Mobile Web Phishing Defense

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Phishing

- Human factors problem – users give up credentials to the wrong party
- 2 million victims and $1.2 billion in losses for US banks in 2003
Goal: Eliminate phishing

- **Problem:**
  Users give up their passwords in an authentication session

- **Solution:**
  1. *Stop users before they enter passwords*
  2. Remove *users and passwords* from the authentication session

Mobile Device Limitations

- **Physical restrictions**
  - Screen size
  - Input interface

- **Vendor restrictions**
  - Limits on running additional software
  - Upgrades
URL Display

http://welcometo.bankofamerica.malweb.org/index.jsp

- No https indication
- Truncation from middle – lose effective second level domain
- Long URLs never fully displayed

Chrome

- Lack of trusted chrome elements
- Developers actively try to remove chrome from view
SSL

- What can a user do here?
- Even if they wanted to, users can’t
  - Examine SSL certificates
  - Diagnose invalid certificates

Mitigation Strategies

- Browser designer
  - Sites need to identify themselves to the user
  - Keep effective second level domain name

- Website authors
  - Site designers should shorten URLs

- Network administrators
  - Network level anti-phishing proxy filters
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Cellular Based Authentication

- Cellular devices authenticate to network, network authenticates user to websites

- **Advantages**
  - Usability – Without active user participation, users can’t make security mistakes
  - Ease of deployment – Takes advantage of existing infrastructure, billions of cell phones and users
  - Trust – Wireless network authentication relatively hard to attack from the outside
WebCallerID Architecture

Protocol
Protocol

- Get user profile associated with IP address
- Authentication Assertion
- Relying Party

User’s Browser

Identity Server

AAA Server

Authentication Assertion

Implementation

- Based on OpenID, but could be used with other SSO systems
- AJAX client handles all authentication for user, user simply clicks “Login” and the network handles the rest
- Unique identity per RP (directed identity) prevents colluding RPs from tracking a user across sites
- Construct identity per RP via keyed hash of (user, domain)
Deployment

- No changes needed for user clients
- No changes needed for OpenID enabled relying parties
- Works with
  - cell phone based browsers
  - PCs with cellular modem
  - PCs with a tethered phone

Security Benefits

- Users don’t need to:
  - Create and remember good passwords
  - Identify malicious relying parties
  - Carry another physical token

- Websites don’t need to:
  - Store and handle user authentication data
  - Worry about phishing sites stealing valid credentials
Mobile Device Authentication

- Multi-factor authentication
  - Many sensors – location, audio, video, wireless networks
  - Combine multiple forms of evidence to authenticate

- Passive system
  - Minimal user interaction
  - Mimics human authentication processes