



**STATE OF HAWAII
OFFICE OF ELECTIONS**

802 LEHUA AVENUE
PEARL CITY, HAWAII 96782
elections.hawaii.gov

SCOTT T. NAGO
CHIEF ELECTION OFFICER

December 27, 2016

The Honorable Ronald D. Kouchi, President
and the Members of the Senate
State Capitol, Room 409
Honolulu, Hawaii 96813

Dear President Kouchi and Members of the Senate:

For your information and consideration, I am transmitting two (2) copies of the Report to the Legislature in accordance with Senate Concurrent Resolution 70, SD 1 and Senate Resolution 41, SD 1.

Very truly yours,

SCOTT T. NAGO
Chief Election Officer

STN:AS:jk
OE-16-438

Enclosures

c: The Honorable Joseph M. Souki, Speaker of the House
Legislative Reference Bureau



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December 27, 2016

The Honorable Joseph M. Souki, Speaker
and the Members of the House of Representatives
State Capitol, Room 431
Honolulu, Hawaii 96813

Dear Speaker Souki and Members of the House of Representatives:

For your information and consideration, I am transmitting two (2) copies of the Report to the Legislature in accordance with Senate Concurrent Resolution 70, SD 1 and Senate Resolution 41, SD 1.

Very truly yours,

SCOTT T. NAGO
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SCOTT T. NAGO
CHIEF ELECTION OFFICER

December 27, 2016

Charlotte Carter-Yamauchi, Director
Legislative Reference Bureau
State Capitol, Room 446
Honolulu, Hawaii 96813

Dear Director Carter-Yamaguchi:

For your information and consideration, I am transmitting two (2) copies of the Report to the Legislature in accordance with Senate Concurrent Resolution 70, SD 1 and Senate Resolution 41, SD 1. Also enclosed are the letters of transmittal to the Senate President and the Speaker of the House.

Very truly yours,

SCOTT T. NAGO
Chief Election Officer

STN:AS:jk
OE-16-440

Enclosures

Final Status Update on the Implementation of Hawaii's New Voter Registration System

December 27, 2016

Office of Elections
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Pearl City, Hawaii 96782
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Foreword

This report was generated in response to Senate Concurrent Resolution 70, SD 1 and Senate Resolution 41, SD 1 requesting the Office of Elections to provide a status update on the implementation of Hawaii's new voter registration system.

SCOTT T. NAGO
Chief Election Officer

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1 INTRODUCTION

Senate Concurrent Resolution 70, SD 1 and Senate Resolution 41, SD 1 request a status update on the implementation of the new statewide voter registration system. A preliminary status update was to be provided no later than July 1, 2016 and a final status update no later than twenty days prior of the convening of the 2017 Legislative Session. The preliminary status update was issued on June 29, 2016. This status update has been revised to reflect changes that have occurred during the last six months. As such, the present final status update supersedes and replaces the earlier preliminary status update.

This final status update report provides background on the role of the Office of Elections, County Clerks, Department of Transportation (DOT), County Examiner of Drivers, Office of Enterprise Technology Services, and vendors involved in the development of the new statewide voter registration system. It also addresses various issues and how they have been resolved. The appendices detail the following information required by the resolutions:

- 1) Project management schedule that itemizes the various project deliverables and delivery timeline;
- 2) Identification of completed deliverables and the amounts paid to the State's contractor;
- 3) Description of the process used for quality assurance and resolution of issues or problems identified by users;
- 4) Management plan for the voter registration system that includes descriptions of the projected annual operational costs, risk mitigation, and user support; and
- 5) Itemization of expenditures from funds provided pursuant to sections 101 and 251 of HAVA.

2 BACKGROUND

There is a statutory division of responsibilities between the Office of Elections and the counties. The Office of Elections is responsible for polling places and the counting of ballots, while the counties are responsible for voter registration and absentee voting. HRS §§ 11-11, 15-4, and 11-184. However, with changes in federal and state law the role of the Office of Elections in regard to voter registration has changed. Specifically, with the enactment of the Help America Vote Act of 2002 (HAVA), the Office of Elections became responsible for implementing a statewide voter registration system for use by the counties. Additionally, Act 225, SLH 2012 required the Office of Elections to develop an online voter registration system.

2.1 MAINFRAME STATEWIDE VOTER REGISTRATION SYSTEM

The initial statewide voter registration system (Mainframe SVRS) was developed in 1981 as a result of a cooperative agreement between the City and County of Honolulu (City) and the neighbor island counties. The Mainframe SVRS is housed and administered by the City on behalf of the four counties.

The Mainframe SVRS uses a street directory system to assign voters to the appropriate voting precinct. The street directory has been customized by the counties over the years and requires that election officials be familiar with the vagaries of the system when entering voter registration applications. For example: (1) street addresses need to be truncated in order to accommodate character limitations of the system; (2) given that many individuals do not have mail service at home, election officials must be familiar with the zip codes designated by the county to best represents different areas; (3) election officials must be aware of situations in which the county accepts alternate names for a particular street; and (4) election officials have to deal with situations where a voter lives in an area that does not have a street address and instead is required to provide a physical description of where they live.

The system was originally built to serve as a statewide database as permitted by state law (i.e., “[v]oter registration information that is collected and maintained by the clerk of each county may be transmitted to a central file for the purpose of correlating registration data to prevent or detect duplicate voter registrations and for the compilation of election reports.”) HRS § 11-14(c). However, as federal and state laws, as well as voting methods have evolved, additional modules have had to be added.

The Mainframe SVRS requires a separate absentee voter tracking module. This module indicates whether a voter has applied for an absentee ballot and the mailing address. This address may be different from the voter’s Mainframe SVRS mailing address (i.e., a voter may apply for a seasonal absentee ballot to be forwarded to the mainland for the Primary Election). Seasonal absentee ballot requests and permanent absentee ballot requests are manually segregated from normal registrations in a non-election year to be manually entered into this module during the election year.

Additionally, the counties have had to adapt modules and procedures to archive images of voter registration documents and capture signatures for purposes of comparing them against the signatures on absentee ballot return envelopes. Each county separately archives voter registration applications with their own county specific system. Similarly, the Office of Elections operates a separate election management system, which is used for candidate filing, staffing polling places, and similar logistical matters.

2.2 NATIONAL VOTER REGISTRATION ACT OF 1993

The National Voter Registration Act of 1993 (NVRA) has had a significant impact on statewide voter registration systems by requiring driver licensing officials to register drivers and ensure the integrity of the voter registration rolls. Driver licensing must comply with the following provisions:

- 1) “Each State shall include a voter registration application form for elections for Federal office as part of an application for a State motor vehicle driver’s license.” 52 USC § 20504 (a).
- 2) “The voter registration application portion of an application for a State motor vehicle driver’s license—(A) may not require any information that duplicates information required in the driver’s license portion of the form (other than a second signature or other information necessary under subparagraph (C).” 52 USC § 20504(c)(2).
- 3) “Any change of address form submitted in accordance with State law for purposes of a State motor vehicle driver's license shall serve as notification of change of address for voter registration with respect to elections for Federal office for the registrant involved unless the registrant states on the form that the change of address is not for voter registration purposes.” 52 USC § 20504 (d).

Pursuant to NVRA, the simultaneous motor voter application was developed to require applicants to only provide their information once, and serves as the source document for driver licensing officials and election officials. As such, driver licensing officials first enter the information from the motor voter application into the statewide traffic records system, and provide the application to election officials. Election officials then manually review the applications and determine which applicants also completed the voter registration portion of the application. For those who have filled out that portion, the election officials create a record in the Mainframe SVRS.

2.3 HELP AMERICA VOTE ACT OF 2002

HAVA requires each state to develop a comprehensive plan for implementing various mandates related to improving the conduct of elections, including the creation of a statewide voter registration system and authorized grant money to implement these mandates. The federal funds came with certain requirements, such as providing annual reports to the U.S. Election Assistance Commission (EAC) on the utilization of these funds and being subject to federal audits.

As it relates to the HAVA requirement of a statewide voter registration system (i.e., Section 303), \$4,000,000 in HAVA funds were earmarked in our state plan when we applied for the funds. However, the Mainframe SVRS complied with the requirements of HAVA. Given this, it was determined between the State and the counties that the portion of the federal funds earmarked for a new statewide voter registration system would not be immediately expended and would continue to collect interest in a federally required trust fund, until a determination was made that there was a need to migrate to a new system, due to a significant change in technology or something similar that would improve the administration of elections.

In addition to using the funds for HAVA purposes and reporting requirements to the EAC, the State is required to comply with a maintenance of effort (MOE) requirement in terms of our utilization of state funds. Federal funds are meant to only supplement state funds allocated for election activities related to the purpose of HAVA. In other words, the utilization of federal funds, cannot serve as a basis to reduce state funding for elections (i.e., federal funds cannot be used to supplant state funds). HAVA makes the acceptance of federal funds contingent on “maintain[ing] expenditures of the State for activities funded by the payment at a level that is not less than the level of such expenditures maintained by the State for Fiscal Year 2000.” Section 254(b)(1). The level of such expenditures in Fiscal Year 2000 was \$2,299,552. As such, the Office of Elections’ general fund budget is required to meet that amount in order to retain the previous grant money.

2.4 ONLINE VOTER REGISTRATION

The 2012 Legislature amended voter registration laws to permit individuals who have a valid government-issued identification that is capable of electronic confirmation to be able to register electronically. Act 225, SLH 2012 (codified as HRS § 11-15.3). The Legislature authorized \$500,000 for fiscal year 2012-2013, for the planning and designing of the system with any remaining funds being permitted to be used to implement the online voter registration system. Additionally, in recognition of the technological issues that needed to be addressed, the online voter registration requirements of the law were not to be effective until the 2016 Primary Election.

The use of an electronic application “constitute[s] consent for election officials to obtain confirmatory information regarding the applicant from government databases associated with government-issued identification, including the applicant's signature.” HRS § 11-15.3(c). The relevant government-issued identification databases were the driver’s license and state identification card databases that the City and County of Honolulu managed as part of the statewide traffic record system, on behalf of DOT.

We consulted with the Office of Enterprise Technology Services (OETS), formerly known as the Office of Information Management Technology (OIMT), to

plan the development of an online voter registration system. We proposed to develop an online voter registration system through an intergovernmental agreement with the City to supplement the Mainframe SVRS since the City operates both the Mainframe SVRS and the statewide traffic record system. In the alternative, we proposed to develop with a private consultant, a new statewide voter registration system that would include an online voter registration system.

With OETS's approval we were able to have further discussions with the City's Election Administrator about a possible intergovernmental agreement, involving the utilization of the \$500,000 appropriation, which would benefit both parties in regards to improving voter registration. These discussions ultimately resulted in a meeting between the Chief Election Officer, City Managing Director, City Department of Information Technology Director, and City Election Administrator. At that meeting, the City declined our request to incorporate online voter registration into the present system as it had other information technology demands that took priority.

After consulting with the four counties, it was decided to migrate to a new system that would be housed with the State, and that would include an online voter registration component. In order to move forward, we initially contracted with a consultant for \$95,000 for their assistance. Given that the original \$500,000 was only authorized for fiscal year 2012-2013, we could only encumber the initial \$95,000. The remaining \$405,000 reverted to the general fund at the close of the fiscal year. An additional \$4,215.89 in general funds was expended the subsequent fiscal year to account for an amendment to the consultant's contract that took it from \$95,000 to \$99,412.80. Subsequent expenditures regarding the statewide voter registration system have primarily been from HAVA funds, general funds provisoed by the Legislature to ETS for the statewide voter registration system (Act 119, SLH 2015), and our general funds.

2.5 NEW STATEWIDE VOTER REGISTRATION SYSTEM

With the consultant, we issued a request for information (RFI) in 2013 after developing some initial requirements. The eventual procurement was to solicit a unified system that would provide a statewide voter registration system with online voter registration and election management.

After reviewing the responses to the RFI and consulting with the counties, we developed more detailed specifications for a request for proposals (RFP) to be issued in 2014. This exploratory stage confirmed our previous understanding that this would be a significant project involving various factors.

Specifically, while we could rely on the vendor to develop and customize its software to meet our needs, the software or system would not exist in a vacuum. For example, we would need to provide the servers that the system would operate on, which would involve coordinating with OETS for these servers

and the associated security of managing the servers ourselves. Additionally, we would need to address any technical issues with DOT and the City Department of Information Technology (City DIT) to ensure that its database of driver licenses and state identification cards was accessible to the new statewide voter registration system, as the ability to compare registration applications against state identification records is a requirement of any statewide voter registration system. Further, there would be additional deployment costs that would need to be accounted for. Finally, we understood that such a complex system would require ongoing maintenance that would need to be factored into our ongoing budget requests. Ultimately, the RFP was issued detailing that deployment hardware, deployment software, and related deployment costs, would not be a part of the vendor's obligation under contract. However, the vendor would be required to provide necessary annual maintenance through 2020.

The state and four counties served as the members of the selection committee and after a detailed review process involving several vendors, the contract was awarded to the present vendor, BPro, for \$1,686,198.74. The actual cost for the development of the system was \$1,223,424.74, with the remaining \$462,774 for maintenance through 2020. The annual maintenance fluctuates from \$53,397 in a non-election year to \$177,990 in an election year (i.e., annual maintenance equates to approximately 9.45% of the cost to initially develop the system by the vendor, not including deployment costs that the state would need to expend).

3 DISCUSSION

The new statewide voter registration system (TotalVote) was launched on August 3, 2015, in conjunction with the mandate of Act 225, SLH 2012 to allow for online voter registration. All voters utilizing the online voter registration system (OLVR) are registering for the first time or updating their current registration within TotalVote. OLVR is integrated into TotalVote and serves as the public interface to the statewide voter registration system.

Since the launch, there have been over 70,000 transactions, while paper applications continue to be entered into the City's mainframe voter registration system. The result of this is that a little less than half of all registrations, not including motor voter applications, are now online. The use of both systems this election cycle requires that the systems sync in near real-time. We plan to implement TotalVote in its entirety for the 2018 Elections following testing and coordination with the counties beginning in 2017.

There are five main issues or changes that have arisen during this project that are worthy of discussion. The issues are as follows:

- 1) The role of OETS and the Hawaii State Government Private Cloud;

- 2) The paradigm shift in utilization of the new statewide voter registration system;
- 3) The movement away from an internal street directory system to a geocoded based addressing system;
- 4) The interaction with driver licensing; and
- 5) The issues related to operating two systems.

3.1 HAWAII STATE GOVERNMENT PRIVATE CLOUD

On December 4, 2014, shortly after the award of the contract to BPro, a new “cloud first” policy was established by Governor Ige. The policy provided that all new information technology projects were to be housed on the Hawaii State Government Private Cloud (GPC). Shortly after this we began discussions with OETS and were assigned an information technology consultant. As can be better discussed by OETS there are various technical and security matters associated with operating in the cloud. These have necessitated various meetings with the counties, driver licensing, and various vendors to ensure access to the new system in a secure manner, along with the ongoing expenditure of funds relating to operating in the Hawaii Government Private Cloud. This has been outlined in our request to the Legislature for an increase in our annual budget. This is further discussed in Appendix C: Management Plan, which includes the projected annual operational costs.

3.2 PARADIGM SHIFTS

Online voter registration has introduced two paradigm shifts. It has changed voters’ expectations from single notification prior to an election to real-time access to their registration record. This paradigm shift has had a significant impact on how voter registration is conducted. While paper applications are internally reviewed, issues and anomalies resolved, and records are entered into the system by the counties, an applicant registering online can check the status of their application at their convenience.

Similarly, the expectations of election administrators have evolved to automate previously manual review processes. The previous procedures were nuanced by vagaries of applicants not providing information on their application in conformance with the operational rules of the system. For example, in the past election officials would manually review each application and resolve issues before entering it into the system and assigning it a precinct. OLVR emulates that process by creating an electronic queue in which each application made online would be placed for election officials to review before it was accepted by them into the system.

In developing OLVR and TotalVote, election officials established rules and criteria for online applications to meet to automate the process. As such, the majority of OLVR transactions are accepted with an automated review. However, there will continue to be registrations that will need to go into the queue for manual review that cannot otherwise be screened by the system alone.

3.3 GEOCODED ADDRESSING

In Mainframe SVRS, the counties assign voters to the proper precinct using a street directory. This system attempts to list every street segment within a particular precinct. In order to use the street directory, the election officials have to reformat certain address information provided by the voter, so it conforms with the street directory system. As such, the street directory has a variety of vagaries that have occurred over the years that require human intervention that cannot be easily automated or creates difficulties replicating in a new system. Among these are (1) truncating of street addresses to accommodate character limitations; (2) county designation of zip codes as opposed to designation by USPS for residence address purposes; and (3) county permitted variations on street names. These issues originally were internal ones for election officials to address.

However, by providing an online polling place locator, as well as the introduction of OLVR, in which the voter types in their addressing information and the system attempts to autosuggest an address, the previously mentioned vagaries of the system have become an external matter. Specifically, online users at times would say the autosuggestion was incorrect or the county election officials would say it was incorrect, based on the above noted vagaries between how USPS and the City street directory believed addressing should occur.

The original autosuggestion feature used by the online voter registration system was provided by a national addressing service, which utilized the addresses recognized by USPS. The various other national services similarly provided standardized services that conform to USPS and not the counties' street directory. We explored the following options before making a decision:

1. Modify the counties' street directory to conform to a national service and USPS.
2. Provide autosuggested addresses, and standardize to the street directory internally.
3. Allow voters to freeform the address, and standardize to the street directory internally.
4. Require voters to enter their address based on the street directory format.

5. Develop a geographic information system (GIS) to customize the street directory and allow for autosuggested addresses.

The election community decided on option five, to move to a GIS based system which would permit the counties to customize each address and associate it with a geocoded point (i.e., latitude and longitude coordinates). This technology was incorporated into TotalVote and OLVR as opposed to using the street directory system with its vagaries, which were now being heightened due to the public's online interaction with the system.

Specifically, TotalVote would permit the counties to control the attributes of every address, without having to conform to the USPS or any national service (i.e., the counties would control how addresses are standardized to conform to the addressing conventions they have developed over the years). With this in place, we could utilize an autosuggestion program that was based on a fixed agreed upon universe of addresses.

The movement to a GIS based system was consistent with the election community's interest in such a system for greater accuracy in assigning voters that had been developing over the years. Specifically, the state reapportionment commission and the county redistricting commission utilize GIS to draft the lines to determine the U.S. Representative, state senatorial, state representative, and county districts. These lines do not conform with the traditional lines developed by USPS or the county planning department, which have their own separate purposes. What offices a voter is authorized to vote for are determined by where they live in relation to those state reapportionment and county redistricting lines. Additionally, election officials review and establish manageable-sized voting precincts and appropriate polling places which require additional precinct lines to be developed and considered when assigning voters.

We have been working with ESRI, a national leader in the area of GIS. The autosuggestion feature used in online voter registration, while a work in progress, is generally working to allow the vast majority of voters to be able to submit an address that corresponds to the Mainframe SVRS street directory for voter assignment purposes. To the extent the online voter registration program suggests an address that does not conform to the Mainframe SVRS street directory, those applications are sent to a virtual queue for the counties to review and resolve in the same way they would for a paper application.

3.4 INTERACTION WITH DRIVER LICENSING

Election officials rely on the DOT driver licensing and state identification databases to interact with the statewide voter registration system under HAVA, NVRA, and Act 225, SLH 2012.

The director of DOT, is considered the state motor vehicle authority under federal law, while the county examiners of drivers are responsible for the

issuance of state driver's licenses, under state law. Additionally, DOT under state law is required to operate a statewide traffic records system and provide information contained in the system in response to requests from government agencies, or any person pursuant to administrative rule. HRS §§ 286-171 & 286-171 and HAR §§ 19-121-1 through 19-121-100. The City, as the largest county, administers the statewide traffic records system on the City mainframe on behalf of DOT. The City has also entered into a contract with Marquis ID Systems on behalf of the state and counties to issue driver's licenses and additional services beyond what the City mainframe can provide on its own. This includes maintaining digitized signatures of all driver's license and state identification card holders.

In developing TotalVote, we have worked with the City DIT and the Examiner of Drivers to develop three webservices to access certain data.

The first webservice allows us to confirm if a voter registration applicant has a driver's license or state identification card. We are required to submit the applicant's name, date of birth, and SSN and the City checks for a record that matches. If there is a perfect match, it returns a code saying that the person has a driver's license or state identification card. At that point, the applicant is permitted to continue in to the OLVR.

The second webservice is to be used in conjunction with election officials entering paper records into TotalVote. This again requires the operator to enter the applicant's name, date of birth, and SSN. However, the webservice will return the following information that will autopopulate the voter registration record: residence address, mailing address, and gender. The operator would need to review the information to ensure that it is the same as what is on the paper application. If it is, then the operator can simply accept the information and save some data entry time. However, as people frequently move, the address information provided by driver licensing might be found to be out of date. If so, then the operator will need to type in the information as it appears on the application.

The third webservice does not connect directly to the statewide traffic records system, but instead connects to the City's vendor, Marquis ID Systems, who is responsible for producing the actual licenses and has a database containing similar information to what the statewide traffic records system has, with the addition of images, such as the scanned motor voter applications, and the digitized signature of the driver that appears on their license, after the applicant uses a digital signature pad when applying for the license. Similar to the other webservice, we provide the name, date of birth, but not the SSN, as the Marquis ID System database does not contain SSNs. Instead, we have to provide the driver's license number or state identification card number that was provided by the online applicant. If the name, date of birth, and government identification card number match, then the system returns the digitized signature of the applicant, in order to complete the voter registration application process.

In addition to these three webservices, we are in discussions with the City and DOT to authorize two more services. While technically any agreement would be with DOT, pragmatically speaking the agreement of the City is required as they manage the statewide traffic records system on behalf of DOT and the City argues that driver's license records are primarily county records that they have the authority to decide or decline to release.

The first webservice would permit us to receive the electronic image and data associated with each motor voter applicant who fills out the voter registration portion of the application, as opposed to the current practice in which driver licensing provides us the original of all motor voter applications, regardless of whether the applicant filled out the voter registration portion.

The second service would permit election officials to connect through the driver licensing connection, through the American Association of Motor Vehicle Administrators (AAMVA), with the Social Security Administration (SSA) to confirm a voter's SSN, if the applicant is not already a holder of a driver's license or state identification card, and allow this search to be done from within the new voter registration system. This would be an improvement over the current service that the City provides which is a separate SSN check, through AAMVA, that is not integrated into the voter registration system. Unfortunately, City DIT has explained that it cannot integrate the full nine digit SSN check into our voter registration system, due to the inability of their system to distinguish between requests coming from the voter registration system and from driver licensing officials. Given this, they are requesting that we use an alternative SSA webservice that is used by election officials in other states that only utilizes the last four digits of the SSN. We have agreed to this and DOT is now requesting authorization from SSA to establish this webservice connection. If granted then we would work with AAMVA and the City to establish this service.

Since our preliminary status update, Act 167, SLH 2016 has passed which impacts the structure of these webservices. Currently, the webservices use the full nine digit SSN as both driver licensing and election officials utilize it as a unique identifier for drivers and voters. However, as of January 1, 2018, election officials will no longer utilize the full nine digit SSN. Instead, election officials are required to permit applicants to use their driver's license number, state identification card number, or the last four digits of their SSN, if they don't have a driver's license or state identification card number. If an applicant has none of these, then they are issued a unique voter identification number.

3.5 OPERATING TWO SYSTEMS

As it stands, all online transactions are handled by TotalVote, while paper transactions are entered in to Mainframe SVRS. The use of both systems this election cycle requires that the systems share voter registration data. While we refer to the sharing of data between the two systems as "running in parallel," it is important to note that the sharing of the data between these two systems does

not technically constitute running in parallel. Specifically, when running two systems in parallel, both systems should have the same information in real-time, the same capture mechanisms and capabilities, and in the event of one system failure, the other system should take over with minimal or little down-time to users.

In our case, we are running two systems that both capture voter registration information and reconcile that information once a week through a batch process. Additionally, the methods of collecting data are different in both systems – Mainframe captures paper applications, while TotalVote captures online applications. If TotalVote were to go down, then no one will be able to register online, violating the true definition of running in parallel as we will not be able to provide the same functionality. However, if Mainframe SVRS were to go down, then we could still capture the voter information on paper forms and manually enter them into TotalVote.

In 2015, the counties and the state agreed to operate TotalVote with Mainframe SVRS in this manner for this election cycle to allow us to directly engage in activities and tasks in the new system under real election conditions. This agreement was based on the premise that Mainframe SVRS could easily share data with another system. The alternative was to test TotalVote sufficiently in advance of the 2016 Elections to get us comfortable and confident operating the new system.

A significant amount of resources have been expended by all entities to attempt to allow the two databases to communicate in near real-time. However, while TotalVote transmits information regarding OLVR applications to the Mainframe SVRS via a webservice, which is nearly real-time, City DIT was unable to develop a similar webservice to transmit its data to TotalVote in nearly real-time. Instead, they were only able offer batch updating. As such, TotalVote transmits online voter registration applications to the Mainframe SVRS, while Mainframe SVRS transmits paper application information to the TotalVote once a week.

This lag between the systems makes it more difficult to use them in the manner originally intended, but ultimately still possible. Specifically, in order to truly know the universe of registered voters at any given time, election officials must utilize both systems, as opposed to simply relying on the contents of one system (i.e., Mainframe SVRS will contain recent paper registrations that have not been sent to the new system given the timing of the batch updates, and the new system may have online voter registrations that the Mainframe SVRS has not yet been able to process.)

Given our collective goal was to successfully conduct the 2016 Elections, the counties and state, along with City DIT and the TotalVote vendor, BPro, focused their attention on ensuring the systems remained in sync to the extent possible during the election cycle.

4 CONCLUSION

It has been agreed by the election community that TotalVote will be utilized in its entirety for the 2018 election cycle. To accomplish this, we plan to thoroughly test and finalize the functionality of TotalVote in 2017. The testing will involve affidavit entry, purging voters, generating data for yellow cards and white cards, printing poll books, and updating voting credit for voters. We plan to complete testing no later than March 31, 2017. After testing is completed, we will be focused on the logistical issues associated with updating and migrating all voter records to TotalVote which is planned for June 30, 2017.

The framework of TotalVote, including data entry procedures and overall functionality were in place for users in 2016 to test. However, the demands of the 2016 election cycle, did not permit the counties, State, and vendor to collaborate on the testing of the system at that time. The vendor has already provided a test site, separate and apart from the live voter registration database, to test functionality such as entering voter registration records, receiving mail ballots, and creating poll books. Additionally, the counties have indicated that they are utilizing various components of TotalVote as they feel appropriate.

As indicated above, the migration to TotalVote is a significant undertaking. It is our hope that this report and its appendices will provide relevant information as called for in Senate Concurrent Resolution 70, SD 1 and Senate Resolution 41, SD 1.

APPENDIX A: PROJECT MANAGEMENT SCHEDULE & HAVA EXPENDITURES

This appendix includes tables relating to the project management schedule, current expenditures, and expected expenditures to address the following requirements of Senate Concurrent Resolution 70, SD 1 and Senate Resolution 41, SD 1:

- 1) Project management schedule that itemizes the various project deliverables and delivery timeline;
- 2) Identification of completed deliverables and the amounts paid to the State's contractor;

* * *

- 5) Itemization of expenditures from funds provided pursuant to sections 101 and 251 of HAVA.

While the voter registration (similar to the Mainframe SVRS with additional components), online voter registration (required by Act 225, SLH 2012), and election management are part of the same system, for purposes of discussing deliverables, the project was broken into these three components.

PROJECT DELIVERABLES AND TIMELINE

The following tables reflect the delivery timeline for the online voter registration (OLVR), voter registration (VR), and election management (EM) modules of the system. Deliverables in italics are to be completed between now and June 30, 2017. In association with these deliverables, the contract provides for vendors to have eleven onsite trips to the state for onsite discussions with the state and to perform training.

TABLE 1: ONLINE VOTER REGISTRATION

Deliverables and Payables	Completion Date
Planning and Design	12/04/2014
Design Final Draft	12/05/2014
Login without DMV Interface	12/19/2014
Data Conversion	01/09/2015
Registration	01/15/2015
Registration Update	02/02/2015
Testing	04/03/2015

Deliverables and Payables	Completion Date
Change Orders	04/17/2015
Final Approval	04/20/2015
Requirements Complete and Approved	05/01/2015
Go Live	08/03/2015
Final Data Conversion/Training	08/15/2015

TABLE 2: VOTER REGISTRATION

Deliverables and Payables	Completion Date
Planning and Design	12/04/2014
Design Draft Final	12/05/2014
Data Conversion	01/08/2015
Voter Applications	03/31/2015
Absentee	04/30/2015
DMV interface	07/03/2015
<i>Petition Requirements</i>	<i>01/13/2017</i>
<i>Petition processing</i>	<i>01/27/2017</i>
<i>Testing</i>	<i>02/03/2017</i>
<i>Change Orders</i>	<i>02/10/2017</i>
<i>Final Approval</i>	<i>03/31/2017</i>
<i>Final Data Conversion/Training</i>	<i>03/31/2017</i>
<i>Go Live</i>	<i>06/30/2017</i>

TABLE 3: ELECTION MANAGEMENT

Deliverables and Payables	Completion Date
Design Final Draft	12/05/2014
Data Conversion	01/08/2015
Planning and Design	05/01/2015
Candidate Management	11/01/2015

Deliverables and Payables	Completion Date
HR, Inventory Requirements	02/19/2016
Inventory	03/04/2016
Voter Information Portal	05/01/2016
<i>Election Night Reporting</i>	<i>06/30/2017</i>
<i>Reports</i>	<i>01/20/2017</i>
<i>Human Resources</i>	<i>06/30/2017</i>
<i>Ballots</i>	<i>03/10/2017</i>
<i>Poll books / Vote By Mail</i>	<i>03/10/2017</i>
<i>Testing</i>	<i>03/15/2017</i>
<i>Change Orders</i>	<i>03/17/2017</i>
<i>Final Data Conversion/Training</i>	<i>06/30/2017</i>
<i>Go Live</i>	<i>06/30/2017</i>

EXPENDITURES

The following tables list all of the expenditures for this project which have come from HAVA funds, including payments to BPro under the contract. We have additionally included tables detailing how much will be paid for the remaining deliverables to BPro out of HAVA funds. Tables 4 through 7 provide an overview of expenditures paid and to be paid.

TABLE 4: BPRO OVERVIEW

Description	Amount Paid
Initial BPro Deliverables Completed	\$635,689.12
Initial Onsite Travel	\$62,820.00
Change Order – GIS Address Management	\$142,569.01
Change Order – Webservice with City	\$45,875.53
Change Order – Operator Security Devices	\$1,050.00
Change Order – Load Testing	\$8,247.25
Total	\$896,250.91

TABLE 5: OTHER VENDORS OVERVIEW

Description	Amount Paid
Hawaiian Telcom – System Security Monitoring	\$39,476.54
6 Head LLC – Consultant Services	\$170,762.50
ESRI – GIS Addressing Support	\$110,787.18
Other Expenses	\$198,471.01
Total	\$519,497.23

TABLE 6: BPRO OVERVIEW OF REMAINING DELIVERABLES

Description	Amount to be Paid through 06/30/2017
Initial Deliverables – Pending Completion	\$472,565.62
Travel – Pending Completion	\$62,820.00
Total	\$535,385.62

TABLE 7: BPRO ANNUAL COST

Licensing and Maintenance	Amount to be Paid
2017	\$53,397.00
2018	\$177,990.00
2019	\$53,397.00
2020	\$177,990.00
Total	\$462,774.00

DETAILED EXPENDITURES

Tables 8 through 19 provide more detailed information regarding payments to vendors that have been paid and to be paid.

TABLE 8: BPRO INITIAL DELIVERABLES – COMPLETED

Deliverable Date	Invoice Date	Invoice No.	Module	Amount Paid
12/04/2014	12/05/2014	8852	Planning and Design (VR)	\$20,824.83
12/04/2014	12/05/2014	8853	Planning and Design (OLVR)	\$2,936.84
12/05/2014	05/01/2015	9210	Design Draft Final (VR)	\$6,296.41
12/05/2014	05/01/2015	9211	Design Final Draft (OLVR)	\$9,584.29
12/05/2014	05/01/2015	9215	Design Draft Final (EM)	\$5,314.00
12/19/2014	05/01/2015	9212	Create Login w/o DMV Interface (OLVR)	\$21,061.55
01/08/2015	01/23/2015	8911	Data Conversion (VR)	\$20,824.83
01/08/2015	01/23/2015	8912	Data Conversion (EM)	\$20,913.83
01/09/2015	01/23/2015	8910	Data Conversion (OLVR)	\$2,936.84
01/15/2015	05/01/2015	9216	Registration (OLVR)	\$19,440.45
02/02/2015	05/01/2015	9217	Registration Update (OLVR)	\$10,554.50
03/31/2015	06/03/2015	9268	Voter Applications (VR)	\$98,066.57
04/03/2015	05/01/2015	9213	Completion of Testing (OLVR)	\$10,711.25
04/17/2015	05/01/2015	9214	Change Orders (OLVR)	\$10,594.20

Deliverable Date	Invoice Date	Invoice No.	Module	Amount Paid
04/20/2015	-		Final Approval (OLVR)	\$0.00
04/30/2015	06/03/2015	9274	Absentee (VR)	\$93,088.60
05/01/2015	06/03/2015	9269	Requirements Complete (OLVR)	\$23,769.08
05/01/2015	06/03/2015	9270	Planning and Design (EM)	\$20,913.83
07/03/2015	08/25/2015	9395	DMV Interface (VR)	\$48,853.75
08/03/2015	-		Go Live (OLVR)	\$0.00
08/15/2015	08/25/2015	9396	Final Data Conversion Training	\$7,994.25
11/01/2015	03/03/2016	9833	Candidate Management	\$26,224.00
02/19/2016	03/03/2016	9832	HR / Inventory Requirements	\$13,710.22
03/04/2016	05/05/2016	9946	Inventory	\$73,150.00
05/01/2016	05/05/2016	9945	Voter Information Portal	\$67,925.00
Total				\$635,689.12

TABLE 9: BPRO INITIAL DELIVERABLES – PENDING COMPLETION

Deliverable Date	Module	Amount to be Paid
01/13/2017	Petition Requirements (VR)	\$15,675.00
01/27/2017	Petition Processing (VR)	\$83,495.50
02/03/2017	Completion of Testing (VR)	\$37,411.00
01/20/2017	Reports (EM)	\$26,224.00
02/10/2017	Change Orders (VR)	\$15,675.00
03/31/2017	Final Approval (VR)	\$0.00
03/10/2017	Ballots (EM)	\$33,130.82

Deliverable Date	Module	Amount to be Paid
03/10/2017	Poll Books / Vote By Mail (EM)	\$36,418.25
03/31/2017	Final Data Conversion/Training (VR)	\$7,994.25
06/30/2017	Go Live (VR)	\$0.00
02/24/2017	Human Resources (EM)	\$73,150.00
06/30/2017	Election Night Reporting (EM)	\$67,925.00
03/15/2017	Completion of Testing (EM)	\$21,615.82
03/17/2017	Change Orders (EM)	\$25,766.56
06/30/2017	Final Data Conversion/Training (EM)	\$28,084.42
06/30/2017	Go Live (EM)	\$0.00
	Total	\$472,565.62

TABLE 10: BPRO ON SITE VISITS – COMPLETED

Travel Date	Invoice Date	Invoice No.	Description	Amount Paid
14-Aug	08/29/2014	8715	August Travel	\$10,470.00
15-Jan	01/22/2015	8909	January Travel	\$10,470.00
15-May	06/03/2015	9271	May Travel	\$10,470.00
15-Jun	08/21/2015	9373	June Travel	\$10,470.00
15-Jul	08/21/2015	9391	July Travel	\$10,470.00
15-Aug	09/08/2015	9392	August Travel	\$10,470.00
			Total	\$62,820.00

TABLE 11: BPRO ON SITE VISITS – PENDING

Travel Date	Description	Amount to be Paid
TBD	Neighbor Island Travel	\$10,470.00
TBD	Travel	\$10,470.00

Travel Date	Description	Amount to be Paid
TBD	Travel	\$10,470.00
TBD	Travel	\$10,470.00
TBD	Travel	\$10,470.00
Total		\$52,350.00

TABLE 12: CHANGE ORDER – GIS ADDRESS MANAGEMENT

ESRI Date	BPro Date	Invoice No.	Description	Amount Paid
07/01/2015	08/06/2015	9272	ESRI Address Management	\$43,160.00
07/01/2015	08/06/2015	9273	ESRI Street Map Premium	\$13,089.01
10/01/2015	11/12/2015	9527	ESRI Address Management	\$43,160.00
03/01/2016	04/04/2016	9878	ESRI Address Management	\$43,160.00
Total				\$142,569.01

TABLE 13: CHANGE ORDER – WEB SERVICE WITH CITY

Sirius Date	BPro Date	Invoice No.	Description	Amount Paid
08/01/2015	08/25/2015	9372	Sirius Computer Solutions	\$17,765.00
10/01/2015	10/13/2015	9480	Sirius Computer Solutions	\$22,990.00
12/01/2015	12/22/2015	9581	Sirius Computer Solutions	\$1,234.41
02/20/2016	03/03/2016	9835	Sirius Computer Solutions	\$182.88
03/01/2016	03/16/2016	9858	Sirius Computer Solutions	\$182.88
04/01/2016	05/04/2016	9928	Sirius Computer Solutions	\$1,508.72
07/27/2016	08/12/2016	10100	Sirius Computer Solutions	\$182.88

Sirius Date	BPro Date	Invoice No.	Description	Amount Paid
08/17/2016	08/25/2016	10103	Sirius Computer Solutions	\$182.88
09/28/2016	10/05/2016	10157	Sirius Computer Solutions	\$1,463.00
09/30/2016	10/12/2016	10173	Sirius Computer Solutions	\$365.76
Total				\$45,875.53

TABLE 14: CHANGE ORDER – LOAD TESTING

CC Date	BPro Date	Invoice No.	Description	Amount Paid
07/15/2016	07/29/2016	10074	Customer Centrix - Loadstorm Plus	\$6,530.00
08/10/2016	08/12/2016	10099	Customer Centrix - Loadstorm Plus	\$1,227.98
09/23/2016	10/05/2016	10158	Customer Centrix - Loadstorm Advanced	\$489.27
Total				\$8,247.25

TABLE 15: CHANGE ORDER – OPERATOR SECURITY DEVICES

Invoice Date	Invoice No.	Amount Paid
09/24/2014	8720	\$1,050.00
Total		\$1,050.00

TABLE 16: ESRI – GIS ADDRESS MANAGEMENT

Invoice Date	Invoice No.	Amount Paid
04/20/2016	93123933	\$11,060.21
06/03/2016	93134222	\$40,980.63
06/22/2016	93146080	\$11,880.37
07/14/2016	93158180	\$15,311.26
08/23/2016	93175168	\$16,631.94

Invoice Date	Invoice No.	Amount Paid
09/30/2016	93190990	\$11,404.45
10/18/2016	93197836	\$3,518.32
	Total	\$110,787.18

TABLE 17: 6 HEAD CORP – CONSULTANT SERVICES

Invoice Date	Invoice No.	Amount Paid
06/20/2014	169	\$1,306.25
07/15/2014	170	\$5,106.25
08/13/2014	171	\$5,462.50
09/05/2014	172	\$5,462.50
10/09/2014	173	\$12,943.75
11/06/2014	174	\$5,106.25
12/04/2014	175	\$5,462.50
01/06/2015	176	\$8,668.75
02/02/2015	177	\$4,987.50
03/01/2015	178	\$8,550.00
05/07/2015	179	\$11,162.50
05/07/2015	180	\$5,581.25
06/01/2015	181	\$9,262.50
06/30/2015	182	\$10,687.50
08/11/2015	183	\$15,556.25
09/17/2015	184	\$13,775.00
10/12/2015	185	\$12,231.25
11/09/2015	186	\$4,987.50
12/17/2015	187	\$2,968.75
01/13/2016	188	\$4,275.00
02/17/2016	189	\$2,731.25
03/15/2016	190	\$4,393.75

Invoice Date	Invoice No.	Amount Paid
04/13/2016	191	\$2,850.00
05/02/2016	192	\$4,987.50
06/02/2016	193	\$831.25
07/06/2016	194	\$356.25
08/04/2016	195	\$118.75
09/07/2016	196	\$593.75
12/02/2016	197-199	\$356.25
	Total	\$170,762.50

TABLE 18: HAWAIIAN TELCOM – SECURITY MONITORING

Invoice Date	Invoice No.	Amount Paid
03/15/2016	INV 70987606	\$8,848.19
04/08/2016	INV 71305826	\$3,403.15
04/25/2016	INV 71623252	\$3,403.15
06/01/2016	INV 71939880	\$3,403.15
08/04/2016	INV 72255098	\$3,403.15
08/05/2016	INV 72570934	\$3,403.15
09/20/2016	INV 72879539	\$3,403.15
10/05/2016	INV 73188370	\$3,403.15
11/14/2016	INV 73499608	\$3,403.15
12/08/2016	INV 73807021	\$3,403.15
	Total	\$39,476.54

TABLE 19: OTHER EXPENDITURES

Invoice Date	Vendor	Description	Amount Paid
08/20/2015	Office Max	(1) Dymo label Writer 450 used for labeling during voter registration	\$225.71

Invoice Date	Vendor	Description	Amount Paid
09/11/2015	DAGS: ICSD	(15) Vormetric licenses for transparent encryption server and annual support	\$72,433.47
09/18/2015	CDW Government	(10) KODAK scanners to be used with new SVRS processing	\$21,387.14
11/02/2015	City and County of Honolulu	Online service for August 2015 - city running reports for OLVR and SVRS system	\$7,125.32
11/02/2015	City and County of Honolulu	Online service for September 2015 - city running reports for OLVR and SVRS system	\$12,136.49
12/09/2015	Sirius Computer Solutions	Enterprise Endpoint Solution for Statewide Voter Registration System	\$54,762.19
01/19/2016	Hawaiian Airlines	Tvl 1/26/16 HNL-OGG-HNL to install PAN software; D. Rosenbrock	\$152.40
01/19/2016	Hawaiian Airlines	Tvl 1/26/16 HNL-OGG-HNL to install PAN software; S. Kumar	\$152.40

Invoice Date	Vendor	Description	Amount Paid
01/19/2016	Hawaiian Airlines	Tvl 1/26/16 HNL-OGG-HNL to install PAN software; M. Benevides	\$152.40
01/19/2016	Hawaiian Airlines	Tvl 1/27/16 HNL-LIH-HNL to install PAN software; M. Benevides	\$152.40
01/19/2016	Hawaiian Airlines	Tvl 1/27/16 HNL-LIH-HNL to install PAN software; S. Kumar	\$152.40
01/19/2016	Hawaiian Airlines	Tvl 1/27/16 HNL-LIH-HNL to install PAN software; D. Rosenbrock	\$152.40
01/19/2016	Hawaiian Airlines	Tvl 1/28/16 HNL-ITO-HNL to install PAN software; M. Benevides	\$195.50
01/19/2016	Hawaiian Airlines	Tvl 1/28/16 HNL-ITO-HNL to install PAN software; S. Kumar	\$195.50
01/19/2016	Hawaiian Airlines	Tvl 1/28/16 HNL-ITO-HNL to install PAN software; D. Rosenbrock	\$195.50
03/23/2016	Hawaiian Airlines	Tvl 3/31/16 HNL-ITO-HNL to update IP security cert. in software; M. Benevides	\$203.50
03/23/2016	Hawaiian Airlines	Tvl 3/31/16 HNL-ITO-HNL to update IP security cert. in software; D. Rosenbrock	\$166.40

Invoice Date	Vendor	Description	Amount Paid
03/23/2016	Hawaiian Airlines	Tvl 3/31/16 HNL-ITO-HNL to update IP security cert. in software; S. Kumar	\$194.50
03/31/2016	Enterprise Rent A Car	Rental car on 3/31/16 to update IP security cert. in software; D. Rosenbrock	\$50.50
07/01/2015	East West Concepts	Translations	\$1,791.05
08/17/2015	East West Concepts	Translations	\$10,497.42
08/20/2015	East West Concepts	Translations	\$504.75
12/02/2015	East West Concepts	Translations	\$372.13
12/02/2015	East West Concepts	Translations	\$8,798.89
03/23/2016	Pacific Gateway Center	OLVR proofing of translations-Chinese, Japanese and Ilocano	\$1,012.50
02/02/2016	City and County of Honolulu	Data processing services for the month of December 2015	\$1,043.96
03/08/2016	City and County of Honolulu	Special Batch Processing charges for the month of January 2016	\$80.39

Invoice Date	Vendor	Description	Amount Paid
04/07/2016	City and County of Honolulu	Special Batch Processing charges for the month of February 2016	\$770.31
05/09/16	East West Concepts	Translations	\$314.01
05/24/16	SystemMetrics	3 year premium support for firewall	\$3099.48
Total			\$198,471.01

APPENDIX B: QUALITY ASSURANCE

The Statewide Voter Registration System Project has multiple mechanisms in place to provide quality assurance. These include:

1. Quality Assurance of Project Management
2. Quality Assurance of Government Private Cloud (GPC) Infrastructure
3. Quality Assurance of Networking and Data Security
4. Quality Assurance of Software Development
5. Resolution of Issues or Problems Identified by Users

1. QUALITY ASSURANCE OF PROJECT MANAGEMENT

- ETS Oversight – Upon selecting the Government Private Cloud for IaaS hosting services, Office of Elections engaged ETS for quality assurance and oversight support
 - Office of Elections reports to the Deputy CIO on a monthly basis, submitting details on task status, decisions made, changes to schedule, and open risks and issues.
 - As a part of this monthly oversight relationship, ETS provides recommendations on the best course of action to mitigate risk and complete a successful implementation
 - In addition to the regular reporting cycle with the CIO, Office of Elections periodically meets with the CIO for status checks so that the CIO remains up to date of the status and direction, and can provide quality assurance oversight and assist with key decision making around the overall system
 - The project is run under the framework and methodology defined in the Project Management Center of Excellence (PMCE)
- Project Team Configured for Quality Assurance Checks and Balances – The project team is configured such that multiple parties have direct and indirect lines of reporting across the organizational chart. This allows for knowledge sharing across the team and opportunities to provide second opinions across various areas of the project. See **Error! Reference source not found..**

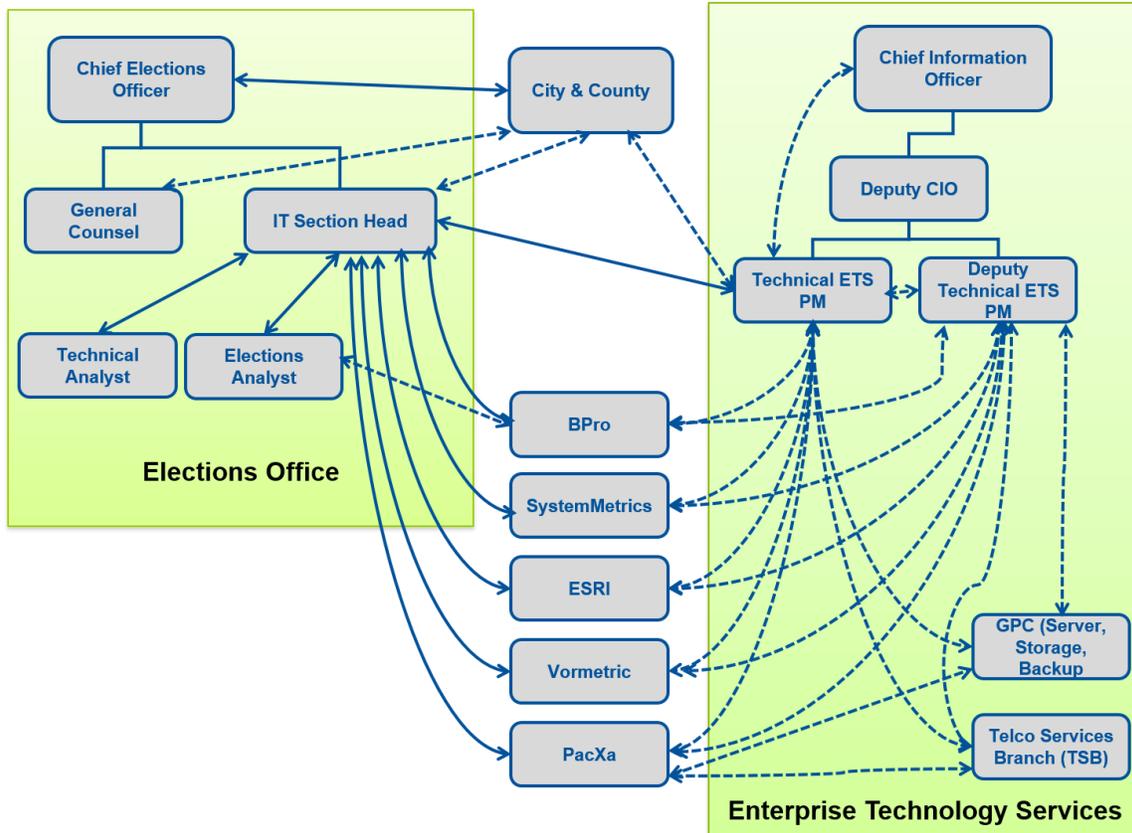


Figure 1: Project Organizational Chart

2. QUALITY ASSURANCE OF GOVERNMENT PRIVATE CLOUD (GPC) INFRASTRUCTURE

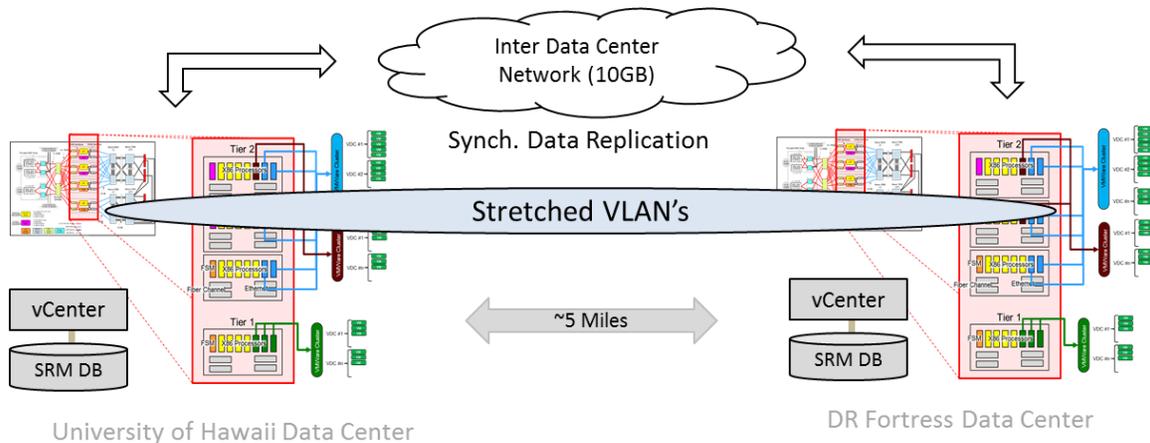
Government Private Cloud (GPC) Overview

- Dedicated private cloud for State offering Infrastructure as a Service (IaaS)
- Service hosted on State and leased data centers facilities
- Primary location at DRFortress; Secondary location at the UH ITC Data Center;
- GPC provides virtualized compute, storage and network infrastructure without single points-of-failure:
 - Redundant and high availability hardware: compute and storage on IBM Pureflex and V7000 hardware
 - Resilient and fault-tolerant LAN/WAN using Cisco Nexus 7000, 5000 and 2000 series FEX switches.
- VMWare (ESXi 5.5) and AIX virtualized environments

- Windows 2012; Red Hat Enterprise Linux version 6.x and higher, AIX version 7 and higher guest O/S
- Two levels of firewall/security – Traffic into the data centers firewalled by Cisco ASA physical appliances; Traffic between VMs inside data center firewalled by VMWare’s NSX software
- Antivirus protection and Intrusion Prevention of all virtual machines provided by Trend Micro
- Backup of all virtual machines and user data using IBM’s TSM and TSM VE products
- Data center facilities including power, cooling, rack space, cabling
- Monitoring of all VMs by the State’s security operations center located at Keoni Ana building
- Patching of Windows, Linux and AIX operating systems
- Encryption of data at rest on a needed basis provided by Vormetric systems
- State employees from ETS work on GPC from the following groups:
 - Server Group : Implement and support all VMWare Hypervisor and Windows/RHEL operating systems
 - TSB Group: Implemented all LAN/WAN and perimeter firewalls and provide IPAM, DNS and VPN services
 - SSB Group: Handle backups, AIX, TSM, TSM VE and IBM p260/770 nodes
 - AD Group: Responsible for all Active Directory requests
 - Cyber Security Group: Installed Trend Micro agents on all VMs and monitor all GPC VMs from SOC
 - Facilities Group: Provide all physical security, space, power and cooling
- Primary Data Center located at DRFortress data center
- Secondary Data Center located at University of Hawaii’s Data Center
- Identical Hardware and software installed at both locations
- Data gets replicated between the two sites

- All departments on the NGN have access to both locations
- In the event of a disaster at DRFortress, all VMs will come up at UH
 - All core services will be brought up first : Active Directory, Domain Name Servers, Network Time Servers
 - All department VMs will be brought up after the core services are up and running
 - Users will access the VM's at UH ITC Data Center instead of DRFortress
 - No change required at the users end
- VMs operational on the GPC are monitored by the Security Operations Center (SOC)
- SOC services provided by ICSD/OIMT
- SOC provides these services to GPC:
 - Security information event management
 - Cyber attack patterns and remediation steps
 - Monitoring of vulnerabilities within virtual servers
 - Alerts to server owners of abnormal activities originating from their virtual servers
 - Suggestions to mitigate risks and protection from cyber attacks
- Whole VM Backups:
 - VM's residing in the GPC are backed up daily
 - Backups are performed at the VM level
 - Agentless backups, nothing to install or manage
- File or application level backups:
 - Agent must be installed and configured per VM
 - GPC customer must manage file level backup and restore policy
 - Recovery is done by the customer

- GPC DR Services (Windows/Linux x86)
 - Production VM's are replicated to DR facility (UH)
 - Replication delay ~5 minutes
 - Site Recovery Manager Tool used to bring up all VMs at DR site automatically



ELECTIONS SYSTEMS ON GPC

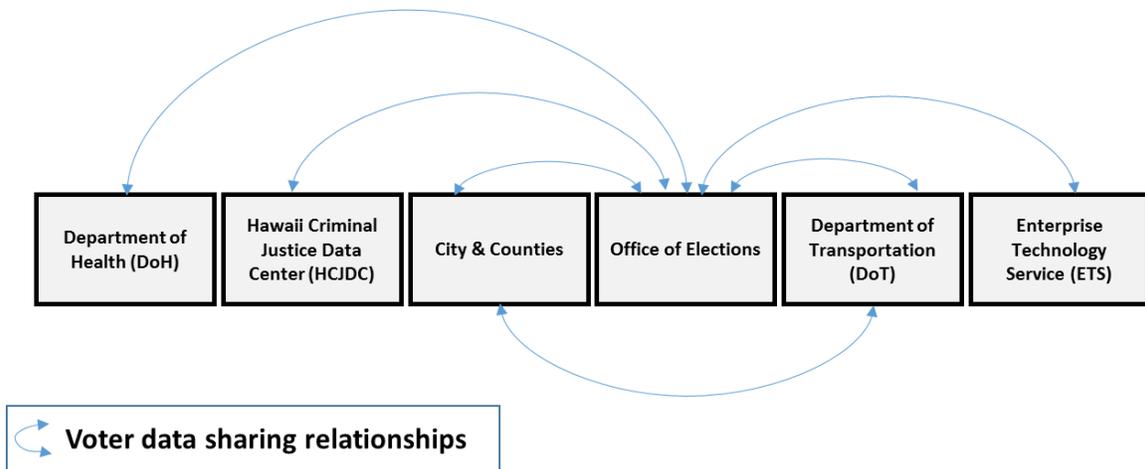
- Online Voter Registration Systems (OLVR)
 - This is the public facing system where all Hawaii residents can go to register. This system ties back to the central elections database. The system was developed by BPro and runs on the two redundant servers which are front ended by a load balancer. This load balancer intercepts all traffic and sends the requests to each one of the OLVR servers based on server utilization. Since going live on August 3, 2015 the system has been in operation 99.99% of the time and was able to handle the load during the republican and democratic caucuses.
- TotalVote is the central database where all voter information is stored.
- This database runs inside the internal side of the GPC and is NOT directly accessible by the general public. All data inside this database is encrypted using Vormetric's transparent encryption technique. This system was developed by BPro and runs on two redundant servers, front ended by a load balancer. Public users enter their information on the OLVR system, which sends this data to TotalVote. Once the data gets inside TotalVote, county officials are alerted of a new registration and they start their verification process. All counties access TotalVote through a secure encrypted VPN tunnel so that all data going between county offices and GPC is encrypted. Since going live on August 3, 2015, this system has completed over 70,000 voter registration transactions for voters whose

information is stored inside this secure database. This system authenticates users based on the State of Hawaii's Active Directory, which follows security policies as mandated by ETS.

- External systems:
 - Social Security Verification – Currently performed through City and County's mainframe. Each county has access to the City's systems where they login and verify SSN. We have been working with City and County to streamline this process and have agreed to implement an automated SSN verification system. All technical requirements have been mapped out and a network design has been completed. DOT has agreed to enter into an MOA with the SSA to allow elections officials to use their HAVV service for social security verifications.
 - Death Record Verification – Currently in discussions with department of health to implement an automated and secure system to validate death and name change records. The current system is not efficient and requires manual processing.
 - Criminal Record Verification – Currently in discussions with Hawaii Criminal Justice Data Center to implement an automated and secure system to validate criminal records. The current system is not efficient and requires manual processing.
 - Driver's License Verification – Have reached an agreement with DOT whereby they will share all drivers that are also registered voters. We are in the process of establishing a baseline between TotalVote and DL database. Once that baseline has been completed, then TotalVote will have all up to date information and going forward, DOT will provide elections any new/updated information.
 - MIDS check – Currently in discussions with MIDS to electronically obtain signatures of drivers that are also registered voters. MIDS has agreed to implement an automated system.
 - Real-Time GIS Locator – Have been working with ESRI to map out all the GIS information and input that into TotalVote so that registered voters can pull up their polling places and precinct locations from GIS maps. This process will be ongoing as we work with ESRI to provide correct mapping information.
- Public Facing Office of Elections website is also housed on the GPC. This is the entry point for constituents to access all elections related information, including, online voter registration.
- File Servers and Image Repository Servers: These systems are also running on the internal side of GPC where counties store their voter and

candidate files and images. All transmission from counties to these servers is through a secure encrypted VPN tunnel so that all data in-flight is encrypted. Data at-rest on both of these servers are encrypted using Vormetric's transparent encryption. Only authorized users have access to these servers and each county can only see their own information and NOT anyone else's information.

- Call center and worker intake servers are also housed inside the internal section of GPC. These systems will be used during election times to hire seasonal workers and to provide call center services to the general public.
- Anti-malware software is installed on all servers inside the GPC, on all database servers and all county/office of elections computers. This anti-malware software checks for any suspicious activities on any of the computers or servers and stops any service running that appears malicious. The anti-malware and VPN products are from Palo Alto Networks who have been listed as the leaders in the VPN/Firewall/Anti-malware space.
- Overall project management and technical architecture on the security/infrastructure side has been provided by ETS consultants. These consultants have been working with ETS for over 2 years and have followed best practices and guidelines as mandated by ETS.
- ETS Involvement – Since early 2015, the Office of Elections has been working with ETS to implement this new system. At that time, Keone Kali was the CIO and he was supportive of this project. After his departure, the new CIO, Todd Nacapuy has been very supportive and has been assisting the Office of Elections to ensure that the new system gets implemented as per ETS standards and meets all regulatory and compliance requirements. Todd was also instrumental in helping out with getting DOT to provide DL data to the Office of Elections and to get DOT to sign an MOA with SSA.



3. QUALITY ASSURANCE OF NETWORKING AND DATA SECURITY

The Office of Elections is implementing a statewide voter registration, which is hosted on the State of Hawaii’s government private cloud infrastructure (GPC) at two data centers – DRFortress (Primary) and UH (Secondary).

The main system that houses all of this information was developed by BPro and is called TotalVote. This is a web application front-end with a MS SQL server database back-end. Both the web application servers and the database servers are hosted within the State’s Private Cloud environment.

All data at-rest and in-transit is encrypted because it contains PII information.

NETWORK ARCHITECTURE

The Office of Elections is located in Pearl City and all county offices are connected to the GPC via the State’s private next generation network (NGN).

This network is closed from the outside world and any Internet traffic from this closed network is done through perimeter firewalls. All traffic entering and leaving this network is monitored by the security operations center (SOC). The SOC team also looks at cyber attacks from the outside and insider threats whereby traffic from any internal NGN IP is attempting to send packets to the outside world to unknown destinations. The SOC uses SIEM tools to capture all traffic and provides logs of suspicious or malicious activities.

Each termination point into the NGN network from any county or the Office of Elections is firewalled and very specific access control lists (ACLs) are implemented to allow traffic flow between the county offices and the GPC. ACLs are implemented based on source IP, destination IP, service type and port numbers corresponding to each type of service. Without the ACLs in place, no traffic is allowed into the GPC environment. Currently, there are ACLs at the NGN firewalls in place for each county office to connect to TotalVote. These

county workstations DO NOT have access to any other servers or resources on the GPC other than the elections servers.

DATA AT-REST ENCRYPTION

All elections servers and databases on the GPC are encrypted using Vormetric's transparent encryption technique. This solution is currently in use at other state and federal agencies including the FBI and the CIA. The main differentiator between this solution and other encryption solutions in the market is that the Vormetric solution is able to mask systems administrators from seeing any data. Other solutions that offer full disk encryption, SAN level encryption, database level encryption, operating system level encryption all suffer from one common problem – the systems administrators of these systems have access to the encryption/decryption keys and could potentially see your data either at the file level, database level, or storage level. At the heart of the Vormetric encryption solution is their encryption engine and key manager called the Digital Security Manager (DSM). Currently, we have installed two DSMs in high-availability (HA) mode; one at DRFortress which is the primary DSM and the second at UH which is the secondary DSM. All encryption is performed using the advanced encryption standard (AES) with 256 bit ciphers. The encryption and decryption keys are managed from the DSM using the key management interoperability protocol (KMIP) which is a standard driven by the OASIS organization, to which all leading encryption companies are members of. The actual encryption and decryption keys are delivered using elliptic curve cryptography (ECC). The Office of Elections has their own domain defined within the DSM and only certain members from the Office of Elections have the authority to allow access to elections officials to view the TotalVote data.

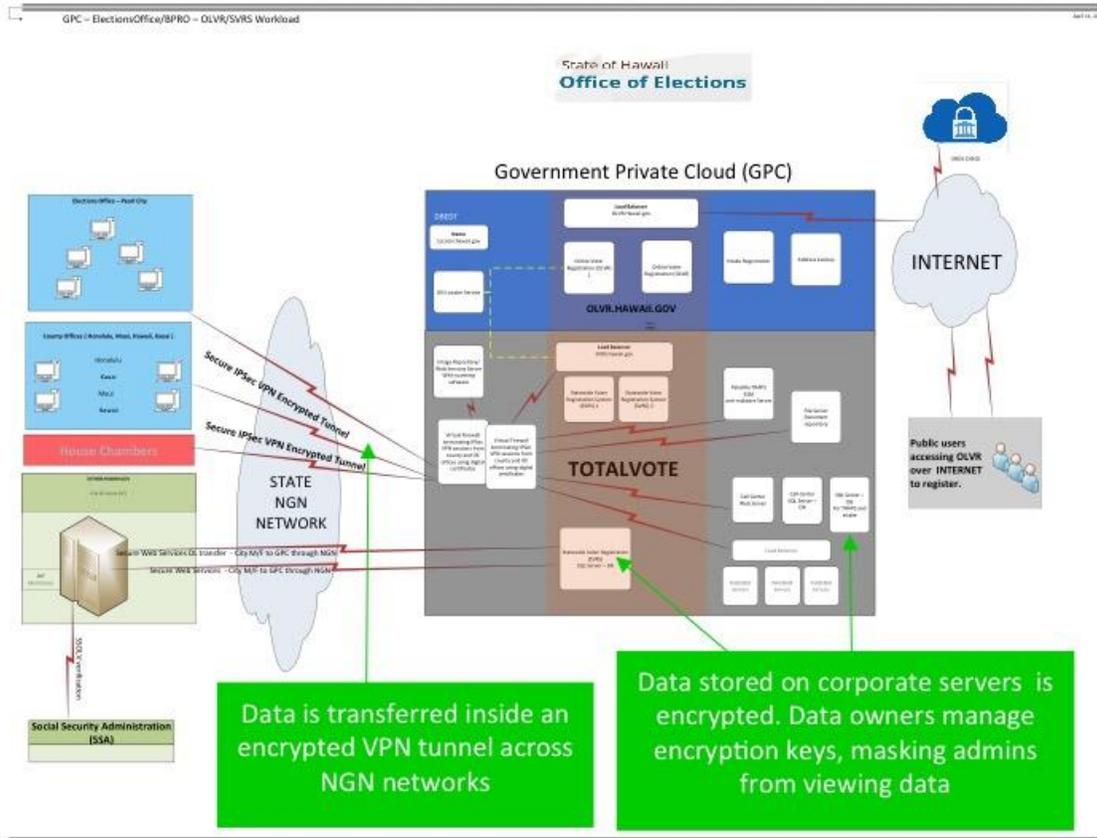
DATA IN-FLIGHT ENCRYPTION

To protect data in-flight from the county offices in to the GPC, all traffic from the county desktops are tunneled through and IPsec encrypted tunnel. Inside the GPC are two Palo Alto networks next generation firewalls that terminate IPsec VPN connections from the county desktops. Before an encrypted tunnel can be established, the desktops and users are authenticated using two factors – the user's active directory credentials and a client digital certificate. Both of these are presented to the Palo Alto Next Generation Firewall (NGFW) and an IPsec session get established only after successful authentication. We have implemented split tunneling so that all traffic destined for TotalVote is forced through the encrypted IPsec tunnel while all other traffic flows outside the VPN. Using this method, we are also able to track all activities flowing through TotalVote and present those logs for audit purposes.

Authentication into TotalVote is handed through Active Directory as well, so the users have to enter their AD credentials after establishing a secure IPsec tunnel into TotalVote. Once the user gets authenticated on TotalVote, then, based on their AD credentials, they are granted either read-only, read-write, or administrative privileges.

DATA FLOW BETWEEN GPC AND CITY'S MAINFRAME

There are two web services currently in place to exchange information between the GPC and City's mainframe. In addition to the web services, the city also transfers a file through secure file transfer protocol (SFTP) to the Axway SFTP servers managed by ICSD. TotalVote picks up and processes the file.



4. QUALITY ASSURANCE OF SOFTWARE DEVELOPMENT

The new statewide voter registration system is comprised of many different components that span multiple disciplines such that a single process for quality assurance and resolution of issues or problems identified by users is both impractical and ineffective. Separate processes have been implemented by the Office of Elections that have been tailored to meet the specific needs of the different components that are customary and effective given the areas of technical content, level of detail, and user involvement. There are three general areas that the components fall into: Application, Interfaces, and Infrastructure.

Quality assurance is primarily managed by testing the various components at the appropriate level of detail given the stage of development or deployment. At the lowest and finest level of detail is 'unit' testing, which is conducted for every block of code before it is released to the next level of development integration. Unit testing is used for Application and Interface testing and is conducted by the development resources assigned to the task. The results of the

unit tests are used internally, in an iterative manner, by the development resources to verify the functionality of a block of code meets the stated requirements. Code blocks are integrated together to form 'code modules' that address functional elements of the Application or Interface and the test protocols are expanded. For Application development, code modules are presented to the user community to test for the expected functionality and if any issues are identified they are added to the tracking processes established by the Office of Elections. This testing process iterates until the user community approves the module functionality. Code modules integrate into functional features of the Application that typically manifest as user interface Application pages, performing a high level user requirement, such as entering/updating a voter registration record. At this level, the functional features are deployed to a test site and the user community is allowed to interact with the Application with actual data, testing the operation of the Application in conjunction with other functional features that make up the solution. Test versions of the Application are generally identified as Beta releases. This development approach is widely practiced in the software development industry and is known as Agile development.

In the case of Interface development, test data is passed between the two or more Applications involved in the exchange of data until the code module meets the stated requirements. The development resources assigned to the Interface development participate in the testing and directly address any issues discovered during module testing and the trial process is iterated. The Interface development follows the Agile approach of iterative development and testing.

Issues or problems identified by users precipitate from the iterative processes described above and are tracked by different methods depending on the stage of development or testing. At the finest level of detail, software requirements are entered into a commercially available requirement and issue tracking software program, called JIRA, which is maintained by the vendor. Software requirements are entered into JIRA, updated and closed when completed as marked by passing unit or module testing. Any failure to comply with the software requirements, or bugs, are entered into JIRA and tracked to their resolution. Problems or issues identified at the Beta level are tracked differently based on their content. Bugs in the software are entered into JIRA but changes to the requirements, meaning the user community determines a change in the software requirements are warranted, are tracked at the Project Management level. The Project Management level consists of a collaborative team of the Office of Elections and vendor resources that meet regularly and the meetings are governed by a set of meeting minutes. The meeting minutes are a set of high level tasks of current development efforts, system level problems reported, all of which are tracked, updated weekly and include completion dates for resolution.

5. RESOLUTION OF ISSUES OR PROBLEMS IDENTIFIED BY USERS

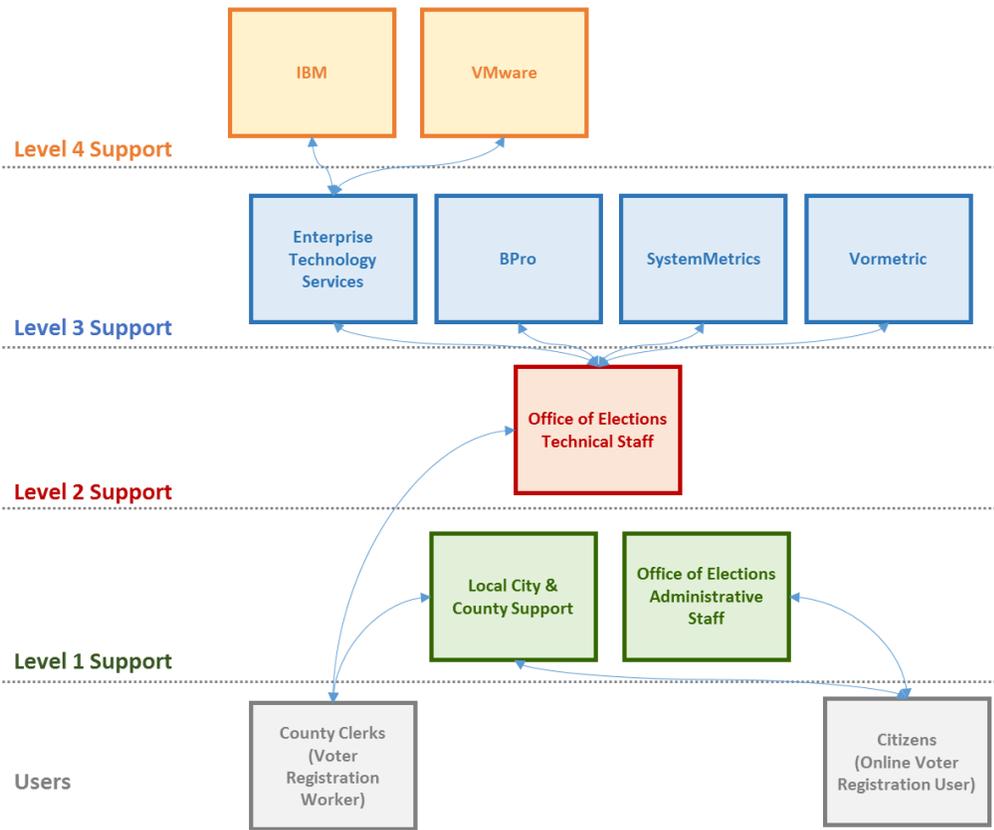
Level 1 Support: Citizens (Online Voter Registration Users) may report issues or problems to the Office of Elections via multiple channels: directly to the Office of Elections via email or a centralized contact number to the Office of Elections Administrative Staff, or via the City & County offices. The support personnel at City & County and the Office of Elections Administrative Staff have been provided FAQs and Scripts to answer all kinds of voter services questions. They have agreed to do very basic preliminary troubleshooting and diagnosis to determine if the issue is with the Online Voter Registration System. If it is, and the Level 1 Support person does not have a script of FAQ available to resolve the issue, it is escalated to Level 2 Support. County Clerks (Online Voter Registration Users) may also report issues directly to Level 2 Support.

Level 2 Support: The Office of Elections has a small team of technical resources who are familiar with the Online Voter Registration system, and perform technical troubleshooting. If the issue is a complex application issue it may have to be escalated to the application vendor BPro (Level 3). If it appears to be an OS or lower issue, it may be escalated to Enterprise Technology Services, GPC support team (Level 3). If it appears to be an issue with database encryption the team may escalate directly to Vormetric (Level 3). In addition, issues with the PAN VPN (network encryption) or Trapps (anti-malware software) are escalated to SystemMetrics (Level 3) for resolution.

Level 3 Support: The appropriate Level 3 vendor works the issues to resolution. As the Office of Elections selected the GPC for IaaS hosting services, for issues or problems that are at the OS level or further down the stack, the Office of Elections coordinates with the ETS GPC support staff. At this time, communication flows via the GPC migration team to the technical staff for resolution. In some instances when an issue cannot be resolved by internal ETS GPC teams it may have to be further escalated to other vendor teams (Level 4) for support.

Level 4 Support: Supporting vendors include the hardware (e.g., IBM) or hypervisor (e.g., VMware) vendors who are contacted directly by Level 3 support (ETS).

- Level 4 Support
- Level 3 Support
- Level 2 Support
- Level 1 Support



APPENDIX C: MANAGEMENT PLAN

TotalVote has many different components that span multiple disciplines and include the Application, Interfaces, and Infrastructure. Operational costs, risk mitigation and user support originates from different sources for each of these components and are outlined below.

The annual operational costs for the Application are contained in the contract between the Office of Elections and vendor. These costs include the provision of user support by the vendor.

TABLE 20: BPRO ANNUAL COST

Licensing and Maintenance¹	Amount to be Paid
2017	\$53,397.00
2018	\$177,990.00
2019	\$53,397.00
2020	\$177,990.00
Total	\$462,774.00

Additionally, there are costs associated with maintaining TotalVote on the Hawaii State GPC. We have previously requested funds for security software, security management services, and a system administrator. There are also costs associated with maintaining geocoded addresses.

TABLE 21: OTHER ANNUAL OPERATING EXPENSES

Description	Amount to be Paid
Annual GIS Maintenance ²	\$35,000.00
Government Private Cloud Consultant ³	\$156,000.00

¹ We do not require the same level of support in non-election years. As such, there is a lower maintenance cost in those years.

² The maintenance of the geocoded addresses, including the creation of new geocoded address to reflect new housing developments, requires the utilization of a GIS vendor, which has been estimated at a cost of \$35,000 per year. The GIS vendor is selected from a WSCA list and approval must be obtained from OETS, who is also a signatory to the GIS contract for the services.

³ The statewide voter registration system resides on the Hawaii State Government Private Cloud (GPC). This complex system currently utilizes a consultant that the OETS has hired for purposes of maintaining the GPC. It is our understanding that half of the consultant's time is spent on matters related to the statewide voter registration system, given its complexity and importance.

Description	Amount to be Paid
Security Software ⁴	\$25,000.00
Security Management ⁵	\$40,000.00
System Administrator ⁶	\$100,000.00
Total	\$356,000.00

In regard to the state’s maintenance of effort obligation under HAVA, the \$4,000,000 in HAVA funds are to be used primarily to establish the new system and not for ongoing operational expenses. As such, it is important that the operating costs of TotalVote be accounted for in our general fund budgets going forward.

The primary risks faced by Hawaii’s new voter registration system relate to the data stored by the system and system availability. Both of these risks are mitigated by hosting the Application on the GPC, whose primary concerns are data security and system availability. Please refer to the GPC’s operational procedures and policies for data security and availability assurance for additional details.

Other, less likely risks, relates to the reliability of the Application and Interfaces. The Application and Interfaces are tested extensively prior to being used in production environments. Any new releases or upgrades are also tested

The consultant is contracted by OETS, utilizing funds that the Legislature provided to OETS to address various information technology projects, including the new statewide voter registration system. To the extent the Legislature discontinue providing the funding directly to OETS, we will need a corresponding increase in our budget to acquire the same professional services. The contract for the professional services can only be obtained after approval from OETS that the services are necessary for the project, in accordance with OETS policies.

⁴ Given the sensitive nature of the information maintained on the Hawaii State Government Private Cloud (i.e., names, SSNs, addresses, and dates of birth), security software required by OETS was installed in relation to the statewide voter registration system. This software has annual licensing and support costs that are necessary to ensure that it can continue to protect the data in this environment.

⁵ The statewide voter registration system on the Hawaii State Government Private Cloud is accessible to the counties, as the counties handle day to day registration transactions. This requires that the connections between the counties and Hawaii State Government Private Cloud be monitored and that safeguards such as digital certificates be used to track these transactions. A security management service for this purpose is required.

⁶ In order to operate and manage the statewide voter registration system on a day to day basis, the system requires either an in-house administrator, such as an SR-24, or we need to contract for such services. This system administrator would oversee all contractors to ensure that the needs of the county and state election administrators are met. While we believe hiring an in-house staff member for that purpose is preferable, to the extent we need to contract out for that purpose, we estimate approximately \$100,000.

under similar programs prior to release to production. Inherent in the GPC-hosted environment are automatic data back-up, fail-over capability and roll-back procedures to revert to a previous version of the Application should a crash of the system occur. These are all industry best practices and supported by the GPC. The Interfaces all include real-time monitoring as well so that support personnel are notified in the event that transmission errors occur or an Interface goes off-line.