NIST Special Publication 1500-102

Voter Records Interchange Common Data Format Specification

Version 1.0

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Reports on Computer Systems Technology

The Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST) promotes the U.S. economy and public welfare by providing technical leadership for the Nation's measurement and standards infrastructure. ITL develops tests, test methods, reference data, proof of concept implementations, and technical analyses to advance the development and productive use of information technology. This document reports on ITL's research, guidance, and outreach efforts in Information Technology and its collaborative activities with industry, government, and academic organizations.

Abstract

This document presents a specification for voter records data interchange related to voter registration, i.e., registration requests from online voter registration made to voter registration systems, and responses to the requests returning from the voter registration system. The specification includes XML (eXtensible Markup Language) and JSON (JavaScript Object Notation) schemas.

Keywords

Common data format (CDF); Federal Post Card Application (FPCA); JavaScript Object Notation (JSON); National Voter Registration Act (NVRA); voter registration; eXtensible Markup Language (XML).

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Executive Summary

Voter records are exchanged between an increasing number of entities. Whether it is voter registration offered during an interaction at the motor vehicles administration (MVA), an update to a voter record using an online portal, records exchanged as part of a voter matching database, or requests for absentee ballots, all of these systems need a common data format to effectively communicate.

However, the data exchanged is generally in a non-uniform format. This can cause a number of complications in that each state/territory, or sometimes each individual portal application, may have its own format that must be interpreted and translated on the receiving end. Voter addresses, in particular, are often provided to voter registration (VR) authorities in formats that are difficult to efficiently store in voter registration databases and use in various related applications. The collection of accurate voter registration address information is central to the routing of voter registration requests and subsequently in assigning voters to election districts. Each voter records application being developed must then be aware of each state's specific formats or design its own format, which complicates development and inhibits the implementation of digital voter record systems.

This specification assists election officials and developers in more easily implementing and supporting the development of online voter registration (OVR) systems by providing them with a uniform common data format for voter records interchange (VRI), that is, the voter registration requests and responses needed for OVR and for voter records maintenance. The languages used in the common data format are XML (eXtensible Markup Language) and JSON (JavaScript Object Notation).

The advantages of using this specification include:

- Providing a ready data interchange format for OVR systems to remove the need for individual system development projects to define their own data models and formats.
- Assisting election officials by reducing or eliminating non-standard exchange formats for voter registration data. Currently, the systems involved and data they produce do not interoperate, adding complexity to the process.
- Providing a baseline CDF (common data format) for voter registration data that can be continually refined to be more efficient and adaptable across all states. Once jurisdictions adopt the CDF VRI, their experience and feedback will refine the continued development of the specification.
- Providing the foundation for additional use cases in the future, which could include:
    - matching driver's license data between the MVA and voter record systems,
    - automated notifications between the MVA and voter record systems,
    - interoperability with electronic pollbooks,
    - voter record maintenance activities,
    - cross-state record matching, or

- facilitating data reporting for the Election Administration and Voting Survey (EAVS).

This specification provides background and explanation of how online voter registration typically works, using the data required by the National Voter Registration Act (NVRA) and Federal Post Card Application (FPCA) voter registration forms, including state-specific additions to these forms. It then contains an explanation of a UML (Unified Markup Language) model that was created to detail the data elements required in voter registration requests and responses. The UML model was used to generate XML and JSON schemas, which are both explained and used in various implementation examples.

The intended audience of this specification includes election officials, VR system designers and developers, and others in the election community including the general public. Some background in election administration and registration is useful in understanding the material in this specification.

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1 Introduction

This document is a specification for a common data format (CDF) for voter records data interchange related to voter registration, such as, registration or ballot requests from online voter portals made to voter registration (VR) systems, and responses to the requests returning from the VR system. The specification includes an XML (eXtensible Markup Language) [1] schema and references a JSON (JavaScript Object Notation) [2] schema.

The primary features of this specification include:

- A data format for voter registration requests and responses when using the National Voter Registration Act (NVRA) [3] or Federal Post Card Application (FPCA) [4] forms and state-specific variations of these forms.
- A data format for ballot requests and responses when using the FPCA forms, as well as state specific forms.
- A data model in Unified Modeling Language (UML) [5] that itemizes and defines the data involved in voter records interchange and that is used to derive the XML and JSON schemas.
- Instructions for implementing and using the XML and JSON schemas.
- A flexible specification to cover additional use cases for other types of registration transactions, such as for voter record maintenance.

1.1 Why this Specification is Needed

The purpose of this specification is to provide data interchange formats in XML and JSON for voter records requests and responses so as to assist election officials and developers in implementing and supporting the development of voter records systems within states. Advantages of using this specification include:

- Providing a ready data interchange format for OVR (on-line voter registration systems) to remove the need for individual system development projects to define their own data models and formats.
- Assisting election officials by reducing or eliminating non-standard exchange formats for voter registration data. Currently, the systems involved and data they produce do not interoperate, adding complexity to the process.
- Providing a baseline CDF (common data format) for voter registration data that can be continually refined to be more efficient and adaptable across all states. Once jurisdictions adopt the CDF voter records interchange (VRI) specification, their experience and feedback will refine the continued development of the specification.
- Providing the foundation for additional use cases in the future, which could include:
    - matching driver's license data between the MVA and voter record systems,
    - automated notifications between the MVA and voter record systems,
    - interoperability with electronic pollbooks,

- voter record maintenance activities,
- cross-state record matching, or
- facilitating data reporting for the Election Administration and Voting Survey (EAVS) [6].

1.2 Intended Audience

The intended audience of this specification includes election officials, VR system designers and developers, and others in the election community, including the general public. Some background in election administration and registration is useful in understanding the material in this specification.

1.3 Motivation and Methodology

This document was written primarily to assist election officials and developers in implementing and supporting voter record systems by reducing or eliminating non-standard exchange formats for voter record data. Additionally, there are sometimes significant variations among different jurisdictions within a state as well as among the states themselves in the way they automate voter registration and related parts of voter records management.

NIST and a community of U.S. election officials, analysts, and election system technologists analyzed varying VR scenarios and use cases and their associated data interchanges. They did this to analyze existing practices and create a standard data interchange format for emerging voter record systems. This specification implements the following use cases:

1. OVR Submission: Digital VR applications forms transmitted between components of state systems or to state systems by third-party systems, following the formats of the NVRA and FPCA voter registration application forms, including state-specific additions to these forms.
2. VR Update Submission: Similar application forms including voter registration updates (change of name, change of address), change of voter status, and ballot requests.
3. OVR Transfer: Subsets of applications used for third-party OVR assistant organizations to transfer users and user data to state OVR systems.
4. Voter Records Lookup: Requests for information regarding voter records within a VR system, or between a VR system and a third party.

A UML data model was subsequently generated to represent the data associated with voter record requests and responses and to show how the data elements are related and organized. Finally, XML and JSON schemas were generated from the UML data model.

The advantages of using a UML data model as an intermediate step to generating the XML and JSON schemas include that:

- the model is independent of the concrete data formats (or other potential formats that could be derived), and

- relationships between data elements are easier to correctly define and visualize when they are independent of any specific data format.

If changes are needed to the specific XML and JSON formats, one can make changes to the UML model and then generate or derive new versions of the formats.

Much of the data involved in voter record requests consists of voter addresses such as current addresses, postal addresses, and previous addresses. Rather than implement new and complicated functionality in this specification for representing addresses, NIST decided to use the existing U.S. Thoroughfare, Landmark, and Postal Address Data Standard [7] which contains four major classes of addresses that are broken out into 11 different types of addresses. These can be used to represent addresses where voters live and where they receive postal mail (if different), including overseas addresses.

While this specification is focused on digital OVR submission, subsequent versions of this specification may implement additional use cases, including:

- MVA Match: Subsets of digital applications exchanged between state VR systems and MVA or similar systems, to perform driver's license data matching (if required) as part of OVR processing.
- MVA Notification: Data exchanged by MVA or similar systems and VR systems, as part of NVRA compliance to digitally notify VR systems of MVA records of its customers who requested voter registration. May also include similar data push from MVA of existing MVA records recently updated with change-of-address, as part of semi-automated steps toward permanent voter registration, or other forms of data exchange to VR systems that might facilitate elements of automatic or permanent voter registration.
- Cross-State Records Match: Data interchange between state VR systems and systems for records matching, for example the Electronic Registration Information Center (ERIC) [8].
- Election Administration Voting Survey (EAVS) Submission: Subsets of voter records externalized from voter records systems for data aggregation and reporting, including but not limited to EAVS reporting.

Note that this specification addresses U.S. governmental elections and is not intended for use “as is” in other types of elections or in other countries. However, the specification was written with the intention that it be adaptable to other election environments.

1.4 Document Structure

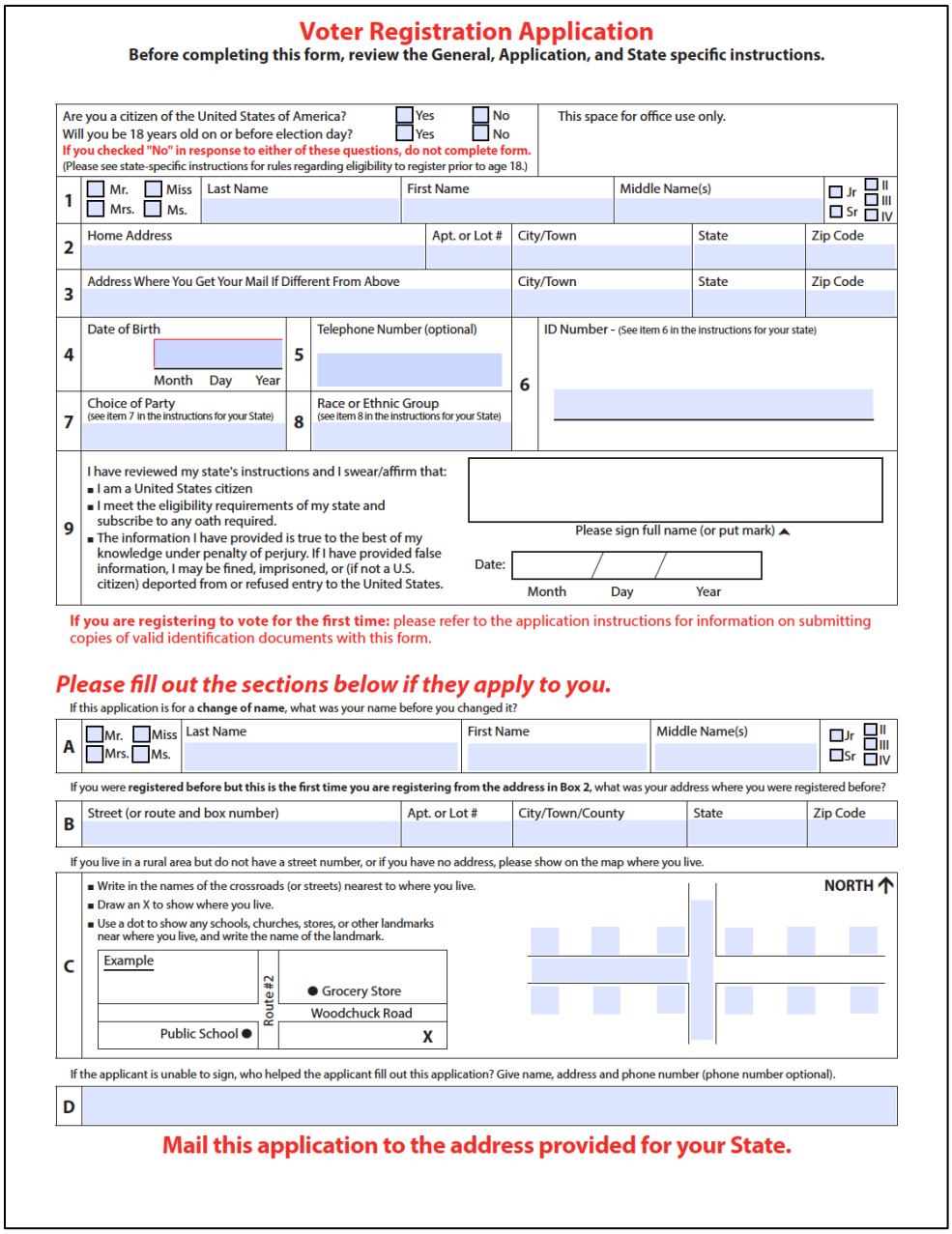
This specification includes the following material:

- Section 2 – overview of the supported voter record transactions, the VRI UML model, and the FGDC (Federal Geographic Data Committee) standard.
- Section 3 – VRI UML Model documentation.

- Section 4 – VRI XML and JSON usage examples, including registration requests and responses.
- Appendices – Acronyms, glossary, references, and schema download locations.

2 Overview of Digital OVR Transactions

This section presents an overview of the digital OVR voter registration transactions supported by this specification and examples of how they are implemented using the NVRA and FPCA forms (shown in Figures 1 and 2) as well as with state-specific forms, e.g., modifications to the NVRA. It also contains an overview of the U.S. Thoroughfare, Landmark, and Postal Address data standard [7] used by this specification for representing voter addresses.



Voter Registration Application

Before completing this form, review the General, Application, and State specific instructions.

Are you a citizen of the United States of America? ☐ Yes ☐ No
Will you be 18 years old on or before election day? ☐ Yes ☐ No
If you checked "No" in response to either of these questions, do not complete form.
(Please see state-specific instructions for rules regarding eligibility to register prior to age 18.)

This space for office use only.

1 ☐ Mr. ☐ Miss ☐ Mrs. ☐ Ms. | Last Name | First Name | Middle Name(s) | ☐ Jr ☐ Sr ☐ II ☐ III ☐ IV

2 Home Address | Apt. or Lot # | City/Town | State | Zip Code

3 Address Where You Get Your Mail If Different From Above | City/Town | State | Zip Code

4 Date of Birth (Month Day Year) | 5 Telephone Number (optional) | 6 ID Number - (See item 6 in the instructions for your state)

7 Choice of Party (see item 7 in the instructions for your State) | 8 Race or Ethnic Group (see item 8 in the instructions for your State)

9 I have reviewed my state's instructions and I swear/affirm that:
- I am a United States citizen
- I meet the eligibility requirements of my state and subscribe to any oath required.
- The information I have provided is true to the best of my knowledge under penalty of perjury. If I have provided false information, I may be fined, imprisoned, or (if not a U.S. citizen) deported from or refused entry to the United States.

Please sign full name (or put mark) ▲

Date: Month Day Year

If you are registering to vote for the first time: please refer to the application instructions for information on submitting copies of valid identification documents with this form.

Please fill out the sections below if they apply to you.

If this application is for a **change of name**, what was your name before you changed it?

A ☐ Mr. ☐ Miss ☐ Mrs. ☐ Ms. | Last Name | First Name | Middle Name(s) | ☐ Jr ☐ Sr ☐ II ☐ III ☐ IV

If you were **registered before but this is the first time you are registering from the address in Box 2**, what was your address where you were registered before?

B Street (or route and box number) | Apt. or Lot # | City/Town/County | State | Zip Code

If you live in a rural area but do not have a street number, or if you have no address, please show on the map where you live.

C
- Write in the names of the crossroads (or streets) nearest to where you live.
- Draw an X to show where you live.
- Use a dot to show any schools, churches, stores, or other landmarks near where you live, and write the name of the landmark.

Example: ● Grocery Store; Route #2; Woodchuck Road; Public School ●; X

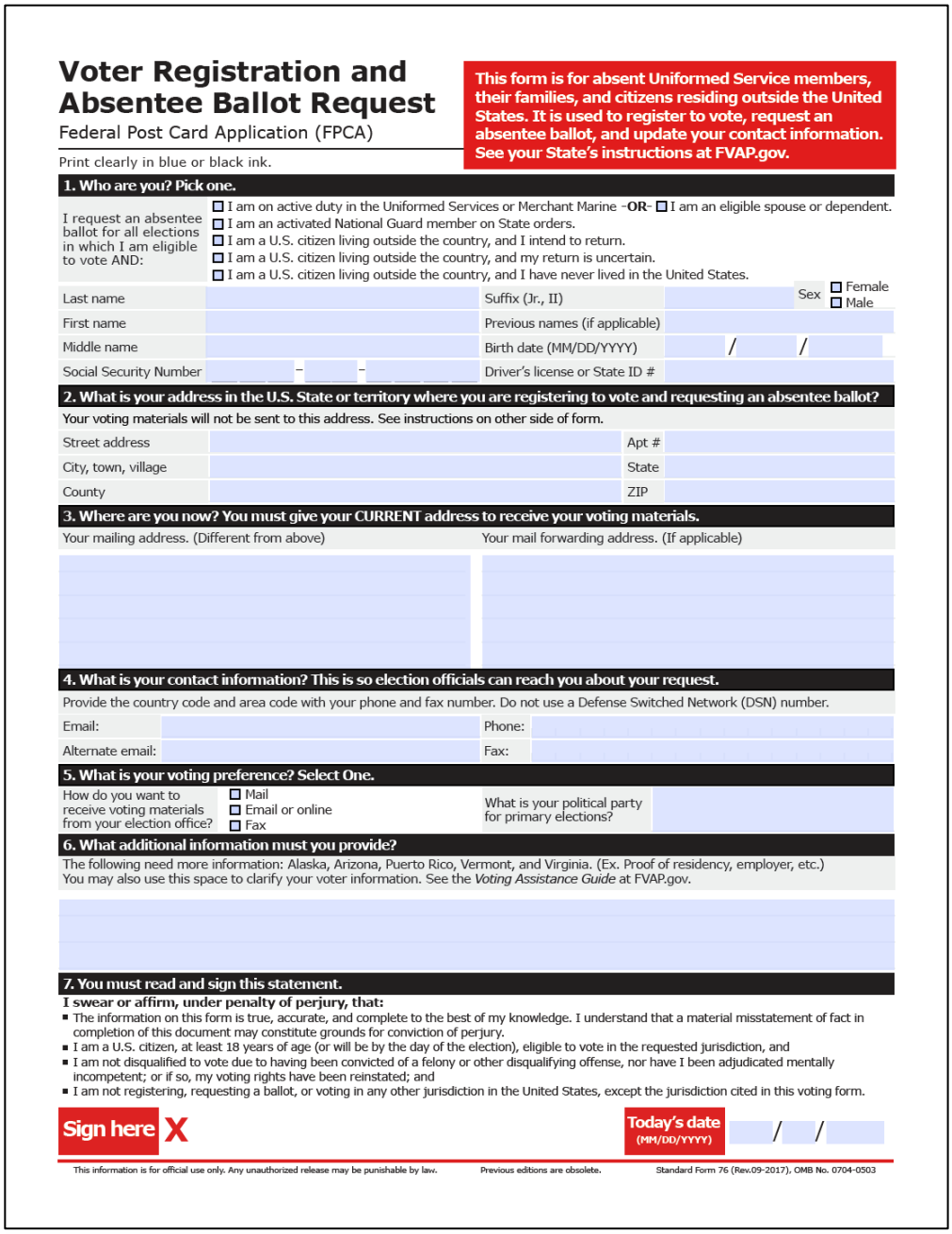
NORTH ↑

If the applicant is unable to sign, who helped the applicant fill out this application? Give name, address and phone number (phone number optional).

D

Mail this application to the address provided for your State.

Figure 1 — National Voter Registration Act (NVRA) form



Voter Registration and Absentee Ballot Request

Federal Post Card Application (FPCA)

This form is for absent Uniformed Service members, their families, and citizens residing outside the United States. It is used to register to vote, request an absentee ballot, and update your contact information. See your State's instructions at FVAP.gov.

Print clearly in blue or black ink.

1. Who are you? Pick one.

I request an absentee ballot for all elections in which I am eligible to vote AND:

- ☐ I am on active duty in the Uniformed Services or Merchant Marine -**OR**- ☐ I am an eligible spouse or dependent.
- ☐ I am an activated National Guard member on State orders.
- ☐ I am a U.S. citizen living outside the country, and I intend to return.
- ☐ I am a U.S. citizen living outside the country, and my return is uncertain.
- ☐ I am a U.S. citizen living outside the country, and I have never lived in the United States.

Last name		Suffix (Jr., II)		Sex	☐ Female ☐ Male
First name		Previous names (if applicable)			
Middle name		Birth date (MM/DD/YYYY)	/ /		
Social Security Number	– –	Driver's license or State ID #			

2. What is your address in the U.S. State or territory where you are registering to vote and requesting an absentee ballot?

Your voting materials will not be sent to this address. See instructions on other side of form.

Street address		Apt #	
City, town, village		State	
County		ZIP	

3. Where are you now? You must give your CURRENT address to receive your voting materials.

Your mailing address. (Different from above)	Your mail forwarding address. (If applicable)

4. What is your contact information? This is so election officials can reach you about your request.

Provide the country code and area code with your phone and fax number. Do not use a Defense Switched Network (DSN) number.

Email:		Phone:	
Alternate email:		Fax:	

5. What is your voting preference? Select One.

How do you want to receive voting materials from your election office?

- ☐ Mail
- ☐ Email or online
- ☐ Fax

What is your political party for primary elections?

6. What additional information must you provide?

The following need more information: Alaska, Arizona, Puerto Rico, Vermont, and Virginia. (Ex. Proof of residency, employer, etc.)
You may also use this space to clarify your voter information. See the *Voting Assistance Guide* at FVAP.gov.

7. You must read and sign this statement.

I swear or affirm, under penalty of perjury, that:

- The information on this form is true, accurate, and complete to the best of my knowledge. I understand that a material misstatement of fact in completion of this document may constitute grounds for conviction of perjury.
- I am a U.S. citizen, at least 18 years of age (or will be by the day of the election), eligible to vote in the requested jurisdiction, and
- I am not disqualified to vote due to having been convicted of a felony or other disqualifying offense, nor have I been adjudicated mentally incompetent; or if so, my voting rights have been reinstated; and
- I am not registering, requesting a ballot, or voting in any other jurisdiction in the United States, except the jurisdiction cited in this voting form.

Sign here X **Today's date (MM/DD/YYYY)** / /

This information is for official use only. Any unauthorized release may be punishable by law. Previous editions are obsolete. Standard Form 76 (Rev.09-2017), OMB No. 0704-0503

Figure 2 — Federal Post Card Application (FPCA) form

The forms shown in Figures 1 and 2 are paper-based, whereas states implementing OVR make digital representations of the forms, usually with some state-specific modifications that may request additional data.

2.1 Voter Records Request

The digital NVRA and FPCA forms form the basis for digital OVR registration. The NVRA form is used for U.S. non-military citizen registrations whereas the FPCA form is used by U.S. military, their families, and citizens residing outside the U.S. to register and, if desired, request a ballot at the same time.

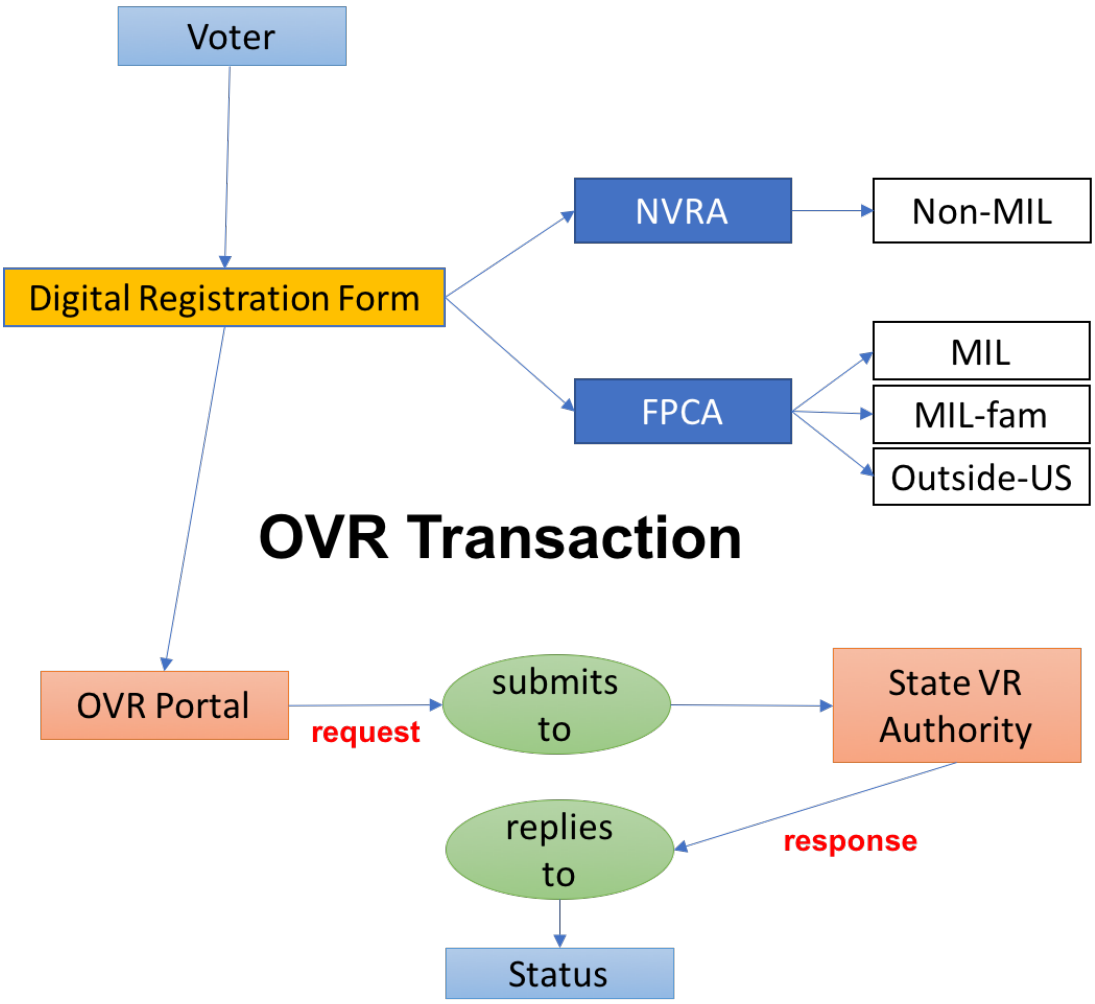


Figure 3 — Voter Registration Use Case

The submission of a digital registration form to a VR authority represents a voter records request. The response transmitted back from the VR authority to the submitter includes a status such as “registration-created” or would indicate an error for reasons including “incomplete” or “ineligible”. The request consists of a registration request, e.g., initial registration, followed by various information about the voter and the submitter of the request.

The use case for the digital OVR request, shown in Figure 3, includes:

- A client IT "OVR submitter",
- A service IT system "VR authority", and
- The submission, a digital NVRA, FPCA, or otherwise state-specific form via transmission from OVR submitter to VR authority.

Currently, VR authorities are typically the back-end components of actual state OVR systems, while submitters include clients of state OVR systems such as the MVA or other clients that are operated by third-party VR organizations and that integrate with OVR systems by sending all or part of an NVRA/FPCA dataset collected by the client from a human registrant.

An OVR transaction, as used in this specification, generally consists of a voter records request followed by a voter records response, although this may vary across U.S. states and territories. The voter records request UML model in Figures 4 and 5 include four types of requests that could be sent from an OVR submitter to a VR system (see the VoterRequestType enumeration in Figure 5):

1. Request a registration for a voter using the digital NVRA or FPCA form.
2. Request a lookup for one or more voter registration records.
3. Request a ballot for one more elections as part of the digital FPCA form, or as part of a state specific digital form.
4. Request a state-specific action for a voter using possibly a state-specific digital form.

The Voter class is the primary class; it contains information about the voter, including name, addresses, party registration, voter's signature, method of contact, etc. If a third-party registration assistant or proxy is being used, the RequestHelper or RequestProxy classes are used to include name and other information generally required by the registration forms.

Both the voter records request and response models contain a class ExternalIdentifier, which is used to associate an identifier with an item. In the case of the request model, it is used optionally to associate an identifier to the political party, and in the response model, to optionally associate identifiers with political geography such as precincts and districts. The enumerations often contain a value called "other", which is to be used when none of the enumeration values apply. Classes that use these enumerations generally contain an OtherType or similarly-named attribute to contain that value. For example, in the ContactMethod class, if none of the enumeration values of ContactMethodType apply, "other" would be used in the Type attribute, and the OtherType attribute would contain the value

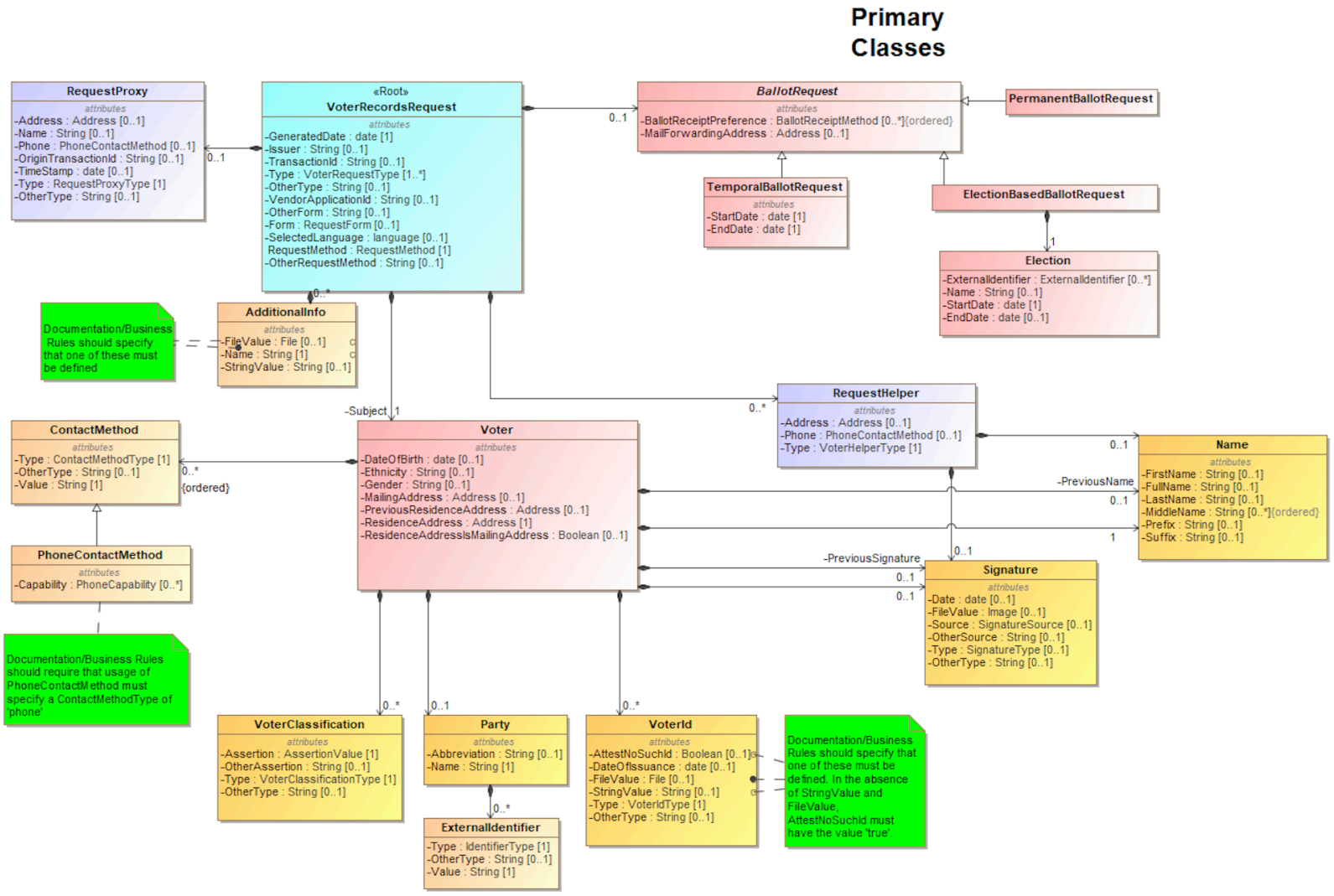


Figure 4 — Voter Records Request UML Class Diagram

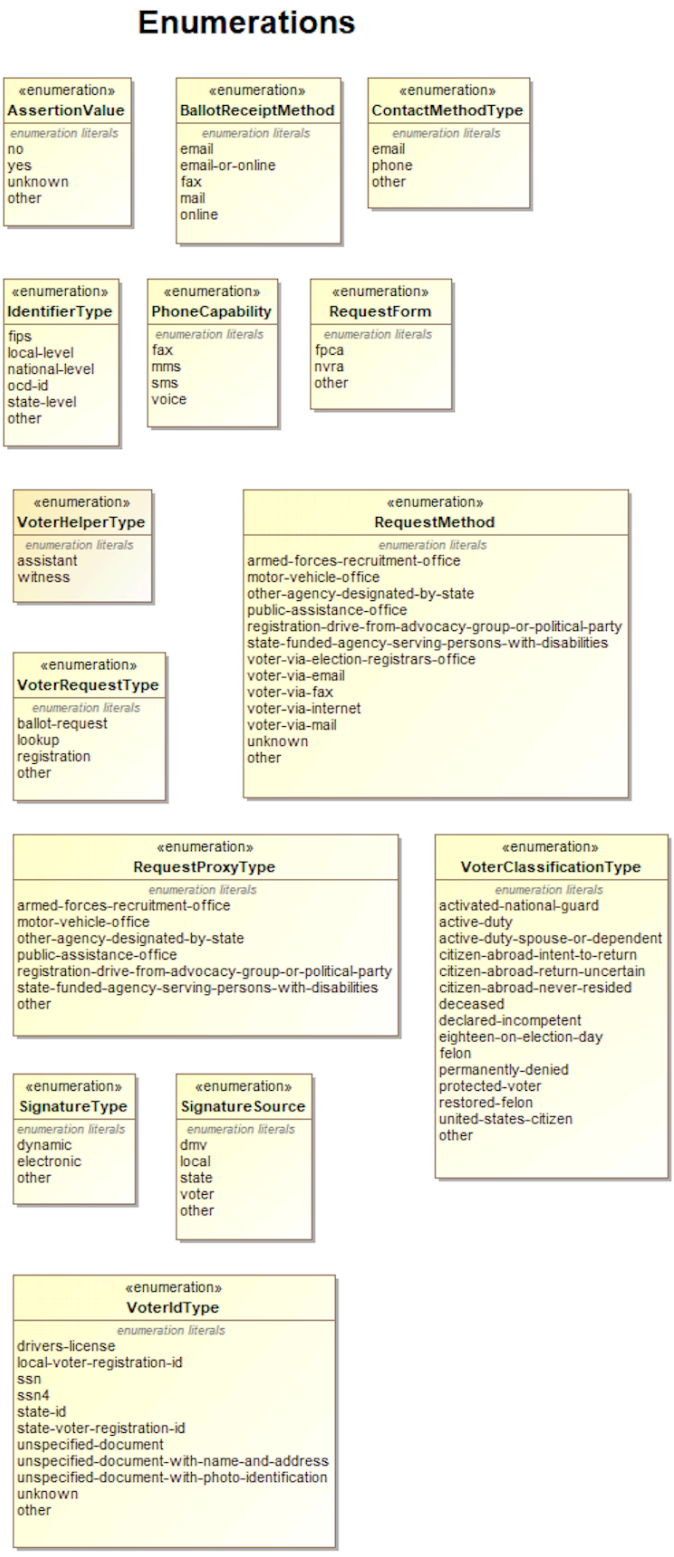


Figure 5 — Voter Records Request UML Enumerations

2.2 Voter Records Response

The voter records response simply returns a response to the voter records request. The UML model is simpler than the request model in that a response generally contains little data other than the results of the request, which are:

1. The registration request was acknowledged, but no further status is available.
2. The registration request was rejected, including a reason(s) for the rejection.
3. The registration request succeeded, including the action(s) taken.

The response model also allows for a set of voter records to be returned, if the request Type was set to lookup.

The UML model in Figure 6 shows the VoterRecordsResponse class, which has four corresponding types of responses. The first, RequestAcknowledgement, represents the typical current practice in online voter registration, where a registration authority operates an online service that receives VR requests and saves them for later processing by local elections offices' staff. In this typical practice, the acceptance of an online VR request is simply an acknowledgement that the request was received without error.

The second type of response, RequestRejection, contains the reason(s) for the error that is causing the rejection as well as any additional details. While the various errors that can occur are beyond the scope of this specification, the RequestError enumeration lists a series of common errors, including:

1. The request is incomplete in some way including incomplete address or name or birthdate or signatures.
2. A lookup of the voter's identity failed.
3. The voter is ineligible to vote.

If none of the errors in the enumeration are appropriate, a different error can be specified in the OtherError attribute.

The third type of response, RequestSuccess, is used for cases where the receiving service is able to process a request to success and notify the sender synchronously. The contents of a RequestSuccess are modeled on the information that becomes available to a newly registered voter as a result of successful registration.

In the UML model, the RequestSuccess class optionally includes these items: voter's assigned polling place and precinct, the location of the local election authority, and a list of districts that the voter resides in. The successful registration also returns the registration action(s) that occurred, which may differ from what was requested. For example, a request for a new voter registration may succeed, but if the voter was already registered, the response may indicate a registration update as opposed to a registration creation.

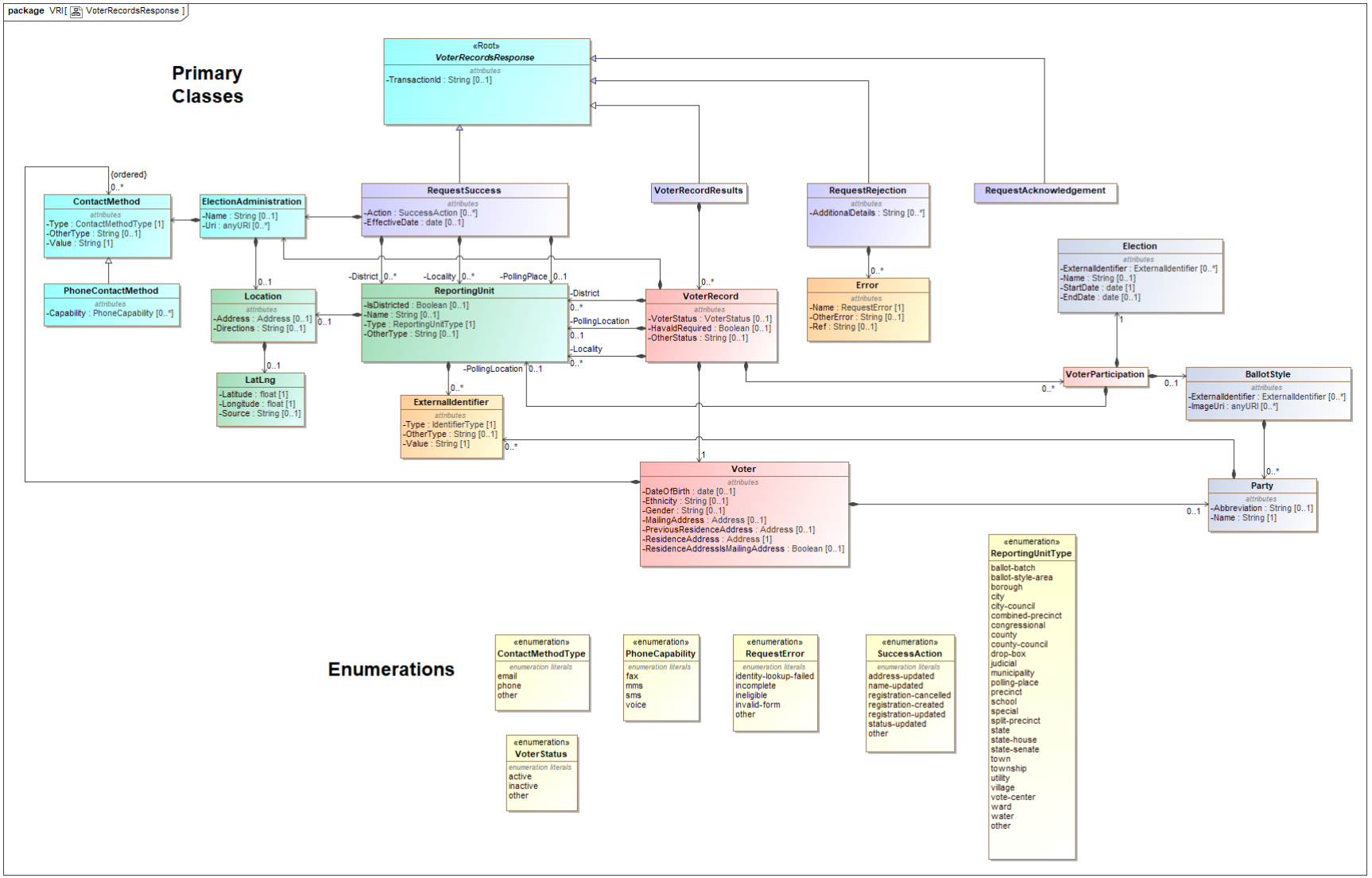


Figure 6 - Voter Records Response UML Class Diagram

The fourth type of response, VoterRecordResults, is used when responding to the specific request of a lookup of one or more voter's records. The contents of VoterRecordResults includes a VoterRecord for each potential match.

Each VoterRecord contains details about the voter's registration and optionally information regarding the voter's election participation history, voter's assigned polling place and precinct, the location of the local election authority, and a list of districts that the voter resides in.

2.3 Including State-specific Request and Response Items

The UML model and associated XML and JSON schemas contain several features to enable state-specific requests and responses. Using these features, it is possible to use this specification as local modifications are needed.

The AdditionalInfo class is used for information not addressed in this schema by other attributes, e.g., state-specific data that does not "fit" in any other attribute. The type of data will thus be highly specific to the generating application, and consuming applications must "know" the meaning of the data to make use of it. Each AdditionalInfo class would contain the name of the data, and then its value, depending on whether the data represents the value directly as a string or represents a file name.

For example, if a state requires its registration form to include the voter's language, it would need to use the AdditionalInfo class to contain a value representing the voter's language. An XML example is as follows, using English as the voter's language:

```
<AdditionalInfo>
   <Name>Language</Name>
   <StringValue>en-US</StringValue>
</AdditionalInfo>
```

The XML and JSON usage examples in Section 4 contain a number of examples showing usage of the AdditionalInfo class. Additionally, each enumeration generally contains an "other" value that can be used when none of the enumeration values are sufficient. If "other" is used as the enumeration value, there is an attribute named OtherType that can be used to hold the other data. For example, a state may wish to implement a specific "address-update" transaction and would thus need to use "other" for the Type attribute in the VoterRecordsRequest class. The OtherType attribute would then contain the type of registration request, i.e., "address-update", e.g. in XML,

```
<VoterRecordsRequest xmlns:xsd="http://www.w3.org/2001/XMLSchema" ... >
   <GeneratedDate>2017-02-10</GeneratedDate>
   <Issuer>Ohio Secretary of State</Issuer>
   <TransactionId>2a642eb5-169e-4a3b-8899-adc7ea6d00d0</TransactionId>
   <Type>other</Type>
   <OtherType>address-update</OtherType>
   ...
```

2.4 Dealing with Addresses — The U.S. Thoroughfare, Landmark, and Postal Address Data Standard

Voter addresses are perhaps the most complex part of a voter registration request or other related data exchanges. As you will see in the examples in this specification, the vast majority of the data in a voter registration request has to do with voter addresses. There are multiple types of voter addresses for VR purposes, e.g.:

- Current registration address,
- Previous registration address,
- Multiple types of addresses for location and mailing purposes, e.g.,
    - Postal mailing address,
    - Structured and unstructured street address,
    - Rural addresses,
    - PO (postal office) box addresses,
    - Military and diplomatic addresses, and
    - Mailing addresses outside the U.S.

Rather than "re-inventing the wheel" by specifying an address format, this specification makes use of an existing XML-based standard for structuring addresses: the U.S. Thoroughfare, Landmark, and Postal Address Data Standard [7] issued by the Federal Geographic Data Committee (FGDC) [9] and covering the complexity of addresses managed by or encountered by organizations and agencies such as the United States Census and USPS (U.S. Postal Service). Use of the FGDC standard greatly simplifies this specification and leaves maintenance of the standard to a more appropriate management body.

A complete overview of the FGDC standard and how to use it is beyond the scope of this specification, and readers and developers are encouraged to refer to the FGDC standard documentation. Briefly, the FGDC standard classifies all U.S. addresses into a simple taxonomy of address classes organized into 4 groups:

1. Thoroughfare Classes — 5 address types,
2. Landmark Classes — 2 address types,
3. Postal Deliver Classes — 3 address types, and
4. General Class — 1 address type.

Altogether, there are a total of 11 address types (most are Thoroughfare types, see section 2.4.1 below). The address types are used, then, for voter addresses in the VRI specification, which includes the following four types of voter addresses:

- ResidenceAddress
- PreviousResidenceAddress,
- MailingAddress, and
- MailForwardingAddress.

To deal with these voter addresses in a consistent manner, the XML and JSON[1] schemas generated from the UML model map the *<Address>* type to one of the 11 different address types in the FGDC schema, as shown in Figure 7. Note that a namespace prefix of *addr* is used for XML types corresponding to the 11 FGDC address types; *addr_type* is also used for other address component types that are defined in a schema included by the FGDC schema (shown in other examples in this specification).

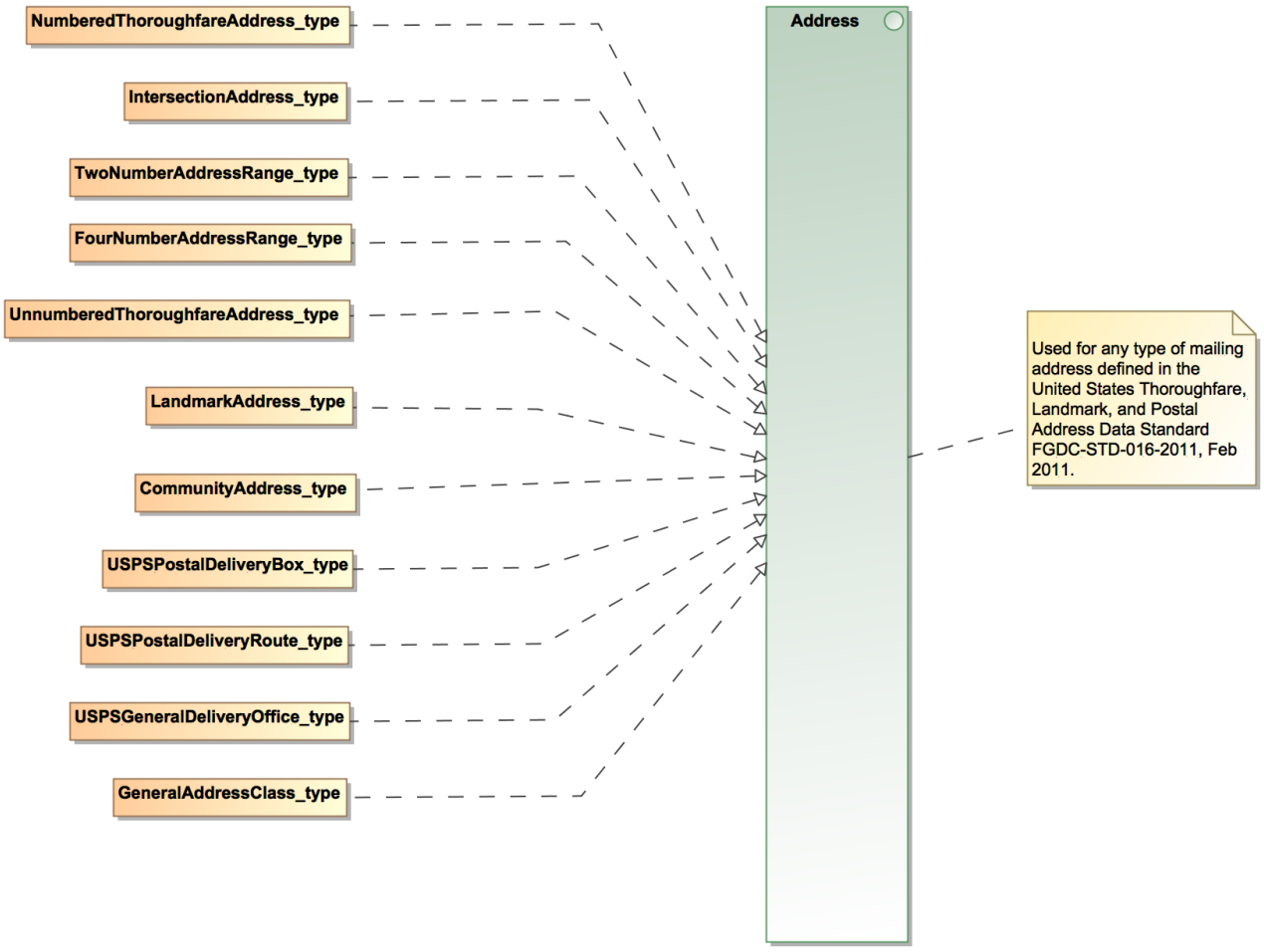


Figure 7 - FGDC Address Types Mapped to Single Address Attribute

2.4.1 Thoroughfare Classes

Most business and residential addresses are Thoroughfare addresses; therefore this class will be used most often. It specifies a location by reference to a thoroughfare, i.e., a road or part of a road or other access route along which a delivery point can be accessed. A thoroughfare is

[1] Because the FGDC standard was written for XML and does not include a JSON schema, NIST created a JSON version from the relevant sections of the FGDC XML schema (see Appendix D for download locations).

typically but not always a road — it may be, for example, a walkway, a railroad, or a river. The thoroughfare address types are:

1. Numbered Thoroughfare Address, e.g., *123 Main Street*.
2. Intersection Address, e.g., *Fifth Avenue and Main Street*.
3. Two Number Address Range, e.g., *405-411 West Green Street*.
4. Four Number Address Range, e.g., *900-962, 901-963 Milton Street*.
5. Unnumbered Thoroughfare Address, e.g., *Forest Service Road 698*.

Of the 5 types listed, *Thoroughfare* Addresses are generally used most often. Unnumbered Thoroughfare Addresses are also used for those areas where no address numbers have been assigned and the addresses often include only the thoroughfare name. A simple XML example showing the Numbered Thoroughfare type used in the *<MailingAddress>* element for "500 W Tuscarawas Ave, Barberton, OH 44203" is as follows:

```
<MailingAddress>
   <NumberedThoroughfareAddress_type>
      <addr:CompleteAddressNumber>
         <addr_type:AddressNumber>500</AddressNumber>
      </addr:CompleteAddressNumber>
      <addr:CompleteStreetName>
         <addr_type:StreetNamePreDirectional>W</StreetNamePreDirectional>
         <addr_type:StreetName>TUSCARAWAS</StreetName>
         <addr_type:StreetNamePostType>AVE</StreetNamePostType>
      </addr:CompleteStreetName>
      <addr_type:CompletePlaceName>
         <PlaceName PlaceNameType="MunicipalJurisdiction">BARBERTON</PlaceName>
      </CompletePlaceName>
      <addr_type:StateName>OH</StateName>
      <addr_type:ZipCode>44203</ZipCode>
   </NumberedThoroughfareAddress_type>
</MailingAddress>
```

2.4.2 Landmark Classes

Landmark addresses specify a location by reference to a named landmark. A landmark is a relatively permanent feature of the manmade landscape that has recognizable identity within a particular cultural context, e.g., a large statue or structure such as an apartment complex. The landmark address types are:

- Landmark Address, e.g., *Statue of Liberty*.
- Community Address, e.g., *123 Urbanizacion Los Olmos, Ponce, PR 00731-1235*.

2.4.3 Postal Delivery Classes

Postal delivery addresses specify points of postal delivery that have no definite relation to the location of the recipient, such as a post office box, rural route box, overseas military address, or general delivery office. The USPS specifies each class in detail in USPS Publication 28[10]. The postal delivery types are:

- USPS Postal Delivery Box, e.g., *PO Box 16953*.
- USPS Postal Delivery Route, e.g., *RR 1, Box 100*.
- USPS General Delivery Office, e.g., *General Delivery*.

2.4.4 General Address Class and Handling Non-U.S. Addresses

The general address class provides a "catch-all" way to handle addresses, including non-U.S. addresses. The general address class may include addresses from any or all of the other classes, or addresses whose class is unknown or whose syntax does not conform to any of the thoroughfare, landmark, and postal classes. Although the scope of the FGCD standard is restricted to U.S. addresses, this class was included to facilitate reconciliation with address standards of other nations and to accommodate files that mix addresses from the U.S. and other countries.

There are three types mapped to this class:

- The complete address as a single unparsed string of text, e.g., *PO Box 1511, Ames, IA 50010*.
- The complete address with place, state and zip code parsed out to a single field, e.g., *PO Box 1511; Place State ZIP = Ames, IA 50010*.
- The complete address with place, state, zip code, zip plus 4, and country name are parsed out to separate fields, e.g., *PO Box 1511; Complete Place Name = Ames; State Name = IA; Zip Code = 50010*; *Country Name = USA*

ISO 3166-1 [12] country codes is favored for country names, e.g., *USA* for United States, *MEX* for Mexico, *GBR* for United Kingdom.

A simple XML example for *"PO Box 1511, Ames, IA 50010-4231, USA"* in which the address components are structured to the extent possible is as follows:

```
<MailingAddress>
   <GeneralAddressClass>
      <addr_type:DeliveryAddress>PO Box 1511</DeliveryAddress>
      <addr_type:CompletePlaceName>
         <addr_type:PlaceName>Ames</PlaceName>
      </CompletePlaceName>
      <addr_type:StateName>IA</StateName>
      <addr_type:ZipCode>50010</ZipCode>
```

```
      <addr_type:ZipPlus4>4231</ZipPlus4>
      <CountryName>USA</CountryName>
   </GeneralAddressClass>
</MailingAddress>
```

For non-U.S. or overseas addresses, it may or may not be practical or possible to structure the address similarly. A simple XML example is as follows for *"33, boulevard du Port, F 95510 Cergy-Pontoise cedex, France"*:

```
<MailingAddress>
   <GeneralAddressClass> Cergy-Pontoise University, 33, boulevard du Port, F 95510
    Cergy-Pontoise cedex, France</GeneralAddressClass>
</MailingAddress>
```

The entire address is contained in an unstructured string, however it is possible to specify it with more structure, as follows:

```
<MailingAddress>
   <GeneralAddressClass>
      <DeliveryAddress>33, boulevard du Port</DeliveryAddress>
      <CompletePlaceName>
         <PlaceName>Cergy-Pontoise cedex</PlaceName>
      </CompletePlaceName>
      <ZipCode>F 95510</ZipCode>
      <CountryName>FRA</CountryName>
   </GeneralAddressClass>
</MailingAddress>
```

For additional usage information, the FGDC standard documentation should be consulted [6].

3 Voter Records Interchange UML Model Documentation

This section contains documentation for each of the UML classes, attributes, and enumerations. Curly braces around an attribute indicate that the attribute is a reference to an instance of an associated class. For example, the attribute {GpUnit} is a reference to an instance of the GpUnit class.

3.1 Class AdditionalInfo

Used in request messages for specifying information not addressed in this model by other attributes, e.g. state-specific information that does not "fit" in any other attribute. The information will thus be highly specific to the generating application, and consuming applications must "know" the meaning of the information to make use of it. For this reason, use of this class is discouraged as much as is possible.

The StringValue and FileValue attributes are both optional, however exactly one of them must be included.

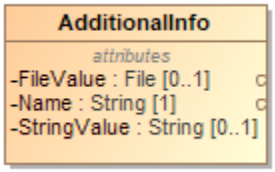


Figure 8 – AdditionalInfo

Attribute	Multiplicity	Type	Attribute Description
FileValue	0..1	File	Used if the value is in a file; contains the filename and MIME (Multipurpose Internet Mail Extension) type
Name	1	String	Name of the value.
StringValue	0..1	String	Used if the value is a string; contains the string.

3.2 Class BallotRequest

An abstract class, used in request messages for a request for a ballot. Classes for specific types of BallotRequest inherit the attributes and define their own.

Figure 9 — BallotRequest

Attribute	Multiplicity	Type	Attribute Description
BallotReceiptPreference	0..*	BallotReceiptMethod	The voter's preference on how to receive their ballot in order from their most preferred method to least. If omitted, the default method for the form will be used.
MailForwardingAddress	0..1	Address	

3.3 Class BallotStyle

Used in response messages for referencing a ballot style defined elsewhere, such as in an Election Management System (EMS).

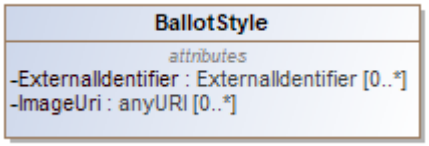


Figure 10 — BallotStyle

Attribute	Multiplicity	Type	Attribute Description
`ExternalIdentifier`	0..*	`ExternalIdentifier`	For associating an ID with the ballot style.
`ImageUri`	0..*	`anyURI`	URI (Uniform Resource Identifier) for a ballot image.
`{Party}`	0..*	`Party`	For associating one or more parties with the ballot style.

3.4 Class ContactMethod

Used in request and response messages in three ways:

1. ElectionAdministration optionally includes this class to specify how to contact the election administration.
2. Voter optionally includes this class to specify the method for contacting a voter regarding the voter's request. If the voter can be contacted in multiple ways, the application creating the data should order the occurrences of ContactMethod by priority.
3. The PhoneContactMethod class uses ContactMethod as a base class, and should be used with when the contact method is for a telephone and it is necessary to describe the capabilities of the telephone.

The Capability attribute is provided by the PhoneContactMethod class.

Figure 11 – ContactMethod

Attribute	Multiplicity	Type	Attribute Description
Type	1	ContactMethodType	The contact method type, e.g. email or phone.
OtherType	0..1	String	Used if ContactMethodType value is other.
Value	1	String	The value of the ContactMethod. This will be the text value of the phone number, email address, or other mechanism. The values must be free of any formatting characters, such as parentheses or dashes for a phone number.

3.5 Class Election

Used in request and response messages to describe an election event. Only the date of the election is required. Other attributes may be used to describe the election for which a ballot is requested or a voter participated.

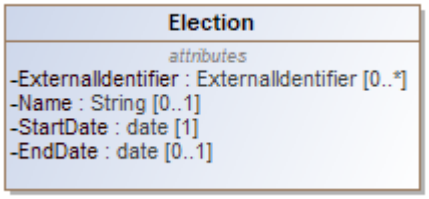


Figure 12 — Election

Attribute	Multiplicity	Type	Attribute Description
`ExternalIdentifier`	0..*	`ExternalIdentifier`	For associating an ID with the election.
`Name`	0..1	`String`	For including a name for the election; the name could be the same name as appears on the ballot.
`StartDate`	1	`date`	The first day of the election.
`EndDate`	0..1	`date`	For an election that spans multiple days, the last day of the election.

3.6 Class ElectionAdministration

Used in response messages; ElectionAdministration optionally includes ContactMethod to specify contact information for the election authority.

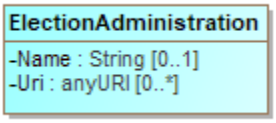


Figure 13 — ElectionAdministration

Attribute	Multiplicity	Type	Attribute Description
{ContactMethod}	0..*	ContactMethod	For including various contact information.
{Location}	0..1	Location	Location of the election authority.
Name	0..1	String	Name of the election authority.
Uri	0..*	anyURI	A URL for the election authority.

3.7 Class ElectionBasedBallotRequest

Used in request messages as an implementation of BallotRequest in which a ballot for a single election event is requested.

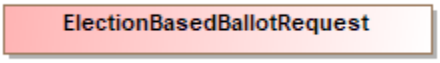


Figure 14 — ElectionBasedRequest

Attribute	Multiplicity	Type	Attribute Description
{Election}	1	Election	The election for which the ballot is requested.

3.8 Class Error

Used in response messages; RequestRejection includes this class to describe the errors that caused the rejection.

Figure 15 — Error

Attribute	Multiplicity	Type	Attribute Description
Name	1	RequestError	Used to indicate the type of error.
OtherError	0..1	String	Used when Name value is other.
Ref	0..1	String	Reference (e.g. Xpath) to the entity that the error applies.

3.9 Class ExternalIdentifier

Used in request and response messages by BallotStyle, Election, Party and ReportingUnit, which optionally include this class for associating a jurisdiction's codes, i.e., identifiers, with political parties or geopolitical units such as counties, towns, precincts, etc. Multiple occurrences of ExternalIdentifier can be used to associate multiple codes, e.g., if there is a desire to associate multiple codes with an object such as state-specific codes as well as OCD-IDs (Open Civic Data Identifiers) [11].

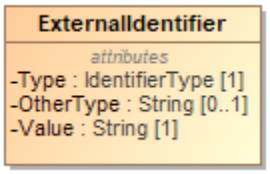


Figure 16 — ExternalIdentifier

Attribute	Multiplicity	Type	Attribute Description
Type	1	IdentifierType	An identifier type, e.g., FIPS.
OtherType	0..1	String	Used when Type value is other.
Value	1	String	The identifier used by the jurisdiction.

3.10 Class File

Used in request and response messages; VoterId optionally uses this class for FileValue to specify a filename for voter identification purposes such as for a utility bill. AdditionalInfo also optionally includes FileValue.

File extends the xsd:base64Binary type to add the attributes for filename and (Multi-Purpose Internet Mail Extensions) MIME type, e.g., application/pdf for a file of type PDF.

The Image element uses this class as a base class, thus Image can be used when the type of file is for an image, e.g., image/png.

Figure 17 — File

Attribute	Multiplicity	Type	Attribute Description
Data	1	base64Binary	The file content encoded using base64.
FileName	0..1	String	The filename.
MimeType	0..1	String	The MIME type associated with the file.

3.11 Class Image

Used in request and response messages; Signature optionally includes this class to indicate that a file contains an image of a voter's signature. Image uses File as a base class, thus attributes of File can be included in Image.

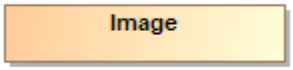


Figure 18 — Image

3.12 Class LatLng

Used in response messages by Location, which optionally includes this element to specify the latitude and longitude of a voter's voting location.

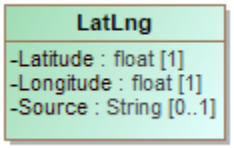


Figure 19 — LatLng

Attribute	Multiplicity	Type	Attribute Description
`Latitude`	1	`float`	Latitude of the location.
`Longitude`	1	`float`	Longitude of the location.
`Source`	0..1	`String`	System used to perform the lookup from location name to lat/lng, e.g., the name of a geocoding service.

3.13 Class Location

Used in response messages by ElectionAdministration and ReportingUnit, which optionally include this element to specify the address and directions to a voter's voting location. The LatLng element can be included to specify the latitude and longitude of the voting location.

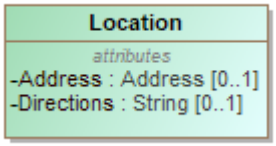


Figure 20 — Location

Attribute	Multiplicity	Type	Attribute Description
Address	0..1	Address	Address of the voting location.
Directions	0..1	String	Directions to the voting location.
{LatLng}	0..1	LatLng	Latitude/longitude of the voting location.

3.14 Class Name

Used in request and response messages; Voter includes this class for specifying the name of a voter and, optionally, for specifying a previous name of the voter, using PreviousName instead of Name. RequestHelper also includes this class for specifying the name of a request helper.

Multiple occurrences of the MiddleName attribute can be used as needed, e.g., for names with additional middle names or nicknames such as “John Andrew Winston (Jack) Smith”.

All elements are optional, however at least FullName must be included if the other attributes are not.

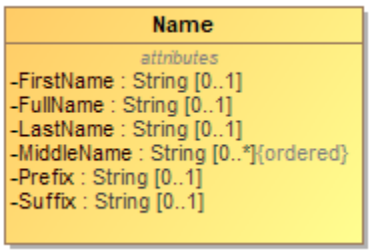


Figure 21 — Name

Attribute	Multiplicity	Type	Attribute Description
FirstName	0..1	String	Person’s first (given) name.
FullName	0..1	String	Person’s full name.
LastName	0..1	String	Person’s last (family) name.
MiddleName	0..*	String	Person’s middle name.
Prefix	0..1	String	A prefix associated with the person, e.g., Mr.
Suffix	0..1	String	A suffix associated with the person, e.g., Jr.

3.15 Class Party

Used in request and response messages by BallotStyle, which optionally includes this type to specify the associated political party such as for closed primaries, and by Voter, which optionally includes this type to specify a voter's political party.

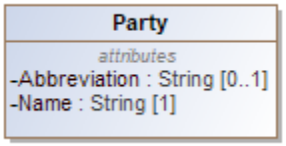


Figure 22 — Party

Attribute	Multiplicity	Type	Attribute Description
Abbreviation	0..1	String	Short name for the party, e.g., "DEM".
{ExternalIdentifier}	0..*	ExternalIdentifier	For associating an ID with the party.
Name	1	String	Official full name of the party, e.g., "Republican".

3.16 Class PermanentBallotRequest

Used in request messages as a subtype of BallotRequest, which serves to request ballots for election events that the voter is qualified on a long term basis. Although “permanent”, the request may be subject to renewal or cancellation procedures.

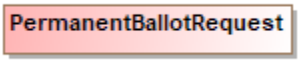


Figure 23 — PermanentBallotRequest

3.17 Class PhoneContactMethod

Used in request and response messages; RequestHelper, and RequestProxy use this class to specify a telephone number as well as the capabilities of the telephone, e.g., sms, fax, etc.

PhoneContactMethod is subtype of ContactMethod. Thus, the elements that include ContactMethod could use PhoneContactMethod as applicable.

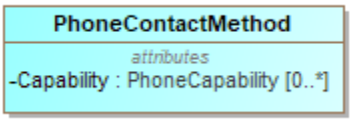


Figure 24 — PhoneContactMethod

Attribute	Multiplicity	Type	Attribute Description
Capability	0..*	PhoneCapability	Specifies the phone's capabilities, e.g., fax, sms.

3.18 Class ReportingUnit

Used in response messages; RequestSuccess and VoterRecord include this class so as to provide a list of geopolitical geography associated with the voter's registration, e.g., the voter's precinct, polling place, districts, etc. VoterParticipation optionally includes this class to specify the polling place used by the voter. The Type attribute uses the ReportingUnitType enumeration to specify the type of geopolitical geography being defined. If the reporting unit type is not listed in enumeration ReportingUnitType, use "other" and include the reporting unit type (that is not listed in the enumeration) in OtherType.

The IsDistricted boolean is not strictly necessary, as it is possible to identify districts by their Type attribute. However, if the type of district is not listed in the ReportingUnitType enumeration and therefore OtherType is used, then IsDistricted is necessary. The IsDistricted boolean can also be used to signify that a ReportingUnit defined as a jurisdiction, e.g., a county, is also used as a district for, e.g., county-wide contests.

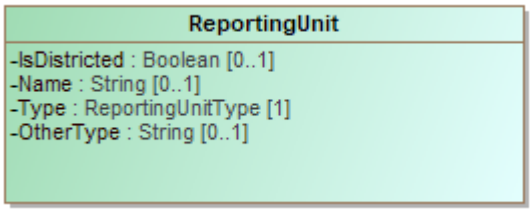


Figure 25 — ReportingUnit

Attribute	Multiplicity	Type	Attribute Description
{ExternalIdentifier}	0..*	ExternalIdentifier	For associating an ID with the ReportingUnit.
IsDistricted	0..1	Boolean	Boolean to indicate that the reporting unit is a district.
{Location}	0..1	Location	Location of the district office.
Name	0..1	String	Name of the reporting unit.
Type	1	ReportingUnitType	Enumerated type of reporting unit, e.g., district, precinct.
OtherType	0..1	String	Used when Type value is other.

3.19 Class RequestAcknowledgement

Used in response messages for indicating that the request was received but action on the request is pending.

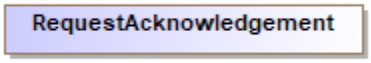


Figure 26 — RequestAcknowledgement

3.20 Class RequestHelper

Used in request messages; VoterRecordsRequest optionally includes this element to specify information about a request helper, i.e., a request assistant or witness involved in a voter's request.

RequestHelper optionally includes the Name element to specify the registration helper's name and optionally includes the Signature element if a registration helper's signature is required.

Figure 27 — RequestHelper

Attribute	Multiplicity	Type	Attribute Description
Address	0..1	Address	Address of the request helper.
{Name}	0..1	Name	To specify the name of the helper.
Phone	0..1	PhoneContactMethod	Request helper's phone number.
{Signature}	0..1	Signature	To specify the signature of the helper.
Type	1	VoterHelperType	To specify the type of helper, e.g., assistant.

3.21 Class RequestProxy

Used in request messages; VoterRecordsRequest optionally includes this class to specify information about a request proxy involved in a voter records request. OriginTransactionId can be used to include an optional identifier of the originating external transaction from the proxy, e.g., used for the transaction ID generated by a MVA application enacting a voter registration request to a registration portal application (on behalf of a citizen obtaining a driver's license).

This sub-element is not to be confused with TransactionId in VoterRecordsRequest, which is used to include a transaction ID of the voter records request, e.g., the transaction ID of the registration portal's voter records request.

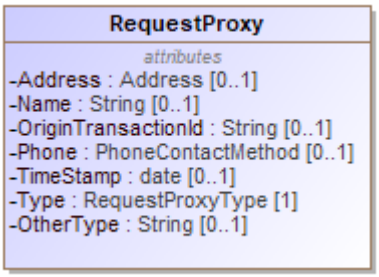


Figure 28 — RequestProxy

Attribute	Multiplicity	Type	Attribute Description
Address	0..1	Address	An address associated with the proxy.
Name	0..1	String	A name associated with the proxy.
OriginTransactionId	0..1	String	An identifier associated with the transaction between the proxy and, e.g., the registration portal.
Phone	0..1	PhoneContactMethod	A phone number associated with the proxy.
TimeStamp	0..1	date	The date of the request from the proxy.
Type	1	RequestProxyType	The type of the requesting proxy, e.g., motor-vehicle-office, voter-via-email.
OtherType	0..1	String	Used when OtherType value is other.

3.22 Class RequestRejection

Used in response messages for indicating that the request failed. The Error attribute is used to indicate the type of error that occurred. The AdditionalDetails attribute can be used to provide more information as to the rejection.

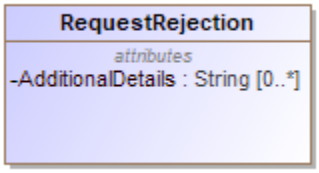


Figure 29 — RequestRejection

Attribute	Multiplicity	Type	Attribute Description
AdditionalDetails	0..*	String	Used to provide additional details as applicable.
{Error}	0..*	Error	For associating a RequestRejection with one or more Error.

3.23 Class RequestSuccess

Used in response messages for indicating a successful response to a request. The Action attribute is used to indicate the action that occurred, which may differ from what was requested. For example, a request for a new voter registration may succeed, but if the voter was already registered, the response may indicate a registration update as opposed to a registration create.

The response also includes, optionally, other information useful to the voter, including a description of the voter's polling place, districts (i.e., contests) associated with the polling place, or other geopolitical geographies such as the voter's precinct.

Figure 30 — RequestSuccess

Attribute	Multiplicity	Type	Attribute Description
Action	0..*	SuccessAction	Used to indicate the action that occurred.
{District}	0..*	ReportingUnit	One or more districts associated with the voter's precinct.
EffectiveDate	0..1	date	The effective date of the action.
{ElectionAdministration}	0..1	ElectionAdministration	The election administration that conducts elections for the voter.
{Locality}	0..*	ReportingUnit	Other geographies such as the voter's precinct.
{PollingPlace}	0..1	ReportingUnit	The voter's polling place.

3.24 Class Signature

Used in request and response messages; Voter optionally includes this class for specifying information about a voter's signature on a registration request. If there is a need to include previous signature that uses a different name, e.g., a maiden name, Voter uses PreviousSignature instead of Signature.

RequestHelper optionally includes this class for specifying information about the helper's signature.

Source is used to specify the source of the voter's signature, for example, on file at a motor vehicles administration. FileValue is used to include an image of the voter's signature.

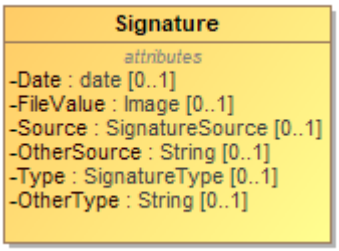


Figure 31 — Signature

Attribute	Multiplicity	Type	Attribute Description
Date	0..1	date	The date of the signature, i.e., when created.
FileValue	0..1	Image	The signature image in base 64 binary.
Source	0..1	SignatureSource	A source for the signature, e.g., MVA.
OtherSource	0..1	String	Used when Source value is other.
Type	0..1	SignatureType	A signature type, e.g., dynamic.
OtherType	0..1	String	Used when Type value is other.

3.25 Class TemporalBallotRequest

Used in request messages as a subtype of BallotRequest in which election opportunities for which the voter is qualified during a given time frame may be requested.

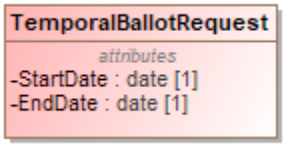


Figure 32 — TemporalBallotRequest

Attribute	Multiplicity	Type	Attribute Description
StartDate	1	date	The date at which the request comes into effect.
EndDate	1	date	The date at which the request is no longer effective.

3.26 Class Voter

Used in request and response messages to contain attributes specific to identifying a voter.

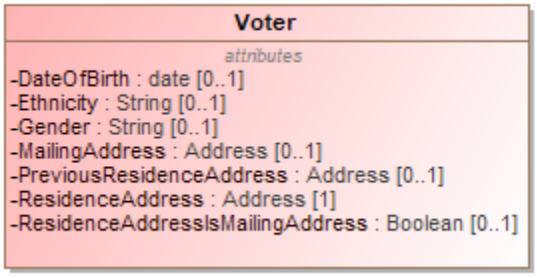


Figure 33 — Voter

Attribute	Multiplicity	Type	Attribute Description
{ContactMethod}	0..*	ContactMethod	How to contact the voter, listed in order of preference.
DateOfBirth	0..1	date	The voter's data of birth in YYYY-MM-DD format.
Ethnicity	0..1	String	The voter's ethnicity.
Gender	0..1	String	Older systems may not understand values other than 'Male' or 'Female' (the only choices available on FPCA).
MailingAddress	0..1	Address	Where the voter receives postal mail, mapped to the FGDC specification Address classes.
{Name}	1	Name	Voter's name.
{Party}	0..1	Party	Voter's political party.
{PreviousName}	0..1	Name	A voter's previous name.
PreviousResidenceAddress	0..1	Address	Where the voter was previously registered, mapped to the FGDC specification Address classes.
{PreviousSignature}	0..1	Signature	Information about a previous voter signature on the registration form.

Attribute	Multiplicity	Type	Attribute Description
ResidenceAddress	1	Address	Where the voter is registered or requests to be registered, mapped to the FGDC specification Address classes.
ResidenceAddressIsMailingAddress	0..1	Boolean	If set to true, MailingAddress need not be included.
{Signature}	0..1	Signature	Information about the voter signature on the registration form.
{VoterClassification}	0..*	VoterClassification	How the voter is classified per assertions the voter has made on a registration form.
{VoterId}	0..*	VoterId	Information to provide voter identity.

3.27 Class VoterClassification

Used in request and response messages; Voter optionally includes this class to describe a voter's classification per criteria on the voter's request form, e.g., united-states-citizen or eighteen-on-election-day.

VoterClassification includes assertions of the voter in response to the voter request form criteria. For example, an assertion of true may be used with a criterion of united-states-citizen. Assertions can be negative, such as providing an assertion of false for a criterion of felon, an assertion of unknown to indicate that the voter does not know whether they meet or do not meet the specific criteria on the form or an assertion of other, in which the assertion is specified by the value of OtherAssertion.

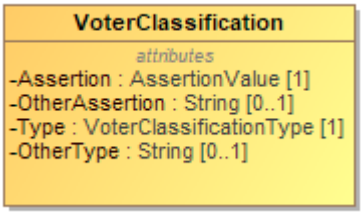


Figure 34 — VoterClassification

Attribute	Multiplicity	Type	Attribute Description
Assertion	1	AssertionValue	A positive, negative, other or unknown assertion
OtherAssertion	0..1	String	A locally defined assertion value.
Type	1	VoterClassificationType	A classification type, e.g., felon.
OtherType	0..1	String	Used when Type value is other.

3.28 Class VoterId

Used in request and response messages to include information about a voter's identification that may be required in a registration request. Voter includes VoterId.

AttestNoSuchId is used to attest that the voter has no ID of a specified type, thus it must be included with a value of true if attesting that the voter has no ID for that specified type. It can be included with a value of false to attest that the voter does have an ID of the specified type, in which case either StringValue or FileValue must be included; however, it is assumed to be false if not included.

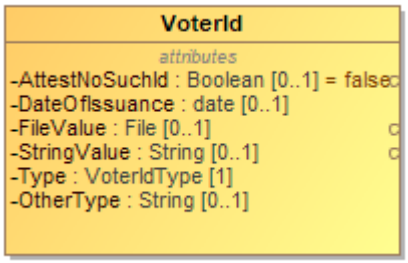


Figure 35 — VoterId

Attribute	Multiplicity	Type	Attribute Description
AttestNoSuchId	0..1	Boolean	Used to attest that the voter has no ID. Assumed to be false if not present.
DateOfIssuance	0..1	date	Date the ID was issued.
FileValue	0..1	File	Used to include a file name for the ID.
StringValue	0..1	String	Used to include the ID as a string.
Type	1	VoterIdType	The type of voter ID.
OtherType	0..1	String	Used when Type value is other.

3.29 Class VoterParticipation

Used in response messages for indicating an election that the voter participated in. Participation does not imply a counted ballot.

Figure 36 — VoterParticipation

Attribute	Multiplicity	Type	Attribute Description
{BallotStyle}	0..1	BallotStyle	For associating the voter participation to a specific ballot style, such to a partisan ballot in a closed primary.
{Election}	1	Election	For associating the voter participation to a specific election event.
{PollingLocation}	0..1	ReportingUnit	The polling place used by the voter.

3.30 Class VoterRecord

Used in response messages to represent a voter record stored in a Voter Registration Database (VRDB). VoterRecord optionally contains additional information useful to the voter, including a description of the voter's polling place, districts associated with the voter's precinct, or other geopolitical geographies such as the voter's precinct.

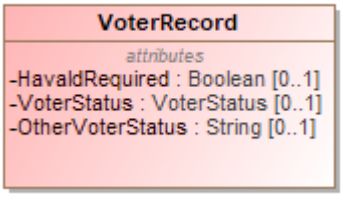


Figure 37 — VoterRecord

Attribute	Multiplicity	Type	Attribute Description
{District}	0..*	ReportingUnit	One or more districts associated with the voter's precinct.
{ElectionAdministration}	0..1	ElectionAdministration	The election administration that conducts elections for the voter.
HavaIdRequired	0..1	Boolean	Indicates that the voter must present identification at the polls per HAVA (Help America Vote Act of 2002).
{Locality}	0..*	ReportingUnit	Other geographies such as the voter's precinct.
{PollingLocation}	0..1	ReportingUnit	The voter's polling place.
{Voter}	1	Voter	For details specific to a particular voter.
{VoterParticipation}	0..*	VoterParticipation	For associating a VoterRecord to elections the voter has participated in.
VoterStatus	0..1	VoterStatus	The status of the VoterRecord, possibly to indicate the ability to receive a regular ballot.
OtherVoterStatus	0..1	String	Used when VoterStatus value is other.

3.31 Class VoterRecordResults

Used in response messages for indicating a successful response to a lookup request.

A lookup for a single voter may result in multiple VoterRecord objects being returned. This can occur if the voter has duplicate records in the VRDB, or if the criteria specified in the lookup request was broad.

Figure 38 — VoterRecordResults

Attribute	Multiplicity	Type	Attribute Description
{VoterRecord}	0..*	VoterRecord	The voter record(s) returned.

3.32 Class VoterRecordsRequest

The root element for request messages, for defining items pertaining to the status and type of the voter records request and when it was generated. VoterRecordsRequest includes the Subject association to specify various information about the voter in question. It includes the BallotRequest association to handle a request for a ballot; this request may be part of an FPCA form registration or may be submitted independently.

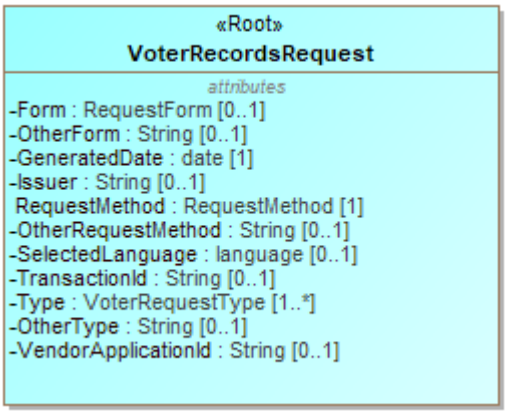


Figure 39 — VoterRecordsRequest

Attribute	Multiplicity	Type	Attribute Description
{AdditionalInfo}	0..*	AdditionalInfo	For including other information not specified by this model.
{BallotRequest}	0..1	BallotRequest	Specifies information relating to a request for a ballot.
Form	0..1	RequestForm	If the request is for a voter registration, the registration form used by the voter.
OtherForm	0..1	String	Used when Form value is other.
GeneratedDate	1	date	The date that the voter records request was generated.
Issuer	0..1	String	The name of the issuer of the voter records request transaction, e.g., State of West Virginia Voter Registration Portal.
{RequestHelper}	0..*	RequestHelper	Included if the registration involves a registration assistant organization.
RequestMethod	1	RequestMethod	The method used by the voter to register.

Attribute	Multiplicity	Type	Attribute Description
OtherRequestMethod	0..1	String	Used when RequestMethod value is other.
{RequestProxy}	0..1	RequestProxy	Included if the registration request is via a proxy, e.g., the MVA.
SelectedLanguage	0..1	language	The language specified by the voter, if any.
{Subject}	1	Voter	Specifies information about the voter who is the subject of the request.
TransactionId	0..1	String	An identifier of the voter records request transaction.
Type	1..*	VoterRequestType	The type of request, e.g., registration.
OtherType	0..1	String	Used when RequestType value is other.
VendorApplicationId	0..1	String	An identifier of the vendor application generating the voter registration request, e.g., X-VRDB Version 3.1.a.

3.33 Class VoterRecordsResponse

The root element for response messages, for defining items pertaining to the status of a response to a voter records request. VoterRecordsResponse is an abstract class with four subtypes that get used according to the type of response:

- RequestAcknowledgement, used to indicate an acknowledgement only.
- VoterRecordResults, used to provide a set of voter records.
- RequestRejection, used to indicate a failure and the type of failure.
- RequestSuccess, used to indication that a successful action occurred and the type of action, which may differ from the type of action requested.

VoterRecordsResponse optionally includes the TransactionId attribute associated with the voter records request.

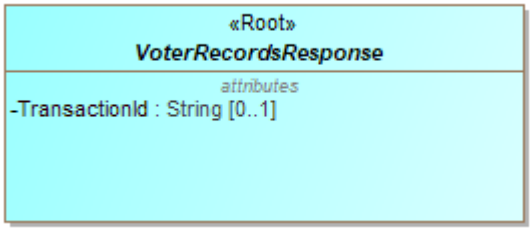


Figure 40 — VoterRecordsResponse

Attribute	Multiplicity	Type	Attribute Description
TransactionId	0..1	String	Transaction ID associated with the voter records request.

3.34 Enumeration AssertionValue

Enumeration for assertions from a voter or a third party, such as a motor vehicles administration (MVA) in response to questions on a registration form, used in the Assertion attribute of VoterClassification. Used in request and response messages.

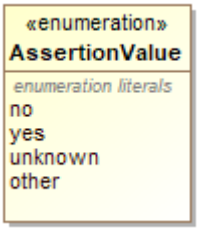


Figure 41 – AssertionValue

Value	Value Description
no	For a voter's or third party's assertion of "no" or "false".
yes	For a voter's or third party's assertion of "yes" or "true".
unknown	For a voter's or third party's assertion of "unknown".
other	For a voter's or third party's assertion of "other".

3.35 Enumeration BallotReceiptMethod

Enumeration for methods for delivering a ballot to the voter, used in the BallotReceiptPreference attribute of BallotRequest. The sub-element may be repeated multiple times with different values as applicable, e.g., to specify both mail and online. Used in request messages.

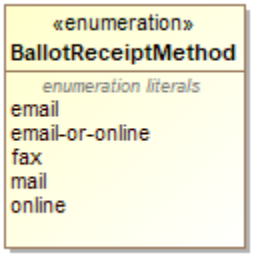


Figure 42 — BallotReceiptMethod

Value	Value Description
`email`	For email only.
`email-or-online`	For electronic mail or downloadable from a website (this value is ambiguous, thus the separate values for email and online).
`fax`	For use of a fax.
`mail`	For postal mail.
`online`	For downloadable from a website, e.g., the voter is sent a hypertext link to a ballot.

3.36 Enumeration ContactMethodType

Enumeration for methods for contacting a voter or an election administration office, used in the Type attribute of ContactMethod. Used in request and response messages.

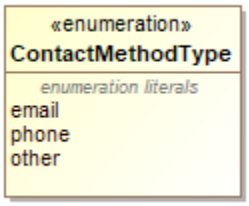


Figure 43 — ContactMethodType

Value	Value Description
email	For electronic mail.
phone	For use of a phone.
other	Used when the type of contact method is not included in this enumeration.

3.37 Enumeration IdentifierType

Enumeration for election data-related codes in the ExternalIdentifier class. Used in request and response messages.

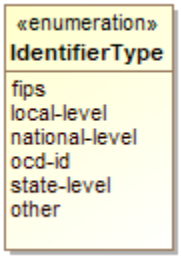


Figure 44 — IdentifierType

Value	Value Description
`fips`	For FIPS codes.
`local-level`	For a code that is specific to a county or other similar locality.
`national-level`	For a code that is used at the national level other than ocd-id.
`ocd-id`	For Open Civic Data identifiers.
`state-level`	For a code that is specific to a state.
`other`	Used when the type of code is not included in this enumeration.

3.38 Enumeration PhoneCapability

Enumeration for telephone capabilities, used in the Capability attribute of PhoneContactMethod. Used in request and response messages.

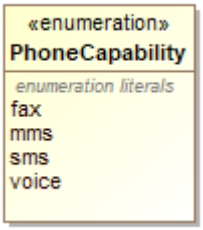


Figure 45 — PhoneCapability

Value	Value Description
`fax`	For telephones that include facsimile capabilities.
`mms`	For telephones that contain Multimedia Messaging Service (MMS) capabilities.
`sms`	For telephones that contain Short Messaging Service (SMS) capabilities.
`voice`	For telephones that contain voice capabilities.

3.39 Enumeration ReportingUnitType

Enumeration for the type of geopolitical unit, used in the Type sub-element in the ReportingUnit element. Used in request and response messages.

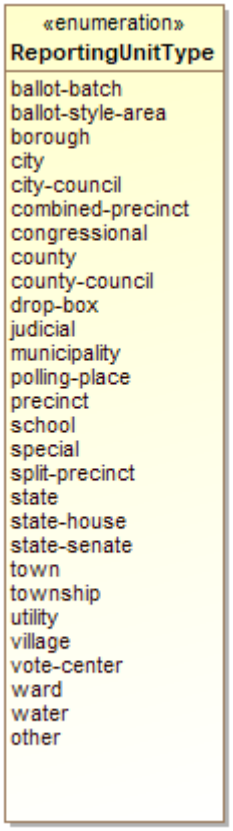


Figure 46 — ReportingUnitType

Value	Value Description
`ballot-batch`	Used for reporting batches of ballots that may cross precinct boundaries.
`ballot-style-area`	Used for ballot style areas generally composed of precincts.
`borough`	Used in CT, NJ, PA, other states, and New York City for boroughs. For AK and LA, see county.
`city`	Used for a city that reports results and/or for the district that encompasses it.
`city-council`	Used for city council districts.

Value	Value Description
combined-precinct	Used for one or more precincts that have been combined for the purposes of reporting. Used for "Ward" if "Ward" is used interchangeably with "CombinedPrecinct".
congressional	Used for U.S. Congressional districts.
county	Used for a county and/or for the district that encompasses it. In AK, used for counties that are called boroughs. In LA, used for parishes.
county-council	Used for county council districts.
drop-box	Used for a dropbox for ballots.
judicial	Used for judicial districts.
municipality	Used as applicable for various units such as towns, townships, villages that report votes and/or for the district that encompasses it.
polling-place	Used for a polling place.
precinct	Used also for "Ward" or "District" when these terms are used interchangeably with "Precinct".
school	Used for a school district.
special	Used for a special district.
split-precinct	Used for splits of precincts.
state	Used for a state and/or for the district that encompasses it.
state-house	Used for a state house or assembly district.
state-senate	Used for a state senate district.
town	Used in some New England states as a type of municipality that reports votes and/or for the district that encompasses it.
township	Used in some mid-western states as a type of municipality that reports votes and/or for the district that encompasses it.
utility	Used for a utility district.
village	Used as a type of municipality that reports votes and/or for the district that encompasses it.
vote-center	Used for a vote center.
ward	Used for combinations or groupings of precincts or other units.
water	Used for a water district.
other	Used for other types of reporting units not included in this enumeration.

3.40 Enumeration RequestError

Enumeration for registration-related errors, used in the Name attribute of RequestRejection. Used in response messages.

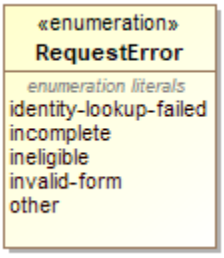


Figure 47 — RequestError

Value	Value Description
`identity-lookup-failed`	A lookup on the voter's identity failed.
`incomplete`	The registration request is incomplete.
`ineligible`	The voter is ineligible to be registered.
`invalid-form`	The registration form specified is invalid.
`other`	Used when the type of error is not included in this enumeration.

3.41 Enumeration RequestForm

Enumeration for types of registration forms, used in the Form attribute of VoterRecordsRequest. Used in request messages.

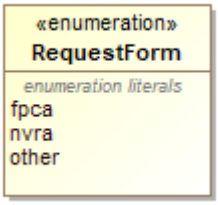


Figure 48 — RequestForm

Value	Value Description
fpca	For the Federal Post Card Application form.
nvra	For the National Voter Registration Act form.
other	Used when the type of form is not included in this enumeration.

3.42 Enumeration RequestMethod

Enumeration for the method used by the voter to register, used in the RequestMethod attribute of VoterRecordsRequest. Used in request messages.

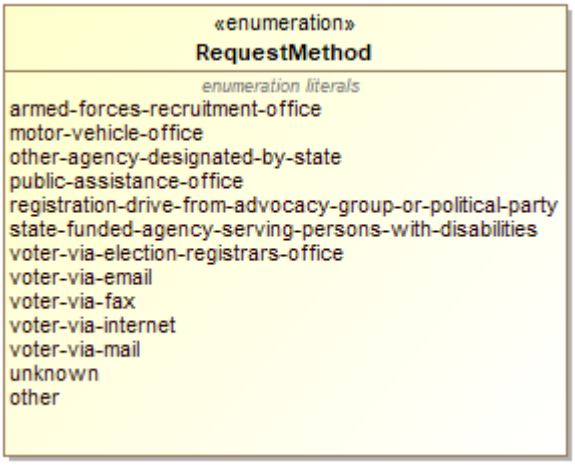


Figure 49 — RequestMethod

Value	Value Description
armed-forces-recruitment-office	The voter assisted by an armed forces recruitment office.
motor-vehicle-office	The voter via an MVA.
other-agency-designated-by-state	The voter assisted by an unspecified state-designated agency.
public-assistance-office	The voter assisted by a public assistance office.
registration-drive-from-advocacy-group-or-political-party	The voter via a registration drive.
state-funded-agency-serving-persons-with-disabilities	The voter assisted by a state-designated agency serving persons with disabilities.
voter-via-election-registrars-office	The voter via an election or registrar's office.
voter-via-email	The voter via email.
voter-via-fax	The voter via fax.
voter-via-internet	The voter via the Internet, e.g., a website.
voter-via-mail	The voter via postal mail.
unknown	The method used is unknown.

Value	Value Description
other	Used when the type of method is not included in this enumeration.

3.43 Enumeration RequestProxyType

Enumeration for the registration proxy, e.g., the MVA, involved in the voter's registration request, used in the Type attribute of RequestProxy. Used in request messages.

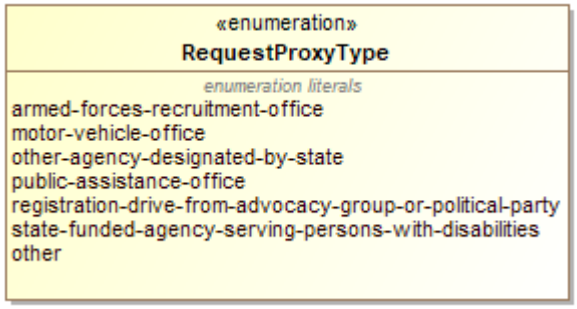


Figure 50 — RequestProxyType

Value	Value Description
`armed-forces-recruitment-office`	The voter assisted by an armed forces recruitment office.
`motor-vehicle-office`	The voter via an MVA.
`other-agency-designated-by-state`	The voter assisted by an unspecified state-designated agency.
`public-assistance-office`	The voter assisted by a public assistance office.
`registration-drive-from-advocacy-group-or-political-party`	The voter via a registration drive.
`state-funded-agency-serving-persons-with-disabilities`	The voter assisted by a state-designated agency serving persons with disabilities.
`other`	Used when the type of source is not included in this enumeration.

3.44 Enumeration SignatureSource

Enumeration for source of the voter's signature, used in the Source sub-element of Signature. Used in request and response messages.

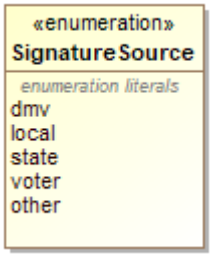


Figure 51 — SignatureSource

Value	Value Description
dmv	For the department of motor vehicles or motor vehicle administration.
local	For an unspecified local source.
state	For an unspecified state source.
voter	The voter has included a signature on the form.
other	Used when the source of the signature is not included in this enumeration.

3.45 Enumeration SignatureType

Enumeration for the type of voter signature, used in the Type sub-element of Signature. Used in request and response messages.

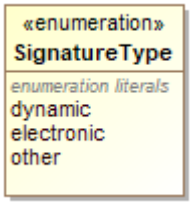


Figure 52 — SignatureType

Value	Value Description
`dynamic`	For use with biometrics or other artifacts captured as part of the act of the voter signing the registration form.
`electronic`	For a facsimile of the signature applied to a marking surface, e.g., paper.
`other`	Used when the type of signature is not included in this enumeration.

3.46 Enumeration SuccessAction

Enumeration for a response to a voter records request, indicating that the response to the request is successful and the action that occurred, used in the Action sub-element of RequestSuccess. The success action may not necessarily match the requested action. Used in response messages.

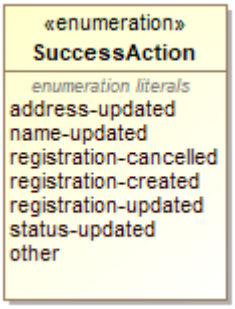


Figure 53 — SuccessAction

Value	Value Description
address-updated	For indicating that an address was updated.
name-updated	For indicating that a name was updated.
registration-cancelled	For indicating that a registration was cancelled.
registration-created	For indicating that a registration was created.
registration-updated	For indicating that a registration was updated.
status-updated	For indicating that a registration status was updated.
other	Used for other types of success actions not included in this enumeration.

3.47 Enumeration VoterClassificationType

Enumeration for voter status classifications, used in the Type attribute of VoterClassification. Whether the voter status, e.g., eighteen-on-election-day, is true, false, or unknown depends on the value of the Assertion attribute. Used in request and response messages.

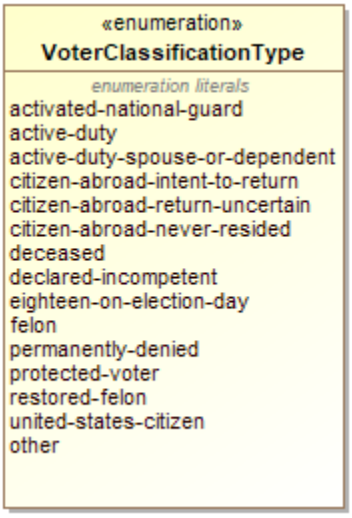


Figure 54 — VoterClassificationType

Value	Value Description
activated-national-guard	The voter is an activated National Guard member on State orders (FPCA).
active-duty	The voter is a member of the Uniformed Services or Merchant Marine on active duty (FPCA).
active-duty-spouse-or-dependent	The voter is an eligible spouse or dependent (FPCA).
citizen-abroad-intent-to-return	The voter is a US citizen residing outside the US and has intention to return (FPCA).
citizen-abroad-return-uncertain	The voter is a US citizen residing outside the US and their return is uncertain (FPCA).
citizen-abroad-never-resided	The voter is a US citizen and has never resided in the US (FPCA).
deceased	The voter is deceased (NVRA).
declared-incompetent	The voter has been declared incompetent (NVRA).
eighteen-on-election-day	The voter will be 18 on election day (NVRA).
felon	The voter is a felon (NVRA).

Value	Value Description
permanently-denied	The voter has not been permanently denied (NVRA).
protected-voter	The voter status is protected (NVRA).
restored-felon	The voter is a restored felon (NVRA).
united-states-citizen	The voter is a United States citizen (NVRA).
other	Used when the type of voter classification is not included in this enumeration.

3.48 Enumeration VoterHelperType

Enumeration for types of registration helpers, used in the Type attribute of RequestHelper. Used in request messages.

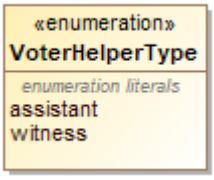


Figure 55 — VoterHelperType

Value	Value Description
assistant	For a registration assistant.
witness	For a registration witness.

3.49 Enumeration VoterIdType

Enumeration for the type of voter ID, used in the Type attribute of VoterId. Used in request and response messages.

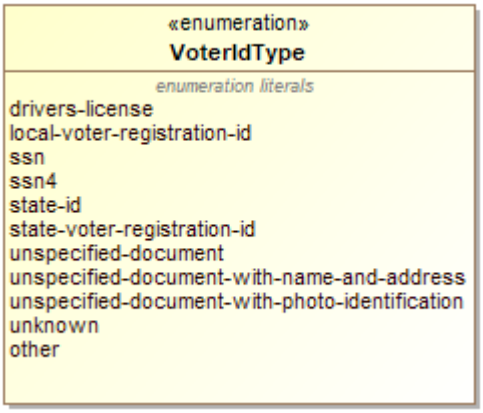


Figure 56 — VoterIdType

Value	Value Description
drivers-license	Used for a driver's license.
local-voter-registration-id	Used for a local voter registration record ID.
ssn	Used for a complete Social Security number.
ssn4	Used for the last four digits of a Social Security number.
state-id	Used for a state ID that is not a state voter registration ID.
state-voter-registration-id	Used for a state's voter registration record ID.
unspecified-document	Used for an unspecified document, not known whether the document contains name, address, or photo ID.
unspecified-document-with-name-and-address	Used for a document that contains the voter's name and address, such as a utility bill.
unspecified-document-with-photo-identification	Used for a document that contains a photograph of the voter.
unknown	Used for documentation that was not captured.
other	Used when the type of ID is not included in this enumeration.

3.50 Enumeration VoterRequestType

Enumeration for the type of voter records request, used in the Type attribute of VoterRecordsRequest. Used in request messages.

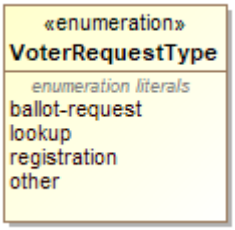


Figure 57 — VoterRequestType

Value	Value Description
`ballot-request`	For requesting a ballot, possibly in conjunction with an FPCA registration request.
`lookup`	For a voter registration lookup.
`registration`	For a voter registration request.
`other`	Used when the type of request is not included in this enumeration.

3.51 Enumeration VoterStatus

Enumeration for the status of the voter in a voter registration database, used in the VoterStatus attribute of the VoterRecord. Used in response messages.

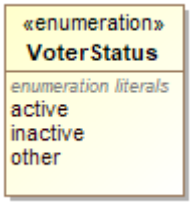


Figure 58 — VoterStatus

Value	Value Description
active	For a voter in active status.
inactive	For a voter in inactive status.
other	Used when the type of voter status is not included in this enumeration.

4 XML and JSON Usage Examples

This section contains several examples showing voter records request and responses in XML and JSON, all using the NVRA form. The examples are:

- Voter Registration Request — XML
- Voter Registration Request — JSON
- Voter Registration Response – XML

In the voter records request examples, note that a significant majority of the statements deal with specifying addresses using the FGDC standard [6].

4.1 Example 1: NVRA-style Voter Registration Request in XML

Figure 59 shows a fictitious digital NVRA-style registration request for "Jackie Nichole Davidson" in the State of Ohio using XML. This request is for an address update, and an example of the filled-out NVRA-style form is shown.

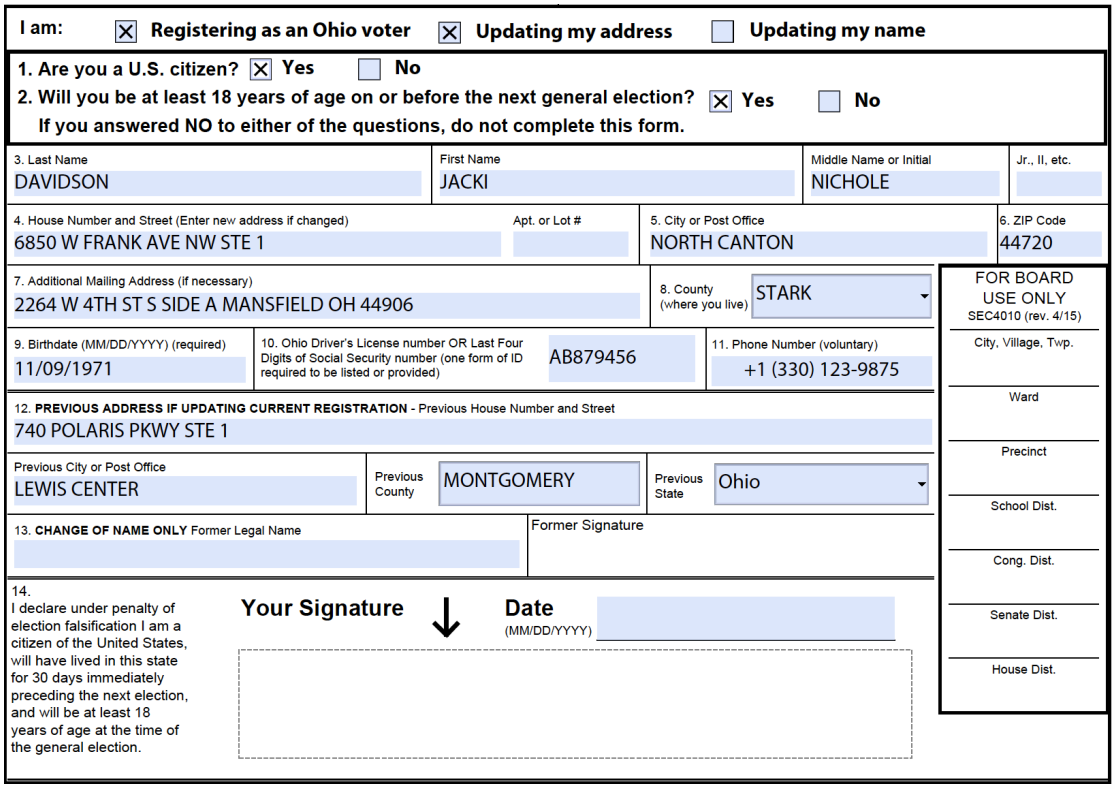


Figure 59 — Example NVRA-style form for a voter address update request

The XML for the voter registration request that contains the information exported from the form is shown below. Note that in lines 7 through 10 the *<AdditionalInfo>* element is being used to indicate that the voter's language preference is English; this is needed because the XML (and JSON) schema does not include a voter-preferred language element but the application at the portal required it. Thus, *<AdditionalInfo>* can be used to add other elements that are required by the application but not present in the schema.

```
<?xml version=”1.0” encoding=”UTF-8”?>
<!—DISCLAIMER: All persons listed below are fictitious -->
<VoterRecordsRequest xmlns:xsd=”http://www.w3.org/2001/XMLSchema”
xmlns:xsi=”http://www.w3.org/2001/XMLSchema-instance”
xmlns:addr_type=”http://www.fgdc.gov/schemas/address/addr_type”
xmlns:addr=”http://www.fgdc.gov/schemas/address/addr”
xmlns=”NIST_V0_voter_records_interchange.xsd” >
        <AdditionalInfo>
                <Name>Language</Name>
                <StringValue>en_US</StringValue>
        </AdditionalInfo>
        <GeneratedDate>2017-02-10</GeneratedDate>
        <Issuer>Ohio Secretary of State</Issuer>
        <RequestMethod>voter-via-mail</RequestMethod>
        <Subject>
                <ContactMethod>
                        <Type>phone</Type>
                        <Value>3301239875</Value>
                </ContactMethod>
                <ContactMethod>
                        <Type>email</Type>
                        <Value>FAKEEMAIL@AOL.COM</Value>
                </ContactMethod>
                <DateOfBirth>1971-11-09</DateOfBirth>
                <MailingAddress>
                        <NumberedThoroughfareAddress_type>
                                <addr:CompleteAddressNumber>
                                        <addr_type:AddressNumber>2264</addr_type:AddressNumber>
                                </addr:CompleteAddressNumber>
                                <addr:CompleteStreetName>

        <addr_type:StreetNamePreDirectional>W</addr_type:StreetNamePreDirectional>
                                        <addr_type:StreetName>4TH</addr_type:StreetName>

        <addr_type:StreetNamePostType>ST</addr_type:StreetNamePostType>

        <addr_type:StreetNamePostDirectional>S</addr_type:StreetNamePostDirectional>
                                </addr:CompleteStreetName>
                                <addr:CompleteSubaddress>
                                        <addr_type:SubaddressElement>

        <addr_type:SubaddressType>SIDE</addr_type:SubaddressType>

        <addr_type:SubaddressIdentifier>A</addr_type:SubaddressIdentifier>
                                        </addr_type:SubaddressElement>
                                </addr:CompleteSubaddress>
                                <addr_type:CompletePlaceName>
                                        <addr_type:PlaceName
PlaceNameType=”MunicipalJurisdiction”>MANSFIELD</addr_type:PlaceName>
                                        <addr_type:PlaceName PlaceNameType=”County”/>
                                </addr_type:CompletePlaceName>
                                <addr_type:StateName>OH</addr_type:StateName>
                                <addr_type:ZipCode>44906</addr_type:ZipCode>
                        </NumberedThoroughfareAddress_type>
                </MailingAddress>
                <Name>
                        <FirstName>JACKI</FirstName>
                        <LastName>DAVIDSON</LastName>
                        <MiddleName>NICHOLE</MiddName>
```

```
                </Name>
                <PreviousResidenceAddress>
                        <NumberedThoroughfareAddress_type>
                                <addr:CompleteAddressNumber>
                                        <addr_type:AddressNumber>740</addr_type:AddressNumber>
                                </addr:CompleteAddressNumber>
                                <addr:CompleteStreetName>
                                        <addr_type:StreetNamePreDirectional/>
                                        <addr_type:StreetName>POLARIS</addr_type:StreetName>

        <addr_type:StreetNamePostType>PKWY</addr_type:StreetNamePostType>
                                        <addr_type:StreetNamePostDirectional/>
                                </addr:CompleteStreetName>
                                <addr:CompleteSubaddress>
                                        <addr_type:SubaddressElement>

        <addr_type:SubaddressType>STE</addr_type:SubaddressType>

        <addr_type:SubaddressIdentifier>1</addr_type:SubaddressIdentifier>
                                        </addr_type:SubaddressElement>
                                </addr:CompleteSubaddress>
                                <addr_type:CompletePlaceName>
                                        <addr_type:PlaceName
PlaceNameType="MunicipalJurisdiction">LEWIS CENTER</addr_type:PlaceName>
                                        <addr_type:PlaceName PlaceNameType="County"/>
                                </addr_type:CompletePlaceName>
                                <addr_type:StateName>OH</addr_type:StateName>
                                <addr_type:ZipCode>43035</addr_type:ZipCode>
                        </NumberedThoroughfareAddress_type>
                </PreviousResidenceAddress>
                <ResidenceAddress>
                        <NumberedThoroughfareAddress_type>
                                <addr:CompleteAddressNumber>
                                        <addr_type:AddressNumber>6850</addr_type:AddressNumber>
                                </addr:CompleteAddressNumber>
                                <addr:CompleteStreetName>

        <addr_type:StreetNamePreDirectional>W</addr_type:StreetNamePreDirectional>
                                        <addr_type:StreetName>FRANK</addr_type:StreetName>

        <addr_type:StreetNamePostType>AVE</addr_type:StreetNamePostType>

        <addr_type:StreetNamePostDirectional>NW</addr_type:StreetNamePostDirectional>
                                </addr:CompleteStreetName>
                                <addr:CompleteSubaddress>
                                        <addr_type:SubaddressElement>

        <addr_type:SubaddressType>STE</addr_type:SubaddressType>

        <addr_type:SubaddressIdentifier>1</addr_type:SubaddressIdentifier>
                                        </addr_type:SubaddressElement>
                                </addr:CompleteSubaddress>
                                <addr_type:CompletePlaceName>
                                        <addr_type:PlaceName
PlaceNameType="MunicipalJurisdiction">NORTH CANTON</addr_type:PlaceName>
                                        <addr_type:PlaceName PlaceNameType="County">STARK
</addr_type:PlaceName>
                                </addr_type:CompletePlaceName>
                                <addr_type:StateName>OH</addr_type:StateName>
```

```
                        <addr_type:ZipCode>44720</addr_type:ZipCode>
                    </NumberedThoroughfareAddress_type>
                </ResidenceAddress>
                <VoterClassification>
                    <Assertion>yes</Assertion>
                    <Type>eighteen-on-election-day</Type>
                </VoterClassification>
                <VoterClassification>
                    <Assertion>yes</Assertion>
                    <Type>united-states-citizen</Type>
                </VoterClassification>
                <VoterClassification>
                    <Assertion>yes</Assertion>
                    <OtherType>ohio-resident</OtherType>
                    <Type>other</Type>
                </VoterClassification>
                <VoterClassification>
                    <Assertion>yes</Assertion>
                    <OtherType>bmv-authorization</OtherType>
                    <Type>other</Type>
                </VoterClassification>
                <VoterId>
                    <AttestNoSuchId>false</AttestNoSuchId>
                    <StringValue>AB879456</StringValue>
                    <Type>drivers-license</Type>
                </VoterId>
                <VoterId>
                    <AttestNoSuchId>true</AttestNoSuchId>
                    <Type>ssn4</Type>
                </VoterId>
        </Subject>
        <TransactionId>2a642eb5-169e-4a3b-8899-adc7ea6d00d0</TransactionId>
        <Type>registration</Type>
        <VendorApplicationId>OLVR 2.0</VendorApplicationId>
</VoterRecordsRequest>
```

4.2 Example 2: NVRA-style Voter Registration Request in JSON

Figure 60 shows a fictitious NVRA-style voter registration request for Jane A. Doe in the State of Ohio using JSON.

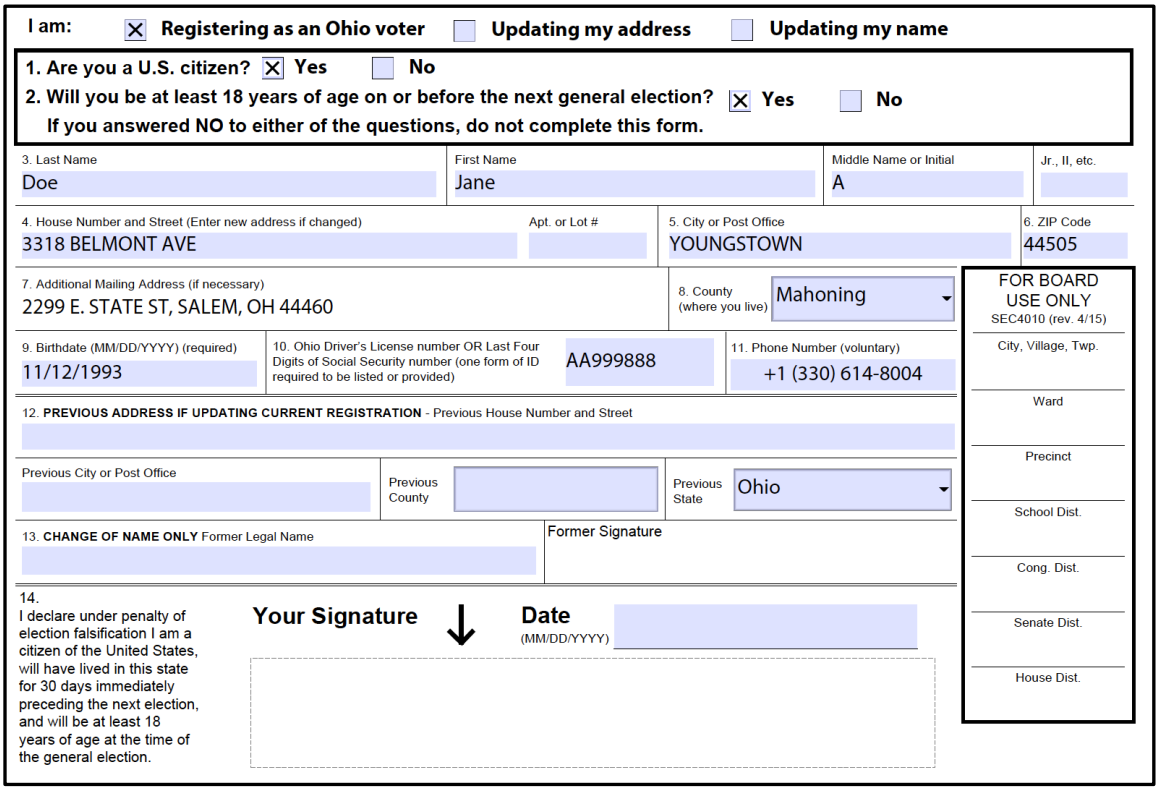


Figure 60 — Example NVRA-style form for a voter registration request

An example of the JSON statements for the voter registration request is shown below. Again, *"AdditionalInfo"* is being used in lines 3 through 14 to add information for elements not included in the JSON (and XML) schema, namely for the voter's preferred language and whether the voter wishes to volunteer as a poll worker.

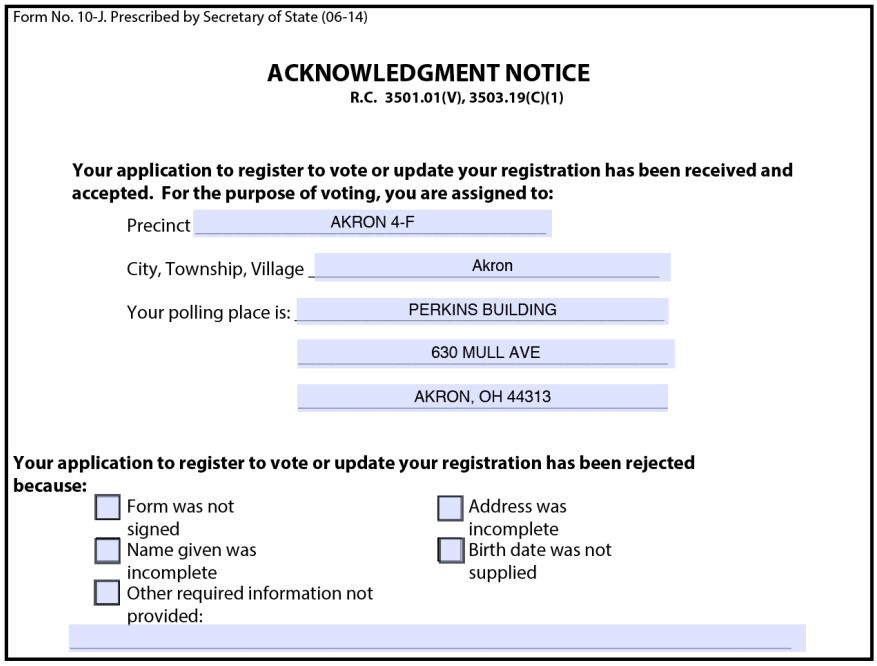
```
{
   “@type”: “VRI.VoterRecordsRequest”,
   “AdditionalInfo”: [
      {
         “@type”: “VRI.AdditionalInfo”,
         “Name”: “Language”,
         “StringValue”: “en_US”
      },
      {
         “@type”: “VRI.AdditionalInfo”,
         “Name”: “IsPollWorker”,
         “StringValue”: “false”
      }
   ],
   “GeneratedDate”: “2017-7-30”,
   “Issuer”: “Ohio Secretary of State”,
   “TransactionId”: “0bb1bfd7-4316-42be-99d5-9c9e3bb9ccc0”,
   “Type”: [
      “registration”
   ],
   “VendorApplicationId”: “OLVR 2.0”,
   “Subject”: {
      “@type”: “VRI.Voter”,
      “DateOfBirth”: “1993-11-12T00:00:00”,
      “VoterId”: [
         {
            “@type”: “VRI.VoterId”,
            “Type”: “drivers-license”,
            “StringValue”: “AA999888”,
            “AttestNoSuchId”: false
         },
         {
            “@type”: “VRI.VoterId”,
            “Type”: “ssn4”,
            “AttestNoSuchId”: true
         }
      ],
      “Name”: {
         “@type”: “VRI.Name”,
         “FirstName”: “JANE”,
         “MiddleName”: [
            “A”
         ],
         “LastName”: “DOE”,
         “Suffix”: “”
      },
      “VoterClassification”: [
         {
            “@type”: “VRI.VoterClassification”,
            “Assertion”: “yes”,
            “Type”: “eighteen-on-election-day”
         },
         {
            “@type”: “VRI.VoterClassification”,
            “Assertion”: “yes”,
            “Type”: “united-states-citizen”
         },
         {
            “@type”: “VRI.VoterClassification”,
```

```
            "Assertion": "yes",
            "Type": "other",
            "OtherType": "swear-accuracy"
         },
         {
            "@type": "VRI.VoterClassification",
            "Assertion": "yes",
            "Type": "other",
            "OtherType": "filled-on-own-behalf"
         },
         {
            "@type": "VRI.VoterClassification",
            "Assertion": "yes",
            "Type": "other",
            "OtherType": "ohio-resident"
         },
         {
            "@type": "VRI.VoterClassification",
            "Assertion": "yes",
            "Type": "other",
            "OtherType": "bmv-authorization"
         },
         {
            "@type": "VRI.VoterClassification",
            "Assertion": "yes",
            "Type": "other",
            "OtherType": "meets-all-requirements"
         }
      ],
      "ContactMethod": [
         {
            "@type": "VRI.ContactMethod",
            "Type": "phone",
            "Value": "(330) 614-8004"
         },
         {
            "@type": "VRI.ContactMethod",
            "Type": "email",
            "Value": "JDOE@TESTEMAIL.COM"
         }
      ],
      "ResidenceAddress": {
         "@type": "addr.NumberedThoroughfareAddress_type",
         "CompleteAddressNumber": {
            "@type": "addr_type.CompleteAddressNumber_type",
            "AddressNumber": "3818"
         },
         "CompleteStreetName": {
            "@type": "addr_type.CompleteStreetName_type",
            "StreetNamePreDirectional": {
               "@type": "addr_type.StreetNamePreDirectional_type",
               "Value": ""
            },
            "StreetName": "BELMONT",
            "StreetNamePostType": {
               "@type": "addr_type.StreetNamePreType_type",
               "Value": "AVE"
            },
            "StreetNamePostDirectional": {
```

```
                "@type": "addr_type.StreetNamePreDirectional_type",
                "Value": ""
            }
        },
        "CompletePlaceName1": {
            "@type": "addr_type.CompletePlaceName_type",
            "PlaceName": [
                {
                    "@type": "addr_type.PlaceName_type",
                    "PlaceNameType": "MunicipalJurisdiction",
                    "Value": "YOUNGSTOWN"
                },
                {
                    "@type": "addr_type.PlaceName_type",
                    "PlaceNameType": "County",
                    "Value": "78"
                }
            ]
        },
        "StateName": "OH",
        "ZipCode": "44505"
    },
    "MailingAddress": {
        "@type": "addr.NumberedThoroughfareAddress_type",
        "CompleteAddressNumber": {
            "@type": "addr_type.CompleteAddressNumber_type",
            "AddressNumber": "2299"
        },
        "CompleteStreetName": {
            "@type": "addr_type.CompleteStreetName_type",
            "StreetNamePreDirectional": {
                "@type": "addr_type.StreetNamePreDirectional_type",
                "Value": "E"
            },
            "StreetName": "STATE",
            "StreetNamePostType": {
                "@type": "addr_type.StreetNamePreType_type",
                "Value": "ST"
            }
        },
        "CompletePlaceName1": {
            "@type": "addr_type.CompletePlaceName_type",
            "PlaceName": [
                {
                    "@type": "addr_type.PlaceName_type",
                    "PlaceNameType": "MunicipalJurisdiction",
                    "Value": "SALEM"
                },
                {
                    "@type": "addr_type.PlaceName_type",
                    "PlaceNameType": "County",
                    "Value": "COLUMBIANA"
                }
            ]
        },
        "StateName": "OH",
        "ZipCode": "44460"
    }
},
```

```
    “RequestMethod”: “voter-via-internet”,
    “Form”: “other”,
    “OtherForm”: “4010”
}
```

4.3 Example 3: NVRA-style Voter Records Response in XML



Form No. 10-J. Prescribed by Secretary of State (06-14)

ACKNOWLEDGMENT NOTICE

R.C. 3501.01(V), 3503.19(C)(1)

Your application to register to vote or update your registration has been received and accepted. For the purpose of voting, you are assigned to:

Precinct AKRON 4-F

City, Township, Village Akron

Your polling place is: PERKINS BUILDING

630 MULL AVE

AKRON, OH 44313

Your application to register to vote or update your registration has been rejected because:

- ☐ Form was not signed
- ☐ Name given was incomplete
- ☐ Other required information not provided:
- ☐ Address was incomplete
- ☐ Birth date was not supplied

Figure 61 — Populated NVRA voter registration response form

This final example shows a fictitious digital NVRA-style registration response in the State of Ohio using XML. An example of the populated response form is shown in Figure 61. The XML for the voter registration response that contains the information used to populate the form is as follows:

```
<?xml version=”1.0” encoding=”UTF-8”?>
<!—DISCLAIMER: All persons and places listed below are fictitious -->
<VoterRecordsResponse xsi:type=”RequestSuccess” xmlns:xsd=”http://www.w3.org/2001/XMLSchema”
   xmlns:xsi=”http://www.w3.org/2001/XMLSchema-instance”
   xmlns=”NIST_V0_voter_records_interchange.xsd”
   xsi:schemaLocation=”NIST_V0_voter_records_interchange.xsd
   NIST_V0_voter_records_interchange.xsd”
   xmlns:addr=”http://www.fgdc.gov/schemas/address/addr”
   xmlns:addr_type=”http://www.fgdc.gov/schemas/address/addr_type”>
   <Action>registration-created</Action>
   <Districts>
      <Name>Akron</Name>
      <Type>municipality</Type>
   </Districts>
   <EffectiveDate>2017-07-31</EffectiveDate>
   <ElectionAdministration>
      <ContactMethod>
         <Type>phone</Type>
         <Value>3306435200</Value>
      </ContactMethod>
      <Location>
         <Address>
            <GeneralAddressClass_type>
               <addr:USPSGeneralDeliveryPoint>470 GRANT ST</addr:USPSGeneralDeliveryPoint>
               <addr_type:PlaceStateZip>AKRON, OH 44311</addr_type:PlaceStateZip>
            </GeneralAddressClass_type>
         </Address>
      </Location>
      <Name>Summit</Name>
   </ElectionAdministration>
   <PollingPlace>
      <Location>
         <Address>
            <GeneralAddressClass_type>
               <addr:USPSGeneralDeliveryPoint>630 MULL AVE</addr:USPSGeneralDeliveryPoint>
               <addr_type:PlaceStateZip>AKRON, OH 44313</addr_type:PlaceStateZip>
            </GeneralAddressClass_type>
         </Address>
      </Location>
      <Name>PERKINS BUILDING</Name>
      <Type>polling-place</Type>
   </PollingPlace>
   <Locality>
      <Name>AKRON 4-F</Name>
      <Type>precinct</Type>
   </Locality>
</VoterRecordsResponse>
```

Appendix A—Acronyms

Selected acronyms and abbreviations used in this document are defined below.

CDF	Common Data Format
DMV	Department of Motor Vehicles
EAC	Election Assistance Commission
EAVS	EAC Election Administration and Voting Survey
FIPS	Federal Information Processing Standard
FPCA	Federal Post Card Application
FWAB	Federal Write-in Absentee Ballot
JSON	JavaScript Object Notation
MMS	Multimedia Messaging Service
MIME	Multipurpose Internet Mail Extensions
MVA	Motor Vehicles Administration
NIST	National Institute of Standards and Technology
NVRA	National Voter Registration Act
OCD-ID	Open Civic Data Identifiers
OVR	Online Voter Registration
SMS	Short Message Service
SP	Special Publication
UML	Unified Modeling Language
UOCAVA	Uniform and Overseas Citizens Assistance in Voting Act
VR	Voter Registration
VRI	Voter Records Interchange
VVSG	Voluntary Voting Systems Guidelines

XML	eXtensible Markup Language

Appendix B—Glossary

Selected terms used throughout this document are defined below.

Election district:	Administrative area in which voters are entitled to vote in contests that are specific to that area.
Election official:	Any person who is involved with administering or conducting an election, including government personnel and temporary election workers. This may include any county clerk and recorder, election judge, member of a canvassing board, central election official, election day worker, member of a board of county commissioners, member or secretary of a board of directors authorized to conduct public elections, representative of a governing body, or other person engaged in the performance of election duties as required by the election code.
Polling place:	Location at which voters may cast in-person ballots under the supervision of election workers during one or more specific time periods.
Precinct:	Election administration division corresponding to a geographic area that is the basis for determining which contests the voters legally residing in that area are eligible to vote on.
Registration assistant:	An organization whose purpose includes assisting voters in registering to vote.
Registration proxy:	An organization that submits a voter registration request on behalf of the voter, e.g., a MVA office that submits a voter registration request for a voter.
Registration witness:	An individual who witnesses a voter's registration, i.e., the voter signing his/her registration form.
Reporting unit:	Geographical area in which reported totals or counts are reported (for example, a jurisdiction, precinct, or election district).
Schema:	A file containing definitions of data elements and attributes with rules for usage, e.g., for XML.

UOCAVA voter: An overseas voter or an active duty member of the U.S. military, either within or outside the United States, including any accompanying spouse and family members who are eligible to vote in their last place of residence in the United States. The Uniformed and Overseas Citizens Absentee Voting Act is commonly referred to as UOCAVA.

Appendix C—References

[1] W3C, *Extensible Markup Language (XML) 1.0 (Fifth Edition)*, W3C Recommendation, November 26, 2008, http://www.w3.org/TR/xml/ [accessed 2/5/2019].

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Appendix D—File Download Locations

The files associated with this specification are available for download from a NIST repository, whose address is:

https://github.com/usnistgov/VoterRecordsInterchange

These files are also available from:

http://vote.nist.gov

The files include:

- This specification,
- UML model,
- XML and JSON schemas, and
- Example files.

Appendix E—Change Log

Version 1 Release 2 – March 31, 2020

- In the UML documentation, corrected the order of UML class attributes and enumeration values in the tables so that they match the order in the UML model and in the JSON and XML schemas.
- In the UML documentation, mentions of class and attribute names are properly linked to each other. Also done for mentions of enumeration and value names.