Kennesaw State University

Center for Election Systems

Rapidly Evolving Election Technologies
Incentives and Barriers to Innovation

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New York, NY

Election Technology Domains

https://www.theguardian.com/technology/2017/jun/05/russia-us-election-hack-voting-system-nsa-report

Russian Hack on voting

US elections 2016

Russian agents hacked US voting system manufacturer before US election – report

- Federal contractor arrested and charged with removing classified material
- NSA report: cyber-attack on software supplier and phishing emails hit officials

The NSA is convinced that the Russian General Staff Main Intelligence Directorate was responsible for interfering in the 2016 presidential election. Photograph: Larry W. Smith/EPA

20,091

David Smith in Washington and Jon Swaine in New York

Monday 5 June 2017 18.47 EDT

Russian intelligence agents hacked a US voting systems manufacturer in the weeks leading up to last year's presidential election, according to the Intercept,

Election Technology Domains

Voting System Manufacturers in the U.S.

- Clear Ballot
- Dominion
- ES&S
- EveryOne Counts
- Hart Intercivic
- MicroVote
- Unisyn

Election Technology Domains

Quick definitions…

Voting systems

- The hardware, software & procedures that accomplish:
  - Ballot design
  - Vote capture and tabulation
  - Reports
  - Audits, related to the above functions
- Conform to standards and are certified by federal and jurisdictional authorities
- Conform to statute and rule

Election Technology Domains

Election systems are systems that collect, process and store data related to elections and election administration. These systems are "owned" and managed by the election jurisdiction.

Election systems include:

- The Voting System
- The Voter Registration System
- Election Nite Reporting system
- Voter Information system (e.g. my voter page, VIP)
- Electronic Pollbooks
- Ballot On Demand systems
- Auditing systems

Election Technology Domains

Campaign systems are used by campaigns, parties, candidates, and advocacy groups, to manage the information related to a campaign, candidate, or cause. These systems are "owned" and managed by the organization they serve. These systems include:

- Email and SMS/MMS systems
- Information websites
- Fund raising systems
- Campaign disclosure and filings
- Customer Relationship Management (CRM)
- Social Media
- Analytics
- 3rd Party Voter Registration Support Systems

Election Technology Domains

Some factors affecting innovation in the election space:

- Push vs. Pull demand for innovation
- Standards development and application
- Statutory requirements that permit, prevent or pervert innovation
- Market size and behaviors
- Transition from hardware to services in market

Expectations for innovation in the election space must be adjusted to account for these factors and their impact on the Six primary election domains: Voters, Campaigns, Service Providers, State Election Offices, System Vendors, and Local Election Offices.

Election Technology Domains

Voter

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Election Technology Domains

Voter

- 96% of those ages 18-29 are internet users
- 84% use social networking sites
- 97% have cell phones
- Over half of ages 18-29 have smartphones and 23% own tablet computers like iPads.*
- Nearly nine in ten (89%) adults over 50 own some type of mobile device and nearly three quarters of adults age 50-59 (73%) own a smartphone**

*Pew Internet Project 2012

** AARP

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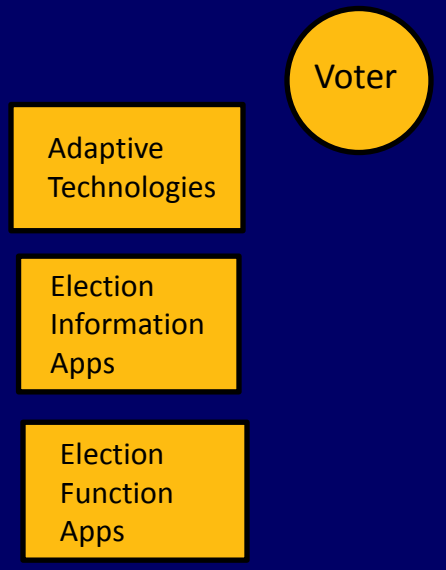
Election Technology Domains

The **Voter** Technology Domain has, and will continue to show strong demand for innovation

- Strong push and pull demand in this space
- External/philanthropic funding
- Few applicable standards
  - Web Content Accessibility Guidelines (WCAG) are guidelines
  - Privacy rather than security
- Large markets and the markets values innovation – frequently updates capabilities
- May use specialized hardware and software or may be hardware independent

Election Technology Domains

- High degree of innovation
- Diverse
- Rapid development



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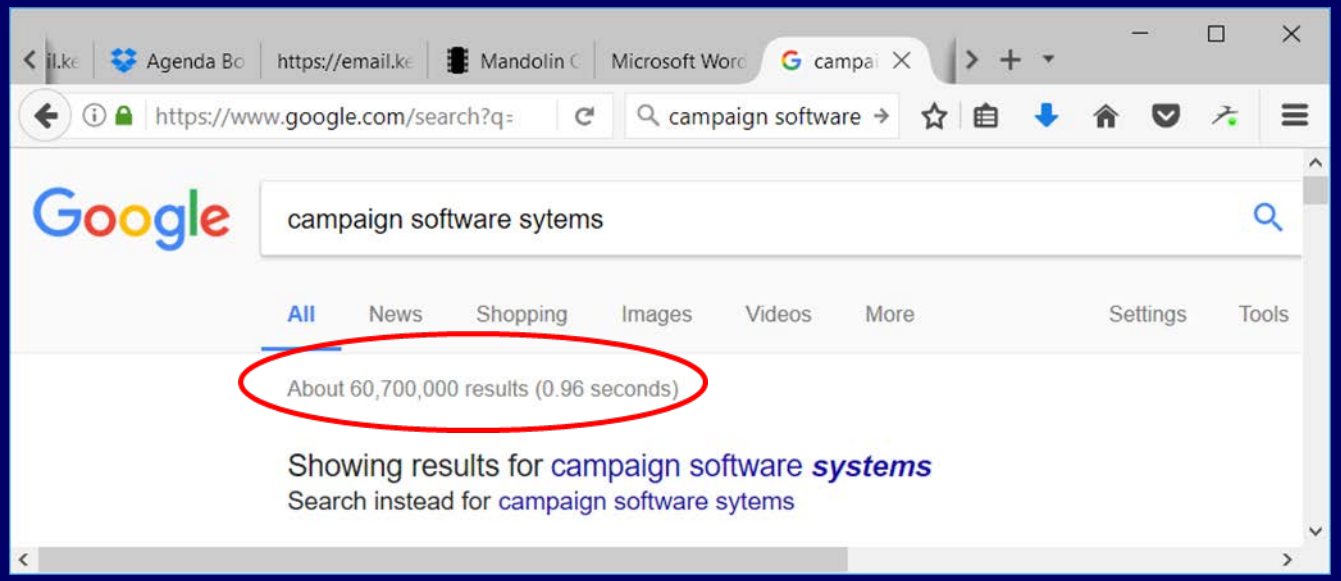
Election Technology Domains

Election Technology Domains

3rd Party systems, including campaign systems, are in high demand and are largely unregulated in their design and use.



Campaigns

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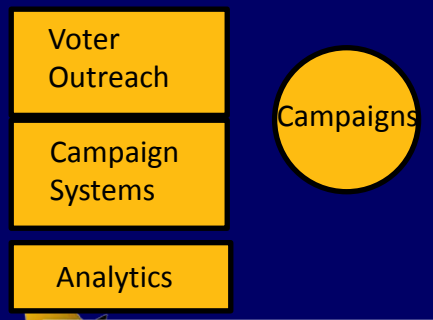
Election Technology Domains

- Campaign systems have high push-pull demand
- Innovations provide competitive advantage
- No applicable standards
- Significant market size and ability to self-pay
- Hardware independent – primarily software systems
- Have significant dependencies and reliance on public election systems



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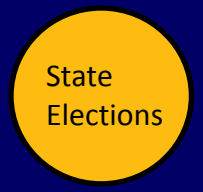
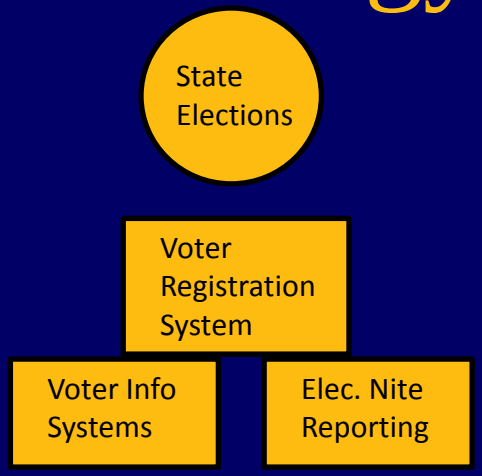
Election Technology Domains



- State-level election systems are large scale, but centrally controlled
- VR systems have mandated functions, but not mandated methods – greater degrees of freedom and innovation
- Unlimited potential for scope creep – the Super VR System
- High pull demand – VIP systems branded to individuals
- High push demand – AVR, OVR
- Hardware independent – greater ease of extension of functionality at lower cost
- Few standards for most systems in this space - Accessibility

Election Technology Domains



- Future growth in redistricting, campaign finance reporting, UOCAVA ballot distribution, precinct check-in, vote center expansion, AVR, OVR, etc.
- High potential for innovation

Election Technology Domains

- The voting system industry has always been a service industry that needed to provide hardware to its customers – in the future, hardware may be remedial
- The growth of election service providers mirrors other information technology industries
- Service provides a needed, persistent revenue streams for firms in the election space
- Contracting for services reduces (?) risk for election officials

Campaigns

Service Providers

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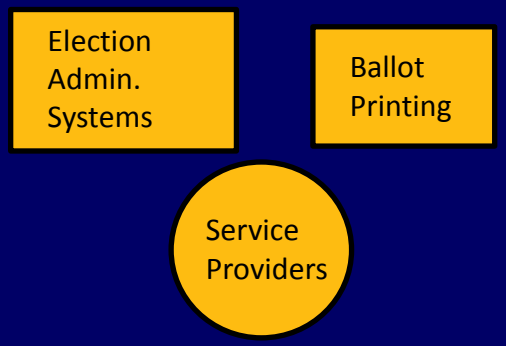
Election Technology Domains

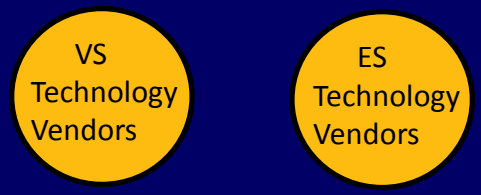
- Demand is primary push
- Innovation provides competitive advantage
- Many election services firms too small to impact overall market trends
- Ballot printing industry is small, and need for innovation is narrow, focusing on cost reduction, error reduction, speed of service, etc., more than product



Campaigns

Election Technology Domains

- Small number of voting system vendors; doubled in the past 10 years – with new vendors signed up.
- Innovation constrained by standards, statutes and rules
- Burden of legacy systems
- Innovation may be punished by market place
- Episodic sales make pull demand hard to estimate; historically relied on push
- Standards require conformance
- Innovation “around the edges” of the voting system

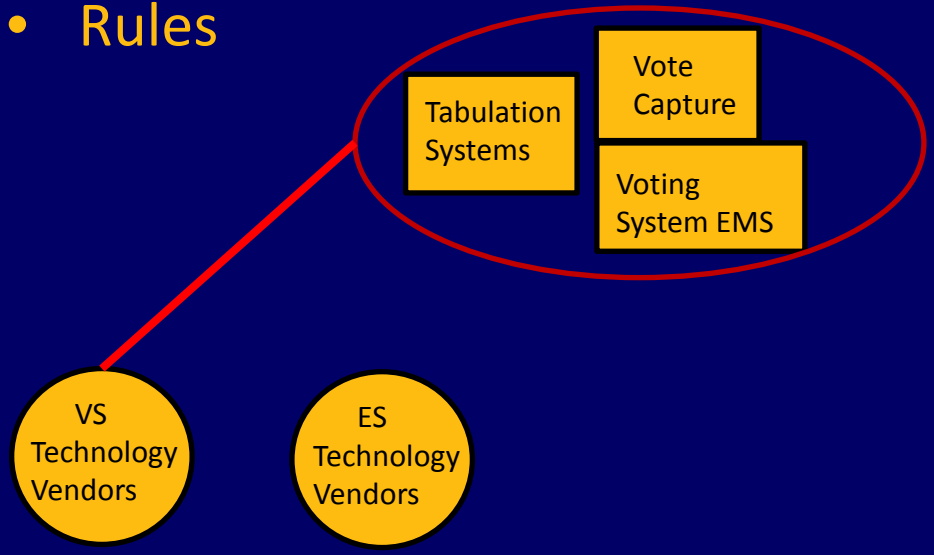


Election Technology Domains

Voting systems are the most regulated system in elections.

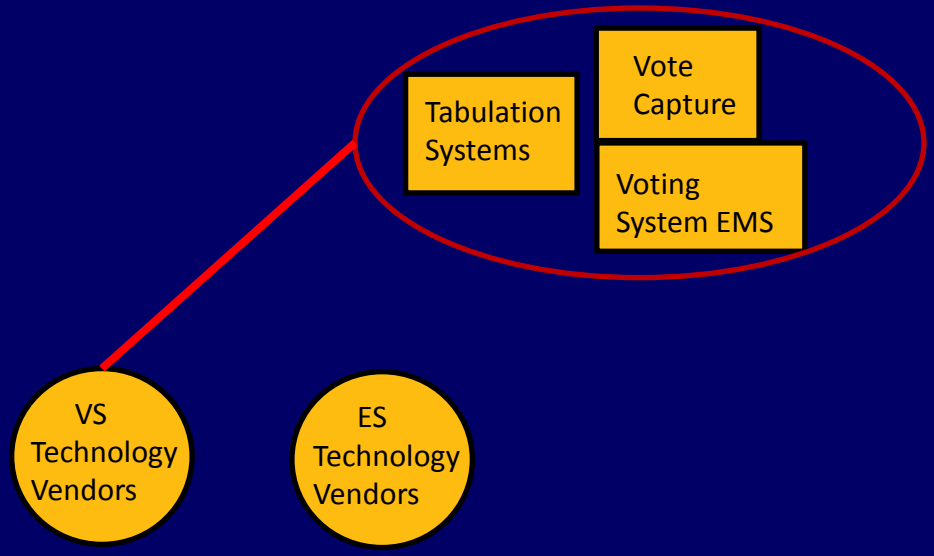
Regulated by

- Standards (Since VSS 1990 – VVSG 1.1)
- State constitutions
- State statutes
- Rules



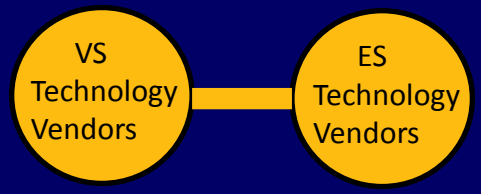
Election Technology Domains

- Innovation has focused on services, methods of purchase, methods of development, integration with other systems
- Core functions have not changed – cannot change
- Dependencies and legacy systems will preserve the “sea anchor” effect on voting systems

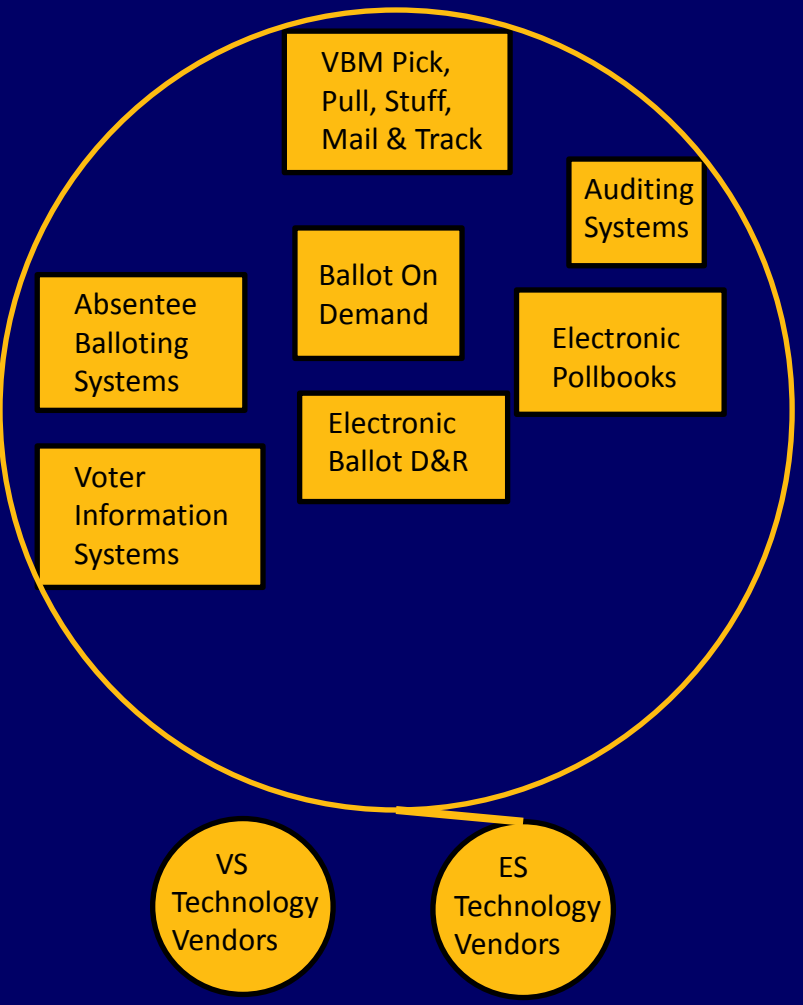


Election Technology Domains

- Election Systems much less constrained by statute, rule or standard
- New players enter the space frequently, mostly small
- Try not to “touch” the voting system
- Greater potential for innovation in election systems
- Voting system vendors expanding product lines into this less regulated space



Election Technology Domains



Campaigns

Election Technology Domains

- The final technology domain is that of the County or local election official
- This is the frequent nexus of the benefits, costs and risks of innovation in the election space
- LEOs are not monolithic in their needs or preferences
- But at they end of the day, they obey the law, follow the rules, and execute within financial and human resources.
- Balancing reliability and predictability with the benefits, risks and costs of innovation is necessary – tend to avoid the leading edge of technological innovation – "the bleeding edge"

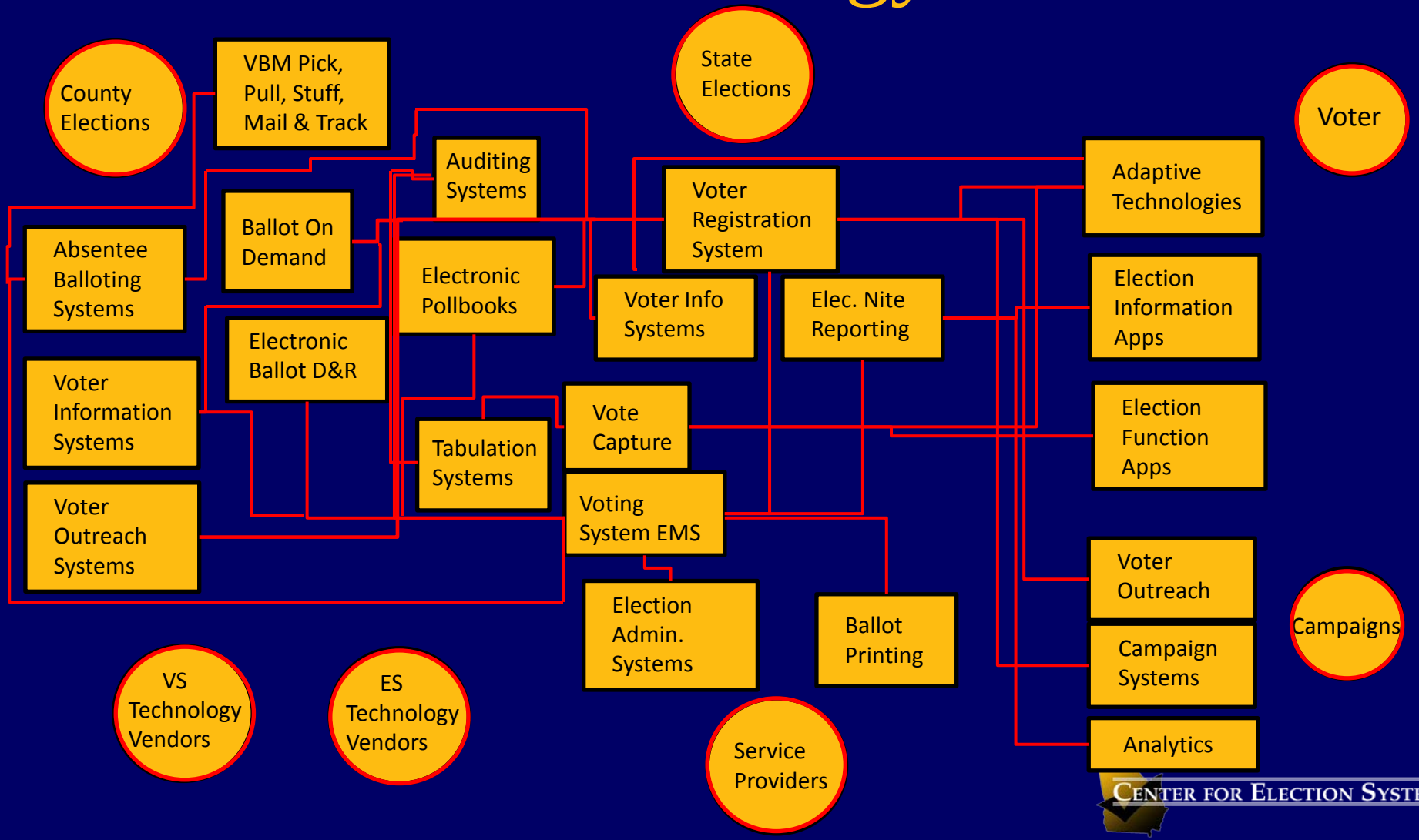
Innovation

- Innovation must produce tangible benefits for LEOs. It must
  - Drive down total cost of ownership of systems
  - Increase reliability and maintainability
  - Permit current and future compliance with statute and rule – i.e., be adaptable
  - Produce products with needed, valued functionality that are secure, auditable, and accessible
  - Produce products that integrate with legacy systems and future systems

Innovation

- Long service life – indefinite life span
- Multi-modal
- Non-invasive security diagnostics
- Must be compatible with dependent systems (e.g. VR systems, BOD systems, etc.
- Implementable within resource constraints including capabilities of election workers

Election Technology Domains



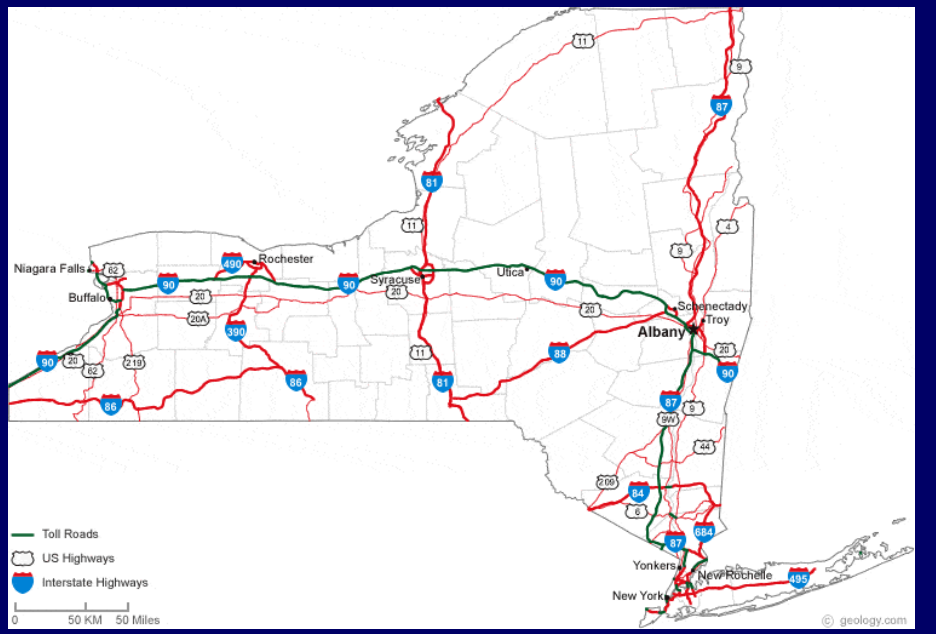
Ongoing Challenges

- Innovation for innovation sake has limited appeal in the voting system space. Innovation must produce tangible improvements in functions and features that are both legally required and justified and of operational value to the jurisdiction

Ongoing Challenges

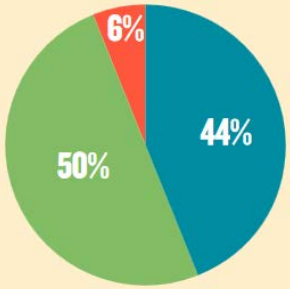
- Progress
  - Improved Accessibility inferred in VVSG 1.1 and 2.0
  - Potential for improved Security in VVSG 2.0
  - COTS – with great power, comes great responsibility
  - Improved Interoperability and CDF
  - Best practices – LA, Travis, and Denver Counties
  - New vendors in the voting system space
  - Increased public and political awareness – how will this be translated into policy and action?

Bridges in NY



FOR NEW YORK'S INFRASTRUCTURE

17,456
NEW YORK STATE BRIDGES TOTAL



OWNERSHIP
- NYSDOT
- Municipalities
- State & local authorities, commissions & railroads

2,012
STRUCTURALLY DEFICIENT

New York has more structurally deficient bridges than the national average, and almost 22% of our total bridge deck area (driving surface) is in need of repair. Structurally deficient bridges are safe for travel, though they often need maintenance or improvements to correct obsolete features.

* American Society of Civil Engineers, 2015.

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