

# Maintaining Democratic Values in e-Voting with eVACS®

Carol Boughton  
Managing Director, Software Improvements  
2nd International Workshop on e-Voting  
2 August - 4 August 2006





# Purpose of electronic election systems

- **Improve accuracy**
- **Faster results**
- **Reduce costs**
- **Increase number of people who can vote without assistance - in secret**
- **Reduce potential for fraud or manipulation of votes**



# Supporting democratic principles

- **Equality (in voting)**
- **Secrecy**
- **Security**
- **Transparency**



# eVACS®

- **Is more than electronic voting**
- **Able to incorporate non-electronic votes**
- **Modular**
- **“Closed system”**



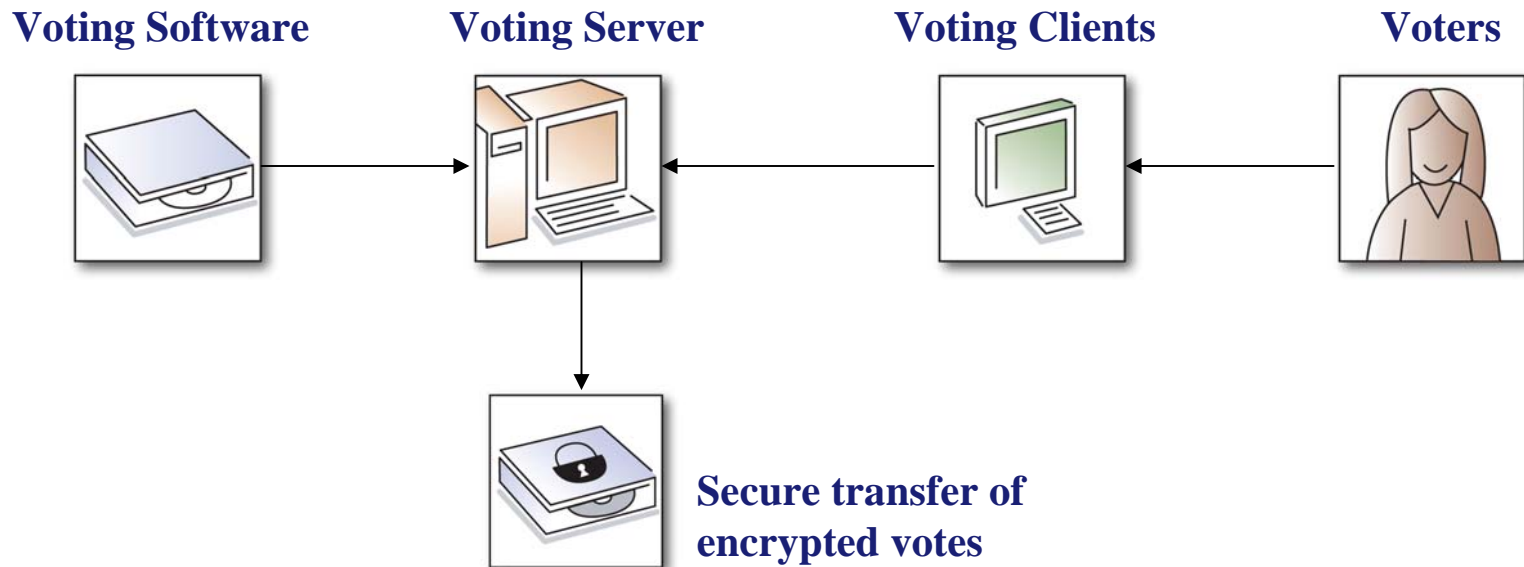


# Modular

- **Set-up election**
- **Voting**
- **Entering non-electronic votes**
- **Counting & Reporting**

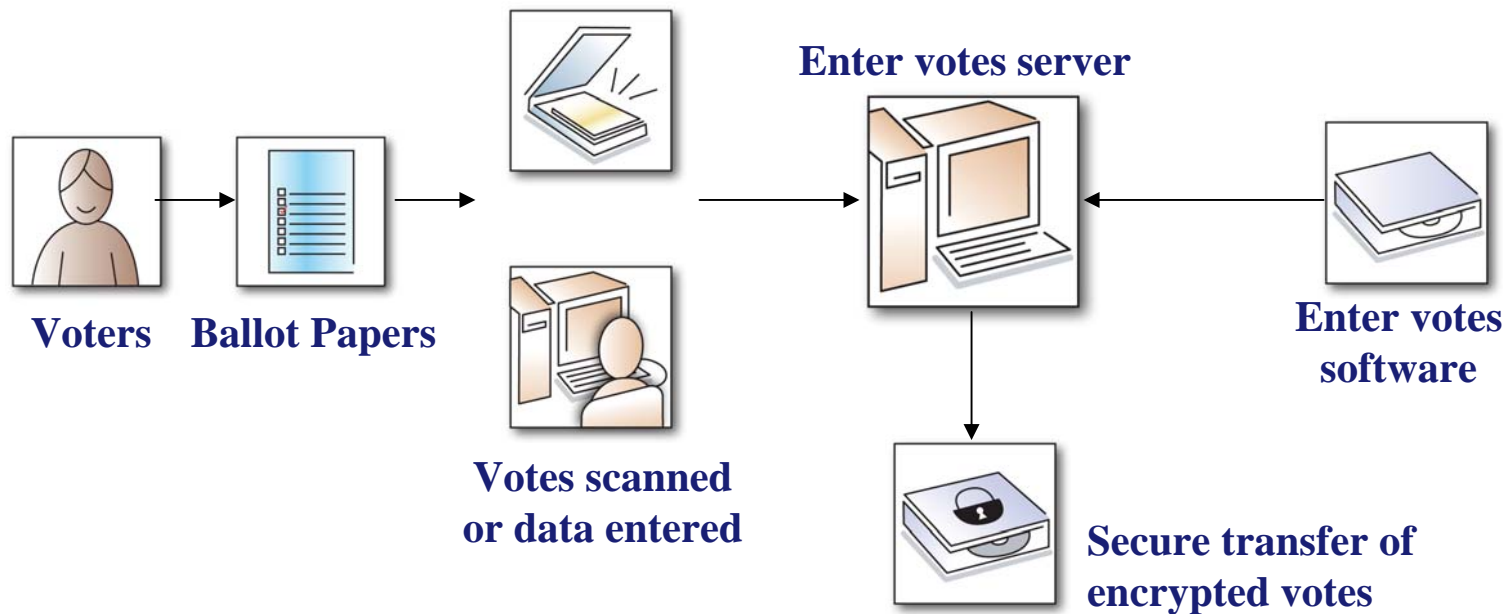


# Voting module



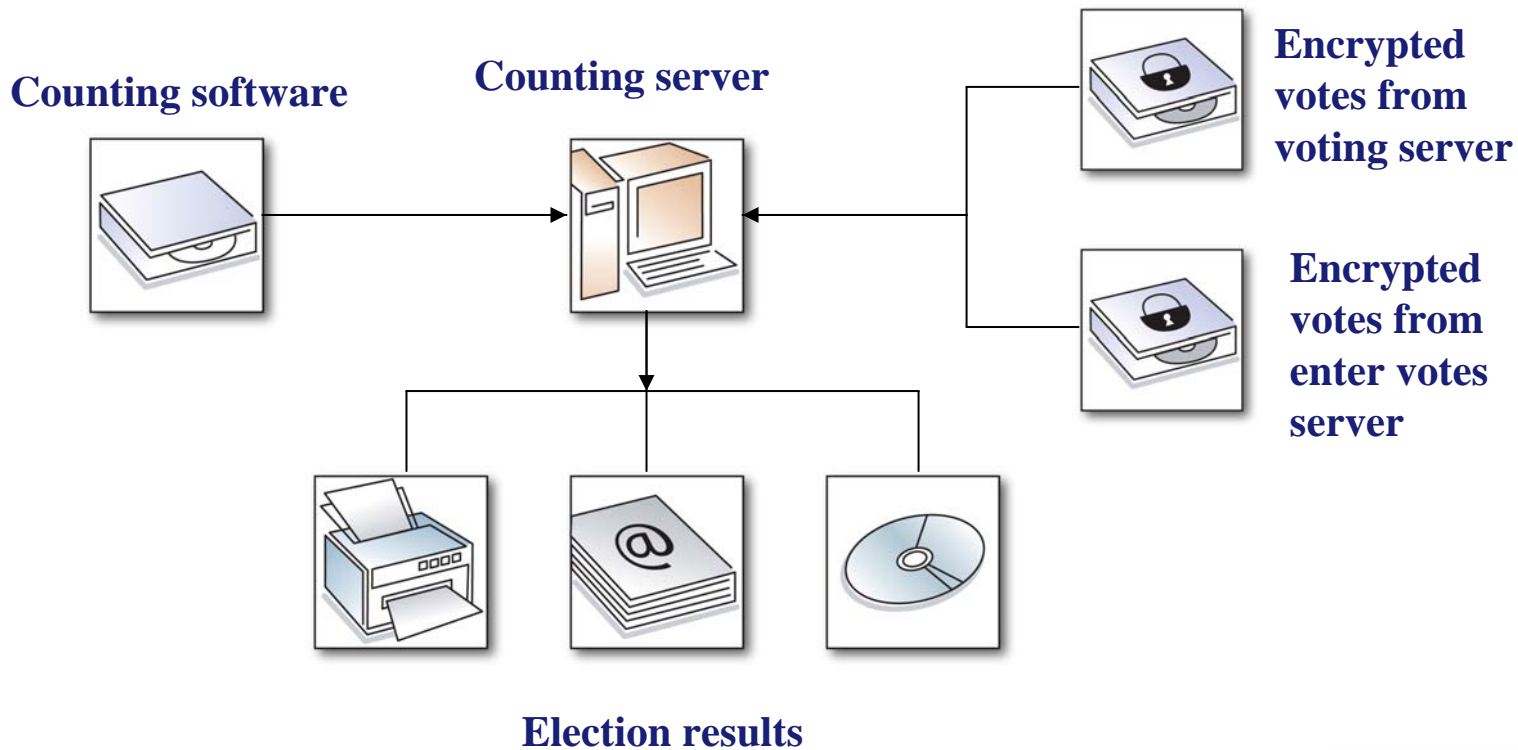


# Entering Non-electronic Votes





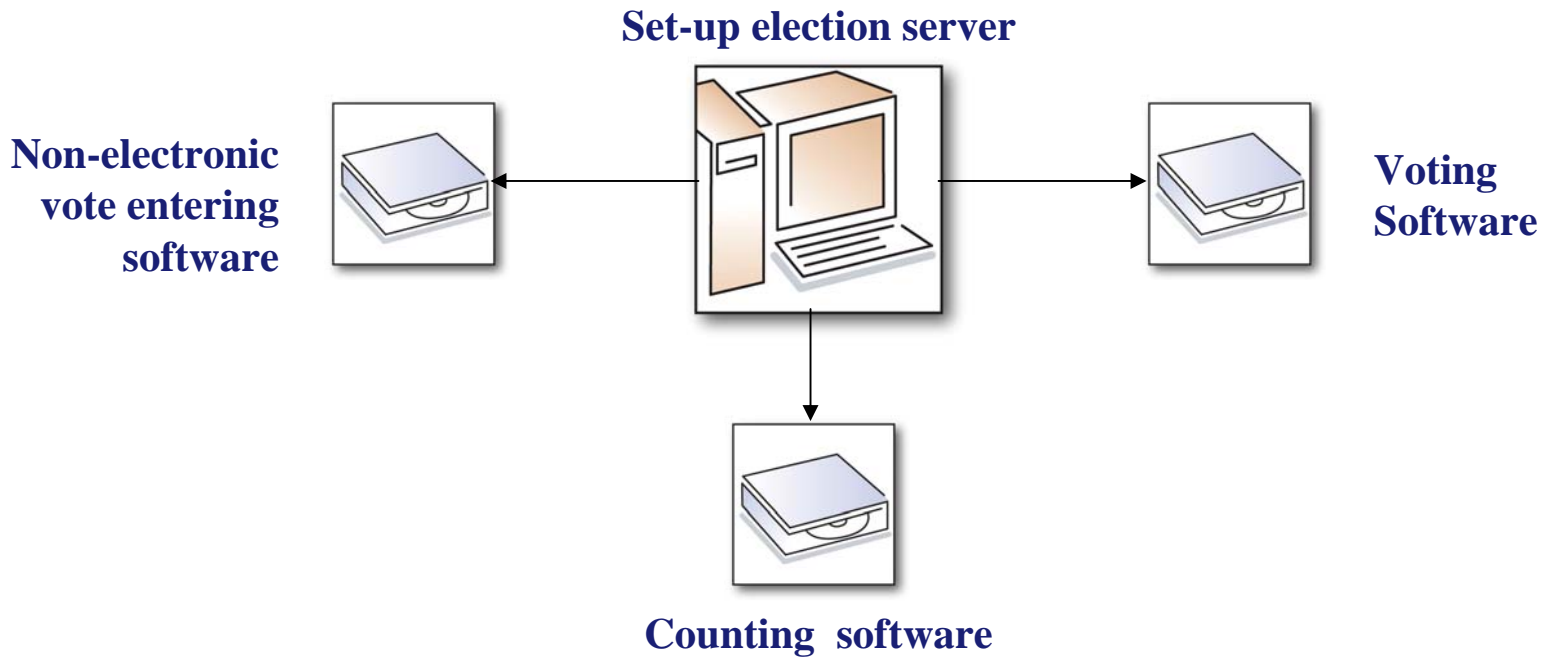
# Counting & Reporting







# Set-up election





# “Closed system”

- **Set-up election generates software for specific election**
  - **Cannot be modified by vendor or election officials**



# eVACS® Hardware

- **Does not require special equipment**
- **Can have a mixture of off-the-shelf hardware**
- **In-built flexibility**



# Equality

- **Audio**
- **Multiple languages**
- **(Special) keypad**
- **Use in booth or at a table**
- **Automatic sequencing of numbered preferences**



# Secrecy

- **Voting screen**
- **Fits in normal voting booth**
- **No clues as to how person is voting**
  - **Keypad navigation**
  - **Audio via headphones**
- **Vote ‘can be hidden’**
- **Voting without assistance**





# Security - Software

- Automated set-up
- Limited functionality
- Installation reformats
- Barcodes
- Only 'completed' votes stored
- Matching keystrokes with voter's choices
- Isolated LAN
- No votes stored on voting machines
- Votes stored on secure server
- Separate databases
- Downloading
- Log of all activities



# Security - Hardware

- Off-the-shelf equipment
- The ROC



# Transparency

- Level 1 - Code available**
- Level 2 - Correct operation**
- Level 3 - Version control**
- Level 4 - Controlled functionality**
- Level 5 - Integrity of votes and the electronic audit trail**

**Any particular level assumes compliance with all lower levels**



# Level 1 - Code Available

- **Source code released**
- **Independent auditing**
- **Independent verification**



## Level 2 - Correct operation

- **Ballots**
- **Voting**
- **Entering non-electronic votes**
- **Counting**
- **Reporting**





## Level 3 - Version control

- **Software used can be shown to be exactly the same that passed levels 1 and 2**
- **Responsibility**
  - **Vendor (*CM and VC*)**
  - **Officials**
  - **Auditor**



# Level 4 - Controlled functionality

- **Able to demonstrate**
  - **Resistant to tampering**
  - **Empty electronic ballot box**
  - **Number of votes in electronic ballot box**
  - **Initial results**
  - **Secure transfer**



# Level 5 - Integrity of votes

- **None of the recorded votes are lost**
- **Only completed votes are recorded**
- **Electronic audit trail**



# Challenging the results

- **Manual election - leads to expensive recounts**
- **Electronic election - evidence is readily available from the electronic audit trail**



# Voting is not everything

- **Election set-up**
- **Inclusion of non-electronic votes**
- **Counting and reporting**
- **A ‘closed system’**





# Making every vote count is important

- **Reflecting voters intentions**
  - Unintentional informal voting
  - Accurate counting
- **Long term consistency**
  - ensuring democratic election principles continue to apply



# Election Integrity

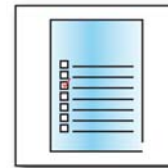
- **Privacy during voting**
- **Authentication of the votes**
- **Avoidance of coercion**
- **Empty ballot box at start of polling**
- **Security of ballots**
- **One vote per person**



# Demonstrating Integrity



**Electronic**



**Paper**

**Minimum potential for error guaranteed if**

- **Compliance with all 5 levels of transparency**
  - *most easily achieved with use of high integrity language and application of sound software engineering principles, practices and processes*

**Maximum potential for (human) error even with**

- **Observation**
- **Manual checking**
- **Transparent process**



# Verifiability via Electronic Audit Trails

- Design
- Development
- Closed system
- Independent auditing



=

