IEEE P-1622™/D01.002

2007-02-28

Draft
Standard for
Voting Equipment Electronic Data Interchange

Sponsored by the

SCC38, Voting Systems Engineering

of the

IEEE Standards Coordinating Committee

Abstract: Enter some abstract wording here.

Keywords: Voting, voting system, election, vote, ballot, Access control, precinct, polling place, voting position, primary, protection profile, voter anonymity, target of evaluation

Introduction

(This introduction is not part of IEEE P-1622, Voting Equipment Electronic Data Interchange.

Copied paragraphs and acknowledgements for Hart and OASIS.)

Enter some introduction text here.

At the time this standard was compiled, the working group had the following membership:

Peter Zelechoski, *Chair*

Kurt Hyde, Vice-Chair   Peter Bohm

The following members of the balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention. (To be provided by IEEE editor at time of publication.)
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Contents

Voting Equipment Electronic Data Interchange

1. Overview

This document is submitted by Project 1622 (P-1622), the Standard for Voting Equipment Electronic Data Interchange development effort. It contains a specification of the data that must or should be exchanged between voting systems, using electronic data exchanges. Some data elements are designated as required exchange elements. Other data elements are designated as optional exchange elements.

1.1 Scope

The scope of this standard is the specification of the data that is to be available for exchange from voting systems to external interested parties and/or systems. Information used to define and create ballots, as well as reporting of voting activity and results, jurisdictional and geo-political information, contest definitions, voter registration, and voting area (a.k.a., precinct) information are all included in the scope. The scope does not include implementation/vendor specific information.

Chapter 4 of this document provides the requirements for data elements. Chapter 5 provides a reference implementation of the standard using EDX, an XML Schema specification that has been submitted by Hart InterCivic. Chapter 6 provides a reference implementation of the standard using EML, an XML Schema specification that has been submitted by OASIS.

1.2 Purpose

The "Voting System" is composed of a number of components, the voter registration system, the candidate filing process, the petition system, ballot definition, voting, tabulation, and reporting systems. This standard provides data interchange specifications to allow the exchange and interoperability of these various systems.

The purpose of this standard is to reach, as nearly as possible, the ideal state, wherein there exists a common definition of the data utilized within election systems and the election industry. This standard should help promote interoperability among functional components, reduce complexity, spur innovation, and provide greater assurance within election systems.

2. References

This draft standard shall be used in conjunction with the following publications. When the following specifications are superseded by an approved revision, the revision shall apply.

ISO/IEC 17799:2000(E), Information technology – Code of practice for information security management.

ISO/IEC 99887, Information technology – XML Specification for Voting System Data

3. Definitions

For the purposes of this draft standard, the following terms and definitions apply. *The Authoritative Dictionary of IEEE Standards, Seventh Edition,* should be referenced for terms not defined in this clause.

Absentee Ballot: A ballot prepared or cast by a voter other than at a regular polling place.

Agency: Any department or agency of a recognized governmental body.

Alternate formats: Alternate formats usable by people with disabilities may include, but are not limited to, Braille, ASCII text, large print, recorded audio, and electronic formats.

Ballot Counter: A counter in a voting device that counts the ballots cast in a single election or election test. This is also known as a public counter.

Ballot Format: One of any number of specific ballot configurations issued to the appropriate precinct. At a minimum, ballot formats differ from one another in content. They may also differ in size of type, graphical presentation, in language used, or in method of presentation (e.g.; visual or audio). This is also referred to as "ballot style".

Ballot Preparation: The process of using election databases or other means to select the specific contests and questions to be contained in a ballot format and related instructions; preparing and testing election specific software containing these selections; producing all possible ballot formats (or styles); and validating the correctness of ballot materials and software containing these selections for an upcoming election.

Ballot Rotation: The process of varying the order of the candidate names within a given contest to reduce the impact of voter bias towards the candidate(s) listed first. States that require ballot rotation may do so for primary elections, general elections, or both. States may rotate the names according to a number of different formulas including by political subdivision, by election district, by precinct, or by ballot displays or voting machines.

Ballot Set: See "Cast Vote Record".

Ballot Style: See "ballot format".

Candidate Register: The record that reflects the total votes cast for the candidate. This record is augmented as each ballot is cast on a DRE or as digital signals from the conversion of voted paper ballots are logically interpreted and recorded.

Canvass: A compilation of election returns and validation of the outcome that form the basis of the official results.

Cast Vote Record (CVR): An electronically produced record of all votes cast by a single voter. This is also referred to as "ballot set" or "ballot image".

Challenged Ballot: A ballot provided to individuals whose eligibility to vote has been questioned. Once voted, such ballots are not included in the tabulation until after the voter's eligibility is confirmed.

Closed Primary: A primary election in which voters receive a ballot listing only those candidates running for office in the political party with which the voters are affiliated, along with nonpartisan offices and ballot issues presented at the same election. Usually, unaffiliated voters are permitted to vote only on nonpartisan offices and ballot issues.

Cross-party Endorsement: The endorsement of a single candidate or slate of candidates by more than one political party. The candidate or slate appears on the ballot representing each endorsing political party. State requirements vary for how votes are recorded when a voter selects the same candidate or slate more than once. This is also referred to as "cross filing".

Cumulative Voting: A practice where voters are permitted to cast as many votes as there are seats to be filled. Voters are not limited to giving only one vote to a candidate. Instead, they can put multiple votes on one or more candidates. (For additional information, access the Center for Voting and Democracy's web site at http://www.fairvote.org/contents.htm#irv.)

Direct Record Electronic (DRE) Voting System: A voting system that records votes by means of a ballot display provided with mechanical or electro-optical components that can be actuated by the voter; that processes the data by means of a computer program; and that records voting data and cast vote records in

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internal and/or external memory components. It produces a tabulation of the voting data stored in a removable memory component and/or in printed copy.

Election Coding: See "Election Programming".

Election Databases: A data file or set of files that contains geographic information about political subdivisions and boundaries; all contests and questions to be included in an election; and the candidates for each contest.

Election District: A geographic area represented by a public official who is elected by voters residing within the district boundaries. The district may cover an entire state or political subdivision, may be a portion of the state or political subdivision, or may include portions of more than one political subdivision.

Election Management System: A set of processing functions and databases within a Voting System that define, develop and maintain election databases; perform election definition and setup functions; format ballots; count votes; consolidate and report results; and maintain audit trails.

Election Programming: The process by which election officials or their designees use voting system software to logically define the ballot for a specific election. Also referred to as "election coding".

Entity Relationship Diagram (ERD): An entity-relationship diagram is a data modeling technique that creates a graphical representation of the entities, and the relationships between entities, within an information system.

General Election: An election in which voters, regardless of party affiliation, are permitted to select persons to fill public office and vote on ballot issues. Where the public office may be filled by a candidate affiliated with a political party, voters choose among the nominees of political parties and, as permitted by state law, unaffiliated candidates.

Integrity: The prevention of unauthorized modification of information.

Marksense: A system by which votes are recorded by means of marks made in voting response fields designated on one or both faces of a ballot card or series of cards. Marksense systems use an optical scanner or similar sensor to read the ballots. Also known as Optical Scan.

Measure Register: The record that reflects the total votes cast for and against a specific ballot issue. This record is augmented as each ballot is cast on a DRE or as digital signals from the conversion of voted paper ballots are logically interpreted and recorded.

Non-partisan Office: An elected office for which candidates run independent of political party affiliation.

Open Primary: A primary election in which voters, regardless of political affiliation, may choose in which party's primary they will vote. Some states require voters to publicly declare their choice of party ballot at the polling place, after which the poll worker provides or activates the appropriate ballot. Other states allow the voters to make their choice of party ballot within the privacy of the voting booth. Voters also are permitted to vote on nonpartisan offices and ballot issues that are presented at the same election.

Optical Scan: See Marksense.

Overvotes: The voting for more than the allotted number of selections in a race.

Paper-Based Voting System: A voting system referred to in the 1990 Standards as a Punchcard and Marksense (P&M) Voting System that records votes, counts votes, and produces a tabulation of the vote count, using one or more ballot cards or a written list of choices.

Partisan Office: An elected office for which candidates run as representatives of a political party.

Political Subdivision: Any unit of government, such as counties and cities but often excepting school districts, having authority to hold elections for public offices or on ballot issues.

Polling Location: The physical address of a polling place.

Polling Place: The area within the polling location where voters cast ballots.

Precinct: An administrative division representing a geographic area in which voters cast ballots at the same polling place. Voters casting absentee ballots may also be combined into one or more administrative

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absentee precincts for purposes of tabulating and reporting votes. Generally, voters in a polling place precinct are eligible to vote in a general election using the same ballot format. In some jurisdictions, however, the ballot formats may be different due to split precincts or required ballot rotations within the precinct.

Primary Election: In most cases, an election held to determine which candidate will represent a political party in the general election. During presidential election years, voters in primary elections may also select delegates to presidential nominating conventions. Some states have an "open primary", while others have a "closed primary". Sometimes elections for nonpartisan offices and ballot issues are held during primary elections.

Primary Presidential Delegation Nominations: A primary election in which voters choose the delegates to the Presidential nominating conventions allotted to their state by the national party committees.

Provisional Ballot: A ballot provided to individuals who claim they are eligible to vote but whose eligibility cannot be confirmed when they present themselves to vote. Once voted, such ballots are not included in the tabulation until after the voter's eligibility is confirmed.

Public Counter: A count of the number of ballots cast on a voting or tabulating unit that is available for viewing for audit by poll workers or poll watchers

Public Network Direct Record Electronic (DRE) Voting System: A form of DRE voting system that uses electronic ballots and transmits official vote data from the polling place to another location (such as a central count facility) over a network beyond the control of the election authority. Examples of such networks include public telephone lines and the Internet.

Punchcard Voting System: A voting system where votes are recorded by means of punches made in voting response fields designated on one or both faces of a ballot card or series of cards.

Ranked Order Voting: A practice that allows voters to rank candidates in a contest in order of choice: 1, 2, 3, and so on. It takes a majority to win. If anyone receives a majority of the first choice votes, that candidate wins that election. If not, the last place candidate is deleted, and all ballots are counted again, but this time each ballot cast for the deleted candidate counts for the next choice candidate listed on the ballot. The process of eliminating the last place candidate and recounting the ballots continues until one candidate receives a majority of the vote. The practice is also known as instant runoff voting, preferences or preferential voting, or choice voting.[1]

Recall Issues (with Options): A process that allows voters to remove their elected representatives from office prior to the expiration of their terms of office. Often, the recall involves not only the question of whether a particular officer should be removed from office, but also the question of naming a successor in the event that there is an affirmative vote for the recall.

Runoff Election: An election to select a winner following a primary, or sometimes a general election, in which no candidate in the contest received the required minimum percentage of the votes cast. The two candidates receiving the most votes for the race in question proceed to the runoff election.

Split Precinct: A split precinct is a precinct containing more than one ballot format in order to accommodate a contiguous geographic area served by the precinct that contains more than one election district.

Straight Party Voting: A mechanism by which voters are permitted to cast a vote indicating the selection of all candidates on the ballot for a single political party.

Tabulation: See "Count".

Undervotes: The practice of voting for less than the total number of election contests listed on the ballot, or of voting for less than the number of positions to be filled for a single office (i.e., A person would undervote if a contest required the selection of 3 out of a given number of candidates, and the voter chose only two candidates).

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[1] For additional information, access the Center for Voting and Democracy's web site at http://www.fairvote.org/contents.htm#irv.

Vote for N of M: A ballot choice in which voters are allowed to vote for a limited number of candidates for a single office from a larger field of candidates. For example, in an election for six open city council seats, voters may be told that they may vote for up to six out of twelve candidates actually listed on the ballot.

Voter Verifiable Audit Record: A human-readable printed record of all of a voters' selections presented to the voter before the vote is cast. This is also called Voter Verifiable Record.

Voting Position: Specific response fields on a ballot where the voter indicates the selection of a candidate or ballot proposition.

Voting Station: A location within the polling place where voters may record their votes. A voting station includes the voting booth or enclosure and the vote-recording device.

Write-in Voting: A means to cast a vote for an individual not listed on the ballot. Voters may do this by using a marking device to physically write their choice on the ballot or they may use a keypad, touch screen or other electronic means to indicate their choice.

3.1 Abbreviations and Acronyms

AES	Advanced Encryption Standard
ASCII	American Standard Code for Information Interchange
CVR	Cast Vote Record
DRE	Direct Recording Electronic voting system
EAC	Election Assistance Commission
EMS	Election Management System
FEC	Federal Election Commission
IEC	International Electrotechnical Commission
ISO	International Organization for Standards
IT	Information Technology
ITA	Independent Test Authority
NASED	National Association of State Election Directors
NIST	National Institute of Standards and Technology
NSRL	National Software Registration Library
NVLAP	National Voluntary Laboratory Accreditation Program
OEA	Office of Election Administration (of the FEC)
PKI	Public Key Infrastructure

4. Electronic Exchange of Voting System Data

The first step in specifying the standard for exchange of voting system data is an understanding of the data that must be exchanged/exchangeable between systems – content, not form. From that we can then produce the form, either prescriptive, preferred, or a 'representative embodiment'.

That data is largely dependent on an understanding of the interfaces between the logical components of voting systems. The Voter Registration (VR) system, Election Management System (EMS), and other interested entities (e.g., the state, news agencies, political watch groups) must be able to exchange information. That is the intent of the following diagram.
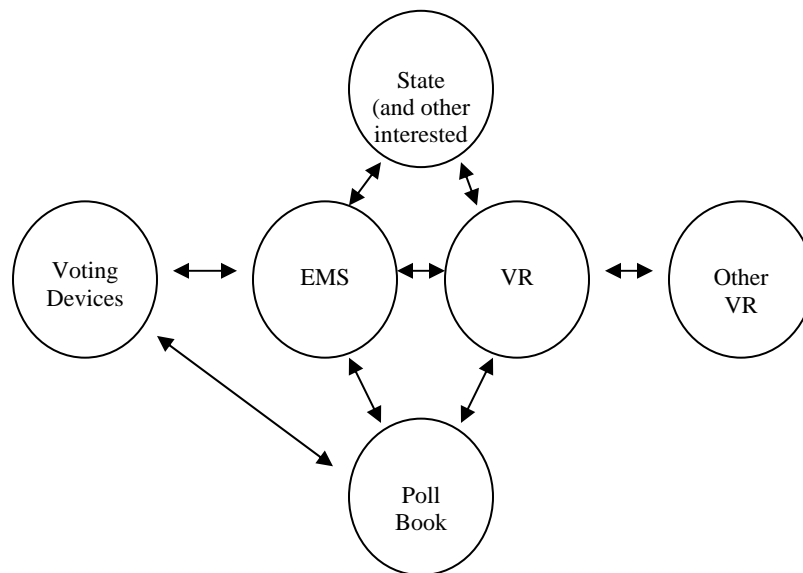
Figure 4.1: Logical Data Interchanges

A VR might need to share information with another VR. A VR might need to create the Voter Roll for a Poll Book. A VR might need to get information about who voted in an election. An EMS might need to provide the definition of an election. An EMS might need to provide election results. Jurisdictional precinct information might need to be merged with the voter roll to create a poll book, and that jurisdictional precinct information might be in the VR or the EMS or elsewhere. These are examples of the kinds of informational exchanges this [DRAFT] standard is intended to support.

4.1 Voter Roll

Voter Registration systems must be able to exchange a list of voters eligible to vote in a given election. Voter Roll is the list of individuals that are registered and eligible to vote in a given election; it is not the entirety of the data needed in a voter registration system, from which the voter roll is usually generated. The minimum set of data that must be provided is:

       Voter Name – the person's name

Voter Identifier – the external identifier for the voter (person).

Registered Address – the address the person claims for the right to register/vote and which determines the issues on which the person is entitled to vote

Ballot Form identifier to be used – the external identifier of the ballot form (or list of forms) the voter may vote on.

Language Preference – the language in which the voter prefers to vote; it is used by polling staff to deliver the ballot forms in the correct language for the voter.

Additional data that may be provided is:

Identification Validation – ID type and number, which may be used by polling place staff to verify voter's identity at the time of voting. Examples of such identification include (but are not limited to):

Social Security Number

Driver's License Number

Military Identification Card

State-issued Identification Card

Date of Birth – the voter's birth date; it may be used to help confirm identity.

Image of person's signature – may be used by polling place staff to verify voter's signature at the time of voting.

Right to Vote Token Identifier – a value that allows verification that an individual is entitled to vote in the specified election; once exercised, that token is no longer valid [depending on voting channel and implementation, this information may be protected; further, in the US it is usually not allowed to be tied to the actual vote because the privacy of the vote takes precedence, so it is optional for the EDI]

4.2 Voting History

Voter Registration systems must track voting history. Voting Systems that handle the Poll Books for an election must be able to send information back to the VR system, indicating who voted (not the choices they voted). The minimum set of data that must be provided is:

Voter Identifier – the external identifier for the voter (person).

Identifier for the Election Voted In – the external identifier for the election

Additional data that may be provided is:

ID validation – in some jurisdictions it may be desired to capture the identifier and/or type of validation used to prove the identity of the voter

Voter Signature Image – in some jurisdictions it may be desired to capture the image of the voter's signature.

Social Security Number

4.3 Election Definition

At a minimum, a voting system that creates or changes the data that defines an election must be able to exchange the Pre-Election Definition. The minimum elements required in a Pre-Election Definition are:

Election – Information about the Election (or elections) being held in the event:

Election identifier – An external identifier for the election

Election name – the name/title of the election

Election Jurisdiction – the State, County, City, etc. to which the election pertains

Election date – the date of the election

Type of election – the type of election (Primary, General, Special, etc.)

Support of various common election types must be provided; optionally, additional types may be supported:

General – (an election where voters are allowed to cast choices for contests without regard to the voter's own party affiliation,

Special – an election other than the normal general election, where voters are allowed to cast choices for contests without regard to the voter's party affiliation,

Primary –an election to select the candidates who will compete for an office in a general or special election,

Open Primary – a Primary election in which any voters can participate, regardless of their political affiliation. Some states require voters to publicly declare their choice of party ballot at the polling place, after which the poll worker provides or activates the appropriate ballot. Other states allow the voters to make their choice of party ballot within the privacy of the voting booth.

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Closed Primary – a primary election where the voter may only vote in contests to select members of the party to which the voter is registered,

Modified Closed Primary – a closed primary election where the voter may vote in some contests to select candidates from parties other than the party to which s/he is registered.

Pick-a-Party Primary – a primary election where the voter may choose which party's contests they want to cast choice on,

Blanket Primary – a primary election where the voter may select candidates without regard to the party to which s/he is registered.

Ballot Forms – The identity of all Ballot Forms for the election event.

Information tying the contests in an election to the ballot forms in the election.

Contests – Information about all Contests for the election event (a contest may be an office/position or a measure). For each contest, the following items must be available:

Contest identifier – An external identifier for the contest

Contest title – A descriptive name for the contest

Type of contest – An indicator of the type of contest (office, measure, other)

Support for common contest types must be provided; optionally, additional types may be supported:

Office – a contest to select the individual(s) to hold an elected office position,

Measure – a contest to approve or disallow an action (e.g., issue bonds, modify the constitution, enact a tax, etc.).

Write-in vote maximum – the maximum number of write-in votes allowed for the contest on a single ballot

Vote maximum – the maximum number of votes allowed for the contest on a single ballot

Cumulative voting indicator – indicates if an individual may cast multiple votes for the same candidate (e.g., vote for 3 contest and voter casts all three votes for one candidate)

Federal contest indicator – indicator if the contest is a federal one

Contest rotation indicator – indicator if the contest requires rotation and, if so, the type of rotation

Party affiliation indicator – indicator if the contest requires party affiliation

Straight party indicator – indicator if the contest requires straight party association

Party specific indicator – indicator if the contest is limited to voting by members of its own party

Choices – Information about all Choices for each contest in the election event (a choice may be a candidate/write-in or a yes/no, for a specific contest)

Choice identifier – an external identifier for the choice

Name of choice – the name by which this contest choice is know (a person's name if it is a candidate, if the contest is a measure or other question it may be "affirmative" or "yes", etc.)

Choice display order – the order in which this choice should appear relative to the other choices for the specific contest; when rotation is used, this is the starting point with the rotation method taking control from that point onward.

Choice party – the party with which the choice is affiliated ; when a choice does not have a party affiliation, an indicator of no affiliation must be provided.

Choice type – type within choice (Candidate, Write-In, Yes/No, Party, etc.).

Information about all Parties involved in the specified election event

Party identifier – an external identifier for the party

Party name – the name for the party

Non-Party indicator – an indicator if the party is unaffiliated

Additional data that may be provided is:

Candidate Filing Deadline – the date beyond which no further individuals may file as candidates for the specified contest within the election event

Voter Registration Deadline – the date beyond which individuals who register to vote will not be allowed to vote in the specified election event

Jurisdictions – information about all jurisdictions that will participate in the specified election event

Districts – information about all districts involved in the specified election event

Polling Places – information about all polling places that will be used for the specified election event

Precincts – information about all precincts that will be used for the specified election event, including precinct splits when splits are used.

Languages Supported (support for multiple languages may be reflected in additional detail elements for many elements) – information about all languages that will be supported in the specified election event

Party Display Order – some locales specify the order in which parties are displayed

Candidate Incumbency – some locales require the incumbent to be indicated

Candidate Certification – indicator if the candidate has been certified; in some locales, only certified write-ins are allowed as valid write-in choices.

4.4 Ballot Form

A ballot form is the grouping of information (e.g., contests and choices, form identifying information, election identifying information) that will be contained on a given ballot. Each ballot form must be able to be shared.

The minimum information for a Ballot Form is the list of all items upon which a voter using it may cast a selection. It must also contain the following information as it relates to those.

The identifier of the individual form (i.e., ballot form identifier or ballot style identifier).

The election event for which this ballot form is to be used.

The elections that are included on this ballot form.

Each contest item, including the specific election it is for, on the ballot form. An indication of the number of choices that may be selected for the specified contest, by the voter, must be included.

Contest display order – An indicator of the order in which this contest should be displayed, relative to the other contests on the ballot

The choices that are available, including the specific contest they are for, on the ballot form.

The parties (a generic term, including political and apolitical endorsements) associated with each choice available on the ballot form.

Additional data that may be provided is:

Language choice is required under certain circumstances and it may be supported in various ways. One way is to have separate ballot forms by language. When that is the case, the language for the specific ballot form must be indicated. When the same ballot form contains multiple languages, an indication of the element's language must be provided for each language specific element.

Auditory content for a given ballot form is required for support of those with certain disabilities, under the Help America Vote Act (HAVA). A ballot form that includes auditory support must provide that same auditory information for exchange.

Graphical elements may be provided on ballots. They may include party or jurisdiction logos, candidate photos, and other items. Such graphical elements may be provided for exchange.

4.5 Cast Ballot

Cast Ballot (a.k.a., Cast Vote Record) is the list of selections made by a voter and submitted on a Ballot Form. At a minimum, a cast ballot data exchange must tell what votes were cast. Therefore, it must contain the following information.

List of Contest Choice Values (for each contest choice on ballot was there a selection, in some cases this is a 0/1 or on/off but in other cases it may be a ranked choice or a weighted voting value; the value should be included here so that tabulation rules can handle it as appropriate). The list must identify what election/contest/choice the given value is associated with, not just the values.

The location where the ballot was cast (e.g., precinct, precinct split, polling location).

The status of the ballot (e.g., provisional, accepted, rejected, spoiled)

Additional data that may be provided is:

Ballot Form

External Ballot Identifier (required in some locations and not allowed in others)

Device Identifier used to cast this ballot.

4.6 Tabulation Report

Tabulation Report is the accumulated value of the Cast Ballots for a given reporting unit. The level at which tabulation reports must be produced is highly locale specific; conformance to this standard requires tabulation information be provided at the smallest precinct level (precinct split if splits are used by the jurisdiction) and upward. In some jurisdictions, tabulation reports must also be produced for each voting location (the combined tabulation of all precincts using that location). It must contain either the atomic piece of information or information that allows it to be accurately derived (e.g., rolling up results from a finer level of detail)..

The location identifier (for location level reports). The minimum required level of location information is that for the lowest level precinct grouping.

The jurisdiction identifier.

The election/contest/choice identification and the accumulated election/contest/choice value for all valid choices in the election event.

The number of registered voters in the specified tabulation group. Values can be calculated by rolling up from the lowest level grouping.

The number of voters casting ballots in the specified tabulation group. Values can be calculated by rolling up from the lowest level grouping.

The number of ballots cast (may be different than number of voters casting ballots if there are multiple ballots included in the election).

The number of precincts included as having reported in the tabulation.

Additional data that may be provided is:

The device identifier (for device level reports).

The location identifier (for location level reports). Additional location information that may be provided would be location information allowing reporting at the precinct group and at the physical polling place.

The number of provisional ballots and a tabulation of the content of those provisional ballots.

4.7 Post Election Canvas Result

The certified results of an election must be shared with many interested parties. The certified results are called the Post Election Canvas Results. The minimum elements required in a Post Election Canvas Report are:

The tabulation report for the specified level (see 4.6, above).

A digital signature that can be validated and used to indicate the content of this data interchange is certified.

5. Reference Embodiment Using EDX

A reference embodiment of an XML schema that fulfills the data exchange requirements specified in section 4 of this [DRAFT] standard, is provided by the EDX[2] schema. A full textual rendering of the EDX schema is available at the following url: http://x.y.z/baseEDX.xsd.

In corollary to the data exchange sub-sections in section 4, each such data exchange has a like sub-section in this section.

The schema location specified in an EDX document should reference the "EDX.xsd" schema; this schema document is trimmed of all extraneous documentation and descriptions, allowing for faster download and validation.   However, when doing development work the more verbose form of the schema "baseEDX.xsd" may be used to allow for better access to that descriptive information.

To be well formed and valid, every EDX document will require a document preface to specify the version of EDX and the up-front includes, message codes, etc. EDX is the core document element. It uses a context of the jurisdiction as its main child-element. The jurisdiction may be a State, County, or Municipality. Election elements are children of the jurisdiction elements. Following the preface will be the document elements for the specific data exchange and, subsequently, the document close. A sample of that preface follows:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<EDX xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xsi:noNamespaceSchemaLocation="file://server/EDX.xsd"
     country="us"
     creationDateTime="2006-11-01T10:10:10">
  <County code="TRAVIS"
          name="County of Travis"
          id="57"
          state="TX">

<!--the specific document message elements go in here -->

  </County>
</EDX>
```

5.1 Voter Roll

EDX provides support for the exchange of Voter Roll information through its **PollBook** element. It supports the required voter roll data elements as follows:

> Voter Name – **PersonName** element (individual name parts are attributes within it: **lastName**, **firstName**, …).

> Voter Identifier – **vuid** attribute within the **Identity** element

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[2] EDX is an XML schema provided by Hart InterCivic who has donated EDX for the general good …

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Registered Address – **ResidentialAddress** element (various parts of the address are individual attributes within this element: **blockNumber**, **streetName**, **city**, **state**)

Ballot Form identifier to be used – **ballotStyleId** attribute within the **VoterCurrentData** element

Language Preference – **lang** attribute within the **VoterCurrentData** element

EDX provides support for the optional voter roll data elements as follows:

Identification Validation – **idNumber** attribute and **idType** attribute within the **Identity** element. The values may be validated against the poll book elements:

Social Security Number – **ssn** attribute within the **Identity** element

Driver's License Number – **idNumber** attribute and **idType** attribute within the **Identity** element

Military Identification Card – **idNumber** attribute and **idType** attribute within the **Identity** element

State-issued Identification Card – **idNumber** attribute and **idType** attribute within the **Identity** element

Date of Birth – **dateOfBirth** attribute within the **Identity** element

Image of person's signature – **SignatureImage** element within the **VoterCurrentData** element

Right to Vote Token Identifier – EDX uses the **RightToVoteToken** element within **VoterCurrentData** element to exchange the hashed value of the voter's right to vote token.

The production of a Voter Roll using EDX is represented in the following example. It is important to note that the sample shows only the portion of the XML document pertaining to Voter Roll and that it is usable only in context (i.e., contained in an EDX document for a specified county and election)::

```
<EDX> <County> <Election>
<PollBook>
  <VoterCurrentData lang="en-US">
    <Identity ssn="123456789"
                    idNumber="123456789"
                    idType="federalID"
                    dateOfBirth="1901-02-03"
                    vuid="A1B2-987654"/>
    <PersonNameList>
      <PersonName lastName="Brown" firstName="Frank"/>
    </PersonNameList>
    <SignatureImage mimeType="base64Binary"></SignatureImage>
    <ResidentialAddress blockNumber="1234"
                    streetName="Main Street"
                    city="Hometown"
                    state="DC" />
    <VoterAssignment plan="ballotform02A"/>
    <RightToVoteToken type="SHA-256"
token="1A2B3C4D5E6F7A8B9C0D1E2F3A4B5C6D1A2B3C4D5E6F7A8B9C0D1E2F3A4B5C6D"/>
  </VoterCurrentData>
```

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```
    <VoterCurrentData lang="ga">
      <Identity ssn="321549876"
                     idNumber="123456790"
                     idType="MilitaryID"
                     dateOfBirth="1951-02-03"
                     vuid="A1B2-987653"/>
      <PersonNameList>
        <PersonName lastName="Jones" firstName="Mary"/>
      </PersonNameList>
      <SignatureImage mimeType="base64Binary"></SignatureImage>
      <ResidentialAddress blockNumber="1234"
                     streetName="Main Street"
                     city="Hometown"
                     state="DC" />
      <VoterAssignment plan="ballotform59"/>
      <RightToVoteToken type="SHA-256"
token="2A2B3C4D5E6F7A8B9C0D1E2F3A4B5C6D1A2B3C4D5E6F7A8B9C0D1E2F3A4B5C6D"/>
    </VoterCurrentData>
    <VoterCurrentData lang="el">
      <Identity ssn="987654321"
                     idNumber="123456791"
                     idType="DriverLicense"
                     dateOfBirth="1989-02-03"
                     vuid="A1B2-987650"/>
      <PersonNameList>
        <PersonName lastName="Smith" firstName="Joseph"/>
      </PersonNameList>
      <SignatureImage mimeType="base64Binary"></SignatureImage>
      <ResidentialAddress blockNumber="1236"
                     streetName="Main Street"
                     city="Hometown"
                     state="DC" />
      <VoterAssignment plan="ballotform01"/>
      <RightToVoteToken type="SHA-256"
token="3A2B3C4D5E6F7A8B9C0D1E2F3A4B5C6D1A2B3C4D5E6F7A8B9C0D1E2F3A4B5C6D"/>
    </VoterCurrentData>
  </PollBook>
</Election> </County> </EDX>
```

5.2 Voting History

EDX provides support for the required voting history data elements through the **VoterDataList** element, as follows:

> Voter Identifier – **vuid** attribute within the **Identity** element

> Identifier for the Election Voted In – **election** attribute within the **VotingActivity** element

EDX provides support for the optional voting history data elements as follows:

> Identification Validation – **idNumber** attribute and the **idType** attribute within the **Identity** element

> Voter Signature Image – **SignatureImage** element within the **VotingActivity** element

> Social Security Number – **ssn** attribute within the **Identity** element

The production of a Voting History using EDX is represented in the following example. It is important to note that the sample shows only the portion of the XML document pertaining to Voting History and that it

is usable only in context (i.e., contained in an EDX document for a specified county; unlike most examples, the **VoterDataList** is not a child of an **Election**, it resides directly under the jurisdictional element [**County, State, or Municipality**]):

```
<EDX> <County>
<VoterDataList>
    <!--  /* voter 12291688 voted */ -->
  <VoterData >
    <Identity  vuid="12291688"
               idNumber="drivelicnumb"
               idType="DL"
               issuingState="TX"
               ssn="231459876"/>
    <VoterNarrativeList>
     <VoterNarrative id="vNidentifier001" type="sig">
       <VoterNarrativeImage mimeType="image/gif"></VoterNarrativeImage>
     </VoterNarrative>
    </VoterNarrativeList>
    <VotingHistory>
     <VotingActivity time="2006-01-03T18:20:00"
                     type="ED"
                     election="electionIdentifier"
                     voterNarrative="vNidentifier001" >
       <SignatureImage mimeType="image/gif"></SignatureImage>
     </VotingActivity>
    </VotingHistory>
  </VoterData>

    <!--  /* voter 18 voted */ -->
  <VoterData >
    <Identity  vuid="18"
               idNumber="USN123456"
               idType="MilID"
               ssn="231459876"/>
    <VoterNarrativeList>
     <VoterNarrative id="vNidentifier002" type="sig">
       <VoterNarrativeImage mimeType="image/gif"></VoterNarrativeImage>
     </VoterNarrative>
    </VoterNarrativeList>
    <VotingHistory>
     <VotingActivity time="2006-01-03T09:20:00"
                     type="ED"
                     election="electionIdentifier"
                     voterNarrative="vNidentifier002" >
       <SignatureImage mimeType="image/gif"></SignatureImage>
     </VotingActivity>
    </VotingHistory>
  </VoterData>
</VoterDataList>
</County> </EDX>
```

5.3 Election Definition

EDX provides support for the required election definition data elements through the **Election** element, as follows:

Information about the Election – EDX uses the **Election** element to transport election level information. The various pieces inside the election are handled as follows:

Election identifier – **altId** attribute of the **Alias** element with a source="**CODE"**

Election name – EDX uses the **name** attribute within the **Election** element to transport this information

Election Jurisdiction – the jurisdiction is the parent to an election in EDX; it can be the **State** element, the **County** element, or the **Municipality** element.

Election date – **date** attribute within the **Election** element

Type of election – **type** attribute within the **Election** element; additionally, the **isFederal** attribute within the **Election** element provides indication of that specific type

Information about the Ballot Forms – EDX uses the **BallotStyles** element to transport the listing of all ballot forms to be used in the specified election; each ballot form is a **BallotStyle** child element of the **BallotStyles** element.

Ballot Form identifier – **name** attribute within the **BallotStyle** element

Contests on the Ballot Form – EDX uses the **BallotStyleContest** element; the grouping of all **BallotStyleContest** elements is a **BallotStyleContests** element within the **BallotStyle** element,

Information about the Contests – EDX transports the grouping of contests for an election in the **Contests** element. Each contest in the group is a **Contest** element within that **Contests** element

Contest identifier –**altId** attribute of the **Alias** element with a source="**CODE"**

Contest title – **name** attribute within the **Contest** element

Type of contest – **type** attribute within the **Contest** element

Write-in vote maximum – **maxWriteins** attribute within the **Contest** element

Vote maximum – **maxVotes** attribute within the **Contest** element

Cumulative voting indicator – **isCumulative** attribute within the **Contest** element

Federal contest indicator – **isFederal** attribute within the **Contest** element

Contest rotation indicator – **rotateChoices** attribute within the **Contest** element

Party affiliation indicator – **party** attribute within the **Contest** element

Straight party indicator – **inStraightParty** attribute within the **Contest** element

Party specific indicator – **partyMembersOnly** attribute within the **Contest** element

Choices – EDX transports the grouping of all choices for a specified contest in the **Choices** element. Each choice in the grouping is a **Choice** element within that **Choices** element

Choice identifier – **altId** attribute of the **Alias** element with a source="**CODE"**

Name of choice – **name** attribute within the **Choice** element

Choice display order – **displayOrder** attribute within the **Choice** element

Choice party – **party** attribute within the **Choice** element

Choice type – **type** attribute within the **Choice** element

Parties – Party within Parties (a container for an iteration of the individual items)

Party identifier – **code** attribute within the **Party** element

Party name – **name** attribute within the **Party** element

Non-Party indicator – **isUnaffiliatedParty** attribute within the **Party** element

EDX provides support for the optional election definition data elements as follows:

Candidate Filing Deadline – **candidateFilingDeadline** attribute of the **Contest** element

Voter Registration Deadline – **cutOffDays** attribute within the **Election** element (specified as the number of days prior to the election)

Jurisdictions – EDX uses the jurisdiction as the main element, from which the election and its children stem. A list of jurisdictions is therefore derived by capturing all jurisdiction documents that contain a given election. When multiple jurisdictions are contained in a single document, each jurisdiction in a given document must also be checked for the existence of the given election.

Districts – a list of the districts for a specified election can be derived from the **Districts** element within the **Election** element for the specified election

Polling Places – a list of the polling places that will be used for the specified election can be derived from the **ElectionPollingPlaces** element within **ElectionDefinition**

Precincts – a list of the precincts that will be used for the specified election can be derived from the Precincts element within the Election element for the specified election. When precinct splits are used by the jurisdiction, the **Splits** child element of the **Precinct** element is used to carry the split information.

Languages Supported (support for multiple languages may be reflected in additional detail elements for many elements) a list of the languages that will be supported for a specified election can be derived from the SupportedLanguageList element for all jurisdictions in an election

Party Display Order – **displayOrder** attribute within the **Party** element

Candidate Incumbency – **isIncumbent** attribute within the **Choice** element

Candidate Certification – **isCertifiedWriteIn** attribute of the **Choice** element

The production of an Election Definition using EDX is represented in the following example. It is a child element of the County element in EDX.

The following example shows:

- An election event that is a "General Election" to be held on December 10, 2006. Since this election event has state-wide contests and municipal elections, the state is managing the event and the election with state-wide contests, while the local municipality is managing the municipal election.

- There are three political parties involved in the election event: Democrat, Independent, and Republican.

- There are two elections in the event.
    - o The first election in the event is a Federal election that has two contests.
        - ▪ The first contest is for President and Vice President. There are three choices for that contest: 1) Homer Smith and Marge Smith, 2) Damond and Blondie Baker, and 3) Charles Brown and Sam Jones. Homer is running from the Democrat party, Damond is running independently (not associated with a party), and Charles Brown is running from the Republican party.
        - ▪ The second contest is for 1st District seat for the US House of Representatives. There are two choices for that contest: 1) Ben Jones, and 2) Mary Adams. Ben Jones is running from the Democrat party and Mary Adams is running from the Republican party.
    - o The second election in the event is a Municipal election for Mayor. The contest for Mayor is the only contest in this election. Pauline Parker is the Democratic candidate for this office and Red Wright is the Republican candidate.
    - o Candidate rotation is used by the managing authority and the initial display order for each contest's candidates is 1/2/3, 1/2, and 2/1, respectively.

- There are two ways to vote in this election event (a.k.a., "channels"). Those are in-person at the polling place ("DRE") and absentee/early by mail ("votebymail").

- There are two in-person polling locations. Polling location 1 is used for individuals from Precinct 001. Polling location 2 is used for individuals from Precinct 002a and 002b. The contest for President/Vice President is open to all and has a global district. The contest for US House District 1 has a district that includes only those voters in Precinct 001 and Precinct 002b. The voters residing in the incorporated area of the municipality (i.e., Precinct 002a) form the district that is entitled to vote in the mayoral race. There is also a vote-by-mail polling location.

- Five languages are supported for this event: US English, Greek, Irish, Polish, and Yiddish. The default language is US English.

- What is traditionally called "Election Day" is the period for on-site voting at the polling location, which begins at 8:00 A.M. and ends at 8:00 P.M. Early/Absentee voting are begun 2 weeks prior

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to Election Day. This means the elections (and the event) begin at 00:01 A.M on November 27th and end at the poll closing time of 8:00 P.M. on December 10th.

```
<EDX>

  <State code="MyState"
         name="The State of MyState"
         state="AZ"
         id="001"  >

      <DistrictTypeList>
        <DistrictType id="Fed01" code="FedPresVP"/>
        <DistrictType id="Fed02" code="FedUsHouse"/>
      </DistrictTypeList>

      <Districts>
        <District id="Fed0101"
                  code="FedPresVP"
                  districtType="Fed01"
                  name="US House District 1"
                  displayOrder="1"/>
        <District id="Fed0201"
                  code="FedUsH01"
                  districtType="Fed02"
                  name="US House District 1"
                  displayOrder="2"/>
      </Districts>

      <Election  id="Election20061210F"
          name="MyState Federal Offices Election of December 10, 2006"
          date="2006-12-10"
          type="GE"
          isFederal ="true"
          isFinalized="true"
          guid="1xxx2xxx3xxx4xxx"
          version="1.0"
          rotationMethod="BP"
          trackVotersByParty="false"
          straightParty="false"
          status="FR"
          cutOffDays="30">
      <Aliases>
        <Alias altID="externalelectionid" source="CODE" />
      </Aliases>

      <Parties>
        <Party  id="1"
              crossOver="false"
              displayOrder="1"
              isUnaffiliatedParty="false"
              name="Democrat"
              code="DEM"/>
        <Party  id="2"
              crossOver="false"
              displayOrder="2"
              isUnaffiliatedParty="false"
              name="Republican"
              code="REP"/>
        <Party  id="3"
              crossOver="true"
              displayOrder="3"
              isUnaffiliatedParty="true"
              name="no party"
              code="npy"/>
      </Parties>

      <Contests>
        <Contest id="11"
              name="President and Vice President"
              type="OF"
              inStraightParty="true"
```

```
                    isCumulative="false"
                    isFederalContest="true"
                    maxWriteIns="1"
                    rotateChoices="true"
                    maxVotes="1"
                    partyMembersOnly="false"
                    displayOrder="1">
            <Aliases>
              <Alias altId="externalContest11Id" source="CODE" />
            </Aliases>
            <Choice id="111"
                    name="Homer Smith and Marge Smith"
                    type="CD"
                    partyCode="1"
                    displayOrder="1"
                    isIncumbent="false">
              <Aliases>
                <Alias altId="externalChoice111Id" source="CODE" />
              </Aliases>
            </Choice>
            <Choice id="112"
                    name="Charles Brown and Sam Jones"
                    type="CD"
                    partyCode="2"
                    displayOrder="2"
                    isIncumbent="false">
              <Aliases>
                <Alias altId="externalChoice112Id" source="CODE" />
              </Aliases>
            </Choice>
            <Choice id="113"
                    name="Damond and Blondie Baker"
                    type="CD"
                    partyCode="3"
                    displayOrder="3"
                    isIncumbent="false">
              <Aliases>
                <Alias altId="externalChoice113Id" source="CODE" />
              </Aliases>
            </Choice>
          </Contest>
          <Contest id="12"
                   name="US House of Representatives District 1"
                   type="OF"
                   inStraightParty="true"
                   isCumulative="false"
                   isFederalContest="true"
                   maxWriteIns="1"
                   rotateChoices="true"
                   maxVotes="1"
                   partyMembersOnly="false"
                   displayOrder="2">
            <Aliases>
              <Alias altId="externalContest12Id" source="CODE" />
            </Aliases>
            <Choice id="121"
                    name="Ben Jones"
                    type="CD"
                    partyCode="1"
                    displayOrder="1"
                    isIncumbent="false">
              <Aliases>
                <Alias altId="externalChoice121Id" source="CODE" />
              </Aliases>
            </Choice>
            <Choice id="122"
                    name="Mary Adams"
                    type="CD"
                    partyCode="2"
                    displayOrder="2"
                    isIncumbent="false">
```

```
                    <Aliases>
                      <Alias altId="externalChoice122Id" source="CODE" />
                    </Aliases>
                  </Choice>
              </Contest>
          </Contests>

          <BallotStyles>
            <BallotStyle name="ballotstyle01">
                <BallotStyleContests>
                    <BallotStyleContest contest="11"/>
                    <BallotStyleContest contest="12"/>
                </BallotStyleContests>
            </BallotStyle>
            <BallotStyle name="ballotstyle02">
                <BallotStyleContests>
                    <BallotStyleContest contest="12"/>
                </BallotStyleContests>
            </BallotStyle>
          </BallotStyles>

          <BallotLanguages>
            <BallotLanguage code="en-US">
              <Name><DisplayText>US English</DisplayText></Name>
            </BallotLanguage>
            <BallotLanguage code="ga">
              <Name><DisplayText>Irish</DisplayText></Name>
            </BallotLanguage>
            <BallotLanguage code="el">
              <Name><DisplayText>Modern Greek</DisplayText></Name>
            </BallotLanguage>
            <BallotLanguage code="pl">
              <Name><DisplayText>Polish</DisplayText></Name>
            </BallotLanguage>
            <BallotLanguage code="yi">
              <Name><DisplayText>Yidish</DisplayText></Name>
            </BallotLanguage>
          </BallotLanguages>

          <Precincts>
            <Precinct id="001"
                    code="P-001"
                    name="Precinct 001"
                    displayOrder="1"
                    isAbsentee="false">
            </Precinct>
            <Precinct id="002"
                    code="P-002"
                    name="Precinct 002"
                    displayOrder="2"
                    isAbsentee="false">
              <Splits>
                <Split id="002a"
                      name="Precinct 002 - Split a"
                      displayOrder="1"/>
                <Split id="002b"
                      name="Precinct 002 - split b"
                      displayOrder="2"/>
              </Splits>
            </Precinct>
          </Precincts>

          <PollingPlaces>
            <PollingPlace name="DescriptiveNameForPollingLocation1"
                          id="PP-001">
              <Description>
                The First Avenue Elementary School Gym
              </Description>
              <PrecinctSplitPolls>
                  <PrecinctSplitPoll precinct="001" votingMethod="DRE"/>
              </PrecinctSplitPolls>
```

```
            </PollingPlace>
            <PollingPlace name="DescriptiveNameForPollingLocation2"
                          id="PP-002">
              <Description>Municipal Library on Broadway</Description>
              <PrecinctSplitPolls>
                <PrecinctSplitPoll precinct="002"
                                   split="002a"
                                   votingMethod="DRE"/>
                <PrecinctSplitPoll precinct="002"
                                   split="002b"
                                   votingMethod="DRE"/>
              </PrecinctSplitPolls>
            </PollingPlace>
            <PollingPlace name="votebymail" id="PO987651234">
              <Description>Vote-by-Mail PO Box 987651234</Description>
            </PollingPlace>
          </PollingPlaces>

          <DistrictContests>
            <DistrictContest district="Fed0101" contest="11"/>
            <DistrictContest district="Fed0201" contest="12"/>
          </DistrictContests>

          <DistrictPrecinctSplits>
            <DistrictPrecinctSplit district="Fed0201"
                                   isIntegral="false"
                                   precinct="002"
                                   split="002a"/>
            <DistrictPrecinctSplit district="Fed0201"
                                   isIntegral="true"
                                   precinct="002"
                                   split="002b"/>
          </DistrictPrecinctSplits>

          <PrecinctSplitContests>
            <PrecinctSplitContest contest="11" precinct="001" />
            <PrecinctSplitContest contest="12" precinct="001" />
            <PrecinctSplitContest contest="11" precinct="002" split="002a"/>
            <PrecinctSplitContest contest="11" precinct="002" split="002b"/>
            <PrecinctSplitContest contest="12" precinct="002" split="002b"/>
          </PrecinctSplitContests>

        </Election>
      </State>

      <Municipality code="SxxxMxxxx"
                    cutoffDays="30"
                    id="Munixxxx"
                    name="Municipality"
                    state="AZ">

        <DistrictTypeList>
          <DistrictType id="Mun001" code="MunIncorporated"/>
          <DistrictType id="Mun002" code="MunUnincorporated"/>
        </DistrictTypeList>

        <Districts>
          <District id="M001"
                    code="Municipal-Incorporated"
                    districtType="Mun001"
                    name="Incorporated Area of Municipality"
                    displayOrder="1"/>
          <District id="M002"
                    code="Municipal-Unincorporated"
                    districtType="Mun002"
                    name="Unincorporated Area of Municipality"
                    displayOrder="2"/>
        </Districts>

        <Election id="Election20061210M"
              name="Municipality General Election of December 10, 2006"
```

```
                    date="2006-12-10"
                    type="GE"
                    isFederal="false"
                    isFinalized="true"
                    guid="1xxx2xxx3xxx4yyy"
                    version="1.0"
                    rotationMethod="BP"
                    trackVotersByParty="false"
                    straightParty="false"
                    status="FR"
                    cutOffDays="30">

          <Parties>
            <Party id="1"
                   crossOver="false"
                   displayOrder="1"
                   isUnaffiliatedParty="false"
                   name="Democrat"
                   code="DEM"/>
            <Party id="2"
                   crossOver="false"
                   displayOrder="2"
                   isUnaffiliatedParty="false"
                   name="Republican"
                   code="REP"/>
          </Parties>

          <Contests>
            <Contest id="31"
                     name="Mayor of Municipality"
                     type="OF"
                     inStraightParty="true"
                     isCumulative="false"
                     isFederalContest="false"
                     maxWriteIns="1"
                     rotateChoices="true"
                     maxVotes="1"
                     partyMembersOnly="false"
                     displayOrder="1">
              <Aliases>
                <Alias altId="externalContestId" source="CODE" />
              </Aliases>
              <Choice id="311"
                      name="Pauline Parker"
                      type="CD"
                      partyCode="1"
                      displayOrder="2"
                      isIncumbent="false">
                <Aliases>
                  <Alias altId="externalChoice311Id" source="CODE" />
                </Aliases>
              </Choice>
              <Choice id="312"
                      name="Red Wright"
                      type="CD"
                      partyCode="2"
                      displayOrder="1"
                      isIncumbent="false">
                <Aliases>
                  <Alias altId="externalChoice312Id" source="CODE" />
                </Aliases>
              </Choice>
            </Contest>
          </Contests>

          <BallotLanguages>
            <BallotLanguage code="en-US">
              <Name><DisplayText>US English</DisplayText></Name>
            </BallotLanguage>
            <BallotLanguage code="ga">
              <Name><DisplayText>Irish</DisplayText></Name>
```

```
        </BallotLanguage>
        <BallotLanguage code="el">
          <Name><DisplayText>Modern Greek</DisplayText></Name>
        </BallotLanguage>
        <BallotLanguage code="pl">
          <Name><DisplayText>Polish</DisplayText></Name>
        </BallotLanguage>
        <BallotLanguage code="yi">
          <Name><DisplayText>Yidish</DisplayText></Name>
        </BallotLanguage>
      </BallotLanguages>

      <Precincts>
        <Precinct id="002"
                code="P-002"
                name="Precinct 002"
                displayOrder="2"
                isAbsentee="false">
          <Splits>
            <Split id="002a"
                name="Precinct 002 - Split a"
                displayOrder="1"/>
            <Split id="002b"
                name="Precinct 002b - Split b"
                displayOrder="2"/>
          </Splits>
        </Precinct>
      </Precincts>

      <PollingPlaces>
        <PollingPlace name="DescriptiveNameForPollingLocation2"
                    id="PP-002">
          <Description>Municipal Library on Broadway</Description>
          <PrecinctSplitPolls>
            <PrecinctSplitPoll precinct="002"
                            split="002a"
                            votingMethod="DRE"/>
            <PrecinctSplitPoll precinct="002"
                            split="002b"
                            votingMethod="DRE"/>
          </PrecinctSplitPolls>
        </PollingPlace>
        <PollingPlace name="votebymail" id="PO0987651234">
          <Description>Vote-by-Mail PO Box 987651234</Description>
        </PollingPlace>
      </PollingPlaces>

      <DistrictContests>
        <DistrictContest district="M001" contest="31"/>
      </DistrictContests>

      <DistrictPrecinctSplits>
        <DistrictPrecinctSplit district="M001"
                            isIntegral="true"
                            precinct="002"
                            split="002a"/>
        <DistrictPrecinctSplit district="M001"
                            isIntegral="false"
                            precinct="002"
                            split="002b"/>
      </DistrictPrecinctSplits>

      <PrecinctSplitContests>
        <PrecinctSplitContest contest="31" precinct="002" split="002a"/>
      </PrecinctSplitContests>

    </Election>
  </Municipality>
</EDX>
```

5.4 Ballot Form

The production of a Ballot Form using EDX is represented in the following example.

In EDX, the Ballot Forms are referenced as the **BallotStyle** element, within an **Election** element. EDX supports the minimum information for a Ballot Form as follows.

>The identifier of the individual form – **name** attribute within the **BallotStyle** element

>The election event for which this ballot form is to be used – the **Election** element that is the parent element for the given **BallotStyle** element.

>The elections that are included on this ballot form – in EDX this would be a unique relationship (one-and-only-one **Election** may be the parent of the **BallotStyle**.

>Each contest item, including the specific election it is for, on the ballot form. An indication of the number of choices that may be selected for the specified contest, by the voter, must be included. – As shown below, each **BallotStyle** uses the **BallotStyleContests** element to enumerate the contests it contains. All other information about the contests, including the choices, is contained in the Election Definition.

>>Contest display order – (see note in parent paragraph, above)

>The choices that are available, including the specific contest they are for, on the ballot form – (see note in previous paragraph).

>The parties (a generic term, including political and apolitical endorsements) associated with each choice available on the ballot form – (see note in previous paragraph).

Additional data that may be provided is:

>Language – EDX uses the **BallotLanguages** element to indicate the languages that are supported in an election. [add] It also uses the **BallotStyleLanguages** element and the **code** attribute of its **BallotStyleLanguage** child element to exchange the languages associated with a given ballot style.

>Auditory content for a given ballot form is required for support of those with certain disabilities, under the Help America Vote Act (HAVA). A ballot form that includes auditory support must provide that same auditory information for exchange – EDX does not support exchange of auditory information.

>Graphical elements may be provided on ballots. They may include party or jurisdiction logos, candidate photos, and other items. Such graphical elements may be provided for exchange – EDX provides _____.

It is important to note that the sample shows only the portion of the XML document pertaining to Ballot Forms and that it is usable only in context (i.e., contained in an EDX document for a specified county and election):

```
<EDX> <County> <Election>
  <BallotStyles>
    <BallotStyle name="MyBallotStyle1" partyCode="PAF">
      <BallotStyleContests>
        <BallotStyleContest contest="11"/>
        <BallotStyleContest contest="22"/>
        <BallotStyleContest contest="33"/>
      </BallotStyleContests>
      <BallotStyleLanguages>
        <BallotStyleLanguage code="EN"/>
      </BallotStyleContests>
    </BallotStyle>
    <BallotStyle name="MyBallotStyle2" partyCode="PAF">
      <BallotStyleContests>
        <BallotStyleContest contest="11"/>
        <BallotStyleContest contest="21"/>
        <BallotStyleContest contest="31"/>
      </BallotStyleContests>
      <BallotStyleLanguages>
        <BallotStyleLanguage code="EN"/>
        <BallotStyleLanguage code="SP"/>
      </BallotStyleContests>
    </BallotStyle>
  </BallotStyles>

  <BallotLanguages>
    <BallotLanguage code="EN">
      <Name>
        <DisplayText>English</DisplayText>
      </Name>
    </BallotLanguage>
    <BallotLanguage code="SP">
      <Name>
        <DisplayText>Spanish</DisplayText>
      </Name>
    </BallotLanguage>
  </BallotLanguages>
</Election> </County> </EDX>
```

5.5 Cast Ballot

The production of a Cast Ballot using EDX is represented in the following example.

In EDX, Cast Ballot information is transported in the **CastVoteRecords** element.   The required information that must be exchanged is supported by EDX as follows:

Each cast ballot within a given election is included as a **CastVoteRecord** child under the **CastVoteRecords** element.

Each Contest on the given ballot is listed as a **ContestVote** child element of the **CastVoteRecord**.

The choice selected for the contest is provided as a **choice** attribute of the **CastVote** element.

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The value associated with that choice (normally 1, unless an irregular voting method is used for the contest) is provided in the **count** attribute of the **CastVote** element.

When multiple selections are made for a given contest on the specified ballot, multiple **CastVote** elements will be included as children of the **CastVoteRecord**.

The location where the ballot was cast (e.g., precinct, precinct split, polling location) EDX uses the **castPollingPlace** attribute to the **CastVoteRecord** element to exchange the location where the ballot was cast..

The status of the ballot (e.g., provisional, accepted, rejected, spoilt)

EDX uses the **provisional** attribute of the **CastVoteRecord** element to indicate provisional status

EDX uses the **status** attribute of the **CastVoteRecord** element to indicate the status as accepted, rejected, or spoiled.

EDX supports the exchange of the additional data that may be provided as follows:

Ballot Form – EDX uses the **ballotStyle** attribute of the **CastVoteRecord** element for this information

External Ballot Identifier – The External Ballot Identifier is provided as a **castBallotId** attribute of the **CastVote** element. Where jurisdictions do not allow the exchange of actual ballot serial numbers, this may be a generated value allowing correlation of votes cast on an individual ballot, while not tying those votes back to the actual document on which they were cast.

Device Identifier – [add] EDX uses the **castDevice** attribute of the **CastVoteRecord** element to transfer the external identifier of the device used to cast this ballot.

The following sample is based upon the sample Election Definition given earlier (see, 5.3). It contains two cast ballots for the Federal election and two cast ballots for the municipal election. It is important to note that the sample shows only the portion of the XML document pertaining to Cast Ballots and that it is usable only in context (i.e., contained in an EDX document):

```
<EDX>
<State code="MyState" name="The State of MyState" id="001" state="AZ" >
   <Election name="Election20061210F" status="TA">
     <CastVoteRecords votingMethod="EV">
      <CastVoteRecord ballotStyle="A12B34"
                      provisional="true"
                      status="Accepted"
                      castPollingPlace="xyz"
                      castDevice="m321s98765432">
       <ContestVote contest="11">
         <CastVote castBallotId="1" choice="111" count="1"/>
       </ContestVote>
       <ContestVote contest="12">
         <CastVote castBallotId="1" choice="121" count="1"/>
       </ContestVote>
      </CastVoteRecord>
      <CastVoteRecord>
       <ContestVote contest="11">
         <CastVote castBallotId="2" choice="112" count="1"/>
```

```
        </ContestVote>
        <ContestVote contest="12">
          <CastVote castBallotId="2" choice="122" count="1"/>
        </ContestVote>
      </CastVoteRecord>
    </CastVoteRecords>
  </Election>

  <Election name="Election20061210M" status="TA">
    <CastVoteRecords votingMethod="EV">
      <CastVoteRecord ballotStyle="A12B34"
                      provisional="true"
                      status="Accepted"
                      castPollingPlace="xyz"
                      castDevice="m321s98765432">
        <ContestVote contest="31">
          <CastVote castBallotId="1" choice="311" count="1"/>
        </ContestVote>
      </CastVoteRecord>
      <CastVoteRecord>
        <ContestVote contest="31">
          <CastVote castBallotId="2" choice="312" count="1"/>
        </ContestVote>
      </CastVoteRecord>
    </CastVoteRecords>
  </Election>
</State>
</EDX>
```

5.6 Tabulation Report

The production of a Tabulation Report using EDX is represented in the following example:

EDX supports the exchange of the required Tabulation Report information as follows:

The **ElectionTally** element is used to carry the tabulation information for an election. The **ElectionTally** element is a child of the **Election** element.

The location – the precinct for which the tally is given is identified by the **precinct** attribute of the **PrecinctTally** element, which is a child of the **ElectionTally** element.

The jurisdiction – as in most EDX documents, the jurisdiction is the parent for the election. In the sample given below, the State is the election owner. The external identifier for the state is the **code** attribute of the **State** element.

The election – as in most EDX documents, the **Election** is the child element of the jurisdiction and it contains all the other tabulation elements. The **name** attribute of the **Election** element is used to identify it.

The contest – is provided by the **contest** attribute of the **ContestTally** element, which is a child of the **PrecinctTally** element.

The choice – is provided by the **choice** attribute of the **CastVoteTally** element, which is a child of the **ContestTally** element.

The accumulated election/contest/choice value – the **count** attribute of the **CastVoteTally** element provides the accumulated value for the specified choice.

The number of registered voters in the specified tabulation group. Values can be calculated by rolling up from the lowest level grouping.

The number of voters casting ballots in the specified tabulation group. Values can be calculated by rolling up from the lowest level grouping.

The number of ballots cast (may be different than number of voters casting ballots if there are multiple ballots included in the election). Values can be calculated by rolling up from the lowest level grouping.

The number of precincts included – the user can derive the number of precincts included in the tabulation by counting up those that are provided in the document..

EDX supports the exchange of the additional Tabulation Report information that may be provided as follows:

The device identifier (for device level reports) – EDX does not currently support a tally at the device level; its lowest level tally is at the precinct-split level.

Additional location information – EDX provides polling locations, districts, and jurisdiction information in the election definition, which may be used to combined the tabulation information into various levels and sub-levels.

The number of provisional ballots and a tabulation of the content of those provisional ballots. EDX provides provisional ballots in its tabulations using the **Provisional** value for the **votingMethod** attribute of the **ElectionTally** element.

The following example shows a tabulation report that correlates to the Election Definition example provided earlier (see 5.3). This election has ballots being cast at a precinct-split level

A user could use the election definition information to determine the list of precincts in each polling location and in the jurisdiction; coupled with the group of precinct tabulation information for all precincts, the user could aggregate upward to the polling location or the jurisdiction.

It is important to note that the sample shows only the portion of the XML document pertaining to the Tabulation Report and that it is usable only in context (i.e., contained in an EDX document for a specified county and election):

```
<EDX>
  <State code="MyState" name="The State of MyState" id="001" state="AZ" >
    <Election name="Election20061210F" status="TA">
      <ElectionTally status="UN" votingMethod="x" disposition="Replace">
        <PrecinctTally precinct="001">
          <ContestTally contest="11" underVotes="0" overVotes="0">
            <CastVoteTally choice="111" count="10"/>
            <CastVoteTally choice="112" count="20"/>
          </ContestTally>
          <ContestTally contest="12" underVotes="0" overVotes="0">
            <CastVoteTally choice="121" count="11"/>
            <CastVoteTally choice="122" count="21"/>
```

```
          </ContestTally>
        </PrecinctTally>
        <PrecinctTally precinct="002">
          <SplitTally  split="002a">
            <ContestTally contest="11" underVotes="0" overVotes="0">
              <CastVoteTally choice="111" count="12"/>
              <CastVoteTally choice="112" count="22"/>
            </ContestTally>
          </SplitTally>
          <SplitTally split="002b">
            <ContestTally contest="11" underVotes="0" overVotes="0">
              <CastVoteTally choice="111" count="13"/>
              <CastVoteTally choice="112" count="23"/>
            </ContestTally>
            <ContestTally contest="12" underVotes="0" overVotes="0">
              <CastVoteTally choice="121" count="14"/>
              <CastVoteTally choice="122" count="24"/>
            </ContestTally>
          </SplitTally>
        </PrecinctTally>
      </ElectionTally>

      <ElectionTally status="UN
                     votingMethod="Provisional"
                     disposition="Replace">
        <PrecinctTally precinct="001">
          <ContestTally contest="11" underVotes="0" overVotes="0">
            <CastVoteTally choice="111" count="1"/>
            <CastVoteTally choice="112" count="2"/>
          </ContestTally>
          <ContestTally contest="12" underVotes="0" overVotes="0">
            <CastVoteTally choice="121" count="1"/>
            <CastVoteTally choice="122" count="2"/>
          </ContestTally>
        </PrecinctTally>
        <PrecinctTally precinct="002">
          <SplitTally  split="002a">
            <ContestTally contest="11" underVotes="0" overVotes="0">
              <CastVoteTally choice="111" count="1"/>
              <CastVoteTally choice="112" count="2"/>
            </ContestTally>
          </SplitTally>
          <SplitTally split="002b">
            <ContestTally contest="11" underVotes="0" overVotes="0">
              <CastVoteTally choice="111" count="3"/>
              <CastVoteTally choice="112" count="3"/>
            </ContestTally>
            <ContestTally contest="12" underVotes="0" overVotes="0">
              <CastVoteTally choice="121" count="4"/>
              <CastVoteTally choice="122" count="4"/>
            </ContestTally>
          </SplitTally>
        </PrecinctTally>
      </ElectionTally>
    </Election>

    <Election name="Election20061210M" status="TA">
      <ElectionTally  status="UN" votingMethod="x" disposition="Replace">
        <PrecinctTally precinct="002">
          <SplitTally split="002a">
            <ContestTally contest="31" underVotes="1" overVotes="0">
              <CastVoteTally choice="311" count="17"/>
              <CastVoteTally choice="312" count="16"/>
            </ContestTally>
          </SplitTally>
        </PrecinctTally>
      </ElectionTally>

      <ElectionTally  status="UN"
                      votingMethod="Provisional"
                      disposition="Replace">
```

```
              <PrecinctTally precinct="002">
                <SplitTally split="002a">
                  <ContestTally contest="31" underVotes="0" overVotes="0">
                    <CastVoteTally choice="311" count="7"/>
                    <CastVoteTally choice="312" count="6"/>
                  </ContestTally>
                </SplitTally>
              </PrecinctTally>
            </ElectionTally>
          </Election>
        </State>
</EDX>
```

5.7 Post Election Canvas Result

The production of a Post Election Canvas Result using EDX is represented in the following example:

A Post Election Canvas Result has one additional requirement to the requirements for a Tabulation Report. That additional requirement is a digital signature that provides assurity that the canvas has been approved and signed by the jurisdiction. EDX supports the production of the Post Election Canvas Result by use of the value of "**CANVAS**" for the **votingMethod** attribute of the **ElectionTally** element. The user would append a digital signature to the end of the **EDX** package using the Digital Signature Standard (DSS) schema; that would require a wrapper around the ElectionTally EDX package. The sample breaks the front-end wrapper and the back-end wrapper to facilitate understanding where the Tally itself exists...

The following block is an example the front-end wrapper:

```
<SignedCanvasResultPackage>

<OptionalOutputs xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:oasis:names:tc:dss:1.0:core:schema
                        http://server/oasis-dss-1.0-core-schema-cd-r5.xsd"
    xmlns="urn:oasis:names:tc:dss:1.0:core:schema">

    <DocumentWithSignature>
        <Document ID="MyEDX">
            <InlineXML>
                <signedEDX>
```

This is an example of the EDX document that is sandwiched between the wrappers:

```
<EDX>
  <State code="MyState" name="The State of MyState" id="001" state="AZ" >
    <Election name="Election20061210F" status="TA">
      <ElectionTally status="OF"
                     votingMethod="CANVAS"
                     disposition="Replace">
        <PrecinctTally precinct="001">
          <ContestTally contest="11" underVotes="0" overVotes="0">
            <CastVoteTally choice="111" count="10"/>
            <CastVoteTally choice="112" count="20"/>
          </ContestTally>
          <ContestTally contest="12" underVotes="0" overVotes="0">
            <CastVoteTally choice="121" count="11"/>
            <CastVoteTally choice="122" count="21"/>
          </ContestTally>
```

```
            </PrecinctTally>
            <PrecinctTally precinct="002">
              <SplitTally split="002a">
                <ContestTally contest="11" underVotes="0" overVotes="0">
                  <CastVoteTally choice="111" count="12"/>
                  <CastVoteTally choice="112" count="22"/>
                </ContestTally>
              </SplitTally>
              <SplitTally split="002b">
                <ContestTally contest="11" underVotes="0" overVotes="0">
                  <CastVoteTally choice="111" count="13"/>
                  <CastVoteTally choice="112" count="23"/>
                </ContestTally>
                <ContestTally contest="12" underVotes="0" overVotes="0">
                  <CastVoteTally choice="121" count="14"/>
                  <CastVoteTally choice="122" count="24"/>
                </ContestTally>
              </SplitTally>
            </PrecinctTally>
          </ElectionTally>
        </Election>
      </State>
</EDX>
```

This is an example of the back-end wrapper:

```
        <SignatureObject>
            <Base64Signature
Type="http://www.w3.org/2000/09/xmldsig#sha256">24xf8vfp3xj4OakfFAnevmzxXY
</Base64Signature>
        </SignatureObject>
      </signedEDX>
      </InlineXML>
      </Document>
    </DocumentWithSignature>
    <Reference>
      <Transforms>
        <Transform Algorithm="EnvelopedSignatureTransform"/>
      </Transforms>
    </Reference>
    <SignatureObject>
      <SignaturePtr WhichDocument="MyEDX"
XPath="OptionalOutputs:DocumentWithSignature:Document:InlineXML:signedEDX:
SignatureObject:Base64Signature"/>
    </SignatureObject>
</OptionalOutputs>


</SignedCanvasResultPackage>
```

6. Reference Embodiment Using EML

A reference embodiment of an XML schema that fulfills the data exchange requirements specified in section 4 of this [DRAFT] standard, is provided by the EML[3] schema. A full rendering of the EML. schema is available at the following url: http://x.y.z/baseEDX.xsd.

In corollary to the data exchange sub-sections in section 4, each such data exchange has a like sub-section in this section.

To be well formed and valid, every EML document will require a document preface to specify the version of EML and the up-front includes, message codes, etc. Following the preface will be the document elements for the specific message and, subsequently, the document close. A sample of that preface follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<EML
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:oasis:names:tc:evs:schema:eml"
  xmlns ="urn:oasis:names:tc:evs:schema:eml"
  xmlns:ts="urn:oasis:names:tc:evs:schema:eml:ts"
  xmlns:ds="urn:oasis:names:tc:evs:schema:eml:ds"
  xmlns:al="urn:oasis:names:tc:ciq:xsdschema:xAL:2.0"
  xmlns:nl="urn:oasis:names:tc:ciq:xsdschema:xNL:2.0"
  xmlns:uscore="urn:uscore"
  Id="eml-310"
  SchemaVersion="4.0">
<!-- replace the 000 in the line below with the correct message #  -->
<!-- this identifies what kind of EML message and how to handle it -->
  <TransactionId>000</TransactionId>

<!--the specific document message elements go in here -->

<!—line below closes the document -->
</EML>
```

EML provides a standard method for Localization of its data exchange messages. That method is the use of Schematron.

A locale establishes requirements for its EML exchanges – such requirements are further restrictions, beyond the base EML schema. Such restrictions might include specific type iterations or message structure types, or extending a base type to require a given attribute.

The end user creates an XML Stylesheet (XSLT) to convert the schematron files into stylesheets. That stylesheet is run against the entire schematron library, creating a library of stylesheets. It is that library of stylesheets that are used to proof-edit your incoming messages before allowing them to be processed. If an error is indicated during the proof-edit, the EML message does not pass the localization and should be

---

[3] EML is an XML schema provided by the Organization for the Advancement of Structured Information Standards (OASIS) …

rejected. If no errors are indicated, the message should be processed. So, the stylesheet that the end user creates to process the library of schematron files should be constructed to produce resulting stylesheets that produce desired results when run against incoming messages. As an example, one practitioner uses a stylesheet that creates an EML 130 message with error codes and element identifiers for any errors detected, thus allowing a rejected message to be returned, indicating what the errors are.

The following paragraphs are copied from the EML specification to help explain how this is accomplished; a flowchart has been included to further aid the reader.

A Schematron schema is an XML document that can be converted to XSLT using an XSLT stylesheet. There is a published stylesheet (skeleton1-5.xslt) that can be used to achieve this. This produces an HTML output from the validation. For EML-UK, we prefer to create an XML file conforming to the 130-response schema to report errors, and convert this for display as a separate process. A separate stylesheet can be produced that will create an output to the specification below. This stylesheet can import the skeleton and just over-ride those aspects where changes are required.

This stylesheet can be used once on each Schematron schema to produce the XSLT file that will be used for validating a specific message type. This stylesheet is then used to transform the incoming EML message into an error report based on the additional EML-UK constraints.

The process is shown in the diagram below.
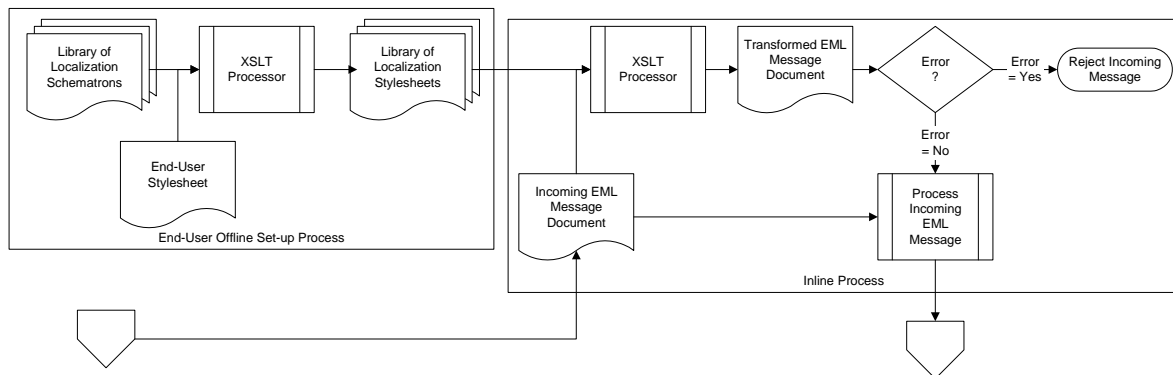
As an example, for the use of EML in the United States, a Localization will be necessary to _____. To accomplish this, a Schematron document would be established as follows:

```
<EML>
   < TransactionId/>
```

That document would then be processed using xxxxx.

```
<EML>
   < TransactionId/>
```

The result will be a stylesheet that can be used to validate incoming Election List documents prior to their ultimate processing.

6.1 Voter Roll

EML uses the ElectionList to carry the information required for a Voter Roll, allowing the information about the voters for a specified election event to be exchanged.

EML provides support for the required voter roll data elements as follows:

Voter Name – **VoterName** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

Voter Identifier – **Id** attribute within **VoterIdentification of**
ElectionList:VoterDetails:VoterRegistration:Voter

Registered Address – **ElectoralAddress** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

Ballot Form identifier to be used – **BallotFormIdentifier** within **ElectionList:VoterDetails**

Language Preference – **PreferredLanguage** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterInformation

EML provides support for the optional voter roll data elements as follows:

Identification Validation – **Id** element with various **Type** values within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

Driver's License – **Id** element with **Type** of **DL** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

Military ID – **Id** element with **Type** of **MID** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

Social Security Number – **Id** element with **Type** of **SSN** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

State issued ID – **Id** element with **Type** of **StateID** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

Date of Birth – **DateOfBirth** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterInformation

Image of person's signature – ??? HOW ???

>> this will be resolved in EML v5 which is in committee at this time.

Right to Vote Token – **VToken** within
ElectionList:VoterDetails:VoterRegistration:Voter:VoterIdentification

The production of a Voter Roll using EML is represented in the following example. It is important to note that the sample shows only the portion of the EML document pertaining to Voter Roll and that it is usable only in context (i.e., contained in an EML document):

```
<EML>
```

```
  < TransactionId/>

  <ElectionList>
    <EventIdentifier Id="thiseventid"/>
    <!-- Repeat the Below Lines for each Voter -->
    <VoterDetails>
      <VoterRegistration>
        <Voter>
          <VoterIdentification Id="12345678">
            <VoterName>
              <nl:NameLine>John Q Public</nl:NameLine>
            </VoterName>
            <ElectoralAddress>
              <al:Address>123 Main Street, Hometown, AK 22034</al:Address>
            </ElectoralAddress>
  <!--eml:VToken>    It won't let me put this in      </VToken-->
            <Id Type="DL">12345678</Id>
            <Id Type="SSN">123456789</Id>
          </VoterIdentification>
          <VoterInformation>
            <DateOfBirth>2000-01-01</DateOfBirth>
            <PreferredLanguage>en-us</PreferredLanguage>
            <Affiliation>DEM</Affiliation>
            <RegistrationSignature Format="bmp">
             captured image of voter signature
             from registration form in base64Binary
            </RegistrationSignature>
          </VoterInformation>
        </Voter>
      </VoterRegistration>
      <BallotFormIdentifier>abc</BallotFormIdentifier>
    </VoterDetails>
    <!-- Repeat the Above Lines for each Voter -->  </ElectionList>

</EML>
```

6.2 Voting History

EML uses the VTokenLog document (**470-vtokenlog**) to carry the information required for a Voting History, allowing the information about who voted in a specified election event to be exchanged.

EML provides support for the required voting history data elements as follows:

> Voter Identifier – **Component** with attribute **Type** of value **VoterIdentifier** within **VTokenLog:VTokens:VToken**

> Identifier for the Election Voted In – **Id** attribute within **VTokenLog:ElectionIdentifier**

EML provides support for the optional voting history data elements as follows:

> Identification Validation – **Component** with **Type** of **IdValidation** within **VToken**

> Voter Signature Image – Component of Type PollBookSignature within VToken ???

> > this will be resolved in EML v5 which is in committee at this time.

> Social Security Number – Component of Type VoterSSN within VToken ???

The production of a Voting History using EML is represented in the following example. It is important to note that the sample shows only the portion of the XML document pertaining to Voting History and that it is usable only in context (i.e., contained in an EML document):

```
<EML>
  < TransactionId/>

  <VTokenLog>
    <EventIdentifier Id="thiseventid"/>
    <ElectionIdentifier Id="thiselectionid"/>

      <!-- Repeat the Below Lines for each Voting Channel -->
    <VTokens>
      <VotingChannel>polling</VotingChannel>

        <!-- Repeat the Below Lines for each Voter voting
             at the specified Voting Channel -->
      <VToken Status="voted">
        <Component Type="VoterIdentifier">1234567</Component>
        <Component Type="VoterSSN">123456789</Component>
        <Component Type="IdValidation">
          <Id Type="DL">TX1234567</Id>
        </Component>
        <Component Type="PollBookSignature">
          <PollBookSignature Format="bmp">
            captured image of voter signature from poll book
          </PollBookSignature>
        </Component>
      </VToken>
        <!-- Repeat the Above Lines for each Voter voting
             at the specified Voting Channel -->

    </VTokens>
      <!-- Repeat the Above Lines for each Voting Channel -->

  </VTokenLog>
</EML>
```

6.3 Election Definition

EML provides separate data exchanges for the various segments of these components. The Election Event data exchange document (**110-electionevent**) contains the definitions for the Elections that are part of the Event, allowing for the possibility of many elections in a single event. The elements for the contests within an election are held within the definition for the specific election. The Candidate List data exchange document (**230-candidatelist**) contains the elements for the candidates for a contest and their affiliation.

EML provides support for the required election definition data elements as follows:

Information about the Election – is contained in the **ElectionEvent:Election** element:

Election identifier – **Id** attribute within **ElectionEvent:Election:ElectionIdentifier**

Election name – **Message** element within **ElectionEvent:Election:Description**

Election Jurisdiction – **ManagingAuthority** element within **ElectionEvent:Election**

Election date – **Date** element within **ElectionEvent:Election**

Type of election (1) – Need to indicate when an election is 'Federal';

>> this will be resolved in EML v5 which is in committee at this time.

Type of election (2) – Type attribute within Election;

Support of various common election types must be provided; optionally, additional types may be supported:

General – ,

Special – ,

Primary – ,

Open Primary – ,

Closed Primary – ,

Modified Closed Primary – ,

Pick-a-Party Primary – ,

Blanket Primary –

>> this will be resolved in EML v5 which is in committee at this time.

List of Ballot Forms – the **Ballots** element is used to transport the list of Ballot Forms, as described in the next section of this chapter of the manual

List of Contests – **Contest** is a multiple occurrence element within **ElectionEvent:Election**; it is also available in the **CandidateList** document as a multiple occurrence element, where candidates for a given contest are enumerated.

Contest identifier – **Id** attribute within **ElectionEvent:Election:Contest:ContestIdentifier**

Contest title – **ContestName** element within
                 ElectionEvent:Election:Contest:ContestIdentifier

<p style="color:red">Type of contest – _____ within Contest</p>

<p style="color:red">Types that should be supported include: Office, Measure.</p>

<p style="color:red">Write-in vote maximum – _____ within Contest</p>

<p style="color:red">>> this will be resolved in EML v5 which is in committee at this time.</p>

Vote maximum – **MaxVotes** element within **ElectionEvent:Election:Contest**

<p style="color:red">Cumulative voting indicator – ??? voting method ??? counting algorithm ???</p>

<p style="color:red">Cumulative voting is the ability to cast as many (within the constraint of the maximum allowed in the contest) votes as desired for any candidate.</p>

<p style="color:red">Federal contest indicator – _____ within Contest</p>

<p style="color:red">>> this will be resolved in EML v5 which is in committee at this time.</p>

<p style="color:red">Contest rotation indicator – _____ within Contest</p>

<p style="color:red">What kind of rotation is used: none, random, linear, … .</p>

<p style="color:red">Party affiliation indicator – **Affiliation** element within
ElectionEvent:Election:Contest
??? Does Not Exist ???</p>

<p style="color:red">Straight party indicator – ??? voting method ???</p>

<p style="color:red">Indicates if this contest belong in the 'straight party' vote casting process.</p>

<p style="color:red">Party specific indicator – ??? voting method ???</p>

<p style="color:red">Only those registered for a specified party (affiliation) are allowed to cast a vote in this contest.</p>

List of Choices – EML uses the **CandidateList** data exchange document (**230-candidatelist**) to enumerate the **Choices**

Choice identifier – **Id** attribute within
CandidateList:Election:Contest:Candidate:CandidateIdentifier

Name of choice – **CandidateName** element within
CandidateList:Election:Contest:Candidate:CandidateIdentifier

Choice display order – **displayOrder** attribute within
CandidateList:Election:Contest:Candidate

Choice party – **Affiliation** element within
CandidateList:Election:Contest:Candidate

Choice type – ?????

Choice types include: Candidate, Write-In, Yes/No, Party, etc..

List of Parties – a list of parties for an election can be derived from the set of **Affiliation** elements contained in the given election definition. The following items are supported within the Affiliation element:

Party identifier – **Id** attribute within **Affiliation:AffiliationIdentifier**

Party name – **RegisteredName** element within **Affiliation:AffiliationIdentifier**

Non-Party indicator – simply an instance of **Affilliation** called **Non Affilliated** (or whatever the election authority desires to name it)

EML provides support for the optional election definition data elements as follows:

Candidate Filing Deadline – _____ within _____

Voter Registration Deadline – _____ within _____

List of Jurisdictions – this can be derived from the collection of the **ManagingAuthority** elements within a given election

List of Districts – this can be derived from the collection of the **Area** elements (a child of **Contest**) within a given election

List of Polling Places – this can be derived from the collection of the **PollingPlace** elements (a child of **VoterInformation**) within a given election

List of Precincts – this can be derived from the collection of the **ReportingUnit** elements within a given election

List of Languages Supported – the **Languages** element within **ElectionEvent** is an enumeration of **Language** elements for the event

Party Display Order – _____ within _____

Candidate Incumbency – _____ within _____

Candidate Certification – _____ within _____

The production of an Election Definition using EML is represented in the following examples. It is important to note that the samples show only the portion of the XML document pertaining to election definition and that they are usable only in context (i.e., contained in an EML document):

The following example set, an election event and its associated candidate list, shows:

- An election event that is a "General Election" to be held on December 10, 2006. Since this election event has state-wide contests and municipal elections, the state is managing the event and the election with state-wide contests, while the local municipality is managing the municipal election.

- There are three political parties involved in the election event: Democrat, Independent, and Republican.

- There are two elections in the event.

  o The first election in the event is a Federal election that has two contests.

    ▪ The first contest is for President and Vice President. There are three choices for that contest: 1) Homer Smith and Marge Smith, 2) Damond and Blondie Baker, and 3) Charles Brown and Sam Jones. Homer is running from the Democrat party, Damond is running from the Independent party, and Charles Brown is running from the Republican party.

    ▪ The second contest is for 1st District seat for the US House of Representatives. There are two choices for that contest: 1) Ben Jones, and 2) Mary Adams. Ben Jones is running from the Democrat party and Mary Adams is running from the Republican party.

  o The second election in the event is a Municipal election for Mayor. The contest for Mayor is the only contest in this election. Pauline Parker is the Democratic candidate for this office and Red Wright is the Republican candidate.

  o Candidate rotation is used by the managing authority and the initial display order for each contest's candidates is 1/2/3, 1/2, and 2/1, respectively.

- There are two ways to vote in this election event (a.k.a., "channels"). Those are in-person at the polling place ("polling") and absentee/early by mail ("postal").

- There are two polling locations. Polling location 1 is used for individuals from Precinct 001. Polling location 2 is used for individuals from Precinct 002a and 002b. The contest for President/Vice President is open to all and has a global district. The contest for US House has a district that includes only those voters in Precinct 001 and Precinct 002b. The voters residing in the incorporated area of the municipality (i.e., Precinct 002a) form the district that is entitled to vote in the mayoral race. There is also a vote-by-mail polling location.

- Five languages are supported for this event: US English, Greek, Irish, Polish, and Yiddish. The default language is US English.

- What is traditionally called "Election Day" is the period for on-site voting at the polling location, which begins at 8:00 A.M. and ends at 8:00 P.M. Early/Absentee voting are begun 2 weeks prior to Election Day. This means the elections (and the event) begin at 00:01 A.M on November 27th and end at the poll closing time of 8:00 P.M. on December 10th.

```
<EML>
  < TransactionId/>

  <ElectionEvent>
```

```
      <EventIdentifier Id="Event20061210G"/>
      <ManagingAuthority>
      <!-- this would equate to the US use for JURISDICTION -->
      <!-- NOTE it is possible for multiple jurisdictions to be included,
              with one overall e.g. a STATE-LEVEL, by having the
              overall provided here for the EVENT and the others
              provided below for the ELECTIONS in the EVENT  -->
        <AuthorityIdentifier Id="TheStateId"/>
        <AuthorityAddress>
          <al:Address>123 Main Street, NoNameCity, MyState</al:Address>
        </AuthorityAddress>
      </ManagingAuthority>
      <AllowedChannels>
        <Channel>
          <ChannelName>polling</ChannelName>
        </Channel>
        <Channel>
          <ChannelName>postal</ChannelName>
        </Channel>
      </AllowedChannels>
      <Languages>
        <Language>en-US</Language>
        <Language>ga</Language> <!--irish -->
        <Language>el</Language> <!--modern greek -->
        <Language>pl</Language> <!--polish -->
        <Language>yi</Language> <!--yiddish -->
        <DefaultLanguage>en-US</DefaultLanguage>
      </Languages>
      <Election>
        <ElectionIdentifier Id="Election20061210F"/>
        <Description>
          <Message>
              MyState Federal Offices Election of December 10, 2006
          </Message>
        </Description>
        <Date Type="x">
          <Start>2006-11-27T00:00:01</Start>
          <End>2006-12-10T20:00:00</End>
        </Date>
        <ManagingAuthority>
          <!-- this would equate to the US use for JURISDICTION -->
          <AuthorityIdentifier Id="TheStateId"/>
          <AuthorityAddress>
            <al:Address>123 Main Street, NoNameCity, MyState</al:Address>
          </AuthorityAddress>
        </ManagingAuthority>
        <Contest>
          <ContestIdentifier Id="Contest20061210F01">
            <ContestName>President And Vice President</ContestName>
          </ContestIdentifier>
          <ReportingUnit>
            <!-- this would equate to the US use for PRECINCT -->
            <ReportingUnitIdentifier Id="Precinct001"/>
          </ReportingUnit>
          <ReportingUnit>
            <ReportingUnitIdentifier Id="Precinct002a"/>
          </ReportingUnit>
          <ReportingUnit>
            <ReportingUnitIdentifier Id="Precinct002b"/>
          </ReportingUnit>
          <Area Type="FedUSPresVP" Id="001"/>
          <!--Area is the equivalent of the US use for DISTRICT -->
          <Description>
            <Message>
                Contest for the Office of
                President and Vice President of the
                United States
            </Message>
          </Description>
          <VotingMethod>other</VotingMethod>
          <MaxVotes>1</MaxVotes>
```

```
          <PollingPlace Channel="polling">
            <PhysicalLocation Id="PollingPlace001">
              <Address>
                <al:Address>108th and Main, SouthTown, MyState</al:Address>
              </Address>
            </PhysicalLocation>
            <TimeAvailable>
              <Start>2006-12-10T08:00:00</Start>
              <End>2006-12-10T20:00:00</End>
            </TimeAvailable>
          </PollingPlace>
          <PollingPlace Channel="polling">
            <PhysicalLocation Id="PollingPlace002">
              <Address>
                <al:Address>
                    11120 West Dodge Road, Municipality, MyState
                </al:Address>
              </Address>
            </PhysicalLocation>
            <TimeAvailable>
              <Start>2006-12-10T08:00:00</Start>
              <End>2006-12-10T20:00:00</End>
            </TimeAvailable>
          </PollingPlace>
          <PollingPlace Channel="postal">
            <PostalLocation Id="PollingPlace003">
                <al:Address>
                    PO Box 1234, Municipality, MyState 98765-1234
                </al:Address>
            </PostalLocation>
              <TimeAvailable>
                <Start>2006-11-27T00:00:01</Start>
                <End>2006-12-10T20:00:00</End>
              </TimeAvailable>
          </PollingPlace>
        </Contest>
        <Contest>
          <ContestIdentifier Id="Contest20061210F02">
            <ContestName>US House District 1</ContestName>
          </ContestIdentifier>
          <ReportingUnit>
            <ReportingUnitIdentifier Id="Precinct001"/>
          </ReportingUnit>
          <ReportingUnit>
            <ReportingUnitIdentifier Id="Precinct002b"/>
          </ReportingUnit>
          <Area Type="FedUSHouse" Id="001"/>
          <!--Area is the equivalent of the US use for DISTRICT -->
          <Description>
            <Message>
                Federal Contest for the Office of
                US House of Representatives for District 1
            </Message>
          </Description>
          <VotingMethod>other</VotingMethod>
          <MaxVotes>2</MaxVotes>
          <PollingPlace Channel="polling">
            <PhysicalLocation Id="PollingPlace001">
              <Address>
                <al:Address>108th and Main, SouthTown, MyState</al:Address>
              </Address>
            </PhysicalLocation>
            <TimeAvailable>
              <Start>2006-12-10T08:00:00</Start>
              <End>2006-12-10T20:00:00</End>
            </TimeAvailable>
          </PollingPlace>
          <PollingPlace Channel="polling">
            <PhysicalLocation Id="PollingPlace002">
              <Address>
                <al:Address>
```

```
                    11120 West Dodge Road, Municipality, MyState
               </al:Address>
             </Address>
           </PhysicalLocation>
           <TimeAvailable>
             <Start>2006-12-10T08:00:00</Start>
             <End>2006-12-10T20:00:00</End>
           </TimeAvailable>
         </PollingPlace>
         <PollingPlace Channel="postal">
           <PostalLocation Id="PollingPlace003">
               <al:Address>
                    PO Box 1234, Municipality, MyState 98765-1234
               </al:Address>
           </PostalLocation>
             <TimeAvailable>
               <Start>2006-11-27T00:00:01</Start>
               <End>2006-12-10T20:00:00</End>
             </TimeAvailable>
         </PollingPlace>
       </Contest>
    </Election>
    <Election>
      <ElectionIdentifier Id="Election20061210M"/>
      <Description>
        <Message>
             MyMunicipality Offices Election of December 20, 2006
        </Message>
      </Description>
      <Date Type="x">
        <Start>2006-11-27T00:00:01</Start>
        <End>2006-12-10T20:00:00</End>
      </Date>
      <ManagingAuthority>
        <!-- this would equate to the US use for JURISDICTION -->
        <AuthorityIdentifier Id="TheMunicipalityId"/>
        <AuthorityAddress>
          <al:Address>13 Ash Street, Municipality, MyState</al:Address>
        </AuthorityAddress>
      </ManagingAuthority>
      <Contest>
        <ContestIdentifier Id="Contest20061210M01">
          <ContestName>Mayor</ContestName>
        </ContestIdentifier>
        <ReportingUnit>
          <ReportingUnitIdentifier Id="Precinct002a"/>
        </ReportingUnit>
        <Area Type="MunMayor" Id="001"/>
        <Description>
          <Message>
               Contest for the Office of Mayor of Municipality
          </Message>
        </Description>
        <VotingMethod>other</VotingMethod>
        <MaxVotes>1</MaxVotes>
        <PollingPlace Channel="polling">
          <PhysicalLocation Id="PollingPlace002">
            <Address>
              <al:Address>
                    11120 West Dodge Road, Municipality, MyState
              </al:Address>
            </Address>
          </PhysicalLocation>
          <TimeAvailable>
            <Start>2006-12-10T08:00:00</Start>
            <End>2006-12-10T20:00:00</End>
          </TimeAvailable>
        </PollingPlace>
        <PollingPlace Channel="postal">
          <PostalLocation Id="PollingPlace003">
              <al:Address>
```

```
                              PO Box 1234, Municipality, MyState 98765-1234
                        </al:Address>
                   </PostalLocation>
                   <TimeAvailable>
                      <Start>2006-11-27T00:00:01</Start>
                      <End>2006-12-10T20:00:00</End>
                   </TimeAvailable>
               </PollingPlace>
           </Contest>
       </Election>
       <EventDate>
          <Start>2006-11-27T00:00:01</Start>
          <End>2006-12-10T20:00:00</End>
       </EventDate>
    </ElectionEvent>

</EML>
```

```
<EML>
    < TransactionId/>

<CandidateList>
    <EventIdentifier Id="Event20061210G"/>
    <Election>
       <ElectionIdentifier Id="Election20061210F"/>
          <Contest>
              <ContestIdentifier Id="Contest20061210F01"/>
              <Candidate DisplayOrder="1">
                  <CandidateIdentifier Id="dem1">
                      <CandidateName>
                         Homer Smith and Marge Smith
                      </CandidateName>
                  </CandidateIdentifier>
                  <Affiliation>
                    <AffiliationIdentifier Id="DEM">
                      <RegisteredName>
                         Democrat Party
                      </RegisteredName>
                    </AffiliationIdentifier>
                  </Affiliation>
              </Candidate>
              <Candidate DisplayOrder="2">
                  <CandidateIdentifier Id="rep1">
                      <CandidateName>
                         Charles Brown and Sam Jones
                      </CandidateName>
                  </CandidateIdentifier>
                  <Affiliation>
                    <AffiliationIdentifier Id="REP">
                      <RegisteredName>
                         Republican Party
                      </RegisteredName>
                    </AffiliationIdentifier>
                  </Affiliation>
              </Candidate>
              <Candidate DisplayOrder="3">
                  <CandidateIdentifier Id="ind1">
                      <CandidateName>
                         Damond and Blondie Baker
                      </CandidateName>
                  </CandidateIdentifier>
                  <Affiliation>
                    <AffiliationIdentifier Id="IND">
                      <RegisteredName>
                         Independent
                      </RegisteredName>
                    </AffiliationIdentifier>
                  </Affiliation>
```

```
                        </Candidate>
                    </Contest>
                    <Contest>
                        <ContestIdentifier Id="Contest20061210F02"/>
                        <Candidate DisplayOrder="1">
                            <CandidateIdentifier Id="dem2">
                                <CandidateName>
                                    Ben Jones
                                </CandidateName>
                            </CandidateIdentifier>
                            <Affiliation>
                                <AffiliationIdentifier Id="DEM">
                                    <RegisteredName>
                                        Democrat Party
                                    </RegisteredName>
                                </AffiliationIdentifier>
                            </Affiliation>
                        </Candidate>
                        <Candidate DisplayOrder="2">
                            <CandidateIdentifier Id="rep2">
                                <CandidateName>
                                    Mary Adams
                                </CandidateName>
                            </CandidateIdentifier>
                            <Affiliation>
                                <AffiliationIdentifier Id="REP">
                                    <RegisteredName>
                                        Republican Party
                                    </RegisteredName>
                                </AffiliationIdentifier>
                            </Affiliation>
                        </Candidate>
                    </Contest>
                </Election>
                <Election>
                    <ElectionIdentifier Id="Election20061210M"/>
                    <Contest>
                        <ContestIdentifier Id="Contest20061210M01"/>
                        <Candidate DisplayOrder="1">
                            <CandidateIdentifier Id="dem3">
                                <CandidateName>
                                    Pauline Parker
                                </CandidateName>
                            </CandidateIdentifier>
                            <Affiliation>
                                <AffiliationIdentifier Id="DEM">
                                    <RegisteredName>
                                        Democrat Party
                                    </RegisteredName>
                                </AffiliationIdentifier>
                            </Affiliation>
                        </Candidate>
                        <Candidate DisplayOrder="2">
                            <CandidateIdentifier Id="rep3">
                                <CandidateName>
                                    Red Wright
                                </CandidateName>
                            </CandidateIdentifier>
                            <Affiliation>
                                <AffiliationIdentifier Id="REP">
                                    <RegisteredName>
                                        Republican Party
                                    </RegisteredName>
                                </AffiliationIdentifier>
                            </Affiliation>
                        </Candidate>
                    </Contest>
                </Election>
        </CandidateList>

    </EML>
```

6.4 Ballot Form

EML uses the **Ballots** data exchange document (**410-ballots**) to carry the information required for a ballot form. This allows the information about what specific ballots are used in an election event and what contests/items are to be placed on each specified ballot to be exchanged.

EML provides support for the required ballot form data elements as follows, using the **Ballots** element (an enumeration of **Ballot** elements):

> The identifier of the individual form (i.e., ballot form identifier or ballot style identifier) – **Id** attribute of the **Ballots:Ballot**:**BallotIdentifier** element

> The election event for which this ballot form is to be used – **Id** attribute of the **Ballots**:**EventIdentifier** element

> The elections that are included on this ballot form – a complete list of them can be derived from the collection of **Id** attributes of the **Ballots:Ballot:Election:ElectionIdentifier** elements

> Each contest item – the **Ballots:Ballot:Election:Contest** element contains all the contest information

> > An indication of the number of choices that may be selected for the specified contest, by the voter – the **MaxVotes** element of the **Ballots:Ballot:Election:Contest** element

> > Contest display order – the **DisplayOrder** attribute of the **Ballots:Ballot:Election:Contest** element

> > The choices that are available – the **BallotChoices** element of the **Ballots:Ballot:Election:Contest** element

> > The parties associated with each choice – the **Affiliation** element within the **Ballots:Ballot:Election:Contest:BallotChoices:Candidate** element

EML provides support for the optional ballot form data elements as follows:

> Language choice is required under certain circumstances and it may be supported in various ways. One way is to have separate ballot forms by language. When that is the case, the language for the specific ballot form must be indicated. When the same ballot form contains multiple languages, an indication of the element's language must be provided for each language specific element– x

> Auditory content for a given ballot form is required for support of those with certain disabilities, under the Help America Vote Act (HAVA). A ballot form that includes auditory support must provide that same auditory information for exchange– x.

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Graphical elements may be provided on ballots. They may include party or jurisdiction logos, candidate photos, and other items. Such graphical elements may be provided for exchange– x.

The production of a Ballot Form using EML is represented in the following examples. The first example shows how fully attributed ballot forms would be exchanged; the second example shows how a list of ballot form identifiers would be exchanged. It is important to note that the samples show only the portion of the XML document pertaining to ballot forms and that they are usable only in context (i.e., contained in an EML document):

```
<EML>
  < TransactionId/>

  <Ballots>
    <EventIdentifier Id="thiseventid"/>
    <!-- Repeat Below Lines for Each Ballot in the Election Event -->
    <Ballot>
      <Election>
        <ElectionIdentifier Id="thiselectionid"/>
        <Contest DisplayOrder="1">
          <ContestIdentifier Id="thiscontestid1"/>
          <Rotation>yes</Rotation>
          <VotingMethod>other</VotingMethod>
          <MaxVotes>2</MaxVotes>
          <MinVotes>0</MinVotes>
          <MaxWriteIn>2</MaxWriteIn>
          <BallotChoices>
            <Candidate>
              <CandidateIdentifier Id="thiscandidateid1"/>
            </Candidate>
            <Candidate>
              <CandidateIdentifier Id="thiscandidateid2"/>
            </Candidate>
          </BallotChoices>
        </Contest>
        <Contest DisplayOrder="2">
          <ContestIdentifier Id="thiscontestid2"/>
          <Rotation>yes</Rotation>
          <VotingMethod>other</VotingMethod>
          <MaxVotes>2</MaxVotes>
          <MinVotes>0</MinVotes>
          <MaxWriteIn>2</MaxWriteIn>
          <BallotChoices>
            <Candidate>
              <CandidateIdentifier Id="thiscandidateid3"/>
            </Candidate>
            <Candidate>
              <CandidateIdentifier Id="thiscandidateid4"/>
            </Candidate>
          </BallotChoices>
        </Contest>
        <Contest DisplayOrder="3">
          <ContestIdentifier Id="thiscontestid3"/>
          <Rotation>yes</Rotation>
          <VotingMethod>other</VotingMethod>
          <MaxVotes>1</MaxVotes>
          <MinVotes>0</MinVotes>
          <MaxWriteIn>0</MaxWriteIn>
          <BallotChoices>
            <ReferendumOptionIdentifier Id="thisreferendumnumber"/>
          </BallotChoices>
        </Contest>
      </Election>
      <BallotIdentifier Id="thisballotid"/>
    </Ballot>
    <!-- Repeat Above Lines for Each Ballot in the Election Event -->
  </Ballots>

</EML>
```

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```
<EML>
  < TransactionId/>

  <Ballots>
    <EventIdentifier Id="thiseventid"/>
    <Ballot>
      <BallotIdentifier Id="thisballotid1"/>
    </Ballot>
    <Ballot>
      <BallotIdentifier Id="thisballotid2"/>
    </Ballot>
    <Ballot>
      <BallotIdentifier Id="thisballotid3"/>
    </Ballot>
  </Ballots>

</EML>
```

6.5 Cast Ballot

EML uses the Votes data exchange document (**460-votes**) to carry the information required for a Cast Ballot, allowing the information about the selections made on each contest on a ballot to be exchanged.

EML provides support for the required cast ballot data elements as follows:

Each choice made on a ballot – **Id** attribute of the **Votes:CastVote:Election:Contest:Selection:CandidateIdentifier** element

The value of the vote – **Value** attribute of the **Votes:CastVote:Election:Contest:Selection** element

The location where the vote was cast – **Id** attribute of **Votes:CastVote:ReportingUnitIdentifier**

The status of the ballot – **Votes:CastVote:VTokenQualified** is used instead of **Votes:CastVote:VToken** when a cast ballot is in a qualified (not accepted/approved) state; accompanying this element is a **Reason** child element, whose **Type** attribute provides the indication of the reason.

EML provides support for the optional cast ballot data elements as follows:

The ballot form used to cast the selections – **BallotName** element within **Votes:CastVote:BallotIdentifier**

The ballot serial number (if applicable) – **Id** attribute of **Votes:CastVote:BallotIdentifier**

The identifier of the device used to cast the ballot – **Id** element within **AuditInformation:ProcessingUnits:OriginatingDevice**

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The production of a Cast Ballot using EML is represented in the following example. It is important to note that the sample shows only the portion of the XML document pertaining to cast ballots and that it is usable only in context (i.e., contained in an EML document):

```
<EML>
  < TransactionId/>

  <Votes>
    <CastVote>
      <VToken>
        <Component Type="TokenId">thistokenid1</Component>
      </VToken>
      <EventIdentifier Id="thiseventid1"/>
      <Election>
        <ElectionIdentifier Id="thiselectionid1"/>
        <Contest>
          <ContestIdentifier Id="thiscontestid1"/>
          <Selection Value="2">
            <CandidateIdentifier Id="thiscandidateid1"/>
          </Selection>
        </Contest>
      </Election>
      <Election>
        <ElectionIdentifier Id="thiselectionid1"/>
        <Contest>
          <ContestIdentifier Id="thiscontestid2"/>
          <Selection Value="1">
            <CandidateIdentifier Id="thiscandidateid3"/>
          </Selection>
        </Contest>
      </Election>
      <BallotIdentifier Id="thisballotserialnmbr1">
        <BallotName>theballotformname</BallotName>
      </BallotIdentifier>
      <ReportingUnitIdentifier Id="Precinct001">
    </CastVote>
    <CastVote>
      <VTokenQualified>
        <Component Type="TokenId">thistokenid2</Component>
        <Reason Type="Provisional">
      </VToken>
      <EventIdentifier Id="thiseventid1"/>
      <Election>
        <ElectionIdentifier Id="thiselectionid1"/>
        <Contest>
          <ContestIdentifier Id="thiscontestid1"/>
          <Selection Value="2">
            <CandidateIdentifier Id="thiscandidateid1"/>
          </Selection>
        </Contest>
      </Election>
      <Election>
        <ElectionIdentifier Id="thiselectionid1"/>
        <Contest>
          <ContestIdentifier Id="thiscontestid2"/>
          <Selection Value="1">
            <CandidateIdentifier Id="thiscandidateid3"/>
          </Selection>
        </Contest>
      </Election>
      <BallotIdentifier Id="thisballotserialnmbr2">
        <BallotName>theballotformname</BallotName>
      </BallotIdentifier>
      <ReportingUnitIdentifier Id="Precinct001">
    </CastVote>
    <AuditInformation>
      <ProcessingUnits>
        <OriginatingDevice Role="">
          <Id>votingdeviceid</Id>
        </OriginatingDevice>
      </ProcessingUnits>
```

```
        </AuditInformation>
    </Votes>

</EML>
```

6.6 Tabulation Report

EML uses the Count data exchange document to carry the information required for a Tabulation Report, allowing the information about the tabulated number of cast votes for each selection to be exchanged. This data exchange uses a generic entity called Reporting Unit to allow for tabulation breakdown, which allows the level of granularity to be down to the individual voting device in the polling location while still delivering the tabulation results up to the highest level.

EML provides support for the required tabulation report data elements as follows:

        Information about _____ – _____:

EML provides support for the optional tabulation report data elements as follows:

        Information about _____ – _____::

The production of a Tabulation Report using EML is represented in the following examples. It is important to note that the samples show only the portion of the XML document pertaining to tabulation reports and that they are usable only in context (i.e., contained in an EML document):

```
<EML>
  < TransactionId/>

  <Count>
    <EventIdentifier Id="thiseventid"/>
    <Election>
      <ElectionIdentifier Id="thiselectionidentifier"/>
      <Contests>
        <Contest>
          <ContestIdentifier Id="thiscontestid1"/>
          <CountingAlgorithm>
              mycountingalgorithm
          </CountingAlgorithm>
          <NumberOfPositions>1</NumberOfPositions>
          <TotalVotes>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid11"/>
              <ValidVotes>9444</ValidVotes>
            </Selection>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid12"/>
              <ValidVotes>8333</ValidVotes>
            </Selection>
          </TotalVotes>
          <ReportingUnitVotes>
            <ReportingUnitIdentifier Id="thisreportingunit1"/>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid11"/>
```

```
              <ValidVotes>9000</ValidVotes>
            </Selection>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid12"/>
              <ValidVotes>333</ValidVotes>
            </Selection>
          </ReportingUnitVotes>
          <ReportingUnitVotes>
            <ReportingUnitIdentifier Id="thisreportingunit2"/>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid11"/>
              <ValidVotes>444</ValidVotes>
            </Selection>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid12"/>
              <ValidVotes>8000</ValidVotes>
            </Selection>
          </ReportingUnitVotes>
        </Contest>
        <Contest>
          <ContestIdentifier Id="thiscontestid2"/>
          <CountingAlgorithm>
              yourcountingalgorithm
          </CountingAlgorithm>
          <NumberOfPositions>1</NumberOfPositions>
          <TotalVotes>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid21"/>
              <ValidVotes>7222</ValidVotes>
            </Selection>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid22"/>
              <ValidVotes>6111</ValidVotes>
            </Selection>
          </TotalVotes>
          <ReportingUnitVotes>
            <ReportingUnitIdentifier Id="thisreportingunit1"/>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid21"/>
              <ValidVotes>222</ValidVotes>
            </Selection>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid22"/>
              <ValidVotes>6000</ValidVotes>
            </Selection>
          </ReportingUnitVotes>
          <ReportingUnitVotes>
            <ReportingUnitIdentifier Id="thisreportingunit2"/>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid21"/>
              <ValidVotes>7000</ValidVotes>
            </Selection>
            <Selection>
              <CandidateIdentifier Id="thiscandidateid22"/>
              <ValidVotes>111</ValidVotes>
            </Selection>
          </ReportingUnitVotes>
        </Contest>
      </Contests>
    </Election>
  </Count>
</EML>
```

6.7 Post Election Canvas Result

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EML uses the Results data exchange document to carry the information required for a Post Election Canvas, allowing the information about the final certified results and winners of each contest to be exchanged.

EML provides support for the required canvas result data elements as follows:

Information about the Election – Election:

EML provides support for the optional canvas result data elements as follows:

Information about the Election – Election:

The production of a Post Election Canvas Result using EML is represented in the following example. It is important to note that the sample shows only the portion of the XML document pertaining to post election canvas results and that it is usable only in context (i.e., contained in an EML document):

```
<EML>
  < TransactionId/>

  <Result>
    <EventIdentifier Id="thiseventid"/>
    <Election>
      <ElectionIdentifier Id="thiselectionidentifier"/>
      <Contest>
        <ContestIdentifier Id="thiscontestid1"/>
        <Selection>
          <CandidateIdentifier Id="thiscandidateid11"/>
          <Votes>2222</Votes>
          <Ranking>1</Ranking>
          <Elected>yes</Elected>
        </Selection>
        <Selection>
          <CandidateIdentifier Id="thiscandidateid12"/>
          <Votes>1111</Votes>
          <Ranking>2</Ranking>
          <Elected>no</Elected>
        </Selection>
      </Contest>
      <Contest>
        <ContestIdentifier Id="thiscontestid2"/>
        <Selection>
          <CandidateIdentifier Id="thiscandidateid21"/>
          <Votes>111</Votes>
          <Ranking>2</Ranking>
          <Elected>no</Elected>
        </Selection>
        <Selection>
          <CandidateIdentifier Id="thiscandidateid22"/>
          <Votes>99999</Votes>
          <Ranking>1</Ranking>
          <Elected>yes</Elected>
        </Selection>
      </Contest>
    </Election>
  </Result>

</EML>
```