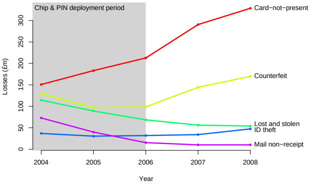
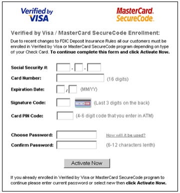
Verified by Visa and MasterCard SecureCode
Vulnerabilities and Consequences



MasterCard SecureCode

VERIFIED by VISA



Verified by Visa / MasterCard SecureCode Enrollment:

Due to recent changes to FDIC Deposit Insurance Rules all our customers must be enrolled in Verified by Visa or MasterCard SecureCode program depending on type of your Check Card. **To continue complete this form and click Activate Now.**

Social Security #: □-□-□

Card Number: □ (16 digits)

Expiration Date: □/□ (MM/YY)

Signature Code: □ (Last 3 digits on the back)

Card PIN Code: □ (4-6 digit code that you enter in ATM)

Choose Password: □ How will it be used?

Confirm Password: □ (6-12 characters lenth)

Activate Now

If you already enrolled in Verified by Visa or MasterCard SecureCode program to continue please enter current password or select new then **click Activate Now.**

Steven J. Murdoch

`http://www.cl.cam.ac.uk/users/sjm217/`

UNIVERSITY OF CAMBRIDGE
Computer Laboratory

Tor
www.torproject.org

Cambridge International Symposium on Economic Crime, 2 September 2009, Cambridge, UK

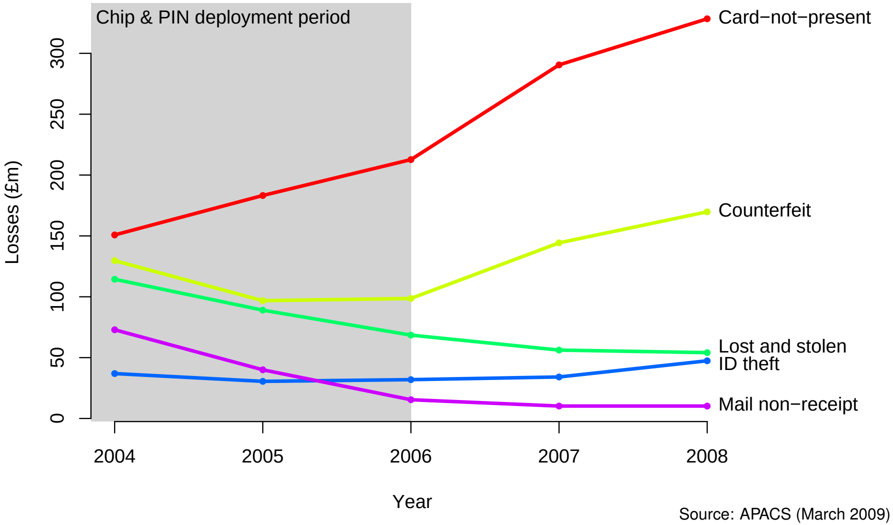
Chip & PIN is now being deployed worldwide

- Chip & PIN, based on the EMV (EuroPay, Mastercard, Visa) standard, is deployed throughout most of Europe
- The UK was an early adopter (started 2003, complete by 2006)
- Deployment has started in Canada and Mexico
- Transactions (point-of-sale and ATM) are authorized using a smart card and PIN
- Chip is more difficult to clone than older magnetic stripe, but there are still vulnerabilities (see my talk tomorrow, 13:45)

Chip and PIN

EMVCo

UK card fraud continues to rise



Source: APACS (March 2009)

Totals (£m): 505 (2004), 440 (2005), 427 (2006), 535 (2007), 610 (2008)

Criminals have adapted to Chip & PIN

Since 2003, fraud has shifted to areas where Chip & PIN is not used

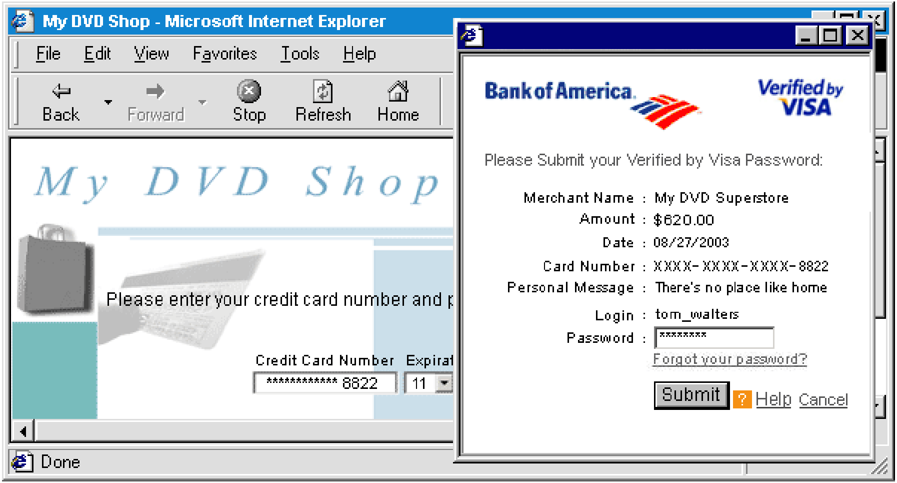
- **Card not present** (up 118% to £328.4m)
- Fraud abroad (up 149% to £230.1m)
- Online banking (up 330% to £52.5m)

- Banks have rolled out mitigation measures in each of these categories (with varying success)
- In this talk I will discuss one defence against card-not-present fraud: **3-D Secure**
- Branded as Verified by Visa and MasterCard SecureCode

VERIFIED by VISA

MasterCard® SecureCode™

Customers enter a password online



My DVD Shop

Please enter your credit card number and p

Credit Card Number: ************ 8822

Expirat: 11

Please Submit your Verified by Visa Password:

Merchant Name : My DVD Superstore

Amount : $620.00

Date : 08/27/2003

Card Number : XXXX-XXXX-XXXX-8822

Personal Message : There's no place like home

Login : tom_walters

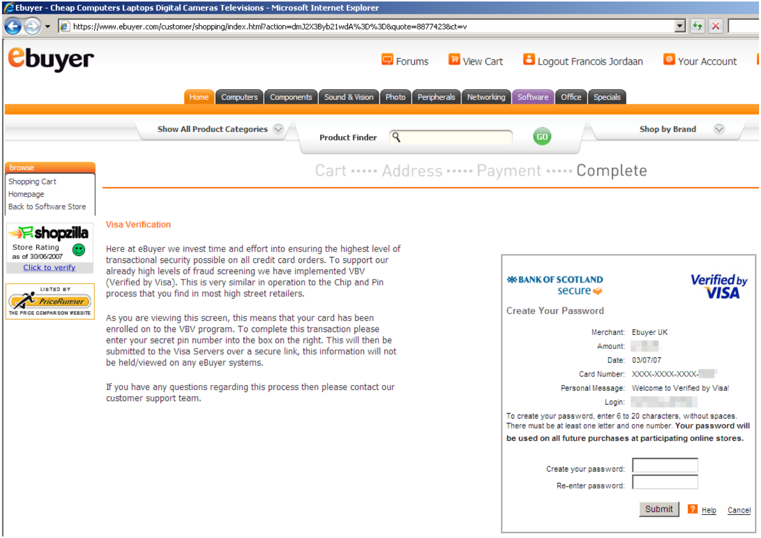
Password : ********

Forgot your password?

Online shopping website shows a password form on check-out

Customer’s bank verifies the password to authorize the transaction

The form is often embedded



Visa Verification

Here at eBuyer we invest time and effort into ensuring the highest level of transactional security possible on all credit card orders. To support our already high levels of fraud screening we have implemented VBV (Verified by Visa). This is very similar in operation to the Chip and Pin process that you find in most high street retailers.

As you are viewing this screen, this means that your card has been enrolled on to the VBV program. To complete this transaction please enter your secret pin number into the box on the right. This will then be submitted to the Visa Servers over a secure link, this information will not be held/viewed on any eBuyer systems.

If you have any questions regarding this process then please contact our customer support team.

Create Your Password

Merchant:	Ebuyer UK
Amount:	[redacted]
Date:	03/07/07
Card Number:	XXXX-XXXX-XXXX-[redacted]
Personal Message:	Welcome to Verified by Visa!
Login:	[redacted]

To create your password, enter 6 to 20 characters, without spaces. There must be at least one letter and one number. **Your password will be used on all future purchases at participating online stores.**

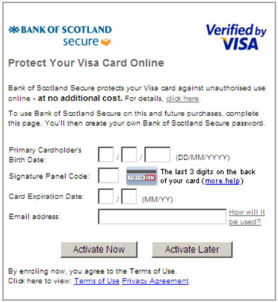
Create your password:

Re-enter password:

Source: `http://blog.isotoma.com/2007/07/ebuyer-bank-of-scotland-adopts-verified-by-visa/`

3-D Secure suffers from a number of security vulnerabilities

- Enrolment is often weak:
  - e.g. date of birth and card details for Bank of Scotland
- Customer cannot tell who will see their password:
  - Password should only be sent to the bank, but
  - A criminal could put up a fake form
- Often customers have increased liability for such transactions:
  - Normally merchants take the losses, and a charge-back fee
  - With a 3-D Secure password, the customer is *de facto* liable



Protect Your Visa Card Online

Bank of Scotland Secure protects your Visa card against unauthorised use online - **at no additional cost.** For details, click here.

To use Bank of Scotland Secure on this and future purchases, complete this page. You'll then create your own Bank of Scotland Secure password.

Primary Cardholder's Birth Date: __ / __ / ____ (DD/MM/YYYY)

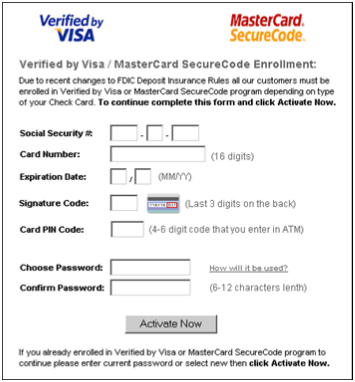
Signature Panel Code: ___ The last 3 digits on the back of your card (more help)

Card Expiration Date: __ / __ (MM/YY)

Email address: ________ How will it be used?

By enroling now, you agree to the Terms of Use.
Click here to view: Terms of Use Privacy Agreement.

Criminals have already started attacks



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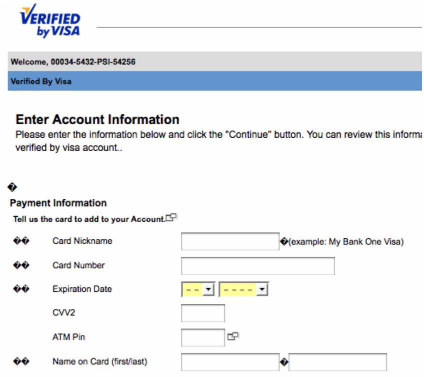

Welcome, 00034-5432-PSI-54256

Verified By Visa

Enter Account Information

Please enter the information below and click the "Continue" button. You can review this informa
verified by visa account..

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Payment Information

Tell us the card to add to your Account.

�� Card Nickname □ �(example: My Bank One Visa)
�� Card Number □
�� Expiration Date -- ▾ ---- ▾
CVV2 □
ATM Pin □
�� Name on Card (first/last) □ � □

When I called my bank, and said that the site `securesuite.co.uk` asked for my password, they said is was a scam

Actually this was legitimate, and run by RSA (aka Cyota/EMC), who provide 3-D Secure services to many banks

The customer has been left out

- The “3-D” part of the name indicates the three domains protected by 3-D Secure:
    - Acquirer (merchant and their bank)
    - Issuer (the customer’s bank)
    - Payment System (MasterCard or Visa)
- Note that there is no mention of the customer here!

- Liability has shifted to the customer, but they have not been given the ability to prevent fraud
- Criminals are taking advantage of this weakness
- More sophisticated attacks are likely
- Regulatory pressure is needed to fix the problem

Questions?