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Sun's Worldwide Java Developer Conference

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Trust, Proof, and Payment

Software Distribution in the Age of the Internet

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Security and Java

- Current focus on boundaries and detecting “bad” applets at runtime
  - Distinguishing “trusted” from “untrusted”
  - Limiting applet activity
  - Severely limiting “untrusted” applet activity
- Current applet screening very coarse
  - Netscape - local vs remote
  - Others - inside/outside firewall, etc.
- Where is user judgment?

What Do the Players Want?

- Users want control in:
  - Trusting the author and integrity of the applet
  - Authenticating the “reseller” of the applet
  - Preventing fraudulent use of their credit cards
- Developers want:
  - Payment
  - Piracy prevention
- Electronic distributors and resellers want payment and info
- Visa and Mastercard want to prevent fraud

...all before the applet is loaded

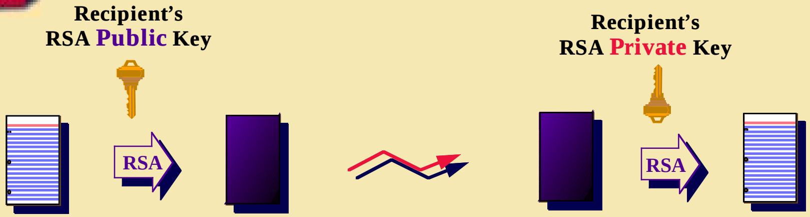
Security Foundation for Applet Sales and Distribution

- SSL
  - Secure piping
- Signed applets and signature-aware browsers
  - Integrity of application
  - Authenticity of developer
  - User decides which ***developers*** she trusts!
- Secure transactions (SET)
  - Authentication — Cardholder, Merchant, and Acquirer
  - Protection of CC information
  - Indemnity — for merchant and cardholder
  - Fraud Control — for issuers
- Signed distribution
  - Trusted reporting of distribution chain back to developer

RSA Crypto Foundation

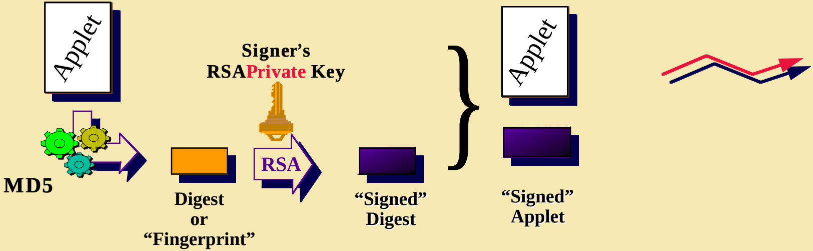
- RSA Digital Signature
  - Authenticates author and integrity of a document or application
- RSA Digital Envelope
  - Provides privacy for communication, transactions, and data between sender and recipient
- Both based on RSA Public Key Cryptography and Digital Certification of keys

Public Key Crypto Basics



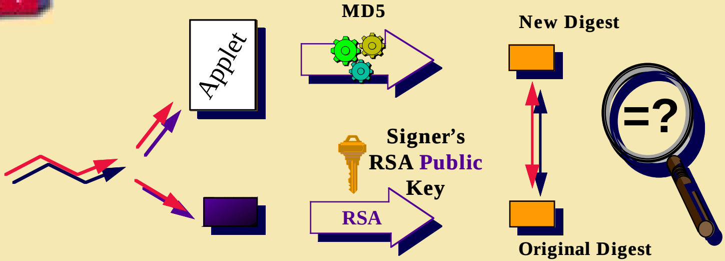
- Algorithm asymmetrical
  - Pair of keys for each entity
  - What the Public key locks, only the Private key unlocks, and vice versa
- Eliminates need to share secrets
- Allows positive identification of sender and recipient

Signing an Applet

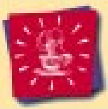


- Author Signs a “fingerprint” of the Applet and binds it to the Applet

Verifying a Signature



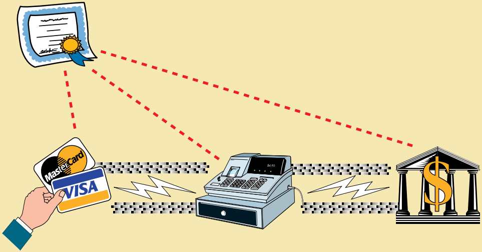
- Recipient decrypts original fingerprint, and matches it with a new one
  - Verifies both integrity of applet and author's identity



Certificates

- You need to have trust in the “labeling” of public keys
- Certificates establish trust indirectly via trusted “Certificate Authorities” — i.e., Verisign
- Uniform mechanism
- Many certificates for many purposes
- Facilitates secure, *ad hoc* commerce and communication

SET — the Secure Payment Card Transaction Standard



- "Preflights" the identity of all participants using certs and challenges
- Obscures Credit Card from merchant until after identities and approval are complete
- Deals only with value and method of transaction, not the order
  - Restrictions make it strong and exportable worldwide

What’s Next

- Java standards for code signing using digital signatures
- Java browsers that check applet signatures and inform the user
- Certificate standard and infrastructure for signature verification
- SET finalization and deployment in browsers, merchant servers, and payment gateways

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