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SESSION ID: LAW-T07

ELECTIONS AT RISK: GLOBAL THREATS/ LOCAL IMPACT

MODERATOR: **Michael A. Aisenberg**
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Dominion Voting Systems

Serge Jorgensen
Founding Partner, CTO
Sylint Group

AGENDA

Hacking Democracy

LAW-T07 – March 5, 2019

- Goals, Introductions. Michael Aisenberg

The Election Threat

- The Vulnerabilities & Attacks Landscape. Bob Martin
- Policy Perspective, Foreign Interference, "Hearts and Minds." Kay Stimson

Election System Remedies

- Legal Perspective. Lucy Thomson
- Technology Perspective. Serge Jorgensen

ABA Section of Science & Technology Law

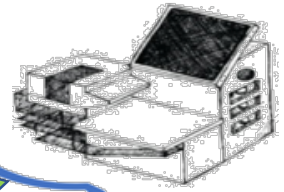
The Election System Ecosystem

Local and OnLine Voter Registration

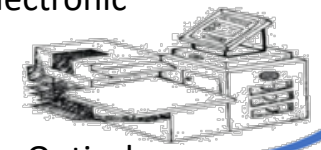
Mail-Ballot Delivery/ Return Systems

Voting Systems

Direct Record Electronic



Ballot Marking Systems



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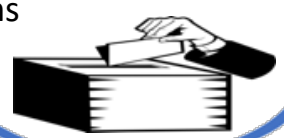
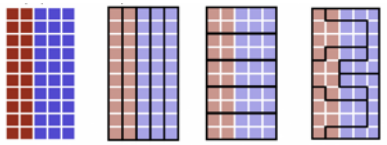




Voting (re)Districting Systems

Electronic Pollbooks

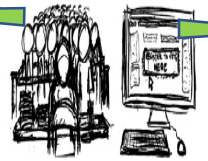
Candidates

Ballot Printing/Delivery System

Voting

Results and Auditing

Election-Night Reporting Systems



Candidate Filing Systems

Ballot Creation System

Ballot Questions

Campaign Voter Information Database

Campaigning

Debates

Voters

Media

Laws, Rules, Policies, Procedures

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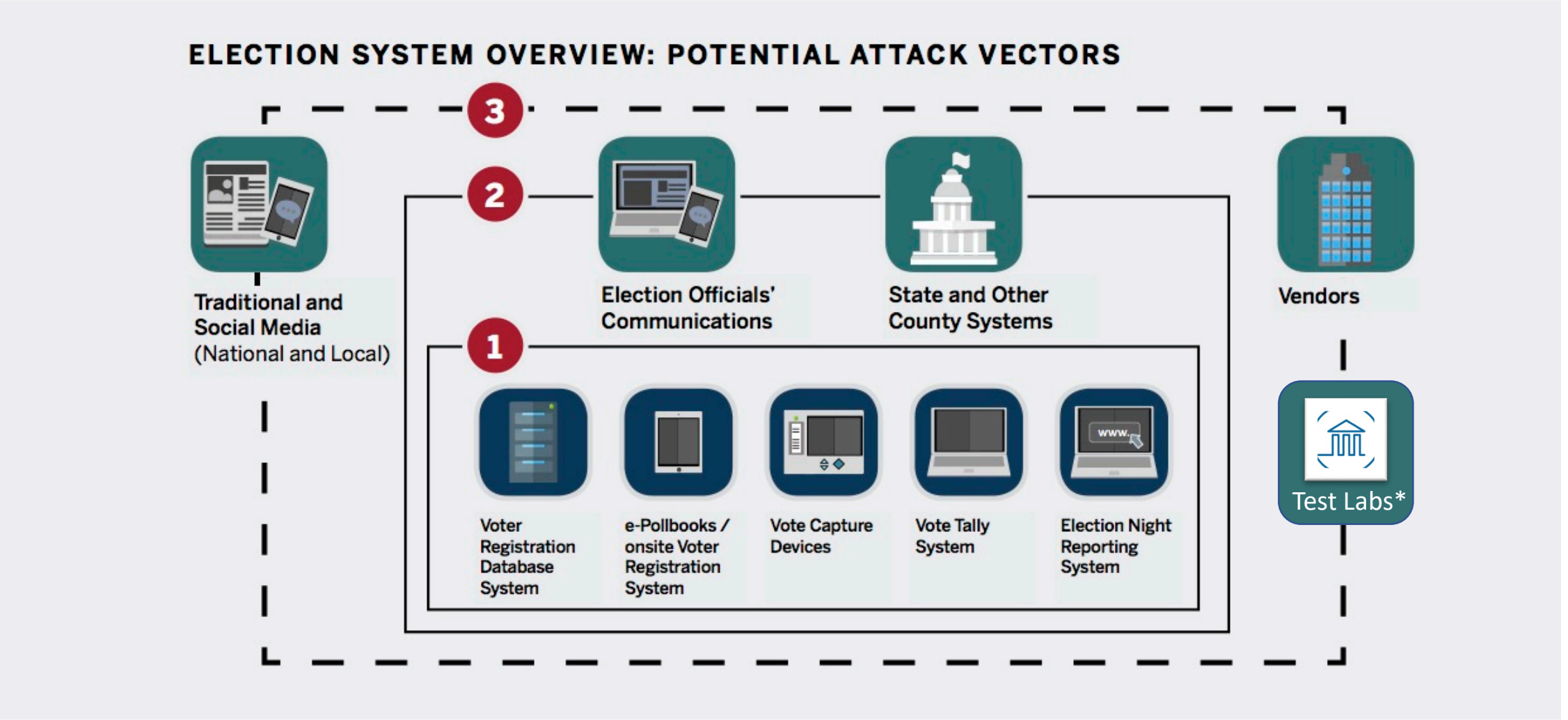
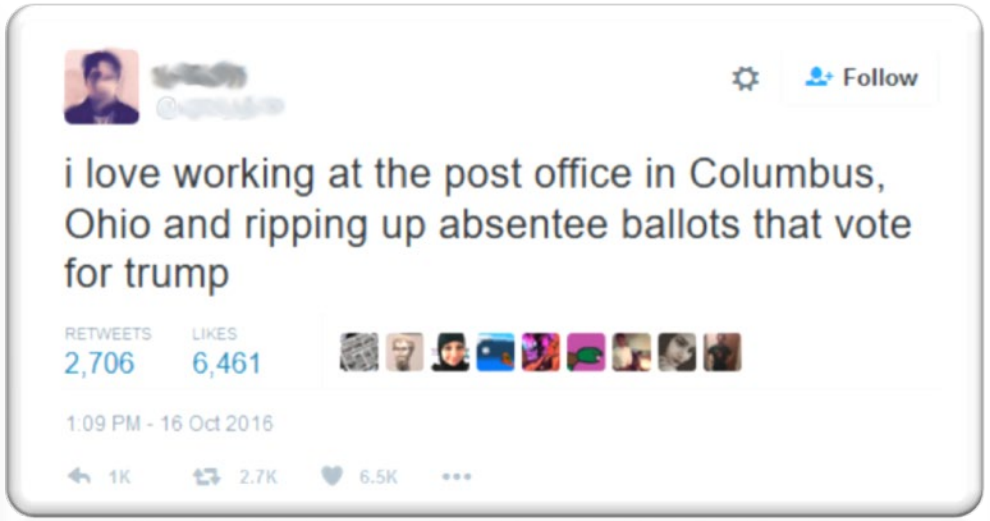
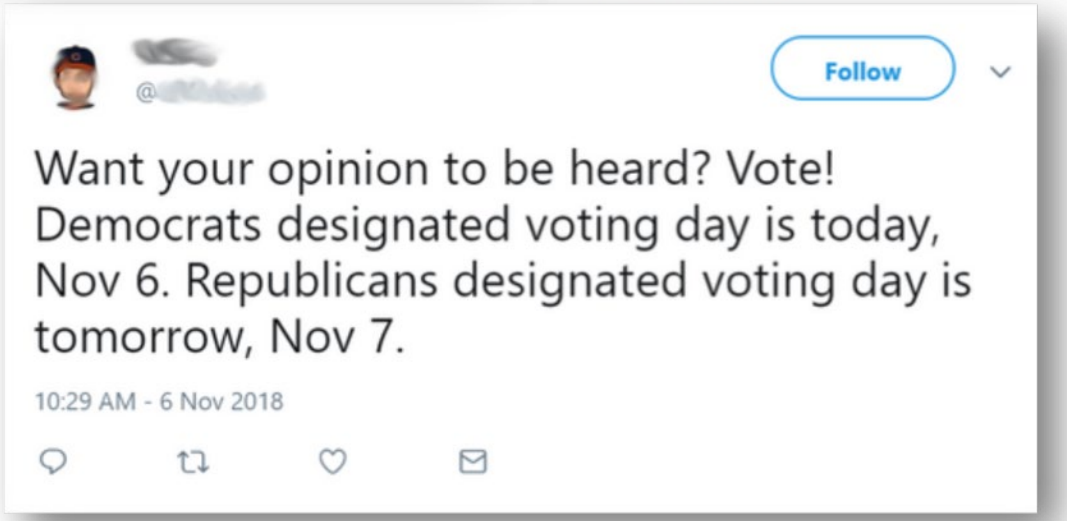
Where Might Adversaries Aim Their Attacks?



SOURCE: Harvard Belfer Center Image [*Modified]

Biggest Challenge: Misinformation & Manipulation





Protecting U.S. Elections: Federal Law & Election Administration

MOVE: Military & Overseas Voter Empower-ment Act (2009)

HAVA: Help America Vote Act (2002)

NVRA: National Voter Registration Act (1993)

ADA: Americans with Disabilities Act (1990)

UOCAVA: Uniformed & Overseas Citizens Absentee Voting Act (1986)

Federal Election Campaign Act (1971, 1974)

VRA: Voting Rights Act (1965)

January 2017: U.S. Department of Homeland Security critical infrastructure designation for elections

U.S. Election Assistance Commission created under HAVA (2002)

50 States + DC/US Territories
3,140 Counties
5,312 Midwest Townships
1,620 NE Townships
8,800+ Election Jurisdictions
175,000+ Voting Precincts

Source: U.S. EAC (2016)

How to Assist Election Officials?

Before Election

- Voter Registration
- Poll Worker Recruitment & Training
- Voting Equipment Testing & Configuration
- Candidate Filings & Ballot Prep/Proofing
- Voting Sites/Precincts
- Early/Alternative Voting Options

Election Day

- Voting
- Vote Tallying
- Unofficial Results Reporting

Post-Election

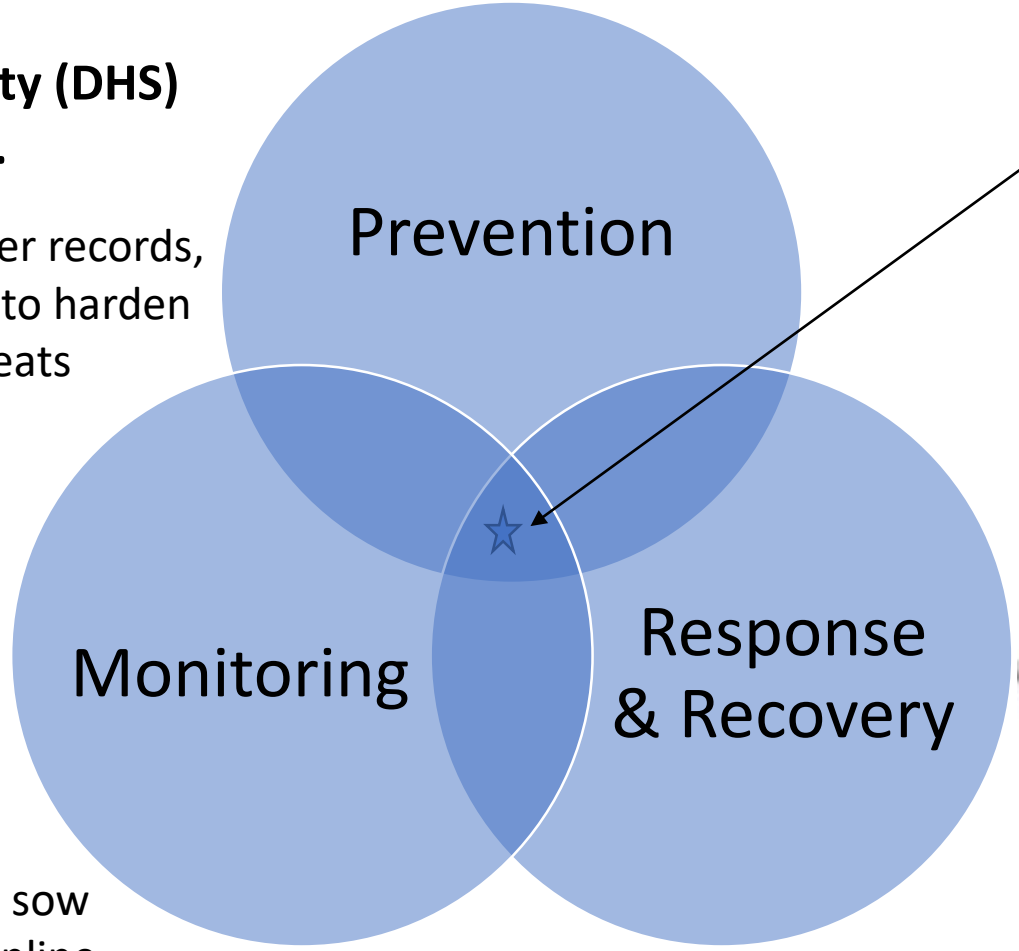
- Canvass
- Certify
- Audit

Certify? Contest? Recount? Litigate?

What is Being Done to Protect U.S. Election Systems?

U.S. Dept. of Homeland Security (DHS) Lessons from 2018 Midterms…

- Trend towards resilience (paper records, audits) with non-stop activity to harden elections against dynamic threats
- Resources needed to address chronic underfunding of elections/technical support
- Highly decentralized threat environment requires coordinated info-sharing
- Few reported threats to EI/ adversaries still attempting to sow discord, spread “fake news” online



Under a **2017 DHS Critical Infrastructure Designation**, the federal government has created Government & Private Sector Coordinating Councils to secure U.S. election infrastructure

What are Top Priorities for 2020?

- ☑ Learning from Coordinated Sharing
- ☑ Developing Capacity to Respond to Major Incidents/Attacks
- ☑ Enhancing Cybersecurity Protections

THE ELECTON ECOSYSTEM – STAKEHOLDERS

9,000 U.S. jurisdictions administer elections, ~ 175,000 precincts

LAWS, POLICIES, PROCEDURES, & STANDARDS

Policy-makers

Federal
- Congress
- DHS and EAC

States
- Secretaries of State
- State legislatures

Local
- Election officials

Private
- Election system manufacturers
- 3P technology contractors

International
- UN, Treaties, Laws, Agreements, Manuals

CANDIDATES AND CAMPAIGNS

Candidates

- Candidate filing system/ Qualifications

Campaigning

Debates

Media & Messaging

Social Media
- Platforms
- Monitoring (Facebook, Twitter)
- "Fake News"

VOTING – *Voters*

- Voter information system

Voter Registration
- Local/ DMV/ post office
- Online

- Voter registration database
- Voter authentication system
- Electronic pollbooks

VOTING (early, absentee, and election day)

1) Onsite
- e-Pollbooks/ barcode scanner
- Paper ballots
- DREs
- Optical scanners

2) Mail (OR, WA, CO + 19)
- Ballot delivery/return

3) Internet (30 states)

ELECTION ADMINISTRATION

Election Officials

(re)Districting – GIS

Ballot questions
- ERIC – voter registration verification/ states

Election Management System

~3P tech contractors
- Ballot creation system
- Voting equipment configuration
- Ballot Tracking system (printing/ delivery/ return)
- Voting equipment configuration
- Central tabulators/ vote tallying
- Election night reporting (ENR) – statewide/unofficial
- Certify: final election results
- Canvass
- Audits
- Recounts

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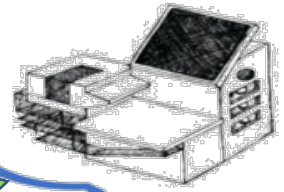

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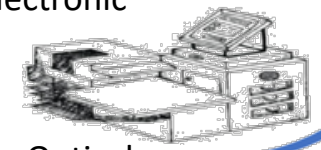

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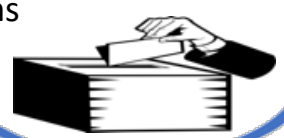

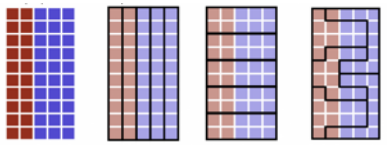

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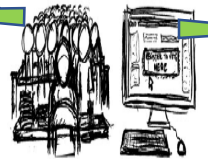

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APPLYING ELECTION LAW KNOWLEDGE

- **TODAY: Understand the latest legal and policy issues impacting U.S. elections**
  - "Hacking Democracy" – What are the practical implications of the continuing & evolving global risk landscape confronting election systems and their host governments?
  - Where are the threats and vulnerabilities? Historical & existing….
  - What is the impact of new technologies on the structure and use of election systems and these risks?
  - Understand Proposed Remedies for—
    - Securing Election Infrastructure
    - Combatting Social Media Misinformation/Manipulation
- **BACK HOME: *Act* —everyone has a stake in our election system**
  - Identify opportunities to assist in strengthening election systems
    - *As voters*: Demand that our policy-makers, election officials, and political party leaders act to ensure the integrity of elections
    - *As public officials*: Act to secure our election/voting systems
    - As *industry*: Partner with election officials to protect our elections

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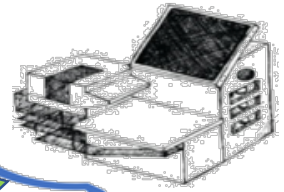

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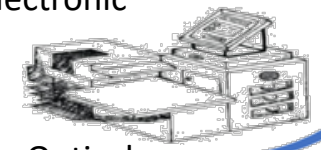

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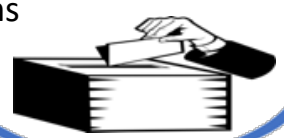

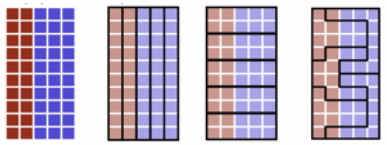

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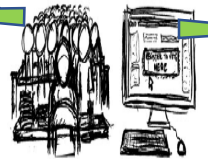

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Exploitable Weaknesses, Vulnerabilities & Exposures

- **Weakness:** mistake or flaw condition in ICT architecture, design, code, or process that, if left unaddressed, could under the proper conditions contribute to a cyber-enabled capability being vulnerable to exploitation; represents potential source vectors for zero-day exploits -- Common Weakness Enumeration (CWE) https://cwe.mitre.org/

- **Vulnerability:** mistake in software that can be directly used by a hacker to gain access to a system or network; **Exposure:** configuration issue of a mistake in logic that allows unauthorized access or exploitation – Common Vulnerability and Exposure (CVE) https://cve.mitre.org/

- **Exploit:** take advantage of a weakness (or multiple weaknesses) to achieve a negative technical impact -- attack approaches from the set of known exploits are used in the Common Attack Pattern Enumeration and Classification (CAPEC) https://capec.mitre.org

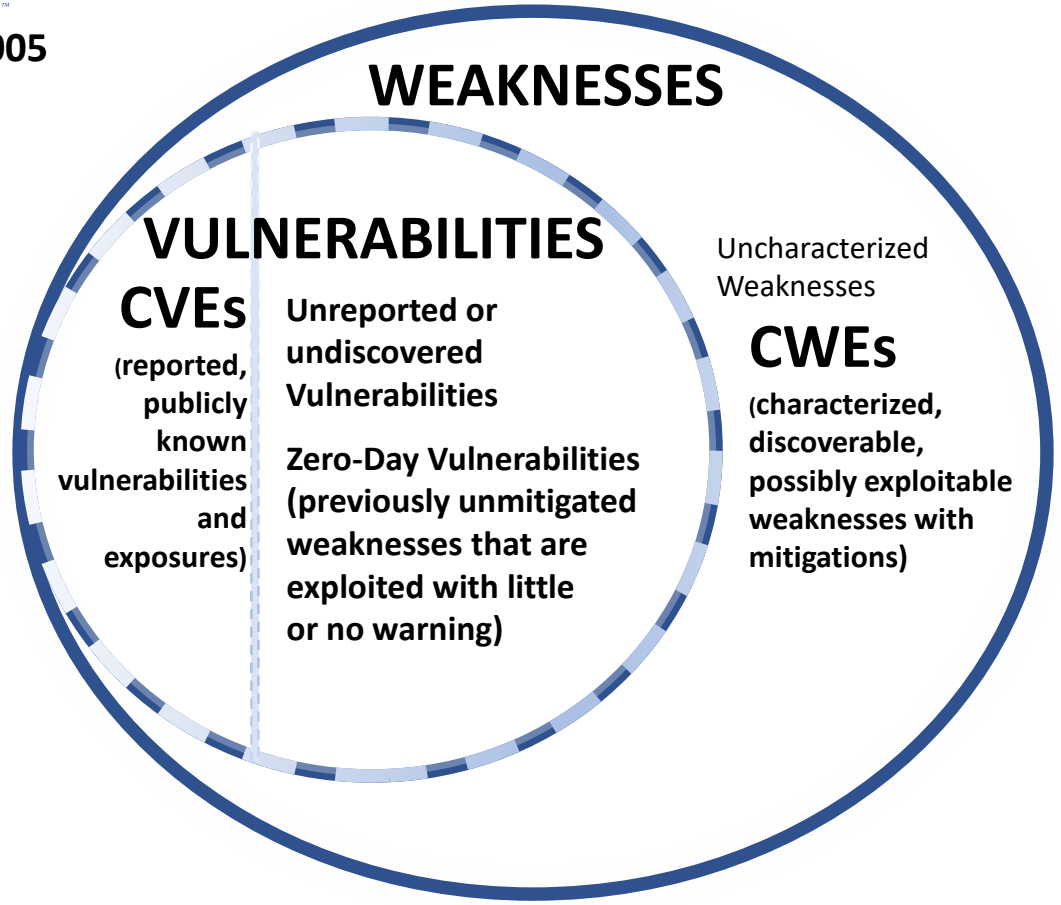
CWE 2005

CWSS 2012

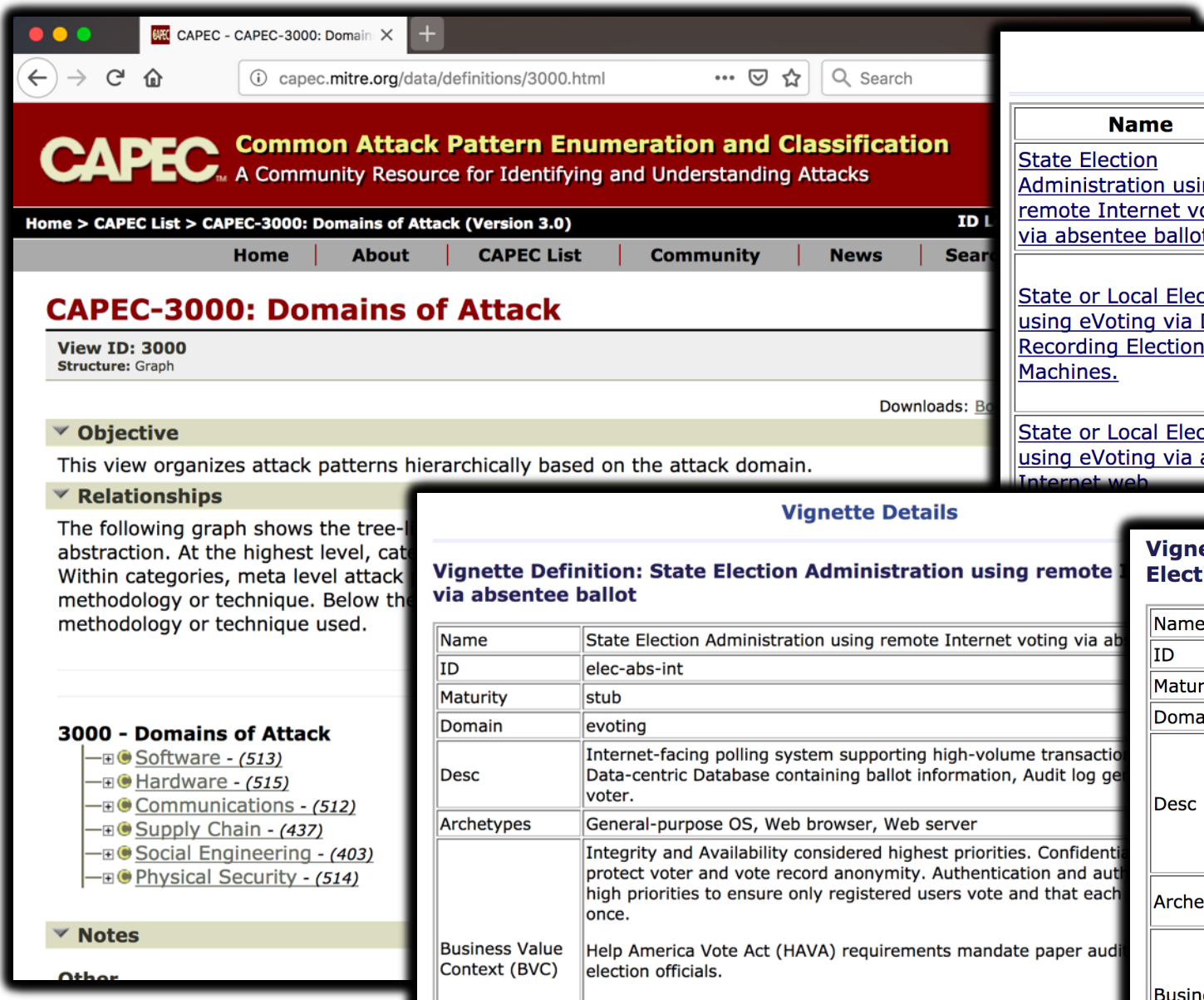
CVE 1999

CVSS 2002

CAPEC 2005



The existence (even if only theoretical) of an exploit designed to take advantage of a weakness (or multiple weaknesses) and achieve a negative technical impact is what makes a weakness a vulnerability.



Vignette Summary

Name	Description
State Election Administration using remote Internet voting via absentee ballot	Internet-facing polling system supporting high-volume transactions, high availability, Data-centric Database containing ballot information, Audit log generation for each voter.
State or Local Elections using eVoting via Direct Recording Election Machines.	DRE systems are not directly connected with the Internet. Vote data is uploaded to a centralized server via modem. Election worker retrieves hardcopies of the voting record from the machine and delivers the printouts to election officials. DRE machines are programmed with firmware uploaded from a compact flash card. It is generally accepted that the computer used to upload the firmware to the flash card should not be connected to the Internet.
State or Local Elections using eVoting via an Internet web	Internet-facing polling systems are connected to the Internet and are designed to support high-volume transactions and high availability. A Data-centric Database is used to collect ballot information, Audit logs are generated for voter.

Vignette Details

Vignette Definition: State Election Administration using remote I via absentee ballot

Name	State Election Administration using remote Internet voting via ab
ID	elec-abs-int
Maturity	stub
Domain	evoting
Desc	Internet-facing polling system supporting high-volume transactio Data-centric Database containing ballot information, Audit log ge voter.
Archetypes	General-purpose OS, Web browser, Web server
Business Value Context (BVC)	Integrity and Availability considered highest priorities. Confidenti protect voter and vote record anonymity. Authentication and aut high priorities to ensure only registered users vote and that each once. Help America Vote Act (HAVA) requirements mandate paper audi election officials. Security incidents might facilitate fraud via malicious influence of outcomes, facilitate extortion, coercion, or vote selling, incur Fed concerns, & erosion of voter confidence.
Notes	
References	*No references recorded.*

Vignette Definition: State or Local Elections using eVoting via Direct Recording Election Machines.

Name	State or Local Elections using eVoting via Direct Recording Election Machines.
ID	evoting-DRE
Maturity	under-development
Domain	evoting
Desc	DRE systems are not directly connected with the Internet. Vote data is uploaded to a centralized server via modem. Election worker retrieves hardcopies of the voting record from the machine and delivers the printouts to election officials. DRE machines are programmed with firmware uploaded from a compact flash card. It is generally accepted that the computer used to upload the firmware to the flash card should not be connected to the Internet.
Archetypes	Embedded Device, Endpoint System, Removable Storage Media, Proprietary Firmware, Modem Communications
Business Value Context (BVC)	Integrity essential to election terminals as well as endpoint systems used in pre-election device programming. Protecting PII less important than ensuring accurate vote tabulation and audit trails. Physical security of devices also essential. Help America Vote Act (HAVA) requirements mandate paper audit logs for use by election officials. Security incidents might facilitate fraud via malicious influence of election process or outcomes as well as incur Federal regulatory concerns, and erosion of voter confidence.
Notes	
References	*No references recorded.*

https://cwe.mitre.org/cwraf/data/vignettes.html

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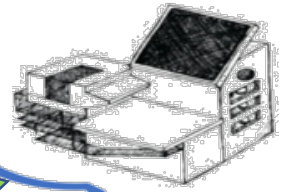

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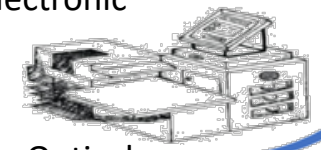

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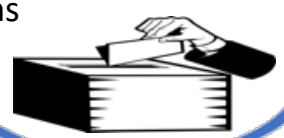

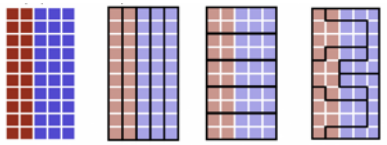

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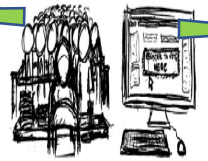

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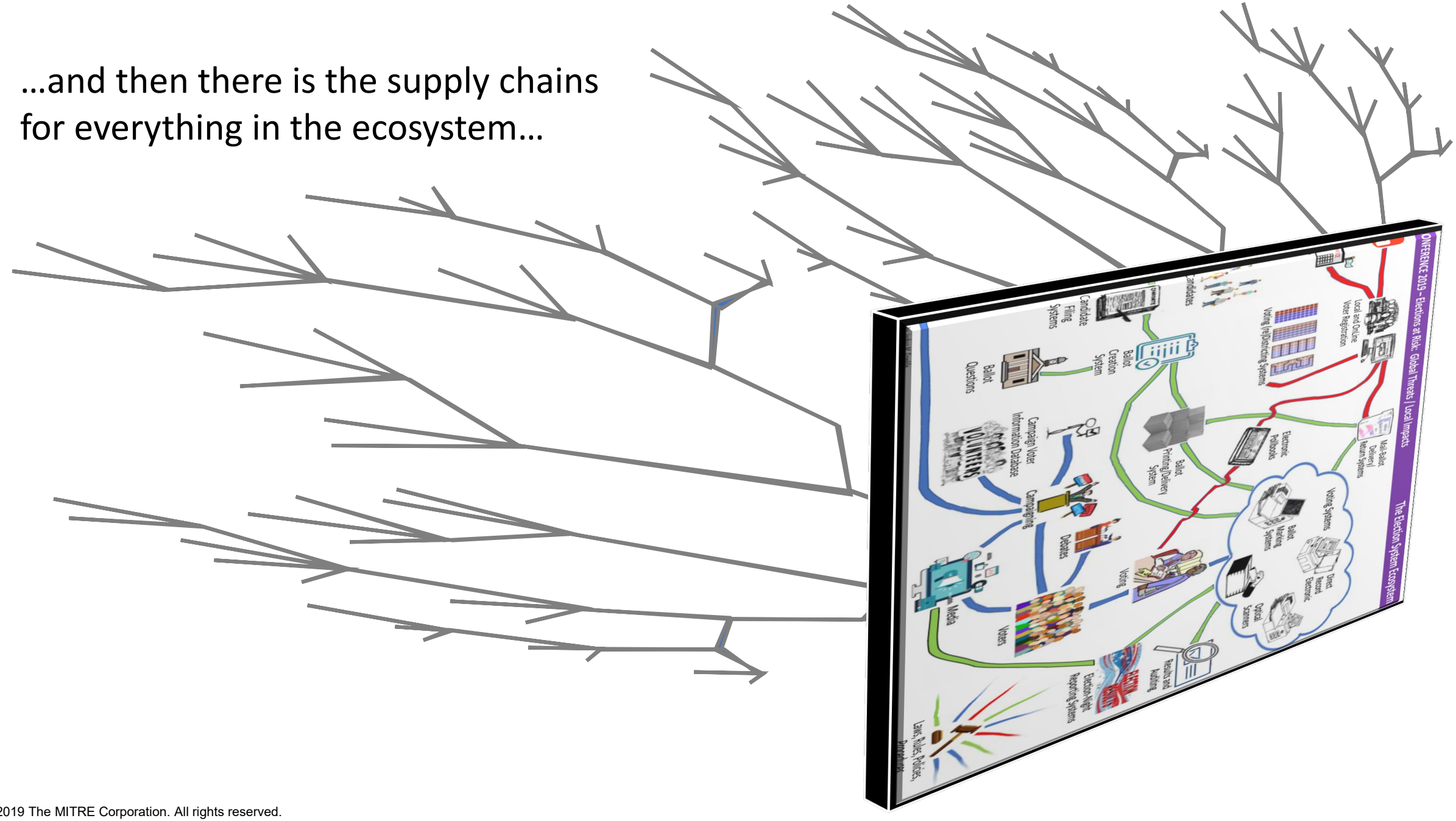
…and then there is the supply chains for everything in the ecosystem…



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Learn More

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- Harvard Kennedy School, Belfer Center, *State and Local Election Cybersecurity & Cybersecurity Campaign Playbooks* (Feb. 2018)
- *Election Infrastructure Subsector Specific Plan:* U.S. Dept. of Homeland Security (2018)

- *Additional references and reports are posted at:*

  http://ambar.org/hottopics

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