

Principle 9

AUDITABLE

The voting system is auditable and enables evidence-based elections

9.1 - An error or fault in the voting system software or hardware cannot cause an undetectable change in election results.

9.1-A – Software Independence

An undetected error or fault in the voting system’s software or hardware SHALL not be capable of causing an undetectable change in election results.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-B – Tamper Evident Records

The voting system SHALL produce tamper-evident records to enable detection of incorrect election outcomes.

(Add icon)

Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-B.1 – Voter Verification

Tamper-evident records SHALL provide individual voters the opportunity to verify that the voting system correctly interpreted their ballot selections.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-B.2 – Tamper-evident Record Creation

A tamper-evident record of the contents of each vote SHALL be captured at the time of each vote's casting.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-B.3 – Tamper-evident Record of Errors

Detected errors SHALL be recorded in a tamper-evident manner.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-C – Auditor Verification

Voting systems records SHALL enable external auditors to verify that cast ballots were correctly tabulated.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-C.1 – Auditable with Software Independence

The voting system SHALL enable a meaningful audit in the presence of compromised or malicious software resident on the system.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-C.2 – Auditable with Hardware Independence

The voting system SHALL enable a meaningful audit in the presence of compromised or malicious hardware components.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-D – Voter Reports Errors

Voting systems SHALL document and provide a method, either through procedural or technical means, for voters to report detected errors or incorrect results.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:

Gap notes:

9.1-E – Paper-based or Cryptographic E2E System

Voting systems SHALL meet the requirements within either the Paper-based System Architectures and / or Cryptographic E2E System Architectures section.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

Paper-based System Architectures

The following requirements apply to paper-based voting systems.

9.1-E.1 – Paper Record Production

The voting system SHALL produce a paper record of the voter’s ballot selections.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.2 – Understandable Paper Record

The recorded ballots selection SHALL be presented in a manner understandable by the voter.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:

Gap notes:

9.1-E.3 –

All representations of a voter’s ballot selections produced by the voting system SHALL agree with regard to the selections made by the voter.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.4 – Paper Record Transparency & Interoperability

All representations of a voter’s ballot selections SHALL use an open and interoperable format.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.5 – Identification of Errors

The voter SHALL have the opportunity to identify ballot errors before it is cast.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.6 – Ballot Error Correction

The voting system SHALL allow a voter to restart a voting session if a ballot is deemed incorrect.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.7 – Ballot Integrity

Each ballot's integrity SHALL be maintained throughout the voting process.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.8 – Unique Identifier

Each paper ballot that is counted SHALL contain a unique identifier.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.8.1 – Unique Identifier Application

Paper ballot identifiers may be printed onto the ballot or affixed via some other mechanism.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

Cryptographic E2E System Architectures

The following requirements apply to voting systems using cryptographic E2E technology.

9.1-E.9 – Cryptographic E2E Transparency

The underpinning cryptographic E2E protocol SHALL be publicly available for open review.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.10 – Cryptographic E2E Voter Verification

Individual voters SHALL have the opportunity to confirm that the system correctly interpreted their ballot selections.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.11 – Identification of Errors

The voter SHALL have the opportunity to identify ballot errors before it is cast.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.12 – Ballot Receipt

Before casting a ballot, the voter receives a receipt that allows them to verify that their ballot has been correctly recorded by the system.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.12.1 – Plaintext Ballot Receipt

Receipts provided to voters SHALL not display selections made by voters.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.12.2 –

Receipts SHALL not enable voters to prove to others their selections on any cast ballots.

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Discussion

Status: New
Updated: Nov. 3, 2017

VVSG 1.1:
Gap notes:

9.1-E.13 – Ballot Receipt Transparency & Interoperability

Any receipt information provided SHALL be represented in an open and interoperable format.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.13.1 – Ballot Receipt Unique Identifier

Each ballot receipt SHALL contain a unique identifier.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.14 – Receipt Transparency

The voting system SHALL be capable of exporting receipts in an open format.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.15 –

The voting system SHALL make publicly available all encoded ballots.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.16 – Ballot Counted

Voters SHALL have the opportunity to verify that their ballots are included within the tabulation results.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.16.1 –

The receipt provides sufficient information for voters to verify that their cast ballots are uniquely contained within the publicly available list of encoded ballots.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.1-E.17 – Verification of Encoded Votes

The voting system allows any individual to verify that the encoded votes were properly tabulated.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

- 9.2 - The voting system produces readily available records that provide the ability to check whether the election outcome is correct and, to the extent possible, identify the root cause of any irregularities.

9.2-A – Compliance Audit Procedures

The voting system documentation SHALL specify the election procedures necessary to perform a compliance audit.

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Discussion

A compliance audit ensures that the election audit trail is sufficiently accurate to reconstruct the outcome according to how voters cast their ballots. Compliance audits provide assurance that a full hand count of the election audit trail shows the outcome according to how the voters really voted.

Status: New
Updated: Nov. 29, 2017
VVSG 1.1: N/A
Gap notes:

9.2-B – General Post-Election Audit Procedures

The voting system documentation SHALL specify the election procedures necessary to perform a post-election audit.

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Discussion

Status: New
Updated: Nov. 29, 2017
VVSG 1.1: N/A
Gap notes:

9.2-C – Generation of Per-Ballot CVRs

The voting system SHALL be capable of recording and reporting a cast vote record for each ballot.

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Discussion

Status:	New
Updated:	Nov. 29, 2017
VVSG 1.1:	N/A
Gap notes:	

9.2-D – Reporting Intermediate Results

The voting system SHALL be able to report intermediate results as the audit is being conducted.

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Discussion

Status:	New
Updated:	Nov. 17, 2017
VVSG 1.1:	N/A
Gap notes:	

9.2-E – Reporting Anomalous Audit Events

The voting system SHALL be capable of reporting problems as they arise (e.g., matching failures).

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Discussion

Status:	New
Updated:	Nov. 17, 2017
VVSG 1.1:	N/A
Gap notes:	

9.2-F – Reporting of Audit Results

The voting system SHALL be able to report the final results of the audit.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1: N/A
Gap notes:

9.2-G – Reporting Format

The voting system manufacturer SHALL document the intermediate and final election audit results in an open format.

(Add icon)

Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1: N/A
Gap notes:

9.3 - Voting system records are resilient in the presence of intentional forms of tampering and accidental errors.

9.1-A – Blank

This is a stub.

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Discussion

Status: New
Updated: Nov. 3, 2017
VVSG 1.1:
Gap notes:

9.4 - The voting system supports efficient audits.

The following requirements apply to voting systems that perform risk limiting audits.

9.4-A – Defining Minimum Risk Limiting Audit Functionality

The voting system’s risk limiting audit logic SHALL use the audit trail to guarantee that there is a large, pre-specified probability that the audit will correct a preliminary outcome if the preliminary outcome is wrong.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

9.4-B – Unique Ballot Identifiers

Election auditors SHALL be able to uniquely address individual ballots.

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Discussion

Status: New
Updated: Nov. 29, 2017
VVSG 1.1:
Gap notes:

9.4-C – Multipage Ballots

The voting system SHALL be able to appropriately manage multipage ballots.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

9.4-D – Notification of Full Count Efficiency

The voting system is able to alert election officials when a full count would be more efficient than conducting the risk limiting audit.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

9.4-E – Selection of Sample or Batch Size

The voting system SHALL be able to assist election jurisdictions with selecting a sample size and/or batch size.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

9.4-F – Notification of Reaching the Desired Confidence Level

The voting system is able to alert an auditor once the desired confidence level is attained.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

9.4-G – Modifying the Desired Confidence Level

The voting system is able to modify the desired confidence level for each audit.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

9.4-H – Concurrently Auditing Multiple Contests

The voting system SHALL be able to audit multiple contests concurrently.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

9.4-I – Tracking Audited Ballots

The voting system SHALL keep track of which ballots were already audited.

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Discussion

Status: New
Updated: Nov. 17, 2017
VVSG 1.1:
Gap notes:

The following requirements apply to voting systems that perform ballot level comparison audits.

9.4-J – Accepting Audit Input

The voting system SHALL be capable of manually accepting ballot information from election auditors.

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Discussion

Status:	New
Updated:	Nov. 17, 2017
VVSG 1.1:	
Gap notes:	

9.1-K – Selecting Individual Ballots

The voting system SHALL be capable of selecting which individual ballot to audit.

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Discussion

Status:	New
Updated:	Nov. 17, 2017
VVSG 1.1:	
Gap notes:	