“BlackPOS” Malware Revisited

Webinar

17 December 2015

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Agenda

- The Discovery of BlackPOS
- Malware Capabilities
- Attack Characteristics
- BlackPOS Detection Strategies
- POS Malware Prevention
- Questions and Answers

Trends in Data Compromises

Criminals are launching more sophisticated attacks targeting merchants

The Discovery of “BlackPOS”

BlackPOS Background and Discovery

- Initially seen “in the wild” in early 2012
- Dubbed Kaptoxa, pronounced (“Kar-toe-sha”) based on strings found in the malware
- Identified again in late 2013, believed to be found at several retailers
- Linkages found to earlier POS malware
- Source code has been leaked multiple times
- Associated with a number of data breaches reported in recent years

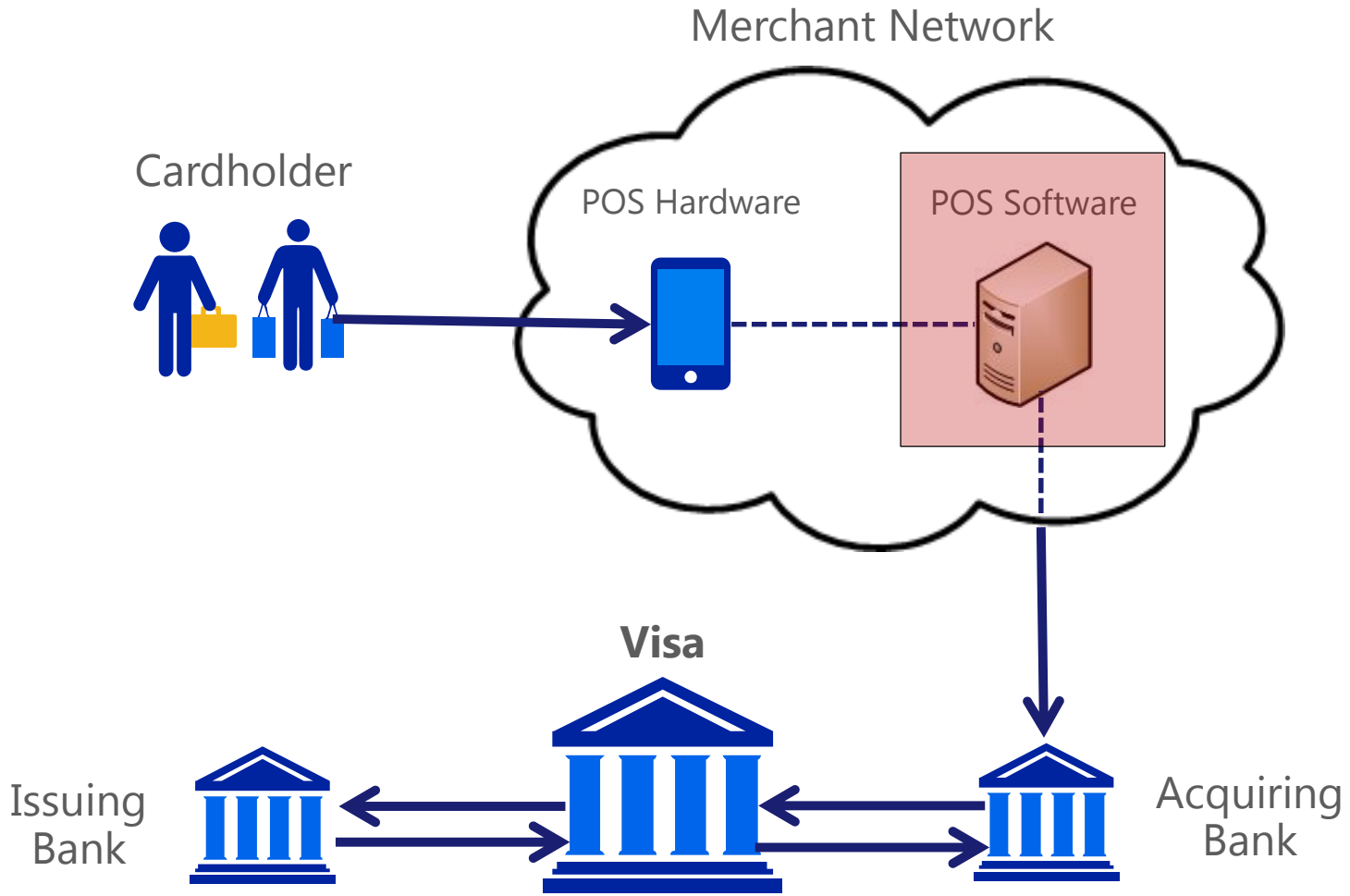
BlackPOS Research and Analysis

- Security researchers are continually reverse-engineering
- String found in one of the earlier versions:

  z:\Projects\Rescator\MmonNew\Debug\mmon.pdb
- Since its discovery, many different versions have been identified –each with new or slightly different characteristics
- Also related to “FrameworkPOS” malware

BlackPOS Malware Capabilities

Point-of-Sale (POS) RAM Scraping



POS RAM Scraping Primer

- Authorization data temporarily stored in clear text system memory
- Cybercriminals attack memory space because it is the easiest path to the data
- RAM scrapers generally use logic to identify track 1 and 2 data
- Some malware known to use Luhn algorithm to validate
- Captured data is pulled out of memory as it passes through
- Data is often briefly stored on the system it was captured

BlackPOS (somewhat) Unique Characteristics

Recent Variations and Functionality

- Additional functionality:
  - Self-deletion capability post exfiltration (reported in recent versions)
  - Not service dependent, so removal is more likely
  - Character shifting obfuscation
  - System level log scrubbing, e.g. Windows Event Log Viewer
  - Data movement timing mechanisms

BlackPOS Capabilities

Core Capabilities With Varying "bells and whistles"

- Different variations each incident (no MD5 match, no A/V detection)
- Installation and persistence mechanisms
- Memory-scraping
- Data encoding and masking
- Data exfiltration
- Self-removal

Attack Characteristics

BlackPOS Attack Characteristics

Initial Attack Vectors

- Common attack scenarios
  - Remote access credentials
  - Internet-facing systems with weak authentication
  - Botnet infection
  - Exfiltration occurs via ports / services commonly associated with data transfer
    - ICMP
    - TLS/HTTPS
    - NetBIOS
    - SSH
    - FTP/SFTP

Post-Attack Infrastructure Setup

Once Inside: Network Exploration and Exploit Tools Accompanying BlackPOS

- Network exploration and system mapping
- Proxies
- Privileged account identification
- Account takeover
- Data aggregation
- Data exfiltration
- Evidence cleanup / anti-forensics

BlackPOS Characteristics

POS Malware Distribution, Data Aggregation, Hiding and Exfiltration

- BlackPOS malware installation
- Data movement timing mechanism
- Aggregation servers
- “Jump” servers for data exfiltration

BlackPOS Detection Strategies

BlackPOS Prevention and Detection Strategies

BlackPOS Warning Signs

- Unexpected Windows services on the POS system
- Unexplained SMB traffic from or from the POS system (possibly encrypted)
- New, unexplained (likely encrypted or encoded) files on the POS
- Newly installed Windows services on POS system
- Outbound FTP traffic to the Internet

BlackPOS Prevention

- Ensure that overall payment processing environment is securely configured and maintained in accordance with the PCI DSS.
    - Ensure that firewall rules only allow remote access from known IP addresses
    - If remote connectivity is required, enable it only when needed
    - Contact your support provider or POS vendor and verify that a unique username and strong password exists for each of your remote management applications
    - Use the latest version of remote management applications and ensure that the latest security patches are applied prior to deployment
    - Plan to migrate away from outdated or unsupported operating systems like Windows XP
- Remote access applications best practices
    - Enable logging and examine logs regularly
    - Do not use default or easily-guessed passwords
    - Restrict access to only the specific IPs and only for established time periods
    - Only use remote access applications that offer strong security controls
    - **Always use two-factor authentication**. If remote access is required by your POS integrator, insist on two-factor authentication

Indicators of Compromise (IOCs)

- Operating system target selection
  - Windows XP, mostly Professional
- Processes activity
  - Searches for *pos.exe* to determine what to scrape
- Exfiltration
  - Creates file *output.txt* which may contain card data
  - Creates *.dll* files (e.g., *twain_32*.dll*) which may contain card data
- File names / MD5 hashes
  - *svchosts.exe* / ce0296e2d77ec3bb112e270fc260f274
  - *bladelogic.exe* / 433a2750429d805907aa4848ff666163
  - *svchosts.exe* / c0c9c5e1f5a9c7a3a5043ad9c0afa5fd
- System Center Configuration Manager (SCCM) manipulation
  - Normal vs. abnormal SCCM behavior

Upcoming Events and Resources

Upcoming Webinars – Training tab on www.visa.com/cisp

- "Kuhook" Point-of-Sale Malware
  - 27 January 2016, 10 am PST

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Questions?