CYBERSECURITY

Cultural Change to Support the Business

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Agenda

- Cybersecurity culture
- Layered security
- Incident Response
- Challenges with public systems
- NARA as a target
- Emerging threats
- Wrap-up

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Cybersecurity Culture

- Executive buy-in
- Policy for enforcement
- Cybersecurity is a process
- Continuous enhancement and maturity
- Track latest threats
- Continuous monitoring
- Confidentiality, Integrity, and Availability
- Incident Response
- Compliance is a requirement, not a goal

Layers of Protection

- Map security to the data
- Review website/application (DevSecOps)
- Email security
- Patch, patch, patch
- Secure the humans
    - Multi-factor to avoid password loss or reuse
    - Don’t assume all users require the same level security
- Secure the endpoints
    - Workstations, mobile devices

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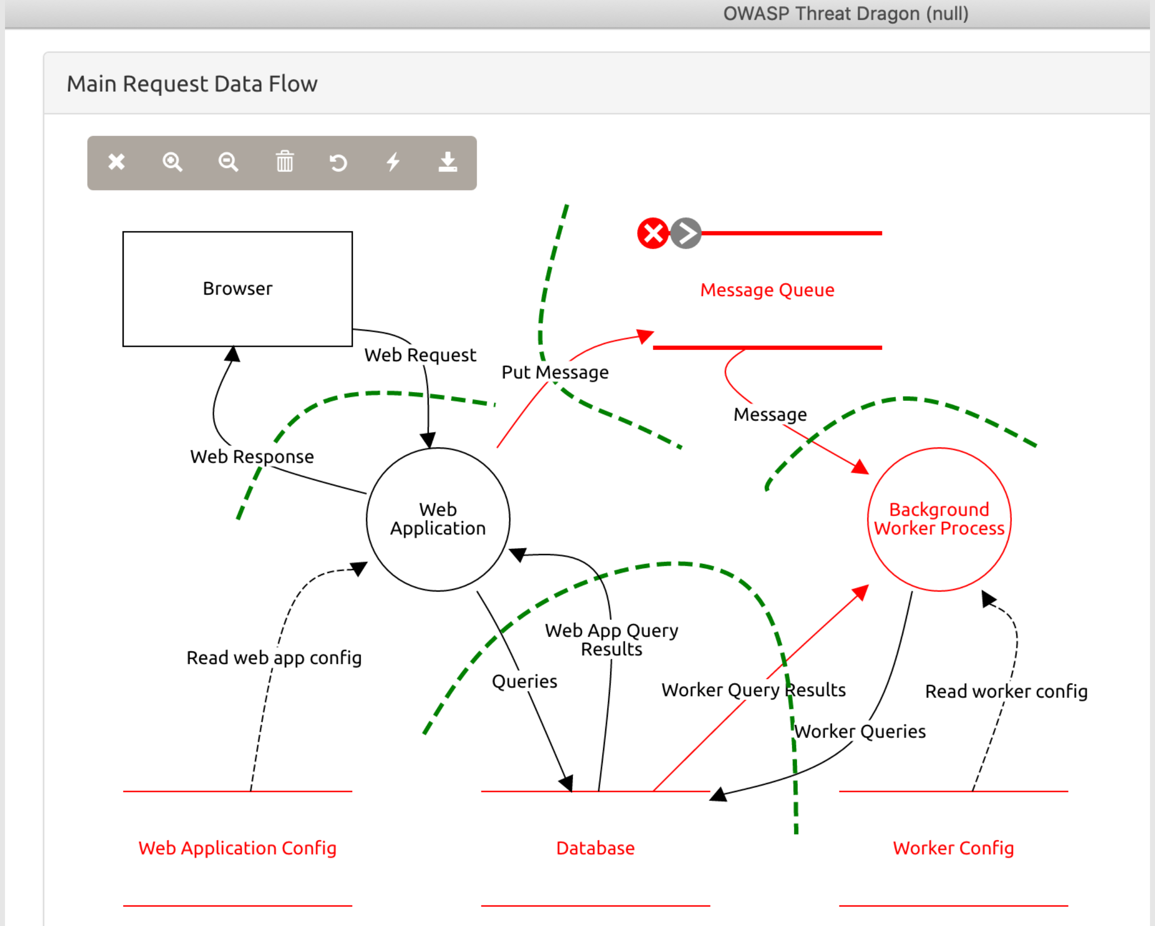
Layers of Protection (cont’d)

- Secure the architecture
  - Physical, cloud, IoT
- Incident Response when things go wrong
- Don’t forget about Availability in the C,I,A triangle
  - Understand access trends
  - Load balance
- Leverage available resources
  - Establish local law enforcement, FBI contacts
  - DHS offers free services, by request only

Threat Assessment

- Enumerate applications, actors, & data
- Define trust boundaries
- Enumerate security controls
- Enumerate threats
  - Industry
  - Intelligence
- Describe gaps
- Identify mitigations



https://threatdragon.org

Security Supports Business Functions

- Understand the business
- Work with, don’t fight the business process
  - At NARA everything is a record (possibly malware)
  - Open access culture
- Find a balance for cyber hygiene
- Put effort into the greatest returns

Secure the “hardware”

- Set a policy to require compliance
  - Center for Internet Security (CIS) Benchmarks
- Maintain gold images
- Continuously test for deviations
- Internet of Things (IoT)
  - Avoid hardware with no configuration
  - Change default password, segregate
- Mobile devices
  - Limit data on foreign travel
  - Re-image after travel
  - Encrypt device
  - Whitelist apps

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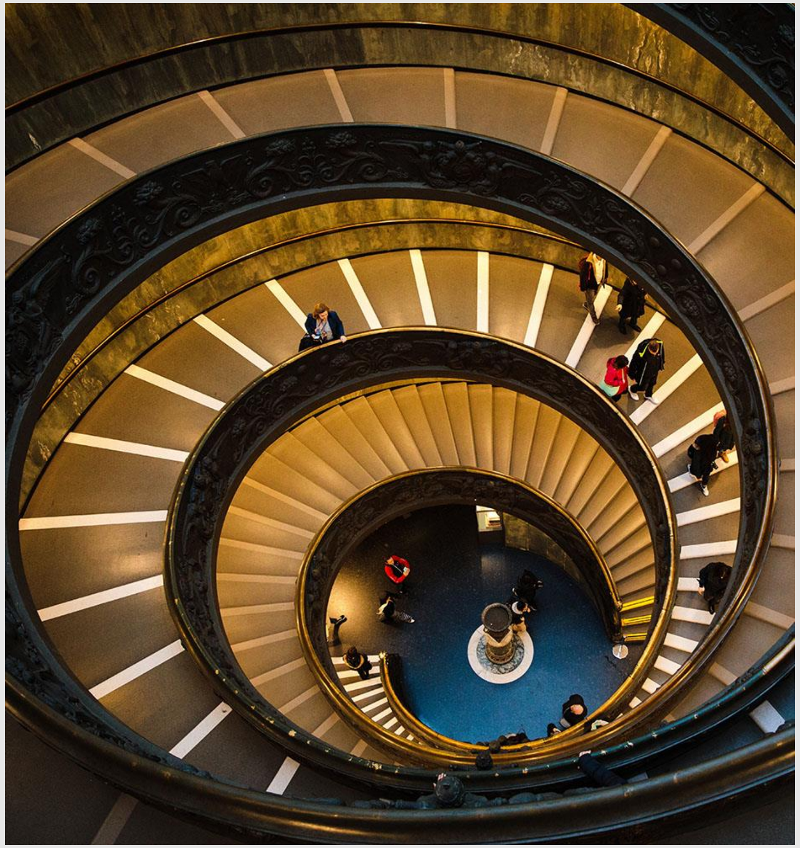
Availability

- System and data availability
  - Know access patterns and provide enough resources
- Backups
  - Multiple methods (automated, media)
  - Segregate to avoid destruction
  - Encrypt offsite
  - Test to validate the process
- Ransomware works
  - Effective and efficient
  - New models use extortion

Email Security

- Controls to check every email
  - Block based on blacklist
  - Test attachments and links
- Outgoing email controls to protect from spoofing
- Block personal email accounts
- Outsource to cloud-based providers
  - Threat intelligence
  - Patching
  - Crowdsource protection



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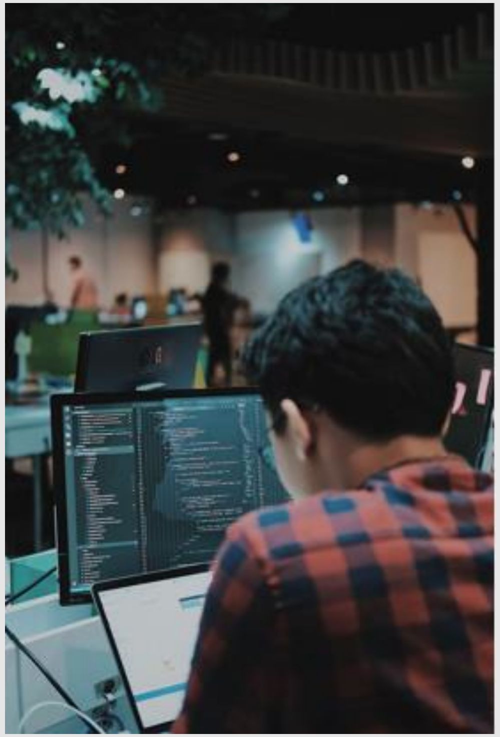
Secure the Endpoints

- Basic anti-virus no longer effective (signatures)
- Behavior-based agents
- Host-based firewalls
- Application whitelisting
  - Block escalation if compromised
- Logging
  - Need information if system compromised
  - Identify lateral movement
  - Latest version of PowerShell

Secure the Humans

- Training
  - Phishing, fake websites, malicious ads, coupons
- Awareness
  - Cyber hygiene
  - Current threats
- Segregate elevated user roles
  - Administrators web browsing with privileged accounts is bad
- Successful cyberattack usually involves multiple levels of failures
  - Ransomware spread by admin credentials
  - Missing patches or other vectors for privilege escalation



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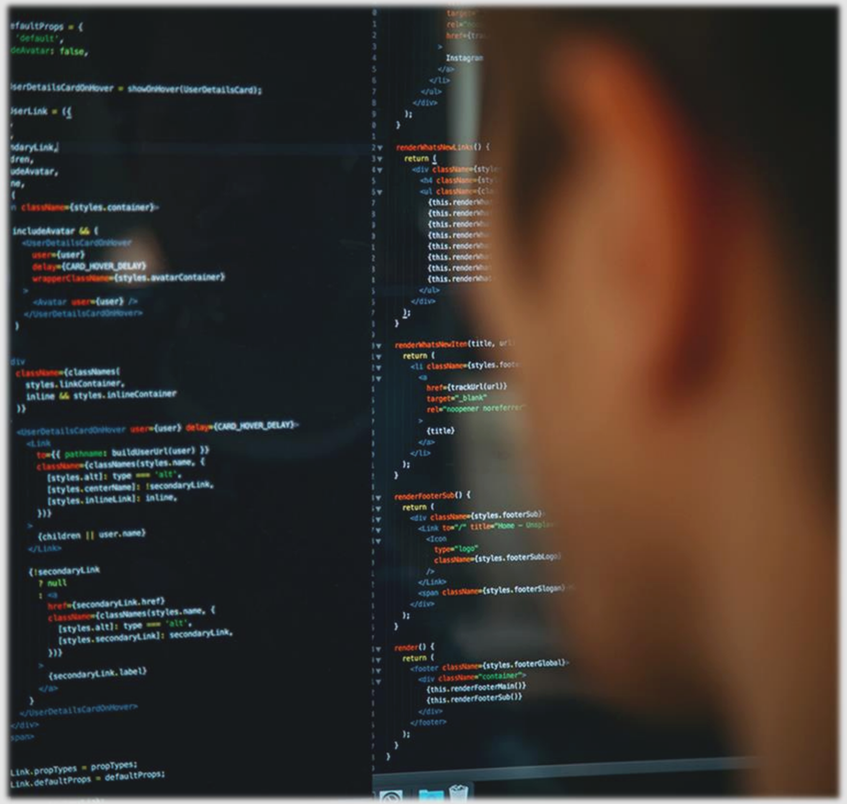
Patch, Patch, Patch

- Policies for process and enforcement
- Reliable patching process
  - Monitor and validate
- Patch 3rd party software
- Monitor EOL software, hardware, operating system
- Test 3rd party libraries in custom software
- Systems must maintain support
  - Administrators, licensing, etc.

Incident Response

- Detection when controls fail
- Mitigate damage
- Train the IR personnel
- Test your IR capabilities



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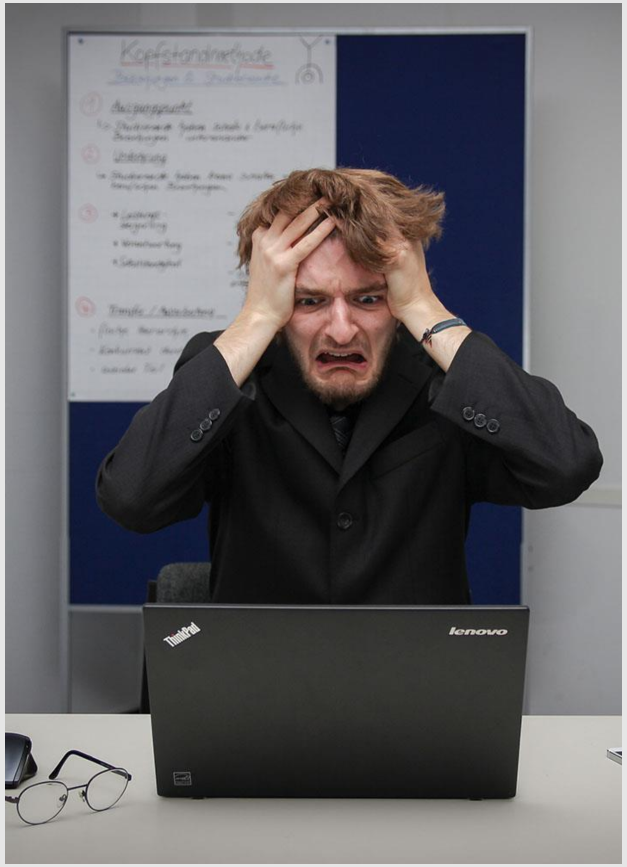
Mixed Data Security

- NARA has similar challenges as election data
  - Openness is our business model
  - Receive data from external sources
  - Develop unique controls, segregation, & monitoring
- Public
- Protected/Internal
- Restricted Access
  - Presidential
  - Title 13/Census
  - PII/Military records
- Classified

Public Use Systems

- Physical access to portions of the building
- Research rooms for access to the data
- Scanning and printing
- Personal imaging equipment
- Security controls
  - Isolated from network
  - Same monitoring tools
  - Limited accounts
  - Unique passwords



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Public Website

- NARA business is providing access to records
- National Archives catalog
- Census data (after 72 years)
- Military records
  - Limited access, but controls to segregate
  - Grant access to physical records
- Security controls
  - Segregated and limited access from internal network
  - Same monitoring agents
  - Additional tools such as WAF, DLP
  - Controls for creating website and publishing data

NARA as a Target

- All .gov systems are targets as a trophy
- Target of Anonymous
  - Increase monitoring based on threats
- Consistent stream of probes
  - Don’t call them attacks
  - Phishing
  - Scanning
- Threat modeling is important
  - Understand attackers
  - Understand attack vectors
  - Where should we allocate our resources?
  - When should we outsource?

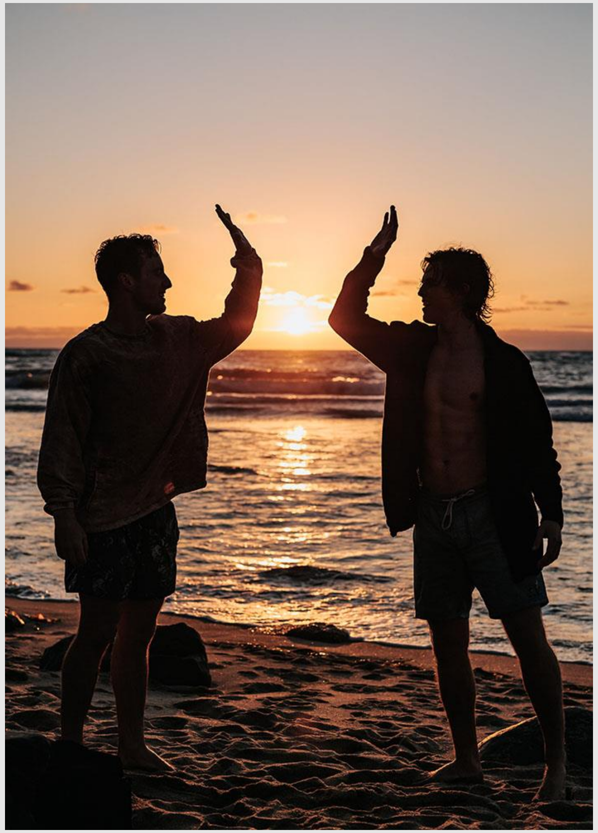
Photo by Fauzan Saari on Unsplash

Case Study: Bad Day

- SUBJECT: ISIS posted a video on YouTube hacking NARA !!!
- re: ISIS posted a video on YouTube hacking NARA !!!
- re: fwd: re: re: ISIS posted a video on YouTube hacking NARA !!!
  - Call me
- Not a hack, but unofficial part of website
  - Reviewed the video for evidence
  - Confirmed audit of the logs
  - No detected signal from Incident Response tools
- LESSONS:
  - Follow a formal process for reviewing all website content
  - Test IR and audit capabilities
  - Identify capabilities which were missing

Case Study: Integrated Development

- Webapp developed without security review
- Assumed security review would follow happy path
- Critical finding discovered
- Deployment delayed
- Financial cost to refactor, test, & deploy
- LESSONS:
  - Engage security early and often (moved to DevSecOps)
  - Schedule should allocate time to resolve findings
  - Enforcement mechanism to fix findings



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Case Study: Malware from Email

- Alert from workstation
- Powershell command to delete shadow copy
- Powershell parent was Acrobat
- Acrobat parent was web browser
- No log of email in email threat prevention service
- LESSONS:
  - Successful test of behavior-based agent
  - Block access to personal email
  - Disable browser history clearing
  - Disable incognito mode
  - Awareness: Mixing business and personal increases chance of phishing

Photo by Tyler Nix on Unsplash

Emerging Threats

- Business Email Compromise (BEC)
  - Spearphishing, email compromise, email spoofing controls
- Voice deepfake used to steal $243,000 [1]
- Multi—factor authentication (MFA) scams
  - SMS is no longer secure, but better than password
- Social media spearphishing
- Ransom via threat to release data
  - Payment may not avoid future ransom

[1] https://www.forbes.com/sites/jessedamiani/2019/09/03/a-voice-deepfake-was-used-to-scam-a-ceo-out-of-243000

Final Thoughts

- Executive buy-in, awareness, policy
- Explain why security control will help the business
- Learn current threats
- Do NOT treat all users equal
- Do NOT treat all data equal
- Layered controls to avoid Single Point of Failure
- Continuous monitoring and IR when things go wrong
- Test: patching, backups, IR

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Thank You!

- Sandra Paul-Blanc
- Philip Kulp
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Questions?

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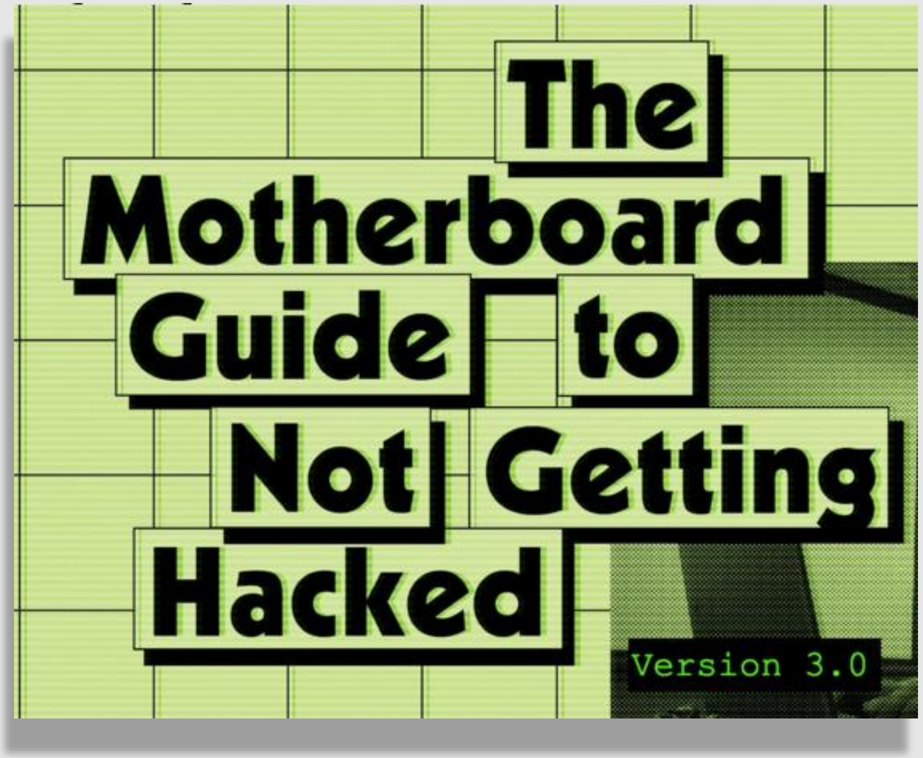
BACKUP SLIDES

How not to get Hacked

- Threat Modeling: What, Who, How likely, Consequences, Effort to exert
- Keep apps up to date
- Secure passwords and do not reuse!
  - Use password apps
- Two-factor
  - OTP managers are good (don’t lose your phone!)
  - Text-based not always secure (SIM hijacking)
  - Hard tokens are great (YubiKey)
- Use anti-virus, anti-malware, adblocker (Defender is great and free)
- Minimized addon use in browsers
- Keep regular backups
- Don’t post on social media…Hey I’m going on vacation for two weeks…



https://www.vice.com/en_us/article/d3devm/motherboard-guide-to-not-getting-hacked-online-safety-guide

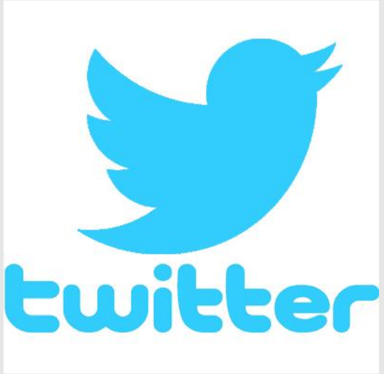
Media Security

- Incoming
  - Limit to specific workstations
- Policies for handling media
  - Encrypt mobile devices (USB, laptops)
  - Auto scan on insert
  - Disable USB or whitelist model

Photo by Brina Blum on Unsplash

Available Resources

- News Sources
- Twitter
- Podcasts

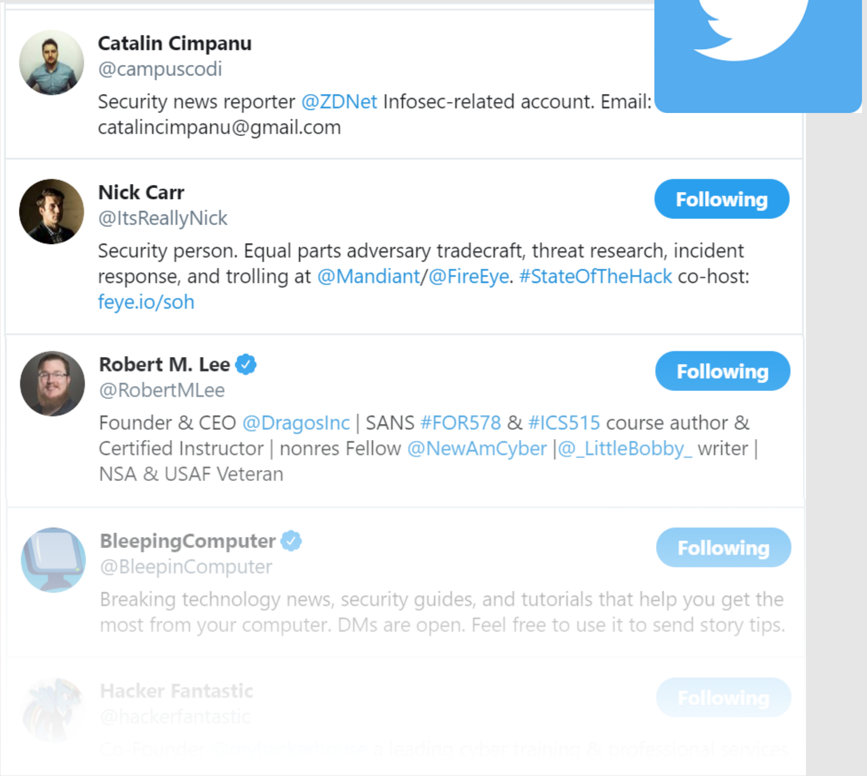


News Sources

- Bleeping Computer
  - https://www.bleepingcomputer.com/
- Motherboard by VICE
  - https://www.vice.com/en_us/topic/cybersecurity
- SC Media
  - https://www.scmagazine.com/home/security-news/
- Threat Post
  - https://threatpost.com/

Twitter

- Goal: Follow differing perspectives on cybersecurity news
- Vulnerability researchers
  - @taviso, @HackerFantastic, @FuzzySec
- Cybersecurity reporters
  - @campuscodi, @BleepingComputer, @briankrebs
- Perspectives on cybersecurity news
  - @RobertMLee, @dotMudge, @mattBlaze
- Real-world cybersecurity techniques
  - @SwiftOnSecurity – https://decentsecurity.com
- Current threats
  - @ItsRealNick, @MalwareJake
- APT and state-sponsored group tracking
  - @RidT



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Podcasts

- StormCast
  - SANS 5-10 minutes daily
- Cyber
  - Interviews and news by VICE Motherboard
- Risky Business
  - Security concepts with journalist Patrick Gray
- Security Now!
  - Weekly in-depth discussions

Chief Information Security Officer

- Executive buy-in
- Executive awareness
- Limits
  - Can’t buy every cyber software/service on the market
  - Limited staff
  - Pushback from business owners
- Compliance
  - Federal government (cyber)
  - Federal government (records management)
  - National Archives
  - Compliance is a requirement, not a goal !!!