CO-OP FINANCIAL SERVICES

WHITE PAPER

EMV Adoption

Executive Overview

As of 2011, there were more than one billion Europay, MasterCard and Visa (EMV®)-compliant chip-based payment cards in use worldwide. While all U.S. financial institutions are investigating and contemplating EMV, what remains in question, especially for credit unions, is the status of the U.S.-based adoption rates.

What is critical for all stakeholders in payment processing—from card issuers and merchants to terminal manufacturers and processors—is the varied costs involved in moving from the traditional magnetic stripe technology, used on nearly all U.S. credit and debit cards, to EMV. For example, this new format requires upgrades or enhancements to all point of sale (POS) terminals, ATMs, credit and debit cards.

Visa, MasterCard, American Express and Discover have placed a timeline for U.S. adoption, which has elevated this issue from conceptual to imminent. While credit unions aren't required to act immediately, with guidelines in tiered effect by 2013, 2015 and 2017, the proverbial writing is on the industry wall. The time to formulate an adoption strategy is now.

Along with the aforementioned network of four pushing for compliance, the government has entered the equation, specifically the Federal Reserve Board. In August 2012, the Fed stated its position regarding interchange fees and routing. The highly anticipated final ruling on the Durbin Amendment, Regulation II, is considered a complicated decision. Early adopters could realize minimal cost savings due to projected decreases in fraud activity via EMV. However, the network exclusivity clause in the Amendment causes trepidation for non-affiliated networks, thus confusing credit unions as to what approach is deemed compliant.

Whether federal oversight coupled with the network guidelines will encourage an early industry adoption rate remains questionable. For most financial institutions, there is still a "wait-and-see" approach. There are EMV frontrunners that have experienced success with partial rollouts, including the first U.S. EMV adopter, the United Nations Federal Credit Union. However, there is far more involved with EMV than simply adding this chip-based technology to existing platforms.

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 aforementioned topics, 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.

A Global Outlook

While EMV technology was first introduced in 1994, MasterCard and Visa later raised the bar by co-founding the public corporation EMVCo LLC, which provides guidance and protocols. 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. In 2002, Europay International SA became part of MasterCard. Two years later, JCB International Credit Card, which is accepted in 17 countries, joined EMVCo. Finally, American Express joined in 2009. In 2012, Discover agreed to implement a 2013 EMV mandate for acquirers and direct-connect merchants in the U.S., Canada and Mexico.

As of Q4 2011, EMVCo finds that approximately 1.5 billion EMV cards have been issued globally. The organization previously had found that 18.7 million POS devices accept EMV cards, representing 40.1 percent of the total payment cards in circulation and 71 percent of the POS devices installed globally.[1] The company manages EMV Integrated Circuit Card Specifications to enhance and facilitate compatibility and operability.

How prevalent is EMV globally?

According to the digital security firm Gemalto, the majority of the world, sans the U.S., is compliant or is in the process of migrating to EMV chip technology for debit and credit payments. The NCR Corporation reported that France was the first country to launch EMV and has since experienced an 80 percent decline in fraudulent activity. Today, 97 percent of European ATMs are EMV compliant.[2]

"It is still early in the adoption process for the U.S. with a very small percentage of issuers using (or testing) EMV," said CO-OP Financial Services Senior Product Manager, Michelle Thornton. "The U.S. has a different payment landscape and is online all the time which is different than the European model. There are also more considerations such as the impact of the Durbin Amendment and specifically how EMV will affect debit card transactions."

In 2011, EMVCo released worldwide EMV statistics, and as Thornton noted, U.S. adoption rates were considered so low that the paper listed U.S. findings as "not reported." In Africa and the Middle East, for example, 233,003,747 cards were issued with a 17.6 percent adoption rate. The number of EMV terminals was listed at 345,000 with a 60.7 percent adoption rate. In Europe Zone One (SEPA countries), 645,472,323 cards were issued with a 73.9 percent adoption rate. The number of EMV terminals was the highest at 10,500,000 as well as having the highest adoption rate, 79 percent.[3]

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.

"For EMV adoption, there are more parallels to Canada than Europe as the Canadian model is more like the U.S," said Thornton. "There are some lessons to be learned there, one of the most important of which is that adoption takes a long time," she continued. "Canada's first announcement was in 2003, their first pilot in 2007, and still roughly 10 percent of their cards are not EMV."

October 1, 2012 marked a significant day in the U.S. EMV adoption process as Visa officially expanded its Technology Innovation Program (TIP) to the U.S. This eliminated the requirement for eligible merchants to annually validate their compliance with the PCI Data Security Standard for any year in which at least 75 percent of the merchant's Visa transactions originate from chip-enabled terminals.[4] However, in order to qualify, terminals must be enabled to support both contact and contactless chip acceptance, including mobile contactless payments based on Near Field Communication (NFC) technology.

As of April 1, 2013, Visa will mandate that all acquirers and acquirer processors support merchant acceptance of EMV chip transactions. To this end, acquirers and acquirer processors must be able to carry chip data in Field 55—Integrated Circuit Card (ICC) Related

1 EMV in the United States, *Gemalato*, retrieved August 22, 2012 from www.gemalto.com/EMV/.
2 EMV Compliance with NRC Brochure, *NCR*, retrieved August 21, 2012 from http://www.ncr.com/newsroom/resources/EMV-compliance.
3 EMVCo LLC. Figures reported in Q1 2011 and represent the latest statistics from American Express, JCB, MasterCard and Visa, as reported by their member financial institutions globally.
4 Visa Expands Technology Innovation Program for U.S. Merchants to Adopt Dual Interface Terminals, Visa Bulletin, August 9, 2011, http://usa.visa.com/download/merchants/bulletin-tip-us-merchants-080911.pdf.

Data in Base I and V.I.P. authorization and full financial messages for both contact and contactless transactions. MasterCard, American Express and Discover have all followed suit with the same timelines, eliminating some of the uncertainty in the market.

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.

The New Payment System Potential

Proponents of EMV look beyond the inherent fraud protection offered as they see the resounding possibilities offered by a new payment ecosystem. An April 2012 report conducted by MasterCard stated that banks, retailers and consumers would collectively benefit from this migration.

"The shift towards a new ecosystem is dependent on enabling dynamic authentication with an enhanced contactless environment. This is essential for providing a robust, reliable and rapid infrastructure that is needed for delivering innovations such as advanced, seamless mobile payments," the April 2012 report stated. "Deployment of EMV, including acceptance of contactless payments, reduces the need for significant additional investments in creating this ecosystem. With EMV as the foundation, further future innovations like biometric verification and new payment types could more easily be implemented."[5]

Under the Visa and MasterCard guidelines, an industry-wide adoption of dual-interface chip technology will take place incrementally over the course of the coming years. This will build the necessary infrastructure for the U.S. market to accept NFC-based mobile payments.

How it 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, and 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 ultimately determines whether the transaction should be performed offline or online. The issuer indicates their preferences for authorization and authentication on the card profile on the chip.

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. Firstly, Online PIN is encrypted and verified online by the card issuer. Secondly, there is Offline PIN, which is verified offline by the EMV card and only passes along the result of the transaction. Thirdly, there is common signature verification, which compares the cardholder signature on the receipt to the signature on the back of the card. And finally, there is no CVM option, which typically occurs with low-value transactions or for transactions at unattended POS locations.

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.

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

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.

Many credit union industry executives are keeping a watchful eye before considering adoption. There are numerous variables and moving parts to decipher, such as routing, which is far more complicated with EMV. Whereas merchant routing is currently controlled by the merchant or merchant acquirer through BIN routing tables, EMV must take CVM into account as well, either at the terminal or with the acquirer. And the terminal or merchant acquirer must have the same payment application loaded in order for the transaction to even commence. "EMV is replacing a magnetic strip with a computer," said Thornton. "This is a big leap that requires considerable development and a lot of thought."

Fraud and Interoperability

The leading benefit of EMV is that it provides strong transaction security features and ancillary fraud-saving capabilities not possible with traditional magnetic stripe cards. Thornton explained that CO-OP Financial Services estimates that approximately 50 percent of fraud is due to counterfeit cards created from skimming.

To underscore her earlier point that the U.S. should look to its northern neighbor, Thornton offered Canadian fraud statistics post-EMV adoption. 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," said Thornton.

While U.S. EMV adoption is slow, many people 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 reasons United Nations Federal Credit Union (UNFCU) became the first U.S. EMV early adopter. And while the credit union's international member base makes EMV a logical choice, the success rate is a positive indicator for those credit unions currently serving as spectators. 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.[6]

"For a successful early rollout like this, it's best to have a large segment of your population living overseas, so this made a lot of sense for United Nations Federal Credit Union," 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 and 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.

6 Morrison, David. "EMV Adoption Charge Is Led by Credit Unions," Credit Union Times. 27 August 2012. http://www.cutimes.com/2012/08/27/emv-adoption-charge-is-led-by-credit-unions.

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. "Many industry experts say that loading this software is best done as a local update versus a remote download due to security and compatibility concerns. This is just one example of the amount of effort the industry as a whole must undertake in order to support EMV. A standardized and open approach will speed adoption and lessen cost to the industry as a whole."

The MasterCard report supported Thornton's stance. "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. This will be more difficult to achieve in the U.S. for two key reasons: The large number of industry players presents a large coordination challenge, [and] there is currently no banking association with the strength needed to be an effective central point for alignment," the report stated.[7]

What MasterCard and other market leaders agree upon is that in order for the migration to be successful, a broad agreement between stakeholders is required as to where and when national deployment occurs. This will include aligning messaging with financial institutions, merchants and consumers as well as testing of interoperability.

"It is for these reasons, among others such as a liability shift, that credit unions should be concerned about EMV adoption. Credit unions should continue to watch the market so they can act when appropriate for their unique business needs," said Thornton.

The Debit Durbin Issue

October 2012 marked the 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. With that debate aside, the August 2012 Durbin Amendment Regulation II ruling might allow EMV early adopters to receive nominal biannual fraud rebates; however, the ruling language is cumbersome and it remains unclear if this will increase early adoption rates.[8]

With 14 PIN debit networks in the United States, a U.S. EMV implementation gives rise to a host of legitimate concerns. "With the slow adoption rate to date by major banks and credit unions, it seems this is not something they necessarily want to do, but rather something they know they will have to do," said Thornton. "Eventually, EMV adoption will help reduce fraud and there is no question about that fact. But in 2012, it is extremely expensive and there remain many uncertainties about deployment in the U.S., particularly with debit."

Industry leaders share these concerns. The Secure Remote Payment Council (SRPc) finds that the current international standards for chip technology are not considering the competitive, newly federally regulated, real-time payment infrastructure. 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 is a sticking point, as the application on the chip that controls behavior of a chip transaction is required within each chip's technology. This concern reaches across the payment ecosystem and is echoed with great concern in the merchant community.

7 "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

8 Retail Payments Risk Forum. "Is the final Durbin Amendment rule an impetus for EMV in the United States?" July 25, 2011. Retrieved from http://portalsandrails.frbatlanta.org/2011/07/is-final-durbin-amendment-rule-impetus-for-emv-in-united-states.html.

"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 noted in a 2012 report.[9]

Thornton advises credit unions to apply respective due diligence and seek education before taking a proactive stance on EMV adoption, because certain variables could place an otherwise well-intentioned credit union in trouble. "As an example, if a credit union deploys EMV but only has a Visa application on the card, then the transaction may not be able to be routed anywhere except Visa. As such, the credit union would not be in compliance with the Durbin Amendment as it requires at least two un-affiliated networks," said Thornton. "This could potentially change the credit union's cost structure as well because all transactions routing to Visa instead of other providers like NYCE or CO-OP could mean higher costs. The same would be true for a MasterCard EMV card."

What is more confounding to credit unions is the payment branding associated with EMV. While there could be more than one payment application on the same card, the terminal is responsible for selecting the application for transaction processing. "The applications must be loaded onto the chip during the issuing process. If an EMV application is specific to one network, portability between networks is lost. A change in a network, such as from PULSE to Shazam, would require all cards to be reissued. For the majority of low-cost chip cards, the load process fuses the application in place," the SRPc report noted. "Once fused, it cannot be altered. Therefore, EMV requires issuers, and by complement, merchants, to make decisions regarding which payment brands will be placed on cards or terminals in advance of issuing. Such decisions cannot be reversed or modified once issuing has occurred."

Recommendations for Adoption

While Visa hasn't placed a mandate on issuers, 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 credit unions are rightly waiting to see what the industry will do so they only have to do a reissue of cards once, and most credit unions will not see large fraud savings for some time."

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. The majority of credit unions are best left perched in the catbird seat, keeping a keen eye on incremental changes before adoption.

To be clear, change is looming. 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 accepted than it was previously. 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.

Thornton said the best advice for credit unions is to first answer one basic question: what is the primary reason to move forward with EMV now? The answer to this question should lead to a detailed analysis and approach.

"If it is global interoperability, an EMV prepaid travel card may solve your immediate need as you take a wait-and-see approach," 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 to 18 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

9 The Secure Remote Payment Council. 2012. The Secure payment Council Announces Chip and Pin Working Group for Debit Networks [Press Release].

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 United Nations Federal Credit Union, 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," she noted.

If fraud reduction is the primary reason to move forward with EMV, 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 few 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."

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 2013.

Today, the migration cost to EMV from magnetic stripe can cost $25,000 to $60,000 or higher depending on the requirements of the credit union. And there are variables to consider when evaluating costs. For example, the type of chip (i.e., proprietary or open) used can define success rates. "An open chip like Java will give the credit union more flexibility to make changes if needed as the market evolves," said Thornton. "If the size of the chip is too small, it may also limit changes available to the credit union."

In many areas of the world, such as Canada and France, debit cards are issued with two EMV applications, a credit application (signature POS) and a debit application (PIN POS) on the same chip. If, in answer to the debit routing question, the PIN debit networks choose a common "PIN debit" application, this second payment application will reside on the card with the Visa or MasterCard application. "This two-payment system requires a chip large enough to carry both applications," said Thornton."Issuing with a smaller chip now means that the credit union would have to reissue those cards with different stock in order to add the second application."

Issuers also need to determine 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 the aforementioned variables in place, it next must determine if its providers are ready to move forward, which includes assessing personalization vendors, EFT processors and potentially the core processor.

The uncertainty swirling around EMV deployment on debit cards does not extend to credit cards. For those credit unions owning credit portfolios, starting the EMV migration with the credit card portfolio is considered a prudent way to embark.

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, Durbin Amendment and NFC.

The CO-OP Financial Services Roadmap

CO-OP Financial Services is an active member in the SRPc Chip and PIN Work Group of PIN debit networks. This collective approach helps "define and adopt a POS and ATM solution for chip and PIN acceptance for PIN debit networks in the U.S." noted SRPc. "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 Financial Services can assist with a phased approach. The first of which is "on behalf of" processing for EMV-enabled cards. This allows transactions to be authenticated with EMV technology but completed by magnetic stripe, noted Thornton. This approach will provide credit unions with quick-to-market acceptance for international travelers, lower implementation costs and a supported EMV liability-shift target date.

Forthcoming phases include online chip and PIN including all elements of DE55, scheduled for 2013, and eventually offline chip and PIN EMV processing scheduled for 2014. "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 what it could do for its portfolio, as well as how it relates to the new regulatory environment," she continued. "With this information in place, a credit union can build a sophisticated case as to when is the best time to move forward with EMV adoption."

For up-to-date information on EMV and how it affects your credit union, visit our EMV Resource Center at www.co-opfs.org/EMV