The State of Point Of Sale (POS) Security

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Agenda

• Payment Ecosystem Breach Trends
• Current threats and breach trends
• Emerging threats to the payment ecosystem
• Effective threat management for payments
• Visa Threat Intelligence
Payment Ecosystem & POS Breach Trends
Global Breach Trends - Overview

• The US and Europe represent the top two regions for data breaches

• Across all regions so far in 2017, we have seen about as many Visa accounts breached as all of 2016

• More breaches occur at e-commerce merchants, but the majority of stolen account data comes from Level 1 brick and mortar entities (~85%)

• 2017 saw a substantial increase in breached “Agents” (banks, processors)
Global Breach Trends – By Channel and Entity Type

**Total Breach Alerts By Channel**

- Agent: 41%
- Brick and Mortar: 35%
- Ecommerce: 16%
- Other: 8%

**Total Breach Accounts By Channel**

- Agent: <1%
- Brick and Mortar: 85%
- Ecommerce: 7%
- Other: 8%

**Total Breach Alerts By Entity Type**

- L1: 51%
- L2: 23%
- L3: 10%
- L4: 7%
- Agent: 4%
- Other: 3%

**Total Breach Accounts By Entity Type**

- L1: 72%
- L2: 10%
- L3: 4%
- L4: 7%
- Agent: 6%
- Other: 2%
- EU: 72%
Global Breach Trends – By Merchant Type

- Restaurants, retailers and lodging (hotels) are the three leading market segments through the first six months of 2017.
- Restaurant breaches continue a downward trend from prior years.
- Retail breaches continue an upward trend, more than double from 2015.
- There has been an increase of Business-to-Business (ecommerce channel) and as well as lodging breaches over the prior year.
Evolved POS Malware

• Customized payment card-stealing malware

• Kaptoxa (BlackPOS), BlackPOSv2, Alina, Dexter, ModPOS, Backoff, FindPOS, RawPOS, Poseidon

• POS malware is not just RAM-scraping anymore:
  - Screenshot-grabbing
  - Keystroke logging
  - Command-and-control
  - Data exfiltration
  - Self deletion (malware self-removal)

• POS malware becoming increasingly resistant to analysis
Emerging Point Of Sale Threats
EMV Effect on Merchant Breaches

• Starting to shift away from big retailers to merchants without advanced security
• Criminals are targeting remaining mag stripe data, and in different ways
• Many vulnerable merchants out there
• Breaches involving card-not-present data are on the rise
• Big data gone bad (combining stolen data from multiple breaches)
Multi-stage Attacks & Targeting Business Partners

• Attacking Point Of Sale “Integrators” to reach large numbers of smaller merchants
• Underground sites selling enterprise access, like xDedic, popping up
• Huge underground market in authentication credentials (single-factor remote access)
• Breached merchants as pivot points
Multi-Site “Land and Expand” Tactics

“With all the meteor activity in this system, it's going to be difficult to spot approaching ships”

• Attackers set up a hierarchy of breached merchants
• Conduct recon and launch attacks from legitimate merchants
• Exfiltrate payment card data through other merchants
• Attacker IPs and C2 servers are tough to spot, look like false positives
Hiding in Plain Sight, Deception and Anti-forensics

• Tactics, tools used to avoid detection
• No malware
• PowerShell exploits
• Sneaky exfiltration methods
• Data encryption with asymmetric keys
• Log deletion
• Timestomping
Forced “Fallback” Transactions

• “Fallback” described
• What would it take to disable the chip card reader and force a less secure transaction (swipe)?
• Attack would need to be successful on multiple devices (100s/1000s)
• Requires very advanced malware & a detailed understanding of POS devices
• What if the Windows system controlling POS devices had this as an option?
Effectively Managing POS Threats
Root Cause - Ineffective Threat Intelligence

- Incident response process only existed on paper
- Slow/no reaction to obvious threats
- Threat intelligence with no forethought or focus
- Intelligence and IR teams drowned in information overload
- False sense of security or single points of failure
- Attacks end up succeeding anyway, right under their noses

**Actual forensic finding:** "Investigation showed client’s anti-virus system had been alerting *starting approximately 3 days after the breach* began but client was unaware or unresponsive to the alerts."
Effective Payment Threat Management

- Put yourself in a position to identify the **breach** before the **fraud** occurs
- Knowing and practicing Incident Response with TTPs
- Adapting defenses and response over time
- Include threat intelligence for **relevant threats**
Common Merchant Breach Scenario

- Attacker spearphishes employee
- Steals VPN login credentials
- Performs internal network reconnaissance
- Attacker elevates privileges
- Attacker gains access to AD Domain
- Attacker distributes POS malware
- Aggregates and exfiltrates payment card data
Components of a Working Cyber Defense

Intelligence-driven cybersecurity

• Collect, prioritize and share cyber intelligence
• Internal and external intelligence (what you observe and what others observe)
• Process to prioritize events
• Process to respond quickly
• Continually adapt defenses based on observed threats (and successful attacks)
• Practice incident response with a focus on evolving threats
How important are IOCs to your business?

- Higher fidelity intelligence
- Operationalizing cyber intel and automation
- More reliable for earlier breach detection
- Reduce payment card fraud and the overall impact of a breach
- Streamline incident management
- Enables proactive cyber defense
- Aging of IOCs, what Visa sees
Visa’s Results With Intel-led Breach Detection

Incorporating IOCs into breach detection reduced detection time

- Cut detection time in half from 2014
- Many detected compromises had little or no occurrence of fraud
- In many cases, Visa was the first to detect
- Intelligence for early detection now available throughout payment ecosystem
Visa Threat Intelligence Indicators of Compromise are not found in other leading threat intelligence tools\textsuperscript{1}

\textsuperscript{1} Visa. Based on a sample of Visa Threat Intelligence indicators compared to four commercial threat intelligence sources/vendors, 2016
**SIEM Integration:** Correlation of IoC’s with log data. Analysts create rules and alerting mechanisms to assist in breach identification, incident response and remediation.

**Endpoint:** Clients utilize the VTI API to configure endpoint monitoring for IoC’s. This allows merchants to run endpoint scans for threat hunting on files and connections found in the VTI feed.

**Firewall:** IP addresses and domains from the IoC feed which are known to be malicious and unnecessary for daily operations can be blocked/quarantined/monitored at the firewall level to prevent connections and quickly detect malicious activity, helping to avoid breaches from occurring.

**Third Party:** Threat Intelligence Platforms, Simulated Breach Vendors, Operations Management
Thank You

Questions?