Elections Division
Office of the Secretary of State

Report of the Secretary of State on the Examination of Clear Ballot Group ClearVote 1.3.3 Voting System

May 2017

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Overview

Application

On April 10th Clear Ballot submitted an application for Washington State Certification of ClearVote 1.3.3. The Voting System includes ClearDesign, ClearAccess, and ClearCount. Copies of operating and maintenance manuals, training materials, technical and operational specifications were provided as part of the Technical Data Package.

Modification of Certified Voting System

This is a modification of a currently certified voting system (ClearVote 1.3). This system is a paper based digital scan voting system with a commercial off the shelf (COTS) scanners, printers, and computers.

This system has completed testing at an Election Assistance Commission (EAC) approved Voting System Test Lab (VSTL), Pro V&V, and is currently used in Oregon and Colorado.

National Certification

ClearVote 1.4 is currently being evaluated by the EAC for certification. It is anticipated to be EAC certified in mid 2017.

Software & Hardware

 The following hardware and software of the system were tested by the VSTL:

Table 2.1: Software/Firmware

Software /Firmware	Version
ClearDesign Components, Version 1.3.3	
Ubuntu	14.04.3 server
MySQL Linux	5.5.32 The database engine
Apache2	2.22-6ubuntu5.1
libapache2-mod-fcgid	1:2.3.7-0.ubuntu2
PhantomJS	1.9.01-1
Python 2	2.7.6
Python web.py	1:0.37+20120626-1
Python MySQL dB library	1.2.3-2ubuntu1
Python SQLAlchemy	0.8.4-1build1
Python Pillow library	2.3.0-1ubuntu3
Python dbutils library	1.1
Python xlrd library	0.9.4
Python rtf library	0.2.1
Python FontTools library	3

Python PyCrypto library	2.6.1
JavaScript jQuery	1.10.2
JavaScript DataTables	1.10.5
JavaScript Bootstrap	3.0.0
JavaScript jQuery-Impromptu	5.2.3
JavaScript jQuery-qrcode	1.0
JavaScript jQuery-splitter	0.14.0
JavaScript jQuery-ui	1.10.4
JavaScript jscolor	1.4.2
JavaScript tinymce	4.1.9
JavaScript fastclick	1.0.4
JavaScript libmp3lame	na
JavaScript jszip	na
JavaScript papaparse	4.1.2

ClearAccess Components, Version 1.3.3

Windows	8.1 or 10
Python	2.7.10
Python web.py	0.38
Python pywin32 library	2.2.0
Python pyCrypto library	2.6.1
JavaScript DataTables	1.10.5
JavaScript jQuery	1.10.2

ClearCount Components, Version 1.3.3

Debconf	1.5.49ubuntu1
python	2.7.4
python-mysqldb	1.2.3-1ubuntu1
PIL-python-imaging	1..7+2.0.-1ubuntu0.1
PyInstaller	2.1
python-webpy	1:0.37+20120626-1
Ubuntu Server	13.04-serveramd64
mysqlserver	5.5.32
apache2	2.2.22-6ubuntu5.1
libapache2-mod-fcgid	1:2.3.7-0.ubuntu2
samba	2:3.6.9-1ubuntu1.1
JavaScript Bootstrap library	2.3.2
JavaScript Chosen library	1.0.0
JavaScript jQuery library	1.10.2
J JavaScript jQuery-migrate library	1.2.1
JavaScript DataTables library	1.9.4
JavaScript FixedHeader library	2.0.6
JavaScript hotkeys library	no version, dated May 25, 2013
JavaScript pep library	no version, dated Oct 4, 2013
JavaScript tooltip library	1.3
JavaScript LESS library	1.3.3
JavaScript TableTools library	2.1.5
ZeroClipboard.js	na

Table 2.2: Hardware Components ClearVote 1.3.3

ClearVote 1.3.3 Voting System Component	Serial Number(s)
ClearDesign Components	
Dell Precision M2800	13Q0362
Dell Laptop Latitude E5570	927QQC2
TRENDnet Switch TEG-S80g	CA11238032857
ClearAccess Components	
Dell OptiPlex 3240 All In One	F0B6B02
Dell Inspiron 15 5000 Series 2 in 1 (Windows 10)	29XF1C2
Oki Data Laser Printer Model: B432dn	SAK5B007647A0
Brother Laser Printer Model: HL-L2340DW	U63879M4N628612, U63879M4N628617, & U63879M4N628535
HP OfficeJet 100 Mobile printer	MY648F10JG
HP Inkjet Printer Model: HP7612	CN6343R0D6
APC Smart-UPS 1500 (for All In One PC) Model: SMT1500	3S1525X07491
APC Smart-UPS 2200 (for the Laser Printers) Model: SMT2200	AS1603160039
Origin Instruments Sip/Puff Breeze with Headset Model: BZ2	AC-0313-H2
Storm EZ Access Keypad Model: BZ2	1500005
Hamilton Buhl Over-Ear Stereo Headphones Model:HA-7	CLR-002-20-HP
ElectionSource Table Top Voting Booth (Privacy Screen) Model: VB-60B	CLR-002-21-VB
Hosa Technology Male 3.5 mini to Female ¼" Adapter	Model: GMP112
Hamilton Buhl Sanitary Headphone Covers	Model: HYGENX45
Security Seals Model: MRS2-12030	CLR-002-22-Seal
ClearCount Components	
Fujitsu fi-6800 Scanner	A9HCA00737
Fujitsu fi-6670 Scanner	AAADC00936
Fujitsu fi-7180 Scanner	A20D000798
IBML ImageTrac Lite Scanner 6000 series	A-108126000019
IBML ImageTrac DS series Scanner 1210	763SHT416568M100050029
Toshiba Laptop Model: S55-A5167	1E098351S, 1E123732S, & 1E068199U
Lenovo Laptop Model: Y50-70 20378 59441402	CB34965397& CB34673854
Dell Laptop Latitude E5570	5537MC2, J2ZQQC2, & FXDQQC2
HP ProBook Laptop Model: 4540s	CLR-002-23-Laptop

Lenovo Server Tower Model: TS140	MJ03T42D
Dell 22 inch Monitor Model: S2240M	CN-0CFGKT-64180-58B-0X3T
Apex Boxx Server	B159306
APC Smart-UPS 1500 (for Fujitsu scanners) Model: SMT1500	3S1525X07491
APC Smart-UPS 2200 (for IBML scanners) Model: SMT2200	AS1603160039
TP-Link VPN Router Model: HP7612	2149342000209
TRENDnet TEW-733GR	C1408RN800574
NETGEAR ProSAFE FVS318G 8-Port Gigabit VPN Firewall (FVS318G-200NAS)	40F266BA00280
Lenovo USB Portable DVD Writer Model: GP60NB50	411HV005130 & 411HR027583
Dell OptiPlex 7440 All In One	64WPXG2

The ScanServer™ computer hosts the primary database and the ClearCount server and client software that recognizes and analyzes ballots. It can be a desktop or laptop computer. Minimum requirements include:

- 4-core, 8-thread processor
- At least 8 GB of RAM
- At least 500–750 GB of disk space
- Gigabit LAN connection
- USB 3.0 ports for backing up databases on external hard drives

When a jurisdiction installs or updates a ClearCount product, the installer program replaces the ScanServer computer's operating system with Linux. Therefore, the operating system originally installed on the ScanServer computer is unimportant.

A desktop or laptop computer enabled with a USB 2.0 or later port that can successfully run the listed software is required for use in a ScanStation. One computer is needed for each scanner in concurrent use.

The minimum requirements for a ScanStation computer are:

- 4 core, 8-thread processor
- At least 4 GB of RAM (at least 8 GB recommended)
- At least 500 GB of disk space
- Gigabit LAN connection

Software requirements for each ScanStation computer include:

- Operating system: Windows 8.1 Pro
- For Fujitsu scanners:
- Fujitsu ScandAll PRO™ 2.0.12

- o Fujitsu TWAIN driver for the connected scanner, one of:
- o fi-7180 PaperStream IP 1.4.0
- o fi-6800 10.10.710
- o fi-6670 9.21.1202
- For ibml scanners:
  - o SoftTrac® Capture Suite 4.0 (for ImageTrac 6000 series)
  - o SoftTrac ScanDS 4.4.0 (for ImageTracDS 1155 and 1210)
  - o ibml TWAIN driver for the connected scanner, one of:
  - o 03-02-01 (for ImageTracDS 1155 and 1210)
  - o TWAIN Manager 6.4.0 or later (for ImageTrac 6000 series)

Testing & Inspection

Testing and evaluation of ClearVote 1.3.3 was conducted by Secretary of State staff at the Pierce County Elections Office in Tacoma, WA on May 16, 2017. Examining the system for the Office of the Secretary of State was Stuart Holmes, Voting Information Systems (VIS) Manager and several members of the Pierce County Elections Department.

Due to ClearVote 1.3.3 receiving a successfully test at an VTSL prior to state certification testing, a two phase testing program was developed and approved by Secretary of State VIS Manager for state certification testing.

Delivery acceptance testing of the equipment and software to determine if the correct model and versions of the equipment and software are delivered and that the equipment, software and system operate as documented by the vendor.

Election Results Testing to ensure that the equipment, software and system perform each of the functions required by federal, state and local law in order to administer an election from the beginning to the end.

Ballots were manually voted using the accessible voting unit, ClearAccess, and incorporated into the results to ensure proper tabulation.

Executive Summary of Findings be Secretary of State Staff

Voting System Accuracy

ClearVote 1.3.3 successfully and accurate tabulated all ballots including additional hand marked and manually voted ballots from the accessible voting units. Results were manually audited and reviewed by a team of two.

Additionally, several days prior ClearVote 1.3.3 passed an acceptance test that was conducted by Pierce County. During that successful test, ballots were hand-marked using various marking

devices, overvotes and undervotes were adjudicated, write-ins were included, and ballots marked on the accessible device (ClearAccess) were included.

Results Reporting

ClearVote 1.3.3 was able to produce the state required reports for election results by precinct and cumulative.

Presidential Primary

ClearVote 1.3.3 can perform all the functions necessary to comply with current state requirements for the Presidential Primary. It can detect cross-party voting in a Presidential Primary without manual intervention.

System Limits

Characteristic	Tested Limit
Precincts in an election	5,000
Splits per precinct	50
District categories	5,000
Districts per single category	5,000
Districts	5,000
Contests in an election	5,000
Candidates/Counters in an election	5,000
Ballot styles in an election	5,000
Contests in a ballot style	125
Candidates in a contest	200
Ballot styles in a precinct	50
Number of political parties	50
"Vote for" descriptors in a contest	50
Supported languages in an election	15
Number of write-ins per contest	30

Ballot Scanning

ClearVote 1.3.3 uses Fujitsu or IBML high-speed scanners capable of scanning up to 16,000 ballots per hour using the ImageTrac Lite. Scanning speeds of each of the four available scanners are:

> Small scanner: Fi-7180 – 700 per hour
> Medium scanner: fi-6800 – 3,000 per hour
> Medium/Large scanner: DS 1210 - 6,000 per hour
> Large scanner: ImageTrac Lite – 16,000 per hour

Ballot Processing

Different from other digital scan systems, most adjudication occurs after Election Day. Prior to Election Day, only unreadable ballots are adjudicated. After results have been enabled, adjudication can begin on all overvotes, undervotes, and write-ins.

ClearCount can be used on laptops or desktop workstations. On laptops the small screen is a drawback, however the county could use the external monitor port to use a large screen monitor. Some benefits of using laptop computers is the built in battery backup and the ability for counties to store them compactly and reuse the election space when not in 'election mode' (especially in smaller counties who could benefit from repurposing their office space when not conducting an election).

System Security

ClearDesign and ClearCount require a server that stores the election data. That connection to the server is via a HTTPS connection through a VPN router capable of IP/MAC/Domain name filtering and other high security features. This is ideal for completely locking down the internal network in large counties.

All laptops and computers will be hardened to restrict only 'approved' applications to be opened on each workstation along with securing and protecting other important areas of that workstation.

The ClearAccess devices will come with a bezel that will cover and protect the exposed ports and only expose those require for accessibility and power. Those ports can be protected via a tamper evident seal when not in use.

All software and media has an easy to view hash value that will ensure that the device's software has not changed since its last install. Additional system and election event logs can be accessed to view any activity on that device. Furthermore, users can be given roles or credentials that limit their ability to perform any action on the system.

Physical Security

Clear Ballot's security recommendations are:

When the components of the ClearCount system are not in use, they must be stored in a locked area under the custody and control of the jurisdiction. Access to this area must be controlled by the jurisdiction so the system cannot be accessed by unauthorized individuals and so that any breaches in security can be recognized through the auditing functions of the system.

When in storage or in use, the ClearCount system must be kept within a controlled area where only individuals authorized by the jurisdiction to handle and process ballots or maintain the voting system can come into direct contact with the ballots or components of the system. Each jurisdiction must also follow all jurisdictional and state rules for the handling and processing of ballots in addition to this Clear Ballot procedure. This means that at least one security method is employed to provide deterrence and physical security:

- Receptionists or guards with a gate or other barrier to the scanning area.
- Security cameras.
- Electronic door locking mechanisms such as ID cards or key fobs that record the identity of the device used or person to unlock the door.
- A locking computer rack or other cabinet to contain components of the ClearCount system.

Write-Ins

ClearVote 1.3.3 allows for entering write-in candidates after results have been enabled. Write-in candidates do not have to be on a qualified or declared list prior to ballot processing. Clear Ballot representatives recommended that counties review marks in the write-in box prior to adjudicating write-in votes for any marks that are not write-ins (marked the write-in oval, however did not write-in a name).
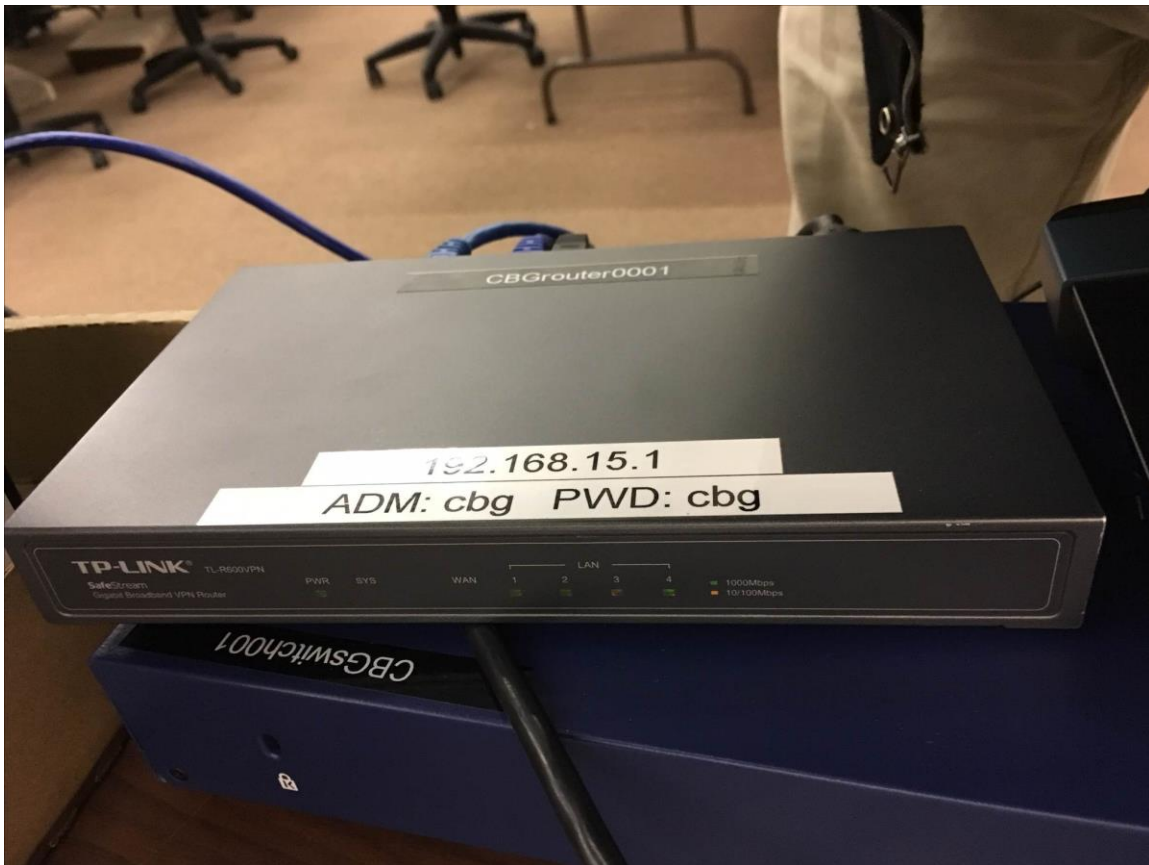
Accessible Voting

ClearAccess has an accessible voting unit that is touchscreen, can be used with the provided accessible switches or the voter's sip-n-puff or other USB assistive device. Once the voter has completed voting, their ballot is printed onto regular ballot paper. Depending on the county's procedures and in compliance with all other state elections law, the voter could then put their ballot into a return envelope and put into a ballot drop box and processed with all other ballots returned by mail or in drop boxes. The vote is not captured electronically so this device **is not** a direct recording electronic (DRE) voting unit so this device does not need to be audited separately. The votes on ClearAccess will be a part of the post-election audit as the ballots can be mixed in with all other ballots.

Conclusion

After an evaluation of the system, Stuart Holmes, Voting Information Systems Manager, believes the system and its components meet current Washington State requirements for Presidential Primary, Special, Primary, and General Elections as well as security, accuracy, and transparency.

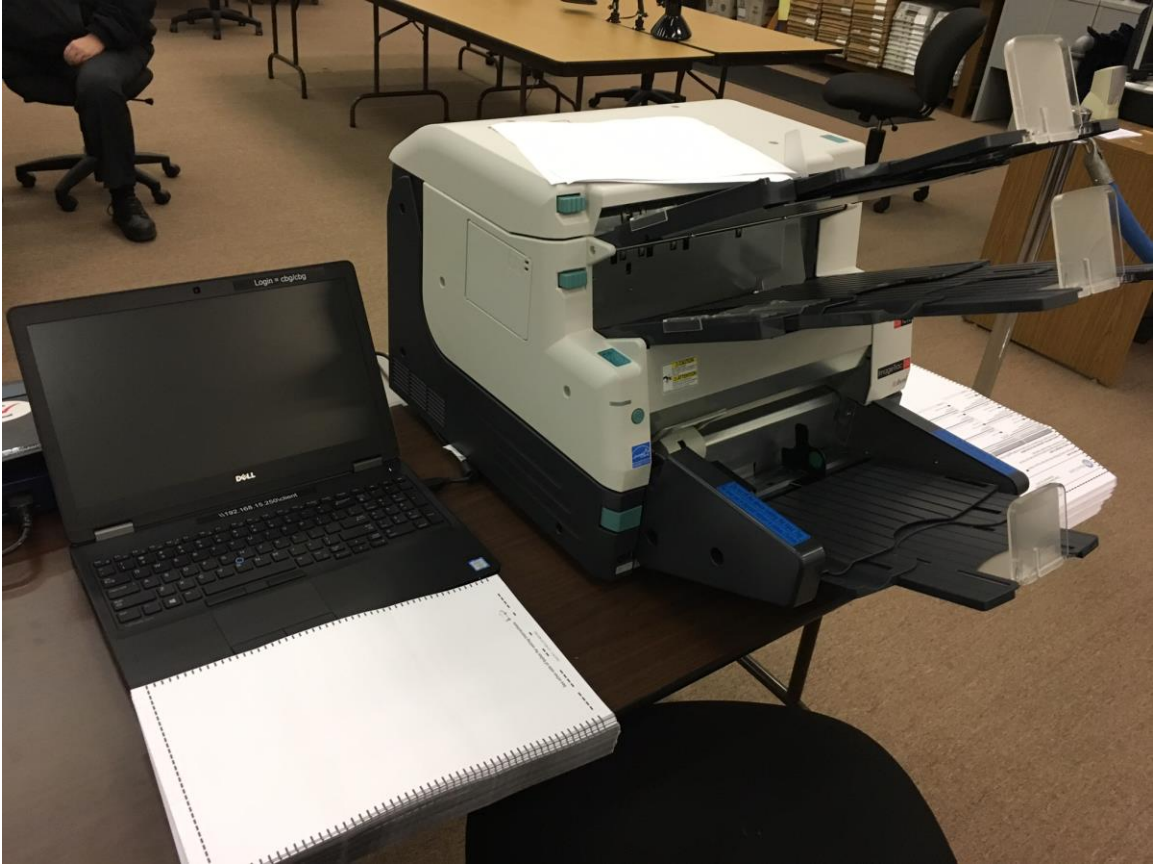## Pictures of System (taken during ClearVote 1.3 test)

Router:

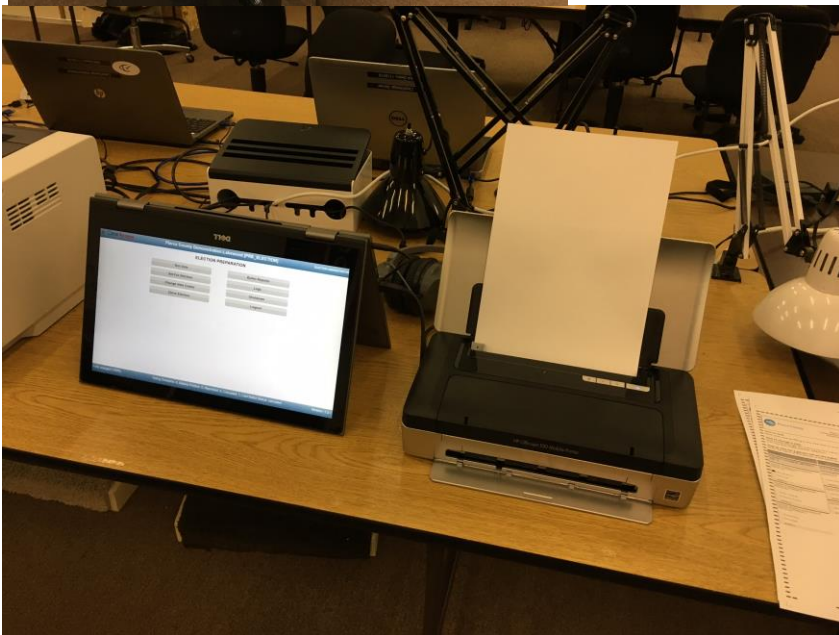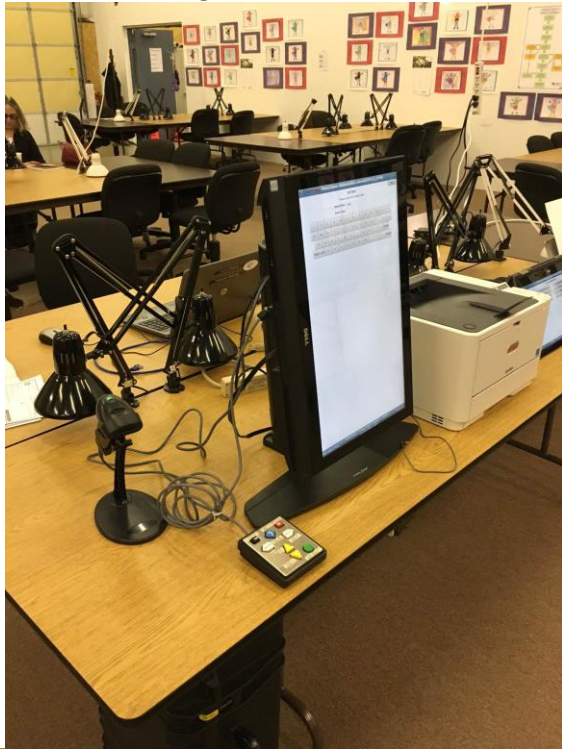Medium size scanner (left) small size scanner (right)

ScanServer

Medium size scanner with
workstation

Large size scanner (picture left) with scan station (right – on floor)

Accessible Voting Unit

Mobile ballot printer for accessible voting mobile unit

Ballot printer for voting centers

ClearVote server