“BlackPOS” Malware Revisited

Webinar

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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

Prevention

Layered defense

Early warning signs

IOCs
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?