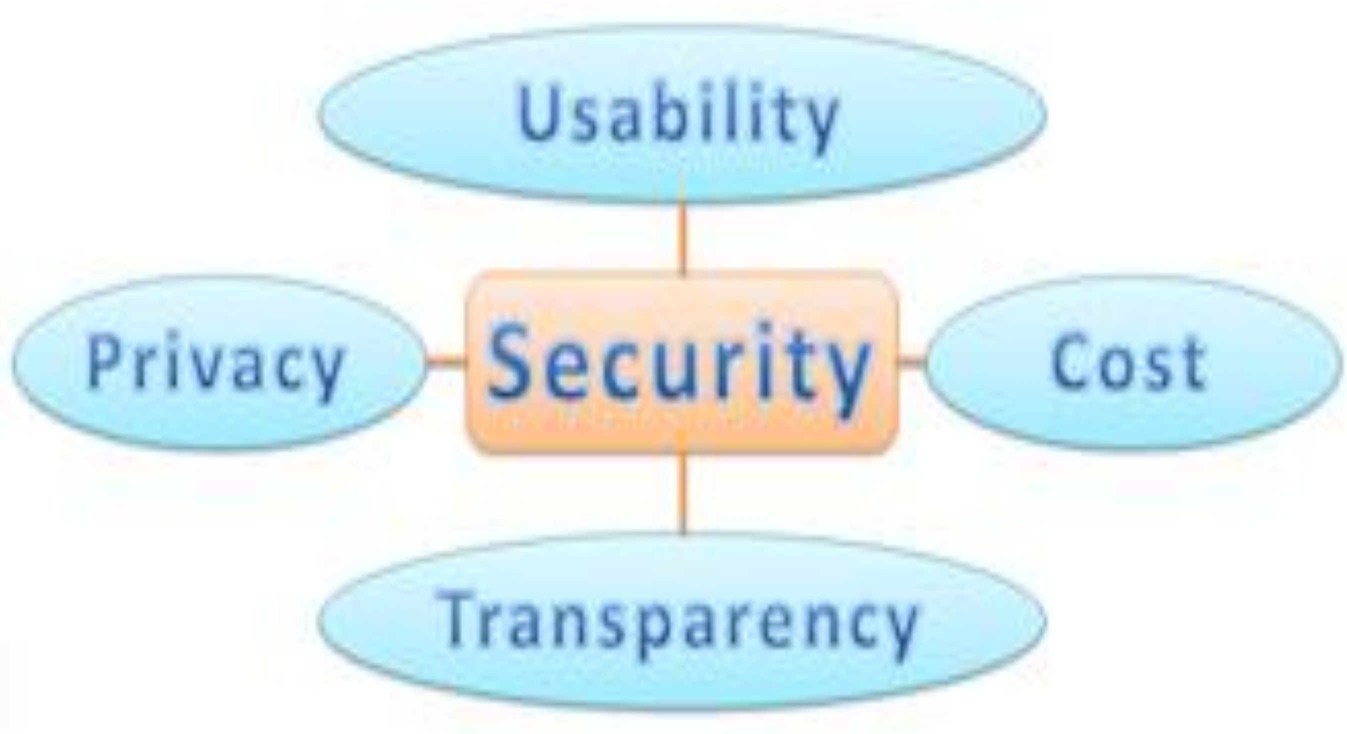
# Hacking the White House:

## Election Fraud in the Digital Age

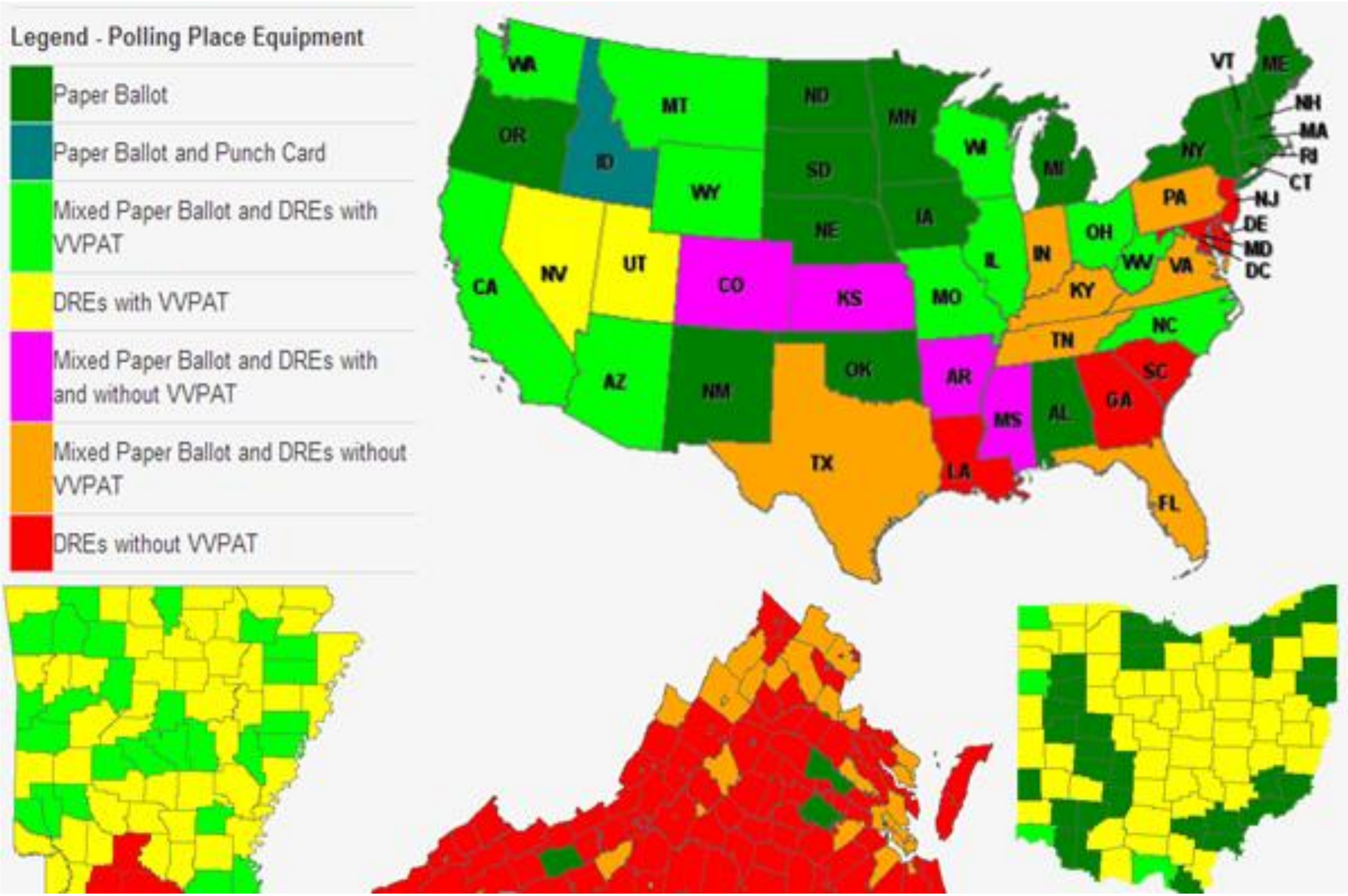
# I thought we fixed all of this after the 2000 election mess?

# A Short History of Voting in the U.S.



# A Short History of Voting in the U.S.

1. DRE = Lever Machine
2. PCOS = Punch Card
3. Vote-by-mail is not private


Legend - Polling Place Equipment
Paper Ballot
Paper Ballot and Punch Card
Mixed Paper Ballot and DREs with VVPAT
DREs with VVPAT
Mixed Paper Ballot and DREs with and without VVPAT
Mixed Paper Ballot and DREs without VVPAT
DREs without VVPAT
WA
OR
ID
MT
WY
ND
SD
NE
MN
IA
WI
MI
IL
IN
OH
PA
NY
VT
ME
NH
MA
RI
CT
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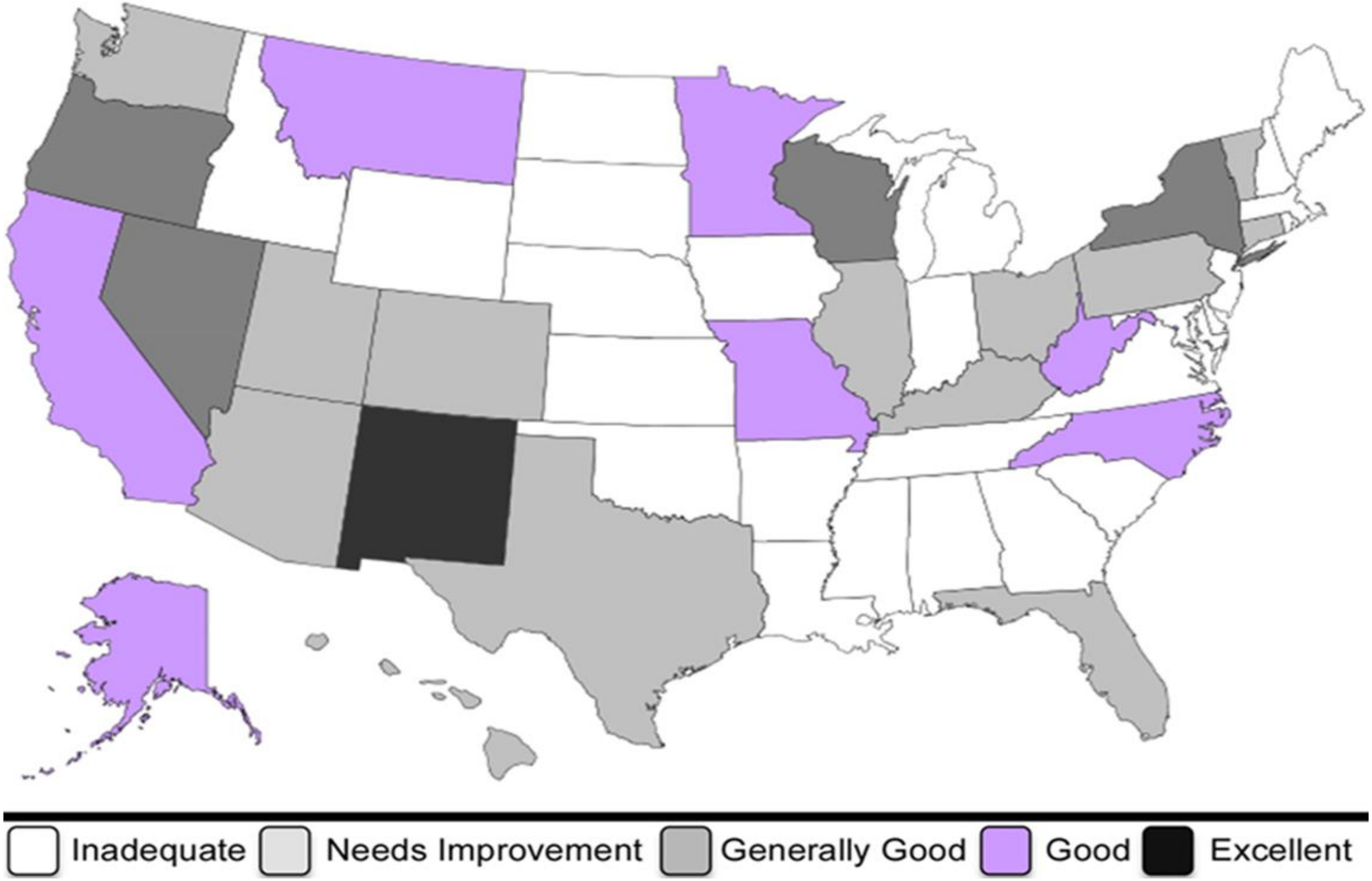

Inadequate
Needs Improvement
Generally Good
Good
Excellent

# So how would I steal it?

# My requirements

1. **Covert:** Paper & electronic counts must match
2. **Cheap:** Very few accomplices if any
3. **Assurances:** No attacks based on unclear data
4. **Believable:** Only attack swing states

# System Design Attacks

Don’t scale well or are too risky:

1. Ballot Design
2. Voter Registration & Authentication
3. Denial of Service
4. Physical Access

# Software and Hardware Attacks

Most don’t scale or have data:

- Fleeing Voter Attacks
- Provisional Voter Attacks
- Attacking Individual Machines
- Attacking Vendors
- Attacking via Wireless

# X% and Presentation Attacks

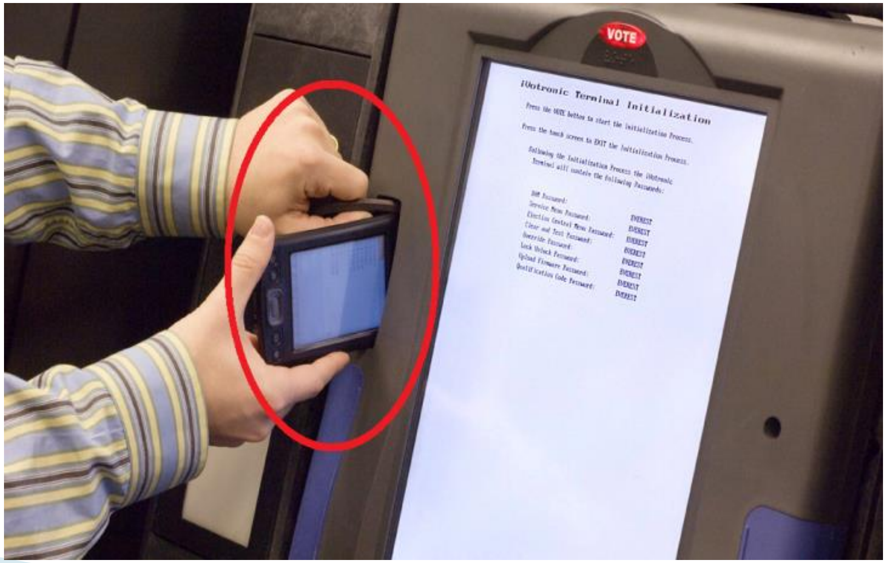
DREs Only!

# How Flawed are the Machines?

- Very

```
340: Assume buf is large enough for a token
341: This would be better if it delt[sic] with CStrings
342: rather than with fixed buffers. Gems implemented
343: this at one point.

#define DESKEY ((des_key*) "F2654hD4")
```



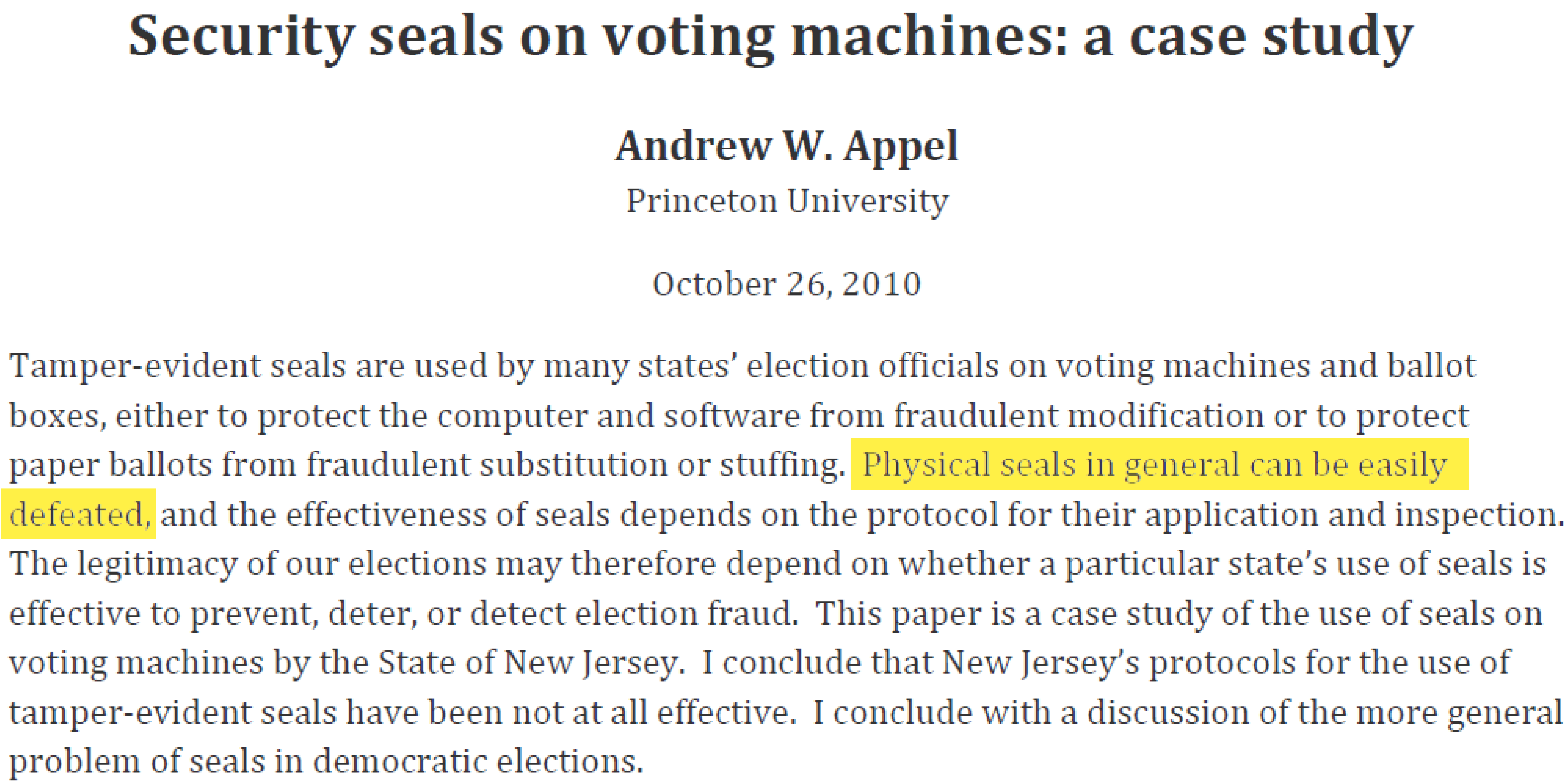
iVotronic Terminal Initialization

Press the VOTE button to start the Initialization Process.

Press the touch screen to EXIT the Initialization Process.

Following the Initialization Process the iVotronic Terminal will contain the following Passwords:

DBM Password: EVEREST
Service Menu Password: EVEREST
Election Central Menu Password: EVEREST
Clear and Test Password: EVEREST
Override Password: EVEREST
Lock Unlock Password: EVEREST
Upload Firmware Password: EVEREST
Qualification Code Password: EVEREST



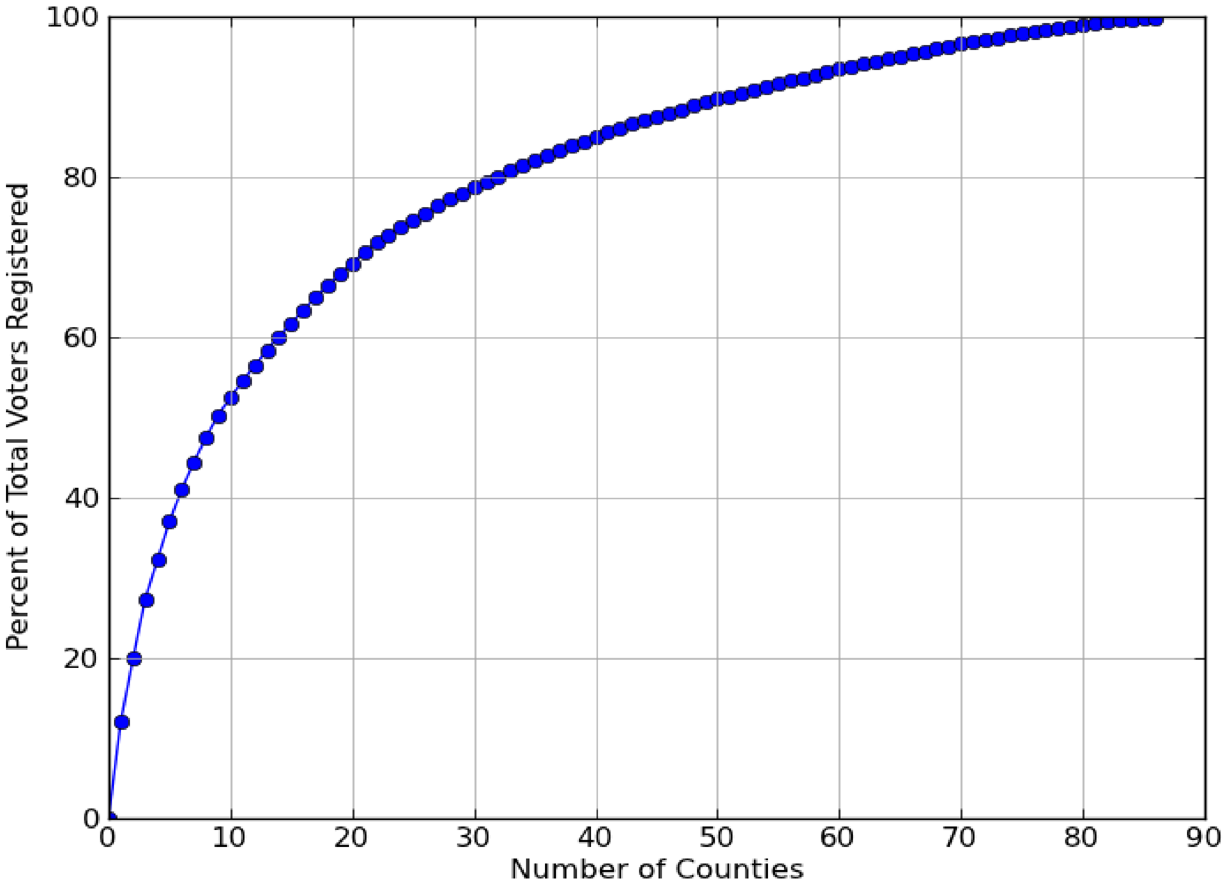
# Security seals on voting machines: a case study

**Andrew W. Appel**
Princeton University

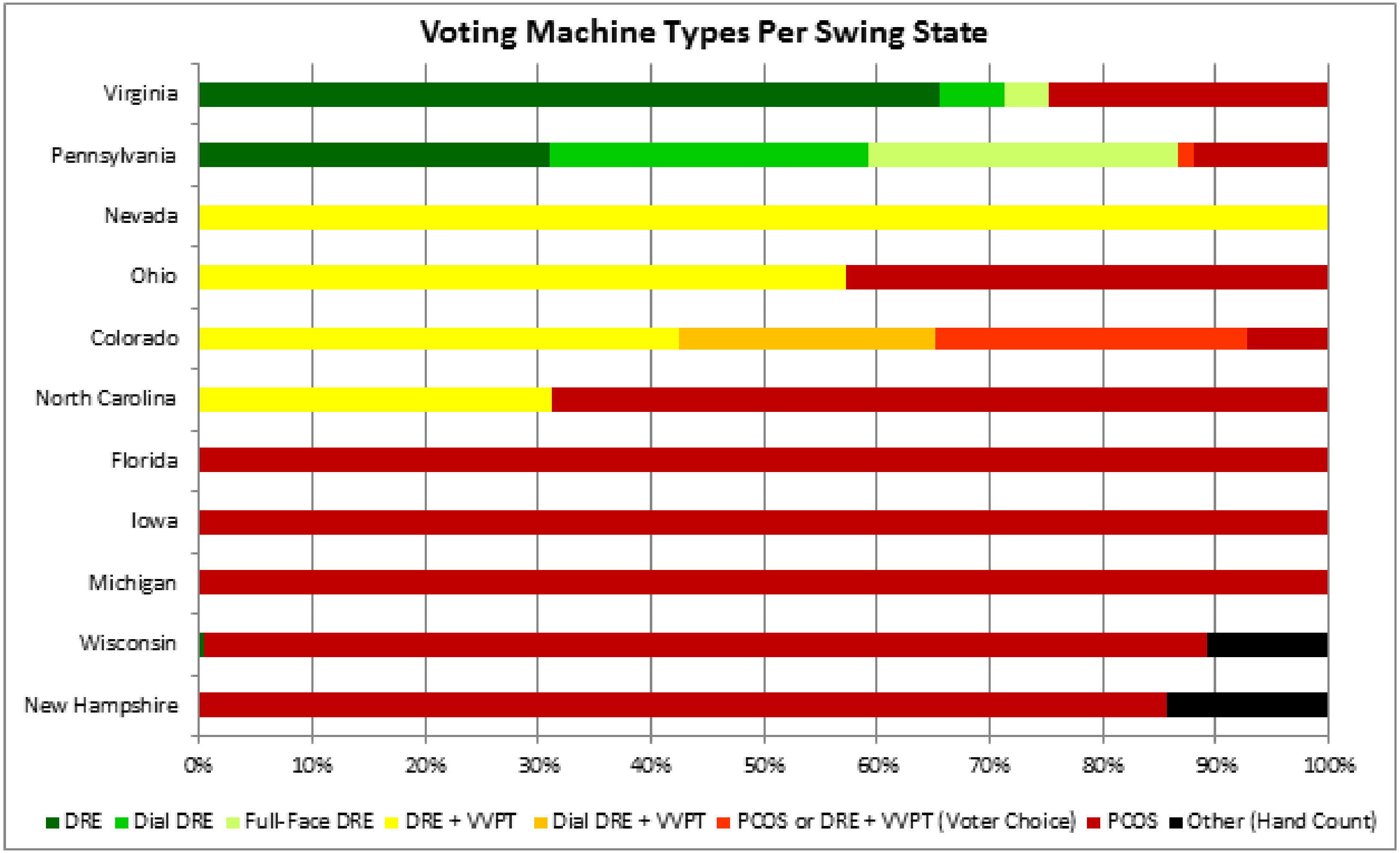
October 26, 2010

Tamper-evident seals are used by many states' election officials on voting machines and ballot boxes, either to protect the computer and software from fraudulent modification or to protect paper ballots from fraudulent substitution or stuffing. Physical seals in general can be easily defeated, and the effectiveness of seals depends on the protocol for their application and inspection. The legitimacy of our elections may therefore depend on whether a particular state's use of seals is effective to prevent, deter, or detect election fraud. This paper is a case study of the use of seals on voting machines by the State of New Jersey. I conclude that New Jersey's protocols for the use of tamper-evident seals have been not at all effective. I conclude with a discussion of the more general problem of seals in democratic elections.

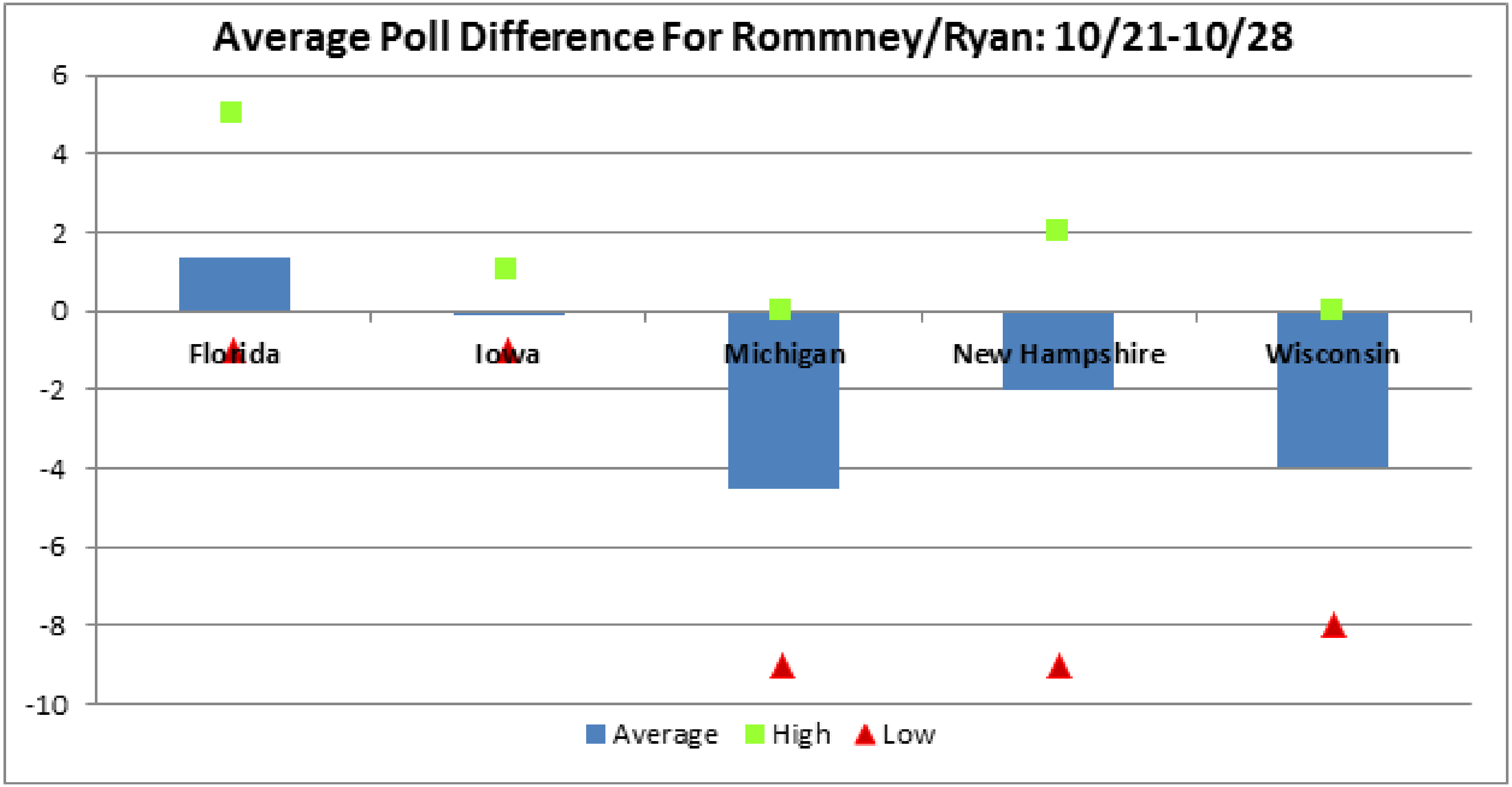
# Attacking the EMSs



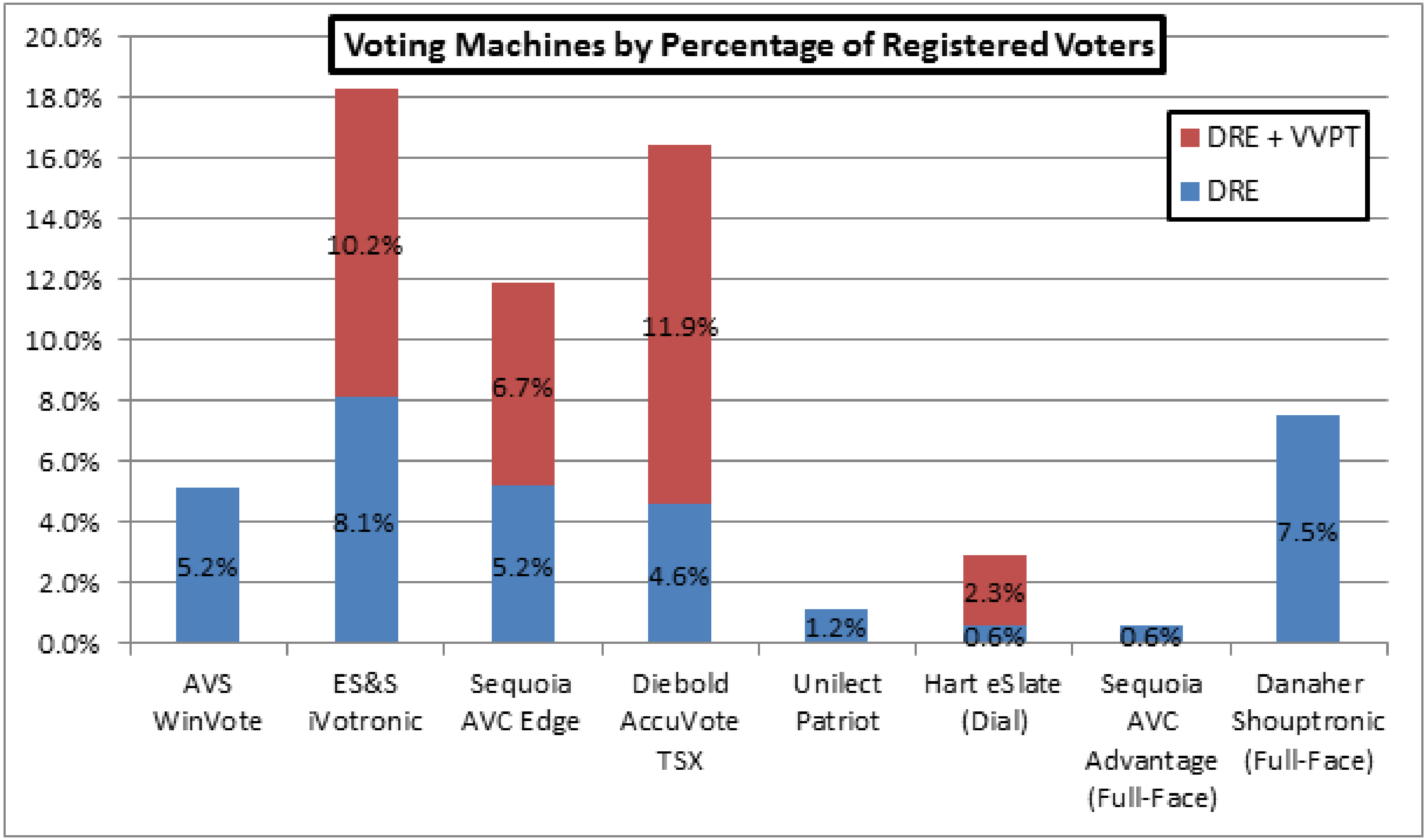
# My Final Plan



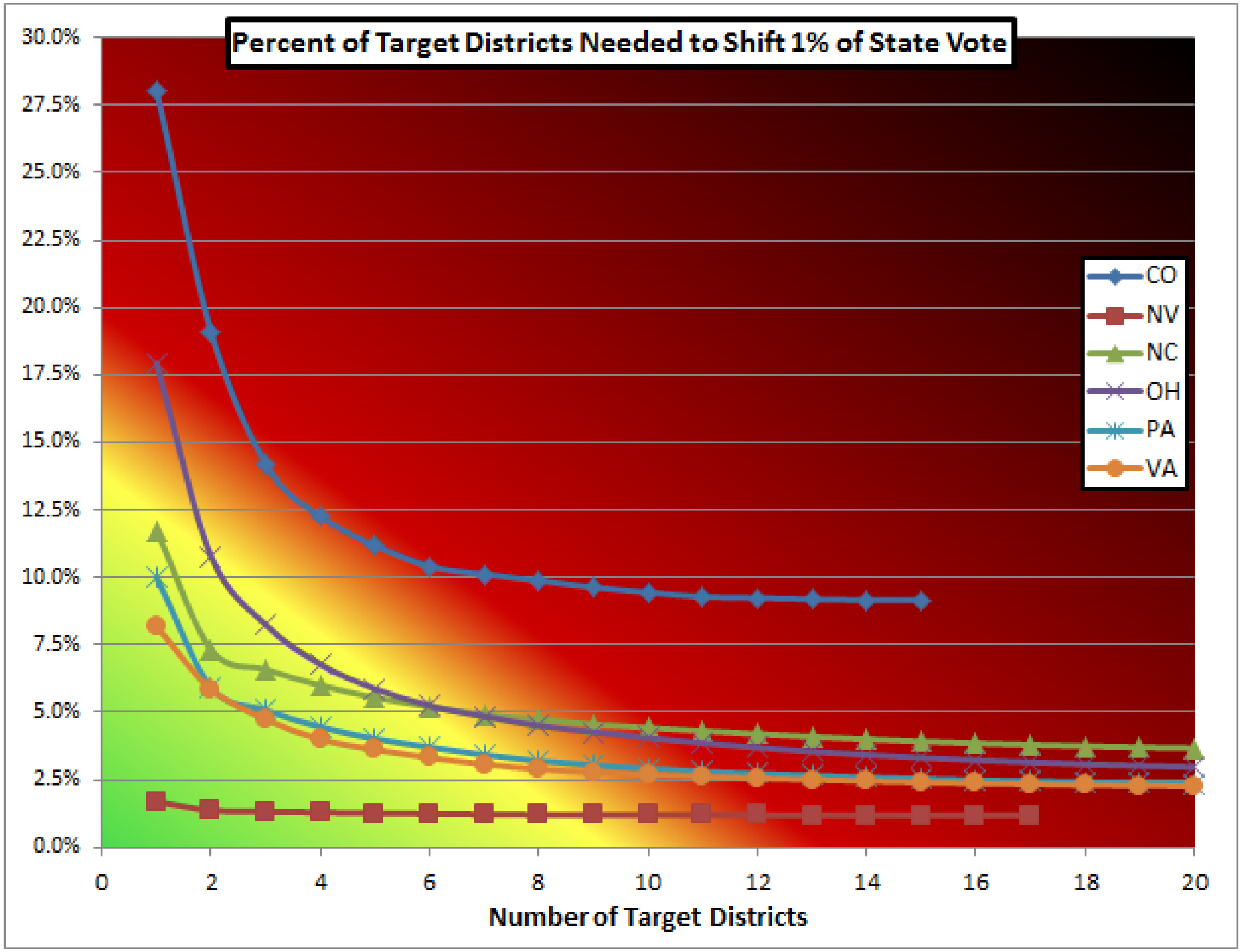
# My Final Plan



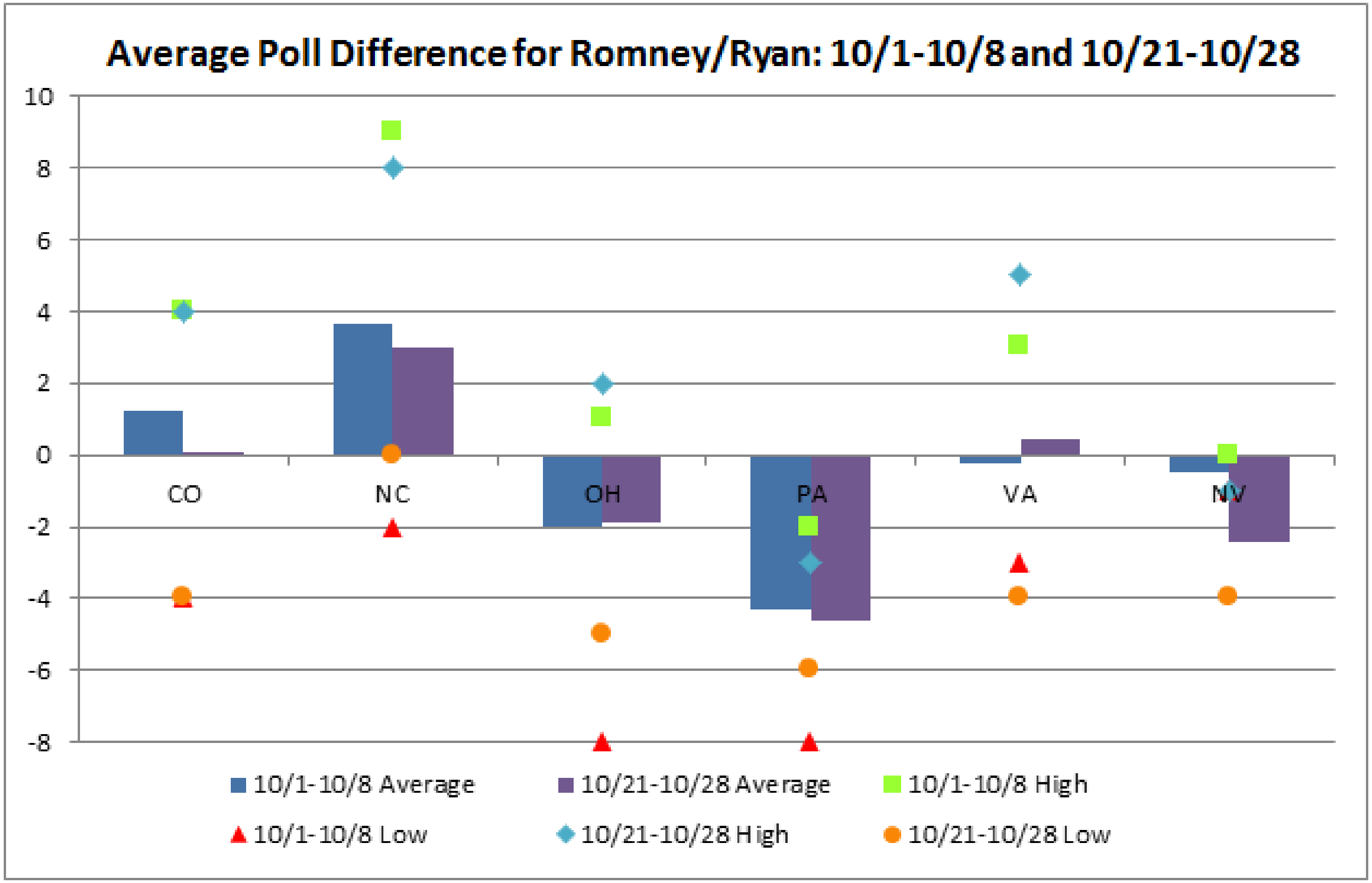
# My Final Plan



# My Final Plan



# My Final Plan



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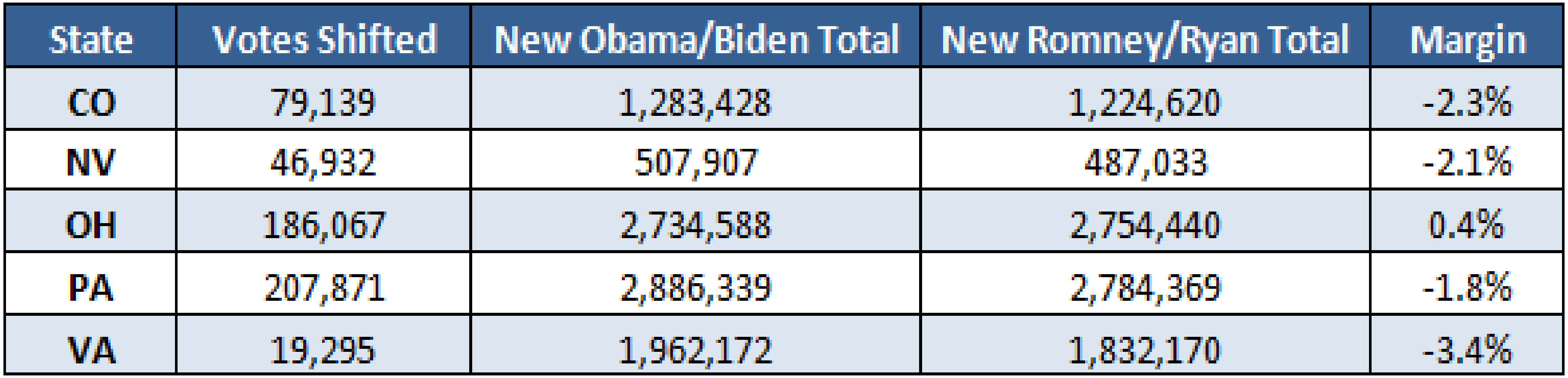

| State | Votes Shifted | New Obama/Biden Total | New Romney/Ryan Total | Margin |
|---|---|---|---|---|
| CO | 79,139 | 1,283,428 | 1,224,620 | -2.3% |
| NV | 46,932 | 507,907 | 487,033 | -2.1% |
| OH | 186,067 | 2,734,588 | 2,754,440 | 0.4% |
| PA | 207,871 | 2,886,339 | 2,784,369 | -1.8% |
| VA | 19,295 | 1,962,172 | 1,832,170 | -3.4% |

# So how do we fix this?

# The Short Term

- Paper Trails and Audits
- Parallel Testing
- Buddy System and Security on EMS
- No wireless components

# The Long Term

- Balance Usability, Cost and Transparency with Precinct Systems
- Be wary of Privacy on Remote Voting
- We are not ready for internet voting!
- IPSnail

# Time for Q&A!