Emerging Trends Affecting Cyber Security

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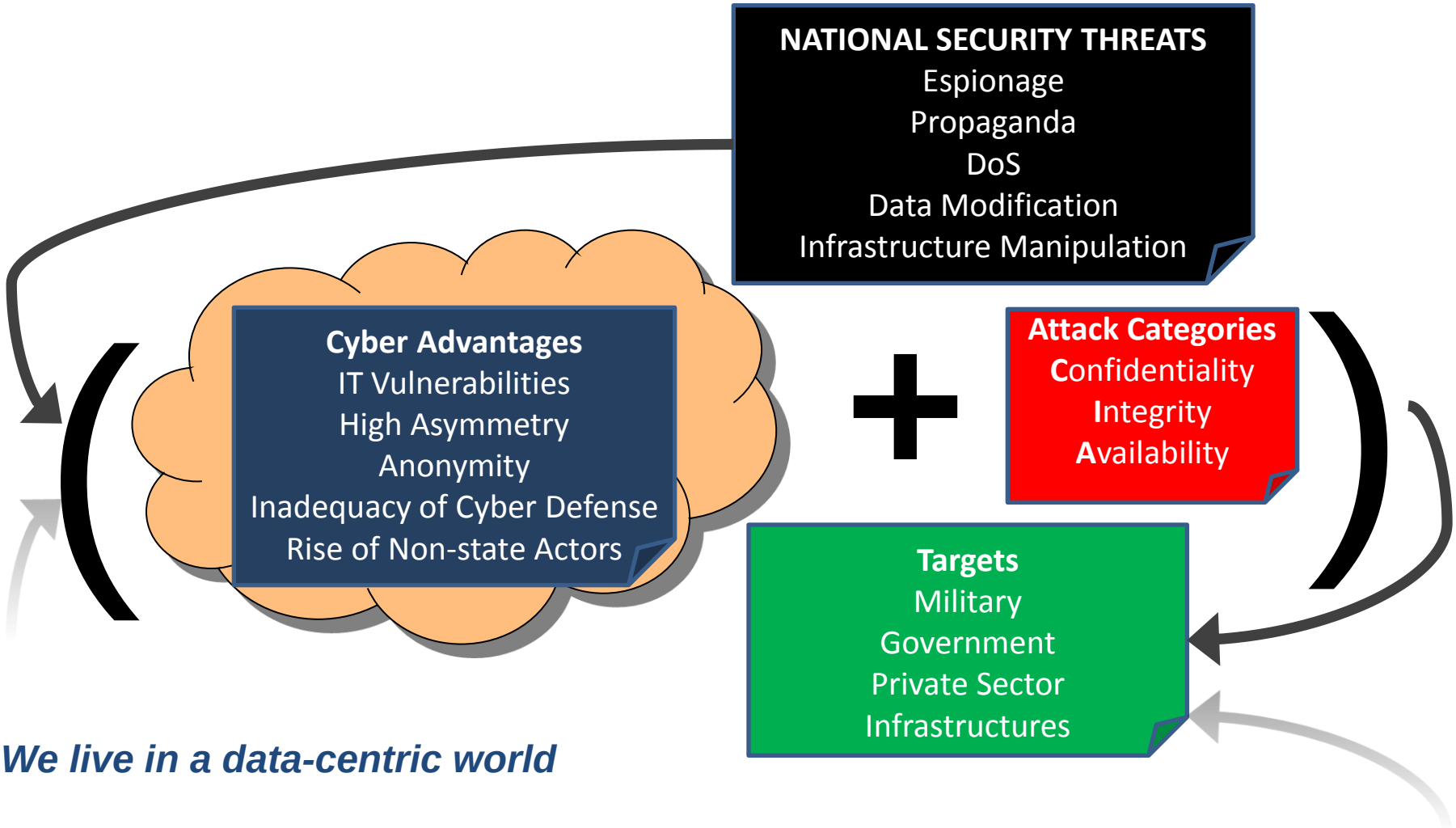
2012 Tech Trends

- BYOD…media tablets
- Social networking for business
- Biometric authentication
- Cloud going mainstream
- Virtualized enterprise
- Electronic wallets
- Geo-locations
- Gamification
- Apps available in App Stores
- Big data

Cyber Defense Arena

Successful attacking is about information gathering and reconnaissance



We live in a data-centric world

Greatest Concerns in 2012

- Remote employees
- BYOD
- Cloud computing…major provider suffers significant breach
- Removable media
- 3rd party apps…proliferation of new apps
- Data categorization challenges…data loss prevention (DLP)
- Risks coming from anywhere
- Identity theft
- New cyber legislation, security, and compliance
- DR/BCP planning
- Consumerization of IT
- Mobile Device Management (MDM)
- Gen Y

Security Trends

- **Attack Source - 2/3 from malnets**
  - Preventing attacks by isolating the source rather than defending perimeters
- **Using social media to deliver payloads**
  - Users more trusting of content
  - Increased number of social networks
- **High-profile attacks on mobile computing devices rising**
  - Apple iPhone and iPad (closed) tends to be more secure than networks accessed by Google Android (open) devices
  - Increasing number of devices
  - A new opportunity for hackers

Security Trends

- **Top economic crimes**
  - corporate fraud
  - distributing viruses
  - illegally accessing data
  - stealing personal corporate fraud
- **Cybercriminal activity**
- **Attacks on emerging technologies**

State of Cyber Defense

- **Less than half of U.S. organizations have adequate technology to secure their cloud computing infrastructures.**

- **Executives, IT security, and compliance disagree on:**
  - Cloud is as secure as on-premise data centers
  - Who is responsible for cloud data security
  - What security measures to use

- **Ownership of cloud security is dispersed**

- **Executives review cyber-risks**
  - 36% at least once a year
  - 15% never do.

Threats on the Rise

- **Scareware**
  - LizaMoon SQL Injection (buy AV)
- **iFrame injections**
  - Advertising/redirection to malicious websites
- **JavaScript malware**
  - Bypass security measures to run embedded code
- **Blackhole exploit kit**
  - Uses unpatched exploits to hack computers
- **WordPress injection attacks**
  - malicious code at start/end of blog that blocks access

Cybercriminals

- **Many actors…Motivation varies**
  - Shift to organized groups attacking for profit or retaliation
  - Motivation drives the technique used
  - Types of actors: Hactivist, cyber crime, nation states, terrorism
- **Organized criminals use advanced malware for attacks**
- **Advanced Persistent Threats (APTs) affecting SMBs and consumers**
- **Recent Attacks**
  - RSA's SecureID incident – Employee opens attached Excel doc in email
  - Stuxnet's successor - Duqu discovery
    - Stuxnet infected SCADA equipment changing results
  - Hacktivists/Script-kiddies target machines
  - Anonymous, LulzSe

Cybercriminals

- **Create and disseminate malware**
  - Underground “pay-per-install” industry
    - Hackers charge to access malware
  - More than 50 “families” of malware
    - Data-stealing Trojan horses
    - Spam bots
    - DoS bots
    - Fake AV
  - Malware “repacked” every 11 days, on average, to avoid AV detection
  - Freeware, toolkit, hackers available underground

Attacks by the Numbers

- **Malicious Attacks Blocked by one vendor**
  - 2011: 5.5 billion
  - 2010: 3 billion (HP, 2012)
- **Vulnerabilities Identified Decline**
  - 21% decline between 2010 and 2011
- **Targeted Attacks Aim at Business**
  - 50% -- Enterprises (2,500+ employees)
  - 32% -- Midmarket companies (250 to 2,500 employees)
  - 18% -- Small Businesses (under 250 employees)
    - Don't think they're a target
    - Not taking action to protect themselves.

Vulnerable Users

- **Vulnerable Users are Beachhead for Server Attack**
  - **Attacks shifting to Users**
    - Servers behind firewalls -- direct server attacks are rare
    - Compromised users are beachheads to attack servers
    - Example user-based attacks -- Spear-phishing
      …RSA breach compromised its SecureID system
  - **Why current technologies fail**
    - Attacks are sophisticated and targeted
      - Botnets, malicious active content, XSS, Anonymizers, etc.
    - Desktop/gateway AV – signature technology for the known
    - Employee awareness

New Vulnerabilities

- **New Vulnerabilities**
  - Exploits have gone elsewhere
    - Custom-built Web apps
  - New techniques allow attackers to exploit old vulnerabilities to launch new attacks
    - Blackhole exploit injected into USPS website
  - Vulnerability severity is increasing (17% in 5 years)
    - High security vulnerabilities causing remote code execution
  - Browser/browser plug-ins with highest number of vulnerabilities disclosed
    - Leaders: ShockWave and Java
  - Software may be more secure, the apps running on top of them are introducing vulnerabilities

Browser

- **Browser market share**
  - IE remains the most popular enterprise browser -->50% overall traffic
    - 4% - IE 9 (latest stable release)
    - 30% - IE 8 (most dominate browser)
    - 18% - IE 7
    - 3% - IE 6 (over a decade old – support ends 2014).
- **Browser plugins**
  - Outdated browser plugins - a significant threat
    - Adobe Reader, Adobe Shockwave, MS Outlook, Java, Adobe Flash, MS Silverlight, QuickTime, Windows Media Player, and RealPlayer
      - MS updates at the OS level; Adobe does not
  - Browser exploit kits tend to target Java, Adobe Reader and Adobe Flash

Web Apps

- **Web Attacks Increasing**
  - 2009: 250,000 attacks
  - 2010: 480,000 attacks
  - 2011: 500,000 attacks(HP, 2012)
- **Commercial Web Apps…the new frontier**
  - 24% - attacks had a high severity rating
  - 36% - of all vulnerabilities came thru these apps
  - 4 of the 6 most popular Open Source Vulnerability Database (OSVDB) vulnerabilities are exploitable via the web
  - Vulnerabilities increase with customization and add-ons
- **HTML5 trends**
  - Fuels growth of next gen web app attacks
  - Developers not using secure coding practices

Web Apps

Coding mistakes in web apps leading to vulnerabilities

- Can be difficult to detect
- Can result in loss of compliance, data sharing, or fuel other attacks
- 93% Apps vulnerable to information leakage and improper error handling
- 86% contained injections flaws letting hackers take control over internal databases on a Web site.
- SQL injection vulnerabilities attacked 3x over other XSS
- 54% contained XSS flaws - Cross-Site Scripting Attacks
  - 2011: 10 million attacks
  - 2010: 25 million attacks
- 50%+ of web sites expose server type/software version from the header information

Advanced Persistent Threats (APTs)

- **Adversaries take advantage of IT complexity**
- **Defenses:**
  - Layering
  - Defense-in-depth
  - Use IDS, IPS, Monitoring, Assessments
  - Change control
  - Communicate

Spread of 3rd Party Apps

- **Proliferation of vulnerable 3rd-party apps**
- **Patch management using Windows Server Update Services (WSUS) is useless…**
  - 95% of organizations have installed social media apps
  - 78% of Web 2.0 app support file transfer
  - 66% apps have known vulnerabilities
  - 28% propagate malware
- **Proliferate mobile malware**
  - Google Marketplace/Apple's App Store more vulnerable than Blackberry
    - Mobile malware largely targets Android OS
  - *Trending:* Mobile devices getting anti-theft protection

Search Engines

- **Search engines becoming a leading attack vector**
  - Malware distributors inject code in legitimate and fake websites to lure people to download malware.

- **Black path search engine optimization**
  - Poison search results
    - Points to one malicious page forcing it to surge towards the top in the search engine results
  - Looks at the user agent to determine if you fall within desired target area
    - Browser version

Botnets

- **Botnets - a universal threat**
  - Spread attacks
  - Collect hosts to be sold
  - Active families: Zeus, Asprox, Spyeye, Gumblar, Powerbot
  - Increased presence and growing
    - 75% of all new malware strains were Trojan apps
      - Silently infects PCs so that act like botnets then phoning home to attackers with stolen information
- **Botnet-related ecosystems**
  - Offer “malware infection as a service”
  - Leased hourly or daily for attacks/scams.

Mobile

- **Mobile browsers traffic**
  - 50%+ Apple IoS (growing)
  - 35-40% Android (declining)
  - 13-15% Blackberry (declining)
  - Lost devices - major security challenge
- **Mobile employees, smart devices and removable media**
  - Access networks
  - Transmit/store data
- **42%**
  - Employees use their personal mobile devices at work
  - Enterprises unable to secure these devices.

Mobile

- **Mobile Risk**
  - 95% have company's data on mobile devices
  - 40% of organizations with mobile devices containing corporate data have no plans to address this vulnerability.
- **IT landscapes becoming more dispersed**
- **Mobile app security still in its infancy**
- **Mobile app are different yet the same**
- **Number of attack types conducted against mobile apps are increasing**
- **No platform is safe**
- **Webkits opens the doors for hackers**

Spyware

- **Geo-location – a potential privacy violation**
  - Knows where you live, where you are
  - Tracks personal habits
  - Employer use increasing
  - Malware leveraged to customize attacks
    - Money making potential

Sports & Gambling

- **Sports & Gambling**
  - Sporting events (i.e., March Madness, Super Bowl, NBA selection process, NFL division championships)
    - Sports and gambling parallel in peaks and valleys
      - Significant bandwidth consumed as employees monitored events
  - Gambling goes hand-in-hand with major sporting events
  - Increasing number of employees gambling during normal work hours on company computing systems
    - Employee compromise possible

Social Media

- **96% Gen Y on it**
- **93% of online users use it**
- **20% of 2011 marriages started online**
- **Facebook**
  - 2nd only to email
  - 3rd largest, if a country
    - (China, India, ***Facebook***, US, Indonesia, ***Twitter***)
- **Twitter**
  - 6th largest, if a country
  - 3 Yrs. = 1 billion tweets
- **Hitting social networks by fooling users**
  - **Cybercriminals**: Send email redirecting to fake website
  - **Motivators:** financial, proprietary data, competitive advantage, revenge

Social Networking

- **Social Networking**
  - **5% - Web app traffic -** total traffic w/in an organization
    - Facebook, Gmail, YouTube, Twitter, MSN Messenger, Hotmail, Yahoo mail
  - **Facebook** enterprise traffic is declining
    - Policy blocks
    - Facebook implement new security measures
      - WebSense for URL scanning
  - **Twitter** transactions increasing slightly
    - Quick check and leave
    - Valued as a business tool

Policies/Blocks Increasing

- **Blocks**
  - Total social networking blocks
  - Post/write to social networking sites
  - Time of date, you can read but not write, rate limiting, etc.
  - Streaming media
  - Instant messaging (IM)
  - Webmail
  - Quota
  - Botnet
  - Proxy/Anonymizers
- **Policies**
  - IM
  - Malware
  - Webmail
  - Streaming media
  - File type
  - Risk score setting
  - XSS/cookie theft
  - Spyware/Adware
  - Protocols

BYOD

- **Gen Y likes**
- **BYOD and IT self-service - increased data loss**
- **Shifting device ownership to employees risks:**
  - Security breaches
    - Theft, negligence, device sharing, BYO-virus
    - Clean your own infections
    - Launch own network services (consumerization of IT)
  - Lost productivity due to device failures
  - Corporate network congestion

BYOD…Coping Strategies

- **Requires a formal BYOD plan**
  - Only a few have or have started a plan
- **Segregated networks are highly recommend**
    - Production, Guest, BYOD
    - A secure wireless network with coverage and capacity
    - Network must handle the load
- **Device aware infrastructure**
  - The ability to detect what devices are on/attempting to get on the network
- **Access controls**
  - Deny and why
- **Ability to disassociate devices from the network when required**
- **Self service portal**
  - Password resets, app provisioning, FAQs

Disaster Recovery

- **Organizations DR Plans**
  - 95% have a Plan
  - 44% have a remote, cloud-based Plan
- **DR Planning is important but doesn't get the attention it deserves**
  - When your systems are in DR they are in risk
  - Old DR paradigm
    - Production apps – email, sales, accounting, marketing/design, LOB apps, payroll, VoIP
- **Resilience is the new DR**
  - High availability - next generation for infrastructure
  - High available IT infrastructure changing DR planning
    - Apps still run from another location uninterrupted, i.e., email

In the Cloud…

- **Safety of Cloud Infrastructure**
  - 33+% think cloud infrastructure environments, i.e., IaaS are as secure as on-premise data centers
  - 34-52% have sufficient policies and procedures for cloud infrastructure.
- **Responsibility for defining security requirements …**
  - 21% compliance officers
  - 22% business unit leaders
- **Lacking technologies**
  - 35% have adequate technologies to secure their IaaS environments
- **Auditing**
  - 59% of internal audit reviews don't include feedback on security in the cloud infrastructure environment

Cloud Defenses

- **Defenses organizations Have:**
  - 88% - firewalls to protect sensitive or confidential information
  - 85% - antivirus/antimalware software in place
  - 50%- identity and access management
  - 31% - major cloud providers use encryption to protect data from insider threats.
    - **If data is encrypted,** 69% place non-regulated customer data in the cloud
      - Email address lists, purchase history, shipping information.
    - **If data is not encrypted**, 52% still place this data in the cloud.

Encryption concerns

- View by end users: "over-kill“, not welcomed
- Expensive and intrusive: Encrypting all production data without looking at the value
- Causes degradation in performance
- Data loss if encryption keys are lost or employees refuse to provide passwords
- Another password prompt for information access
- Management of encryption systems - certificates, keys, passwords, additional storage requirements
- IS/IT personnel must work closely
- Finding the right balance among locking data down, discomfort, and acceptable risk.

DIY

- **Web exploit toolkits, purchased and traded online, let hackers access enterprise IT systems to steal mission-critical data.**
  - 80%+ attacks successfully infected systems.
- **Blackhole: Pre-packaged Attacks**
  - Vulnerabilities
  - Exploit delivery
    - compromise through SQL, injection, XSS, etc.
    - Spam campaigns – send malicious email
  - Anti-detection
  - Compromise hosts
- **Malicious attacks skyrockets as hackers explore new targets**
  - Increased use of toolkits

DIY

- **Reconnaissance**
  - Use poor coding practices to detect web server info
  - Social engineering
- **Obfuscation**
  - The deliberate act of making code difficult to understand
  - Used to evade security devices
    - JavaScript
    - Exploit (driven by exploits in the wild)
    - PDFs

APPROACHES

A New Way of Thinking

- **Current State**
  - Old paradigm - target threats, block the threat
  - Common approach - stacks of AV layers searching for inbound attacks
  - No silver bullet or single solution
  - Threats evolve yet remain cyclical
    - High tech, low tech, no tech
  - Threat-centric
  - Core configuration and vulnerability exposure of the endpoint overlooked or low priority.

Current to Desired State…

Traditional

- **Blacklisting as the core**
  - Zero Day
  - 3rd Party App Risks
  - Malware-as-a-Service
  - Consumerization of IT

Layered, Defense-in-Depth

- **Guard data and endpoints**
- **Use a layered approach**
  - Lvl 1: Patch/Configuration Management
  - Lvl 2: Application Control
  - Lvl 3: Device Control
  - Lvl 4: AV/AntiMalware, Firewalls, etc.
- **Forensics analysis**
- **Digital rights management**
- **Security policy management**
- **Protect intellectual property**
- **Enforcement policies**
- **Training/employee awareness**

A New Way of Thinking

- **Layer 1: Patch and configuration management**
  - Can eliminate much of the attackable "surface area" of your endpoints (OS, 3rd Party vulnerabilities)
- **Layer 2: Application whitelisting**
  - Prevents unknown/unwanted software and malware executing on endpoints and servers.
- **Layer 3: Data encryption**
  - Protects data that traverses/resides on your servers, networks and endpoints.
- **Layer 4: Device control (DMZ, IDS/IPS, Firewalls, Log Mgmt., Lifecycle development), AV, Training, DLP, Policies, etc.**
  - Enables central management
  - Enforce security policies
  - Prevent data loss and theft
  - Thwart malware intrusion.

Trusting apps - Risk-based

- **Automate monitoring**
- **Remember many internet apps are not trustworthy**
- **Many legitimate apps for PCs, fewer for mobile**
- **Android apps subject to modification in the open**
  - **Buyer Beware:** downloads from app store may not be what you think
  - **Discipline Required:** Mobile apps on a corporate network a vector for cyber attacks
- **Connect all business and organizational processes to security requirements**

Summary

- Create a formal BYOD policy (compliance)
- Audit wireless network and identity services
- Create a DR/BCP Plan with resiliency in mind
- Use a layered, defense-in-depth approach
- Conduct a risk assessment of your environment
- Manage changes to your environment

Thank you!

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Resources:

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