DEFENDING THE 2018 MIDTERM ELECTIONS FROM FOREIGN ADVERSARIES
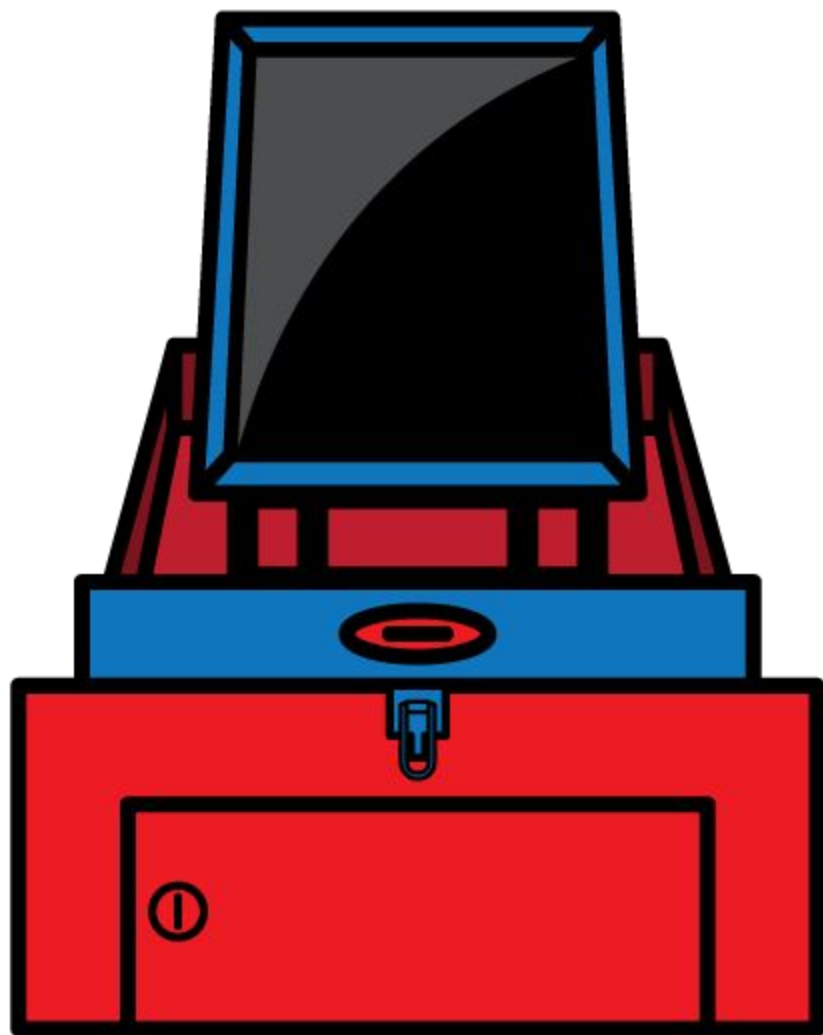
[presented by] = [[josh kevin eli] * [franklin] + [ian weinstock]]

Disclaimer

This work does not represent the opinions of our various employers. This is personal work; done on personal time. It is party agnostic.

Agenda

- History
- Methodology
- Election Infrastructure
- Campaign Results
- State Results
- Vendor Results
- Recommendations
- Conclusions

JOSH FRANKLIN

KEVIN FRANKLIN

ELI FRANKLIN

IAN WEINSTOCK

What is ElectionBuster?

- A python application, software suite, and project
- Everything we do is to protect US elections
- Our scope is large:
  - Candidates, election officials, voting system manufacturers, voting services providers
- Started with finding fake presidential sites, now:
  - Assessing campaign infrastructure
  - Assessing online state and local infrastructure
  - Identifying fake sites for candidates, PACs, and states

Project History

- Humble beginning as a 2012 GMU graduate project
- Initially a manual process to find fake domains
- Initially a single program, now a suite
- Shoutout to Robert Tarlecki and Matt Jablonski for their excellent teamwork for Shmoocon 2014 [7]
- Presented an update on the 2014 and early 2016 election findings at BsidesDC 2015 [10]

Focus on measurable impact for 2018
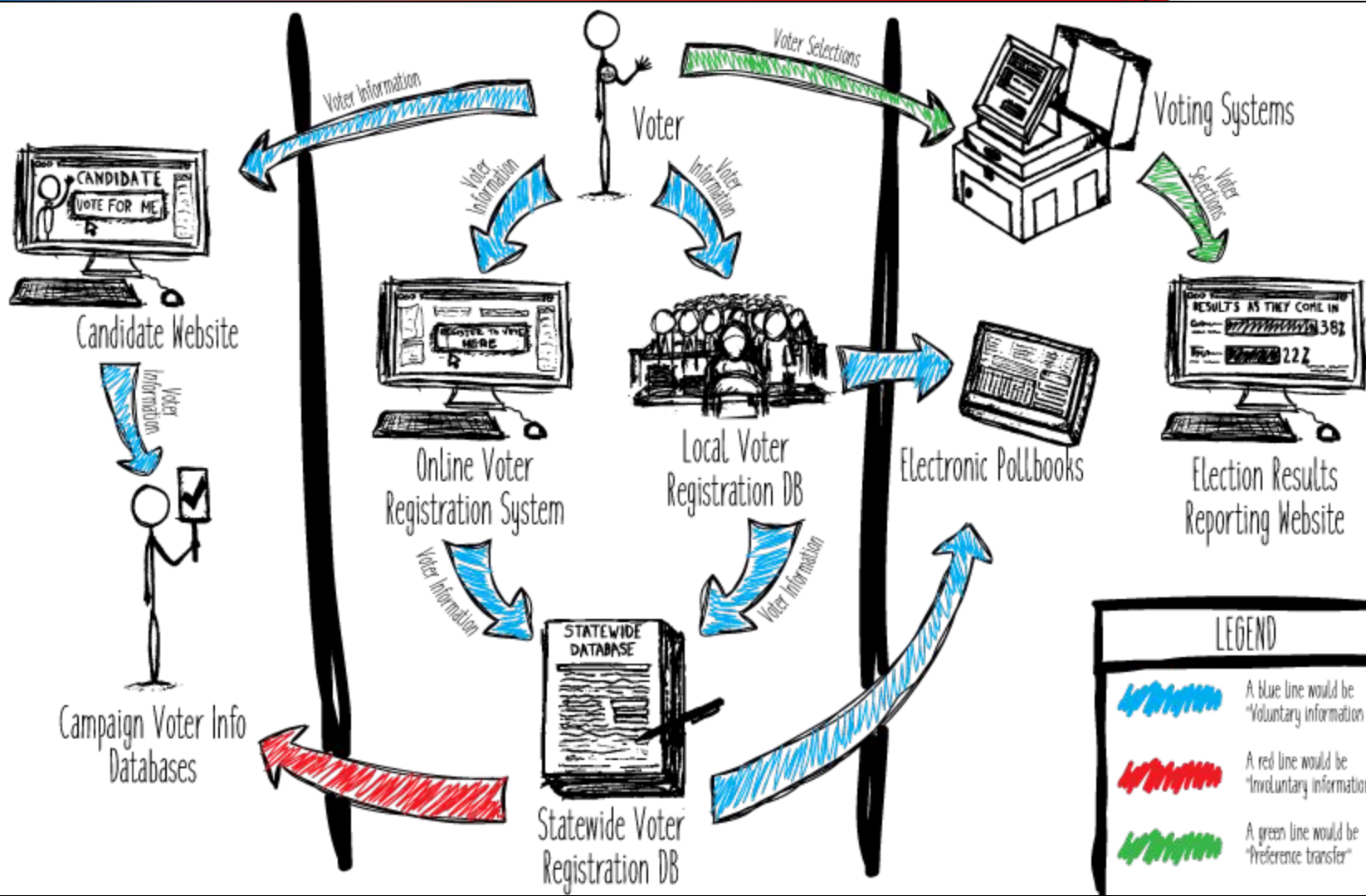
Project Methodology

1. Obtain names of candidates
2. Gather lists of candidate and state election websites
3. Process candidate names and websites with ElectionBuster and other assessment tools
   Note: See [11] for the grading scale and rubric
4. Perform manual and automated data analysis
5. Disclose results to affected parties in a responsible manner
6. Party like rockstars
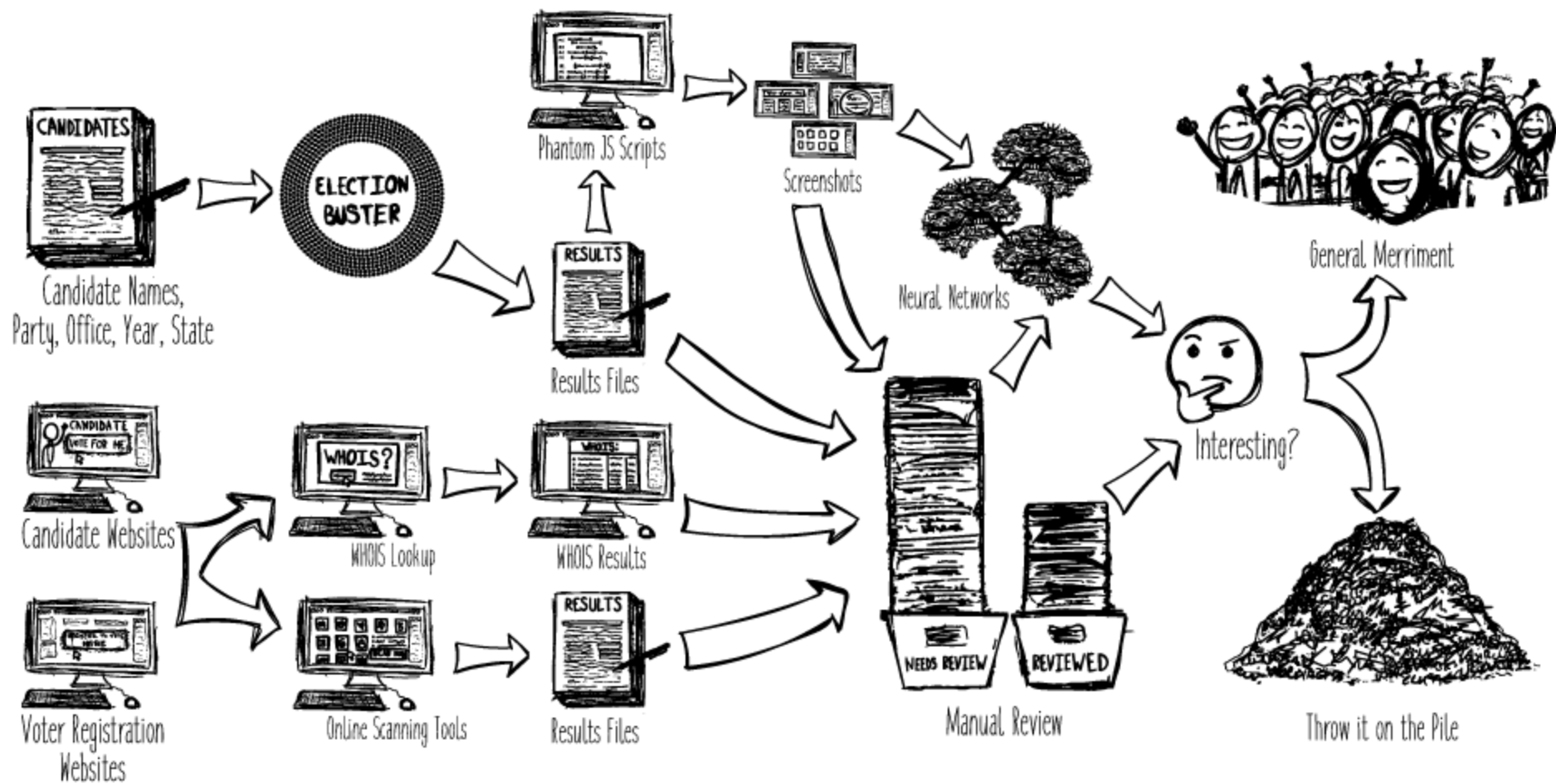
What Systems Are Out There?

- Controlled by election officials (examples)
  - Voting equipment (e.g., Opscan, DREs, BMDs)
  - Electronic pollbooks
  - State election websites (e.g., SoS, SBoE)
  - Voter registration systems with online interfaces
- Under candidate and party control
  - Candidate & party websites
  - Candidate & party voter information DBs
- Other control: PACs, Non-profits

Candidate Website

Voter Information

CANDIDATE
VOTE FOR ME

Voter Information

Campaign Voter Info
Databases

Voter

Voter Information

Voter Information

Online Voter
Registration System

Voter Information

Voter Information

STATEWIDE
DATABASE

Statewide Voter
Registration DB

Voter Information

Local Voter
Registration DB

Voter Information

Electronic Pollbooks

Voter Selections

Voter Selections

Voting Systems

Voter Selections

RESULTS AS THEY COME IN
38%
22%

Election Results
Reporting Website

LEGEND

A blue line would be
"Voluntary information transfer"

A red line would be
"Involuntary information transfer"

A green line would be
"Preference transfer"

2016 Election Attacks

- Phishing of campaigns, voting service providers, and election officials [2]
- Typosquatting on campaign fundraising sites and party contractor-controlled domains [6]
- Social media manipulation & (mis|dis)information [5]
- Data breaches of federal, state, & local systems [8]
  - Also candidate and campaign systems [9]
- Direct attacks on online voter registration systems and campaign infrastructure [4]

Campaigns 101

- There are 1000s of candidates running in this November's election
  - We've scanned most of them
- Most campaigns are very small operations, with little to no IT expertise
- Larger campaigns have sophisticated IT infrastructure
- We observed campaigns being run purely from Twitter, Facebook, Instagram, and Snapchat
  - This might be the future...cheap and secure

2012 Findings

- Basically guessing for typosquats
- Manual data analysis
- Found very interesting typosquats
- Fake DNC and RNC site accepting donations
- Infected political action committee (PAC) sites
- Presented results at Shmoocon 2014 [7]

Our Country Deserves Better PAC
www.**ourcountrydeservesbetter**.com/
This site may be compromised.
Buy Viagra online from an official certified pharmacy, OVERNIGHT Shipping, Exclusive
& competitive discount prices, express shipping & discrete packaging.

2014 Findings

- First iteration of ElectionBuster
- Found NRCC sites that could potentially confuse voters into donating to the wrong candidate
- Several candidate sites were actively distributing malware
- Sensitive WHOIS information
- Highlighted need to focus on data analysis

VOTE **SWANSON** OR DON'T

TOGETHER WE CAN
ELECT A MAN WHO DOESN'T EVEN WANT THE JOB

"VOTE RON SWANSON IN 2016"
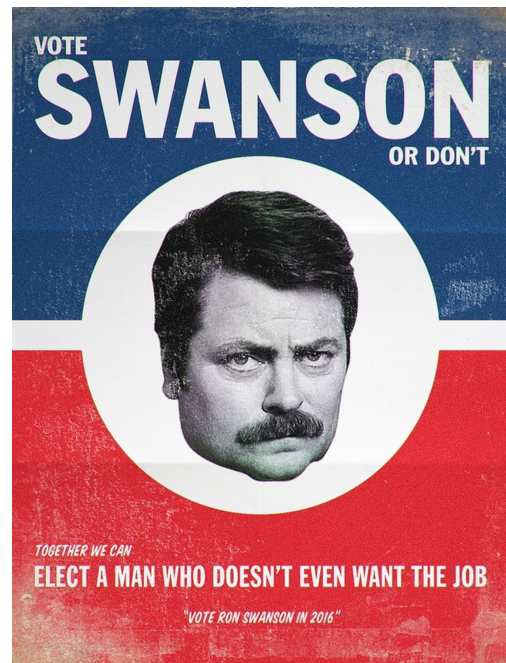
KIRKPATRICK
FOR CONGRESS

A career politician and insider, Kirkpatrick was booted out of Congress by Arizonans in 2010 after she sided with Nancy Pelosi and supported ObamaCare. But in 2012, she managed to return after Pelosi's allies came to her rescue with millions of dollars.

That probably explains why Kirkpatrick continues to be in in Pelosi's back pocket.

Kirkpatrick is a huge embarrassment to Arizona. How?

- Kirkpatrick walked out on her own town hall because she didn't want to answer questions about voting for ObamaCare.

- After she lost the election, Kirkpatrick brought campaign staffers on the official House payroll then spent over $100,000 in taxpayer funds on salaries and bonuses for just two days of work.

- Kirkpatrick voted to keep the Grand Canyon shut down so she could protect ObamaCare.

- Kirkpatrick isn't just liberal – she doesn't even do her job as a representative. She missed 16 votes in just her first few days back in Congress.

DONATE

www.annkirkpatrick.com

2016 Hillary Clinton Typosquats

www.mikeforpresident.org

www.rand.vote   www.rubio.vote

                                        www.jeb.vote

www.votehillaryclinton.com www.hillary.vote

                                    www.cruz.vote
www.carson.vote   www.rubio2018.org

www.trumpforpresident.org

hillaryforpresident.com

                                        www.huckabee.vote

www.jebforpresident.net
        www.votehillary.com   www.votejeb.com

Day of scans:
E-Day 2016
                                        www.votewalker.com

R igraph
www.rubio2018.com
                www.cruzsucks.com
                    www.hillaryforpresident.com
        www.walker.vote

2016 Donald Trump Typosquats

www.jebebush.com www.jillstein.us

www.trumpforprez.com

www.ted2016.org

www.donaldjtrump.com www.teamhillary.com

ww.jeb4president.com

www.trump2016.com

Day of scans:
E-Day 2016

R igraph

www.votetrump.com www.presidenttedcruz.org

2018 Donald Trump Typosquats

www.kirstengillibrandforpresident.com

www.presidenttedcruz.org

www.votetrump.com

www.rock2020.com

www.donaldjtrump.com

www.donaldtrump.com

www.mikepence.com
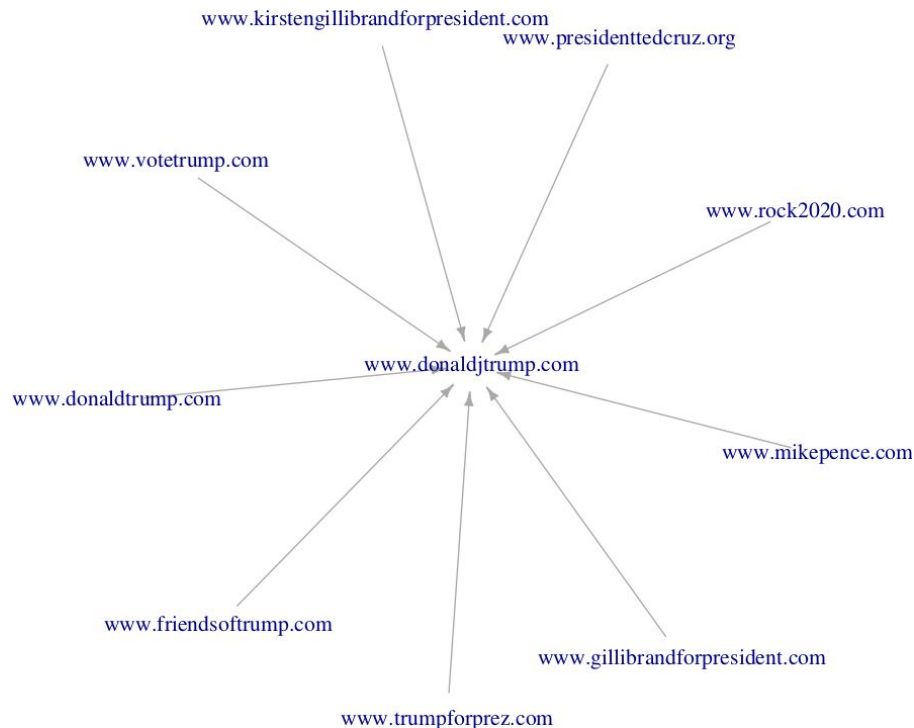
Date of scans:
20180715

R igraph

www.friendsoftrump.com

www.gillibrandforpresident.com

www.trumpforprez.com

Success...and Failure

- We released PACScan in 2015
- Pointed it at ActBlue, one of the main fundraising platforms used by Democrats
- Recent indictments show that DNC and DCCC sites were hacked to redirect to a fake ActBlue page:
  - actblues(dot)com
- Although we detected it, we did not flag it as malicious even after investigating

May 31, 2016, YERMAKOV searched for open-source information

ny 1 and its reporting on X-Agent and X-Tunnel. On or about June

onspirators attempted to delete traces of their presence on the DCCC

g the computer program CCleaner.

une 14, 2016, the Conspirators registered the domain actblues.com,

ked the domain of a political fundraising platform that included a

ons page. Shortly thereafter, the Conspirators used stolen DCCC

modify the DCCC website and redirect visitors to the actblues.com

```
###########################################
INPUTS = actblue, 2016, 2016Total runtime
There were 27 positive results.There wer
----------------------------------------Pos
----------------------------------------
http://www.actblue.com
http://www.catblue.net
http://www.artblue.us
http://www.aceblue.com
http://www.antblue.com
http://www.actblue.org
http://www.catblue.com
http://www.ictblue.com
http://www.actblue.net
http://www.actblues.com
http://www.artblue.info
http://www.aceblue.biz
http://www.agtblue.com
```

ElectionBuster 2018 Updates

- Rewritten for Python3
- New variants and templates for PACs, election websites, and manufacturers
- Correlating ElectionBuster data with open source threat intelligence
- Began checking for homographic attacks via EvilURL and DNStwist

A Curious Case: Linda Coleman

- Candidate for State office in North Carolina
  - Under our radar
- Previously ran for Lt. Governor, this domain was purchased and repurposed [3]
- Code stripped from Wayback Machine to create a pharmaceutical storefront
- Ivan Gusev did not redact WHOIS information
- Assumed fake name, not politically motivated

Note that this was not originally identified by us; we independently investigated.

LINDA COLEMAN
LT. GOVERNOR

IT'S TIME FOR A DIFFERENT APPROACH IN RALEIGH.

I'm running for Lieutenant Governor because I want to give North Carolina's middle class families a fighting chance again. The Republican majority running things in Raleigh continues to unravel so much of what built our great state. It's time for a different approach. I know, working together, we can achieve this and more. Join me today by signing up below. Acheter cialis pas cher en pharmacie

Linda Coleman

WHOIS lindafornc.com

Registrant	******** ********
Registrant Org	Private person
Registrant Country	RU
Registrar	GoDaddy.com, LLC
	IANA ID: 146
	URL: http://www.godaddy.com
	Whois Server: whois.godaddy.com
	abuse@godaddy.com
	(p) 14806242505
Registrar Status	ok
Dates	1,136 days old
	Created on 2015-01-30
	Expires on 2019-01-30
	Updated on 2018-01-31
Name Server(s)	NS1.DEALCOUPONSHOP.COM (has 16 domains)
	NS2.DEALCOUPONSHOP.COM (has 16 domains)
Tech Contact	******** ********
	Private person
	Myasnitskaya, 15,
	Moscow, Moscow obl, 119313, RU
IP Address	208.89.215.19 - 23 other sites hosted on this server
IP Location	- Washington - Seattle - Virpus
ASN	AS23033 WOW - Wowrack.com, US (registered Jan 07, 2002)
Domain Status	Registered And Active Website
Whois History	12 records have been archived since 2015-01-30
IP History	5 changes on 6 unique IP addresses over 3 years
Registrar History	1 registrar

◇
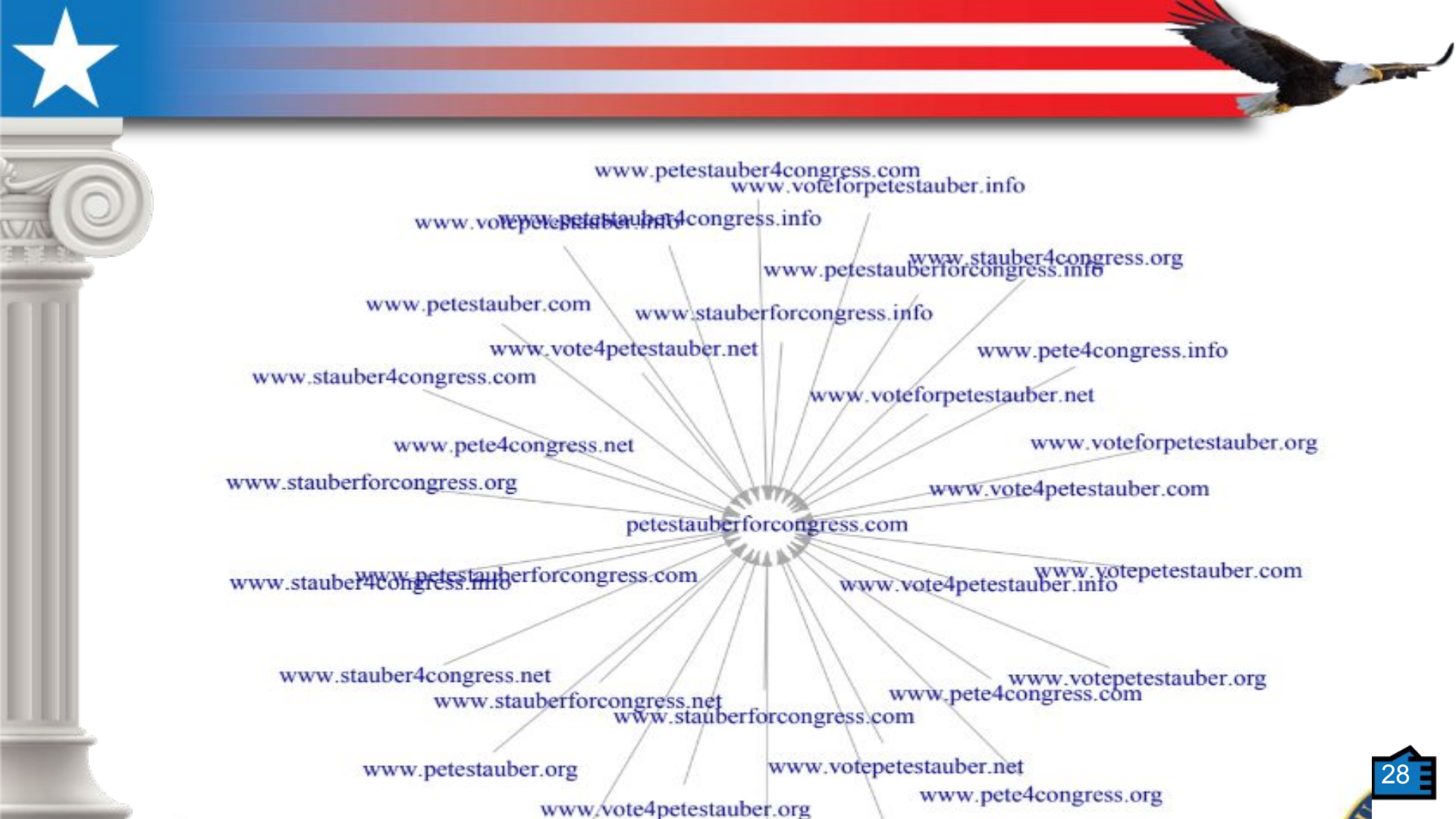
ELECT COMRADE DEVIN NUNES

избранный товарищ Дьявол Нунес

↓

www.electdevinnunes.com

YDS Young Democratic Socialists of America

DSA
Democratic Socialists of America

Facebook

Twitter

Home | About DSA | Get Involved | News & Calendar | Resources & Tools | FAQ | Chapters

DSA is the major organization on the American left with an all-embracing moral vision, systematic social analysis, and political praxis rooted in the quest for radical democracy, social freedom, and individual liberties.
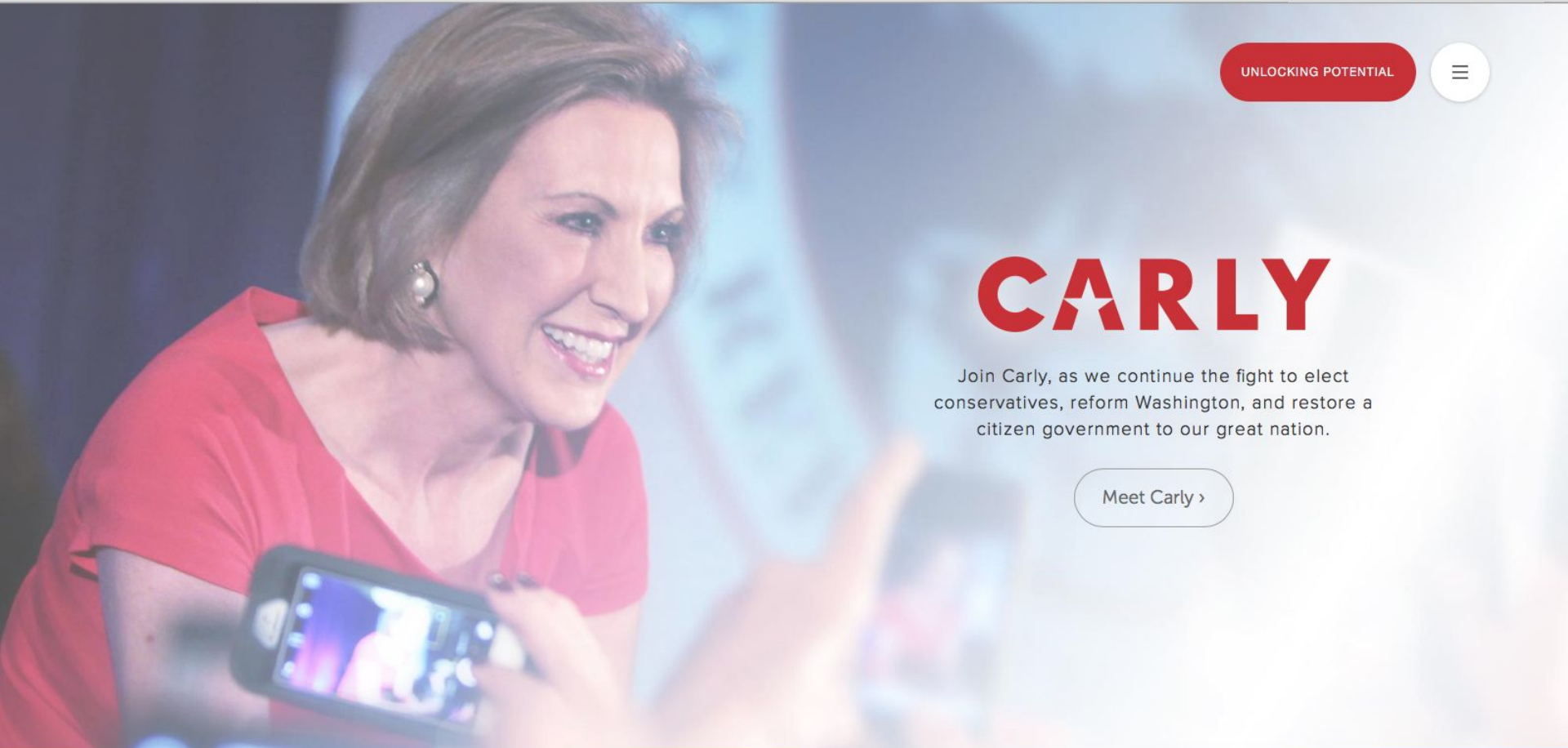—Cornel West

JOIN US

DONATE

Who we are & what we do

UNLOCKING POTENTIAL

CARLY

Join Carly, as we continue the fight to elect conservatives, reform Washington, and restore a citizen government to our great nation.

Meet Carly ›

www.carlyfiorina.com

Home   About Carly   On the Issues   Blog & News   Endorsements   Coalitions   Volunteer   Store   Donate

carly
u.s. senate

Text
"Join"
to CARLY
(22759)

Meet Carly Fiorina

Carly's Job Tour

Carly vs. Boxer: On Job Creation

Carly knows firsthand what it takes to create jobs. Take a closer look at who's fighting for you...

Read More

JOBS TOUR

Job Creators Say "Enough is Enough" to Boxer

"Carly Fiorina knows firsthand the challenges facing companies across the nation that are struggling in this difficult economy, and she has consistently demonstrated her commitment to advancing policies that support the interests of businesses large and small. christian louboutin shoes replica

As a U.S. senator, Carly will help produce sustained economic growth and create more jobs, and we are pleased to endorse her candidacy for U.S. Senate."–Bakersfield Chamber of Commerce President and Chief Executive Officer Debra Moreno

Cheap Non Owners Car Insurance here Non Owners Car Insurance Auto

Read More

CREATING JOBS

Job Creators Reject 28 Years of Boxer's Failed Leadership, Endorse Carly

"For 28 long years, Barbara Boxer has failed to fight for jobs, failed to fight for policies that spur economic growth and failed to fight for American companies. Today we are rejecting Boxer's nearly three decades of failed leadership and antagonism toward California's businesses," said U.S. Chamber of Commerce Senior Vice President and National Political Director Bill Miller.

edtreatment.org

Click here to download Carly's economic growth plan.

no deposit bonus

Read More

PROTECT THE AMERICAN DREAM
Take Action. Join Carly.

SIGN UP FOR UPDATES

Email Address

Cell Phone

Zip Code   Subscribe

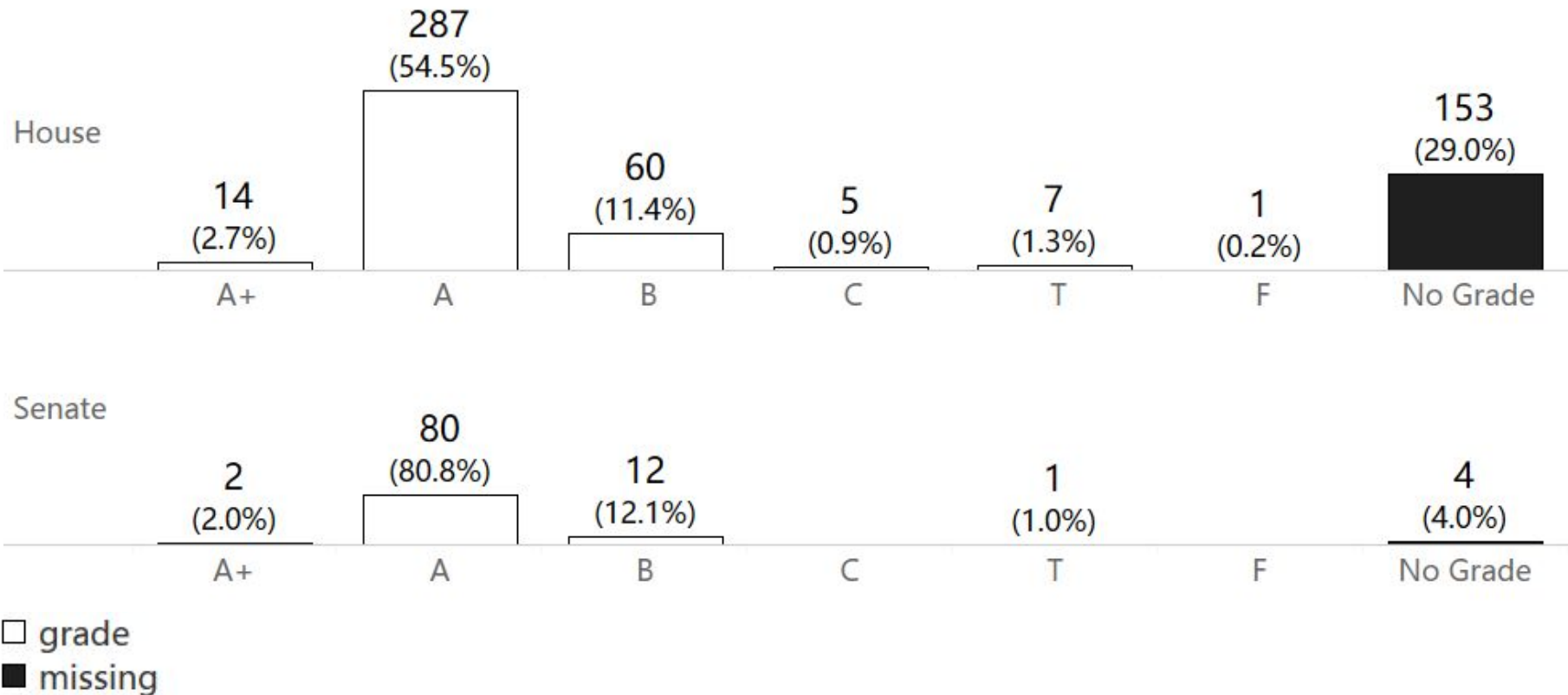MAKE A CONTRIBUTION

VOLUNTEER

JOIN A COALITION
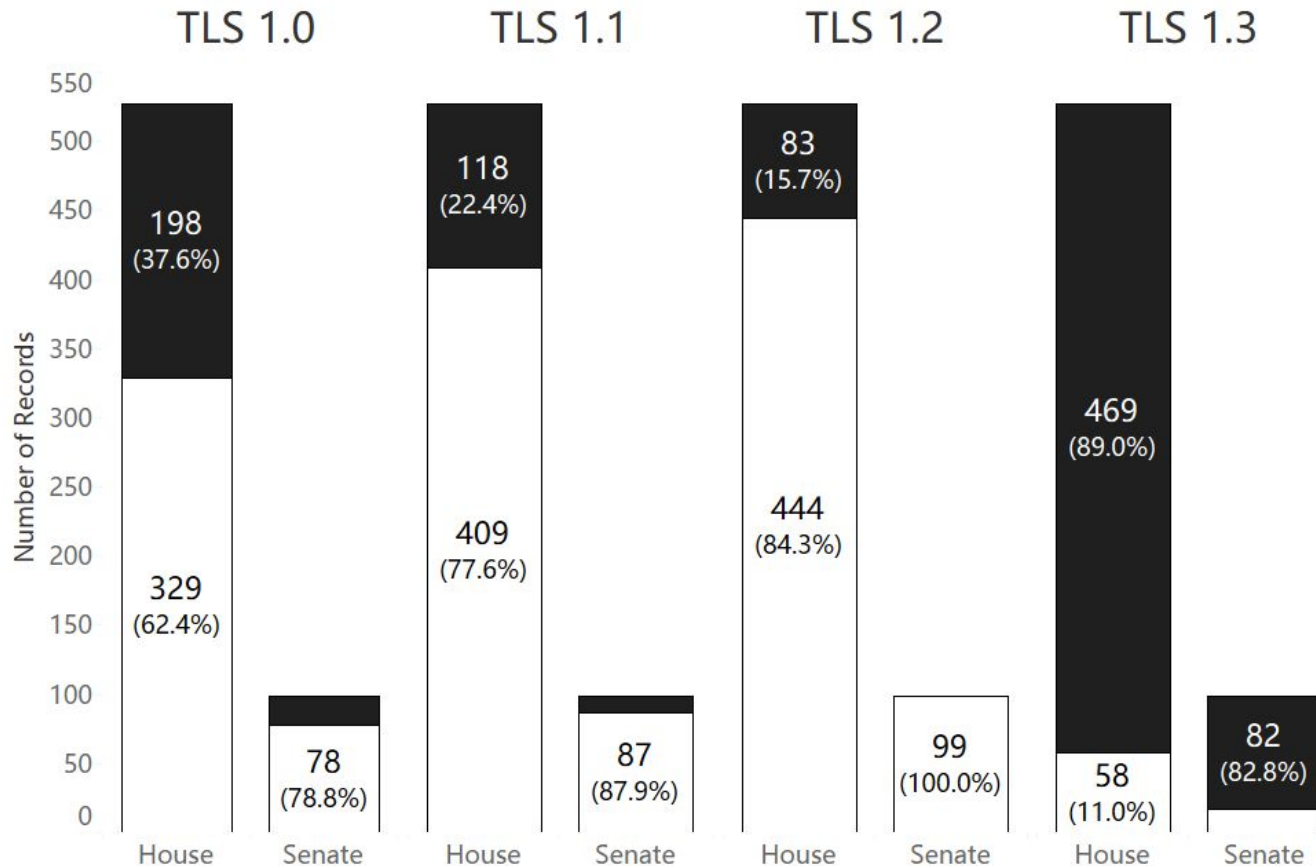
REGISTER TO VOTE

Add Facebook Application

Congressional Site Statistics

- The following stats include everyone running for the Senate that we could identify
- All House incumbents are included in these stats
  - Races we deemed important were also included
  - Too many candidates to include
  - Skewing towards incumbents likely alters stats
- A majority of the scans were taken during June 2018
- Relied on Ballotpedia for pulling candidates

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Congressional Site Grades

	A+	A	B	C	T	F	No Grade
House	14 (2.7%)	287 (54.5%)	60 (11.4%)	5 (0.9%)	7 (1.3%)	1 (0.2%)	153 (29.0%)
Senate	2 (2.0%)	80 (80.8%)	12 (12.1%)		1 (1.0%)		4 (4.0%)

☐ grade
■ missing

Congressional TLS Implementations

Let's Look to the States!

- States / local jurisdictions host election sites
- Election sites provide info, report results, and register voters
- Sites may be hosted by SoS, State Board of Elections (SBoE), or 3rd party org (e.g., Cloudlfare, Google)
- Overwhelming majority use a .gov TLD
  - Others use a .us or .org TLD
- About half of the VR systems move from .gov to .us or .org

JON HUSTED
Ohio Secretary of State

Home	Secretary Husted & the Office	Elections & Voting	Campaign Finance	Legislation & Ballot Issues	Businesses	Notary
		Media				

REGISTER TO VOTE OR UPDATE YOUR VOTER REGISTRATION INFORMATION

Español

Welcome

1. Eligibility

2. Personal Information

WELCOME TO OHIO'S ONLINE VOTER REGISTRATION SYSTEM

This system provides a convenient and secure way to:

- Register to vote in Ohio
- Update your voter registration address

WHAT YOU NEED

https://olvr.sos.state.oh.us

American Samoa

- Unincorporated United States Territory
- Runs separate .gov and .org sites
  - Not the only state organization to do this
- Site infected via a Drupal vulnerability
- Contacted for remediation
- Responsible authorities were advised
- Often to view the infected site, you need to approach from an IP outside the US
- 1 man IT operation

Coverage From Leaked NSA Memo

The nonexistent email accounts were called
"requestabsentee@americansamoaelectionoffice.org" and "r-
questabsentee@americansamoaelectionoffice.org." The analyst believes they
did this to create the email accounts—although this is something they could
have done directly by just registering the accounts. [19]

requestabsentee(at)americansamoaelectionoffice(dot)org

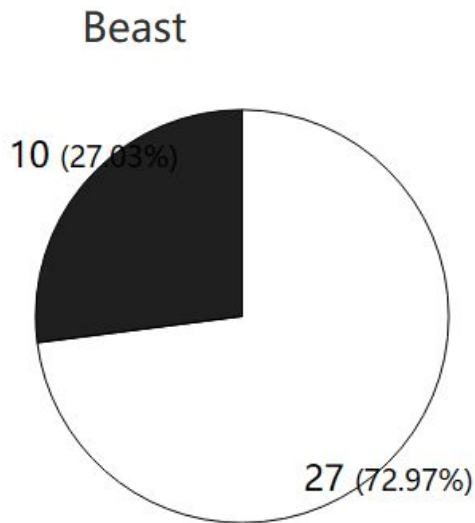*Although strange, we believe this to be coincidental.*

Voter Registration Site Grades
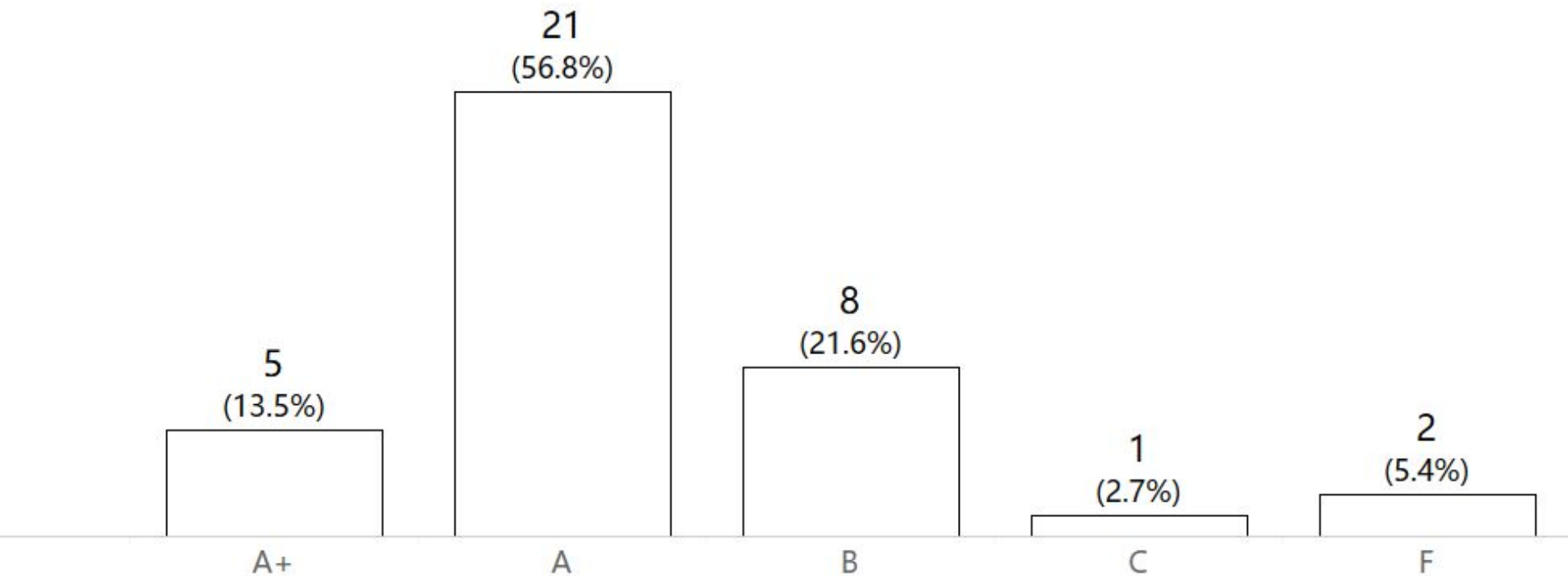
Voter Registration HSTS Use

9 (24.3%)
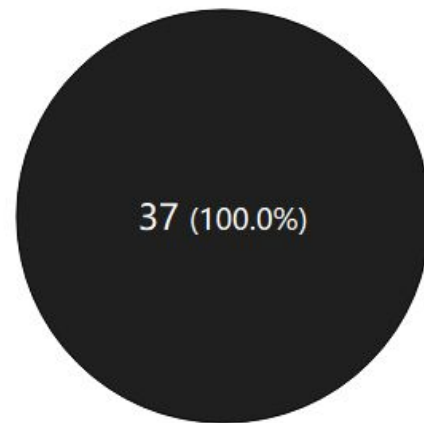
28 (75.7%)
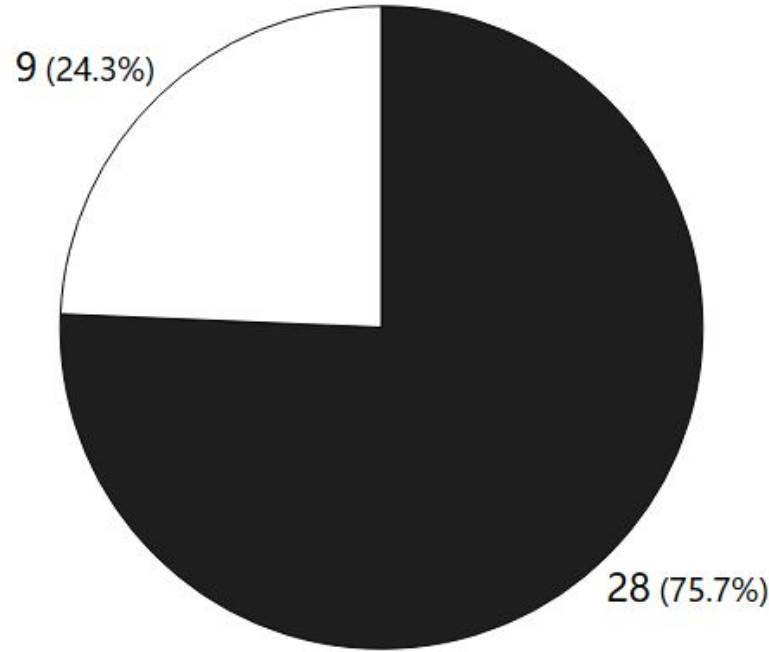
☐ Enabled

■ Disabled

Voter Registration Vulnerabilities

Beast — 10 (27.03%), 27 (72.97%)
Heartbleed — 37 (100.0%)
Poodle — 37 (100.0%)
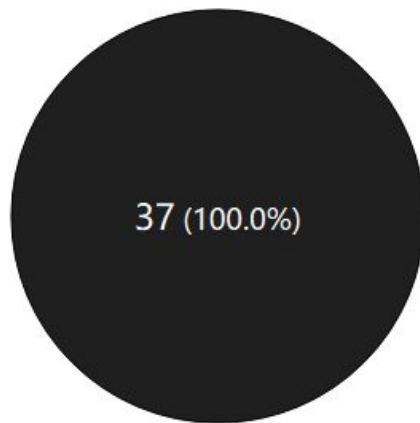
☐ Included
■ Excluded
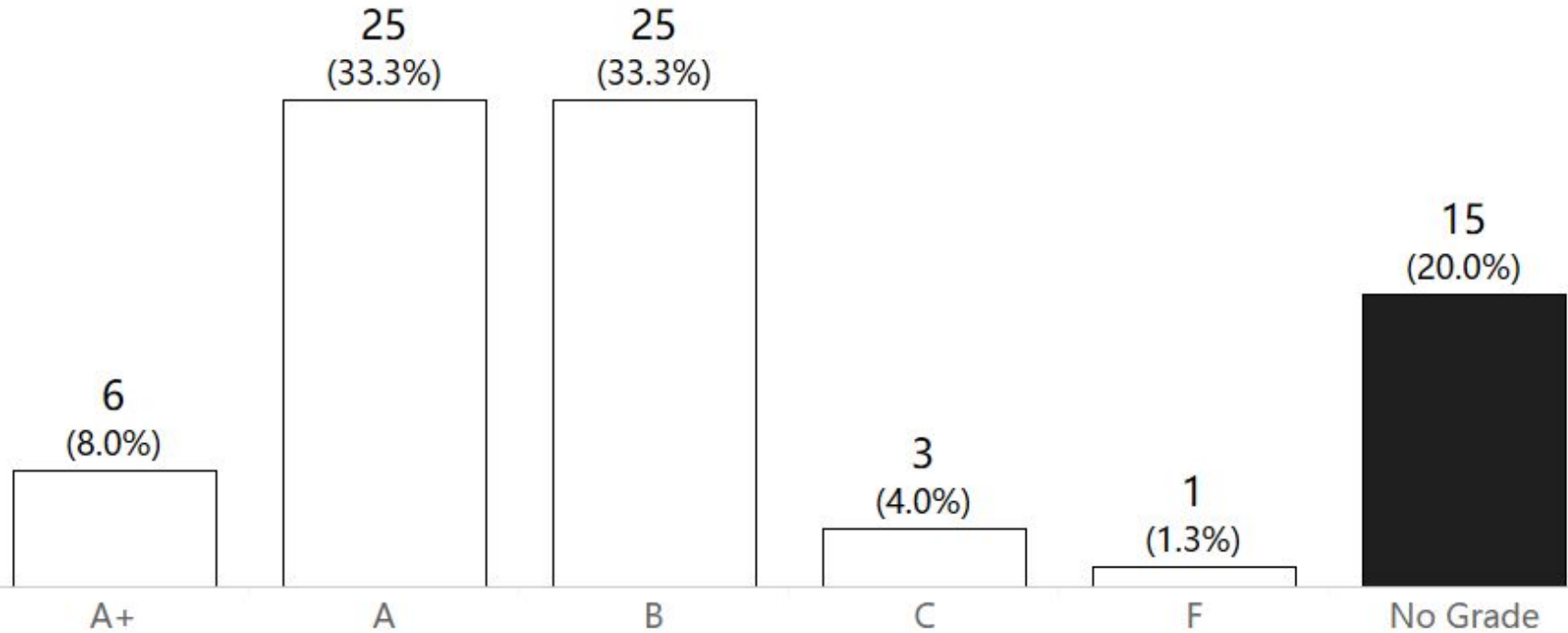
Election Site Grades

Election Site Vulnerabilities

Beast

37 (49.333%)
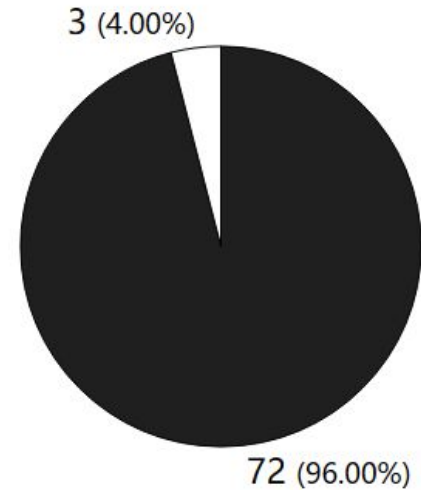38 (50.667%)

Heartbleed

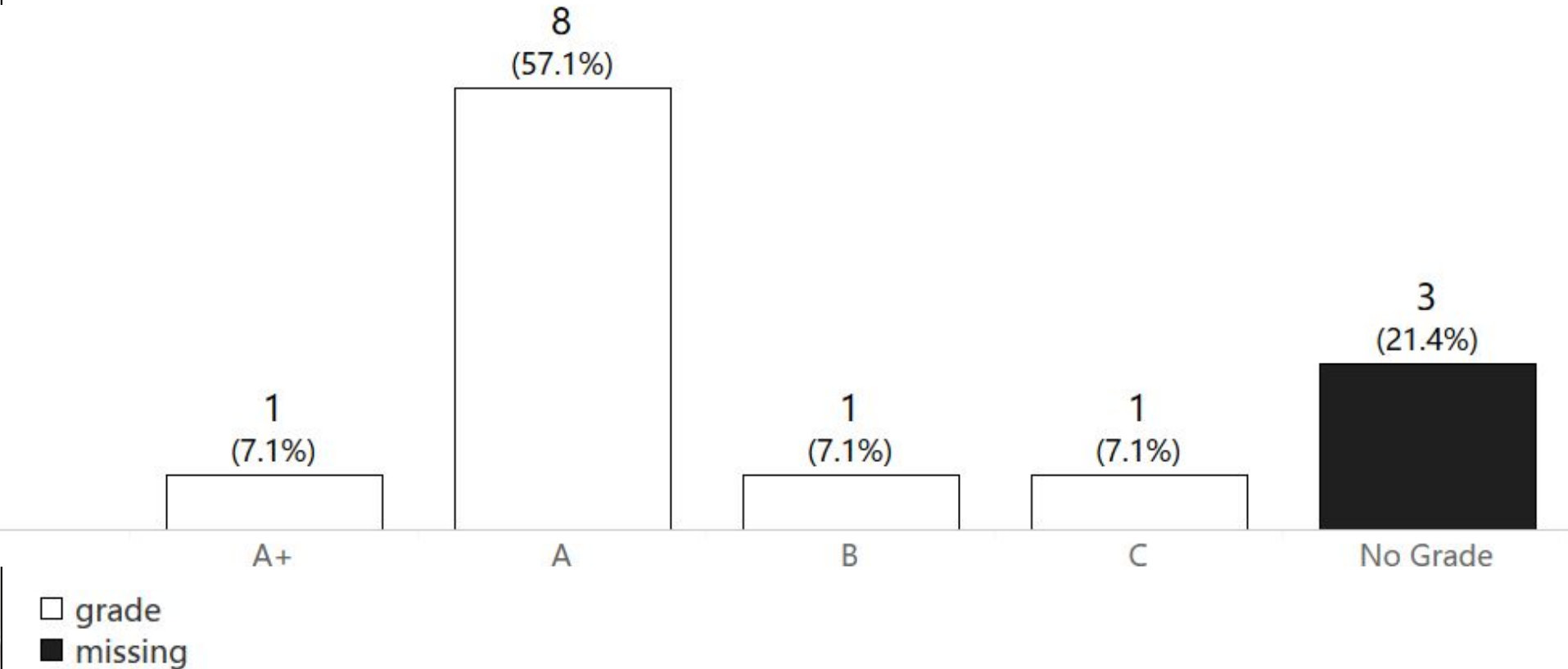75 (100.0%)

Poodle

3 (4.00%)
72 (96.00%)
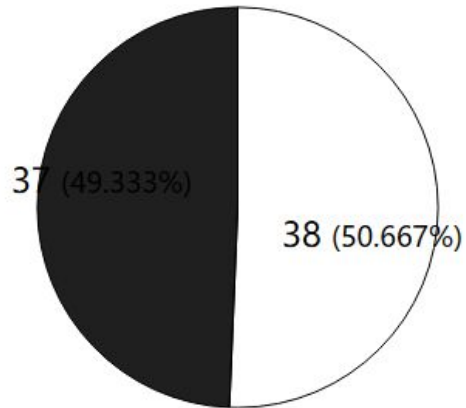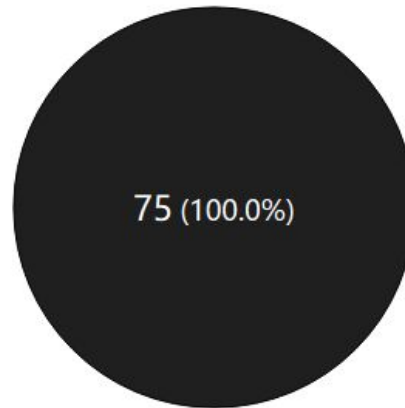
☐ Included

■ Excluded

Vendor Site Statistics

- Election vendors have websites too!
- There are different types of vendors
- The following stats include:
  - Voting system manufacturers
  - Voting system resellers
  - Voter registration vendors
  - Voting service providers

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Vendor TLS Grades

Bar chart showing vendor TLS grades. A+: 1 (7.1%), A: 8 (57.1%), B: 1 (7.1%), C: 1 (7.1%), No Grade: 3 (21.4%). Legend: grade, missing.

Recommendations to Campaigns

- Beware what you click
- Two factor authentication - even personal accounts
- Purchase common election domains, before someone else does - list in the appendix
- Please use a trusted digital certificate
- Use TLS 1.2+, strong cipher suites with HSTS
- Incumbents should consider EV certs
- Work with ISPs and FBI for domain takedowns
- Run security assessment tools on your own domain

Recommendations to States

- Two factor auth for all critical systems
- Purchase common domains (Register+state.com)
- Maintain a trusted certificate, consider EV cert
- Use TLS 1.2+, strong ciphers / algorithms
- Get on the HSTS pre-load list
- EI-ISAC / DHS can help with intel & remediation
- Run open source tools on your own domain
- Obtain outside assessments - vet providers
- Make it easy to contact you: security@yourstate.gov

The Aftermath

- 0 sites with SSL, 0 homographs, a lot of HTTP
- 2 VR systems with a grade of F, 1 with a grade of C
- Contacted campaigns and vendors using untrusted certificates and insecure protocols
- Contacted all, and worked with some, states affected by:
  - Likely typosquats / suspicious domains
  - Insecure, or no, TLS implementations
  - Untrusted certificates, known vulnerabilities
  - Malware actively on their site

50

Thoughts on US Security Posture

- The situation is improving, yet there's still common sense ways to improve security
- States are getting some monetary assistance from Congress
- The community is responding:
  - Center for Internet Security released an election focused cybersecurity handbook [16]
  - Center for Democracy and Technology (CDT) & Center for Technology and Civic Life (CTCL) are working to teach election officials cybersecurity basics [18]
  - Defending Digital Democracy effort focused on campaign security [15]

Conclusions

- We need to continue defending our elections
- More needs to be done, at larger scale - faster
- We assessed the bare minimum of web security
- It's difficult to advise officials on security problems
- Responsible disclosure is SO MUCH work
- If you don't vote, you're helping the attackers
- Much of this can be done by ordinary citizens
- Wanna help? You need to learn: Work the polls

For a copy of the slides and data, visit:

pleasego.vote

Josh: @thejoshpit
Ian: @heuristicmystic
https://github.com/thorshand/electionBuster

Appendix

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CDT

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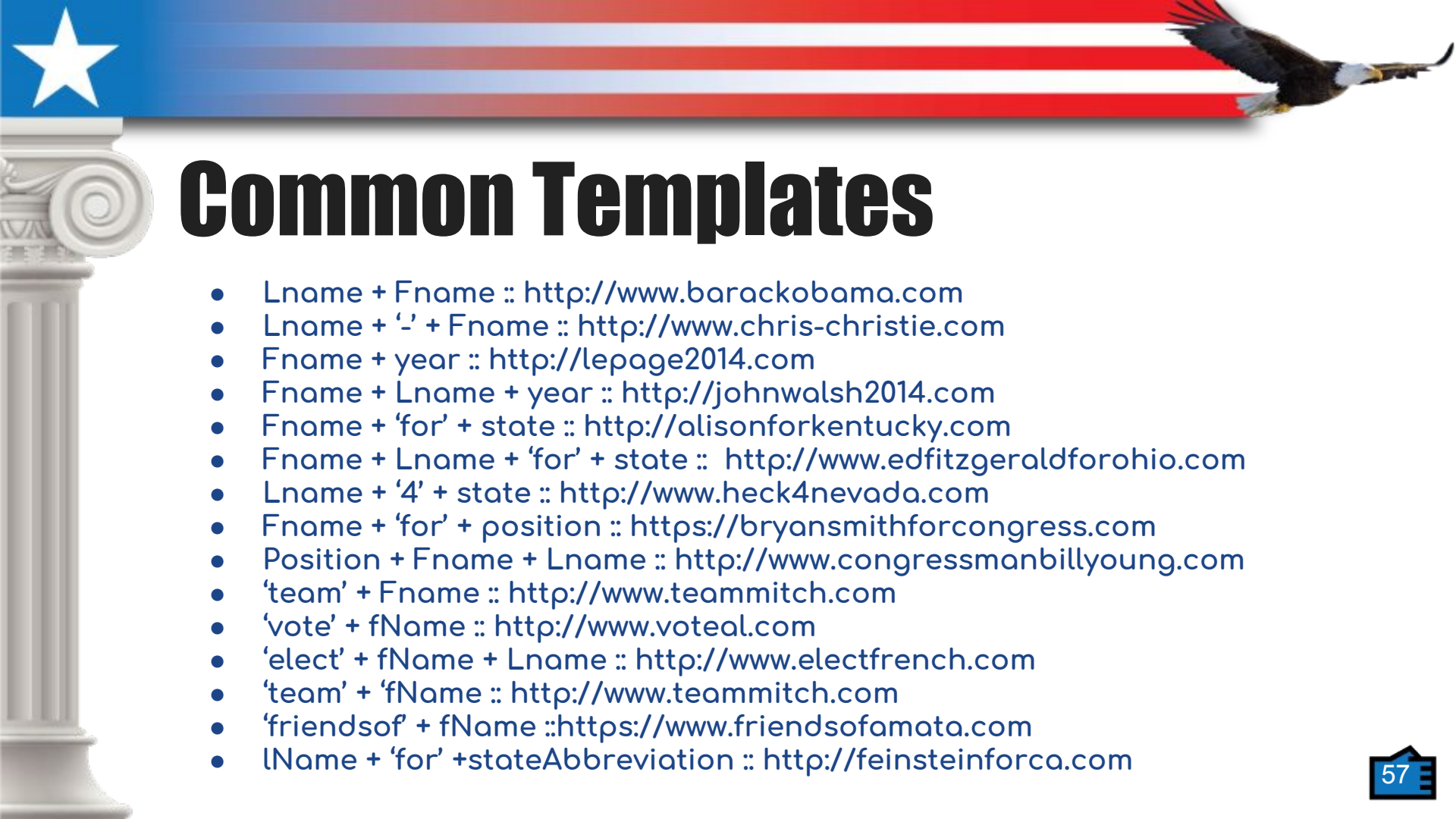
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Special Thanks To Tony Adams

- Cybersecurity expertise
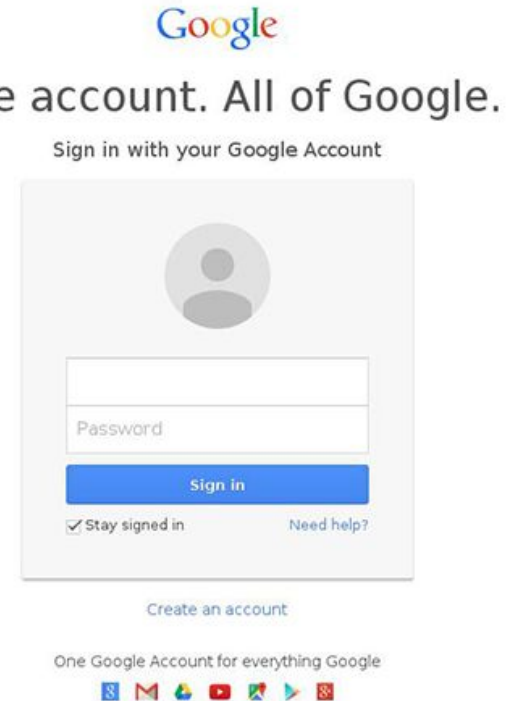- Elections expertise
- Sounding board for the entire talk

Common Templates

- Lname + Fname :: http://www.barackobama.com
- Lname + '-' + Fname :: http://www.chris-christie.com
- Fname + year :: http://lepage2014.com
- Fname + Lname + year :: http://johnwalsh2014.com
- Fname + 'for' + state :: http://alisonforkentucky.com
- Fname + Lname + 'for' + state :: http://www.edfitzgeraldforohio.com
- Lname + '4' + state :: http://www.heck4nevada.com
- Fname + 'for' + position :: https://bryansmithforcongress.com
- Position + Fname + Lname :: http://www.congressmanbillyoung.com
- 'team' + Fname :: http://www.teammitch.com
- 'vote' + fName :: http://www.voteal.com
- 'elect' + fName + Lname :: http://www.electfrench.com
- 'team' + 'fName :: http://www.teammitch.com
- 'friendsof' + fName ::https://www.friendsofamata.com
- lName + 'for' +stateAbbreviation :: http://feinsteinforca.com

CamPAINS

- Attacks started as early as 2015
- 100s of bit.ly and other links emailed to DNC / Clinton officials [2]
  - dnc.org, hillaryclinton.com
- Use of fake gmail splash pages
- Lead to access of emails, chats and GDrive
- Information distributed to other organizations (e.g., Wikileaks)

Google

One account. All of Google.

Sign in with your Google Account

Password

Sign in

☑ Stay signed in   Need help?

Create an account

One Google Account for everything Google

Phishing Vendors & Officials

- Phishing emails sent to US voting system service vendors and over 100 election officials [17]
- Masqueraded as a voting technology vendor and a fake cybersecurity company
- Emails contained a Word document with a malicious payload
- The addresses used contained gmail domains such as vrsystems(at)gmail(dot)com

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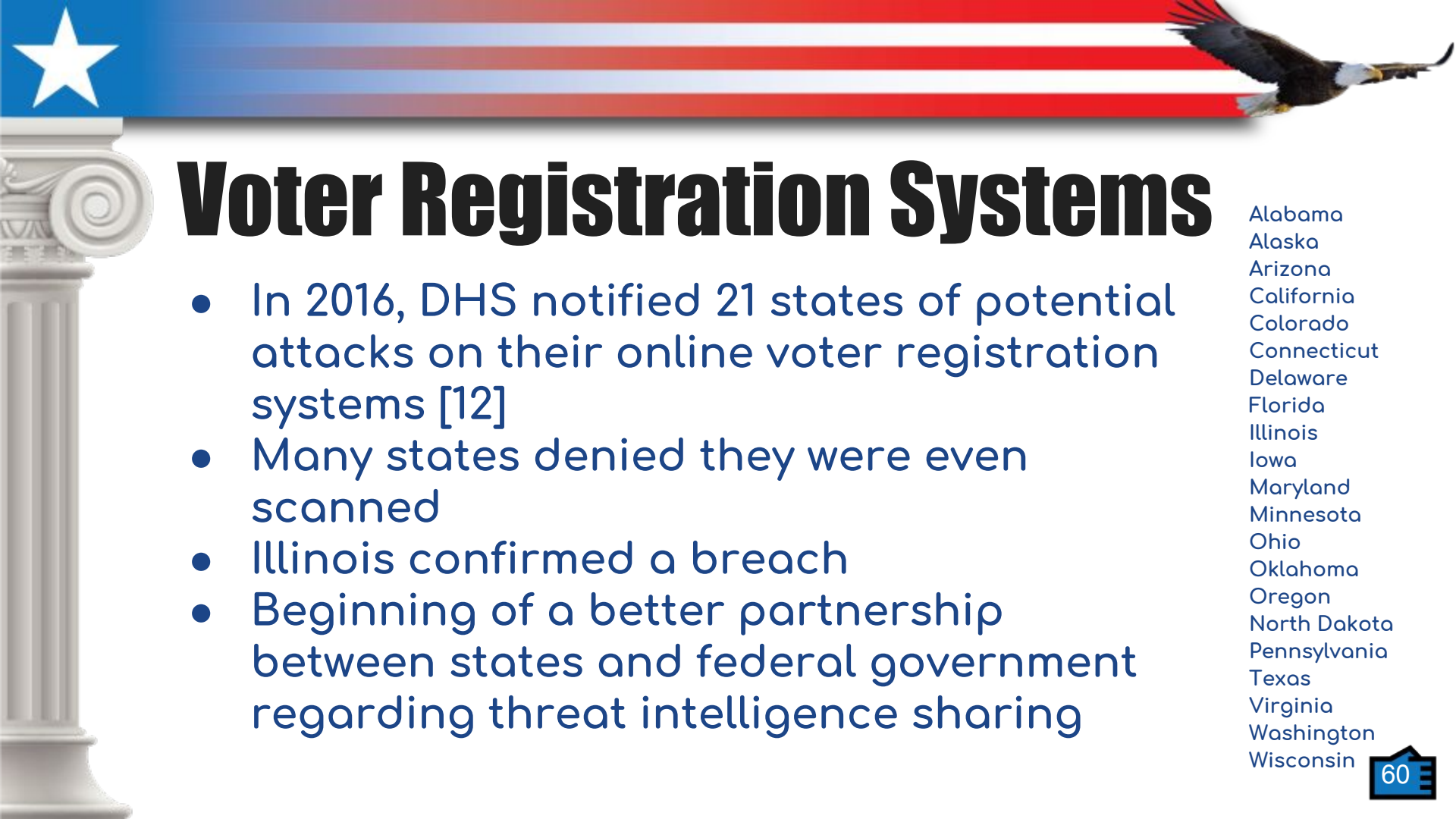
Voter Registration Systems

- In 2016, DHS notified 21 states of potential attacks on their online voter registration systems [12]
- Many states denied they were even scanned
- Illinois confirmed a breach
- Beginning of a better partnership between states and federal government regarding threat intelligence sharing

Alabama
Alaska
Arizona
California
Colorado
Connecticut
Delaware
Florida
Illinois
Iowa
Maryland
Minnesota
Ohio
Oklahoma
Oregon
North Dakota
Pennsylvania
Texas
Virginia
Washington
Wisconsin

Data Breaches

- Local: 650k voter records left on a CF card [8]
- State: Illinois VR system breached [12] as well as the Georgia KSU Center for Election Systems [20]
- Federal: Vendor information stored on US EAC certification portal [14]
- Vendor: ES&S AWS bucket leaks 1.8 million records [13]
- Campaign: Deep Root Analytics stored 1.1 TB of voter information on an unsecured server [9]
  - Over 200 million records

Homographic Attacks

ⱳww.donaldjtrump.com
www.donaldɟtrump.com
wᴡᴡ.donaldjtruмp.com
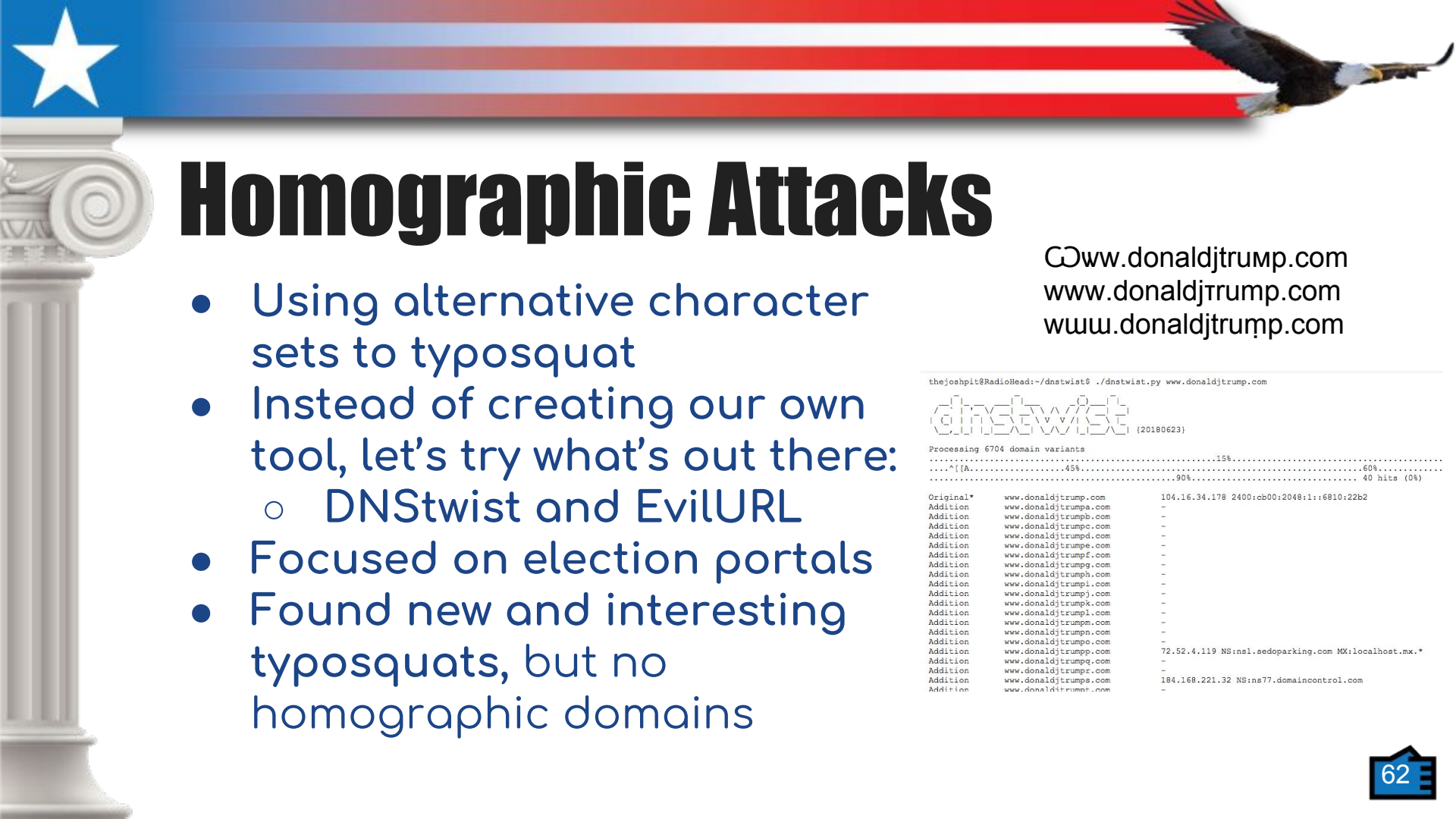
- Using alternative character sets to typosquat
- Instead of creating our own tool, let's try what's out there:
    - DNStwist and EvilURL
- Focused on election portals
- Found new and interesting typosquats, but no homographic domains

```
thejoshpit@RadioHead:~/dnstwist$ ./dnstwist.py www.donaldjtrump.com
    _           _            _     _
 __| |_ __  ___| |___      _(_)___| |_
/ _` | '_ \/ __| __\ \ /\ / / / __| __|      {20180623}

Processing 6704 domain variants
......................................................15%...............
....^[[A...................45%.....................................60%............
......................................................90%................... 40 hits (0%)

Original*     www.donaldjtrump.com      104.16.34.178 2400:cb00:2048:1::6810:22b2
Addition      www.donaldjtrumpa.com     -
Addition      www.donaldjtrumpb.com     -
Addition      www.donaldjtrumpc.com     -
Addition      www.donaldjtrumpd.com     -
Addition      www.donaldjtrumpe.com     -
Addition      www.donaldjtrumpf.com     -
Addition      www.donaldjtrumpg.com     -
Addition      www.donaldjtrumph.com     -
Addition      www.donaldjtrumpi.com     -
Addition      www.donaldjtrumpj.com     -
Addition      www.donaldjtrumpk.com     -
Addition      www.donaldjtrumpl.com     -
Addition      www.donaldjtrumpm.com     -
Addition      www.donaldjtrumpn.com     -
Addition      www.donaldjtrumpo.com     -
Addition      www.donaldjtrumpp.com     72.52.4.119 NS:ns1.sedoparking.com MX:localhost.mx.*
Addition      www.donaldjtrumpq.com     -
Addition      www.donaldjtrumpr.com     -
Addition      www.donaldjtrumps.com     184.168.221.32 NS:ns77.domaincontrol.com
Addition      www.donaldjtrumpt.com     -
```

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Ron Barber
CONGRESS

Ron Barber is running for Congress because he is more interested in keeping his job than making sure there are jobs for you and your family.

Barber will say just about anything to get elected – even if that means just going along with what Washington special interests tell him to do.

How out-of-touch is Ron Barber?

- Barber voted against a balanced budget that bans taxpayer-funded first class travel for Members of Congress (Roll Call #88, 3/20/13)

- Barber voted against constructing the Keystone Pipeline (Roll Call #179, 3/22/13)

- Barber voted to allow student loan interest rates to increase (Roll Call#183, 5/23/13)

- Barber even voted against work requirements for food stamps — requirements passed under Democratic President Clinton. (Roll Call #476, 9/19/2013)

DONATE

Fed up with Ron Barber? Sign up Today

www.ronbarber2014.com

Predicting Election Outcomes

- Discovered on accident
- The number of hits ElectionBuster returns for a given candidate is often *correlated* with who wins the race
- ElectionBuster hits are sometimes equal with candidates, which means a toss up
- Correlation != causation
- Likely even talking about this will change it
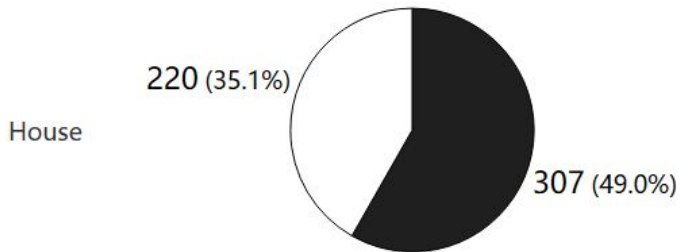- Let's cherry pick some examples!

Illinois Election Results

Governor

- Pritzker: 45.2%
- Biss: 26.6%
- Kennedy: 24.3%

- Raunder: 51.4%
- Ives: 48.6%

4th District

- Garcia: 66.4%
- Flores: 21.6%
- Gonzalez: 12%

3rd District

- Lipinski: 51.2%
- Newman: 48.8%
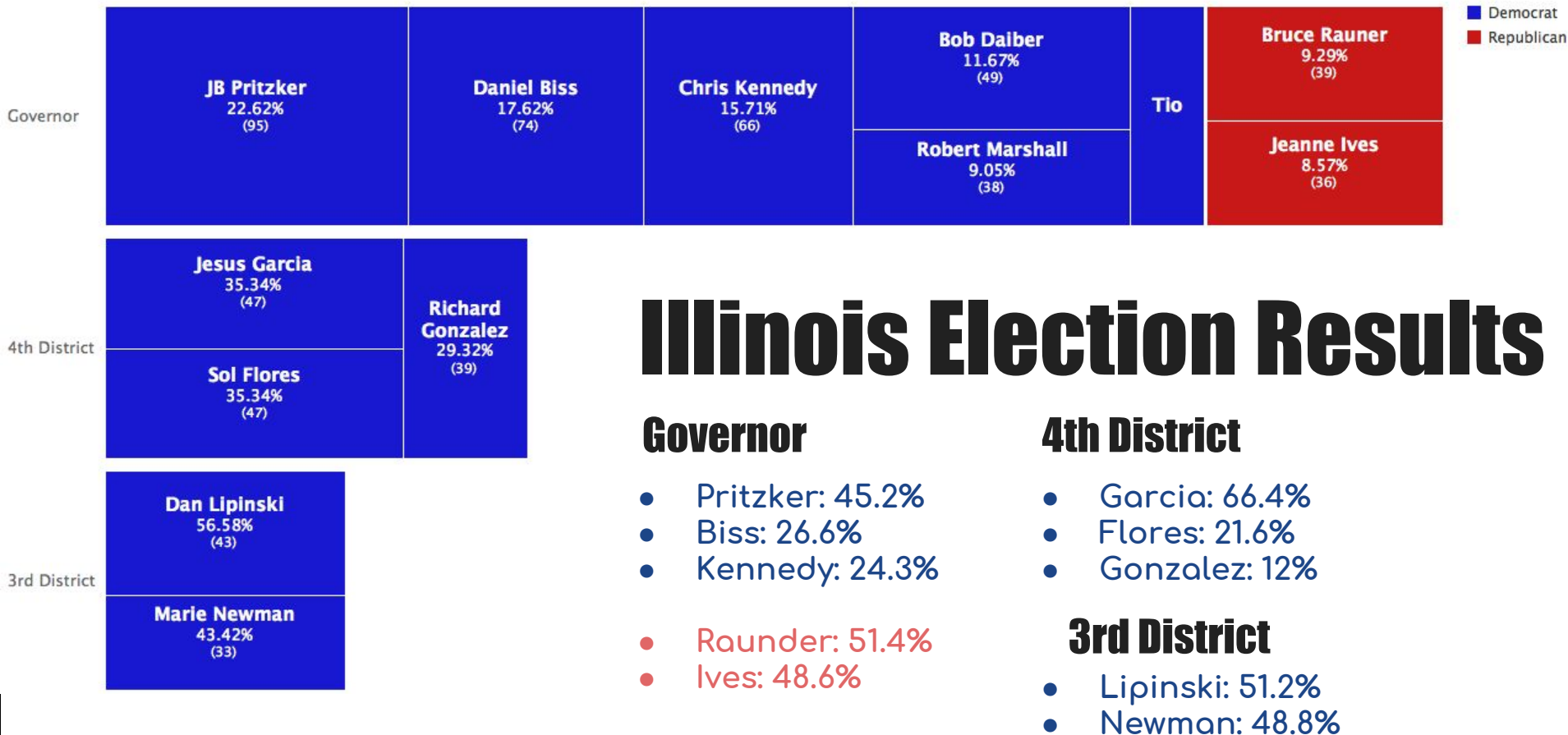
[1] Illinois Primary Election Results, New York Times, 2018.

Hits Per Candidate over 2016

Candidate
- Bernie Sanders
- Donald Trump
- Gary Johnson
- Hillary Clinton
- Jeb Bush
- Jill Stein
- Ted Cruz
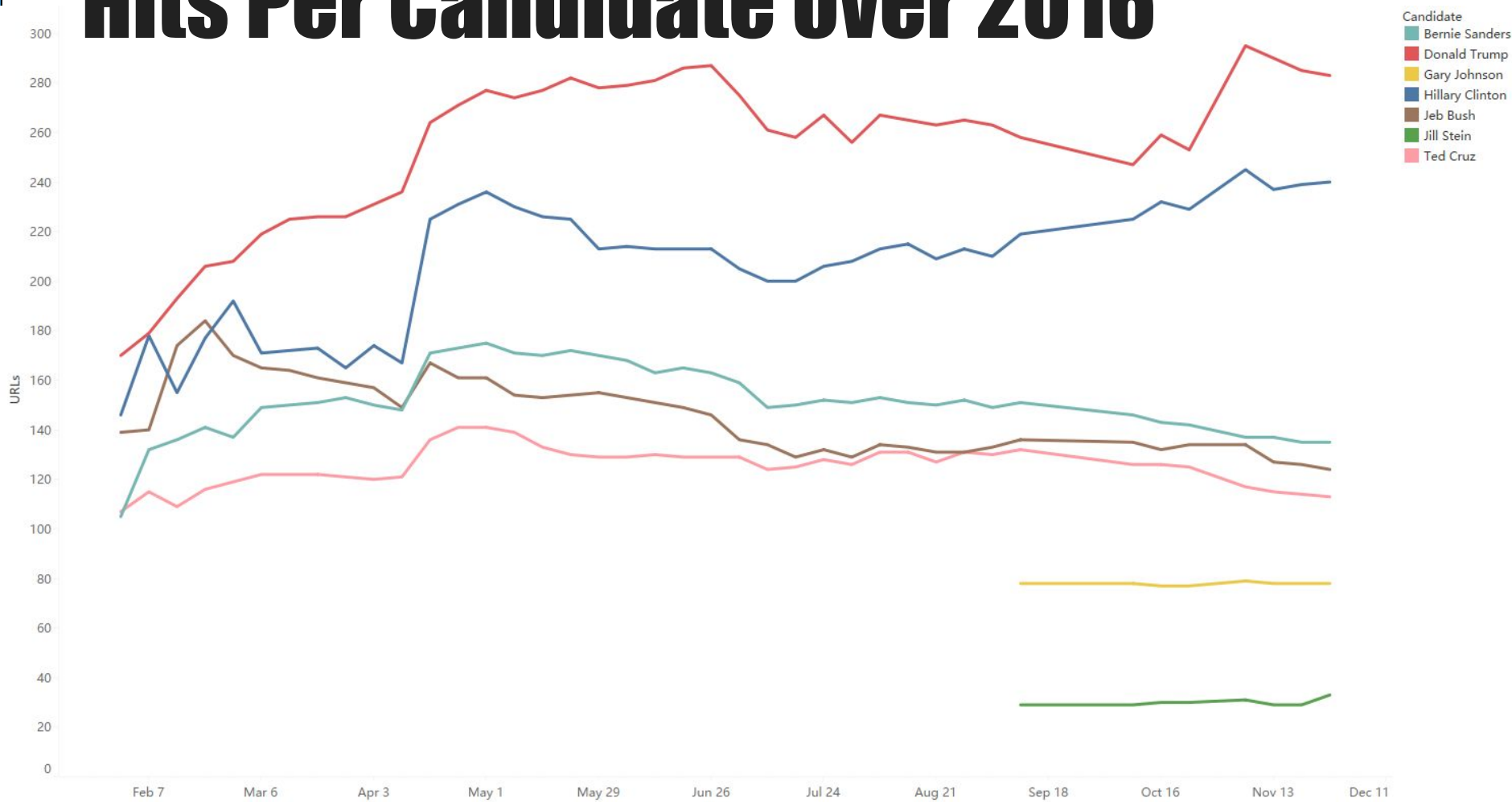
Congress on Lets Encrypt & HSTS

Letsencrypt

HSTS

House

220 (35.1%)

307 (49.0%)

69 (11.0%)

458 (73.2%)

Senate

50 (8.0%)

49 (7.8%)

8 (1.3%)

91 (14.5%)
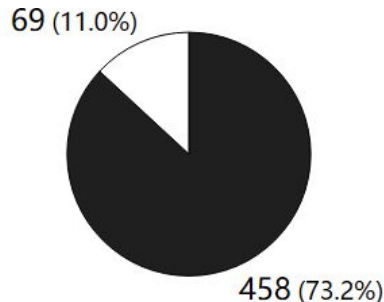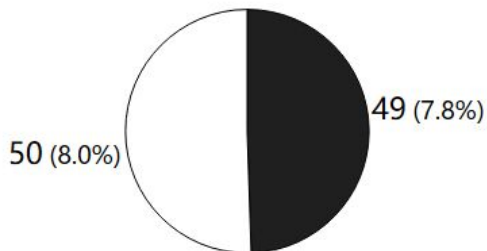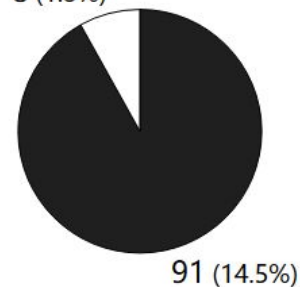
□ Let's Encrypt

■ Other Authorities

□ Enabled

■ Disabled

Election Site TLS Implementations

Election Site HSTS Use

11 (14.7%)

64 (85.3%)
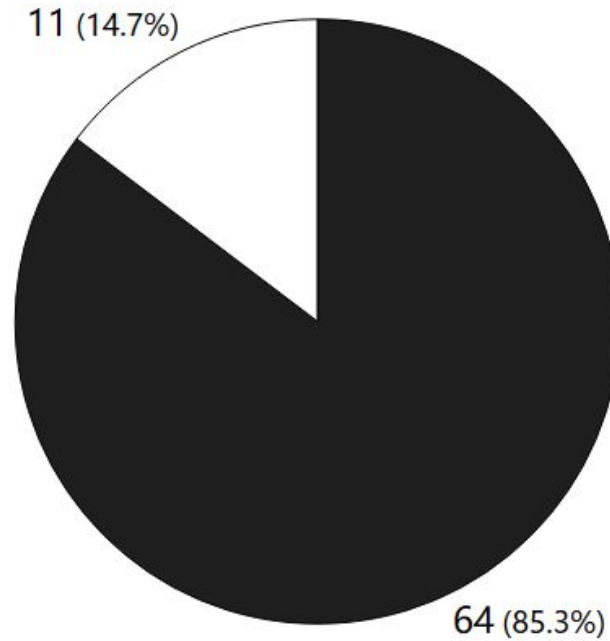
☐ Enabled

■ Disabled

Vendor TLS Implementations

Vendor HSTS Use

5 (35.7%)

9 (64.3%)
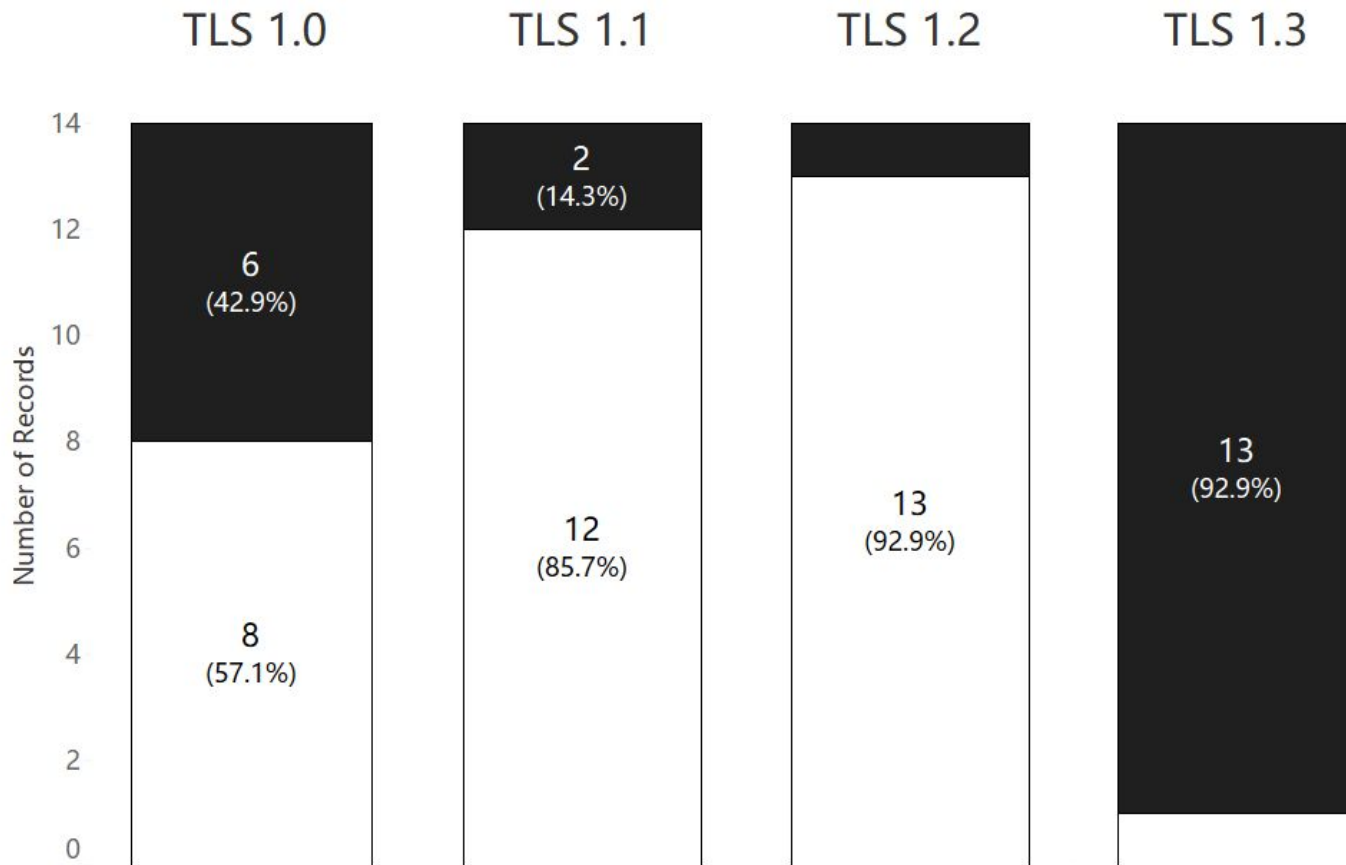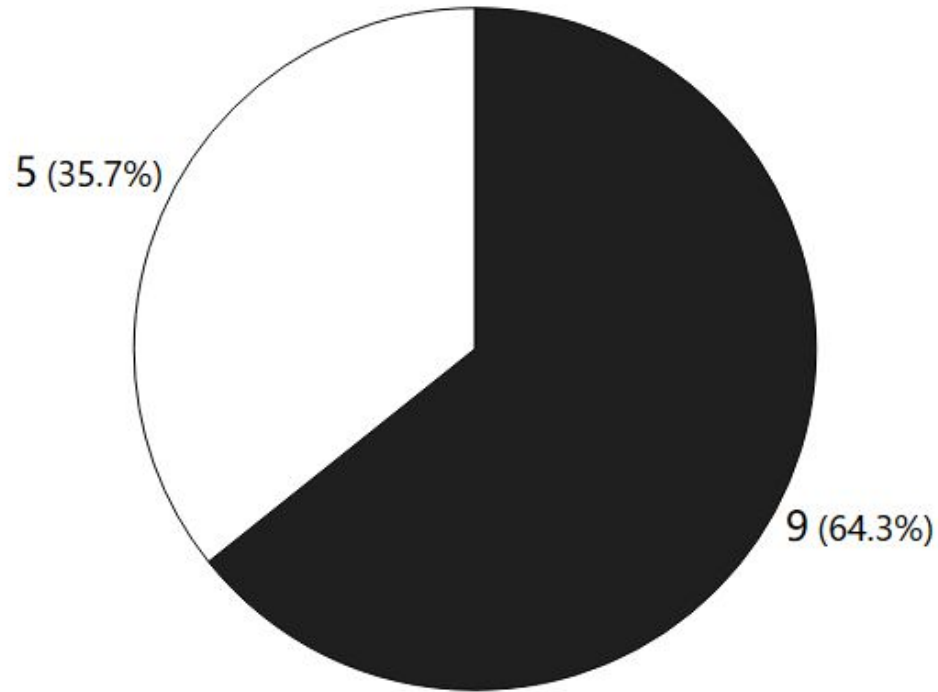
☐ Enabled

■ Disabled

Recommendations to Companies

- Advise your clients on cybersecurity issues
- Purchase common domains
- Maintain a trusted certificate, consider extended validation (EV) certificate
- Use TLS 1.2+, strong cipher suites
- Use HSTS, get on the pre-load list
- Request assistance from EI-ISAC, DHS, FBI and other organizations