

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF STATE**

**RESULTS OF ES&S ELECTRONIC POLL BOOK EZRoster 3.5.0.1  
EVALUATION**



**Issued By:**

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## **RESULTS OF THE EZRoster 3.5.0.1 ELECTRONIC POLL BOOK EVALUATION**

### **I. INTRODUCTION**

Pennsylvania's voter registration law, Act 3 of 2002 (Act 3), 25 Pa.C.S. §§ 1101 et seq., requires that the poll book or district register "shall be in a form prescribed and approved by the Secretary" for both paper and electronic poll books, (25 Pa. C.S. §1402(b)(2)). Pursuant to the request by Election Systems and Software (ES&S), the Department of State (Department) evaluated the EZ Roster 3.5.0.1 Electronic Poll Book (EPB) to ensure that the system complies with all the applicable requirements of Act 3, including the regulations implementing Act 3, 4 Pa. Code §§ 183.1 et seq., and the Pennsylvania Election Code, 25 P.S. §§ 2601 et seq., and therefore can be used in Pennsylvania elections. The evaluation consisted of in person system demonstrations conducted by the Department with ES&S, conference calls and email communication with ES&S personnel and documentation review. The in-person demonstrations happened on February 7, 2017 in Hearing Room 5 and October 18, 2017 in Ocean room of Keystone Building located at 400 North Street, Harrisburg, Pennsylvania. Marian Schneider, then Deputy Secretary for Elections and Administration; Jonathan Marks, Commissioner of the Department's Bureau of Commissions, Elections and Legislation; and Kathleen Kotula the Department's Deputy Chief Counsel, represented the Secretary of the Commonwealth (Secretary) on February 7, 2017. Commissioner Marks; Jessica Myers, Deputy Director of Policy; and Ian Everhart, Attorney, Office of the General Counsel represented the Secretary of the Commonwealth on October 18, 2017. ES&S was represented by John Lento, then ES&S Senior Certification Specialist, on February 7, 2017; and Steve Pearson, Sr. Vice President Certification, and TJ Burns, State Certification Manager, on October 18, 2017. Staff members of Bureau of Commissions Elections and Legislation (BCEL) and the Department's Office of Chief Counsel also attended the demonstration. ES&S team members were available for teleconference discussions during the demonstration. The Department videotaped the demonstrations on both days.

## II. THE EZRoster 3.5.0.1 ELECTRONIC POLL BOOK

The EZ Roster 3.5.0.1 EPB demonstrated for use in Pennsylvania included the following components: (1) ExpressPoll Tablets -Toshiba Encore 2/Encore 10 windows tablet with EZ Roster 3.5.0.1 software, integrated poll book stand, swivel stand and peripheral devices; (2) EZRoster Emulator; and (3) CentralPoint. The following is a brief description of the components summarized from the documentation supplied by ES&S.

- **ExpressPoll Tablets -**

- Toshiba Encore 2 tablets purchased from ES&S come pre-installed with Windows 8 Professional and EZRoster 3.4 or later.
- Toshiba Encore 10 tablets purchased from ES&S come pre-installed with Windows 10 Professional 64 bit and EZRoster 3.5 or later.

The tablets are configured to operate in kiosk mode and are designed for use by poll workers at the polling place, to identify voters and record the issuing of ballots during an election. The tablet stores voter data on internal memory and a microSD card. The kiosk mode allows a non-admin user to access EZRoster software and its features required to “check-in” a voter at a polling place. The system also supports an administrative windows user under a “supervisor” role to perform specific EZRoster operations that require privileged access.

- **The Toshiba Encore 2 Swivel Stand and Toshiba Encore 10 Integrated Poll book stand -**

The stands allow housing the integrated devices and peripherals required for use at a polling place and facilitate easy assembly. A list of supported integrated and peripheral devices are listed in Attachment D.

- **EZRoster Emulator and resources -**

EZRoster Emulator is used to simulate the EZRoster software on a computer (PC). The emulator software is used for testing the election database file, editing the resource file and viewing the effect of the edit on the EZRoster software.

Once the changes to the resource file and data preparation is complete, the files from the EZRoster Emulator PC can be copied to a USB thumb drive for installation and testing on the tablet.

- **CentralPoint -**

CentralPoint is the web-based application that compiles data from tablets to display and track polling place activities in real-time, allowing election administrators to monitor polling locations and mitigate issues. The data recorded on CentralPoint can be viewed in dashboard formats like charts, maps and reports and can be configured to display and update in near real-time. CentralPoint also allows communicating to polling places from election office via instant messages or email.

### **III. EVALUATION APPROACH, PROCEDURES AND RESULTS**

#### **A. Evaluation Approach**

To evaluate whether EZRoster 3.5.0.1 EPB can be successfully used for elections in the Commonwealth of Pennsylvania and meets all the requirements mandated by Act 3 and the Pennsylvania Election Code the following approach was used: (1) System Demonstration; and (2) Documentation Review.

The Department requires a System Demonstration to confirm on a field-ready system that the EPB satisfies all the statutory requirements and to understand the capabilities of the system. The documentation review consisted of analyzing the system specifications, user manuals, vendor quality assurance testing, code comparison, Voting System Test Laboratories (VSTL) test reports and other third-party reports. Electronic poll books are heavily configurable distributed systems, typically consisting of networked tablets or laptops used at the polling place to check-in voters. They work in conjunction with a central server performing the management functions, which include: preparing the election data, performing voter history updates and monitoring deployed devices at polling places. The documentation review was conducted to confirm that the system can be efficiently used for

elections in the Commonwealth of Pennsylvania and to aid in deciding the EPB connectivity configuration to be approved for use in Pennsylvania.

## **B. Procedures**

### **1. System Demonstration**

Representatives from ES&S demonstrated the EZRoster 3.3.1.0 system on February 17, 2017. The demonstration included an end to end set up and capability walkthrough of both the tablet used at the polling place and the CentralPoint system. ES&S used the test data supplied by the Department for the demonstration. The purposes of the demonstration were to (a) validate that the system complies with Pennsylvania's statutory requirements for poll books; (b) discuss the overall capabilities of the system; and (c) to evaluate the level of compliance with the Commonwealth Information Technology Policies (ITPs) outlined in Attachment C of this report. Before the Department finished considering the evaluation results, ES&S released an updated version of the software with newer hardware and operating system. They presented this system for approval in Pennsylvania.

ES&S representatives demonstrated the EZRoster 3.5.0.0 system to Department on October 18, 2017. The demonstration consisted of an end to end walk thru of the system functionality and a review of the security features of the system. During the demonstration and discussions, the Department identified that the access to the maintenance functions - including system id settings, back up options, transaction log management and network settings - required enhanced access control.

ES&S released a new version of the software, EZRoster 3.5.0.1, changing access controls on the maintenance functions to make them more secure. They presented this for approval to the Department in December 2017. ES&S submitted documentation to substantiate that the new release included only the requested security enhancement and the functionality of the EPB remained unchanged from the earlier version demonstrated. The Department did not require an additional full demonstration of the EZRoster 3.5.0.1, because a review of system functionality and verification of compliance to statutory requirements occurred during the demonstrations held for EZRoster 3.3.1.0 and EZRoster

3.5.0.0 in February and October 2017.

## **2. Documentation Review**

The Department requested the following documentation from ES&S for review.

1. System Specifications;
2. Hardware/Software/Peripherals/Additional Equipment Requirements;
3. Technical Data Sheet;
4. User Manual;
5. Usability Reports;
6. Security and Penetration Testing Reports
7. Internal Quality Assurance test details
8. Code compare results between 3.5.0.0 and 3.5.0.1 and;
9. Reports from other states using the system.

Department staff reviewed the supplied documentation and analyzed the documentation of the system in detail.

## **3. Results**

### **1. System Demonstration Results**

- a) Conformance to statutory requirements - The vendor successfully demonstrated that the EPB system conforms to the statutory requirements outlined in Pennsylvania law. The demonstration performed on EZRoster 3.3.1.0 and EZRoster 3.5.0.0 both proved that the system can be configured to meet the statutory requirements. *See Attachment A* for the list of statutory requirements discussed and validated during the demonstration.
- b) Review of system capabilities - The Department reviewed the overall functional and nonfunctional capabilities of the system during the demonstration and documentation review. *See Attachment B* for the list of system functional and nonfunctional capabilities discussed during the demonstration and a brief overview of the discussion points.

- c) Level of Compliance with Commonwealth IT policies – The Department provided ES&S with a copy of the Commonwealth of Pennsylvania IT policies relating to the security of distributed systems and system connectivity. The Department also provided ES&S with a questionnaire they completed and submitted as part of the examination request. The Department set aside time during the demonstrations to discuss the security architecture of the system. The written response to the questionnaire and the security discussion with ES&S technical team during the demonstrations allowed Department staff to evaluate the system’s level of compliance to Commonwealth IT policies and to understand the security features of the system. *See Attachment C* for the specific policies and discussion summary that occurred during the demonstration and the questionnaire.

## **2. Documentation Review Results**

Department staff analyzed the documentation provided by ES&S to understand the system capabilities in detail. The submitted documentation included test reports for EZRoster 3.3.1.0 and EZRoster 3.5.0.0 by Pro V&V, a federally recognized VSTL, to attest conformance to PA state statutory requirements. No anomalies were reported as part of the VSTL testing.

The Department reviewed the code comparison reports submitted by ES&S as part of the EZRoster 3.5.0.1 application. The review ensured that the only changes between EZRoster 3.5.0.0 and EZRoster 3.5.0.1 was the security enhancement for maintenance function access control. The quality assurance test details submitted by ES&S represented that regression testing was performed on EZRoster 3.5.0.1 to test all functionalities of the system.

The demonstration and documentation review determined that EZRoster 3.5.0.1 consists of Encore2/Encore 10 tablets configured as kiosks to perform voter check-in activity at the polling place and a CentralPoint server hosted on a cloud server to perform administrative functions. The system allows the following modes of configuration:

- A live (fully connected) mode where data flows continuously between cloud-based CentralPoint servers and all tablets in use at a polling place;
- A restricted server communication mode where the system can be configured to transfer only operational/performance data from the tablets to the CentralPoint cloud server. The data transmitted doesn't contain any voter check-in data. This configuration allows monitoring of the polling place devices remotely;
- A configuration where the tablets at a polling place communicate to each other without any connection to the CentralPoint cloud server. This configuration allows voter check-in data to sync up in a polling place, thus allowing the use of multiple Tablets at a polling place.

The networked environment makes the EPB system vulnerable to hacking attempts that can compromise the integrity of check-in data and/or result in unauthorized access to voter data. The Department staff analyzed the connectivity configurations discussed during the demonstration in conjunction with the documentation provided and existing Department test protocols for Electronic Poll Books to come up with the connectivity approved for use in Commonwealth of Pennsylvania, which minimizes the security risks and maximizes the benefits in moving to an EPB solution.

### **3. Observations**

Department staff noted the following as part of the demonstration and documentation review.

- 1) EZRoster 3.5.0.1 uses software configuration features to determine the final functional behavior of the system. Even though the demonstration and subsequent evaluation showed that the system can be configured to satisfy all the statutory requirements, the Department will need assurance that the system setup complies with the approved configuration after purchase.



- 2) The deployed system security posture will depend on the parameters selected during set up. This will necessitate validating the configuration during and after the setup activity to ensure that the system is configured in a secure manner.
- 3) EZRoster 3.5.0.1 election set up requires the involvement of ES&S data conversion team for preparing the data to be loaded to the tablets. The data extracted from the Statewide Uniform Registry of Electors (SURE) system is transferred via secure file transfer to ES&S for conversion services. ES&S team prepares the data and the converted data is then transferred back to the county to be loaded to the emulator and then the tablets. The data transfer and conversion services outside of the county IT offices will require strict monitoring and access control policies to avoid data compromise.
- 4) The system audit logging design is geared towards ensuring an audit trail of the check-in activities performed by the poll worker at the polling place. Capture of logs required for detecting and managing security incidents will require further analysis during acceptance test.
- 5) EZRoster 3.5.0.1 deployed in fully connected mode or restricted server communication mode communicates with the cloud server located outside of the polling place and transmits transactional and operational data throughout Election Day to the CentralPoint server. The demonstration included a discussion of the full capabilities of the system. The live or restricted mode maintains a communication channel between the polling place and cloud server for the entire time the polls are open on Election Day. The product manufacturers represent the transmission to be secure but in absence of penetration testing, it is not advisable to approve a connectivity configuration where the Tablets communicate to the CentralPoint server in real-time on Election Day.

#### **IV. CONDITIONS FOR APPROVAL**

Based on the evaluations, the Secretary of the Commonwealth of Pennsylvania approves EZRoster 3.5.0.1 subject to the following conditions:

- A. The tablets in operation at a polling place **must not** be configured to communicate to the CentralPoint server during the polling hours on Election Day. The tablets in operation at a polling place can communicate to synchronize voter check-in data between each other at the polling place during the polling hours.
- B. Any data transfer required during the process of election set up and voter history updates between the county and ES&S data conversion services must happen via secure file transfer process. The file transfer and download must be tracked and audited to make sure that data has not been accessed by unauthorized personnel.
- C. The tablets at an individual polling place communicating with each other must be configured and managed in a secure manner and may never connect to a publicly accessible network. The network at the polling place must be a “closed network” allowing only components of the EPB system to connect and encryption must be enabled. The security settings must prevent other devices from detecting and connecting to the network at the polling place.
- D. Any components which are/were part of the EPB system, including removable media, must not be connected to the Electronic Voting system. This includes, but is not limited to: PEB encoders and Voter Access Cards encoded on the EPB systems; USBs; SD cards; printers; CDs; etc.
- E. Portable media used to transfer files between any components of the EPB system must be new, unmodified and not refurbished. Alternatively, removable media that is being reused must be reformatted before each election. All removable media used for elections must be managed with proper chain of custody and administrative safeguards to protect against disclosure, theft, or damage.
- F. Any unused ports in the Tablet used at the polling place must be sealed with tamper-evident seals.

- G. Counties implementing the EZRoster 3.5.0.1 must implement the system using Encore 2 or Encore 10 tablets. Usage of the EZRoster 3.5.0.1 software on ExpressPoll – 5000/4000 is not approved.
- H. Counties purchasing the EZRoster 3.5.0.1 EPB system must work with ES&S and BCEL to do the following:
1. Implement EZRoster 3.5.0.1 EPB system in a manner that satisfies all statutory requirements outlined in Act 3 and the Pennsylvania Election Code. The parameter configuration and the text of informational messages must be approved by BCEL.
  2. Implement EZRoster 3.5.0.1 EPB system in secure manner that complies with applicable county and Commonwealth IT policies and any best practices published by Department of State BCEL. The system configuration, connectivity set up, password configuration and password management policies must be approved by BCEL; and
  3. Implement EZRoster 3.5.0.1 EPB system with sound administrative practices and proper chain of custody in the same manner as counties deploy Electronic Voting Systems.
- I. Counties implementing EZRoster 3.5.0.1 must change all default passwords including the maintenance PIN during implementation. County election officials must implement processes to confirm and maintain records that default passwords were changed before fielding the system. The proof must be systematic export of log files whenever possible. In situations where the log entries are not detailed enough a screenshot of the password change action performed at the election office or checklist can suffice.
- J. Counties must have a contingency plan to ensure that an election will not be affected should any component (including connectivity and power supply) of the EPB system fail or any or all tablets in use at a polling place malfunction on election day. The

contingency plan must ensure that **no** “check in” information is lost. The contingency plan must be reviewed and approved by BCEL. At a minimum, the contingency plan must ensure the availability of a full voter list and a process for maintaining and reproducing a list of voters who have already checked in if the EPB fails during voting hours.

- K. Counties purchasing the EZRoster 3.5.0.1 must work with BCEL to decide what portion of the data from the SURE system can be shared with the vendor. The counties shall not allow the vendor to run any data extraction utilities against the SURE database/system using scheduled programs. Any data transfer must happen via a file extract and secure file transfer process and must be encrypted. The extract must not contain any additional data elements than what was shared during the evaluation. The data elements and sharing mechanism must be approved by BCEL. Counties must ensure the accuracy of data loaded to the EPB system and maintain appropriate reports as necessary for auditability.
- L. Counties purchasing the EZRoster 3.5.0.1 must work with BCEL to finalize the process of voter history updates. ES&S must be able to adhere to the extract format and timing of the update suggested by SURE system administrators.
- M. ES&S must notify the Department of State of any changes made to EZRoster 3.5.0.1 EPB system. This includes any changes to the software and to the environment of the EPB system, including but not limited to ES&S’s development locations, cloud service vendors, data center locations, for example.
- N. ES&S must escrow a copy of the code, trusted build, any verification/identification software used and installation instructions for safe-keeping to the Commonwealth of PA and add the Commonwealth as a beneficiary to any Escrow accounts they have for safekeeping the EZRoster 3.5.0.1 code.

- O. ES&S must provide fully prepared and version controlled system manuals for counties purchasing the EPB. The manuals must clearly identify each user configurable parameter. Final user manuals must be submitted to the Department before sale of product in Pennsylvania.
- P. Counties must perform a thorough evaluation and User Acceptance Test of the EPB system before purchase. This test should include all expected activities occurring as part of the election including interactions to the SURE system. This approval is based on a demonstration done by vendor and documentation review. Demonstration by the vendor cannot be considered equivalent to testing.
- Q. The counties must work with ES&S to define and implement policies on data retention and archiving on all parts of the EPB system including external servers and removable media. Any election data stored on devices outside of the county network must be deleted and/or archived to physical media with access control as soon as it is no longer required or no later than ninety (90) days after Election Day. Voter data shared with the vendor must be tracked and deleted to avoid data breaches. Counties must retain, as required by law, archived copies of data sent and received from the vendor for audit purposes. ES&S must keep audit logs of every data access event and make those audit logs available for inspection to the counties or BCEL upon request.
- R. All jurisdictions implementing the EZRoster 3.5.0.1 must carry out full Logic and Accuracy testing on each device and maintain records of Logic and Accuracy testing. The Department recommends creating a county specific plan for Logic and Accuracy testing that includes all peripherals and anticipated check in scenarios on Election Day. The vendor supplied Logic and Accuracy checklist should be used as a reference but must not be accepted in lieu of a county specific plan.
- S. ES&S must provide audit log specification documentation to BCEL and counties purchasing EZRoster 3.5.0.1 system. The county election officials and IT personnel

must work with ES&S to understand the system logging capabilities. The county must be able to identify and gather logs that provide audit trail of the transactions at the polling place and logs that aid in identifying and managing security incidents, fraudulent activity and operational problems via application suite audit logs or operating system logs. Processes must be implemented to harvest and safekeep the logs after the election for future analysis and review.

## **V. RECOMMENDATIONS**

The Secretary makes the following recommendations to the counties purchasing the EZRoster 3.5.0.1 EPB system:

- a) The counties should consider using the EPB in pilot mode during the first use in an election. This allows the jurisdictions to ensure that all appropriate checks and balances are in place before using the EPB system in full production mode. For larger counties, the county should also consider implementing in a phased approach to mitigate any unforeseen issues that may arise during implementation.
- b) The Secretary urges counties to ensure that all poll workers and election officials receive appropriate training and are comfortable using the EPB. The training activities should include, but not be limited to, hands-on training on devices to perform election set up and operations at a polling place, cyber hygiene practices and procedures for detecting cyber-attacks. The training should ensure that poll workers and elections officials can detect any warnings that signal cyber-attacks and immediately respond to it. Involvement of poll workers during the implementation project from start to finish with onsite trainings at the polling place is also recommended.
- c) The counties using EPB should implement processes of reconciliation at the close of polls to avoid any discrepancies between ballots and voter check ins recorded on the

EPB. Checklists should be developed for poll workers to ensure compliance with all requirements and reduce the chance of human error. Counties should also work with ES&S to produce quick reference cards for use at the polling place on election day.

- d) The Secretary recommends that counties purchasing the EZRoster 3.5.0.1 EPB system perform proof of concept test onsite at all polling places to ensure connectivity and power supply availability. The Secretary further recommends that the test is conducted with a test system using components of the same make, model and configuration as to what will be used on Election Day. Counties should work with ES&S to make available at least two means of connectivity available for use during Election Day.
- e) The counties should consider using the EZRoster 3.5.0.1 EPB system with Toshiba Encore 10 Tablets and Windows 10 operating system. Using the latest available hardware and operating system will maximize the system lifetime with hardware and operating system vendor support.
- f) The counties using electronic poll books should develop and implement a disaster recovery plan that includes the possibility of a data breach or cyber-attack on the EPB.

## **VI. CONCLUSION**

Based on the demonstration, documentation review, and consultation with the Department staff, the Secretary of Commonwealth concludes that the ES&S EZRoster 3.5.0.1 EPB meets all of the applicable requirements sets forth in Act 3 and the Pennsylvania Election Code, and can be used for checking in voters during elections, provided that all of the conditions listed in Section IV of this report are met.

### Attachment A - Statutory Requirements

Requirement	Demonstrated (Yes/No)
The computer list shall be in a form prescribed and approved by the Secretary. (25 Pa. C.S. §1402(b)(2)).	Yes
<b>Form of the Electronic Poll Book</b>	
Each screen of the EPB shall contain the name of the county. (25 Pa.C.S. § 1402(b)(2))	Yes
Each screen of the EPB shall contain the election district. (25 Pa.C.S. § 1402(b)(2)).	Yes
Each screen of the EPB shall contain the date of the election. (25 Pa.C.S. § 1402(b)(2)).	Yes
Each screen of the EPB shall contain the date and time the list was prepared. (25 Pa. C.S. § 1402(b)(2)).	Yes
<b>Content of the List:</b>	
For each election district, the EPB shall contain an accurate list of the names of the registered electors- alphabetically by last name. (25 Pa.C.S. §1402(b)(2) and 1402(c)).	Yes
<p>Poll workers must have access to the list at all times so that voters can be checked in without interruption. The Electronic Poll Book should provide for the following relating to data recovery and adequate contingencies should one or more elements of the Electronic Poll Book fail:</p> <ul style="list-style-type: none"> <li>▪ Memory Redundancy <ul style="list-style-type: none"> <li>• Internal</li> <li>• External</li> </ul> </li> <li>▪ Data Preservation</li> <li>▪ If the contingency for Electronic Poll Book failure is the printing of paper poll books/precinct lists from the EPB,</li> </ul>	Yes



<p>the EPB must provide for the printing of a paper poll book AND a copy of the list of registered voters within the precinct.</p> <p><b>Demonstration Comments:</b> EPB keeps the data during operation on the hard disk of the tablet and a removable micro SD card to ensure that data is always preserved. The system allows a capability to connect printers and configure reports. Reports can be exported and saved to preserve data at any point in time.</p> <p>The EPB must prevent multiple “check-ins” by the same voter.</p> <p><b>Demonstration Comments:</b> The system demonstration showed that the system identifies an attempt to check in an already checked in voter. The EPB displays an indication of the original check in. In an environment where there are multiple filed systems connected data syncing between the devices must be functioning to ensure multiple “check ins” are prevented.</p>	
<p>A legible digitized signature for each registered elector. (25 Pa.C.S. § 1402(b)(2)).</p> <p>The official digitized signature for each registered elector must be obtained from the Statewide Uniform Registry of Electors (SURE) and it must be displayed in such a manner as only the poll worker can see the official signature at the time a voter is signing the EPB.</p>	Yes
<p>Street address of each registered elector. (25 Pa.C.S. § 1402(b)(2)).</p>	Yes
<p>Political party designation of each registered elector. (25 Pa.C.S. § 1402(b)(2)).</p>	Yes
<p>Suitable space for insertion of the signature of the registered elector. (25 P.S. § 3050(a.3); 25 Pa.C.S. § 1402(b)(2)).</p>	Yes

<p>Suitable space for insertion by the proper election official of the number and letter of the stub of the ballot issued to the registered elector or the registered elector's number in the order of admission to the voting systems. (25 P.S. § 3050(a.3); 25 Pa.C.S. § 1402(b)(2)).</p>	<p><b>Yes</b></p>
<p>Suitable space for insertion of the initials of the election official who enters the record of voting in the district register. (25 P.S. § 3050(a.3); 25 Pa.C.S. § 1402(b)(2)).</p> <p>If the EPB is designed in such a manner as it provides for unique login credentials for each election official, this requirement can be satisfied by a system-generated audit report that identifies by unique election official ID which voters were checked in by that election official.</p> <p>Demonstration comments: The poll workers can use their initials to login to the system. The actions are logged with the user id in the transaction log allowing identification of the poll worker who performed the check in. The system can also be configured to require the poll workers initials be captured before a ballot is issued.</p>	<p><b>Yes</b></p>
<p>Indication of whether the elector needs assistance to vote and, if so, the nature of the disability. (25 Pa.C.S. § 1402(b)(2)).</p>	<p><b>Yes</b></p>
<p>The date of birth of the registrant. (4 Pa. Code § 183.11(b)(4)).</p>	<p><b>Yes</b></p>
<p>The SURE registration number of the registrant. (4 Pa. Code § 183.11(b)(5)).</p>	<p><b>Yes</b></p>
<p>The following elector's affirmation must appear above the signature area: "I hereby certify that I am qualified to vote in this election." (25 P.S. § 3043).</p>	<p><b>Yes</b></p>
<p>An identification of whether the registrant's status is active or inactive. (25 Pa.C.S. § 1901(c); 4 Pa. Code § 183.11(b)(6)).</p>	<p><b>Yes</b></p>

<b>Voter Status Flags required by the SURE system:</b>	
For voters who are “Inactive,” affirmation is required. (25 Pa.C.S. § 1901(c) and (d)(3); 4 Pa. Code § 183.11).	<b>Yes</b>
“ID Required”-identification of whether the voter needs to present voter identification. An elector who appears to vote in an election district for the first time must present valid voter identification. (25 P.S. § 3050(a)).	<b>Yes</b>
“Absentee Ballot”-If an elector who voted an absentee ballot is in the municipality on Election Day, he or she must vote in the precinct, and the absentee ballot is voided. (25 P.S. § 3146.6(b)).	<b>Yes</b>
“Must vote in person”-Identification of whether the voter needs to present voter identification if the elector votes for the first time by mail. (Federal: 42 U.S.C. § 15483(b)).	<b>Yes</b>

## **Attachment B - EPB Functionalities**

### **Specific “check in”/voter handling scenarios demonstrated**

- a) **Provisional Ballot -**  
Process of performing a provisional check in and issuing a provisional ballot was demonstrated. The system allows the poll worker to enter a reason for issuing the provisional ballot. The dropdown options for the reason selection can be configured by the county. Any voter affirmations required will need to be managed via paper processes.
  
- b) **Absentee Ballot -**  
The system functionality that allows the poll worker to check in a voter with an absentee ballot issued status was demonstrated. The paper affirmation process required during the check in will need to be managed on paper. The county can configure the system to give appropriate instructions to the poll workers about the affirmation process and any reconciliations that will need to be performed at the close of polls.
  
- c) **Cancel Check in -**  
The system allows cancelling a check in that was already performed. Counties can configure the system to require a Supervisor password for performing the cancel check in function.
  
- d) **Reissue Ballot -**  
The procedure for reissuing a new ballot in place of a spoiled ballot was demonstrated.
  
- e) **Inactive Voter Check in -**  
The process of checking in an Inactive voter with required affirmations was demonstrated. The voter affirmation process will need to be managed on paper. The county can configure the system to give appropriate instructions to the poll workers about the affirmation process and any reconciliations that will need to be performed at the close of polls.
  
- f) **Redirecting a voter to the correct polling place -**  
The system allows locating the correct polling place for a voter if the street data has been included in the database during data conversion and the EPB system is configured to perform the search functionality. The system allows printing the details of the polling location and an option to send a text message to the voter’s phone number indicating the voter’s polling place.

- g) **Search/Lookup voter Capabilities of the EPB -**  
It was discussed that the system allows a poll worker to look up the voter list to find a specific voter using different search combinations. The voter search function allows to search by name (last name, first name, DOB), address and voter id. The system filters the search results based on each additional keyboard entry by the poll worker.
- h) **Check-in a voter multiple times -**  
System behavior/messages when poll worker tries to check in an already checked in voter was demonstrated.

### **SURE System Interaction**

- a) **Capability to import data files from SURE -**  
It was demonstrated that the system allows loading data extracted in an agreed upon format from SURE system. ES&S representatives explained the process as follows:
- The data from SURE system is extracted and transmitted to ES&S via secure ftp.
  - The data conversion team downloads the files to a singular environment that is delineated by state, county and election.
  - The team then prepares the data in a format that can be loaded to the tablets used at the polling place.
  - The converted data is sent back to counties via secure ftp
  - The county officials download the file and load to the emulator for verification.
  - Data is verified using the emulator software and once finalized is loaded on to the tablets.
- b) **Reconciliation of the data load to the EPB -**  
The demonstration and discussion showed that the voter list/data load to the EPB system is reconciled and there is a process to handle exceptions.
- c) **Voting History Updates -**  
The process of getting an extract from the poll book system for voter history updates was discussed. The data from the EPB system is extracted and sent to ES&S data conversion team after election is completed. The data conversion team prepares the data to be loaded to the SURE system for voter history updates. The prepared data is sent to counties for upload to the SURE system via secure ftp process.

- d) County self-sufficiency in managing the interactions with SURE -  
The current implementation requires the involvement of ES&S data conversion team to prepare the data from SURE system into a format required by the poll book.

### **Usability/User Interface**

- a) Procedures for setting up the Field System -  
The procedures for setting up the system at the polling place was demonstrated. The integrated stand allows the system to be fully configured when delivered to the polling place. The assembly at the polling place required only taking the unit out of the case and plugging the ac power adapter or battery pack as applicable.
- b) Poll worker ability to access the system and login -  
The process of poll worker login was demonstrated. The passwords are managed and configured as part of the data conversion services. The system allows the county election officials to set up unique passwords for each consolidation number/polling place.
- c) Screen navigation capabilities -  
The screen navigation capabilities of the poll book were demonstrated and further discussed. ES&S representatives pointed out that there is customization possible with fonts and colors for better readability using configurable parameters without software changes. The system does not allow customization of the screens/workflow based on individual voter profiles. Any settings decided during the data conversion process will apply to the entire EPB system.
- d) Languages Supported by the system -  
ES&S representatives suggested that the voter facing screen supports Spanish display for the voters.
- e) Clarity of the messages displayed to the poll worker -  
The system messages displayed to the poll worker during operation was demonstrated. The discussion suggested that the wording of the messages can be configured based on county requirements without software changes.
- f) System power up and shutdown procedures -  
The processes for powering up the tablet and launching the EZRoster 3.5.0.1 was demonstrated. Poll opening procedures were performed and discussed. The actions that a poll worker must take at close of polls was explained and demonstrated.

- g) **System help availability -**  
The system allows configuring the text of the messages displayed to the poll worker to ensure that the messages are detailed enough. The system also provides the capability to have pdf files linked to any instruction text field on the EZRoster 3.5.0.1 interface.
- h) **Peripheral Connection Capabilities -**  
The EPB system allows connection of peripherals required to perform the voter check in activity. A list of the supported integrated and peripherals devices has been attached to Attachment D.
- i) **Maintenance functionalities -**  
Administrative maintenance functions including system id settings, election data installation and backup options, transaction log and security key management options, software installation and removal options, system and network settings were demonstrated and discussed. The changes done to the maintenance functionalities for EZRoster 3.5.0.1 was demonstrated via webex.
- j) **Election setup -**  
The process for loading elections from a USB was discussed. ES&S had converted and installed the test data provided by the Department for use during the demonstration. The system prompts the user to confirm the action and requires elevated security to perform the election load.

#### **Auditability - Transaction Logging and Reports**

- a) **Transaction Logging capability for EPB -**  
The logging capabilities for the tablet and CentralPoint were discussed. The tablet logging capabilities were demonstrated while the check in actions were performed. The mechanism to access the logs and ways to export the logs were discussed.
- b) **Reporting -**  
The capability to configure and create reports from the EPB system was discussed.

#### **Communication Protocols and Multiple Unit Synchronization**

- a) **Tablet to Tablet communication -**  
ES&S representatives suggested that the system provides tablet connectivity using MiFi hotspots or cellular modem. The hotspots can be configured from the county

office. The system also allows managing the connectivity configuration by accessing the maintenance tab on the tablet.

b) Tablet to CentralPoint communication -

ES&S representatives suggested that the poll book allows secure communication between the tablet and CentralPoint. It was discussed that the system allows the following modes of configuration for CentralPoint communication.

- A live (fully connected) mode where data flows continuously between cloud-based CentralPoint servers and all tablets in use at a polling place.
- A restricted server communication mode where the system can be configured to transfer only operational/performance data from the Tablets to the CentralPoint cloud server. The data transmitted doesn't contain any voter check-in data. This will allow monitoring of the polling place devices remotely.

c) Frequency of check in activity sync up between tablets -

The tablets at a polling place if connected synchronizes near real time. If there is a connectivity issue, then the units in operation at a polling place will not communicate check in data. Once the connectivity is restored the transaction sync up will happen and will include all the transactions during the period of connectivity loss.

d) CentralPoint Hosting -

It was discussed that CentralPoint is hosted on a cloud server hosted by Microsoft Azure.

### **Capacity, Redundancy, Fault tolerance and Continuity of Operations**

a) Data Preservation -

ES&S representatives explained that there are multiple ways to ensure data preservation and redundancy. On each individual tablet, the data is stored on the tablet local hard drive and micro SD card. If the system is running in peer to peer mode voter check in data is synchronized between all tablets in a polling place. If the jurisdiction is running EPB system connected to the CentralPoint server, all voter check in transactions are synchronized to the CentralPoint server throughout the day. The tablet also allows to print and/or export reports containing voter check in data when required while the system is in operation.

b) Power supply and Battery Life -



The power Supply and battery life of the system was discussed to ensure that the system can work on battery as well as power. The system also provides a capability to charge the battery while the system is being stored in the carrying case. ES&S representatives suggested that 10 and 20 hours battery packs are also sold with the system depending on county requirements.

- c) Ability to remove/add new units without disturbing existing units -  
A new tablet can be introduced to the polling place without disturbing the existing units in operation.
- d) System capability to support the volume of voters in any county in Pennsylvania -  
It was discussed that the system will be able to support the volume of voters in any of the counties in PA without any performance degradations.

#### **System Monitoring and Notification of System Errors or Deviations**

- a) Capability to perform a self-test -  
It was demonstrated that the system alerts the poll worker if there is an issue with any of the peripherals connected to the system, like the printers and the micro SD card.
- b) Visible Display Indicating System Connectivity -  
The demonstration showed that the system has a display of whether the unit is connected and communicating to other tablets and/or the central point server.
- c) Visible Display Indicating Power Supply/Batter Power -  
The demonstration showed that the system has an indication that alerts the poll worker when running on battery. The system alerts the poll worker when the battery charge reaches 30% by changing the color of the battery indicator.

#### **Security and Chain of Custody**

- a) Password configuration on tablet -  
The system allows passwords to be set up for each polling place. The poll worker can use their initials to login to the system. The password configuration is county managed and is part of the data conversion process. The system has the capability to configure a supervisor password for functions requiring enhanced security during election set up. The functions requiring enhanced security can be defined by the county during set up. The maintenance password is required to perform functions under the maintenance tab. The maintenance password can be changed on the tablet. The system can also be configured to require dual login which requires both users to type in their identification and password.

- b) Information displayed to the voter on the signature pad -  
The screen presented to the voter for signature doesn't display the signature on file. It contains the voter affirmation and has an assigned location for the voter to sign using the stylus.
- c) Access controls for the CentralPoint -  
CentralPoint system allows administrators to create new users (there is no page where a user can sign up). The user can then setup their password with an expiring token sent via email.
- d) Data in Motion Security -  
Please refer to Item H in Attachment C.
- e) Data at Rest Security -  
Please refer to Item D in Attachment C.

### **Maintenance, Support and Training**

- a) Hardware and software acquisition options and support -  
ES&S representatives suggested that they will work with the county to configure an optimal system for use in the county. It was discussed that there are multiple options for lease or acquisition and a complete list can be provided only by sales team. The system requires purchase of all the required components from ES&S.
- b) Service Agreement and Warranty Options -  
ES&S representatives explained that there are several Service Agreement and Warranty options available for the system. Further discussions suggested that the sales team will be able to work with the county to provide a tailored agreement as needed by the county.
- c) Training Options -  
ES&S suggested that the county will be offered training options at purchase.

## Attachment C - Commonwealth IT Policies

- A) ITP-SEC001 – Policy that governs Commonwealth’s antivirus agent, host intrusion prevention agent (host-based intrusion prevention system), incident response servlet and patch management agent for all servers.

Discussion Summary: The discussions suggest that the tablets in use at the polling place use a hardened operating system image with windows defender. The hardened Windows image is built specially to allow the EZRoster application to run in kiosk mode with a poll worker login. The firewall can be configured to contain a list of acceptable external devices that can be connected. The discussion held during the demonstration on October 18, 2017 suggested that the poll book system can implement whitelisting practices to ensure that only the required files are loaded to the tablet from external USB drives and micro SD cards. CentralPoint servers implement various network security monitoring, detecting, alerting and response to threats to provide increased visibility and operability. Capabilities include firewalling, web application firewalls (WAF), logical segmentation, IDS/IPS, vulnerability management, application control, antivirus, botnet protection, encryption at rest, encryption in transit, multi-factor authentication, continuous vulnerability assessment schedules, separation of duties, limited and delegated access to environments and non-public access to systems.

It was also suggested ES&S has implemented processes that represent best practices for patch management which involves reviewing the patches and deploying the patches after testing.

- B) ITP -SEC004 - Establishes policy and enterprise-wide standards for commonwealth agencies on Web Application Firewalls

Discussion Summary: ES&S teams will work with the county’s IT and security teams to recommend best practices to facilitate long term system operability, performance, networking, architecture, and security. ES&S suggested that well defined, layered approaches of protection are designed with specific instruction sets. Private networking, network access controls, network security groups, secure remote access, dmz zones, segregated subnets are addressed throughout the architecture. Limited data is transmitted to ES&S private cloud servers. Multi layered tiered access topology is deployed in Azure ES&S private cloud networks. Load balancers, WAF, and firewalls are placed in-between tiers. No servers are exposed to the internet. Only secure data transmissions are permitted over the internet.

- C) ITP-SEC019 and ITP -SEC016 – Establishes policy and procedures to protect commonwealth electronic data.

Discussion Summary: ES&S suggested that they have an appointed contact for security coordination. The discussion represented that there are organizational efforts to ensure

that client data is secure. Third party penetration assessments are performed annually and adhoc scans are run monthly.

D) ITP-SEC020 - Establishes policy and standards for encryption of data at rest

Discussion Summary: It was discussed that the database files used by EZRoster, can be encrypted using AES-256 encryption and a password. Once encrypted, database file(s) cannot be opened on the ExpressPoll until they have been decrypted using the encryption password. When encryption is used, files that are dynamically created on the ExpressPoll, including the archive log and new voters file are automatically encrypted using the same encryption method and password that was used to decrypt the loaded PollData.db3 database file.

E) ITP-SEC024 – Establishes policies, procedures and standards related to reporting and managing of cyber security incidents.

Discussion Summary: ES&S suggested that they have a defined process in responding to cybersecurity incidents. The steps in responding and managing cybersecurity incidents involve Initial Triage of incident by ES&S security response team, communication with impacted customers, followed by engagement of assistance and support, full incident triage and incident notification and escalation if required. ES&S also suggested that the organization has policies to continually perform security assessments which involves assessment of access rights every 60 days and vulnerability and penetration assessments done externally annually and internally monthly.

F) ITP-SEC025 – Establishes guidelines for the proper electronic use and disclosure of Personally Identifiable Information.

Discussion Summary: ES&S suggested that data in the poll book system is protected by encryption of data. It was also explained that the company involves tooling such as OWASP, SANs Security Training and is working towards adopting Microsoft's Secure Development Lifecycle methodologies and practices. The application design involves Threat Modeling/Threat identification as part of SDLC to identify exposure during design and code review phases.

G) ITP-SEC029 - Establishes policy and procedures for commonwealth agencies for physical security of IT resources.

Discussion Summary: ES&S suggested that the organization follows policies to avoid unauthorized access to their facility by using access restrictions and monitoring the facilities by cameras installed on premise. The restricted access records are audited yearly. Physical access to IT related media including back up tapes is controlled to avoid unauthorized data access.

The physical security of the tablet is ensured by using tamper proof locks and seals to seal any unused ports. The system at the polling place consists of a tablet, the integrated

stand and micro SD card. The tablet can be affixed into the stand, which includes a lock to prevent any type of removal. The micro SD card is inserted to the tablet, and a seal is placed over the opening, preventing the user from easily removing the micro SD card and making it obvious if the seal is broken. The system can be placed in a protective case with the data loaded, the micro SD card inserted and the tablet locked to the stand. The case can also be sealed to recognize the fact the system may have been compromised if the seal is broken.

- H) ITP-SEC031 - Establishes policy and standards for encryption of data in transit to improve the confidentiality and integrity of data.

Discussion Summary: ES&S suggested that the poll book system involves encryptions and secure transmission protocols. The application supports https /TLS 1.2/AES256.

- I) ITP-SEC032 Establishes compliance standards for enterprise Data Loss Prevention (DLP).

Discussion Summary: The policy refers compliance to the below mentioned policies. ES&S's answers are provided below

- 1) ITP-SEC019 - Policy and Procedures for Protecting Commonwealth Electronic Data

Refer to Item C above.

- 2) ITP-SEC020 - Encryption Standards for Data at Rest

Refer to Item D above.

- 3) ITP-SEC031 - Encryption Standards for Data in Transit

Refer Item H above

- 4) ITP-SEC017 - CoPA Policy on Credit Card Use for e-Government Applications (if applicable)

Not applicable

- J) ITP-SEC035 - This Information Technology Policy establishes policy, responsibilities, and procedures for connecting and using mobile communication devices to access commonwealth IT resources.

Discussion Summary: The discussion suggests that EPB Solution utilizes a Toshiba tablet for the voter facing display and signature capture. The tablet uses a hardened windows image and the EZRoster application. The windows image is built specifically to allow the EZRoster application to run in kiosk mode. The Windows image also doesn't receive automatic patch updates to prevent unexpected downloads to the system. ES&S will

monitor all security patches and recommend image updates after testing if a patch is required.

- K) ITP-SEC007 - This Information Technology Policy establishes establish minimum standards for the implementation and administration of user, system, network, device, application account IDs, passwords, and requirements around multi-factor authentication.

Discussion Summary: The Tablet with EZRoster 3.5.0.1 supports options that enable the creation of county defined poll worker and supervisor passwords. The passwords are specific to each consolidation number/polling place. The maintenance PIN on the tablet also can be changed by the county personnel. The system comes with default passwords and the best practice recommendation by ES&S suggests counties to change the default passwords.

CentralPoint system allows administrators to create new users and users can change passwords by an email weblink with an expiring token. CentralPoint users can be configured to limit re-authentication attempts. CentralPoint allows to be configured with MFA.

### **Attachment D - Supported Peripherals**

(The list is from Appendix D of the ES&S EZRoster for the Toshiba Encore 2 and Encore 10 Tablets Administrator's Guide Rev. 1.1 released January 04, 2018 (file name EZR3.5.0.1\_V1.1\_AG\_T01\_04\_2018.pdf))

- a) Device: CUSTOM MY<sup>3</sup> Mobile Receipt Printer  
Interface: Micro USB/Bluetooth  
Thermal paper rolls
- b) Device: Seiko DPU-S445 Mobile Receipt Printer  
Interface: Micro USB/Bluetooth  
Thermal paper rolls  
Printer Power Supply  
Printer Power Cable  
Battery Pack  
Printer Data Cable  
Battery Charger
- c) Device: Portable Battery Powered 3G/4G Wireless N Router
- d) Device: Cradlepoint Mobile Broadband Router
- e) Device: Smart Card Reader  
Used on the Z-stand as well as the Swivel Pedestal stand.
- f) Device: Motorola/Zebra Symbol Barcode Scanner 2D  
Interface: USB
- g) Device: 4-Port USB 2.0 Hi-Speed Ultra-Mini Hub with power adapter  
Interface: USB2.0
- h) Device: IDTECH MiniMag II MagStripe Reader  
Interface: USB
- i) Device: DYMO LabelWriter 450 Turbo  
Interface: USB
- j) Device: YES Cart for Tablet Charging - 40 Units  
Interface: Micro USB
- k) Device: YES Cabinet for Tablet Charging - 20 Units  
Interface: Micro USB
- l) Device: Toshiba ExpressPoll Tablet Swivel Stand  
Interface: Micro USB
- m) Device: Toshiba ExpressPoll Tablet Integrated Pollbook Stand  
Interface: Micro USB

