Enterprise Defense & Why You're (Organization Is) Most Likely Doing it Wrong.

Tom Parker, April 2015

FusionX

The Speaker..

- CTO FusionX
- Consultant > 15 Years
- Author (2004): Cyber Adversary Characterization
- Speaker/Trainer Blackhat Briefings/Training
  - Come learn how to own SCADA gear this summer!
- Columnist Dark Reading

What we do & topic relevance

- Our Perspective:
  - Conduct realistic, scenario based attacks
    - Typically for CXO / BOD Level
  - Identify customer ability to:
    - Detect, Protect, Respond
  - Provides first hand understanding of technical issues and common process level flaws

Todays Agenda

- Review of Threat Environment
  - Evolution 00's - today
- Common Adversary TTP's
- Key Issues in Enterprise Environments
- Addressing Gaps:
  - Increasing ROI on Existing Investments

Todays Environment

- 2014 estimated: $500B+ cost to Global Economy
- US “Hemorrhaging” Intellectual Property
- Enterprise IT is Losing Battles Daily
  - Just not the war (yet)
- Focus on Expense in Depth
  - And Compliance

Threat Time Line

Adversary Evolution: Attackers Respond to Defense

- Attackers Forced to Evolve
  - Broad use of firewall products
    - Focus on ‘hard outer shell’
  - Microsoft focus on securing network services
  - Implementation of DEP/ASLR for Services
  - Lower Service Profile in Default Configurations
    - Resulting in less network attack surface
- Offensive vs. Defensive Evolution

Real-World Attacks Today

- Are not:
  - Nessus
  - Always sophisticated
- Are:
  - Fully Asymmetric

Process of Compromise: Non Linear

Observe, Orient & Decide: Reconnaissance

- Careful Planning Pays Dividends
  - Surgical Compromise of Key Resources/Individuals
  - Reduced Likelihood of Detection
  - Increased Chances of Success
- Common Sources Include:
  - Social Networks
  - Search Engine Data Mining
  - Tech Forums
  - Paste Bin, Gist etc.

Act: Phishing & Drive-by Attacks

- Remains Tactic of Choice for Many Groups
- Often Provide High ROI for Attacker
  - Direct, internal network access
  - Immediate domain credentials / tokens
  - Access to large amounts of internal data
- Cannot Be Entirely Solved via User Education
- Cannot Be Entirely Solved via IT Controls
  - Even next-gen technologies (FireEye et al.)

Observe, Orient, Decide

- Information Repositories
  - Poorly Protected File Shares
  - Asset Management Systems
- Network Equipment
  - Pub SNMP etc.
- Broadcast Protocols

Act: Lateral Movement & Escalation

- Attackers <3 Flat Networks
  - Direct Access to Administrative Interfaces
  - Exploitation of Internal Network Services
  - Access to File Shares / Databases
- Secondary User Account Compromise
  - Targeting of Administrative Group Users

Act: Common Internal Targets

- Authentication Subsystems:
  - Domain Controllers
  - RAS Servers
  - Two Factor Systems (RSA SecurID Servers et al)
- Remote Access Devices:
  - SSL & B2B VPN Appliances
  - VDI Environments

Act: Common Internal Targets (Cont.)

- Internal Web Applications
  - Think HR, CRM, Management Apps
    - Often built on tech such as SAP, JD Edwards, E-Business
  - Typically less security scrutiny than ext. apps
    - Fewer controls between application tiers
    - Far less frequently tested & monitored
- Management Infrastructure
  - Frequently crosses over trust-zones
  - Patch & configuration management systems

Detect, Protect Respond

- Basic Enterprise Issues Hamper:
  - Detection: with confidence
  - Protection: effectively
  - Response: quickly enough, or at all

Detect: Key Issues

- Missed First Opportunities for Detection
  - Before primary attack even occurs
- Common Missed Opportunities
  - Domain Registration
  - Network Recon
  - Social Networks etc.

Detect: Key Issues

- There's LOTS of Data within Enterprise
- Often Look to 'Next-Gen' Solutions
  - When the answer/data might already exist
- Data worthless without context
  - Asset context
  - Event context

Detect: Key Issues

- Common Monitoring Gaps:
  - Service & Privileged Account Usage
  - Industrial Control Systems Equipment
    - Often operated behind back of Enterprise IT
  - Enterprise Applications
    - Any monitoring often lacks application context
      - Generally focused around WAF technology
      - Versus application-level feedback to SIEM
  - Databases
    - Query auditing uncommon
    - DB logging infrequently tied to SIEM

Protect: Key Issues

- You can only protect what you know exists
- Unknown Unknowns
  - Poor Internal & External Asset Awareness
    - Sparsely Distributed Assets / Hosting
    - Domain Registration Tracking
    - Asset Management / Unmanaged Connectivity
  - Data Classification, Storage & Flows
    - Where your crown jewels are stored (incl. the copies)
    - How does it move around the environment

Protect: Key Issues

- Poor User Education wrt/:
  - Social Media Usage
  - Use of Technical Forums
  - Use of Paste Bin et al.

Protect: Key Issues

- Basic Hygiene Issues
  - Poor network segmentation
    - Common IT resources leveraged across trust-zones
  - Excessive account privileges
  - Third party software patching
  - Insecure or non existent system base lines
  - Insecure remote access solutions (end points)
  - Over reliance on silver bullet solutions
    - FireEye, MIR et al.

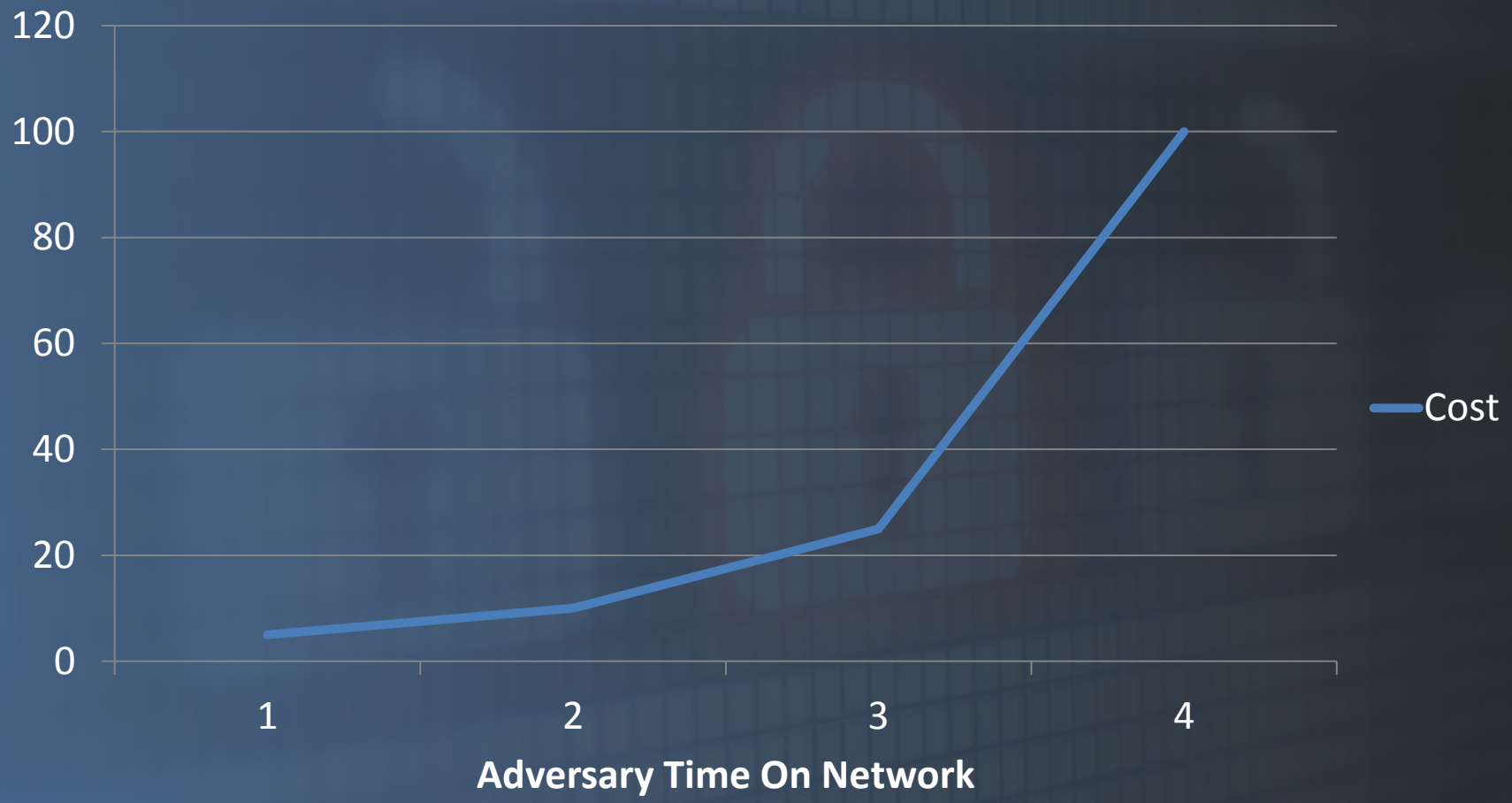
Incident Response: Everyone Has a Plan

"Everyone has a plan 'till they get punched in the mouth" – Mike Tyson

Compromise Time Line

- First 24 Hours of Internal Access **Critical**
  - For Both Attackers and Defenders
  - > 24 Hours == Non-trivial remediation
  - Will have established multiple C2 methods
- One week+:
  - Enterprise-wide compromise
  - Will likely know more about your own environment than your own staff
  - Significantly hinders future defensive efforts

Cost Of Response



Response: Key Issues

- Response Times Hampered By:
  - Poor knowledge of targeted assets
    - Allowing for effective triage/prioritization
  - Incomplete information on breach activity
    - Poor visibility / forensic data readily available
  - Inability to handle digital ‘fog of war’
- Response Plan Infrequently (Fully) Tested
  - Table-top exercises have limited value

Detect

- Users
  - Educate them
    - They might be your first line of detection
    - Ensure acceptable social network use is covered.
  - Develop a culture of self reporting
  - Educate them some more
  - Proactively monitor for infringements
    - Particularly social network / disclosures
- Monitor
  - New domains, SSL Certs, Web Sites
    - Via threat intel & other monitoring services

Detect

- Databases: Increase ROI
  - Leverage Table & Column ACL's
    - Enabling detection of anomalous queries
  - Monitor Sensitive Fields
    - Such as via Oracle AUDIT Tables
  - Baseline Normal Query Activity
    - Such as Originating from App Server
    - Leverage SIEM for Deviations & Correlation Events

Detect

- Applications
  - Hook Applications to Understand Business Logic
    - Log business logic trespass attempts
    - Instrument Interface to SIEM
  - Stop Relying on that WAF!
- Identify & Track Priv. Account Activity
  - Reduce day-to-day use of priv. accounts.
  - Service account RDP'ing – probably not good.

Detect

- Industrial Control Systems
  - Everyone has them
    - HVAC, Energy Distribution Subs, Data Centers Power Management, Branch UPS Devices et al.
  - Find them, monitor them.
- Get Context
  - Develop Asset Risk / Scoring
    - Automate Prioritization Accordingly

Protect

- Get Asset Management Right
  - Don’t necessarily buy that list IT gave you.
  - Monitor Company-Branded Websites
  - Centralize Hosting / Reduce Attack Surface
- Mature Data Classification
  - Enforce adherence to data protection policy
  - Leverage e-Discovery tools to identify spillage

Protect

- Address Segmentation Issues
  - Identify & address problematic trust relationships
- Review Privilege Requirements
- Implement 3rd Party Patch Strategy
  - Proactively identify gaps
- Evaluate True Effectiveness of Security Products
  - Don't believe (all) the marketing.

Respond

- Ensure your Responders Understand:
  - Your network
  - Have IR SME's for Specialized Systems
  - Ensure access is provisioned to the right data
  - Train your team to operate under fog of war
  - Test & update your IR plan regularly
    - Not just table top exercises

Detect, Protect, Respond

- Find a Sparring Partner
  - (Don’t just go fight Mike Tyson)
  - Not nessus.
  - Engage in scenario based red teaming activities
    - Test your response times (let the SOC believe its real)
    - Test your business continuity processes
      - Legal, marketing, corporate communications

Wrapping Up

- Get back to basics
- Focus has to change from
  - Silver Bullet Solutions
    - No Solution Can Save you from Poor Hygiene
  - Compliance-centric Security
- Many solutions exist within the Enterprise
- Smart Money Matters, not Volume
  - Measure ROI

Questions?