OFFICIAL BALLOT

Interpreting Babel: Classifying Electronic Voting Systems

5th International Conference on Electronic Voting

Bregenz, Austria - July 13, 2012

Presented By:

Vote for 2

- ⬭ Joshua Franklin
- ⬭ Jessica Myers

Continue voting next side ➔

Precinct 0001 Ward 0002 Split 0003 Poll Worker Initials _____ _____

Introduction

- ✓ Jessica Myers
- ✓ Joshua Franklin
- ✓ Employed at U.S. Election Assistance Commission

"The views expressed here are solely those of the authors and do not represent the official policy of the U.S. Election Assistance Commission."

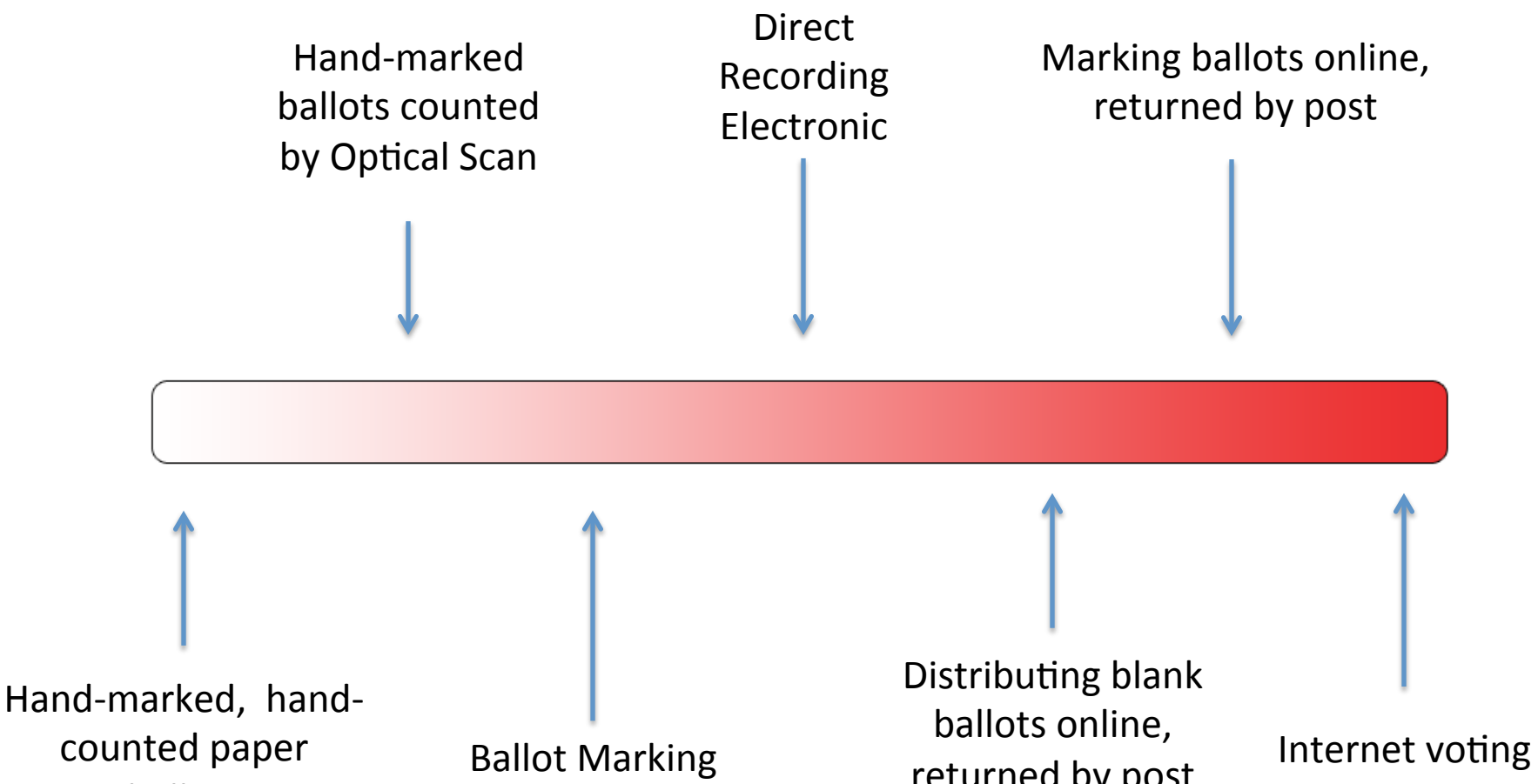
Continue voting next side

Overview

- ✓ Spectrum of Electronic Voting
- ✓ Evoting in the States
- ✓ Previous Work
- ✓ What's In, What's Out?
- ✓ The Classification Structure
- ✓ Applying the Structure to Existing Systems
- ✓ Hybrids
- ✓ Other Uses
- ✓ Next Steps
- ✓ Conclusions

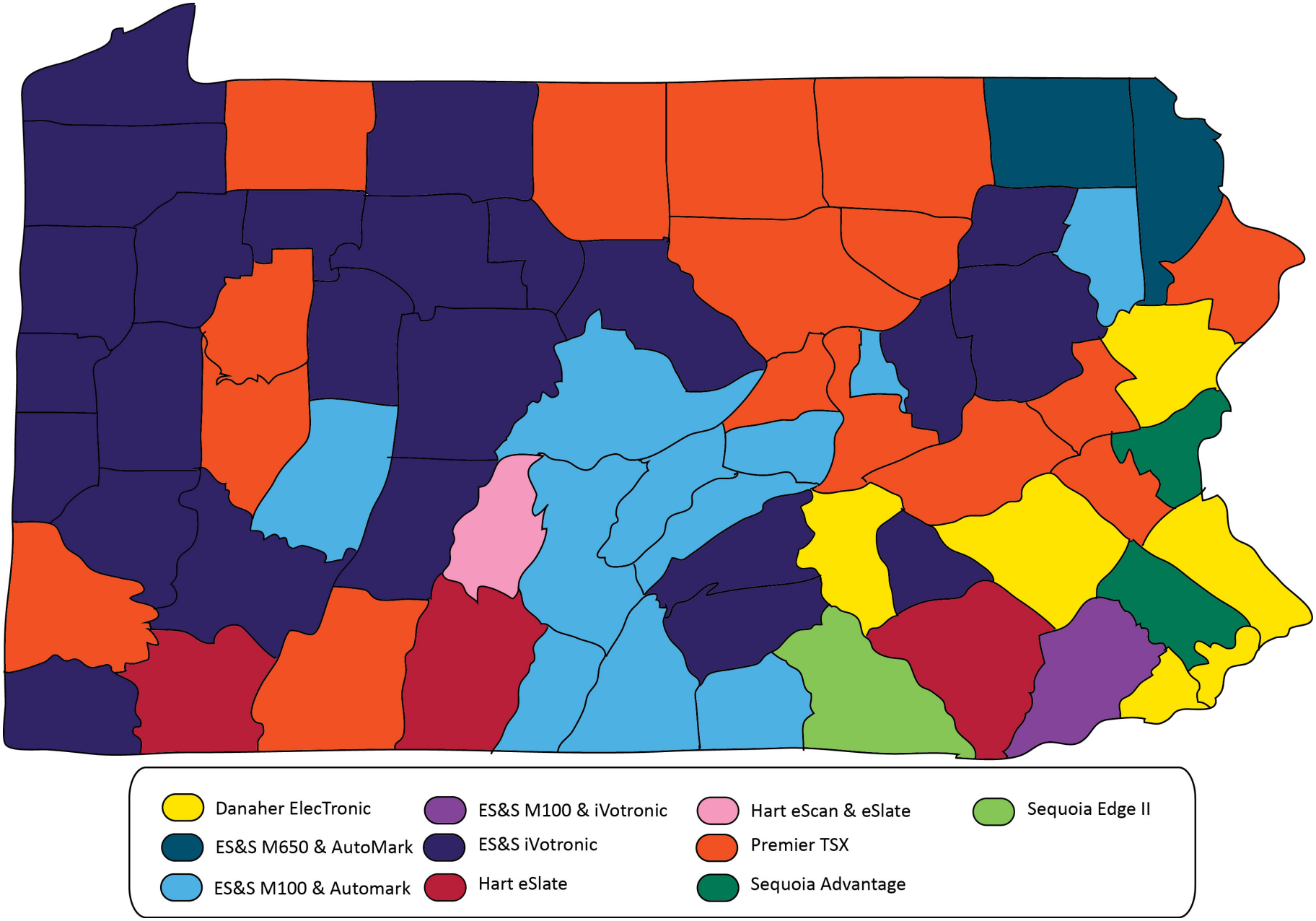
Continue voting next side

The Spectrum of Electronic Voting

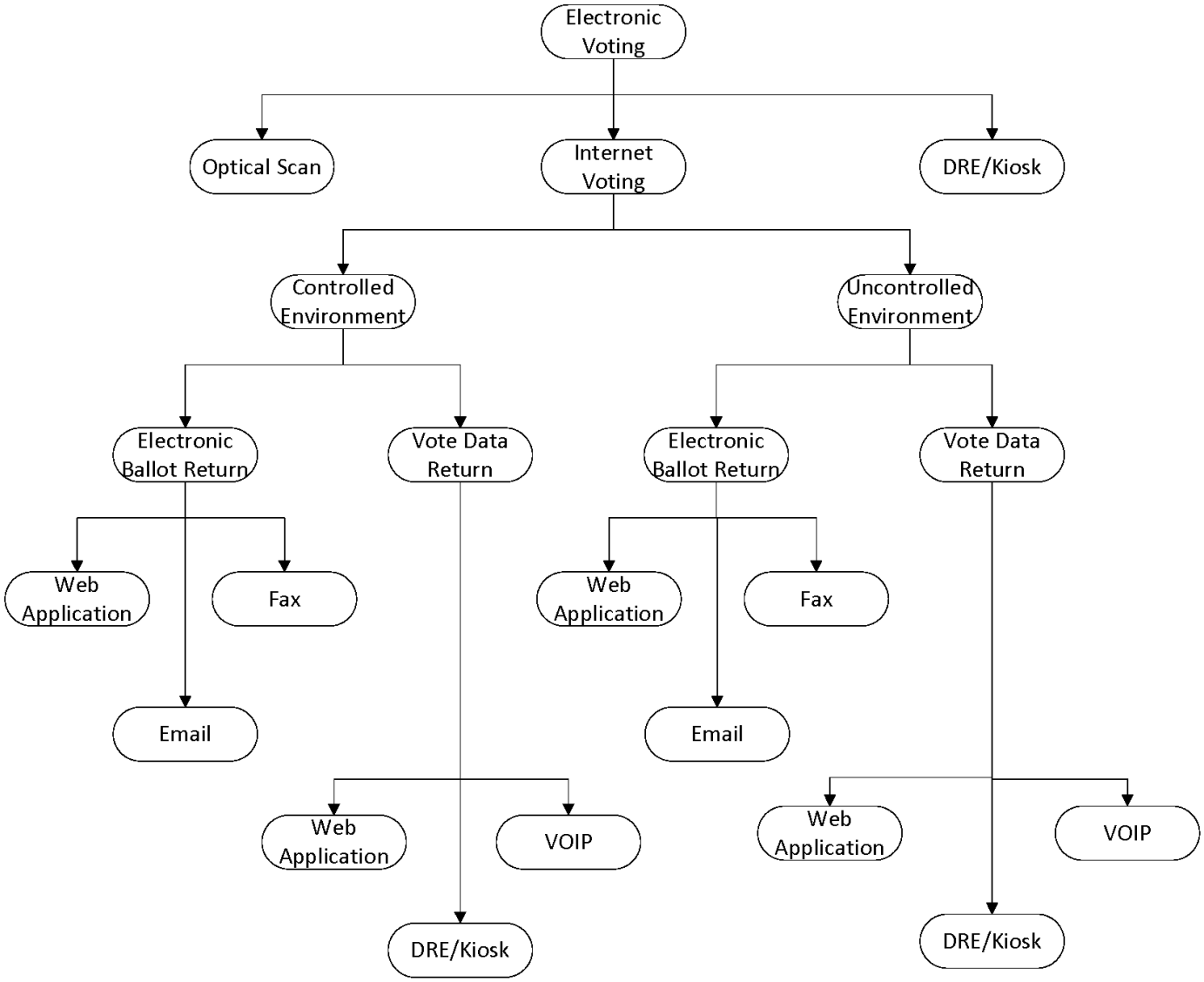


Continue voting next side

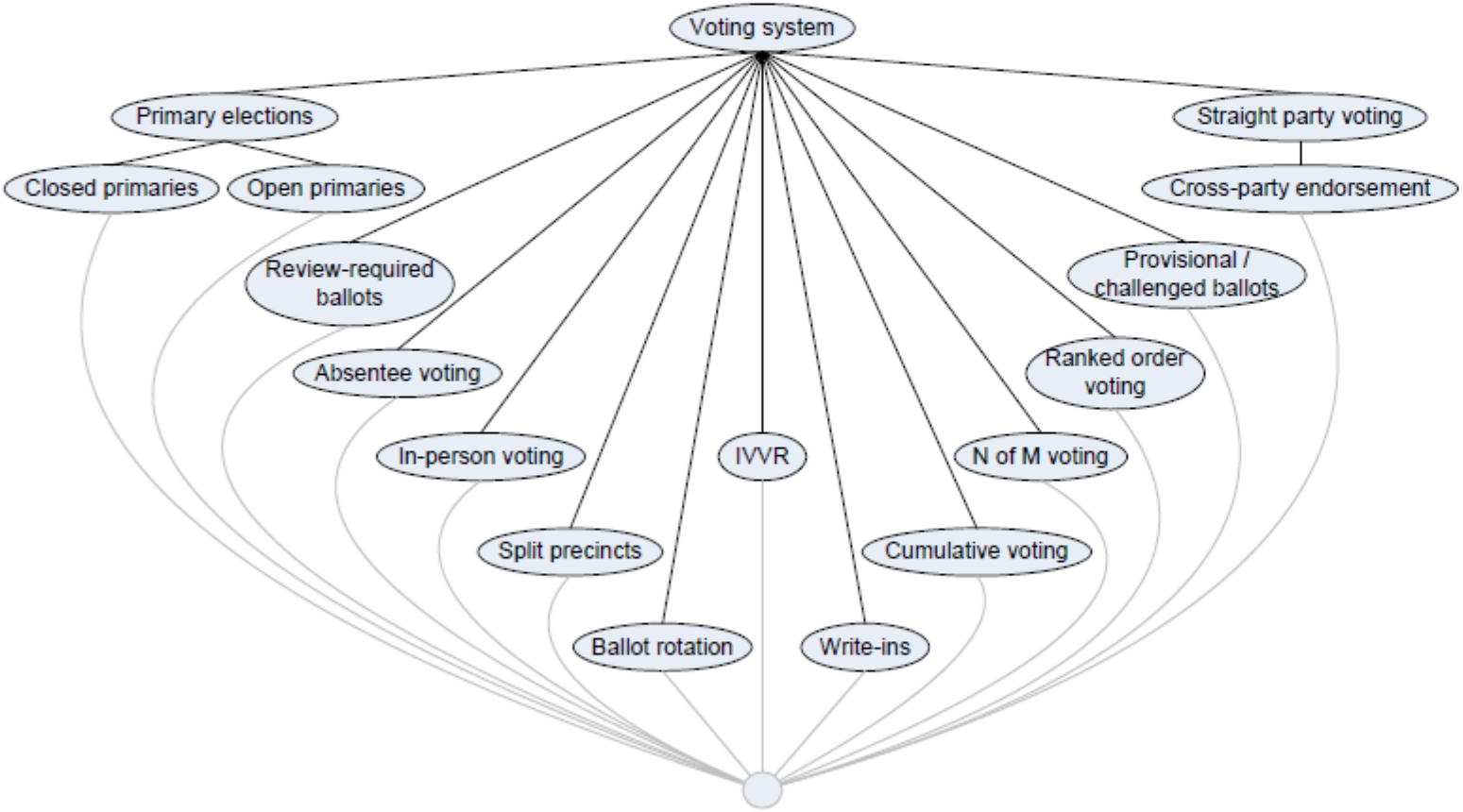
Electronic Voting Systems in Pennsylvania, 2008



Survey of Internet Voting



NIST VVSG 2.0

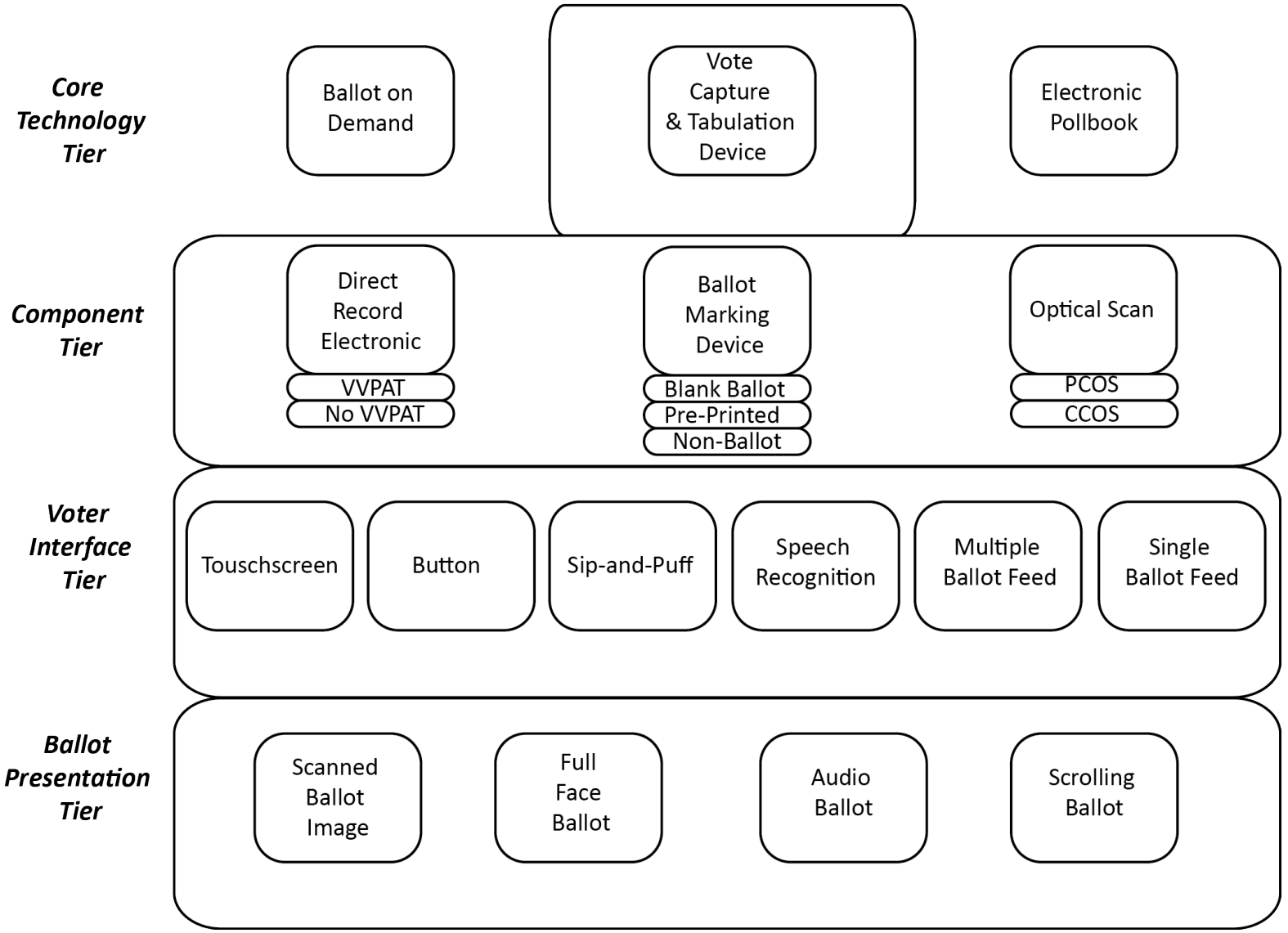

Voting system
Primary elections
Closed primaries
Open primaries
Straight party voting
Cross-party endorsement
Review-required ballots
Provisional / challenged ballots
Absentee voting
Ranked order voting
In-person voting
IVVR
N of M voting
Split precincts
Cumulative voting
Ballot rotation
Write-ins

What's In, What's Out?

- ✓Out:
  - Remote Electronic Voting (i.e., Internet voting)
  - Lever machines
  - Hand-marked, Hand-counted paper ballots
  - Punch card voting systems
  - Election Management systems
  - Voter registration systems
- ✓In:
  - Everything else…

Continue voting next side

Evoting Classification Structure



Tier 1 – Core Technology Tier

- ✓ Broadest classification tier
- ✓ Defined by overall purpose of the system:
  - Ballot on Demand
    - Prints blank ballots as needed
    - Operated by election officials/pollworkers
  - Electronic Pollbook
    - Accesses voter registration database at polling place
    - Operated by election officials/pollworkers
  - Vote Capture and Tabulation Device
    - Cast and Tabulate votes
    - Voters interact with this system
    - **Central focus of this paper**

Continue voting next side

Tier 2 – Component Tier

- ✓ Defined by vote storage
  - Physical media (e.g., ballots)
  - Electronic media (e.g., bits)
- ✓ Three categories:
  - Direct Record Electronic (DRE)
  - Optical Scan
  - Ballot Marking Device

Continue voting next side

Tier 3 –Interface Tier

- ✓ Describes the method voters use to input selections.
- ✓ Six categories:
  - Multiple Ballot Feed
  - Touchscreen
  - Button
  - Single Ballot Feed
  - Sip-and-puff
  - Speech Recognition

Continue voting next side

Tier 4 – Ballot Presentation Tier

- ✓ Describes the manner a ballot is presented to voters.
- ✓ Four options:
  - Full Face Ballot
  - Scrolling Ballot
  - Scanned Ballot Image
  - Audio Ballot

Continue voting next side

Applying the Structure

- ✓ Ballot on Demand: Election Services BoD
- ✓ Electronic Pollbook: Hart & Sctyl epollbook
- ✓ Vote Capture & Tabulation
  - OS: Hart eScan, ES&S M650
  - Direct Record Electronic: Premier TSX, Danaher
  - Ballot Marking Device: Automark
- ✓ Hybrids
  - Unisyn OVI
  - Dominion Imagecast (NY)

Continue voting next side

Hart eScan

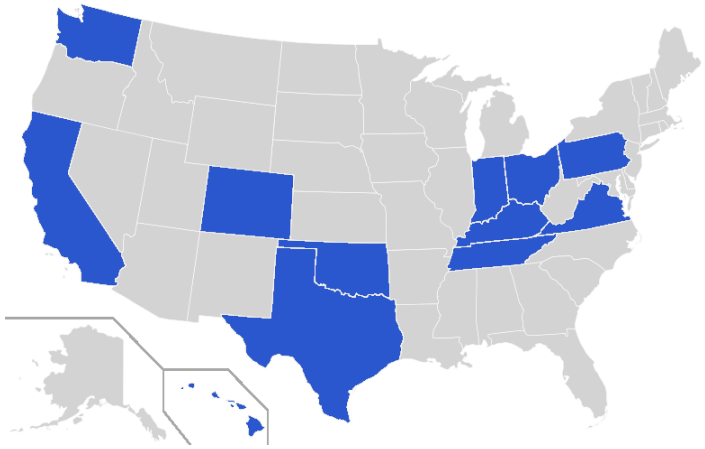
Classification:

Tier 1 = VCTD

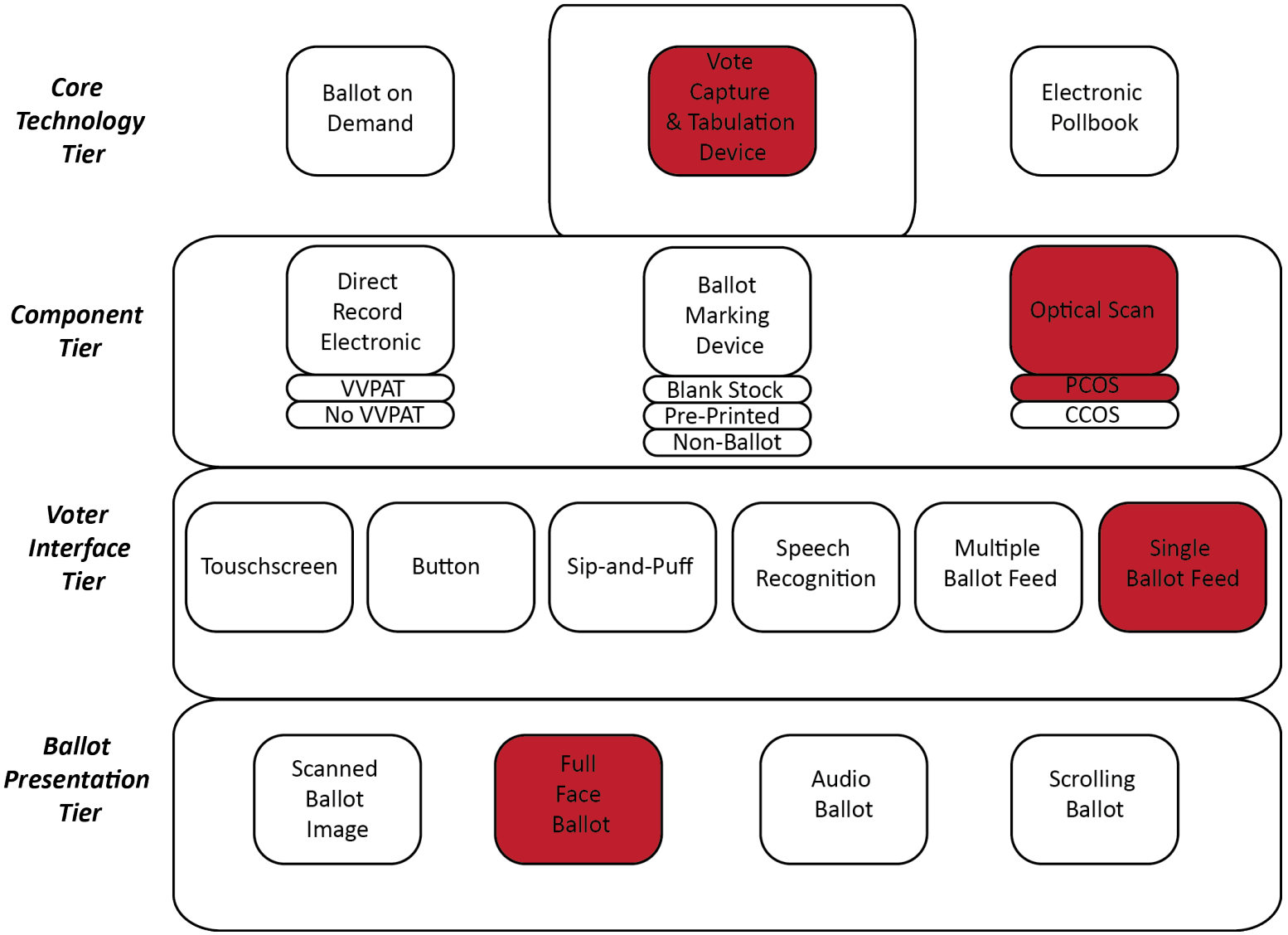
Tier 2 = OS

Tier 3 = Single Ballot Feed

Tier 4 = Full Face Ballot



Hart eScan - Classification



ES&S M650

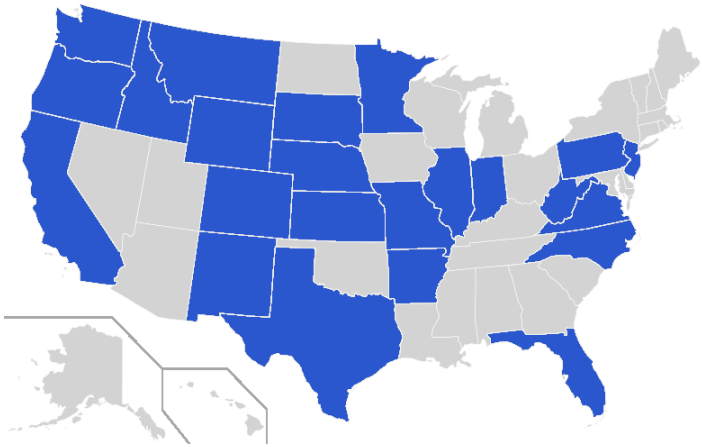
Classification:

Tier 1 = VCTD

Tier 2 = OS

Tier 3 = Multiple Ballot Feed

Tier 4 = Full Face Ballot



Diebold TSX

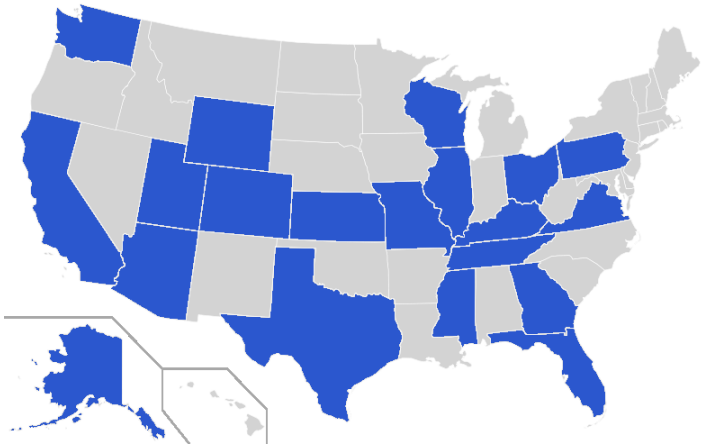
Classification:

Tier 1 = VCTD

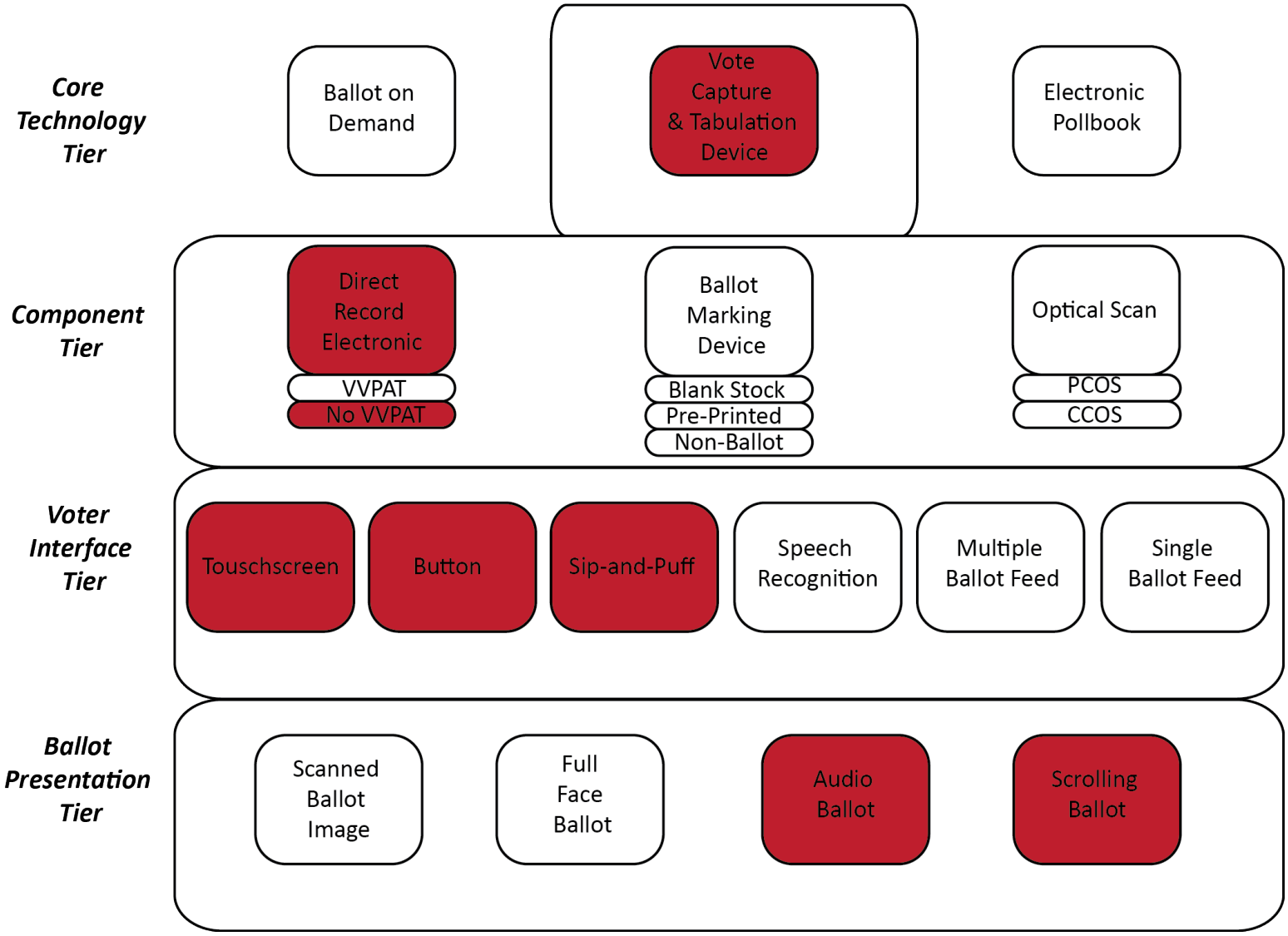
Tier 2 = DRE

Tier 3 = Touchscreen,
Button,
Sip-and-Puff

Tier 4 = Scrolling Ballot,
Audio



Diebold TSX - Classification



Danaher Electronic 1242

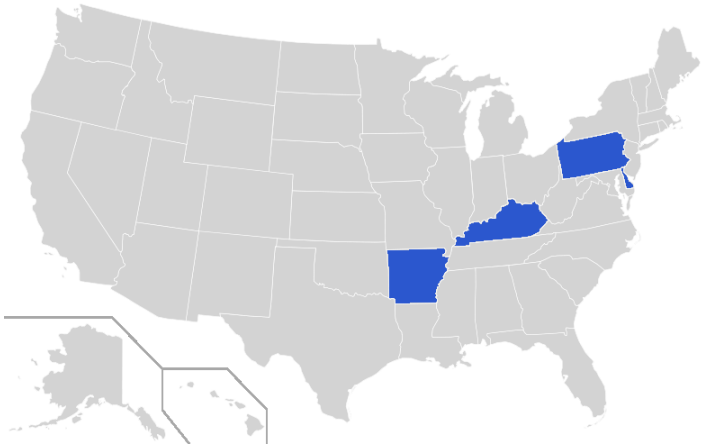
Classification:

Tier 1 = VCTD

Tier 2 = DRE

Tier 3 = Button,
Sip-and-Puff

Tier 4 = Full Face Ballot,
Audio



ES&S Automark

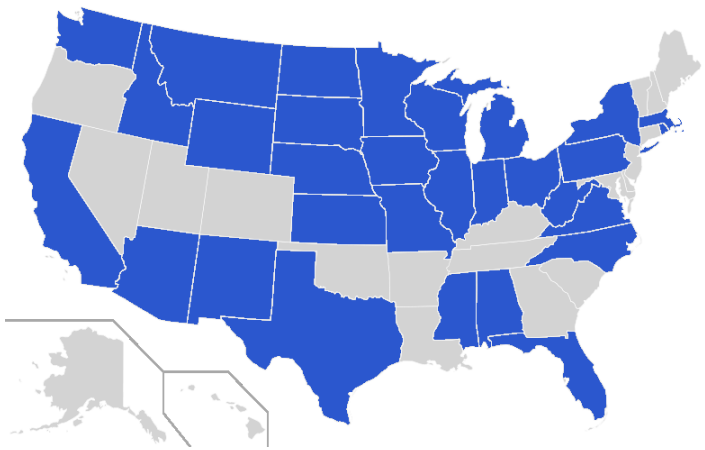
Classification:

Tier 1 = VCTD

Tier 2 = BMD

Tier 3 = Touchscreen,
Button,
Sip-and-Puff

Tier 4 = Scrolling ballot,
Audio



Hybrid Voting Systems

- ✓ Combine functions from the Core Technology and Component Tiers.
- ✓ Trend in new U.S. evoting technology.
- ✓ Example:
  - A system with BMD and DRE characteristics, but one chassis and interface.

Continue voting next side

Unisyn OVI

Classification:

Tier 1 = VCTD

Tier 2 = BMD,
DRE,

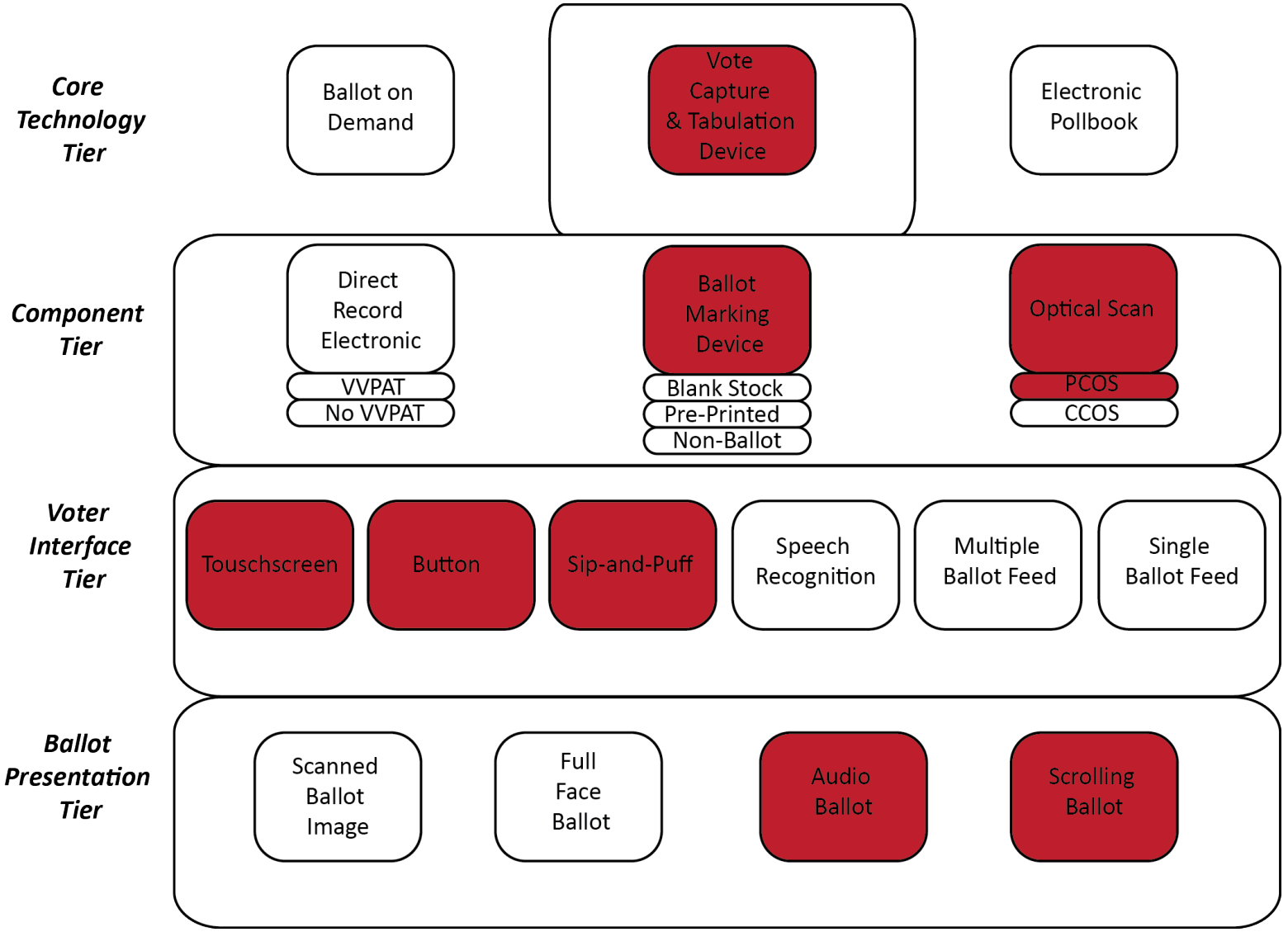
Tier 3 = Touchscreen,
Button,
Sip-and-Puff

Tier 4 = Scrolling ballot,
Audio

Location:

Unknown

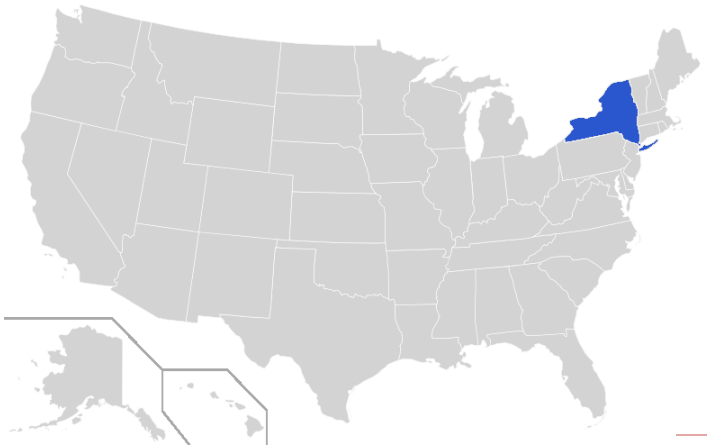
Unisyn OVI - Classification



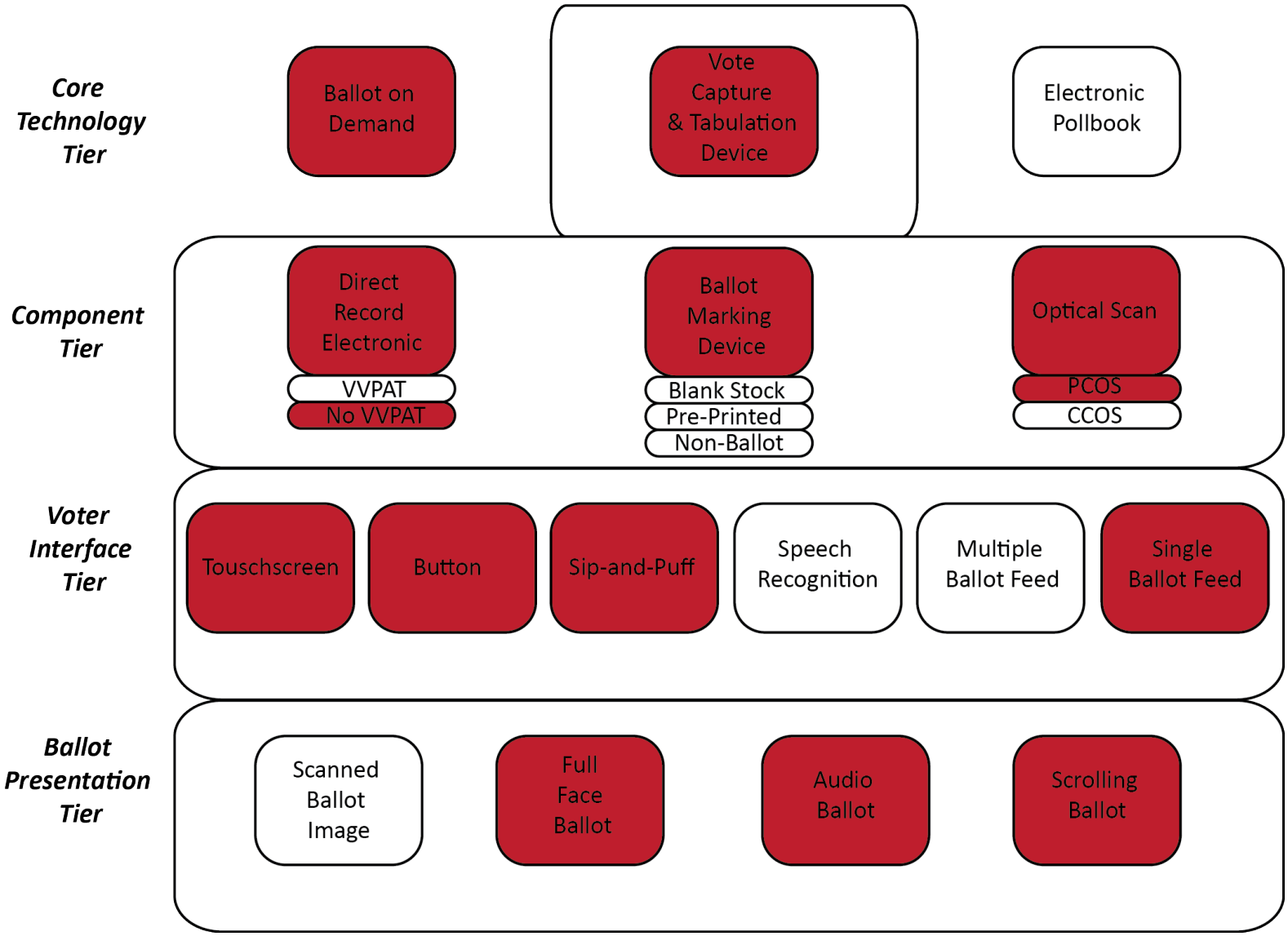
Dominion Imagecast Evolution (NY)

Classification:

Tier 1 = VCTD,
BOD
Tier 2 = BMD,
OS,
DRE,
Tier 3 = Single Ballot Feed,
Touchscreen,
Button,
Sip-and-Puff
Tier 4 = Scrolling ballot,
Full Face Ballot,
Audio



Imagecast NY- Classification



Uses of the Classification Structure

- ✓ Terminology
- ✓ Contracting and Procurement
- ✓ Standards development and definition
- ✓ Information sharing between stakeholders
- ✓ Outreach to general public, media, etc.
- ✓ Educating new election officials

Continue voting next side

Next Steps

- ✓ Expand tiers for Ballot on Demand and Electronic Pollbook
- ✓ Additional functionality (e.g., card readers, barcode scanners, etc.)
- ✓ Adjust structure to incorporate Remote Electronic Voting
  - ✓ Unified evoting taxonomy

Continue voting next side

References

[1] U.S. Election Assistance Commission, Survey of Internet Voting, September 2011

[2] U.S. National Institute of Standards and Technology, VVSG 2.0

[3] Marking your ballot using the Ballot Marking Device (BMD), NYC Board of Elections http://www.votethenewwayny.com

[4] Welcome to the Hart eScan and eSlate Voting System, City of Alexandria, Virginia

http://alexandriava.gov/elections/info/default.aspx?id=60668

[5] Unisyn Products- OpenElect Voting Interface (OVI)

http://www.unisynvoting.com/products/ovi.htm

* All Voting System Geography Information from Verified Voting's Verifier http://www.verifiedvoting.org/verifier/

END OF BALLOT

Be sure to review your ballot selections

Interpreting Babel:
Classifying Electronic Voting Systems

Questions?

Jessica Myers - jescurmy@gmail.com

Joshua Franklin - josh.michael.franklin@gmail.com

Precinct 0001 Ward 0002 Split 0003 Poll Worker Initials_____ _____