



EMV 101 – What You Need to Know

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Today's Discussion



- Brief Overview of EMV
 - What is EMV?
 - Why EMV?
 - EMV Vision and Strategy
 - EMV in the US and Globally
 - EMV and FIS in Canada (Everlink)
- Visa/MasterCard/Discover Recommendations
- FIS Business Line Updates
- Next Steps
- Appendix
 - Available resources
 - Terminology

Poll: How familiar are you with EMV smart card technology?



- Very familiar
- Somewhat familiar
- Not familiar at all

EMV Introduction

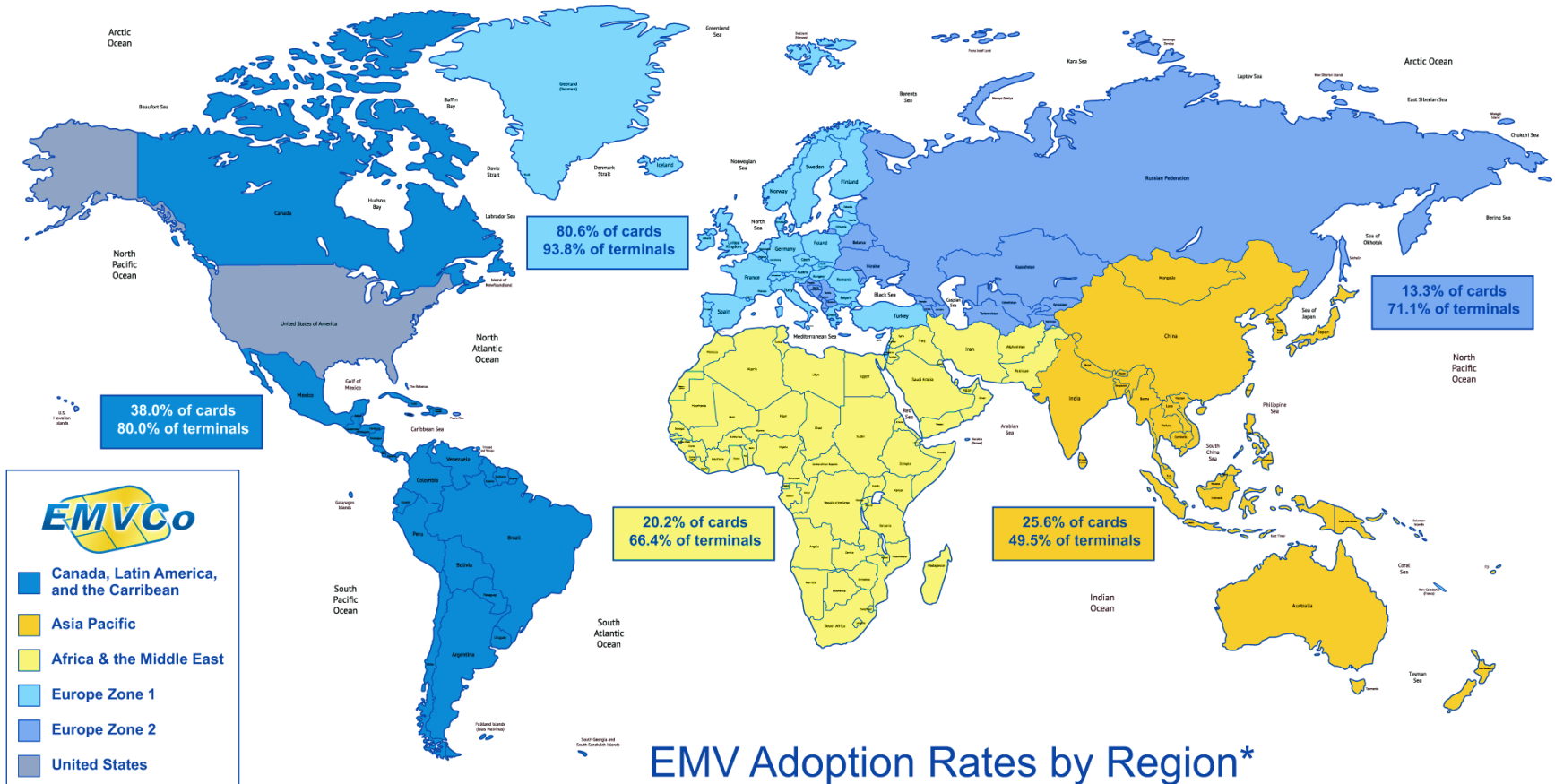
What is EMV?



- EMV® is a global standard for credit and debit payment cards based on chip card technology.
- The EMV name comes from Europay, MasterCard and Visa, the companies that in 1994 initiated development of the EMV Specifications.
- EMV chip-based payment cards, also known as smart cards, contain an embedded microprocessor, a type of small computer. The microprocessor chip contains the information needed to use the card for payment, and is protected by various security features.



EMV – A Global View



EMV Adoption Rates by Region*

*Figures reported as of Q3 2011 and represent the latest statistics from American Express, JCB, MasterCard, and Visa, as reported by their member financial institutions globally. Figures do not include data from the United States.

Worldwide EMV Deployment and Adoption



Region	EMV Cards	Adoption Rate	EMV Terminals	Adoption Rate
Canada, Latin America, and the Caribbean *	259,549,827	38.0%	4,342,000	80.0%
Asia Pacific*	317,316,028	25.6%	4,174,000	49.5%
Africa & Middle East*	25,882,716	20.2%	380,000	66.4%
Europe Zone 1*	708,914,657	80.6%	10,985,000	93.8%
Europe Zone 2*	31,739,128	13.3%	586,500	71.1%
United States**	1,000,000***	Less than 1%	30,000	Less than 1%
TOTALS	1,343,402,356	42.4%	20,467,500	75.9%

*Figures reported in Q3/2011 and represent the latest statistics from American Express, JCB, MasterCard and Visa, as reported by their member financial institutions globally.

** 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.

***SAN FRANCISCO, Feb. 6, 2012 /PRNewswire/ -- Visa Inc The one million cards figure is based on Visa issuer estimates.

Source: EMVco, Mercator Advisory Group, Visa

EMV Introduction

Why EMV?



Advantages of EMV Contact and Contactless Payment Cards

- More secure against card fraud than cards that rely only on magnetic stripe
- A transaction-unique digital seal or signature in the chip proves its authenticity in an offline environment and prevents criminals from using fraudulent payment cards
- Can be used to secure online payment transactions and protect cardholders, merchants and issuers against fraud through a transaction-unique online cryptogram
- Supports enhanced cardholder verification methods
- Stores considerably more information than magnetic stripe cards

Security Benefits

- With online authorization, a dynamic cryptogram protects against the use of skimmed data and stolen account data
- Card usage restrictions are systematically enforced
- With offline authorization, a PIN capability protects against lost and stolen card fraud
- With offline authorization, data authentication protects against counterfeit cards
- Limits on offline activity protects against credit overruns and fraud

EMV in the United States



- Reasons why EMV chip technology could make sense for the United States.

Major factors include:

— Physical World Fraud

- Fraud in the U.S. is above the global average and still on the rise.
- Lessons learned from the many migration activities worldwide indicate that fraud migrates towards those regions which have not yet migrated to EMV chip technology, therefore, if the United States did not move to EMV, it could become the primary target of fraudsters and fraud rates will continue to rise.
- Rest of the world cannot solve fraud issue without U.S. participation.

— Cardholder Inconvenience Abroad

- With market penetration of EMV technology deployment growing around the world, the magnetic stripe technology becomes more and more archaic.

— Mobile and Contactless

- Implementing EMV chip technology in the United States will speed up mobile and contactless payments and make them more secure.
- The devices that accept EMV chip cards are dual contact/contactless devices.
- Installing these devices to accept EMV, merchants will ready themselves to accept mobile and contactless payments

Issues Surrounding EMV in the US



EMV investment will be significant

ROI from fraud savings – TBD

Issuance and Acquiring process is very different

- Card cost is higher for EMV cards compared to traditional mag-stripe cards
- Multiple configuration options: Contact, contact + contactless, online PIN, offline PIN
- Script and testing procedures for each card product

EMV expertise in personalization bureaus

EMV Reality – FIS Everlink in Canada



Everything about EMV is very, very different from Mag-Stripe

- EMV planning started in 2003
- Interac mandated EMV compliance
- Required very complex coordination of multiple projects, organizations and teams.
- EMV readiness and compliance required an “all hands on deck” initiative
- Executive commitment and dedicated focus was vital in order to succeed
- The move to EMV required a massive amount of planning, collaboration, development and implementation work
- Actual EMV conversion planning was a 3 year effort
- The migration consumed another 2 years to convert all clients and systems and hardware to EMV

EMV compliance takes longer and costs more than your most pessimistic estimates

- Add as much contingency as your policies will permit

FIS EMV Vision and Strategy



VISION:

- To enable the clients we serve to competitively position themselves for the enablement of EMV payment cards, and to set a foundation for EMV card and mobile payments while reducing losses due to fraud.

STRATEGY:

- Provide the subject matter expertise, thought leadership, and client specific strategy planning our clients need
- Build out card payment and network infrastructure (credit, debit, prepaid, card production, and NYCE) to mass produce and process EMV cards
- Enhance all card platforms to support EMV cards to lower the losses due to fraud
- Support the education and training of all financial institution customers on EMV standards, requirements, and support clients through migration and implementation planning

APPROACH

- Dedicate resources to drive growth in EMV payment cards and contactless payment transactions
- Multi-year infrastructure build-out and expansion
- Support the migration of financial institutions to EMV cards to lower losses due to fraud
- Leverage advancements of EMV and Mobile to guide future development and go to market capabilities in mobile payments

Current FIS supported EMV environments:

AFFN
Everlink®
Canada
Europe
AccessPrepaid Worldwide



EVERLINK®





Visa/MasterCard/Discover
Recommendations

EMV Revolution in the United States

Visa Guidance – announced August 2011



October 1, 2012

- *Visa will provide a waiver on annual validation for PCI compliance for U.S. merchants if their POS terminals support both contact **and** contactless chip acceptance, including mobile contactless payments based on near field communications (NFC) technologies.*

April 1, 2013

- *Deadline issued by Visa whereby U.S. acquirers and companies reselling acquirer's services must be able to support merchants accepting chip transactions.*

October 1, 2015

- *A liability shift goes into effect for fraudulent domestic and cross-border card present transactions. Essentially, any merchant who does not have a terminal that supports contact or contactless chip payments will accept liability for fraudulent transactions if said fraud occurs on an account which supports chip technology. On the contrary, the issuer will accept liability for fraudulent transactions if said fraud occurs on a terminal which accepts chip technology but the card itself does not contain a chip.*

Combined, these measures look set to have a significant effect on the US card payment market – simultaneously creating an incentive for retailers to adopt new technologies and strong-arming back-office service providers into compliance.

EMV Revolution in the United States

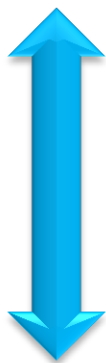
MasterCard Guidance – announced January 2012



- October 1, 2012 – acquirers waiver
- April 2013 – processors mandate
- October 1, 2015 – liability shift
 - Five key differences from Visa’s announced position
 1. Liability hierarchy – encourages PIN adoption
 2. Aligning transaction rules with security levels and risk
 3. Account Data Compromise protection (in addition to PCI audit relief)
 4. Inclusion of ATM channel (already announced – Maestro Cards at ATM’s – effective April 19, 2013)
 5. Industry coordination efforts to ensure adoption

More Risk

Example Liability Hierarchy



Less Risk

Card Type

Magstripe and contactless magstripe

EMV contact or EMV contactless
(Signature CVM)

EMV contact or EMV contactless
(online or offline PIN CVM)

Terminal Type

Magstripe and/or contactless magstripe

EMV contact or EMV contactless (not PIN
capable)

EMV contact or EMV contactless (online or
offline PIN capable)

EMV Revolution in the United States

Discover Guidance – announced March 15, 2012



- To date, Discover has prioritized its global EMV-deployment efforts towards markets which are mandated or have significant chip-card technology presence already.
 - Discover has over 1 million cards in market among international issuers. Deployment efforts continue in 2012, with close to 100 issuing and acquiring deployments slated across the Diners Club, PULSE and Discover card networks.
- **Discover’s approach to EMV is both universal and choice-centric, meaning the company will not restrict any channel, verification process or transaction type. Discover will support:**
 1. All card authentication channels – including online and offline
 2. All cardholder verification methods – *including both chip & PIN or chip & Signature transactions*
 3. All commerce channels – including contact and contactless (which includes mobile)
- Discover’s EMV deployment efforts are underway domestically
 - In January 2012, Discover processed its first U.S. EMV card transactions at enabled Walmart locations. Walmart is certified to process D-PAS in both the U.S. and Canada.

Poll: Does your institution plan on adopting EMV smart card technology?



- Yes, in the next 12 month
- Yes, in the next 12 – 24 months
- No, we don't have a need
- I don't know



FIS Business Line Updates



NYCE[®] Payments Network

NYCE EMV Updates



EMV efforts in progress – company wide participation

Support of US transactions with EMV data

- Support transactions that traverse the NYCE Network
- The NYCE Switch already processes transactions including EMV data for international Issuers on international devices
- NYCE will look to update the NYCE ISO Specification Q3-Q4 2012

Develop a NYCE Network specific EMV program

- Every Network specific EMV program requires development, then certification by card manufacturers and terminal providers prior to deployment
- NYCE is developing own program and evaluating a combined FIS EMV Program
- NYCE has also initiated conversations with other non-FIS related Networks

Create EMV Travel Card Program

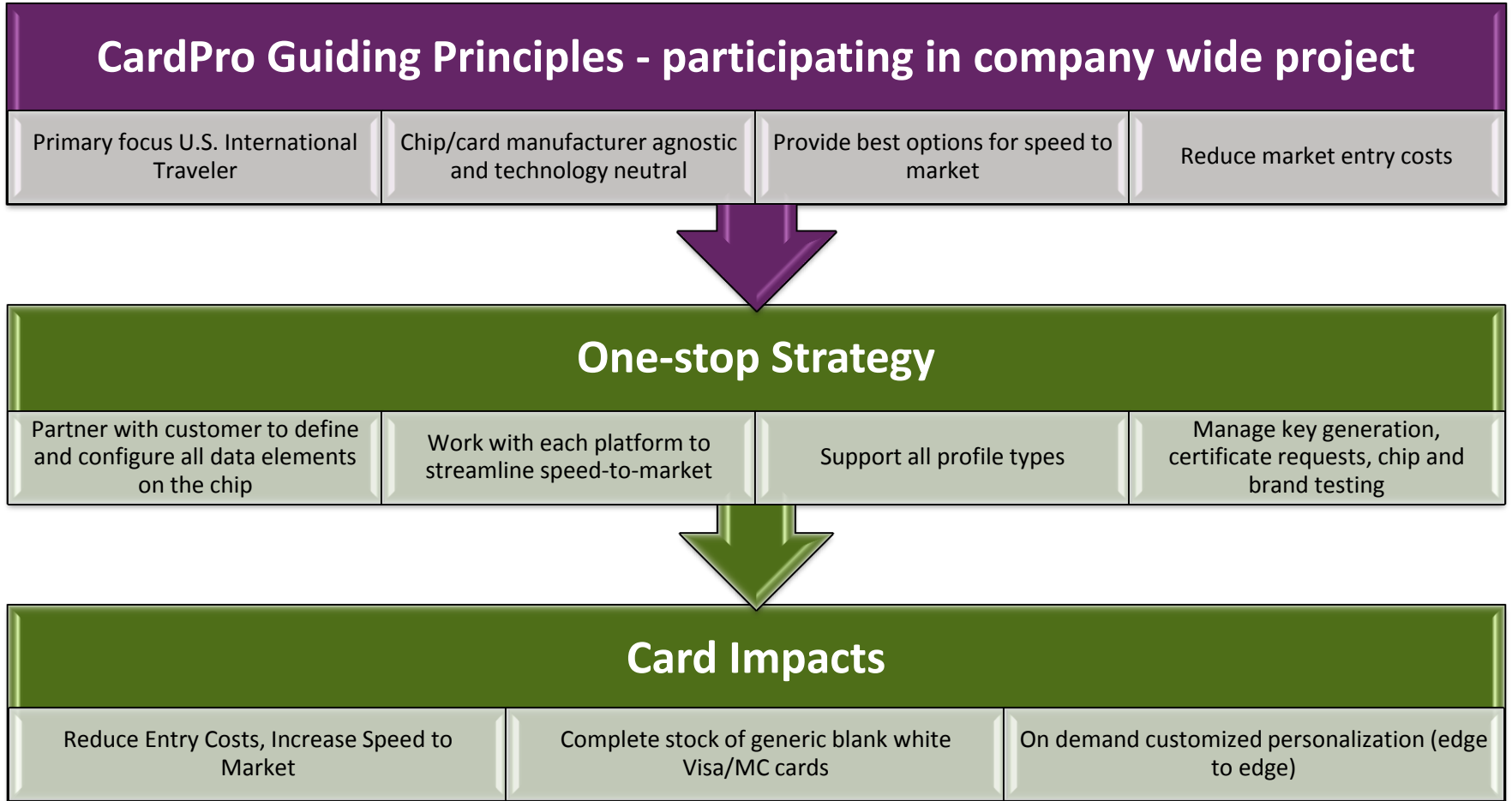
- FIS Prepaid group has created a EMV Travel card Program available to NYCE participants
- Project now available to clients in 2Q 2012



FIS Card Production Update

Issuing contact and contactless chip cards since 2003!

CardPro EMV Update



CardPro Current and Future Plans



Current Status

- Approval on first MasterCard EMV product
 - *Issuing Prepaid Travel cards as of 2011 – (for AFFN network clients)*
- Launching first Visa travel card product Q1 2012
- Currently issuing EMV credit cards for Canadian FI's
- Looking to launch first U.S. credit card traveler programs in 2012

Instant Issuance

- EMV necessitates a completely new approach to in-branch issuance
- Anticipating a Q4 2012 beta release
- Leveraging current solution provided by Everlink in Canada

TSM – Mobile Payments Solution

- Trusted Service Manager (TSM): A service provider that sits between a Financial Institution and a mobile device providing services to securely Over-The-Air provision card data to a mobile wallet.



FIS Debit Update

EMV Roadmap for EFT/Debit

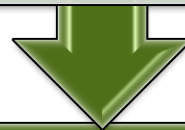


Debit participating in company wide project to insure solution, pricing, etc., are consistent across enterprise



5 EFT Platforms to consider

Brown Deer Debit	New Berlin Debit	St Pete Debit	Norcross Debit	3 rd Party Debit
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Each platform will roll-in solution incrementally over 2012 and into 2013

Brown Deer Debit	New Berlin Debit	St Pete Debit	Norcross Debit	3 rd Party Debit
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Credit Update

Issuing compliant EMV cards in Canada today!

EMV Roadmap for Credit



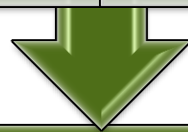
Credit participating in company wide project to insure solution, pricing, etc., are consistent across enterprise



2 Credit Platforms to consider

Base2000

TBS



Each platform will roll-in solution incrementally over 2012 and into 2014

Base2000

TBS

Credit EMV Update

Current and Future Plans



Develop standard chip card profiles

“Chip and Signature US profile” and “Chip and PIN Traveler profile” may shorten BIN certification timeframes

Finalize pricing

Secure Brand pricing and establish FIS Credit pricing for Association approval

Continued internal and client education including webinars to communicate EMV plans for FIS Credit

Schedule group implementations by common criteria such as Association, profile, reissue, etc.

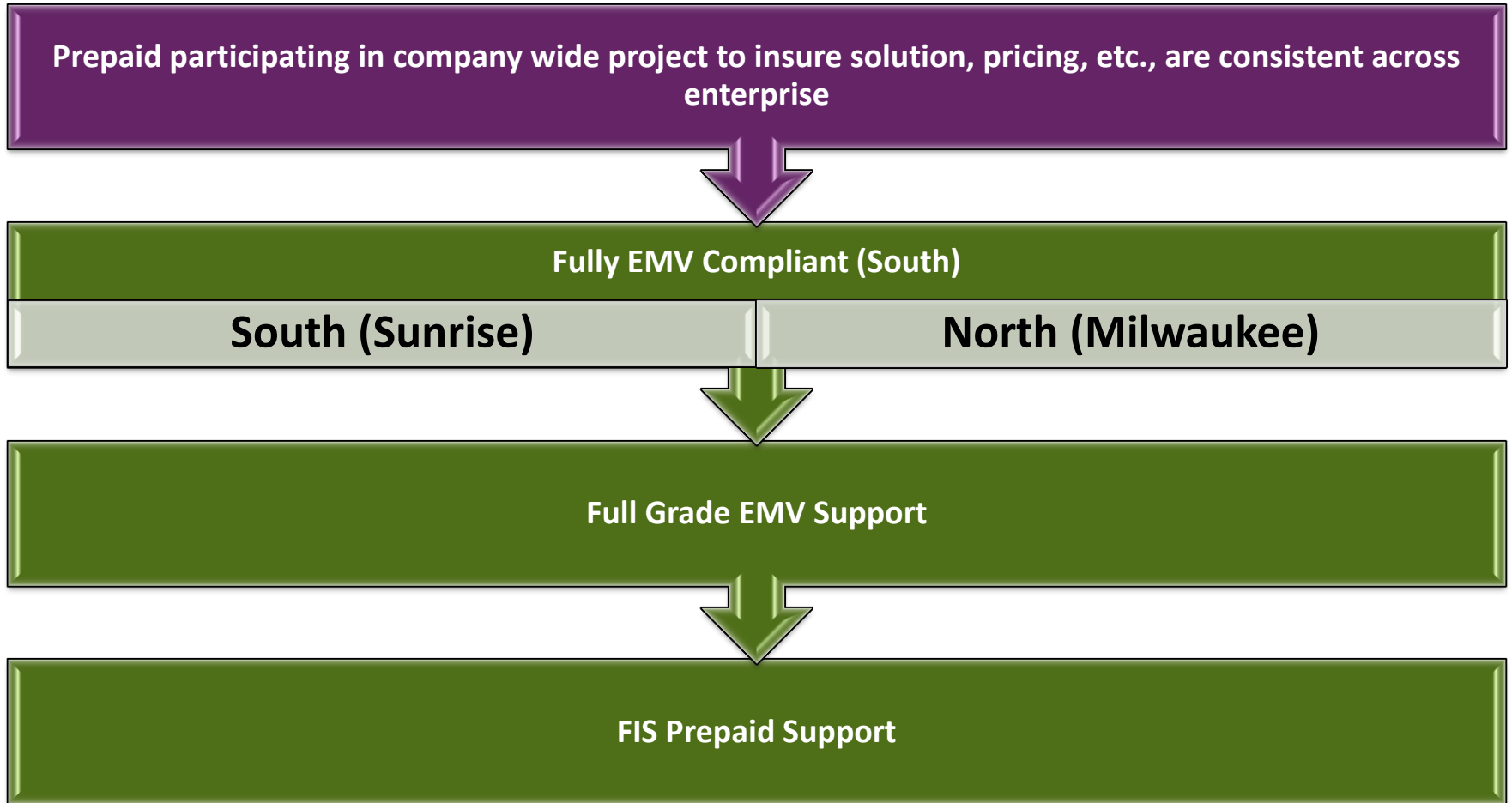


Prepaid Update

EMV processing since 2006!



EMV Roadmap for Prepaid



Prepaid Options Available Today



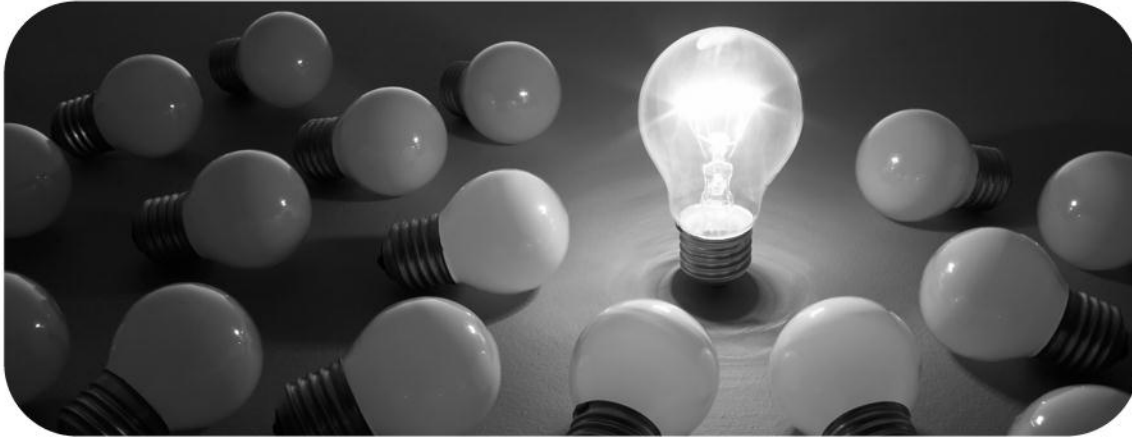
Build an EMV strategy for your card portfolios (debit and/or credit) – the FIS Sponsored Prepaid Travel Card Program can provide a short-term solution for your cardholders travelling abroad

Direct Processing

- Issuing EMV for 5 years
- MasterCard certified worldwide
- Integrated with CardPro
- First U.S. Visa implementation Q2' 2012

Sponsor/Agent Program

- EMV cards available now
- Designed for small/mid-size FI's
- No enrollment fee
- 3 weeks to have cards in branch



Next Steps

FIS and EMV – Next Steps



Return on Investment

Institute consistent pricing and messaging across the product lines



Thought Leadership

Holistic communication approach and messages internally & externally



TSM

Establish FIS as Trusted Service Manager



Payments Network Council

Form a PIN debit council across competitive lines (NYCE; Shazam; Star; etc.)



Enterprise Project Management for EMV

Establish EMV project manager and PMO process to ensure timely product rollout, product requirements and client roadmaps

FIS and EMV Communication

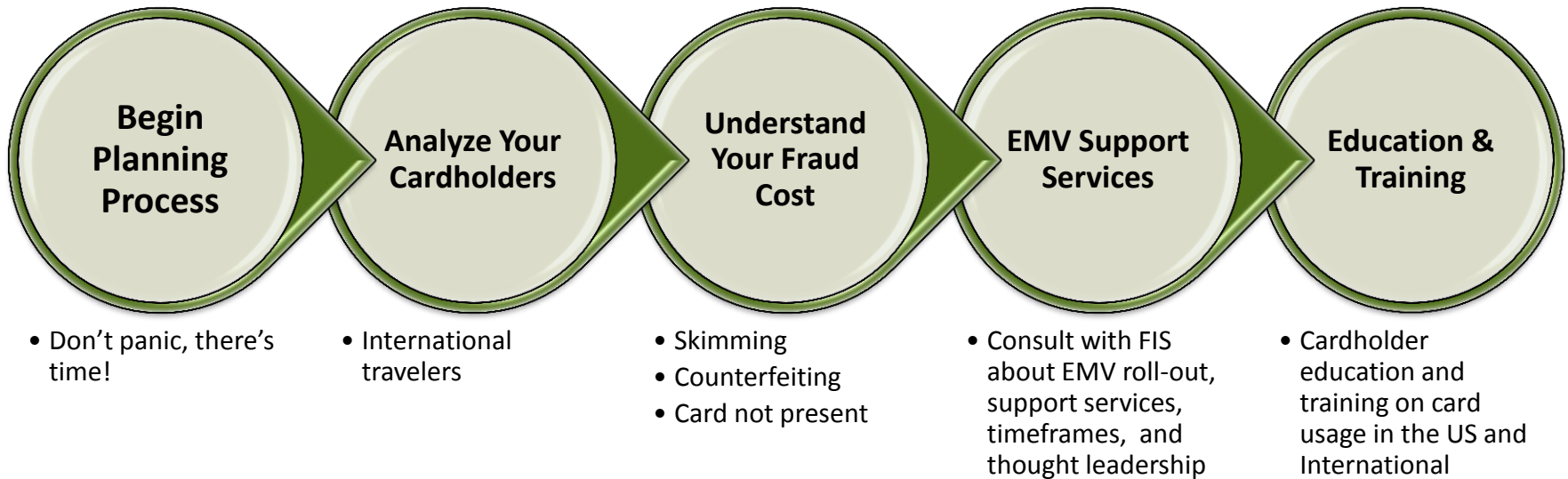


Communication Activities

- Ongoing awareness of our EMV migration – across all audiences
 - *Client webinars*
 - *Product and platform specific communication and education*
- Leverage expertise from EMV cross-functional product team
- Thought leadership participation with analyst groups and speaking engagements
 - *FIS Strategic Insights – March 2012*
 - *NACHA Payments Council – April 2012*
- FIS client conferences to educate and inform to existing clients
 - *InfoShare – April 2012*
 - *Client Conference – May 2012*
- Coming Soon – FIS Resource Center on www.fisglobal.com

EMV – Many Moving Parts

Advice to our clients



Poll: How satisfied were you with the usefulness of the information presented?



- Very Satisfied
- Satisfied
- Dissatisfied
- This was not useful to me



Questions?

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Appendix

Resources

Terminology

Determine Your Readiness

Pricing Considerations

Available Resources



- EMVCo
 - www.emvco.com
- Smart Card Alliance
 - www.smartcardalliance.org
- “Calming the EMV Storm” – an interview with Bastian Knoppers
 - <http://www.fisglobal.com/solutions-insights>
- FIS EMV Prepaid Travel Program
 - Email: moreinformation@fisglobal.com
 - Call: 800.822.6758
- Your FIS Strategic Account Manager
 - Email: moreinformation@fisglobal.com
 - Call: 800.822.6758

Terminology



- EMV
 - Generic name for specifications of ICC/Chip Cards and Terminals. Any EMV card can be supported at any EMV terminal world-side
 - According to EVMCo, approximately 1 billion EMV cards have been issued globally and 15.4 million POS terminals accept EMV cards. Payment brand mandates have driven or are driving Europe, Asia, Africa, Latin America and Canada to EMV
- EMVCo
 - Formed in the late 90's between Eurocard, MasterCard and Visa (EMV)
 - Manages, maintains and enhances the EMV® Integrated Circuit Card Specifications for chip-based payment cards and acceptance devices
- ICC
 - Integrated Circuit Card
 - Can be a simple memory chip card or a very sophisticated micro-controller chip
- Application Interchange Profile (AIP)
 - Specifies the application functions supported by the card (tells the terminal what the card can support)

Terminology



- CVM
 - Cardholder Verification Method
 - A means by which the cardholder is authenticated and could include Offline PIN, Online PIN, Signature or combinations of these.
- ARQC
 - Authorization Request Cryptogram. All EMV transactions flow in and out of a qualified HSM. All EMV transactions use public and private keys.
 - The request cryptogram is created by the chip and contains a combination of data from the terminal and the card itself.
- ARPC
 - Authorization Response Cryptogram. All EMV transactions flow in and out of a qualified HSM. All EMV transactions use public and private keys
 - The host takes information from the ARQC to retrieve necessary data to process the request and send a response.
- Fallback
 - An EMV transaction is attempted, but cannot be completed either due to a defect in the terminal or the chip. The transaction “falls back” to mag stripe.

Terminology



- Issuer Scripting
 - Allows an issuer to do limited changes to risk data on the chip without re-issuing the card – this information is added to the authorization message
 - Post Issuance updates can be performed on the card like application block/unblock, PIN change, by command scripts
- icVV
 - Alternate Card Verification Value defined for storage on VISA EMV Chip
 - Stored on the chip and similar to the CVV on a Magstripe
- On-line
 - All aspects of the transaction validation are handled on-line
 - Limits are checked on the host
 - If possible, PIN is validated by the host
 - On-line PIN is at the host
- Off-line
 - Uses the abilities of the chip to perform many “on-card” functions- including, but not limited to – PIN verification, limits verification, CAM checking, mutual authentication, encryption, etc.
 - Offline Pin is in the chip

Terminology



- Static Data Authentication (SDA)
 - Terminal verifies a static signature of ICC card data
 - SDA uses static data and is prone to electronic skimming attacks and card-cloning
 - Older and is being phased out, not best practice – Will not be used by FIS
- Dynamic Data Authentication (DDA)
 - Card vendor dependent
 - Card generates a dynamic signature
 - Uses transaction unique data from the terminal, like unpredictable number and amount
 - Uses transaction unique data from the card, like ATC
 - Uses derivation of the issuer private keys
 - Validates card using dynamic data
 - DDA involves the use of the following ICC keys
 - Issuer Public Key Certificate
 - Card Private Key
 - Card Public Key and Certificate
 - For DDA support, it is important for ICC cards to include an on-chip crypto processor

What is Online versus Offline?



- Why is this important?
 - For international travelers if offline isn't supported they will still encounter some instances where their card cannot be used
 - Offline requires additional keys
 - Offline is more expensive (data management, key management, size of chip)
 - Cards can't be switched from online to offline without reissuing the card
- EMV transactions can be authorized online or offline
 - For an online authorization, transaction information is sent to the issuer, along with a transaction-specific cryptogram, and the issuer either authorizes or declines the transaction in real time
 - In an offline EMV transaction, the card and terminal communicate and use issuer-defined risk parameters that are set in the card to determine whether the transaction can be authorized. Offline transactions are used when terminals do not have online connectivity (e.g., at a ticket kiosk) or in countries where telecommunications costs are high
 - Cards can be configured to allow both online and offline authorization, depending on the circumstances

Source: SmartCard Alliance EMV FAQ's 020112

Online versus Offline – Global View



Different Countries Have Taken Different Approaches

Offline PIN	Chip + Signature	Online PIN
UK/Ireland	Germany	Australia
France	Portugal	New Zealand
Canada	Spain	USA (For Debit)
Japan	Most of Asia	
Brazil	USA	
Netherlands		
Belgium		
Norway		

Source: Mercator Advisory Group “Deploying EMV” November 2011

EMV Supports Online and Offline Authorization



Offline Authorization

- Card to Terminal
- Limits stored on card
- High cost telecom locations
- Unattended locations
 - *Metro ticket tickets*
 - *After hours fuel*
 - *Vending*

Offline PIN

- Card to Terminal PIN verification

Online Authorization

- Online authorization back to issuer or stand-in / proxy as in current US credit, signature and PIN debit, prepaid

Online PIN

- Online PIN verification back to issuer or stand-in / proxy as in current US PIN debit transactions

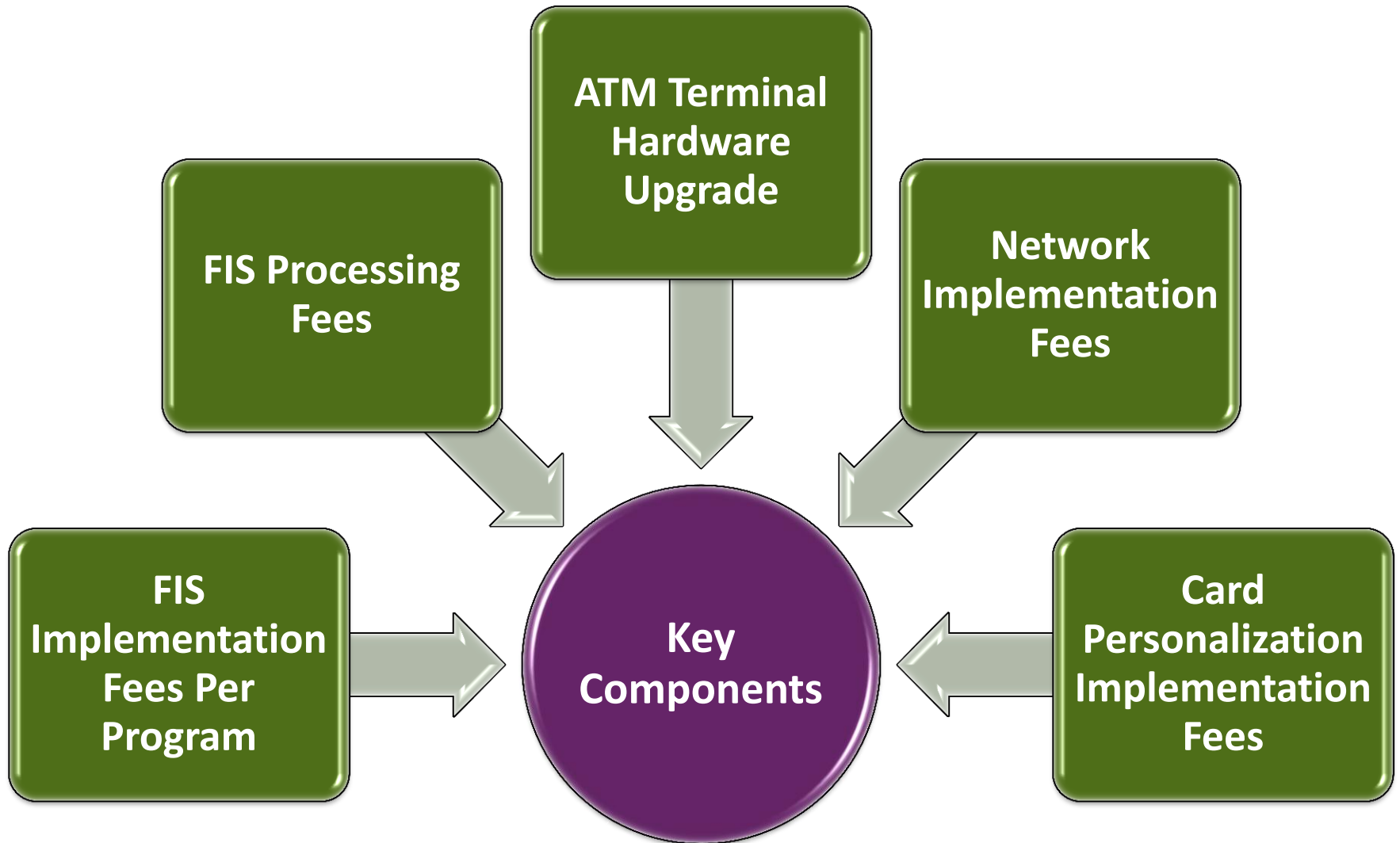
Determining EMV Readiness

Key Considerations



- EMV and Fraud Liability
 - What is your FI's annual loss due to card present (skimming and counterfeiting) fraud?
 - What is the 5 year trend?
 - Are your losses on the issuing side or at your ATMs?
- EMV & International Travel
 - What percentage of your cardholders are traveling internationally?
 - What percentage of your international travelers and transactions are repeat/heavy users?
 - Do you have any metrics as to transaction denials or other issues for these cardholders?
 - What/where/why are these issues occurring?
 - What is your strategy in responding to these issues?
 - Do you want your consumer to have a consistent POS experience regardless of the location?
 - Are you aware that FIS has an EMV Prepaid Travel Card solution that is ready today?

EMV Pricing Considerations





Thank you