

Certification Test Report - Modification

Report Number HIN-20003-CTR-01

Hart InterCivic Verity Voting 2.6

Prepared for:

Vendor Name	<i>Hart InterCivic Inc. (Hart)</i>
Vendor System	<i>Verity Voting 2.6</i>
EAC Application No.	<i>HRT-Verity-2.6</i>
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Accredited by the National Institute of Standards and Technology (NIST) National Voluntary Lab Accreditation Program (NVLAP) and accredited by the Election Assistance Commission (EAC) for VSTL status.



Revision History

Date	Release	Author	Revision Summary
March 29 th , 2021	1.0	J. Panek	Initial Draft
April 5 th , 2021	1.1	J. Panek	Updates to address EAC comments

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The tests referenced in this document were performed in a controlled environment using specific systems and data sets, and results are related to the specific items tested. Actual results in other environments may vary.

Opinions and Interpretations

There are no opinions or interpretations included in this report, except as noted under Recommendations.



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1 Introduction and Document Overview

SLI Compliance is submitting this report as a summary of the certification testing efforts for the **Hart Verity Voting 2.6** voting system, as detailed in the section System Identification, against the Election Assistance Commission Voluntary Voting System Guidelines 1.0 (EAC VVSG v 1.0).

Verity Voting 2.6 is a modification of **Verity Voting 2.5**, certified by the EAC on September 9th, 2020, with limited changes. The system will be tested based on the modified system requirements, as set forth in section 4.6.2.3 of the EAC Voting System Testing and Certification Program Manual, v 2.0. The purpose of this document is to provide an overview of the certification testing effort and the findings from the testing effort for this voting system.

This effort included a review of updates made to the Technical Data Package documentation, a review of all modified source code, and testing of the **Hart Verity Voting 2.6** voting system. Testing consisted of the development of a test plan, managing system configurations, executing test suites of functional and system levels tests based on the system's functionality, and analysis of results. The review and testing were performed at SLI's Wheat Ridge, Colorado facility, from January 7th, 2021 to March 22nd, 2021.

1.1 References

1. Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG v 1.0), Version 1.0, 2005.
2. NIST Handbook 150: 2020.
3. NIST Handbook and 150-22: 2017.
4. EAC Voting System Testing and Certification Program Manual, United States Election Assistance Commission, v 2.0, May 2015.
5. SLI VSTL Quality System Manual, v 3.3, prepared by SLI, dated December 17th, 2020.

1.2 Document Overview

This document contains the following sections:

- System Identification identifies hardware and software for the **Verity Voting 2.6** system.
- System Overview discusses the functionality of **Verity Voting 2.6** system software and firmware.
- The Certification Test Background discusses the testing process.



- Certification Test Results Summary contains the results and analysis of the testing effort.
- Attachments:
 - Attachment A - Warrant of Change Control
 - Attachment B - Attestation of Durability for Verity Voting
 - Attachment C - Attestation of Integrity for Verity Voting
 - Attachment D - Attestation of Production Hardware and Software for Verity Voting
 - Attachment E - Record of Verity 2.6 Trusted Build
 - Attachment F - Final_TDP_Document_List_Verity 2.6
 - Attachment G - Verity Voting 2.6 Discrepancy Report
 - Attachment H - Verity 2.6 Source Code Review Summary
 - Attachment I - Hart Verity Voting 2.6 Modification Test Plan v1.2

1.3 Terms and Abbreviations

The following terms and abbreviations may be used in this document:

Table 1 – Terms and Abbreviations

Term	Abbreviation	Description
American Association for Laboratory Accreditation	A2LA	A nonprofit, non-governmental, public service, membership society whose mission is to provide comprehensive services in laboratory accreditation and laboratory-related training.
Ballot Marking Device	BMD	An accessible computer-based voting system that produces a marked ballot (usually paper) that is the result of voter interaction with visual or audio prompts.
Compact Flash card	CF	This is a type of flash memory card in a standardized enclosure often used in voting systems to store ballot and/or vote results data.
Commercial Off the Shelf	COTS	Term used to designate computer software, hardware or accessories that are ready-made and available for sale, lease, or license to the general public
Direct Recording Electronic	DRE	Voting systems that, using Touch Screen or other user interfaces, directly record the voter's selections in each race or contest on the ballot in electronic form.
Election Assistance Commission	EAC	An independent, bipartisan commission created by the Help America Vote Act (HAVA) of 2002 that operates the federal government's voting system certification program.



Term	Abbreviation	Description
Election Management System	EMS	Typically, a database management system used to enter jurisdiction information (district, precincts, languages, etc.) as well as election specific information (races, candidates, voter groups (parties), etc.). In addition, the EMS is also used to layout the ballots, download the election data to the voting devices, upload the results and produce the final results reports.
Electromagnetic Compatibility	EMC/EMI	The goal of EMC is to validate the correct functioning of different equipment in the same environment and the avoidance of any interference effects between them.
Functional Configuration Audit	FCA	The testing activities associated with the functional testing of the system.
National Institute of Standards and Technology	NIST	A non-regulatory federal agency within the U.S. Dept. of Commerce. Its mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.
National Voluntary Laboratory Accreditation Program	NVLAP	A division of NIST that provides third-party accreditation to testing and calibration laboratories.
Physical Configuration Audit	PCA	The testing activities associated with the physical aspects of the system (hardware, documentation, builds, source code, etc.).
Request For Information	RFI	A means used by testing laboratories and manufacturers to request that the EAC provide an interpretation of a technical issue related to testing of voting systems.
Requirements Matrix	N/A	A matrix that traces the VVSG requirements to the various test modules and test methods.
Technical Data Package	TDP	The data package supplied by the vendor, which includes Functional Requirements, Specifications, End-user documentation, Procedures, System Overview, Configuration Management Plan, Quality Assurance Program, and manuals for each of the required hardware, software, firmware components of a voting system.
Voluntary Voting	VVSG	A set of specifications and requirements against

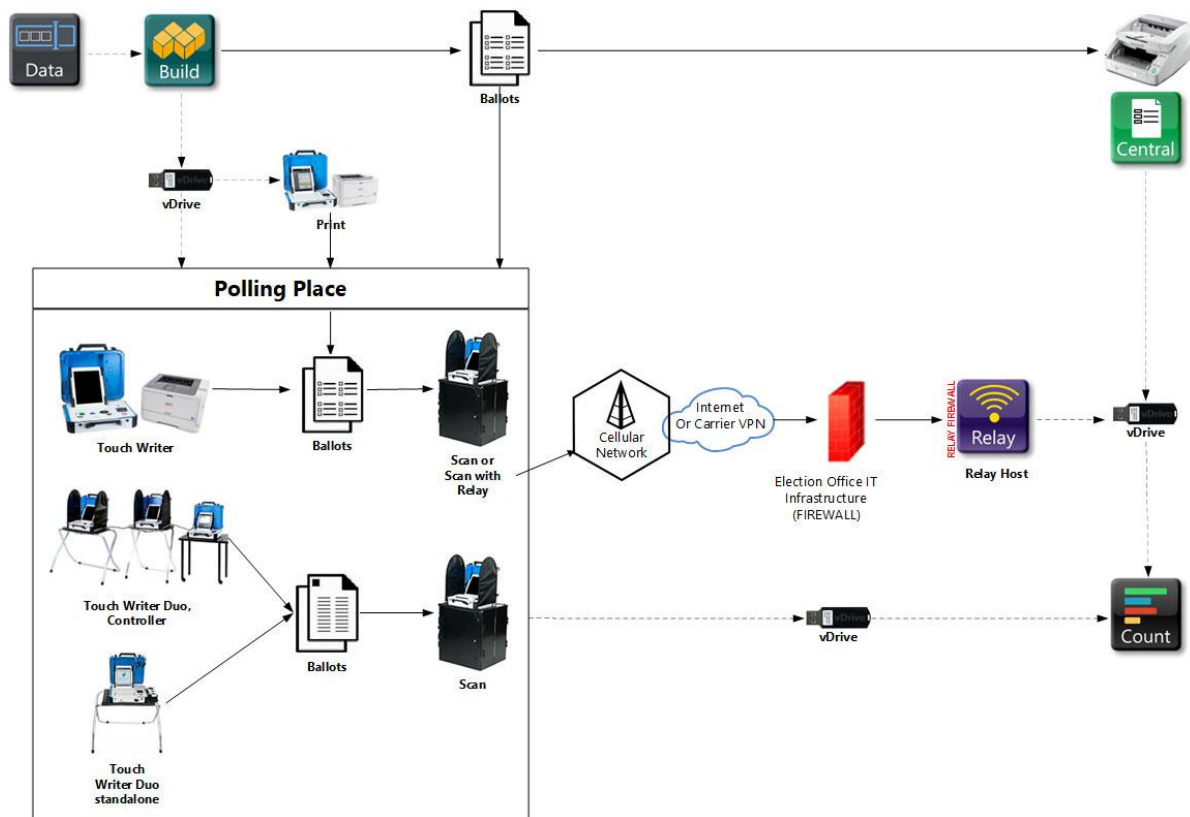
Term	Abbreviation	Description
System Guidelines		which voting systems can be tested to determine if the systems provide all of the basic functionality, accessibility and security capabilities required for EAC certification.
Voting System Test Lab	VSTL	An independent testing organization accredited by NVLAP and the EAC to conduct voting system testing for EAC certification.

2 System Identification

This section details the scope of the **Verity Voting 2.6** voting system and associated components.

The **Verity Voting 2.6** system is composed of software applications, central count location devices and polling place devices with accompanying firmware, and COTS hardware and software.

2.1 System Diagram





Overview of the diagram:

- The components are displayed as touch points of data access, transfers, and verification.
- Dotted lines show the flow of data and air gaps using **Verity vDrives** and are also used to separate the deployment models shown within the polling place.
- **Verity Print** is a ballot production device that provides unmarked printed ballots.
- **Verity Touch Writer** and **Scan** may be installed in polling places to support paper-based voting.
- **Verity Controller**, **Touch Writer Duo**, and **Scan** may be installed in polling places to support paper-based voting.
- **Verity Touch Writer Duo Standalone** and **Scan** may be installed in polling places to support paper-based voting.
- **Verity Relay** is a remote transmission software application that receives election data transmissions sent by Verity Scan devices equipped with an optional Relay modem accessory.
- **Verity Key** (not shown) is required for user access into components to load elections, to use critical features, and to generate reports. Feature access depends on the roles applied to user accounts.

2.1.1 Software and Firmware

The software and firmware employed by **Hart Verity Voting 2.6** consists of two types: custom and commercial off the shelf (COTS). COTS applications were verified to be pristine, or were subjected to source code review for analysis of any modifications and verification of meeting the pertinent standards.

The tables below detail each application employed by the **Hart Verity Voting 2.6** voting system.

Table 2 – Software and Firmware

System Component	Application(s)	Version
Verity Data	EMS Software	2.6.0
Verity Build	EMS Software	2.6.0
Verity Central	High-Speed Scanner Software	2.6.0
Verity Count	Central Count Location Tabulation and Report Software	2.6.0
Verity Relay	Data Transmission Software	2.6.0
Verity Print	Printer Firmware	2.6.0
Verity Scan	Scanner Firmware	2.6.0



System Component	Application(s)	Version
Verity Touch Writer	BMD Firmware	2.6.0
Verity Touch Writer Duo	BMD Firmware	2.6.0
Verity Touch Writer Duo Standalone	BMD Firmware	2.6.0
Verity Controller	Firmware	2.6.0

Table 3 – COTS Software and Firmware

Description	Version
Verity Data/Build	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Central	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Count	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Relay	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Print	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Scan – Paper Ballot Scanner	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763



SQLite	3.28.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Nuance Western OCR, Desktop, OEM	V20
Verity Touch Writer – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Touch Writer Duo – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Touch Writer Duo Standalone – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Controller – Networked Centralized Management Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143

2.1.2 Equipment (Hardware)

The hardware employed by **Hart Verity Voting 2.6** consists of two types: custom and commercial off the shelf (COTS). COTS hardware was verified to be pristine, or was subjected to review for analysis of any modifications and verification of meeting the pertinent standards.

The tables below detail each device employed by the **Hart Verity Voting 2.6** voting system.

Table 4 – Manufacturer Equipment

Hardware Description	Version
Verity Print – Ballot Printer	3005356 Rev E
Verity Print – Ballot Printer*	3005856 Rev B
Verity Scan – Paper Ballot Scanner	3005350 Rev I



Verity Scan – Paper Ballot Scanner*	3005800 Rev B
Verity Touch Writer – Electronic BMD Device	3005352 Rev H
Verity Touch Writer – Electronic BMD Device*	3005852 Rev B
Verity Touch Writer Duo – Electronic BMD Device	3005700 Rev B
Verity Touch Writer Duo Standalone – Electronic BMD Device	3005730 Rev A
Verity Controller – Networked Centralized Management Device*	3005825 Rev B

* SmartPanel updated in previous certification modification for tablet electronics obsolescence.

Table 5 – COTS Equipment

COTS Hardware Description	Version
Verity Data/Build	
Verity Data and Build Applications and Workstation Kit <ul style="list-style-type: none"> • HP Z4 G4 Workstation Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P244 or P24 G4 24 Monitor No wireless functionality • HP Z240 Workstations (supported for existing customers only) Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P232 Monitor No wireless functionality 	A



OKI Data C831dn Color Printer for existing customers only	N35100A
OKI Data C844dn Color Printer	N35301A
OKI Data C911dn Color Printer for existing customers only	N36100A
OKI Data C931e Color Printer	N36100A
OKI Data B432dn Mono Report and Ballot Printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
HP 8-port Ethernet Switch	1405-8GV3
Vinpower Digital 7-target USB Duplicator	USBShark-7T-BK
Vinpower Digital 23-target USB Duplicator	USBShark-23-BK
Verity Central	
<p>Verity Central Applications and Workstation Kit</p> <ul style="list-style-type: none"> • HP Z4 G4 Workstation Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P244 or P24 G4 24 Monitor No wireless functionality • HP Z240 Workstations (supported for existing customers only) Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P232 Monitor 	A



No wireless functionality	
Canon DR G1100 High-Speed Scanner	M111181
Canon DR G1130 High-Speed Scanner	M111171
Canon DR-G2110 High-Speed Scanner	6130030
Canon DR-G2140 High-Speed Scanner	6130020
OKI Data B432dn Mono Printer Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
HP 8-port Ethernet Switch	1405-8GV3
Verity Count	
<p>Verity Count Applications and Workstation Kit</p> <ul style="list-style-type: none"> • HP Z4 G4 Workstation Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P244 or P24 G4 24 Monitor No wireless functionality • HP Z240 Workstations (supported for existing customers only) Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P232 Monitor No wireless functionality 	A
OKI Data B432dn Mono Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only.	N22202A



HP 8-port Ethernet Switch	1405-8GV3
Verity Relay	
<p>Verity Relay Applications and Workstation Kit</p> <ul style="list-style-type: none"> • HP Z4 G4 Workstation Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P244 or P24 G4 24 Monitor No wireless functionality • HP Z240 Workstations (supported for existing customers only) Minimum Requirements: Processor – x86-compatible, 3.0GHz, Quad Core Memory – 64GB Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock Ethernet Port – 100Mb/1Gb USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse HP P232 Monitor No wireless functionality 	A
OKI Data B432dn Mono Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only.	N22202A
HP 8-port Ethernet Switch	1405-8GV3
Verity Print	
OKI Data C831dn Color Printer	N35100A
OKI Data B432dn Mono Blank Ballot Printer	N22500A
OKI Data C844dn Color Printer	N35301A
OKI Data B431d Mono Printer for existing customers only	N22202A
Optional AutoBallot Barcode Scanner Kit	C



Includes the following 2d barcode scanner: <ul style="list-style-type: none"> Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608 	
Verity Scan – Paper Ballot Scanner	
Verity Ballot Box	B
Optional Relay Accessory kit (4G LTE Cat-M1) Includes the following COTS modem: <ul style="list-style-type: none"> Hart part number: 1005248 MultiTech part number: MTD-MNA1-2.0 	A
Verity Touch Writer – Electronic BMD Device	
OKI Data B432dn Mono Marked Ballot Printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
Accessible Voting Booth	D
Optional AutoBallot Barcode Scanner Kit Includes the following 2d barcode scanner: <ul style="list-style-type: none"> Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608 	C
Headphones <ul style="list-style-type: none"> Brand: V7, part number HA300-2NP or HA310-2NP 	2005230
Verity Touch Writer Duo – Electronic BMD Device	
Brother PJ700 Series Thermal Printer	PJ723
Accessible Voting Booth with ATI Tray	D
Standard Voting Booth	D
Optional detachable ATI Kit	A
Optional headphones for ATI Kit <ul style="list-style-type: none"> Brand: V7, part number HA300-2NP or HA310-2NP 	C
Verity Touch Writer Duo Standalone – Electronic BMD Device	
Brother PJ700 Series Thermal Printer	PJ723
Accessible Voting Booth with ATI Tray	D
Standard Voting Booth	D
Optional detachable ATI Kit	A
Optional headphones for ATI Kit <ul style="list-style-type: none"> Brand: V7, part number HA300-2NP or HA310-2NP 	C



Verity Controller	
Optional AutoBallot Barcode Scanner Kit Includes the following 2d barcode scanner: <ul style="list-style-type: none">Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608	C

2.1.3 Modifications

Verity Voting 2.6 is a modification of the EAC certified **Verity Voting 2.5** system.

The modifications to **Verity Voting 2.6** address multiple aspects of the system, including features for all devices and workstations, modifications to Verity Data, Verity Count, and Verity Central, as well as associated documentation updates. Additionally, the **Verity Voting 2.6** system does not contain the Verity Touch, Verity Touch with Access, Z230 Workstation model, and the 32GB workstation configurations that were present within the baseline **Verity Voting 2.5** system.

The following modifications are implemented in this release:

Proposition text wrapping

Affected Software and Devices: Verity Data

If the proposition text of a contest does not fit entirely in the remaining space of a column, the system now supports wrapping proposition text to adjacent columns.

Ballot Layout Validations

Affected Software and Devices: Verity Data

Verity Data now includes ballot validation for propositions that do not fit on a single page. Validation for propositions that do not fit in a single column is removed.

Column forces by precinct-split

Affected Software and Devices: Verity Data

Verity Data now allows users to apply column and page forces to contest by precinct-split.

No candidates have filed

Affected Software and Devices: All

Support has been added for contests where no candidates have filed.

Concurrent write-in assignment

Affected Software and Devices: Verity Count

Verity Count now supports the simultaneous adjudication of write-in within a single task on multiple Count Client workstations.



- A new “Refresh” button and “Last Updated” time indicator are added.
- Adds a new contest selection dropdown experience, that will show all contest that are currently checked out by users.
- New button “Post” added to the election dashboard, to the “write-in resolution” section of the screen. The post button captures the entire write in resolution state of the task and moves it to become available for reporting.

Support for 10 voting types

Affected Software and Devices: Verity Count

Now supports 10 voting types system-wide.

- A new “Results by Category” report supporting up to 10 Voting Types.
- The following Count reports and exports now display up to 10 voting types
 - Cumulative
 - Precinct
 - District
 - Canvass
 - HTML Cumulative
 - HTML Precinct
 - HTML Canvass
 - Detailed Vote Total export

Verity Count MVR Improvement

Affected Software and Devices: Verity Count

Verity Count supports batch subtraction of records during a Manual Vote Recording session. Supported use cases may include changing election data source or other error corrections.

Configuration Changes to Devices

The Verity series of Direct Recording Electronic (DRE) devices are not included in the Verity Voting 2.6 configuration. The DRE devices include Verity Touch and Verity Touch with Access.

Configuration Changes to Workstations

Verity Voting 2.6 only supports workstation models that are equipped with 64GB of memory. As such, the Hewlett Packard Z230 workstation model is not supported in this configuration.

Corrected Defects

The following defects found in Verity Voting 2.5 have been corrected in the Verity Voting 2.6 modification:



Product	Description of Verity Voting 2.5 Defect	Resolution/Results In Verity Voting 2.6
Verity Central	A user was unable to import a Certified Write-in Candidates list that had just been exported.	This has been corrected.
Verity Count	Voting types were not following sequential order in the Reporting Options Screen.	Voting types order has been corrected.

2.1.4 Materials

The following test materials are required for the performance of testing including, as applicable, test ballot layout and generation materials, test ballot sheets, and any other materials used in testing.

- Ballots & blank ballot grade paper
- Thumb drives
- USB dongles
- Ballot marking pens
- Printer paper rolls

2.1.5 TDP Documents Used to Support Testing

The vendor documents used to support testing of the **Verity Voting 2.6** system are listed in Attachment F of this document.

2.2 System Overview

2.2.1 Scope of the Hart Verity Voting 2.6 Voting System

This section provides a description of the scope of **Verity Voting 2.6** voting system components.

The **Verity Voting 2.6** system represents a set of software applications for pre-voting, voting and post-voting election project activities for jurisdictions of various sizes and political division complexities.

Verity Voting 2.6 functions include:

- Defining the political divisions of the jurisdiction and organizing the election with its hierarchical structure, attributes, and associations.



- Defining the election events with their attributes such as the election name, date and type, as well as contests, candidates, referendum questions, voting locations and their attributes.
 - Preparing and producing ballots for polling place and absentee voting or by-mail voting.
 - Preparing media for precinct voting devices and central count devices.
 - Configuring and programming the **Verity Scan** digital scanners for marked paper ballots and Verity Touch Writer printed vote records.
 - Configuring and programming the **Verity Touch Writer BMD** devices.
 - Configuring and programming the **Verity Touch Writer Duo Standalone** BMD devices.
 - Configuring and programming the **Verity Controller** with **Verity Touch Writer Duo** BMD devices.
 - Configuring and programming the **Verity Print** on-demand ballot production device.
 - Transmission of the election results via **Verity Relay**.
 - Producing the election definition and auditing reports.
 - Providing administrative management functions for user, database, networking and system management.
 - Import of the Cast Vote Records from **Verity Scan** devices and **Verity Central**.
 - Preview and validation of the election results.
 - Producing election results tally according to voting variations and election system rules.
 - Producing a variety of reports of the election results in the desired format.
 - Publishing of the official election results. Auditing of election results including ballot images and log files.
- **Verity Scan** is a digital scan precinct ballot counter (tabulator) that is used in conjunction with an external ballot box. The unit is designed to scan marked paper ballots or Verity Touch Writer Duo printed vote records, interpret and record voter marks on the marked paper ballot or record voter selections on the printed vote records, and deposit the ballots into the secure ballot box.
 - **Verity Relay** provides remote transmission capability. Utilizing an optional modem with **Verity Scan**, at close of polls, results are transmitted from the polling place device to the **Verity Relay** workstation.
 - The **Verity Touch Writer** is a standalone precinct level Ballot Marking Device (BMD) which also includes an Audio Tactile Interface (ATI), which allows voters who cannot complete a paper ballot to generate a machine-readable and human readable paper ballot, based on vote selections made, using the ATI.



- The **Verity Touch Writer Duo** is a daisy chained configuration of a **Verity Controller** device configured with up to twelve **Verity Touch Writer Duo** BMD devices, which allows voters to utilize the touchscreen or optional Audio Tactile Interface to generate a machine-readable and human readable printed vote record, based on vote selections made.
- The **Verity Touch Writer Duo Standalone** is a standalone BMD device, which allows voters to utilize the touchscreen or optional Audio Tactile Interface to generate a machine-readable and human readable printed vote record, based on vote selections made.
- **Verity Print** is an on-demand ballot production device for unmarked paper ballots.
- **Verity Election Management** allows users with the Administrator role to import and manage election definitions. Imported election definitions are available through the Elections chevron in Build. Users can also delete, archive, and manage the election definitions.
- **Verity User Manager** enables users with the correct role and permissions to create and manage user accounts within the **Verity Voting** system for the local workstation in a standalone configuration, or for the network in a networked configuration.
- **Verity Desktop** enables users with the correct roles to set the workstations' date and time, gather **Verity** application hash codes (in order to validate the correctness of the installed applications), and access to Windows desktop.
- **Verity Data** provides the user with controls for entering and proofing data and audio. **Verity Data** also performs validation on the exported information to ensure that it will successfully import into **Verity Build**.
- **Verity Build** opens the election to proof data, view reports, and print ballots, and allows for configuring and programming the **Verity Scan** digital scanners, and **Verity Touch Writer** and **Controller/Touch Writer Duo** BMD devices, **Verity Print**, as well as producing the election definition and auditing reports.
- **Verity Central** is a high-speed, central digital ballot scanning system used for high-volume processing of ballots (such as vote by mail). The unit is based on COTS scanning hardware coupled with custom **Hart**-developed ballot processing application software which resides on an attached workstation.
- **Verity Count** is an application that tabulates election results and generates reports. **Verity Count** can be used to collect and store all election logs from every **Verity** component/device used in the election, allowing for complete election audit log reviews.



3 Certification Test Background

3.1 Revision History

Please see the Revision History on pg. 2.

3.2 Implementation Statement

Verity Voting 2.6 is a modification of Verity Voting 2.5 designed to conform to VVSG 1.0 (2005) standards.

Verity Voting 2.6 documents submitted as part of the EAC Application for Voting System Testing have been written to meet the guidance provided by the EAC *Voting System Testing and Certification Manual* Section 3.2.

The Conformance Checklist shown in Section 5 indicates the requirements of the VVSG 1.0 to which Verity Voting 2.6 is designed to conform. The following sections of Volume I are not applicable to the system being submitted for certification testing, as Verity Voting 2.6 does not include the applicable functionality:

- *Section 3.3.1.c – Biometric identification and authentication*
- *Section 7.9 – Voter Verifiable Paper Audit Trail*

As Verity Voting 2.6 is a paper-based solution only, and therefore does not incorporate Hart's DRE device suite, the following sections are not applicable to the system being submitted for certification testing.

- 2.1.2.f
- 2.1.4.k
- 2.1.4.l
- 2.3.1.3
- 2.3.2
- 2.3.3.3
- 3.1.2.f
- 3.1.2.g
- 4.1.1.b
- 4.1.4.3
- 4.1.6.2
- 4.3.5.b
- 5.4.3.b.iv
- 5.5

3.3 PCA - Document and Source Code Reviews

The Physical Configuration Audit (PCA) review of the **Verity Voting 2.6** documentation submitted in the Technical Data Package (TDP) was performed in



order to verify conformance with the Election Assistance Commission Voluntary Voting System Guidelines 1.0 (EAC VVSG 1.0). Source code was reviewed for each modified software and firmware application declared within the voting system.

All PCA document reviews were conducted in accordance with Vol. 2 Section 2 of the EAC VVSG 1.0, to demonstrate that the system meets the requirements. Inconsistencies or errors in documentation were identified to **Hart** in a discrepancy report for resolution or comment. This discrepancy report is included as Attachment G in this document.

All PCA source code reviews were conducted in accordance with Vol. 1 Section 5.2 and Vol. 2 Section 5 of the EAC VVSG 1.0, to demonstrate that the system meets the requirements. Inconsistencies or errors in the source code were identified to **Hart** for resolution or comment. This source code review summary is included as Attachment H in this document.

3.4 FCA - Functional & System Testing

The Functional Configuration Audit (FCA) review of the test documentation submitted by **Hart** in the TDP was conducted according to the VVSG v 1.0 Vol. 2 Section 6.7.

SLI’s standard Test Suites were customized for the **Hart Verity Voting 2.6** voting system and conducted in accordance with VVSG v 1.0 Vol. 2 Section 6, in conjunction with the functional testing. Simulations of elections were conducted to demonstrate a beginning-to-end business use case process for the **Hart Verity Voting 2.6** voting system.

3.4.1 Test Methods

All test methods employed are within the scope of SLI’s VSTL accreditation.

The following validated test methods were employed during this test campaign:

Table 6 – Test Methods

SLI VSTL Test Method Name
TM_Audit_Record_Data v1.1
TM_Ballot_Formatting_and_Production v1.1
TM_Error Message and Recovery v1.3
TM_Pre-Voting_Capabilities v1.2
TM_Readiness v1.1
TM_Security_Access_Control v1.1
TM_Security_Software_Security v1.1
TM_Security_Telecommunications_and_Data_Transmission v1.2
TM_Security_Transmission_of_Official_Data_over_Public_Networks v1.1



SLI VSTL Test Method Name
TM_Security_Wireless_Communications v1.2
TM_Tally_and_Reporting v1.1
TM_Telecommunications v1.1
TM_Voting_Capabilities v1.3

The above listed test methods are implemented in a complementary fashion: modules are employed from various methods to form suites. Suites include a logical sequence of functionality that is used to validate the requirement addressed by each module within the suite.

4 Certification Test Results Summary

4.1 Source Code Review Summary

SLI has reviewed the modified software source code for each application in the **Verity Voting 2.6** voting system to determine the code's compliance with the EAC VVSG 1.0, *Volume 1 Sections 5, 9* and *Volume 2 Section 5.4* and for compliance with **HART's** internally developed coding standards. **Verity Voting 2.6** is implemented with the C, C++, and C# languages.

4.1.1 Evaluation of Source Code

As a modification project, the **Verity Voting 2.6** code base was reviewed using the final **Verity Voting 2.5** code as the baseline, to which the initial **Verity Voting 2.6** code base was compared. The differences found between those two code bases served as the starting point of the code review.

The source code is written adequately in terms of the VVSG 1.0. The code is modular and there is sufficient error handling. Readability is sufficient and supports maintainability. The source code was found to be compliant to the VVSG 1.0 and **Hart** declared industry standards. Please see Attachment H for details on the **Verity Voting 2.6** source code review.

4.2 Technical Data Package Review Summary

As this is a modification project, SLI reviewed the **Verity Voting 2.6** TDP against the final TDP for **Verity Voting 2.5**. The differences between the two TDPs were reviewed for compliance with the EAC VVSG 1.0 according to *Volume 2 Section 2*. The documents that are a part of the **Verity Voting 2.6** system are detailed in Attachment F of this document.



4.2.1 Evaluation of TDP

Three documentation discrepancies were written during the PCA documentation review phase. The issues identified were related to either incorrect or missing information. Details of the discrepancies can be found in Attachment G of this document.

Each of the discrepancies were addressed and resolved with updated documentation prior to the writing of this report. Once all identified discrepancies were resolved, the Technical Data Package for the **Verity Voting 2.6** voting system was found to comply with all applicable standards.

4.3 Functional Testing Summary

4.3.1 Test Suites Utilized

SLI performed tests designed to functionally verify the modifications listed in section 3.2 of this report. The testing incorporated end-to-end election scenarios testing the functionality supported by **Hart**. The following sections detail the test suites that were executed.

4.3.1.1 Modifications

The Modification test suite examined each modification introduced into **Verity Voting 2.6** in order to verify that the modifications implemented, and the subsequent Trusted Build of the firmware, did not adversely affect operations. Various elections were used to exercise the devices and workstations such that each specific modification was functionally verified, with an appropriate quantity of regression testing performed as determined by analysis of the modifications.

4.3.1.2 Security

A security test suite was designed and executed to verify the security posture of the **Verity Voting 2.6** system has remained unchanged from the baseline system.

The examination of the McAfee Whitelisting tool version was completed to ensure it was properly implemented on a new windows-based operating system. All attempts to circumvent or render the whitelisting ineffective were unsuccessful. Software access controls were tested. All attempts to circumvent or manipulate the kiosk mode were unsuccessful. All user roles and authentication mechanisms were properly implemented per the vendor documentation. Attempts for user privilege escalation and all attempts to perform unauthorized or restricted system functionality were unsuccessful.

Automated vulnerability scans were taken of all networked machines to establish system vulnerabilities as well as determine any and all open networking ports. Communications between **Verity Relay** and **Verity Scan** were monitored after



leaving the public cellular network. Network analysis tools were used to obtain network packet captures to examine communication and authentication attempts between devices, and to assess that appropriate encryption is utilized. Vulnerability scans were conducted of all devices that were connected via public or proprietary networking. The communications between **Verity Controller** and daisy chained devices were also examined to confirm that communications were encrypted and that “Man in the Middle” attacks were resisted, and unsuccessful.

4.3.1.3 General Election

A General Election test suite was performed in order to verify proper integration of the full **Verity Voting 2.6** system, and that all components continue to work as expected. This election variant focused on election components such as N of M, overvotes, undervotes, multiple precincts, and scanning to accept both ballots and PVRs in a single session.

4.3.1.4 Open Primary Election

An Open Primary Election test suite was performed in order to verify proper integration of the full **Verity Voting 2.6** system, and that all components continue to work as expected.

4.3.1.5 Verity Count

The **Verity Count** application was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the application.

4.3.1.6 Verity Data/Build

The **Verity Data/Build** application was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the application.

4.3.2 Evaluation of Functional Testing

In this test campaign, the **Verity Voting 2.6** voting system was subjected to examination for changes, updates, and modifications made from the previously certified system, **Verity Voting 2.5**, against applicable requirements within the EAC VVSG 1.0.

Through the duration of testing, two functional discrepancies were written. Details of these discrepancies can be found in Attachment G of this document. One of the discrepancies was reported, resolved, and re-tested as applicable. The remaining functional discrepancy was not resolved. However, it related to a minor typo and was assigned an importance level of “Insignificant”, thus was reported as optional to



address. Once the significant functional discrepancy was resolved, no violation of conformance to the EAC VVSG 1.0 requirements was observed. All components of the **Verity Voting 2.6** voting system have successfully passed all tests.

5 Recommendation

SLI has successfully completed the testing of the **Hart Verity Voting 2.6** voting system. It has been determined that the system meets the required acceptance criteria of the Election Assistance Commission's Voluntary Voting System Guidelines 1.0.

This recommendation reflects the opinion of SLI Compliance based on testing scope and results. It is SLI's recommendation based on this testing effort that the EAC grant certification of the **Hart Verity Voting 2.6** voting system.

6 Signature

Traci Mapps
Director
April 5th, 2021

7 Appendix – Ancillary Products

Ancillary systems represent products and utilities that are not part of the EAC certified system configuration; however, they may be used to facilitate testing.

Ancillary systems include:

- Optional Verity Duo Go - a carrier for use with **Verity Touch Writer Duo** and **Verity Touch Writer Duo Standalone** to allow for “curbside” voting.
- Optional ATI Device
Manufacturer: AbleNet
Device: Dual Jelly Bean Switch

End of Certification Test Report
