Hart Verity Voting 2.4

The Hart Verity Voting election system was examined at Hart's north Austin office during the week starting on Monday, 4/13/20 through Friday, 4/17/20. This was to protect the examiners and Hart personnel during the Corvid-19 pandemic. Only two examiners were allowed to visit the Hart facility at a time. The examination could be observed via a live stream on the days the examiners were not on site. This allowed us to ask questions as needed. I was assigned to visit Hart on Friday with another technical examiner.

The Verity 2.4 release was certified by the Federal Elections Assistance Commission (EAC) in February 2020. Release 2.4 is a modification to the 2.3 release which was certified in Texas in 2019. Jurisdictions interested in this system are advised to review the findings outlined in my report for the 2.3 release.

There were no major changes to the previously certified voting machines or software components. The significant changes to the system include: improved ballot numbering, updates to some COTS components, security and performance improvements, and user interface and reporting improvements.

The following table lists the Verity 2.4 components used for the examination.

Table 1 - Releases for Proprietary Software Components

Software	Version	Location
Verity Data (data management)	2.4.2	central
Verity Build (election definition)	2.4.2	central
Verity Central (central bulk high-speed scanner)	2.4.2	central
Verity Count (tabulator/accumulator/reporting)	2.4.2	central
Verity Print (ballot on demand)	2.4.2	polling location
Verity Scan (precinct scanner)	2.4.2	polling location and/or central
Verity Touch Writer (BMD)	2.4.2	polling location
Verity Touch Writer Duo (BMD)	2.4.2	polling location
Verity Touch (DRE)	2.4.2	polling location
Verity Controller (used to activate and record votes of daisy chained devices)	2.4.2	polling location

For a detailed listing of all the hardware components and applications (including COTS) used in the 2.4 release please refer to the EAC's certification test report.

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Findings

- The responses provided on Form-101 are acceptable.

- The Technical Data Package (TDP) documentation provided appears to be adequate.

- The system software was successfully built on the first day and the hash values were verified to match the values of the executables sent from the EAC.

- The system limitations outlined in the EAC's Scope of Certification document are acceptable.

- The pre-marked and the manually voted test ballots were recorded and tallied correctly.

- Accessibility testing went well; no issues reported.

- The COTS component changes to the system are:

  Okidata COTS ballot printers - models C844dn and C931e can now be used due to manufacturer obsolescence of the existing the C931dn model.

  Verity Print, Verity Touch/Touch with Access and Verity Touch Writer devices now an updated smart touch panel. This was necessary because of manufacturer obsolescence of the previous panel's chipset.

  Canon DRG-2110 and DRG-2140 central scanners are now used due to manufacturer obsolescence of the existing certified models.

- The security enhancements include:

  2-factor authentication is now required by all operators of the system.

  All election data is secured with NIST FIPS 140-2 cryptography.

  Bitlocker is now used on all workstation and server hard drives to encrypt all election data.

  The security key on a vDrive is now validated on each device with a special vDrive with the Verity key and password.

  Whitelisting is used to control what peripherals can be used on devices and central

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workstations.

The precinct USB devices (scanners, printers) are connected with proprietary interfaces on the Verity device side. The printer and scanner side of the USB cable is normal.

Daisy chain cables are proprietary. The Verity Touch (DRE) and TOUCH Duo can be daisy chained. Scanners and Touch Writers are not daisy chained.

All devices now have an "Additional Features" menu accessible at boot time which includes "Validate" which is used to produce device hash files, and "Change Certificate Set" used to update the security certificates. The same functionality is also provided on the workstations.

- There was a significant enhancement to the ballot numbering. The new ballot numbering satisfies the Texas requirement for ballot numbering while maintaining voter anonymity. Both regular and printer voter record (PVR) ballots now have a Unique Ballot Identifier printed on them. The Unique Ballot Identifiers are printed in both base-36 and base-10. The identifier indicates the device type (i.e. Touch Writer), the device's ID, the session number, and a pseudo random number at the end.

  A new "Ballots Issued Report" is accessible from the Verity Touch Writer, the Verity Controller (for the Verity Touch Duo and Verity Touch DRE's), and Verity Print that will show every unique ballot ID issued from a device. The order of the list is shuffled so that unique IDs are reordered to prevent association to a specific voter. The report is specific to the election and voting machine.

- Verity Count will now prompt the operator to check for additional ballots on the vDrive when a duplicate vDrive is read. The operator must enter the administrator credentials to add those ballots to the vote totals if additional ballots are found.

  Duplicate printed ballots are rejected on the precinct and central scanners.

- Verity Data will now associate newly created polling places with all political parties by default. This feature saves time.

- Verity Central can now support up to 8 networked clients per server for the "high scale" configuration to increase throughput.

- The Verity 2.4 system still has the capability for straight party voting. It must first be set up in Verity Data. Texas law no longer allows straight party voting in September, so if it is accidently set up after the law goes into effect, it should be discovered during pre-election testing and removed.

- An issue on a Verity Touch Duo was encountered during the week. The Duo indicated that there were 2 sheets in the printer when there was not. The vendor said that they have seen this

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before. They discovered that the paper was hitting a screw or burr protruding in the paper path. The vendor said they had fixed all the devices in the field, but had not fixed the test unit. We asked to observe the fix. After the fix was applied, the path was still showing a gap that could snag a ballot upon insertion. We experienced this, but we had no issue when the printed ballot was returned to a voter as reported in the field and by other examiners. The vendor said that for cases in the field where a gap existed after the fix, the unit was RMAed. It was reported that only a "handful" had to be RMAed. If this happens on election day, the best remedy is to print another ballot using poll worker access.

- Central Scan cannot scan the Duo printed vote records (PVR's). PVR's must be scanned on a precinct scanner (Verity Scan). Note that precinct scanners can be configured to scan Duo PVR's or regular ballots, but not both.

- The QR code printed on a voted ballot does not contain the voter selections. Only the election and precinct information, and a hash of voter's selections are contained within the QR code.

- The new tablets now trickle charge when plugged into their base. The old tablets did not trickle charge.

- Tablets cannot be hot swapped from one device to another after they are initialized. The tablets are married to their base by serial number during initialization (done in the warehouse typically).

- When a race is over-voted on any of the Touch voting devices, a pop-up message indicates that one of the selections was deselected. The first candidate that the voter selected is deselected regardless of the candidate order on the ballot.

- When the printer was disconnected from a Touch Writer an error message popped up. When the cable was reinserted, it resolved itself. However, when we tried to manually resolve, not all options presented on the menu were operational. This did not affect operations.

- Using a pencil eraser and q-tips to make selections on the touch screens worked fine. Selecting candidates this way may be desired or required due to the increased risk of infection due to the pandemic.

- Paper provisional ballots would not scan in precinct as expected. Paper provisional ballots are not adjudicated on a Verity computer system. They are dispositioned manually. If a provisional ballot is deemed acceptable, the Central scanner will accept it like any other ballot.

   DRE provisional ballots cast will not increment the public ballot counter on the Vertity Controller.

- Curbside voting on a Touch DRE worked well. When the tablet was reconnected to its base, the votes were transferred to the Verity Controller and its public ballot counter was incremented.

   The previous release required the last tablet in a daisy chain of DRE's to be used. Now any

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tablet in the chain can be used because the voting stations are chained together from their bases, not the tablets . The daisy chain to 2nd Touch DRE was not broken (it remained operational) when the 1st tablet in the chain was used to do curbside voting.

The Touch Duo could be used for curbside voting, but the whole system (not just the tablet) must be taken to the curb. Therefore, the Touch DRE is easiest for curbside.

- If the Verity Controller needs to be replaced on election day, a new vDrive must be used. If this happens, the Verity Count system needs to be re-configured to expect the 2 vDrives.

- The Verity Relay sub-system is not being certified as part of this system, but was reviewed anyway. It can be used to transmit results from a precinct location to a central site on election day. Verity Relay requires a workstation at the central site and a modem in a precinct scanner. An operator at the central location must accept the transferred file. The Relay file transmitted must be copied to a vDrive to be processed by a Verity Count machine.

  There were no modems in the examined devices. If Relay was allowed, a proprietary USB modem would be used and it would be locked under the top door of the scanner.

  A COTS modem would not work so a jurisdiction could not use Relay if they tried.

Conclusion

The modifications to the Verity applications and voting devices were relatively minor. The new hardware (printers, scanners, tablets) worked as well as the previous COTS components. There is no loss of functionality or security in this release.

I believe the Hart Verity 2.4 system meets the requirements of the Texas Election Code. I recommend certification.

Tom Watson
Examiner