



Engineer Bhawan, Pulchowk, Lalitpur  
Ph: +977-1-5010251, 01-5010252  
Web: <https://neanepal.org.np/>, Email: [info@neanepal.org.np](mailto:info@neanepal.org.np)

### **Call for Registration and Collaboration for E-Voting System**

The Nepal Engineers' Association (NEA) is embarking on the initial phase of its search for companies interested in collaborating/joint venturing (cost and profit-sharing basis) on the development and manufacturing of electronic voting machines (EVMs) for use in its upcoming elections and by other parties on commercial terms. NEA invites reputable interested registered software supplier/companies are invited to make a presentation to express their interest, capabilities and experiences to participate in this endeavor of NEA.

For detailed technical specifications and requirements, please visit our official website at [neanepal.org.np/download](https://neanepal.org.np/download). This information will provide valuable insights into the project's scope.

#### **Scope of Collaboration:**

The selected company will have the opportunity to collaborate with NEA in the following areas:

1. Participating in discussions and consultations to define the project's technical requirements.
2. Demonstrating their expertise in EVM development and manufacturing.
3. Sharing their innovative ideas and solutions for the electoral process in Nepal.

#### **How to Register:**

Interested parties are kindly requested to submit a letter of intent detailing their organization's expertise, relevant experience, and proposed contributions to the E-Voting System project. Please submit your letters of intent via email to [info@neanepal.org.np](mailto:info@neanepal.org.np) no later than Bhadra 18, 2080.

**Implementation Mode:**

Collaborative NEA-Developer Company Venture: Collaborative development through a partnership between a developer company and NEA. Development and Marketing efforts are a shared responsibility, while the developer company will be in charge of maintenance and upgrade.

## E-VOTING MACHINE TECHNICAL SPECIFICATION

### Hardware Requirements:

- **Processor:** Multi-core processor with sufficient processing power.
- **Memory:** Adequate RAM to handle concurrent user interactions and data processing.
- **Storage:** Sufficient storage for storing the voting data, logs, and system software.
- **Display:** Clear and easy-to-read display for voters to make their selections.
- **Input Interface:** Touchscreen interface for voters to make selections.
- **Audio Output:** Built-in speakers or audio jack for providing auditory feedback to voters.
- **Peripheral Ports:** USB ports for connecting external devices, such as accessibility tools or firmware updates.
- **Battery Backup:** Reliable battery backup to ensure the machine remains functional in case of power outages.

### Software Requirements:

- **Operating System:** A secure and reliable operating system that supports the required functionalities.
- **Voting Application:** A user-friendly interface for voters to select their candidates and confirm their choices.
- **Dual Ballot Types:** Create two distinct ballot types for the central committee and the provincial committee elections.
- **Recount Capability:** The system should be equipped to validate and potentially request a recount through a transparent process, ensuring the election outcome's integrity.
- **Printable Ballot:** Provide voters the ability to view printable ballots via the system; printed ballots placed in the ballot box. Real-time vote updates will be maintained.
- **Encryption:** Robust encryption protocols to secure the communication between the voting machine and the central server.
- **Authentication:** Strong authentication mechanisms to ensure only authorized personnel can access the machine's administrative functions.
- **Audit Trail:** Logging of all interactions and transactions for auditing purposes.

- **Data Protection:** Measures to prevent data manipulation, tampering, or unauthorized access.
- **Accessibility:** Accessibility features, such as screen readers and adjustable font sizes, to cater to voters with disabilities.
- **Multi-Language Support:** Capability to present the interface in multiple languages based on the local demographic.
- **Firmware Updates:** Secure and controlled methods for updating the machine's firmware to patch vulnerabilities or improve functionality.

### **Security Requirements:**

- **Voter Authentication:** Methods like biometric scanning, smart cards, or unique voter IDs to ensure each voter is legitimate.
- **End-to-End Encryption:** Encryption for transmitting voting data from the machine to the central server to prevent interception and tampering.
- **Tamper Detection:** Sensors and mechanisms to detect physical tampering with the machine.
- **Secure Boot:** Ensures that only authorized and digitally signed software can be run on the machine.
- **Voter Privacy:** Design features that prevent others from observing a voter's choices.
- **Paper Trail:** Optional provision for printing a paper receipt or confirmation of the voter's choices without revealing the voter's identity.
- **Network Security:** Firewalls and intrusion detection systems to safeguard the machine's network connectivity.
- **Offline Mode:** Ability to operate offline in case of network failures while maintaining data integrity.

### **Data Management:**

- **Database:** Secure database for storing voter data, candidate information, and voting records.
- **Backup and Recovery:** Regular backup mechanisms to prevent data loss and recovery plans in case of system failures.

- **Data Retention:** Guidelines for how long data should be stored and how it should be securely disposed of after the retention period.

### **Physical Design:**

- **Compactness:** Design the machine to be compact and easy to transport, set up, and store.
- **Durability:** Use durable materials that can withstand transportation, storage, and usage without degradation.
- **Ergonomics:** Ensure the design is user-friendly and comfortable for voters of all ages and abilities.

### **User Interface:**

- **Intuitive Navigation:** Design a straightforward interface that minimizes confusion and allows voters to easily make their selections.
- **Clear Instructions:** Provide clear and concise instructions for voters on how to use the machine.
- **Confirmation Step:** Include a final review and confirmation step before submitting the vote to reduce the chance of accidental errors.

### **Accessibility:**

- **Audio and Visual Feedback:** Provide both visual and auditory feedback to accommodate voters with different sensory abilities.
- **High Contrast Mode:** Include a high contrast mode for voters with visual impairments.

### **Testing and Certification:**

- **Security Testing:** Thoroughly test the machine for vulnerabilities, and conduct penetration testing to identify potential weaknesses. Vulnerability Assessment Penetration Testing should be carried out from Government Agencies or other authorized Agencies.
- **Certification:** Obtain certification from relevant government agencies or independent organizations to ensure compliance with security and usability standards.

### **Connectivity:**

- **Redundancy:** Implement redundant communication methods (e.g., cellular and Wi-Fi) to ensure connectivity even in areas with limited infrastructure.
- **Firewall and Intrusion Detection:** Employ advanced security measures to protect against cyberattacks and unauthorized access.

### **Central Server:**

- **Security Measures:** The central server should employ advanced security measures to protect the integrity of the collected votes and prevent unauthorized access.
- **Real-time Reporting:** Enable real-time reporting of voting results while ensuring the security and accuracy of the data.

### **Transparency and Accountability:**

- **Open Source:** Consider using open-source software for transparency, allowing experts to review and identify potential vulnerabilities.
- **Public Auditing:** Allow for independent auditing of the system's security and functionality to build trust.

### **Emergency Procedures:**

- **Backup Power:** Include backup power solutions to ensure uninterrupted operation during power outages.
- **Emergency Shutdown:** Implement a mechanism for authorized personnel to shut down the machine in case of emergencies.

### **Training and Support:**

- **User Training:** Provide comprehensive training for election officials and poll workers on how to operate the machines and troubleshoot common issues.
- **Technical Support:** Establish a technical support system to address any technical problems that arise during voting.

### **Data Validation and Verification:**

- **Data Validation:** Implement robust data validation checks to ensure the accuracy and integrity of the collected votes.
- **Voter Verification:** Provide mechanisms for voters to verify that their selections were accurately recorded before final submission.

### **Data Encryption:**

- **End-to-End Encryption:** Encrypt voting data not only during transmission but also when stored in the machine and on the central server.

### **Usability:**

- **Simple Language:** Use clear and simple language in instructions and interface text to make the voting process understandable to all voters.
- **Visual Design:** Utilize a visually appealing design that doesn't distract or confuse voters.

### **Privacy Protection:**

- **Anonymity:** Ensure that the voting system does not collect or store any information that could compromise the anonymity of the voters.
- **Data Minimization:** Collect only the minimum necessary data for the voting process.

### **Error Handling:**

- **Graceful Error Handling:** Design the system to handle errors gracefully, providing helpful error messages and guidance to voters and officials.

### **Multi-Modal Interaction:**

- **Touch and Voice:** Consider implementing voice recognition for voters who have difficulty using touchscreens.

### **Post-Election Audits:**

- **Risk-Limiting Audits:** Implement risk-limiting audit protocols to statistically verify the accuracy of the election results.

**Disconnection Handling:**

- **Offline Voting:** If the system operates offline, have mechanisms to reconcile the offline votes securely with the central server.

**Cross-Device Compatibility:**

- **Responsive Design:** If the e-voting system is accessible from multiple devices (e.g., smartphones, tablets), ensure the interface adapts seamlessly to different screen sizes.

**Voter Education:**

- **Educational Material:** Provide comprehensive educational material for voters on how to use the e-voting machine and understand the voting process.

**Scalability:**

- **Large-Scale Voting:** Design the system to handle a high volume of voters during peak times without compromising performance.

**Data Backup and Retention:**

- **Secure Storage:** Ensure that backup data and retention data are securely stored and protected from unauthorized access.
- **Data Retention:** Defining how long vote records will be stored for auditing and potential recounts.

**Vendor Independence:**

- **Open Standards:** Design the system using open standards to prevent vendor lock-in and allow for flexibility in technology choices.

**Multi-Factor Authentication:**

- **Two-Factor Authentication:** Implement two-factor authentication for administrative access to the machines to enhance security.



**Voter Registration Integration:**

- **Integration with Voter Databases:** Integrate the e-voting system with voter registration databases to ensure only eligible voters can cast their ballots.

**Accessibility Certification:**

- **Accessibility Compliance:** Seek certification from accessibility organizations to ensure the system meets accessibility standards.

**Environmental Considerations:**

- **Energy Efficiency:** Design the machines to be energy-efficient to minimize power consumption during operation.

**Mock Elections:**

- **Testing and Training:** Conduct mock elections before the actual voting day to identify any issues and to train election officials.

**Source Code Review:**

- **Independent Review:** Allow independent experts to review the source code of the software for security vulnerabilities and quality assurance.

**Contingency Planning:**

- **Emergency Backup:** Have contingency plans in place for potential system failures or technical issues on Election Day.
- **Manual Backup:** Procedures for handling situations where the electronic system fails, allowing for manual voting and later integration with the electronic system.

**Data Ownership and Privacy:**

- **Clear Data Policies:** Establish clear policies on data ownership, usage, and privacy, and inform voters about how their data will be handled.

**Machine Certification:**

- **Third-Party Certification:** Obtain machine certification from independent third-party organizations specializing in election technology.

**Backup Hardware:**

- **Redundant Hardware:** Have backup hardware available at polling stations in case of machine failures.

**Data Synchronization:**

- **Real-Time Updates:** Ensure that data synchronization between the e-voting machines and central servers occurs in near-real-time to prevent discrepancies.

**Interoperability:**

- **Data Exchange Standards:** Use open data exchange standards to facilitate data sharing between different components of the e-voting system.

**Long-Term Sustainability:**

- **Upgradability:** Design the system with upgradability in mind to accommodate future technological advancements and security improvements.

Implementing e-voting systems requires careful planning, thorough testing, and collaboration with experts and stakeholders. Additionally, regular updates and improvements should be considered to address emerging security threats and technological developments. NEA wants to implement e-Voting system in collaboration with Vendors working in the area.

Anticipating your enthusiastic collaboration, positive and favorable response, as well as your robust technical expertise within the realm of the e-voting system, we eagerly await the prospect of working together.