence of the Common AID on a card and to override standard EMV priority selection of AIDs. This is necessary to make the Common AID the default and enable routing to networks other than the global card networks. Acquirer processors and ATM manufacturers are working on this development which is expected in late 2014 or 2015.

## Recommendations for Adoption

While Visa and MasterCard haven't placed a mandate on issuers or acquirers, the question of whether credit unions should adopt now or wait is a decision subject to a number of respective variables. "There is always a high premium related to early adopters of any new technology and this is no different," said Thornton. "Most financial institutions and merchants have rightly been waiting to see what the industry will do on debit before deploying EMV. Even with merchant deployment low, many issuers have been slowly moving forward on credit cards, primarily piloting initially with their international travelers."

Referring to the Canadian adoption model, it is estimated that a majority EMV U.S. adoption will take at least 10 years. During this time, millions of credit/debit cards will be reissued while payment processing terminals and banking systems are overhauled.

To be clear, EMV is coming. Since the U.S. already operates in an online environment and the costs to implement an offline adoption are higher, online-only EMV is more common. Thornton explained that the preferred profile for EMV in the U.S. is signature and online PIN for first-generation EMV. Additionally, with most payment terminals worldwide now supporting online transactions, global interoperability of online-only EMV cards is no longer a hurdle.

The best thing credit unions can do first is answer one basic question: what is the primary reason to move forward with EMV today versus tomorrow? The answer to this question should lead to a detailed analysis and approach.

"If it is global interoperability, start with your credit card portfolio, which is used internationally at a higher rate than your debit card," she said. "To determine the need, talk to your staff to find out what they are hearing from your international travelers. Do analysis on international transactions to determine what segment of your portfolio will likely travel internationally in the next 12 months.

"Build that data into your business case to help you determine when might be the right time to move forward," Thornton continued. "Until your institution has an EMV chip card, advise your cardholders traveling abroad that Visa and MasterCard rules require merchants worldwide to accept U.S. issued magnetic stripe cards, but for those few unmanned terminals



and kiosks that only accept EMV chip cards, carrying cash is a viable option.”

As was the case with the UNFCU, credit unions need to consider whether they will offer a soft rollout or attempt a complete member adoption. Thornton recommends the former as the better choice for this first-generation EMV deployment in the U.S.: “It’s beneficial to focus on identifying the credit union’s international card usage demographic for early issuance, then pilot with U.S. users to learn about the nuances and needs inherent in EMV before issuing your full cardbase.”

If fraud reduction is the primary reason to move forward with EMV now, it is essential to analyze the source of the fraud today. EMV doesn’t currently protect against CNP fraud. Therefore it is recommended that credit unions investigate how much of respective fraud is related to counterfeiting, skimming or the cloning of cards.

“Understanding that there are still few active EMV terminals in the U.S. today, credit unions should evaluate existing international counterfeit fraud to get a more accurate picture of what the fraud reduction might be in the near-term,” said Thornton. “As the U.S. EMV terminalization reaches critical mass, this equation will change.”

While overall fraud will decline, the liability shift may not have as great an impact as some might think. Industry experts expect that the big box merchants will be ready by the liability shift date, October 1, 2015. If that is true, issuers will not see fraud liability shift to those merchants, nor will there be a liability shift to online merchants. The pool of transactions “eligible” for shifting fraud liability to merchants may well be a relatively small portion of overall transactions.

Building a solid business case and accurately assessing costs is critical to determining timing. While the cost of EMV cards has decreased, the certification and implementation investment remains high for early adopters. Industry experts expect that standardization and streamlining of implementations will normalize and lower costs in 2015.

The migration cost to EMV from magnetic stripe can be \$25,000 to \$60,000 or higher depending on the requirements of the credit union. And there are variables to consider when evaluating costs, such as whether to use contact or dual interface (contact and contactless); the latter is more expensive. Terminalization, as noted earlier, is anticipated to be costly for merchants and the jury is still out on when the market will see a critical mass in contactless acceptance. “The

ROI for EMV chip cards will be dependent on many elements, not just fraud reduction, and will most likely take many years to obtain,” said Thornton. “Consider all factors when making your decision, including marketing strategy, cardholder acquisition and card-holder retention.”

Once a credit union has these variables in place, it next must determine if its providers are ready to move forward, which includes assessing personalization vendors, EFT processors and core processor changes to accommodate EMV specifications.

Credit union executives are encouraged to stay informed and should read EMV chip card communications, Visa Business News and MasterCard communications, sign up to receive industry journals/newsletters and set Google alerts for key words like EMV, chip card and NFC.

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## EMV: The CO-OP Roadmap

CO-OP Financial Services is a founding member of the Debit Network Alliance. This collective approach helped “define and adopt a POS and ATM solution for chip and PIN acceptance for PIN debit networks in the U.S.,” noted DNA. “The goal of this collaborative effort is to provide interoperable adoption of chip and PIN debit payments to the industry, while supporting innovation, choice and the proven track record of PIN security in reducing payment fraud.”

If a credit union determines it is ready to make the migration, CO-OP can assist with a multitude of tools to educate the credit union and members. CO-OP is certified with both Visa and MasterCard for full chip processing on contact cards, including beta testing with the Common AID.

Forthcoming development includes contactless and offline PIN processing support. “CO-OP has a detailed plan to assist credit unions with all EMV needs and requirements,” said Thornton. “The best first step a credit union can take is educating themselves on what this technology is and when it is the best time to move forward with EMV adoption for their credit union.”



## Footnotes

- 1 "EMVCo Publishes Latest EMV Chip Deployment Figures" (May 2014), retrieved August 22, 2014, from [http://www.emvco.com/media\\_center.aspx?id=48](http://www.emvco.com/media_center.aspx?id=48).
- 2 "EMV Compliance with NRC Brochure," NCR, retrieved August 21, 2012 from <http://www.ncr.com/newsroom/resources/EMV-compliance>.
- 3 "EMVCo Publishes Latest EMV Chip Deployment Figures" (May 2014), retrieved August 22, 2014, from [http://www.emvco.com/media\\_center.aspx?id=48](http://www.emvco.com/media_center.aspx?id=48).
- 4 "EMV Adoption Charge Is Led by Credit Unions," Credit Union Times (David Morrison). August 27, 2012. <http://www.cutimes.com/2012/08/27/emv-adoption-charge-is-led-by-credit-unions>.
- 5 "EMV: The Catalyst for a New U.S. Payment Ecosystem." April 2012. MasterCard. Retrieved from [http://www.mastercardadvisors.com/\\_assets/pdf/emvthe\\_catalyst\\_for\\_a\\_new\\_us\\_payment\\_ecosystem.pdf](http://www.mastercardadvisors.com/_assets/pdf/emvthe_catalyst_for_a_new_us_payment_ecosystem.pdf)
- 6 "EMV Migration Forum." EMV Connection Website, viewed August 23, 2014, from <http://www.emv-connection.com/emv-migration-forum>.
- 7 "Is the final Durbin Amendment rule an impetus for EMV in the United States?" Retail Payments Risk Forum. July 25, 2001. Retrieved from <http://portalsandrails.frbatlanta.org/2011/07/is-final-durbin-amendment-rule-impetus-for-emv-in-united-states.html>.
- 8 "The Durbin Debit Dilemma With EMV." Javelin Research & Strategy Blog (Nick Holland). June 24, 2013, from <https://www.javelinstrategy.com/blog/2013/06/24/the-durbin-debit-dilemma-with-emv>.
- 9 "The Secure Payment Council Announces Chip and Pin Working Group for Debit Networks" (News Release). The Secure Remote Payment Council. 2012.

## EMV: Resources

### EMVCo

[www.emvco.com](http://www.emvco.com)

### Smart Card Alliance EMV Connection

[www.smartcardalliance.org](http://www.smartcardalliance.org)

### SRPc and PIN Debit Working Group

<http://secureremotepaymentcouncil.org>

### Visa Announcement

<http://corporate.visa.com/newsroom/press-releases/press1142.jsp>

### MasterCard Announcement

<http://newsroom.mastercard.com/press-releases/mastercard-introduces-u-s-roadmap-to-enable-next-generation-of-electronic-payments>

### MasterCard U.S. Roadmap

<http://www.mastercard.us/mchip-emv.html>

### Discover Announcement

[http://www.investorrelations.discoverfinancial.com/phoenix.zhtml?c=204177&p=irol-newsArticle&ID=1673070&highlight=&gcmpgn=0809\\_ZZ\\_srch\\_gsan\\_txt\\_1&srchQ=emv&srchS=internet\\_cm\\_corp&srchC=internet\\_cm\\_fe&srchP=0](http://www.investorrelations.discoverfinancial.com/phoenix.zhtml?c=204177&p=irol-newsArticle&ID=1673070&highlight=&gcmpgn=0809_ZZ_srch_gsan_txt_1&srchQ=emv&srchS=internet_cm_corp&srchC=internet_cm_fe&srchP=0)

### American Express EMV Roadmap

[http://about.americanexpress.com/news/pr/2012/emv\\_roadmap.aspx](http://about.americanexpress.com/news/pr/2012/emv_roadmap.aspx)

To learn more,  
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