A CENTRALIZED VOTER VERIFICATION PROCESS TO IMPROVE SECURITY AND RELIABILITY IN THE CURRENT U.S. VOTER REGISTRATION SYSTEM

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Abstract

The current voter registration system in the United States is vulnerable to registration fraud because of three major problems: the potential registration of ineligible voters, multiple active registrations of the same voter, and the difficulty of maintaining clean voter lists. These problems arise due to the system’s inability to verify a voter’s registration eligibility. The impact of these problems extends beyond the inaccuracy of the election result. It has caused non-U.S. citizen immigrants who have mistakenly registered to vote to be in jeopardy of deportation.

This paper proposes a Centralized Voter Verification Module (CV2M) to address these problems. The CV2M bridges the Election Division with the Social Security Administration (SSA), the Department of Homeland Security (DHS), and the Department of Justice (DOJ). Data sharing and communication with these federal agencies are essential to help the Election Division in verifying registration eligibility and maintaining accurate voter lists.

This paper describes the integration of the CV2M with the current registration system. It focuses on the conceptual database design and the data security of the CV2M. The integration of the new model will lead to the redesign of four core tasks in voter registration system—registering voters, verifying registration eligibility, ensuring a single active registration for each voter, and maintaining clean voter lists. An assessment of the CV2M is drawn from a discussion of strengths and weaknesses of the newly designed task flows. This paper also identifies some of the political, financial, and integration issues that arise when attempting to implement the module.
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Chapter 1

Introduction

In the United States, the voter registration system is the initial firewall set up to prevent potential voting fraud. However, the current voter registration system has three significant problems: (1) the potential registration of ineligible voters, (2) the holding of multiple active registrations for a voter, and (3) the difficulty of identifying inactive voters and removing them from voter lists. These problems arise in part because of the lack of voter eligibility verification in the registration process. Currently, the registration process only focuses on ensuring that a voter lives in a valid district or is of eligible voting age. The eligibility status, including the citizenship status, conviction status, and mental competency, is voluntary because it is asserted by voters without any further verification by governmental agencies. Also, in the current registration system each state manages its own voter registration database which has no communication with databases of other states. This raises the challenge of identifying active out-of-state registrations when voters move from one state to another.

Federal agencies can help support the verification of registration eligibility through a Centralized Voter Verification Module (CV2M). The CV2M retrieves voter information from federal databases and uses it to help the states’ voter registration system. Cooperation with other federal entities increases the reliability in the voter registration system as registration records are verified. The integration encourages participation in the election as the registration process will be more accessible and simplified for both voters and election staff.
This paper provides a framework for implementing a federally supported, state networked voter registration system to eliminate potential registration fraud. Chapter 1 is an overview of the following aspects of the current registration system: the organizational model, the status of the online voter registration application currently available, and causes and impacts of the main problems. Chapter 2 describes the conceptual design of the CV2M including data model and data security. Chapter 3 describes new workflow of four core tasks of the voter registration system with the integration of the CV2M. Chapter 4 discusses how the integration of the CV2M will address the current challenges that election offices are facing. In addition, it also identifies some potential weaknesses that stem from this integration. Chapter 5 outlines potential constraints that prevent the deployment of this module. Finally, Chapter 6 identifies future works related to the new prototype of voter registration system.

1.1 Current Voter Registration System

Figure 1.1 illustrates the model of current voter registration system. The current registration system is operated as a set of state-by-state independent databases. Statewide Voter Registration Databases (VRD) has been enforced nationwide under the adoption of the Help America Vote Act (HAVA) in 2002. HAVA is a federal law to standardize the election process nationwide [13]. Each state’s voter registration system is supported by the state’s Department of Motor Vehicle (DMV), the Jury Service, the Social Security Administration (SSA), and the National Change of Address (NCOA).

These sources are critical for various verification processes in the registration system. The DMV’s database is the primary source for identification and residential validation. It has been used for identifying the current district in which a voter lives. The Jury Service’s database provides information of the citizenship status. Many states, including Arizona, California, Michigan, New York, Texas, Virginia, and Wisconsin, have incorporated their voter registration system with local Jury Service databases for verifying registration eligibility or identifying ineligible registration records [23]. The SSA’s database is the source for validating identification which includes a person’s social security number, name, and date of birth. The support from the SSA has been enforced under HAVA.
This also enables access to the Death Master List database which improves the process for identifying deceased voters and removing their registration from voter registration database. Lastly, the National Change of Address (NCOA) database provides information of voters who move. This database helps election officials identify inactive voters who have moved out-of-state and remove their registration from the state’s VRD. However, the NCOA database is a voluntary reporting system as it is not mandatory for movers to update their address with the U.S. Postal Service (USPS). Only those who want to forward their mails to the new address need to report their move with the USPS.

In addition to the support from external sources, several immigration acts and reforms have been adopted to help election offices deal with the most challenging issue - potential registration fraud. Measures that are enforced under the National Voter Registration Act (NVRA) and HAVA have required states to include statements identifying eligibility requirements, including citizenship, criminal conviction, and mental competency, on the registration applications [23]. States also have taken extra steps to discourage non-citizens
from registering and voting. Many states, including New York and Hawaii, allow individual voters to challenge other voters, who may seem unqualified, for their right to vote. Some states have adopted strong punitive measures, such as deportation, for non-citizens who vote by falsifying their citizenship information on the registration application. Figure 1.2 highlights the eligibility section of the West Virginia registration application.

![Image of West Virginia registration application](image)

**Figure 1.2. West Virginia registration application**

The Department of Homeland Security (DHS) has also provided additional support in dealing with non-citizen registration as described in section 347 of the Illegal Immigration Reform and Immigration Responsibility Act (IIRIRA) in 1996:

Section 347 -Removal of aliens who have unlawfully voted
Section 347 makes aliens who have unlawfully voted in violation of any Federal, State, or local constitutional provision, statute, ordinance, or regulation is both excludable and deportable. This provision applies to unlawful voting that occurs before, on, or after September 30, 1996 [2].

Despite all these enforcements, the election offices are still facing many challenges to safeguarding their voter registration systems. The impact of these three major problems and the reason that they still persist in the current system will be described in section 1.3.
1.2 Online Registration Services

Providing an online registration service helps increase the voter registration rate as the registration process is more accessible to citizens. However, the online registration service in the U.S is still in a developing stage. There is still a waiting period for voters to receive their registration ID as the validation of each application is still a manual process. Currently, U.S. election offices have provided four online registration-related services. However, the availability of these services is not at the same level in each state.

One of the four online registration-related services is the distribution of an electronic version of a voter registration application and other supported documentation for registration, i.e. North Dakota’s affidavit form. This service is available in forty seven states on states’ official websites. Voters of these states can download a registration application from states’ official websites such as state’s Election Division website or Secretary of State’s website. Only three states still explicitly instruct voters to contact their local election offices to request a registration application (Massachusetts [5], New Hampshire [21], and New Mexico [26]). This approach facilitates the registration process for each state’s election office and voters. It is more convenient for voters to download an application and complete it anytime than to contact local offices for an application. Election offices can also reduce human effort by supporting walk-in or phone-call application requests. The only drawback of this approach is it still requires voters to turn in a completed application before the registration deadline (except in states that allow registration on Election Day).

Completing an interactive web-based voter registration application is another online registration service that has been implemented by Alaska [9], Delaware [12], Louisiana [19], Nevada [20], and Washington [22]. Before voters can download an application, they need to complete a step-by-step web-based registration application. This web-based application also verifies registration eligibility based on an assertion from voters as shown in Figure 1.3. Only voters who are eligible to register are allowed to complete an application shown in Figure 1.4. Otherwise, the system alerts voters of their ineligibility to register as in Figure 1.5. This implementation has reduced a great amount of ineligible registration applications that have been submitted to election offices. However, it is not a fully functional
web application that voter could use to register instantly. They are still required to print and submit their completed application to election offices before the registration deadline.

![Screenshot of Washington State’s Online Voter Registration (Step 1)](image1)

Figure 1.3. Screenshot of Washington State’s Online Voter Registration (Step 1)

![Screenshot of Washington State’s Online Voter Registration (Step 2)](image2)

Figure 1.4. Screenshot of Washington State’s Online Voter Registration (Step 2)

Submitting an online voter registration is another online registration service that does not require voters to download or send their application to local election offices. This
service has been implemented by Arizona [15], Louisiana [19], Colorado [16], Georgia [17], Indiana [18], Kansas [14], and Washington D.C [11]. This service can be considered a fully functional online registration application. To submit an online application, voters need to complete a step-by-step web-based application (Figure 1.6). After the submission, voters instantly receive their voter identification number. Arizona is the only state that successfully implemented an online voter registration system in the 2008 election. For the 2008 Election, Arizona reported receiving 35.1% internet applications out of more than 3 million total applications [4].
1.3 Major Problems

The critical issues in the current registration system are: (1) the potential registration of ineligible voters, (2) the holding of multiple active registrations for a single voter, and (3) the difficulty of identifying inactive voters and removing them from voter lists. This section identifies potential causes of each problem, and the impact that each issue might contribute to the election process.

1.3.1 Registration of Ineligible Voters

At least 3 percent or about 3 million of ballots were cast by ineligible voters in the election in 2004 [23]. These ballots were cast by non-citizens, undocumented immigrants, convicted felons, and those under 17 years old. These ineligible ballots also included voters who vote multiple times as they hold multiple active registrations and those who were using the identity of deceased voters. Registration of ineligible voters is a serious issue that has a negative impact on the result of the election. From the history of U.S. elections, the winner of presidential candidate can be decided by a small margin difference in vote counts. For example, the 2000 election result was decided by 537 votes in Florida [7].

There is a deficiency in the current registration system that allows for ineligible registration. Registration eligibility, which is conditioned on being U.S. citizen, not being convicted, and not having been declared mentally incompetent, is self-attested without requiring any document or further verification. Ineligible voters, i.e. non U.S citizens or convicted felons, have a good chance to register and vote if they check the “Yes” box for a statement such as “Are you a U.S. citizen?” or check to declare themselves not being convicted, as shown in Figure 1.7 and Figure 1.2.

This issue is also caused by the inability to verify registration eligibility because the required information is unavailable when needed. The process of registration applications requires data collecting from local U.S. attorneys to verify the conviction status and status of mental competency. However, there is no mandated deadline for each attorney’s office to send their report to their local election offices. Similarly, data from the SSA’s Death Master File is not collected on a regular interval which has created a loophole in identifying deceased voters [23].
While this issue potentially contributes to an unjust election result, the lack of verification of the citizenship status potentially leads to a severe impact on (lawful) immigrants. This impact is a trade-off with the adoption of the Motor Voter Act in 1993 that encourages citizens to vote by allowing them to register while obtaining their drivers’ licenses. While simplifying the registration process, DMV offices failed to train their staff to inform citizens of their registration eligibility. Non-U.S. citizenship immigrants, especially those who do not understand English well might register and end up being a victim of the system [24] [25]. Registering to vote as a non-U.S. citizen is a crime. The immigrants that register face federal conviction and a deportation charge as stated in the IIRIRA of 1996. Several immigration attorneys have expressed the opinion that resolving this issue through the immigration court is a complicated and hopeless battle [24].

### 1.3.2 Multiple Active Registrations

Duplicate registrations or voters who hold multiple active registrations also contribute to unjust election results. Preventing voters from registering in multiple states or identifying duplicate registrations is still a challenge for the election offices. Currently, there is no easy way to identify voters’ registration of other states without asking them. The implementation of the statewide VRD, under the adoption of the Help American Vote Act (HAVA) in 2002, has eliminated only the challenge to identify duplicate registrations within the same state.

Ensuring a single active registration cannot be achieved by requesting voters to report their out-of-state registration, as shown in Figure 1.8. There is still a chance that voters can get a new registration without reporting their out-of-state registrations. The current registration system cannot guarantee that those who claim to register for the first-time or do not provide their out-of-state registration as requested do not have any active...
registration elsewhere. Even though the penalty of falsifying out-of-state registration seems to discourage people from committing the fraud, it only applies to those who get caught. Also, it is difficult to identify an out-of-state registration for voters who have changed their name as the system cannot match a voter’s record.

Figure 1.8. Alaska voter registration application

Another reason why this issue persists is the inefficiency in the process to remove inactive voters from states’ VRDs. The current process fails to identify inactive voters so they still remain on the voter lists. In the current process, potential inactive voters, who are those absent from one or two elections, are required to confirm their status in a mail that required delivery confirmation. Those fail to confirm are deemed inactive; thus their registration are deactivated. One drawback of this process is the inability to identify potential inactive voters in the first step. Some voters who move out-of-state still cast their vote as their registration still active. Another drawback is a chance for someone to falsify the delivery confirmation even when they have moved.

1.3.3 Challenges to Maintaining Clean Voter List

Difficulties in maintaining clean voter lists also contribute to an inaccurate election result. The inability to remove from voter lists inactive voters (i.e. deceased voters, or voters who move to another state) still remains an issue. This loophole weakens the registration system as it is easy for someone to register as an inactive voter to gain more vote counts.

Maintaining clean voter lists is still a challenge due to the lack of reliable communication between election offices and federal entities that are essential for updated voter information. Under the current registration system, voters will be deactivated when they are reported as a convicted felon or as mentally incompetent by a local attorney office.
Likewise, deceased voters are deactivated when election offices get reports from the SSA’s Death Master File (DMF). However, inactive voters are not removed from active voter lists unless reported by local attorneys’ offices or the SSA.

The challenge of maintaining clean voter lists also stems from the absence of a robust communication with other election offices at the state-level. This state-level communication facilitates in identifying voters who have moved to another state by removing them from the state’s voter list. The current approach that requires voters to report their out-of-state registration is insufficient to identify all voters who have moved; thus, some of them still remain on active voter lists.
Chapter 2

Centralized Verification Module

The CV2M relies upon drawing data from federal databases. One main purpose of the CV2M is to automate the registration process so it does not need voters to affirm their registration eligibility. Another main purpose of the CV2M is to streamline the registration process so that all states’ databases can communicate through a central module. This allows voter information in states’ databases to be updated when information is updated in the federal databases.

The current registration system requires voters to identify their status of citizenship, reveal any criminal convictions, and attest to their mental competency. The CV2M will eliminate these requirements by retrieving the information from federal databases and automatically determining the status of a voter’s registration eligibility. Three federal agencies are selected in accordance to the U.S. GAO for the CV2M to pull data from. These include the Social Security Administration (SSA), the Department of Homeland Security (DHS), and the Department of Justice (DOJ) [23].

This chapter is organized into three sections: (1) overview - describes federal agencies that would provide data needed for verifying registration eligibility, (2) conceptual database design - outlines major entities for the CV2M’s database, and (3) data security - focuses on a security plan to ensure the availability and integrity in the system.

2.1 Overview

Figure 2.1 shows the integration of federal databases in the proposed U.S. voter registration system. A component of the Election Division, CV2M, enables data communi-
Figure 2.1. Overview of the registration system integrated with federal support

cation between state-level election offices and federal agencies. One major element of the CV2M is the Master Voter Database (MVD). The MVD is a voter repository in the election system. Each state’s voter registration database is a subset of the MVD. This model also enables communication between voter registration systems in different states.

The following section describes the role of each federal agency in the registration system.

Social Security Administration (SSA)  The SSA’s database is the primary source providing the records of citizens. Since 2002, the SSA has collaborated with the state-level
voter registration systems under the Help America Vote Act. The new model redirects the communication with the SSA to the election division. Data-sharing from the SSA is essential for the verification process. The SSA’s database provides the social security number, name, state of residence, date of birth and other information for validating voters’ identification. This database also supports the verification of registration eligibility because it provides information of a voter’s citizenship status and mortality status.

Communication with the SSA also facilitates the maintenance of clean voter lists. It simplifies the process of maintaining voters’ record when any change occurs. For example, a voter’s record in the MVD will be updated when a voter’s name has been changed. It is mandatory for those who have filed for changing their name to update their record with the SSA after it has been approved. Furthermore, this communication also partially supports the maintenance of clean voter lists by deactivating the registration of deceased voters and removing them from active voter lists.

Department of Homeland Security The DHS’s database is a supplement to the SSA’s database for verifying the citizenship status. This database ensures an accurate validation of registration eligibility for non-U.S. citizen immigrants. It provides citizenship information of non-U.S. born citizens. The CV2M cannot depend on the SSA’s database alone for the information of immigrants because communication between the DHS and SSA does not exist yet in this regard. The citizenship status of naturalized citizens does not automatically update in the SSA’s database. Naturalized immigrants are required to update their record with the SSA after they become U.S citizens.

Another major role of DHS’s database is to clean up ineligible registrations during the creation of the MVD. When it identifies an active registration of a non-citizen immigrant then the system can automatically deactivate that ineligible registration and remove it from active voter lists. When this is done, the individual should be notified and allowed to correct his/her records.

Department of Justice Data sharing with the DOJ is essential for the verification of registration eligibility because the DOJ’s database is the source for identifying a voter’s con-
victions and mental status. Establishing communication with the DOJ prevents registration of convicted felons or those who have been declared mentally incompetent.

Collaboration with the DOJ in the voter registration system also facilitates in keeping clean active voter lists. With the help of the DOJ’s database, the system can deactivate and remove registrations of convicted felons and those who have been declared mentally incompetent from active voter lists.

2.2 Conceptual Database Design

Figure 2.2. Main entities for the registration process

The CV2M is a relational database-driven system that maintains data including voters’ eligibility status and their registrations. The CV2M would need several databases for all of the various administrative and reporting activities that it might include. In this thesis, only the Master Voter Database (MVD) is described for supporting voter registration process. The MVD allows for the following characteristics in the registration system: pro-
Voting real-time voter information, eliminating self-attestation on registration eligibility, updating voters' information, and enabling multiple levels of authorization. Figure 2.2 illustrates five main entities of the MVD, which include VOTERS, ACTIVE_REGISTRATIONS, INACTIVE_REGISTRATIONS, UPDATES, and NOTIFICATIONS. Table 2.1 is the listing of the relational schema for each entity.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Fields</th>
</tr>
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<tbody>
<tr>
<td>VOTERS</td>
<td>- voter_id (string): a unique identification of a voter.</td>
</tr>
<tr>
<td></td>
<td>- ssn (integer): a voter's social security number</td>
</tr>
<tr>
<td></td>
<td>- name (string): a voter's name</td>
</tr>
<tr>
<td></td>
<td>- dob (date): a voter's date of birth</td>
</tr>
<tr>
<td></td>
<td>- citizenship (boolean): indicate a voter’s citizenship status. TRUE means a voter is U.S. citizen.</td>
</tr>
<tr>
<td></td>
<td>- conviction (boolean): indicate a voter’s conviction status. TRUE means a voter is a convicted felon.</td>
</tr>
<tr>
<td></td>
<td>- mentality (boolean): indicate a voter’s mental incompetency status. TRUE means a voter has been declared mentally incompetent.</td>
</tr>
<tr>
<td></td>
<td>- mortality (boolean): indicate a voter’s mortality status. TRUE means a voter is deceased.</td>
</tr>
<tr>
<td>ACTIVE_REGISTRATIONS</td>
<td>- voter_id (string): a unique identification of a voter. This value must exist in the VOTERS entity.</td>
</tr>
<tr>
<td></td>
<td>- agent (string): the election office that issued and confirmed the registration. This value identifies an election office or it can simply be the state code.</td>
</tr>
<tr>
<td></td>
<td>- reg_id (string): a registration identification issued by an election office.</td>
</tr>
<tr>
<td></td>
<td>- reg_date (date time): a date to issue the registration.</td>
</tr>
<tr>
<td></td>
<td>- conf_no (string): a confirmation confirmed by an election office.</td>
</tr>
<tr>
<td>INACTIVE_REGISTRATIONS</td>
<td>- voter_id (string): a unique identification of a voter. This value must exist in the VOTERS entity.</td>
</tr>
<tr>
<td></td>
<td>- agent (string): the election office issued and confirmed the registration. This value identifies an election office or it can simply be a state code.</td>
</tr>
<tr>
<td></td>
<td>- reg_id (string): a registration identification to be inactivated.</td>
</tr>
<tr>
<td></td>
<td>- req_date (date time): a date to request cancellation of a registration.</td>
</tr>
<tr>
<td></td>
<td>- conf_no (string): a confirmation confirmed by an election office for a cancellation request.</td>
</tr>
<tr>
<td></td>
<td>- conf_date (date time): a date to confirm by an election office for a cancellation request.</td>
</tr>
<tr>
<td>UPDATES</td>
<td>- u_id (string): a unique identification of an update.</td>
</tr>
<tr>
<td></td>
<td>- voter_id (string): a unique identification of a voter. This value must exist in the VOTERS entity.</td>
</tr>
<tr>
<td></td>
<td>- source (string): the federal agency (SSA, DHS, or DOJ) that submits the update.</td>
</tr>
<tr>
<td></td>
<td>- date (date): a date that an update is entered</td>
</tr>
<tr>
<td></td>
<td>- item (string): an item that need to be updated. This is one of the following fields in VOTERS entity: name, dob, citizenship, conviction, mentality, and mortality.</td>
</tr>
<tr>
<td></td>
<td>- item_value (string): a value of the item that need be updated.</td>
</tr>
<tr>
<td>NOTIFICATIONS</td>
<td>- n_id (string): a unique identification of a notification.</td>
</tr>
<tr>
<td></td>
<td>- voter_id (string): a unique identification of a voter. This value must exist in the VOTERS entity.</td>
</tr>
<tr>
<td></td>
<td>- reg_id (string): a unique registration identification of the voter.</td>
</tr>
<tr>
<td></td>
<td>- date (date): a date to notify the election office of the update.</td>
</tr>
<tr>
<td></td>
<td>- item (string): an item that need to be updated. This is one of the following fields in VOTERS entity: name, dob, citizenship, conviction, mentality, and mortality.</td>
</tr>
<tr>
<td></td>
<td>- item_value (string): a value of the item that need be updated.</td>
</tr>
</tbody>
</table>

Table 2.1. Relational Schema for each entity in MVD

VOTERS  This entity stores voters’ information and the status of citizenship, criminal conviction, mental competency, and mortality as shown in Table 2.2.

It is critical to ensure a single instance for each person. The social security number alone cannot be used to determine the uniqueness in the relation as the number has been
Table 2.2. An instance of the VOTERS entity

reused over time by the SSA as an example in row 5 and 6 of Table 2.2. The unique record of each person can be ensured with a combination of the field ssn, name, and dob under the assumption that no two people alive at the same time have the same social security number.

Field voter.id is the primary key of VOTERS entity. This entity is the primary entity for other child entities in the database; thus, its primary key will appear in many places. So a primary key as the combination of field ssn and dob cannot be used as it contains a piece of confidential information which should not spread in many places. Choosing voter.id as the primary key ensures a single occurrence of the social security number in the database.

A new voter record is created during the registration process when a matched record does not exist. Fields ssn, name, and dob are used to locate a single existing record. To ensure a correct result when searching for a record, voters are required to register with the name that appears on their social security card.

ACTIVE_REGISTRATIONS This entity keeps information of voters’ active registration that include the registration identification, date of registration, election office to issue the registration, and the confirmation number. An example instance of voters’ active registration is provided in Table 2.3.

Table 2.3. An instance of the ACTIVE_REGISTRATIONS entity
This is a child entity of VOTERS entity. The field \textit{voter\_id} is the foreign key to \textit{voter\_id} of VOTERS entity. The integrity constraint between this entity and VOTERS entity is zero-or-one relationship meaning that each voter has at most one record in this entity. This is to ensure that a voter has only one active registration.

Local offices are required to confirm when creating a new entry or modifying an existing entry. This is a simple approach to ensure that local offices are allowed only to register those in their district. This table also enables an automatic cancellation request of any previous registration if voters have been registered elsewhere. Before updating an existing record, the CV2M cancels the current registration and sends a notification to the local offices that issued the registration.

\textbf{INACTIVE\_REGISTRATIONS}  This is another child entity of the VOTERS entity to keep track of inactive registrations. An “inactive” registration refers to any registration that has been cancelled. An example instance of inactive registration appears in Table 2.4.

<table>
<thead>
<tr>
<th>voter_id</th>
<th>agent</th>
<th>reg_id</th>
<th>req_date</th>
<th>conf_no</th>
<th>conf_date</th>
</tr>
</thead>
<tbody>
<tr>
<td>23156181</td>
<td>NY</td>
<td>NY324234</td>
<td>1998-12-21</td>
<td>NY19982034392SE</td>
<td>1998-12-21</td>
</tr>
<tr>
<td>67692231</td>
<td>WA</td>
<td>WA2024943</td>
<td>2008-10-04</td>
<td>WA2008321042394ES</td>
<td>2008-10-04</td>
</tr>
<tr>
<td>67692231</td>
<td>DE</td>
<td>DE1232434</td>
<td>2010-10-25</td>
<td>DE201008032421AE</td>
<td>2010-10-25</td>
</tr>
<tr>
<td>89284141</td>
<td>WY</td>
<td>WY7803922</td>
<td>1999-05-01</td>
<td>WY199905324232AE</td>
<td>1999-05-01</td>
</tr>
</tbody>
</table>

Table 2.4. An instance of the INACTIVE\_REGISTRATIONS entity

Over the course of a lifetime, a voter might have registered with several election offices. To satisfy this, the primary key of this entity is the combination of three fields: \textit{voter\_id}, \textit{agent}, \textit{reg\_id}. The integrity constraint with the parent entity is many-to-one relationship.

This entity facilitates collaboration between local offices by ensuring the accuracy of the active voter lists. The CV2M allows an authorized local office to override another local office that no longer can make a claim to particular voters. For example, Montana election offices cannot claim a former Montana resident who has moved to Florida. However, Florida’s election office has the authority to override the registration issued by Montana’s office. An assurance that local offices acknowledge and confirm the cancelled
registration is mandatory. The field conf_no and conf_date are included to serve that purpose.

**UPDATES** UPDATES is another child entity of the VOTERS entity that serves as a repository for all changes in voters’ records. This entity is the bridge between the CV2M and federal agencies which include the SSA, DHS, and DOJ. An example instance of voters’ update appears in Table 2.5.

<table>
<thead>
<tr>
<th>u_id</th>
<th>voter_id</th>
<th>source</th>
<th>date</th>
<th>item</th>
<th>item_value</th>
</tr>
</thead>
<tbody>
<tr>
<td>U0230021</td>
<td>23156181</td>
<td>SSA</td>
<td>1999-05-21</td>
<td>mortality</td>
<td>1</td>
</tr>
<tr>
<td>U7830233</td>
<td>67692231</td>
<td>DOJ</td>
<td>2010-12-04</td>
<td>mentality</td>
<td>1</td>
</tr>
<tr>
<td>U2300492</td>
<td>89284141</td>
<td>DOJ</td>
<td>1999-12-11</td>
<td>conviction</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2.5. An instance of the UPDATES entity

There are many reasons for changing the status of registration eligibility for a given voter. For example, a person might have been recently convicted of a felony or have been declared mentally incompetent. These are changes that affect their registration status as well as voting eligibility. Each instance of an update entry contains information of the agency that reports an update, the date of an update, the category item and the status to be updated.

This entity is a trigger for updating an entry in the VOTERS entity and a voter’s record at state level. It is necessary for this entity to assign a certain eligibility category that each federal agency is allowed to update as shown in Table 2.6. This approach secures the authorization of the source that confirms the data change.

<table>
<thead>
<tr>
<th>Source</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSA</td>
<td>name, date of birth, mortality, citizenship</td>
</tr>
<tr>
<td>DHS</td>
<td>citizenship</td>
</tr>
<tr>
<td>DOJ</td>
<td>conviction, mental status</td>
</tr>
</tbody>
</table>

Table 2.6. Item categories to be assigned to each Federal agency

This entity helps maintain the most recent status of eligibility items. Each new entry will trigger a record update in the VOTERS entity accordingly. An additional constraint in this entity is to only allow for “active” voters meaning those that have not been
reported as deceased (*mortality = false*). This is based on the assumption that no update should occur after death. This constraint also increases the efficiency of data retrieval.

**NOTIFICATIONS**  This entity is the repository of notifications generated by the CV2M to local offices alerting on any changes that affect the registration eligibility. An example instance of notification entry appears in Table 2.7.

<table>
<thead>
<tr>
<th>u_id</th>
<th>voter_id</th>
<th>source</th>
<th>date</th>
<th>item</th>
<th>item_value</th>
</tr>
</thead>
<tbody>
<tr>
<td>U0230021</td>
<td>23156181</td>
<td>SSA</td>
<td>1999-05-21</td>
<td>mortality</td>
<td>1</td>
</tr>
<tr>
<td>U7839233</td>
<td>67692231</td>
<td>DOJ</td>
<td>2010-12-04</td>
<td>mentality</td>
<td>1</td>
</tr>
<tr>
<td>U2300492</td>
<td>89284141</td>
<td>DOJ</td>
<td>1999-12-11</td>
<td>conviction</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2.7. An instance of the NOTIFICATIONS entity

This entity is the bridge between the CV2M and local election offices. It maintains up-to-date registration eligibility in voters’ records. The notification is only necessary for active registrations. It is mandatory for local agents to be informed of any change in the registration eligibility as this has an impact on the eligibility to cast a ballot.

### 2.3 Data Security

System security involves many factors including safeguarding the physical building where information is stored and choosing a secure password. However, it is not within the scope of this project to address every aspect of the security system. The focus of this section is data security in the MVD. Data security is a means to ensure the secrecy, integrity, and availability of information for authorized users. It also prevents unauthorized users from accessing the system.

The CV2M has to support real-time online registration transactions; therefore, the data security policy needs to be enforced at row-level along with the user authentication. To limit data access in the MVD from many external requests, a data security policy is implemented on two levels: local election offices and the federal agencies. This section outlines three objectives in data security that the CV2M needs to satisfy.
**Authentication**  Authentication is a mechanism to limit data access for each local agent. Local agents are not allowed access to the whole voter list. Authentication is a way to determine a sub-list for each local agent. For example, New York’s election office only has access to the voter list of New York. This prevents non-residential registration fraud which can occur if the system does not identify the information authority. The eligibility information of a voter is only released to a local agent that can validate the residency of that voter. For example, a resident of Alaska cannot register through Virginia’s voter registration system because their residency can only be validated by Alaska. Authentication is also a tool to ensure data security of the whole registration system (both the centralize module and states’ system) in case there is a security breach in any local system. Consider the scenario that someone is trying to hack into a local state system. Without the authentication, a person who has gained an access to one local system will have access to the whole centralized module and other local systems as well.

**Disclosure of Voter Information**  The CV2M’s primary content is voters’ and registration data. It is critical to ensure that: (1) information is disclosed to authorized agents, and (2) only requested information is disclosed. Disclosed voter information can be classified into three categories:

1. Confidential information: includes a voter’s social security number, name, and date of birth. These key fields are required to identify each voter’s record. The CV2M does not disclose any confidential information meaning local agents are not granted a SELECT privilege to these fields.

2. Eligibility information: includes the status of citizenship, criminal conviction, mortality, and mental competency. The eligibility information is released upon a request from the local agent.

3. Registration information: includes the information of the registration ID, local agent to issue the registration, and inactive registrations. The registration information is disclosed only to the “authorized” local agent.
The MVD ensures the disclosure of voter information by granting the SELECT privilege to three entities that store voter information. These entities are VOTERS, ACTIVE_REGISTRATIONS, and INACTIVE_REGISTRATIONS.

Voter information is only disclosed to a request from local agents who satisfy the following conditions:

• The first step is to verify the existence of a voter record. Each request includes a voter’s ssn, name, and date of birth. The CV2M looks up the single matching voter record in the VOTERS entity or the SSA database. If a matching record is found, then it will proceed to verify the second condition. Otherwise, the CV2M will notify the requester as of invalid request.

• The next step is to validate a requester’s authority. Voter residency is used as the criterion. Each local agent is only granted access to information of those who live in their locality. The election offices of Delaware can only request information for the residents of Delaware and cannot obtain information of voters who live elsewhere. To determine this, the CV2M verifies the local agent that submitted the request with the current state residency on file in the SSA database. If this condition is not satisfied, the CV2M will deny the request. Thus, the CV2M will not release any voter information.

If both conditions are satisfied, the trigger in the MVD generates a record for the requested person that contains only information on citizenship, criminal conviction, mental competency, mortality, and any active registrations.

Only local agents, which are state-level election offices, are potentially allowed to retrieve voter information. The MVD does not grant any privilege to the federal agencies, which include the SSA, USCIS, and DOJ, to obtain any part of voter information.

**Integration** The MVD needs to grant the UPDATE privilege to its local agents, the SSA, the DOJ, and the DHS on three entities including VOTERS, ACTIVE_REGISTRATIONS, and INACTIVE_REGISTRATIONS. This is necessary for maintaining up-to-date voter records. However, each external entity will be assigned to only certain fields as the following:

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1. Local agents are allowed to update voters’ registration information such as activate a new registration or deactivate a registration.

2. The SSA is allowed to update the status of citizenship, mortality and voters’ information such as name.

3. The DHS is allowed to update the citizenship status.

4. The DOJ is allowed to update the status of conviction and mental competency.

Compared to the current registration system, the CV2M reduces the security risk in data sharing among federal agencies. Instead of monitoring several connections from local election offices, each federal agency only needs to monitor a single connection request for the CV2M. Connections from local agents will redirect to the CV2M. Another benefit is the standardization in the registration process. The CV2M is an initial step to standardize the verification process instead of having one verification module for each state.
Chapter 3

Core Tasks

This section describes the four main tasks in the registration system using the proposed model. These tasks are: (1) registering voters, (2) verifying registration eligibility, (3) ensuring a single active registration, and (4) updating voters’ records. Sample user interfaces, workflow diagrams, and sequence diagrams are used to demonstrate the processes of each task.

3.1 Registering Voters

The CV2M’s role in the registration process is to determine the registration eligibility of a voter and to assure a single active registration for each voter. Integration of the CV2M enables a simple online voter registration process that will instantly notify voters of their registration status as illustrated in Figure 3.1. Voters complete a registration form by providing their identification, including name, date of birth, the state or driver license ID, and social security number. They are no longer required to affirm their registration eligibility as the system will automatically identify it. The CV2M will also automate the cancellation of any currently active registration.

Figure 3.2 shows the process flow in the registration task that involves voters who wish to register, the state’s voter registration system, and the CV2M. The registration form UI enables communication between voters and the state’s system. A voter, who wishes to register to vote, needs to complete and submit the registration form. After the submission,
the registration application will be verified by the state’s voter registration system with the following steps:

1. Verifying residency: The state’s registration system verifies that a voter is a resident of the state. A valid state’s identification card or driver license card is required to establish valid residency status. A state’s registration system will match a record in the state’s DMV database. If no valid record is matched, the registration process will end. Voters will be notified of their ineligibility using the Invalid alert UI. Otherwise, it will continue to the next step.

2. Checking current registration: The system looks up a voter’s current registration record from the state’s voter registration database. This step prevents the system from
issuing multiple registrations for an already registered voter. If a current registration record is found, the registration process will confirm the existing registration (this could be a change of address) otherwise it will continue to the next step.

3. Verifying registration eligibility: The state’s registration system sends a request to the CV2M to query a voter’s registration eligibility. The details of how the CV2M to retrieve a record of a voter’s registration eligibility will be described in section 3.2. After receiving the status of a voter’s registration eligibility from the CV2Ms, the state’s registration system will notify voters who are ineligible to register. Otherwise, it will continue to the next step for voters who are eligible to register.

4. Issuing new registration: The state’s registration system creates a new record in the state’s voter registration database and issues a registration ID for voters who pass all verification steps.

5. Updating a voter’s record: After creating a new registration record in the state’s voter registration database, the state’s registration system notifies the CV2M of an update on a voter’s registration record. The CV2M is responsible for updating a voter’s registration record and ensuring that a voter only has one active registration. A step-
by-step description of this process will be given in section 3.3. Finally, the state’s system will notify voters of their registration status.

There are two levels of verification. The verification process at the state level validates the residential status and prevents statewide multiple registrations for each voter. The verification at the national level is handled by the CV2M to determine a voter’s registration eligibility. Both verification processes aim at filtering various categories of unqualified registrations such as registering multiple times within the same state; registration of non-resident voters, non U.S. citizens, the deceased, convicted felons, or those declared mentally incompetent.

### 3.2 Verifying Registration Eligibility

This is one major step in the registration task that begins after the verification process at the state level. This step determines a person’s registration eligibility based on the status of citizenship, criminal conviction, mental competency, and mortality. The primary purpose in this step is to prevent ineligible voters from registering to vote in the election.

Figure 3.3 illustrates the process flow for retrieving a voter’s registration eligibility. The CV2M processes a request from states local agents in the following steps:

1. **Looking up an existing record:** The CV2M checks the existence of a voter’s record in the MVD. For previously registered voters, their registration eligibility can be retrieved from the VOTERS entity as it is the repository of nationwide voter registration records. A preexisting voter record indicates that voter might have been registered before; otherwise, this is a first-time registered voter. This process will continue to step 2 if no matched record is found. Otherwise, it will proceed to step 3 to verify a state’s authority for voters who have already been registered.

2. **Validating identity:** This step is executed for first-time registered voters because their record does not exist in the MVD. The CV2M queries a voter’s record from the SSA’s shared database to ensure the accuracy of a voter’s identification including social
security number, name, and date of birth. If the system cannot identify a matched record, it will notify the requester that a voter’s identity is invalid.

3. Verifying state’s authority: This step begins when a voter record is found in step 1 or for new voters, the validation of their identity is confirmed with the SSA in step 2. The CV2M determine the requester’s authority for retrieving a voter’s record. An authorized requester is determined with a voter’s current state of residence from the SSA’s shared database. If the CV2M determines that a voter is not a resident of the requester’s authority, it will notify that requester is not an authorized agent.
to retrieve a voter’s record. Otherwise, it will continue to step 4 for the first-time registered voters or process to step 9 for those who have already registered.

4. Creating new record: This step is required for first-time registered voters because their records do not exist in the system. The CV2M creates a new record in the VOTERS entity. Then, it continues to the following steps for retrieving and verifying each item to determine the registration eligibility.

5. Checking mortality status: This step determines whether a voter is deceased or not. The CV2M retrieves a voter’s mortality status from the SSA’s shared database. The system continues to check status of other required items only if a voter is not deceased. Otherwise, it skips to step 9 for a deceased voter.

6. Checking citizenship status: This step determines whether a voter is U.S. citizen. The CV2M queries the information of a voter’s citizenship from the SSA’s and DHS’s database. If neither database can confirm that a voter is a U.S. citizen, the system will skip to step 9; otherwise, it continues to the next step.

7. Checking conviction status: This step determines whether a voter has been convicted or not. The CVM2 retrieves the status of criminal conviction from the DOJ’s shared database. If a voter's conviction status is confirmed as being convicted, the system will skip to execute step 9; otherwise, it continues to the next step.

8. Retrieving mental status: This step determines whether a voter has been declared mentally incompetent from the DOJ’s shared database. This is the last required item that determines a voter’s registration eligibility.

9. Determining registration eligibility: The registration eligibility is determined with the following conditions: is a U.S. citizen, has not been convicted, has not been declared mentally incompetent, and has not deceased. This is presented by the following logical expression:

\[ \text{citizenship} \land \lnot \text{conviction} \land \lnot \text{mentality} \land \lnot \text{mortality} \]
3.3 Ensuring Single Active Registration

This is another major step in the registration task that initializes after a state-level registration system issues a new registration for qualified registrants. This step ensures that voters only hold one active registration. Any previous registrations will be deactivated. It facilitates communication between state agents in the cancellation of any previous registrations when a voter registers in a new state.

Figure 3.4. Process flow for ensuring a single active registration for a voter

Figure 3.4 shows the process flow in ensuring a single active registration for a voter. The following steps will be taken:

1. Creating a temporary record: This step saves the new registration data in a temporary placeholder. Before the system inserts the new registration record in the ACTIVE REGISTRATIONS, it needs to deactivate an existing active.
2. Looking up an existing active registration record: This step searches for a voter’s active registration record that has to be cancelled. If no record is found, the process skips to step 4; otherwise it continues to the next step.

3. Canceling an active registration: This step cancels the current active registration record from state’s voter registration database so that voter’s record does not appear in the active voter lists. The following steps are required:

   (a) Deactivating an active registration: This step deactivates an active registration by moving the record to the INACTIVE_REGISTRATION entity.

   (b) Triggering state-level VRD: This step triggers the state’s voter registration database of the active registration to deactivate that record.

   (c) Confirming registration cancellation: The state’s VRD confirms the cancellation for the requested record. The system then updates that inactive registration record to include the confirmation information.

   After deactivating the active registration record in the MVD and cancelling the registration from the state’s VRD, the system continues to the next step.

4. Activating new registration: The CV2M inserts a voter’s new active registration record to the ACTIVE_REGISTRATION entity. After completing this process, a voter has only one active registration.

3.4 Updating Voter Records

This task triggers when an update affects an entry in a shared database of the SSA, DOJ, and DHS. This is one of the more challenging tasks in the current voter registration system. The purpose of this step is to ensure up-to-date voter records in states’ voter registration databases. Another purpose is to help state-level election offices in keeping clean active voter lists. Figure 3.5 shows the process flow in maintaining voter records in the registration system. This task requires the following steps:

1. Inserting an update entry: This step inserts a record in the UPDATES entity for each update entry from the federal agencies’ shared-database.
2. Updating a voter’s record: This step updates a voter’s record in the VOTERS entity.

3. Identifying an active registration: This step checks whether a voter has an active registration record or not. This tells the system which state agent needs to be updated. Then process proceeds to the next step for voters who have an active registration record. Otherwise, it is the last step for those who do not have any active registration.

4. Triggering state-level VRD: This step triggers the state’s voter registration database to update a voter’s record. This trigger ensures that voter records in the state’s voter registration database are updated when federal entities report new changes. After updating a voter’s record, this step also re-evaluates a voter’s registration eligibility. Then it inactivates a voter’s registration record if a voter status becomes ineligible.
Chapter 4

Rationale Discussion

This chapter discusses the reasoning behind the models described in Chapter 3. These models address three major problems currently existing in the current registration system, which are (1) the registration of ineligible voters, (2) multiple registrations of each voter, and (3) the difficulty of maintaining up to date voter records. Example scenarios are used to identify strengths and weaknesses of the model.

4.1 Preventing Registration of Ineligible Voters

For the scope of this project, the term “ineligible voter” refers to anyone who is not a U.S. citizen, or has been convicted of a felony, or has been declared mentally incompetent, or is deceased. Registration eligibility is determined in step 3 of the registration core task. This model is flexible in that it can adapt to changes in the eligibility criteria by increasing or decreasing the number of parameters that determine registration eligibility. This model also allows the election office to modify requirements in each parameter. For example, the status of criminal conviction could be changed to include those who are listed on newly created terrorist lists. This new requirement would require the model to include a new federal source in addition to the DOJ’s shared-database for the status of criminal conviction. However, the flip side of this model is the inability to modify an individual local registration system. For example, Wisconsin election offices might want to enact a new requirement in the registration eligibility to allow those who have been declared mentally incompetent to vote with the assistance of their caregiver. This model will not allow
Wisconsin to modify their state’s requirement because the model enforces a unified voter registration system where all states must conform.

This model reduces unnecessary transactions that might overload the system. It optimizes the retrieval of the registration eligibility to provide a robust, online voter registration system that gives an immediate response to users. The parameters required for determining the registration eligibility are prioritized in the following order: mortality, citizenship, conviction, and mentality. The first parameter is mortality. There is no need for the system to check on other categories if a person is deceased. The next parameter that the system needs to check is the citizenship status as it is another criterion for registering to vote. The model determines the citizenship status from either the SSA’s or DHS’s shared-database. A person is determined to be U.S. citizen when either database can confirm. If a person is a U.S. citizen, then the system continues to check the conviction status. Lastly, it checks the mental competency status for those who are not convicted as the registration systems do not allow felons to register. One trade-off in this short circuit workflow is the inability to provide every reason why the system determines someone as ineligible to register. Instead, it only gives the first reason discovered by the system. Enabling the system to return all reasons why a voter is ineligible will require some changes in the workflow. There is also a trade-off with the time delay in system response since the system must look up all eligibility parameters. The module is intended for real-time online transactions therefore it is important that the online process be fast otherwise voters may become frustrated and could turn away from using the system.

The new registration workflow also facilitates states that allow registration on Election Day. It eliminates the need to use provisional ballots for voters whose registration eligibility cannot be verified. With sufficient information to identify a voter’s record, this model will retrieve registration eligibility and identify voters who are eligible to vote. Thus, only eligible voters will be registered and permitted to vote.

Another overall drawback of the centralized module is the need to keep records of voters in its databases, including those who are ineligible. While, this is a trade-off with the delay time and spacing in its database, the system needs to reiterate the process of creating a new voter record each time someone has tried to register with the identity of an ineligible voter, i.e. deceased voters.
4.2 Preventing Multiple Active Registrations

To prevent a voter from holding more than one active registration in the current voter registration, voters are required to cancel or report their registration in other states otherwise they will be penalized for committing a registration fraud. Instead, the CV2M prevents this registration fraud in the registration process. The model that ensures each voter has only one active registration provides a convenience in the registration process. Voters are also released from a penalty for not reporting their registration in other states. The model can identify a voter’s active registration from the social security number, and then cancels that registration from the state’s voter registration database. However, voters are required to provide confidential information including social security number, name, date of birth, and state’s ID or driver license. This may turn off voters who are fearful of identity theft and don’t like giving out this information even on a secure site. The CV2M requires this information to ensure the accuracy of identifying each voter so the system does not cancel an active registration of someone else.

This model automates the registration cancellation process by networking states’ registration systems to one unified process. Activating a new registration will trigger the cancellation of any existing registration. Take for example, a voter who has moved from Montana to Pennsylvania and registers to vote in Pennsylvania. He also registered in Montana before moving to Pennsylvania. After activating the registration in Pennsylvania, the model also deactivates the Montana registration. However, this model somehow allows one state’s registration system to indirectly modify another state’s system. In this case, states that can authenticate voters’ residency will activate a trigger to remove voters from another state’s VRD that no longer can authenticate voters’ residency. This model also depends on each state’s DMV to ensure that each person holds legal residency only in one state.

This model also prevents duplicate registrations for voters who have changed their name. Voters’ records are updated when the SSA updates people’s name. In the registration process, voters are required to provide their name that matches with their social security card and their state record (driver license or state’s ID card). The proposed model for the registration process will identify a voter’s record even with their name changed as the information in voters’ record will be updated when the SSA updates its database.
However, this model will prevent voters who have changed their name to register unless their record in the SSA’s and state’s database have updated. It causes disenfranchisement for those voters until they update their name in the SSA and state’s databases.

This model enables the state’s DMV to adopt an automatic cancellation process of other state’s registration while applying for a state ID or driver license. Each person can only declare residency in one state. When a person moves from one state to another state and has became resident of the new state, he or she is also required to give up residency of an old state. This process could be used as a trigger to deactivate an active registration of other states.

This model also supports the start-up process of the CV2M’s database. It helps consolidate the records of a voter with multiple active registrations. This model deactivates registrations that need to be deactivated by matching up registration records with state of residence. For example, a person, who currently lives in Virginia, has multiple active registrations in Montana, Texas, and Virginia. In this case, only the registration in Virginia is active; registrations in Montana and Texas will be cancelled.

4.3 Keeping Clean Active Voter Lists

Maintaining clean voter lists is another challenge that states’ election offices have encountered. To remove inactive voters, election staff member need to collect data reports from several sources such as the death reports from the SSA, a list of criminal convictions from local attorneys’ offices, or a list of those who are declared mentally incompetent from the court. The system still has loopholes that allow for registration fraud. However, the CV2M ensures that states’ active voter lists always remain clean, meaning that inactive voters are always kept off of the list of active voters. One situation where inactive voters still remain in an active voter list is when voters have moved out-of-state and their registrations have not been cancelled properly. This new model requires neither human effort nor support from the NCOA’s database to identify inactive voters that have moved out-of-state. It automatically cancels voters’ existing registration prior to activating a new registration. Thus, a registration of voters who have moved out-of-state will be inactivated immediately in states’ voter registration databases.
Another reason that inactive voters remain in the active voter list stems from the inability to immediately identify changes in a voter’s record that affects registration eligibility. This new model enables automatic updates of voters’ records in states’ voter registration databases when those records are updated in any shared database. This model inactivates registrations of voters who have been convicted, deceased, or declared mentally incompetent.

This model also assists states’ election offices to better prepare for the upcoming Election Day. This model provides a more accurate active voter list that is helpful for organizing the poll area and estimating the number of required poll workers to be assigned for each poll. This helps the states’ election offices by identifying voters who did not vote in a previous election. This ensures that election offices minimize the waste of resources.
Chapter 5

Constraints to Deployment

The CV2M is an initiative to establish federal oversight for the election division. Implementation of this theoretical model requires: (1) support from federal agencies and (2) participation of multiple states’ election offices. Three federal agencies are the critical sources to support the model: the SSA, the DHS, and the DOJ. The adoption of HAVA in 2001 established communication between the SSA and election offices [8]. Establishing a communication with the DOJ or the DHS is straightforward; however, gathering approval from all state authorities is a greater challenge.

The CV2M’s primary data source is the states’ voter databases. Participation of local agents is the critical component of the model because the model has to extract information from each state’s database. The adoption of the model requires several levels of approval from state to local district authorities. Each state administers their election division differently and might have several different concerns. For example, states along the border deal more with illegal immigration and may be more in favor of adopting this system. It is much better to get more states to participate in the system; otherwise duplicate registrations may not be detected.

Implementing the theoretical model proposed in this paper requires addressing several major concerns. These can be categorized into political issues, financial issues, and integration issues. It is not within the scope of this project to resolve these concerns, however one can speculate on the potential problems that need to be addressed.
5.1 Political

Voting is a political issue, thus, one must address several political concerns to turn this theoretical framework into a real model. One major political concern is obtaining support for the deployment of the model. This involves getting approval from political parties and elected officials, local election authorities, election advocates, and other special interest groups. The more political support the more likely this model will have a chance of being implemented. However, convincing these groups is very challenging. There could be an endless list of what-if questions about the capability of the system.

Another political concern is that some states may not want federal oversight in administering the election process. An agreement to adopt the model means each state must comply with federal regulations to provide voters’ data and accept any change in voters’ record from the federal level. Authorities in some states may have a problem giving up control over their voter registration database. An example is the statistics of voter registration records. Currently, states maintain and purge their voter registration lists differently and define different time intervals to remove inactive voters. With federal oversight, voters’ records are updated regularly on a timely basis, and this could lower the registered voter count of some states. It is likely that many states do not want to expose this because it affects the amount of federal funding a state receives. States might also bring up privacy policies to avoid releasing information.

Another potential issue might be that some people will not see a need to enhance the current registration system. If the system works just fine, why waste time and resources to improve it? To obtain necessary support, people must be convinced that CV2M is not just an enhancement of the voter registration system, but an initial and necessary step to enable the development of voter registration applications, i.e., real-time online web-based or mobile application. The flip side of mobilizing the registration system is that it requires less registration clerks. Some states might not want to computerize the system at the cost of increasing unemployment rate.

Creating a centralized module for registration is the first step to initiating a brand-new information and technology (known as IT) section for the election division. The people selected to be part of the section can have an impact on the election system. Even though the
CV2M does not hold any data associated with the election result, the power to manipulate the registration system might pose a potential threat in an election battle.

5.2 Budget

Another drawback to the system is cost. One must determine how much this system will cost, how to procure funding for implementation, and how to ensure funding for system maintenance. Implementing the system will require hardware, software, maintenance, and human resources. To enable a communication with federal agencies, the CV2M needs hardware, such as servers or backup servers, that comply with a certain specification set by federal government. For example, there might be a minimum requirement for deployment of a backup system. The CV2M also requires custom enterprise level management software that enables secured communication between federal and local government agencies. In addition to start up costs there are long-run costs to maintain and support the system.

Another funding issue is to incorporate the model in the current states’ systems. This will require some update in the current process. Some states might not be able to afford to integrate, while some might need to prioritize other issues such as natural disasters. For example, a state might have to balance between enhancing the registration system and recovering from a current fiscal deficit. If the federal government has to provide funding to each state, a problem arises about how to allocate funds. Some states might need more funding than others. For example, a state with much population such as California might have a larger system than Alaska and thus need to develop more complicated integration tools.

5.3 Integration

Integration is another constraint to implementing this conceptual model. To accommodate many different state systems under one unified system will be very challenging. The CV2M is a backbone to support the state-level registration system. However, the implementation of state registration system varies in each state. Some states have their own
in-house IT, while some have partnership with a vendor to implement the system. Several
different commercial databases such as, DB2, Oracle, or SQL, are used for the implementa-
tion of state voter registration databases. From the state’s perspective, each state only needs
to develop their interface to tunnel to the model. The CV2M is responsible for handling all these integrations. Enabling several configurations will make the system more difficult to upgrade or modify. It also makes the system more vulnerable.

Another challenge with integration is the inability to enforce a common setting in the tunneling process for local systems. The CV2M has to handle access from each agent accordingly. Enforcing a communication standard from a top-to-bottom level system with the existing local systems is not a desirable option. Standardization means each local system will be modified. The end result is some states need to downgrade their systems while some need to upgrade their systems. Politically, some states that already exceed the standard level might not want to downgrade their system. It is very unlikely that states will agree to pay to downgrade a working system. On the other hand, some states that want to upgrade their system to be with the standard might not be able to afford the system.
Chapter 6

Conclusion and Future Works

6.1 Future Works

6.1.1 Implementation of a Smaller Scale Model

In order to implement a full scale centralized voter registration module, one should first attempt to create a smaller scale module encompassing a few states. For example, one might create a regional module for some states on the West Coast or all states in the Midwest. The first step is to identify some states that might be interested in supporting the module and then set up a shared system among these states. The testing module illustrates the robustness and effectiveness of the shared module in supporting various voter registration systems. This is also an opportunity to identify and overcome new challenges that could arise. The implementation of this module on a smaller scale also allows for the evaluation of the performance in the proposed module. The measure is based on the actual outcome and expected outcome. Possible metrics of success including the registration rate, degree of registration fraud, or simplicity of the registration process.

6.1.2 Expand beyond the Election System

The CV2M can be a model for the federal government as each federal entity also has a need of data support from other entities. It would be interesting to expand the concept of this module beyond just the election system to a centralized data repository that will be shared among federal entities. The primary purpose is to improve workflow in government
services. For example, a shared repository can help jury offices pre-screen for only eligible citizens to serve as jurors instead of mailing a jury service applications to random applicants which results in less than 50% eligible applicants. A shared repository can also simplify some government-to-citizen (G2C) applications as a shared repository can verify answers in some sections without affirming by applicants. The N-400 Application for Naturalization is a good example [3]. Some questions, such as “Have you ever registered to vote in any Federal, state or local election in the United States?” or “Have you ever voted in any Federal, state or local election in the United States?” can be removed as the DHS can verify these questions with information from a shared repository.

6.2 Conclusion

Voter registration is a critical component of the U.S election as it is the initial step to ensure the accuracy of the election results. The current voter registration system fails to reach this goal due to three major issues: (1) inability to verify registration eligibility (2) inability to prevent multiple active registrations, and (3) difficulty to keep-up with changes in voters’ records. This thesis described the framework of a Central Voter Verification Model (CV2M) that improves the current voter registration system. The CV2M accesses information from federal entities that include the Social Security Administration, Department of Homeland Security, and Department of Justice to verify voter registration eligibility without relying on user affirmed input. The CV2M significantly enhances five core tasks in the registration system. The CV2M models a new registration process that automatically verifies registration eligibility without voter’s self-attestation. The module also incorporates an automated cancellation process of any registration elsewhere to ensure that each voter has only one active registration. The CV2M supports election offices in keeping clean active voter lists. Communication with Federal agencies enables a module that automatically update voters’ records in states’ voter registration databases when changes occur in federal entities. As a consequence, the CV2M paves a path to establish federal oversight in the election system.

However, there are several major concerns that need to be addressed before implementing this proposed module. Approval from all levels of authorities including local,
state, and federal government is required. Different concerns might be raised regarding
the capability of the CV2M to establishing federal oversight in voter registration system.
Some states might want to manage their election system instead of complying with federal
regulations. Some states might prefer the current system and resist to any new changes.
Funding the system is another concern. The proposed module is also costly in term of im-
plementation and maintenance the system. States might not be able to afford integrating
with the module.

Overall, the implementation of this module is a useful improvement of the current
registration system. The CV2M is not just an enhancement to the registration system. It
is a potential strategy to boost voter registration rate as it provides an opportunity to create
a simpler registration process that is more accessible than applying through motor voter
registration.
Bibliography


