HP Enterprise Services, LLC, Response to Washington Office of the Secretary of State (OSOS) for Modernization Elections System

RFI No.: 16-04
December 2015

Hewlett Packard Enterprise

Hewlett Packard Enterprise
13600 EDS Drive
Herndon, VA 20171
December 23, 2015

Ms. Stephanie Goebel
RFI Coordinator, Project Manager
State of Washington, OSOS
Legislative Building, PO Box 40220
Olympia, WA 98504-0220

Reference: WA OSOS RFI 16-04 Modernized Elections System

Dear Ms. Goebel:

Jay Guevarra
Business Development
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HP Enterprise Services, LLC (HPES), appreciates the opportunity to respond to the Request for Information (RFI) from the Washington Secretary of State (WA OSOS) as they seek to gather information about viable alternatives to its current system and procure a modernized Election System.

HPES is excited to share information with WA OSOS based on our experience with a modernized election solution known as Electus, which delivers a modern, feature-rich, highly available, and secure system. The system embraces every advantage that technology can bring to public administration and business communities.

HPES looks forward to sharing our insights, experience, best practices, and recommendations with the OSOS and to partnering with you to place Washington at the forefront in supporting its voters. Our strategy is to collaborate with you, starting with this response to your RFI, to understand your requirements, and provide ideas and innovative solutions to replace WA OSOS' current technology.

As WA OSOS moves forward to develop the RFP, we look forward to meeting and engaging in deeper discussions regarding the information provided in our response. In the interim, if you have any questions or concerns, please contact Jay Guevarra at 650.258.2298 or jay.guevarra@hpe.com.

Sincerely,

Jay Guevarra
Business Development Executive

Effective November 1, 2015, HP Enterprise Service's former corporate parent, the Hewlett-Packard Company (HPCo), separated into two, publicly traded Fortune 50 companies. One company comprises HPCo's enterprise technology infrastructure, software and services businesses and is now an independent, publicly traded company, the Hewlett Packard Enterprise Company (HPE). The other company, HP Inc, (formerly known as Hewlett-Packard Company) comprises HPCo's printing and personal systems businesses and retains the HP logo. As part of the planning for this transaction, HPCo took steps to maintain the strength and reliability of HP Enterprise Services, LLC and other entities.

HP Enterprise Services, LLC (HPES, LLC) is a fully owned subsidiary of Hewlett Packard Enterprise Company (HPE). [HPCo stated in its 2014 Form 10-K] that, based on HPCo's fiscal 2014 results, excluding Corporate Investments and intercompany elimination, HPE will have planned segment revenue of $57.6B. HPE will be well capitalized and is expected to have investment grade credit ratings. HPES, LLC is presently unaware of any plan to change the present structure of HPES, LLC as part of the separation that would require HPES, LLC to seek a novation of the Contract, if awarded one. Should HPES' knowledge of any such plans materially change prior to contract award, HPES will notify the Government.[1]

[1] This document contains forward-looking statements within the meaning of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Such statements involve risks, uncertainties and assumptions. If such risks or uncertainties materialize or such assumptions prove incorrect, the results of Hewlett Packard Enterprise could differ materially from those expressed or implied by such forward-looking statements. All statements other than statements of historical fact are statements that could be deemed forward-looking statements, including any statements of the plans, strategies and objectives of Hewlett Packard Enterprise for future operations; any projections of revenue or other financial projections, other statements of expectation or belief; and any statements of assumptions underlying any of the foregoing. Risks, uncertainties and assumptions include the possibility that expected benefits may not materialize as expected and other risks that are described in Hewlett Packard Enterprise's filings with the Securities and Exchange Commission, including but not limited to the risks described in Hewlett Packard Enterprise's Registration Statement on Form 10 dated July 1, 2015, as amended. Hewlett Packard Enterprise assumes no obligation and does not intend to update any forward-looking statements.

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1. Exhibit B contains business requirements for the Washington State Modernized Elections System. (Note the scope of requirements excludes ballot creation and Tabulation.) Vendors are requested to validate and proof the business requirements to identify any requirements they believe have overlooked. Please provide a list of additional business requirements you recommend we consider for inclusion in a future RFP.

The following are additional business requirements recommended for inclusion in the future RFP:

- Ability for key end users to design and run custom ad hoc reports.
- Ability to process data from batch files, in addition to real-time updates.
- Protect and limit access to voter information such as voters identified as confidential or as part of the Address Confidentiality Program (ACP) from public or unauthorized personnel.

2. Also pertaining to business requirements in Exhibit B, please identify any requirements you believe to be exotic. In other words, identify any requirements that you believe are uncommon, difficult to fulfill, or for any other reason contribute significant cost and/or time to the Modernized Elections System? Please identify which, if any, of the identified requirements are exotic and why.

Based on our review of Exhibit B, the following is a list of the requirements that are not typical for a Modernized Elections System. We are happy to meet with the State of Washington, OSOS to discuss our findings in greater detail in an effort to support your RFP development.

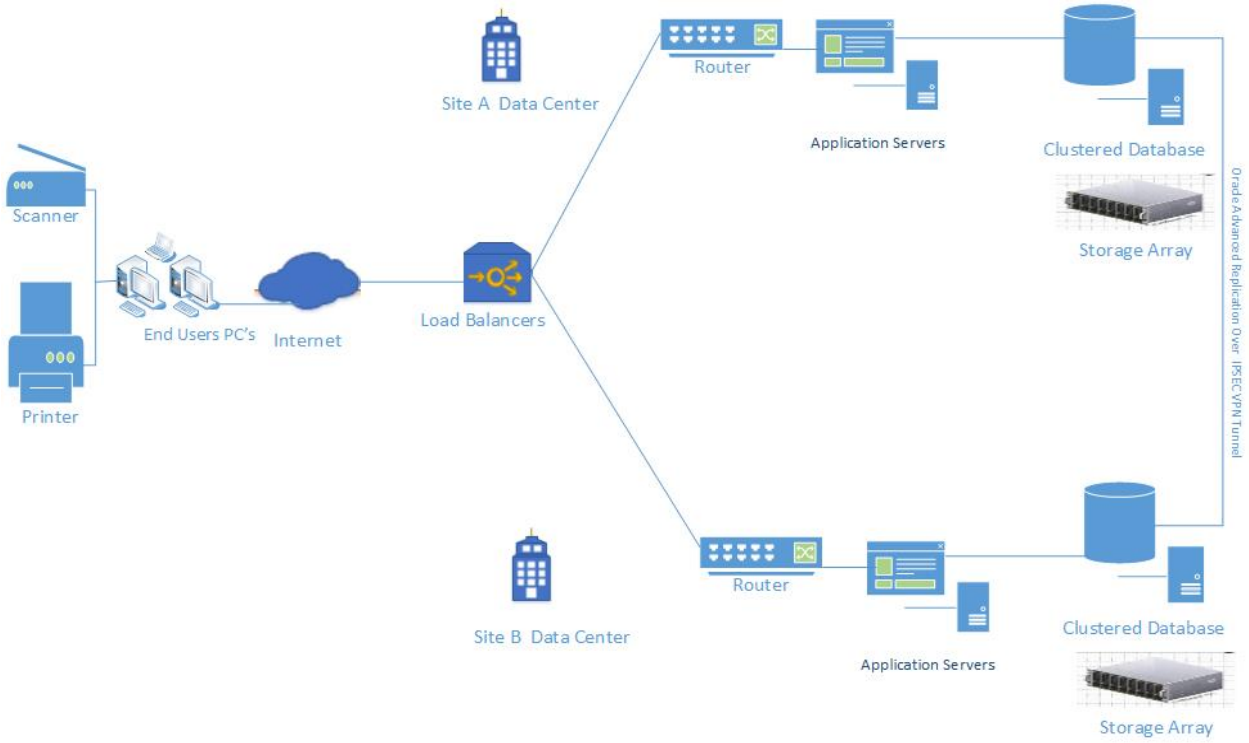
UNCOMMON TO MODERNIZED ELECTIONS SYSTEM	REASON
System supporting multiple languages and the creation of ballots in multiple languages.	Multiple languages are an option, however, it is not considered to be common.
System must allow the creation of public websites.	A common requirement is to have a website as part of the system that is accessible to the public, but having a capability in the system that allows the creation of public websites is not a common requirement.
System must prepare bills for sponsors.	Information is typically provided to an accounting system that generates and tracks the bill and its payment. This is uncommon to have in a voter registration system.

3. Exhibit A contains the WA OCIO IT Security policies. Within Exhibit B, there is a worksheet titled "Critical Election Periods". Washington State Elections Officials desire a solution that balances the provision of uninterrupted services during critical election periods with cost. Please provide a recommendation for high availability. Vendors are encouraged to review the OCIO Policy on Securing Information Technology Assets as referenced above and provide a brief response on how their system meets the state of Washington's security requirements.

HP Enterprise Services, LLC (HPES) recommends the Maximum Availability Architecture (MAA) that we have successfully implemented for our Electus solution. MAA has features that balance the provision of uninterrupted service during critical election periods with cost. This is a multitier architecture designed for high availability and maximum scalability of the system. MAA is based on industry best practices and is a straightforward, redundant, and robust architecture that prevents, detects, and recovers instantly from outages. It also prevents or minimizes downtime for maintenance. MAA provides the following major benefits and features:

- Supports two or more Active-Active or Active-Passive sites at different geographical locations that can be accessed by all elections stakeholders in the state of WA.
- Securely replicates the voter registration and election management database to multiple sites, keeping all sites synchronized.
- Provides the ability to control the length of time required to recover from an outage and the amount of acceptable data loss under disaster conditions. MAA thus allows uptime and recovery time to be tailored to business requirements.
- Reduces the implementation costs for a highly available Oracle system by providing detailed configuration guidelines.
- Provides best practices and recovery steps to eliminate or minimize downtime that could occur because of scheduled and unscheduled outages such as human error, system faults and crashes, maintenance, data failures, corruptions, and disasters.

The following figure shows the high level logical diagram for the MAA architecture.



As shown in the above diagram, the Electus solution allows users to connect to our application residing on the server through the Internet. MAA requires a user to have two more redundant sites, and users are connected to one of these sites using the global load balancer. The load balancer determines user load on each site and connects new users to the site with minimum load at that time. This allows balancing of the load among each redundant site at any given point of time. Connection to one of these redundant sites through the load balancer is completely invisible to end users.

The MAA architecture also utilizes redundant servers and multilayered security to achieve high availability and secure data access.

4. Exhibit A contains the WA OCIO IT Security policies. Within Exhibit B, there is a worksheet titled "Critical Election Periods". Washington State Elections Officials

desire a solution that balances the provision of uninterrupted services during critical election periods with cost. Please provide a recommendation for disaster recovery.

Vendors are encouraged to review the OCIO Policy on Securing Information Technology Assets as referenced above and provide a brief response on how their system meets the state of Washington's security requirements.

The HPES Team will respond to the critical need for disaster recovery by incorporating disaster recovery planning into our implementation plan as well as the incorporation of a tape backup system and other hardware components into the proposed system design.

The Electus solution utilizes Oracle's advanced replication feature for data synchronization between multiple active sites. As Electus provides multiple active site solutions for high availability and disaster recovery, data between multiple sites are replicated to keep data at all sites in sync. Replication enables databases working at two (or more) sites to update each other with transactions taking place local to each database (at each site) and thus provides a data-consistent view to all users, whether they are accessing either site within the Washington OSOS network. Essentially, in the case of a disaster at one site, users can continue to query and update data from the other active site. Replication is performed near real-time, (the time between replication updates is determined after monitoring the system; too frequent updates cause a large overhead while infrequent updates can cause the system to lose some recent transactions; in the event the site fails, users are transferred to the available site because one of the sites completely failed). HPES' technical team will set the replication frequency based on the analysis of the system performance and the transaction rate.

Based on the magnitude of the WA application, and the importance that has been placed on scalability, security, and high availability, HPES proposes a state-of-the-art technical architecture that provides the Secretary with unlimited scalability, maximum high availability, and world class security.

In this environment, HPES provides an architecture that is completely fault-tolerant at every node (at least two of everything), and then this architecture is replicated at two sites. This means that there will have to be multiple failures of the same device to bring an individual site down and if a site was brought down due to catastrophic failure or the highly unlikely possibility that two of the same type of devices failed at the same time, then the users on that site would be moved over instantaneously to the other site without any data loss. This assumes that the two selected sites will reside on the State's maximum bandwidth availability network.

The MAA security architecture is based on the three core requirements that are widely accepted as the "three pillars of security—confidentiality, integrity, and availability.

These concepts penetrate every aspect of the MAA security infrastructure. For example, encryption and layered authentication are used to facilitate the confidentiality of the voter and election data. Data classification, system monitoring, and proactive security defenses are used to make sure of the integrity of the systems and data. Redundant systems, transparent operation, and on-going support and maintenance make certain of reliable availability.

The following are the levels of security that MAA infrastructure components have:

Server Security

- **Antivirus** – All servers in the entire system are running Enterprise Antivirus, which combines antivirus, antispyware, firewall, and intrusion prevention technologies to stop and remove malicious software. Antivirus policy management is used to provide end-to-end

visibility and powerful automation features that reduce incident response times and strengthen protection.
- **User Authentication** – For each system, users and administrators will be required to be uniquely authenticated to the system by ID and complex password.

Network Security

- **IPS** – The IPS operates in-line in the network, blocking malicious, Distributed Denial of Service (DDoS), SYN Flood, IP Spoofing, and unwanted traffic, while allowing good traffic to pass unimpeded. The IPS is deployed seamlessly into the network. The IPS is protecting the in-line at the perimeter and the on internal network segment, at the core.
- **Firewall** – This integrated device, which provides essential security functions, combines a state full inspection firewall with deep inspection technology for application-level protection and IPSec virtual private networking (VPN) capabilities. The firewall acts as a barrier between the outside world, the DMZ and the Trust zones of the system. It is configured with policies that restrict a particular type of traffic to servers in different zones. The firewall is preceded by the IPS device, acting as a second line of defense against any threat to the system.
- **Global and Local Load Balancing** – Provides secure, fast, and available applications for all users. Enables transparent delivery of the application across the multiple sites, facilitating global continuity and application availability.
- **Microsoft Active Directory (AD)** – AD administers the user name, password, and all authentication policies and rules. AD is the central location for configuration information, user authentication requests, and information about all objects stored within AD domain. With AD, users, computers, groups, printers, applications, and other directory-enabled objects are managed efficiently from one secure, centralized location.

Application Security

- **Access to the application-** Access is gained to the main Microsoft network thru a secure login that is required to change periodically. Access gained using the application encrypts all communication using industry standard SSL technology.
- **Password management and password expiration –** This is controlled by establishing standards for variables like password length, password expiration, and number of concurrent connections.
- **Data synchronization** – This process is provided across all sites using Oracle Advanced Replication, a process of copying and maintaining database objects in multiple databases that make up a distributed database system. Changes made to data on one site are captured and stored before being forwarded and applied at each remote location. Even if one site becomes unavailable, users can continue to query and update data from other site. Replication is performed in a near real-time manner (with the time between replication updates selected by the database administrator).

Systems and Network Monitoring

- **Network Configuration Management Software** – Provides monitoring of configuration modification for any device. This software detects and reports any changes to the configuration files, enabling immediate restoration to a desired state. It reduces he operational risks and instills accountability for change providing visibility across the enterprise. It also increases the availability of network services.
- **Network Monitoring Software** – Provides proactive notification of actual server component failure or unavailability alerts and Automatic Event Handling through email. This software

enables effective delegation of management responsibilities by giving system administrators granular control over which users can perform specific management.
- **Syslog** – All network device logs report to Syslog server for further analysis if needed.

5. Please provide a recommendation for system integration approach and methodology, which most effectively supports the specified business requirements and other concerns mentioned in the Background and Objective section.

Electus integration is organized into seven implementation disciplines. Within each discipline, teams perform a set of tasks across each of the implementation steps to ready a site for transition. The seven implementation disciplines are:

- **Implementation Management** – Coordination of all activities necessary to implement the Electus functionality in the target locations. The most important activity is the readiness assessment.
- **Change Management** – Provides communication about the project to align expectations and manage the impact of change on users.
- **Data Conversion** – Converts the legacy data into the format required by Electus application.
- **Infrastructure and Equipment Installation –** Perform the facilities, hardware, software, telecommunication preparations prior to cutover, including installation and verification activities.
- **User Training** – Plan, develop, schedule, and deliver training to users to make sure that they are well prepared to work with the new system.
- **Application Readiness** – Evaluate the readiness of the Electus functionality required for cutover.
- **User Support** – Provide support to users both before and after cutover, creating a smooth transition and a readily available safety net if they encounter problems.

HPES has a well-defined process on customizing Electus by taking advantage of Dynamic System Development Methodology (DSDM), an iterative development methodology. Below are the key steps to this process.

HPES will perform various activities for these disciplines and will work closely with WA OSOS to coordinate plans. Following are the key preparation activities, from a technical perspective, that WA OSOS will need to take in planning to integrate the system.

- Obtain data conversion validation and approval by key stakeholders prior to implementation.
- Plan and select the client site locations, approving the procurement for required HW/SW to set up production sites per MAA.
- Make subject matter experts (SMEs) available to perform user acceptance testing (UAT) and approve application readiness for production rollout.
- Act as a liaison between the counties and the HPES Team and identify a team of SMEs to participate in requirements definition and validation.
- Identify the team for UAT.

1. We will perform various activities in the design and development phase at the highest level for execution of this project including a requirement elaboration activity, General System Design (GSD), and a Detailed System Design (DSD) activity.

2. These activities will be semi sequential but will overlap in such a way that the next logical activity for a given functional area can be initiated before completion of the previous activity. Within each development cycle, there is a clear handover from one team to the next on the completion of their task.

3. Software development life cycle (SDLC) activities will be completed by functional area. For example:

    a. Following the completion of the requirement elaboration activities for voter registration, the analysis team will move on to the requirement elaboration activity of the next functional module—Precinct and Districts.
    b. Parallel to this, the design team will initiate GSD activity for voter registration.
    c. As the requirement elaboration activity for the precinct and districts is completed, the analysis team moves to the Election Management module. At the same time, the design team, having completed GSD for voter registration, begins the GSD activity for Districts and Precincts while detail design is now started for voter registration.
    d. Therefore, for each functional area, each subsequent activity in the SDLC follows right after the completion of the previous activity rather than waiting for the completion of that activity for all functional areas. In this way, while different activities are being executed as required, overlap of the activities allows for advancement of other activities in the SDLC.

4. Once development is done for the scope of a prototype, technical and functional testing will be conducted.

5. Then a prototype demo for the build application will be conducted with the Joint Application Development (JAD) group that defined requirements to capture feedback. The prototype demo schedule will be incorporated in the overall project schedule.

6. The feedback captured in the prototype demo will be documented by a designated note taker and presented to the Change Control Board (CCB) for review and approval. Changes approved by the CCB will be developed in a subsequent iteration and presented in a future prototype demonstration to the users.

7. This iterative demonstration of prototypes will be conducted so as to achieve as close to an approved product as possible. Final approval is only at UAT level. Prototype demos and user testing aids in achieving as close as possible to the desired product.

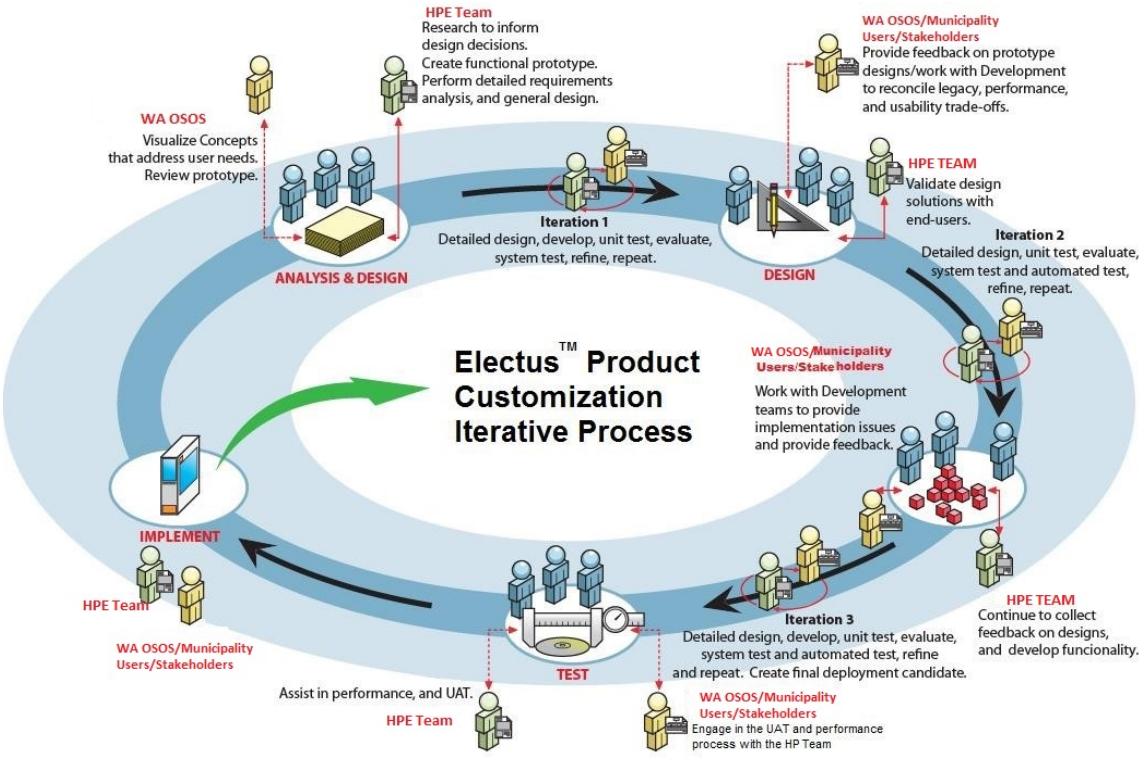
8. All prototypes will be incremental and result in a single integrated application that is built onto the first prototype.

9. Following all the functional module prototypes, system prototypes will be created to demonstrate cross module and system wide functionalities prior to system test. The subsystem and system test will be performed on the system prototypes. This means that although incremental prototypes will be developed, development will culminate into a system build prior to the start of subsystem and system testing which will be done by our business testing team.

10. Following this, UAT, pilot and production applications will be released in line with the overall project schedule.

Figure 1 describes the iterative customization process for Electus.

Figure 1. Iterative Customization Process



6. Please provide a recommendation for project management approach and methodology, which most effectively supports the specified business requirements, other concerns mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

HPES offers strength and experience through proven corporate guidelines, processes, and principles maintained within our global Enabling Delivery and Global Excellence system (EDGE). EDGE is a common solutions process set for application and information engineering work consisting of project management tools and a best practices repository from HPES organizations around the world. The EDGE Best Practices Repository (BPR) is an interactive environment that will give this project team an opportunity to participate in a virtual community based on best practice tools within EDGE including Project Management Version 2 (PM 2), our project management methodology, consistent with the Project Management Institute and its Project Management Body of Knowledge (PMBoK Guide).

We follow a functional track-based approach in project execution. The distinctive functional tracks include overall management and administration, software customization and implementation, data migration, data center setup, interface implementation, and training. By organizing work into these tracks, the project moves forward in parallel work streams that allow milestones to be reached sooner than if the project was strictly organized in sequential phases. This organization also allows smaller functional project teams to take on the tasks associated with each track. While these teams are all accountable to the overall project manager, they are able to eliminate much of the administrative overhead associated with coordination of a large, multidisciplinary project team.

Across all functional tracks, the project moves sequentially through traditional project stages: planning and design, development, UAT, pilot, production, and finalization. These stages serve as cross-functional control points. The transition from one stage to the next involves validation between functional teams of the work completed in previous stages. Figure 2 provides an overview of this project approach, noting key activities in each track for each phase:

Figure 2. HPES' Approach to Project Organization

	Project Administration & Communication				
	Software Customization	**Interface Development**	**Data Migration**	**Infrastructure**	**System Deployment**
Planning & Design	- Schedule and conduct JAD sessions. - Gap and Requirements Analysis.	- Schedule and conduct Agency Meetings. - Agency Interface Design.	- Inventory of sources. - Analysis of existing data. - Develop Plan and Approach.	- Finalize data center location and architecture. - Network Evaluation. - Finalize Hardware and Security Plan. - Order Hardware.	- Survey of County environment. - Recommend hardware to Counties. - Identify Pilot Counties. - Pilot Readiness Check.
Development	- Software Modifications - Test Criteria and QA	- Interface Development - Develop Comm Protocols. - Test Scripts and QA	- Finalize Data Standards - Pilot data collection and migration. - Test Data Migration and Statistical validation.	- Setup Hardware in data centers - Configuration Documentation - Comprehensive System test development - Initial Network testing.	- Order Equipment - Develop verification checklist - Train testing Users.
Acceptance Testing	- Perform UAT - Correction of any defects - Final documentation	- Perform UAT - Correction of any defects - Final documentation	- Validate Data Migration - Required Corrections	- Infrastructure Testing - Load Testing - Security Testing - Failover Testing	- Implement Help Desk
Pilot	- Evaluation of software under real world	- Evaluation of interface under real world	- Phased Collection, Migration, and Evaluation of County Voter Registration Data	- Install Production application - Pre-Production regression testing	- Deliver User Documentation - Pilot Users Training - Rollout in Pilots
Production Rollout	- Software Change, version control, and configuration management procedures in place.	- Interface Change, version control, and configuration management procedures in place.	- Phased production cutover process	- SLA performance management	- Final User Documentation - Statewide Help Desk - User Training - Statewide Rollout
	Phase Finalization				
	On-Going Support and Maintenance				

Project control and delivery management mechanisms drive a limited number of core project deliverables through a formal review and approval cycle. Each functional track has key milestones that demonstrate completion of a major work activity. Interim working documents are key to quality project execution, and are reviewed at weekly core team meetings. The final deliverable document will be submitted for formal review and approval demonstrating that the milestone was achieved in accordance with project commitments and client satisfaction. The Core Team Project Management Committee controls revisions to working documents through the weekly review, and if necessary, through an issues log.

We have found that this approach addresses client concerns to have adequate oversight at project control points, while mitigating the risks associated with an aggressive project schedule.

7. Please provide a recommendation for funding approach and cost distribution, which most effectively supports the specified business requirements, other concerns mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials. Please include citations of the recommended approach in place throughout state and local governments.

The major funding approaches that HPES has experienced with other state and local Government clients includes:

- **Centralized funding approach –** The State of WA would incur the major portion of the system cost. The benefit of this approach is that it allows the State to be the central oversight office, which allows for all decision making and overall project direction. The State would be the largest stakeholder and retain project control and have more design and implementation decision making ability.
- **Distributed funding approach** – Based on a cost distribution model, the WA Counties would fund the project based on a population size strategy. The benefit of this approach is that it allows a larger group of stakeholders to contribute to the overall system design and implementation to make sure all needs are met. Any custom development would therefore be funded by the county requesting functionality that is not included in the base product.
- **Additional funding approach** – The State could apply for additional funding for enhancements through the Help America Vote Act (HAVA) or other Federal funding resources. For traditional revenue source, the state and counties could sell certain voter reports to political parties, candidates, and other organizations.

8. Please provide a recommendation for data conversion and migration, which most effectively supports the specified business requirements, other concerns mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

Successful data conversion and migration is a critical factor in implementing a HAVA compliant statewide voter registration and election management solution. HPES has vast experience with data conversion and migration—13 successful implementations of HAVA compliant statewide voter registration and elections management in more than 900 counties and localities, with more than 40 million voters. We recommend following a data conversion and migration strategy, process, and methodology for this modernization initiative.

The primary objective of this effort is to convert data accurately and reliably from legacy systems to a new solution. Focus areas that will help identify unique requirements and anomalies expected to arise during the conversion design and transformation process are defined in the table below. Although many of the challenges posed cannot be addressed until the detailed conversion design is under way, it is good practice to study these challenges as a component of the strategy definition.

DATA CONVERSION FOCUS AREAS

Focus	Challenge
Source Systems of Record	What will define the system of record for particular data, particularly when/if said data exists in multiple source systems?
Source System Data Integrity	Do inconsistencies, irregularities, or conflicts exist in the current data sets?
Definition of Standards for Target System	What are the governing standards for future data collection and storage?
Conversion Execution	What are the business rules that affect the conversion?
Manual Process	What are the quality guidelines and possible constraints for manual entry of data?
Automated Process	Under what guidelines will data be programmatically converted into the target system?
Integrated Manual and Automated Process	Under what scenario will an integrated manual and automated conversion process be suitable?

DATA CONVERSION FOCUS AREAS

Conversion Programs	What software will be required to support the execution of conversion?
Conversion Dependency	What specific requirements may impose interdependency on particular conversion programs?
Conversion Frequency	Will conversions be designed to execute in a parallel-synchronous or parallel-asynchronous environment? At what intervals will converted data be refreshed in the new system? What data will be converted for which particular phases?
Re-Conversion Requirements	Will conversion programs be required to convert data bi-directionally between the target and the source?
Historical Data Requirements	How much historical data must be converted to provide the business information required to support daily operations? How will historical data not converted be accessed when required?

Discussion of these topics will drive decisions needed to build premises for the data conversion technical designs as they are identified and required in functional design documentation. Data conversion activities are important to support development processes and should begin very early in the project, in parallel with the start of the design phase of the project. The conversion execution is planned in such a manner so that county data is ready and available for functional and system testing activity and pilot data is available for UAT. That mitigates any data conversion threat to the software development schedule.

HPES recommends automating the conversion of existing legacy data to the extent possible, carefully analyze resulting data sets, perform testing, review the results, resolve issues, and continue or repeat these steps until the customer is satisfied with the results.

In data conversion, timing is critical. The steps in process and methodology should be built around the timing and iterations necessary to complete the conversion. We recommend eight steps in our data conversion process:

1. **Plan** – Early in each implementation phase, begin planning for conversion of the data necessary to support that phase and perform the analysis that feeds the conversion design.

2. **Design** – The conversion design is developed and source-to-target mapping is performed once the target data model is defined and stable. Extraction routines are defined and tested. Required data transformation rules are developed and conversion sequencing and reconciliations are finalized.

3. **Extract Data** – Data is extracted from the existing legacy applications, and control reports are generated to facilitate the post-conversion reconciliation process. This step is part of an iterative process in which the extract scripts are modified as data discrepancies, and errors are analyzed and reconciled.

4. **Stage Data** – Data extracted from the source systems is loaded into a staging area. Control reports are generated and compared to the statistics generated from the extraction process, and any discrepancies are noted and resolved. This data set will be retained as a static, reusable reference to the source systems and will not be modified in any manner. The source data is thoroughly analyzed in this step. The goal of this analysis includes:
   - Suitability for inclusion in the new system
   - Identification of anomalies
   - Transformation needs
   - Comparison against companion data sets from other systems to identify and resolve conflicts and duplication.

5. **Load Data to Repository –** As data is moved from the staging area to the conversion repository, transformation rules are applied, duplicate information is eliminated, and known issues are resolved through conversion scripts and various functions and features available through industry-standard Extract, Transform, Load (ETL) tools and specialized utilities. Resulting record counts and contents are compared to the staged data, and exception reports are generated based on any discrepancies discovered. This step is also part of an iterative process. As analysis reveals issues and discrepancies, modifications can be made to the load and transformation scripts, requiring reapplication through the load process. This step may also include manual conversion tasks for loading system tables or other data deemed unsuitable for automated conversions.

6. **Analyze Data –** Upon completion of the load and the transformation to the conversion repository, data is again analyzed to verify that the load process has executed correctly and that the transformation rules were applied successfully. This step in the testing process is used to prove that functions and processes correctly migrated the converted data. Final conversion reports are generated during this step for validation, comparison, and reconciliation purposes.

7. **Reconcile Data –** This takes place immediately after the load, transformation, and analysis steps. The target data is compared to the source data using both manual and automated processing to identify data reconciliation errors and resolve these errors through subsequent extracts and loads. Once any necessary corrections or modifications are made, the data (or a subset) will be moved to the test environment.

8. **Approve Data –** Once the data has been converted to the customer's satisfaction, the stewards of the source data sets will approve the data as ready for production operations. Granted this approval, the data conversion team will load the data into the production environment.

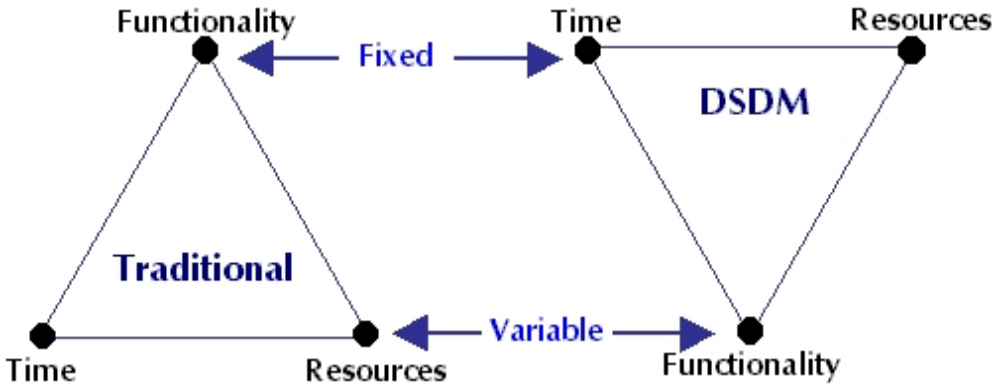
Once the data has been converted and the exit criteria are satisfied, the responsible county and OSOS stakeholder will approve the data as ready for production operations.

9. Please provide a recommendation for user experience design approach and methodology, which most effectively supports the specified business requirements, maximum stakeholder usability and adoption and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

HPES recommends following DSDM—an iterative, Rapid Application Development (RAD) methodology—for software development. DSDM provides a framework of controls for building and maintaining systems that require tight time constraints. The DSDM approach is superior because it addresses the concerns of all parties interested in the system development process– developer, project managers, quality assurance personnel, and especially the end user.

As shown in Figure 3, DSDM is an organized, common-sense process focused on delivering business solutions quickly and efficiently. It is similar in many ways to SCRUM and XP, but it has its best uses where the time requirement is fixed.

Figure 3. DSDM Approach for Software Development



DSDM focuses on delivery of the business solution, rather than just team activity. The process demonstrates the feasibility and business sense of a project before it is created, stressing cooperation and collaboration between all interested parties. DSDM makes heavy use of prototyping to make sure interested parties have a clear picture of all aspects of the system.

Concepts of DSDM

The following describes the core concepts of DSDM.

- **Active User Involvement –** The people who will be using the product must be actively involved in its development, which is facilitated through JAD sessions. It is important for the product to be valuable to the user.
- **Frequent Releases** – DSDM focuses on frequent releases, which allow for user input at crucial stages in the product's development. They also make sure that the product is able to be released quickly at all times.
- **Iterative Development, Driven by User Feedback** – The development of the system is done in iterations, which allows for frequent user feedback, and a partial but prompt solution to immediate needs, with more functionality being added in later iterations.
- **Changes Must Be Reversible** – All products should be in a fully known state at all times. This allows for rollback if a certain change does not work as required.
- **Requirements are Initially Defined at a High Level** – High-level requirements are promoted at the beginning of the project before any coding is done, leaving the details to be worked out during the course of the development.
- **Fitness for Business Purpose is the Goal** – Meeting the business need is more important than technical perfection.
- **Integration Testing** – Testing is done at every step, making sure that the product being developed is technically sound and does not develop any technical flaws, and that maximum use is made of user feedback.
- **Collaboration and Cooperation are Essential** – Collaboration and cooperation between all interested parties are essential for the success of the project. All involved parties (not just the core team) must strive together to meet the business objective.

DSDM is recommended for the following reasons:

- Results of development are directly and promptly visible.
- Users are actively involved in the development of the system and more likely to embrace the concept.
- Basic functionality is delivered quickly, with more functionality being delivered at regular intervals.

- The process eliminates bureaucracy and breaks down the communication barrier between interested parties.
- Because of constant feedback from the users, the system being developed is more likely to meet the stated need.
- Early indicators of whether a project will work become evident, rather than encountering any surprises halfway through the development.
- Ability of the users to monitor and influence the direction in which the project is headed.

10. Please provide a recommendation for system support, including service and maintenance, service level agreements and helpdesk, which most effectively supports the specified business requirements, other concerns mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

HPES provides support for the following: application, Help Desk, network and hardware, infrastructure, and monitoring services. We package these in multiple options that a client can opt for as part of contract discussions or the proposal response to the RFP. HPES provides a full range of these customer support services through a three-tier structure. At the highest level, we provide Tier 1 Help Desk services staffed during your business hours (24x7 support available on request) and SME's who can provide intimate familiarity with the application and insight into resolutions for the most common problems facing your front line workers. All issues reported are logged into our issue tracking system where progress can be monitored by the WA OSOS and counties, and escalation to Tier 2 or 3 (functional and/or technical analysts) can be managed.

All issues reported to the Help Desk are recorded in a web-based issue tracking system accessible to all counties and OSOS users and tracked until the issue is resolved and the original reporter provides approval to close the matter. It is recommended that the customer initially select the platinum package that is all inclusive of all the services listed above. Through our successful implementation of HAVA compliant 13 statewide voter registration and election management solutions, we have learned that the platinum package provides project value of transparency and collaboration among state and county election stakeholders.

11. Please provide a recommendation for contract vehicles and strategies in support of your recommended approach to system support and system integration.

HPES provides "turn-key" services and products based on a fixed price contract. We have a wide menu of support services that we offer to our customers; their choice of the support program and the services desired drives the pricing. While our pricing is standard for support services for our products like Electus, HPES will be in a position to provide these costs once the requirements are detailed in the RFP.

HPES has utilized Firm Fixed Price (FFP) contract vehicles for 13 other states for elections solution implementation and would recommend a similar approach for system support and system integration of WA OSOS' envisioned HAVA compliant solution. Additionally, we have worked with numerous clients, utilizing varying types of contract vehicles including Time and Material (T&M) and Cost Reimbursement contracts. We work with clients' specific needs to utilize any specific type of contract vehicle.

12. Please provide a recommendation for testing, complete through final acceptance testing and to include a mock election.

Software quality is assessed by such factors as usability, reliability, availability, performance and maintainability. Testing is one of several controls that validate the overall quality and "fitness for business" of software products. Other critical elements of the software quality process include the requirements definition and management, design and development standards, configuration management, project and product reviews, testing, and ongoing incident and release management.

HPES has successfully utilized proven testing approach for all 13 HAVA compliant statewide implementations. We recommend this approach, which encompasses a full-scale test strategy that addresses the following aspects of testing:

1. Application Testing
    a. Unit Testing
    b. Module Testing
    c. Multi-Module Testing
    d. Integration Testing
    e. Data Transfer Testing
2. System Testing
3. Data Conversion and Conversion Testing
4. System Architecture Testing
    a. Load/Stress Testing
    b. Security Testing
    c. Data Center Operations/Network Testing
5. User Acceptance Testing (UAT)

During the course of the project, all the above mentioned testing activities should be conducted in three different contexts:

a. Internal Quality Assurance
    - Development, data conversion, and QA teams are involved
    - Unit, module, multi-module, integration, system, and data conversion testing are performed, along with aspects of security testing related to application authorizations, roles, and permissions.

b. Project Team Functional Verification – Inclusive of core team, Standards Committee, pilot counties and additional WA specific resources identified by the project steering committee
    - Verify the application functionality and fitness for business standard of the new application.
    - Occurs in multiple phases:
        i. Core team validation of customized application
        ii. Standards Committee verification that application addresses the agreed upon Real Time Measurements (RTM) requirements
        iii. Pilot county assessment of the application in daily operations as evaluated through mock election process

iv. Pilot county assessment of its migrated data. Post pilot, this process will be repeated for each county as their data is migrated in the statewide implementation to the new modernized system
v. Other county assessment of their migrated data will require completion prior to implementation.

- System, data transfer and data conversion testing are performed, along with aspects of security testing related to application authorizations, roles, permissions and user acceptance of the system functionality.

c. Project team production environment and performance testing

- Objectives include:

i. Verification of the production environment
ii. Installation and operation of production equipment
iii. Performance of the system (equipment and application) under conditions of stress, such as load, failover, and recovery
iv. Verification of response time objectives

- Load/stress, security, data center operations and network testing as well as UAT of the complete system environment are addressed.

HPES recommends identifying a few pilot counties to perform the complete testing, including conducting mock elections utilizing migrated data and new modernized system before moving all counties to the new system. This approach allows for feedback from pilot counties on their experience with the new system and taking necessary and appropriate steps before moving all counties to the new system.

13. Please provide a recommendation for training. Elections Administrators and Staff around the state possess an intimate familiarity with their existing systems. We will require a training plan that enables county and state users to develop a high degree of comfort with the replacement system(s) in advance of go-live in order to support a seamless implementation for all Washington State elections stakeholders. Training to include internal users and administrators/IT support staff.

HPES has extensive experience training state and local Government personnel, including IT support staff and operation users. We have successfully implemented new election software solutions for 13 states, transitioning internal users and administrator/IT support staff to new solution by providing them with appropriate and necessary training. We have used the following approach for training in the past for election systems implementation and recommend a similar approach for the WA election modernization initiative. We have organized end user trainings into two broad categories:

- **Training Plan Before Initial Cutover to Production** – This is a comprehensive plan for all users and IT support staff moving from the old system and includes the following activities:
  - Make certain training plans and schedules for all counties are in place and approved by WA OSOS.
  - Select trainers who have sufficient subject matter knowledge and training experience.
  - Provide a separate training environment and production data for the trainer prior to scheduled training.
  - Develop and review training guides and other necessary documentation.
  - Create a training agenda that covers all application modules in sufficient detail with focus on specific election activities.

  - Incorporate various training approaches for users such as hands-on user training, webinars using the virtual room, and train-the-trainer.
  - Use train–the-trainer to identify key users in each county (specifically bigger counties with many users) to get trained and support other users with additional training need. This approach helps with providing local training support to each county user and manage the training cost.
  - Make the training simple and easy to understand for the end users.
  - Provide the right training by the right expert at the right time.

- **Training Plan During Maintenance and Support Phase** – This plan will cover training needs for end users and the IT support team during the maintenance and support phase of the program. It will focus on enhancements or changes made to the application as a result of new election laws requiring changes to the system and will include the following activities.
  - Make sure release plans for application changes are in place and approved, that the training plan aligns with the release plan. All users are trained before new changes are released to production.
  - Provide trainers who have sufficient subject matter knowledge and familiarity with the enhancement and new changes in the application.
  - Provide a separate training environment with production data and applications with enhancements to the trainer before scheduled training.
  - Develop a training guide and necessary documentation with updated information that has been reviewed by the trainer.

HPES bases its training opportunities on three factors:

  - **Learner-Focused Training** – Our training solutions are designed with the users in mind. The training experience is a process where the learner is guided through a curriculum that instills the knowledge and skills needed for success. The learner is provided with a comprehensive overview of the project and then trained in a simple-to-complex strategy to reinforce his/her comprehension and proficiency. Our training specialists are skilled in adult learning theories to reinforce and accommodate different learning styles and abilities.
  - **Flexible Scheduling** – HPES realizes that our clients are challenged with sustaining normal work tasks needed to serve its customers while learning the new system. We work with the client's management team to derive training schedules and strategies to best serve both priorities.
  - **Cost Control** – HPES leverages its experience with prior programs and environments to make certain that the best strategy is used to meet both the educational and the economic demands of the training challenge.

HPES brings this ability, accountability, and responsiveness to bear on every training solution we implement by:

- Bringing our experience and ability to each training situation to make sure the best possible training solution is implemented. HPES has a strong, successful history in state Government implementations, especially elections.
- Maintaining accountability for the training results. We work with each client to develop strategies and processes that prepare learners to take on their respective work tasks when the solution is implemented.
- Being responsive to unique requirements of our clients by designing training strategies to meet their specific needs, HPES performs a front-end analysis of the training prior to the training design, development, and training implementation to determine details for each

training strategy that are to be used. Once completed, this analysis forms the baseline strategy for all training planning used throughout the project.

Different training strategies are required to best serve different audiences. Typically, our training audiences can be divided into two distinct groups: IT support services and the operational user community. Both groups have subgroups that require additional considerations such as training content, group size, level of engagement/responsibility, schedules, and learning abilities.

14. Please provide a recommendation for documentation, including internal, external, and administrator.

HPES provides a thorough and complete documentation set as listed below, for all internal and external users and administrators and recommends a similar set to WA OSOS for a statewide HAVA compliant envisioned solution.

PHASE	DOCUMENT
Analysis	• Functional Requirement Specifications • Individual JAD Records
Conceptual Design	• Attributes Definitions & Dictionary • Entity Definition and Relationship Diagrams • Function Hierarchy Diagram
Application Design	• Data Dictionary • External Interfaces • FRS Testing Tractability • Requirements Traceability • User Interface Specification • DB Scripts – Tables, Indexes, Contraints, Sequences, SQL
Development	• Software Development Standards
Implementation and Production Rollover	• Installation Guides • System Administration Documentation • System Architecture Diagram • Application Architecture Diagram • Network Diagram • Backup and Recovery Plan • User Guides • Online Help embedded with the application
Support and Maintenance	• Continuous update to above listed documents as and when application goes thru any necessary enhancements/changes.

An important factor in knowledge transfer is the development of concise, user-friendly technical and user assistance documentation targeting specific needs to support the various phases of the system rollout. HPES recommends online help modules that have the following features:

- Complete help system that covers all modules
- Standard Windows help format
- Easily accessed from any screen
- Standard help navigation interface that is familiar and user-friendly
- Searchable – entry of multiple keywords during help system development aids searching for online help
- Context-sensitive access to relevant screen help information
- Printer-friendly layout for output from online help with regular print command from the browser menu

- Easy to update for system upgrades that are integrated when they are delivered.

The availability of the help system online offers a great advantage for updates and system upgrades. When a module is upgraded, its own help module is also updated and uploaded to become available to all users immediately. In addition to the online help, HPES recommends solutions built with meaningful messages and audio visual alerts that are displayed to the users at run-time when validations fail or action is needed from the users. These alerts help the users in completing the tasks successfully and in the right manner.

15. Please provide a recommendation of voter outreach requirements for the Modernized Elections System.

HPES recommends a three-prong approach for voter outreach for the modernization of the Elections System. The approach will use press releases to notify and inform voters about the modernization of the Elections System. The releases will describe the modernization and the benefits to the voters including ease of registration, security of information, improvement in the election management, and any cost savings that may be incurred.

The second part of the approach is to conduct public forums to both provide information to the voters and interested advocacy groups regarding the modernization. During the public forum, the attendees will provide input that may be considered in the modernization project.

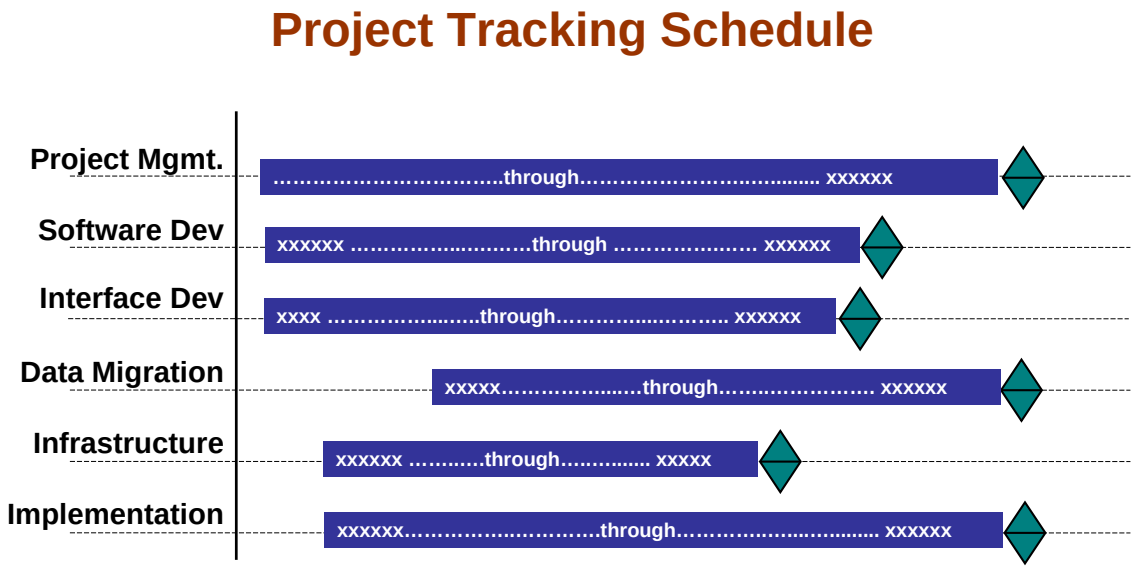
The third prong is to create a website that provides information and gathers feedback on the modernization project. The website will include video of the public forums, a status or dashboard of the project progress, notices of public forum meetings, and provide the public an ability to post a comment or send/receive information interactively via tools such as chat or Twitter.

Additional programs could be created to reach out to youth. Mock elections could be set up by the state or counties, which would allow high school students to participate in an election. This will bring awareness to youth on how to register to vote and what is involved in the voting process. The mock election process can also be used for adults who are studying to become U.S. citizens.

16. Please provide a timeline estimate for implementation of your envisioned solution in response to business requirements in Exhibit B and your responses to items 1 – 15 above.

HPES has followed the track approach for all of our 13 HAVA compliant solution implementations and recommends a similar approach for WA OSOS for their envisioned system. This will expedite the schedule by performing tasks on various tracks in parallel. Figure 4 shows a high-level project tracking schedule. The HPES Team estimates that it would take approximately 18–24 months to successfully implement the envisioned modernized solution. This timeframe can be reduced by minimizing the customization to COTS solution only for "must have" requirements and moving "good to have" customizations to the support and maintenance phase.

Figure 4. Project Tracking Schedule



17. Please provide a cost estimate for implementation of your envisioned solution in response to business requirements in Exhibit B and your responses to items 1 – 16 above.

The cost estimates for the business requirements in Exhibit B and items 1-16 will be provided after the Washington Secretary of State has time to consider which requirements and responses are most desired for the Modernization of the Elections System.