



Office of the *e-Envoy*

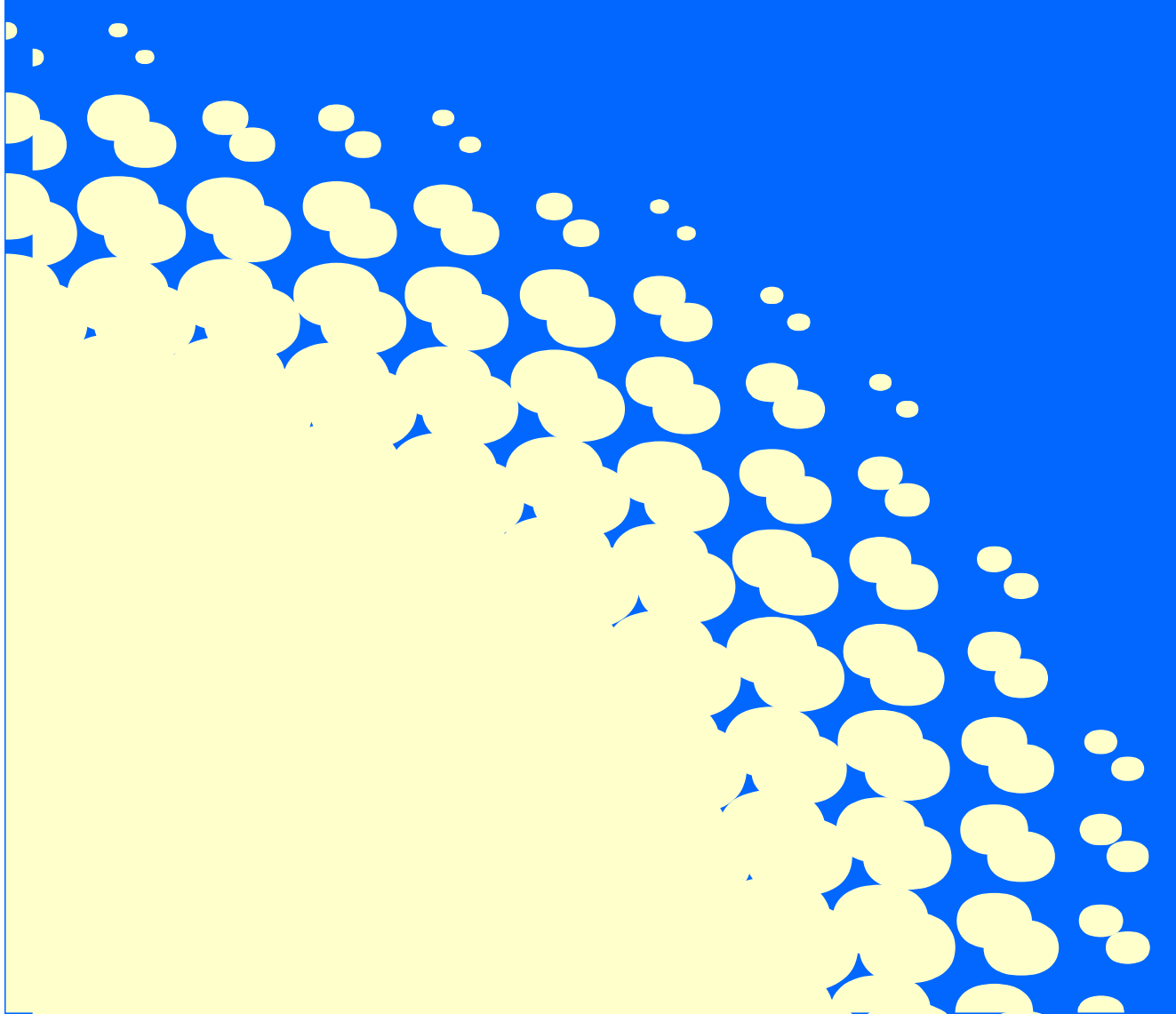
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EML : Customisation for UK Local Elections

Version 1.0



Document Control

Abstract

This document describes the changes and additional constraints applied to the OASIS Election Markup Language (EML) version 2 schemas for use in UK local elections.

It is aimed at decision-makers in the election process and developers of the systems that will be used in pilots.

Date	Version	Status	Comment
11/10/2002	1.0	Approved	Minor updates from 0.3, mainly in the introductory text. Checked against forms supplied by AEA.

Date	Version	Status	Comment
9/10/2002	0.3	Draft	Updated following AEA meeting.
11/9/2002	0.2	Draft	Revised in the light of suppliers' meeting 9 th Sept. Incorporates comments from AEA and Oracle. Section "Processing Using Schematron" added.
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Introduction

This document describes the changes and additional constraints applied to the OASIS Election Markup Language (EML) version 2 schemas for use in UK local elections.

It is aimed at decision-makers in the election process and developers of the systems that will be used in pilots.

The additional constraints described here do not attempt to encode all business rules. Rules that differ between different types of local election (for example, the number of sponsors required for a candidate) are not included.

The messages that form part of EML are intended for transfer between systems. It is not intended that all outputs of an election system will have a corresponding schema.

The current specification does not cover the full requirements for referenda. These will be addressed (if required) at a later date.

This document and its accompanying set of schemas do not claim to satisfy the final requirements of an election system.

It is incumbent on the users of this document to identify any mistakes, inconsistencies or missing data and to propose corrections to the Office of the e-Envoy.

Background

The following is the Executive Summary of the "Election Mark-up Language (EML): e-Voting Process and Data Requirements"[1]:

OASIS, the XML interoperability consortium, formed the Election and Voter Services Technical Committee in the spring of 2001 to develop standards for election and voter services information using XML. The committee's mission statement is, in part, to:

"Develop a standard for the structured interchange among hardware, software, and service providers who engage in any aspect of providing election or voter services to public or private organizations...."

The objective is to introduce a uniform and reliable way to allow election systems to interact with each other. The overall effort attempts to address the challenges of developing a standard that is:

- Multinational: our aim is to have these standards adopted globally
- Flexible: effective across the different voting regimes. e.g. proportional representation or "first past the post".
- Multilingual: flexible enough to accommodate the various languages and dialects and vocabularies.

- Adaptable: resilient enough to support elections in both the private and public sectors.
- Secure: able to secure the relevant data and interfaces from any attempt at corruption, as appropriate to the different requirements of varying election rules.

The primary deliverable of the committee the Election Markup Language (EML). This is a set of data and message definitions described as XML schemas. At present EML includes specifications for:

- Candidate Nomination, Response to Nomination and Approved Candidate Lists
- Voter Registration information, including eligible voter lists
- Various communications between voters and election officials, such polling information, election notices, etc.
- Logical Ballot information (races, contests, candidates, etc.)
- Voter Authentication
- Vote Casting and Vote Confirmation
- Election counts and results
- Audit information pertinent to some of the other defined data and interfaces

As an international specification, EML is generic in nature, and so needs to be tailored for specific election scenarios. Some aspects of the language are indicated in EML as required for all election scenarios and so can be used unchanged. Some aspects (such as the ability to identify a voter easily) are required in some scenarios but prohibited in others, so EML defines them as optional. Where they are prohibited, their use must be changed from an optional to prohibited classification, and where they are mandatory, their use must be changed from an optional to required classification. The technical approach to achieving this is described below.

The UK is an early adopter of EML. Work on identifying the additional constraints for UK local elections has identified several areas in which version 2 of EML does not meet current requirements. This document therefore also proposes changes to the base EML language. These changes will be adopted in the UK and proposed to the international committee for adoption in a later version of EML.

Technical Approach to UK-Locale Specification

EML is described in two documents, one for the process[1] and one for the XML schemas[2]. These schemas adhere to the W3C XML Schema recommendation[3].

For this application, the name and address formats will be changed to the UK GovTalk™ Address and Personal Details[4] formats by replacing the EML externals file with that shown in the Appendix "EML Externals Schema Document (non-normative)" on page 36.

Developing the requirements for this election scenario has identified some areas in the EML specifications do not meet the UK needs. These requirements will be incorporated into the version of EML to be used. These changes from EML version 2 are described in this document.

EML defines the application of SEAL to protect the EML data being exchanged. EML allows for various types of SEAL, and does not mandate any particular security algorithm or parameters. To conform to the requirements of UK local elections, all seals must be verifiable by a third party and may conform to any type allowed in EML, including RFC 2630 [5] and RFC 3161 [6] for the type of `xsd:any`. To meet this requirement systems that generate seals must provide a tool kit and any supporting data, such as certificates, that allow the third party

to validate the seal. This tool must be made available free of any licence cost; it may conform to UK policy on open source software [5].

Other changes are described in this document in text format and schemas are provided using the Schematron language[8]. This is currently in the process of being adopted by the International Organization for Standardisation (ISO) and the International Electrotechnical Committee as part of the ISO/IEC Document Schema Definition Languages (DSDL) or ISO/IEC 19757 standard[9].

Viewing Schemas

EML schemas are supplied as text documents. For viewing the structure of the schemas, we recommend use of one of the many schema development tools available. Many of these provide graphical displays.

The Schematron schemas are mainly short and simple to understand as text documents for those with a working knowledge of XPath [10].

EML Message Validation

The combination of the EML schemas, APD schemas [4], the revised EML externals schema and the Schematron schemas provides the normative definition of the messages to be used in this application. This provides a clear separation between the international EML specifications and the additional constraints used for UK local elections.

Note that the EML externals schema references the APD schemas assuming they are all in the same directory. For validation to work, either the schemas must be placed in the location expected or the path changed in the EML externals schema.

It is up to each specific system implementation whether it uses these schemas for validation of EML messages for either testing or live use. The recommended approach is to validate incoming messages against the EML schemas (with the application-specific EML externals schema), then further validate against the relevant Schematron schema. The first stage requires the use of an XML processor (parser) that conforms to W3C XML Schema. The second stage requires an XSLT processor.

However, an implementation may choose to:

- modify the EML schemas to incorporate those application-specific constraints that can be represented in W3C XML Schema;
- not validate these changes;
- not perform any validation; or
- develop some alternative validation.

However, one purpose of the pilots over the next few years is to test both EML and this mechanism of customisation. The Office of the e-Envoy will welcome feedback on the use of this mechanism.

Processing Using Schematron

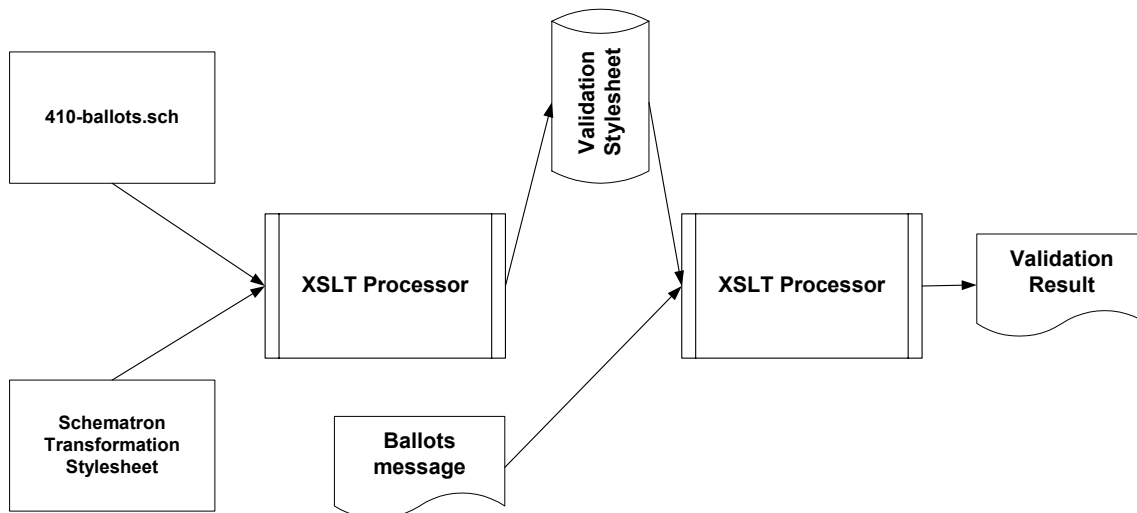
This section gives a short introduction to how validation can be achieved using Schematron schemas.

Validation Using the Schematron Schemas

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 produces an HTML output from the validation. For EML-UK, we prefer to create an XML file 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.



Error Reporting

The schema to be used for error reporting is:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xs:element name="Errors">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="Error" minOccurs="0" maxOccurs="unbounded">
```

```

    <xs:complexType>
      <xs:sequence>
        <xs:element name="Path" type="xs:string"/>
        <xs:element name="Text" type="xs:string"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:schema>

```

The `Path` element contains an XPath expression and the `Text` element contains a description of the error.

The following is an example of an error report for a `Ballots` message that contains two contests, each incorrectly including the elements `Rotation` and `MaxWriteIn`.

```

<Errors>
  <Error>
    <Path>/EML/Ballots/Ballot/Election[1]/Contest</Path>
    <Text>The element Rotation should not be used</Text>
  </Error>
  <Error>
    <Path>/EML/Ballots/Ballot/Election[1]/Contest</Path>
    <Text>The element MaxWriteIn should not be used</Text>
  </Error>
  <Error>
    <Path>/EML/Ballots/Ballot/Election[2]/Contest</Path>
    <Text>The element Rotation should not be used</Text>
  </Error>
  <Error>
    <Path>/EML/Ballots/Ballot/Election[2]/Contest</Path>
    <Text>The element MaxWriteIn should not be used</Text>
  </Error>

```

```

</Errors>

```

The Schema Changes

This section describes how the message specifications change for this application. It is based on EML version 2.0, and uses the element and attribute names from the schemas. Each change is described with the mechanism by which it will be implemented. These can be any of:

- recommend change to the base EML schemas because it does not cater for this circumstance;
- implement in EML externals; or
- implement using Schematron.

All Schemas

Change	Implementation
The <code>Seal</code> must be present.	Schematron
Where there can be an <code>AuditInformation</code> , it is mandatory and must have at least one <code>ProcessingUnit</code> . This affects 440,460,470,480,510.	Schematron
Where there are <code>ContactDetails</code> , there must be at least one child element.	Schematron

EML Core

Description of Schema

Description of Changes

Change	Implementation
<code>Affiliation</code> to be changed from a string to having <code>Name</code> , <code>Description</code> and <code>Logo</code> as children. The logo will be a URL.	change to EML
<code>Id</code> element added to <code>Proposer</code> allow inclusion of Electoral roll number.	change to EML
New <code>Candidate</code> element and <code>CandidateStructure</code> type replace <code>CandidateName</code> .	change to EML
New <code>Agent</code> element and <code>AgentStructure</code> type added.	change to EML
<code>EventStart</code> and <code>EventEnd</code> removed.	change to EML
New <code>DateType</code> simple type is a union of <code>xsd:date</code> and <code>xsd:dateTime</code> .	change to EML
New <code>Gender</code> element.	change to EML

New Logo element.	change to EML
LocationName replaced by PollingPlace with multiple levels to allow Polling District, Polling Station etc.	change to EML
Type attribute added to Message to indicate e.g. "Eligibility message".	change to EML
ElectionEventName replaced by Event. This has two children: EventName and EventQualifier. The EventQualifier allows an event to be divided into regions.	change to EML
ProxyStructure data type added.	change to EML
In VoterInformationStructure, Military replaced by more general Qualification.	change to EML
Optional TransactionId added to EML element.	change to EML
Proxy added to OutgoingGenericCommunicationStructure and IncomingGenericCommunicationStructure	change to EML
TransactionId removed from OutgoingGenericCommunicationStructure and IncomingGenericCommunicationStructure	change to EML
Messages made optional in IncomingGenericCommunicationsStructure and OutgoingGenericCommunicationsStructure	change to EML
Element ProxyAgrees added to Proxy	change to EML

110 - Election Event

Description of Schema

This schema is used for messages providing information about an election or set of elections. An event has a start and end date and time, a list of the languages in which information is to be available and a set of one or more elections. Each election has a set of responsible officers, the voting channels allowed for that election, a set of dates related to the election and one or more contests, each of which can have a different voting method (e.g. *first past the post* or *single transferable vote*). Some voting methods will specify the maximum and minimum numbers of votes, but if these are omitted, they default to sensible values.

EML-UK Explanation and Rules

If the responsible officer is one of those listed below, the exact spelling shown here should be used for the `Responsibility` element. This has not been encoded into the Schematron schema in case other areas of responsibility are needed. Feedback is invited on other values used for future inclusion.

Values for `Responsibility`:

- Returning Officer
- Acting Returning Officer
- Deputy Returning Officer
- Regional Returning Officer
- Local Returning Officer

There are several possible dates associated with an election. These are identified using the Date element with its Type attribute. Each date can have a start date, an end date, both or a single date. Where the date types below are used, the Type attribute should use the exact spelling shown. Feedback is invited on other values used for future inclusion.

Type	Elements Used
Notice of Election	End
Delivery of nomination papers	Start, End
Statement of persons nominated	SingleDate
Notice of appointment of election agents	End
Withdrawal of candidature	End
Change to postal vote records	End
Issue of postal ballots	Start, End
Notice of Poll	SingleDate
Notice of appointment of counting agents	End
Notice of appointment of polling agents	End
Corrections to register	End
Requests to replace lost postal ballots	Start, End
Opening of postal votes	SingleDate
Receipt of expenses	End

Where Contact is used with a Type attribute, typical values for Type are "Organizing Authority" and "Request for postal vote". Feedback is invited on other values used for future inclusion.

Note - the EventName and its Id will have fixed text string values that are to be decided.

Description of Changes

Change	Implementation
EventName has the value ***	Schematron
EventName/@Id has the value ***	Schematron
ElectionEventName changed to new Event element	change to EML
DefaultLanguage added. This is an xlink URI to one of the languages listed.	change to EML
Generic Date element added with a Type attribute. These can have a single date or start and/or end dates. They can be either an xsd:date or a xsd:dateTime type	change to EML

ResponsibleOfficer added with contact details	change to EML
repeatable ChannelDate added	change to EML
Repeatable generic Contact element added	change to EML
New PollingPlace element added to Contest	change to EML
EventStart and EventEnd replaced by new optional EventDate with Start and End elements	change to EML
Messages element added to ElectionEvent, Election and Contest	change to EML
MinVotes made optional	change to EML
Optional xsd:any added	change to EML

The Schematron Schema

```

<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 110-Election Event</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

  </pattern>
</schema>

```

210 - Candidate Nomination

Description of Schema

Messages conforming to this schema are used for three purposes:

1. nominating candidates in an election;
2. consenting to be nominated; or
3. withdrawing a nomination.

The first two of these can be combined in a single message or sent separately.

Note that the message does not cover other forms of option nomination - only human candidates.

The election and contest must be specified as well as information about the candidate and one or more proposers. The candidate must supply a name. Optionally, the candidate can provide contact information, an affiliation (e.g. a political party) and textual profiles and election statements. These two items use the `MessagesStructure` to allow text in multiple languages. There is also scope to add additional information defined by the election organiser.

The proposers use the standard proposer declaration with a mandatory name and optional contact information and job title. Again, additional information can be required.

The candidate must define the action being taken and provide scrutiny information. The scrutiny requirements indicate how the candidate has met any conditions for standing in this election. This could include indicating that a deposit has been paid or providing a reference to prove that he or she lives in the appropriate area.

Finally, there is scope to extend the schema by adding additional information to the nomination.

EML-UK Explanation and Rules

The element `Proposer` in the schema is used for proposer, seconder and any other sponsors. The `Proposer` element has a `Category` attribute which can take the values "primary" (proposer), "secondary" (seconder) or "other".

Description of Changes

Change	Implementation
Replace existing <code>Candidate</code> with new definition in EML core	change to EML
Choice added between nomination and candidate action. Candidate action can be to consent or withdraw.	change to EML
Final <code>xsd:any</code> now has <code>maxOccurs</code> of 1	change to EML
The candidate must have a <code>QualifyingAddress</code>	Schematron
The <code>Affiliation</code> (if any) must have a <code>Logo</code> and <code>Description</code>	Schematron
The <code>Proposer</code> must have a contact method	Schematron
the <code>Proposer</code> must have an <code>Id</code> mandatory with a <code>Type</code> of <code>electoralrollnumber</code>	Schematron
The <code>Candidate</code> must have a <code>ScrutinyRequirement</code> of <code>Type</code> "deposit paid"	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 210-Nomination</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:Candidate">
      <assert test="eml:QualifyingAddress">The candidate's qualifying
address is mandatory</assert>
    </rule>
```

```

<rule context="eml:Affiliation">
  <assert test="eml:Description">The affiliation (party) description is
mandatory</assert>
  <assert test="eml:Logo">A URL for the affiliation (party) logo is
mandatory</assert>
</rule>
<rule context="eml:Proposer">
  <assert test="eml:Contact">The proposer must have a contact</assert>
  <assert test="eml:Id[@Type='electoral roll number']">The proposer must
have an electoral roll number</assert>
</rule>
<rule context="eml:ScrutinyRequirements">
  <assert test="eml:ScrutinyRequirement[@Type='deposit paid']">The
candidate must indicate whether they have paid their deposit</assert>
</rule>
</pattern>
</schema>

```

220 - Response to Nomination

Description of Schema

This message is sent from the election organiser to the candidate to say whether the nomination has been accepted. Along with the acceptance information and the basic information of election, contest and candidate names, the candidates contact details and affiliation can be included and a remark explaining the decision.

Change	Implementation
CandidateName replaced by new Candidate element	change to EML
Final xsd:any now has maxOccurs of 1	change to EML
CandidateAddress is mandatory	Schematron
Candidate/Contact is mandatory	Schematron
Remark is required if the value of Accepted is 'no'	Schematron

The Schematron Schema

```

<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 220-Nomination Response</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:Candidate">
      <assert test="eml:QualifyingAddress">The qualifying address is
required</assert>
      <assert test="eml:Contact">The candidate must have a contact</assert>

```

```

    </rule>
    <rule context="eml:NominationResponse[eml:Accepted='no']">
      <assert test="eml:Remark">A reason for rejection is required in the
Remark element</assert>
    </rule>
  </pattern>
</schema>

```

230 - Candidate List

Description of Schema

This schema is used for messages transferring candidate lists for specified contests. It has the election event name, contest name (with its ID), optionally a contest description and then a list of candidates, each with a name, address, optional affiliation and other useful data.

Description of Changes

Change	Implementation
Allow multiple contests	change to EML
CandidateName changed to more descriptive Candidate element (added to core)	change to EML
Optional xsd:any added to CandidateList and Contest elements	change to EML
Make Description mandatory where there is an Affiliation	Schematron
The Candidate must have a QualifyingAddress	Schematron

The Schematron Schema

```

<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 230-Candidate List</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:Affiliation">
      <assert test="Description">The affiliation must have a
description</assert>
    </rule>
    <rule context="eml:Candidate">
      <assert test="QualifyingAddress">The candidate must have a qualifying
address</assert>
    </rule>
  </pattern>
</schema>

```

310 - Voter Registration

Description of Schema

This schema is used for messages registering voters. It uses the `VoterIdentificationStructure` from the EML core, with the exception that no `VToken` or `VTokenQualified` is allowed. The `VoterInformationStructure` is used unchanged. Proof of ID can be provided, as can information about a proxy. The `CheckBox` element with its `Type` attribute allows binary information such as whether the voter's entry on the electoral register can be sold, or whether the voter wants to participate in the count.

There is the facility for the transmission channel (for example a trusted web site) to add the time of transmission.

This schema allows any additional data to be added to the message for appropriate local extensions.

EML-UK Explanation and Rules

For the UK, the `Qualifier` element of `VoterInformation` is expected to have one of the following values:

- Crown Servant
- EU Servant
- Lord
- 69/70
- Overseas

These text strings should be used as shown here where appropriate. Feedback is invited on other values found to be necessary.

Description of Changes

Change	Implementation
<code>VoterRegistrationStructure</code> added as a global data type to allow restriction elsewhere	change to EML
<code>VoterInformation</code> made optional	change to EML
Proxy added to <code>Voter</code>	change to EML
<code>CheckBox</code> element added with <code>Type</code> attribute and values "yes" or "no"	change to EML
<code>xsd:any</code> added to <code>Voter</code>	change to EML
<code>Affiliation</code> is not used	Schematron
<code>Ethnicity</code> is not used	Schematron
<code>ElectoralAddress</code> is mandatory	Schematron
<code>VoterName</code> must be present	Schematron
The <code>Id</code> element of <code>Voter</code> must be present and have the <code>Type</code> "electoral roll number"	Schematron
There must be a <code>Type</code> value of a <code>CheckBox</code> that is "include in sale of electoral roll"	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 310-Voter Registration</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:VoterInformation">
      <report test="eml:Affiliation">Affiliation is not used</report>
      <report test="eml:Ethnicity">Ethnicity is not used</report>
    </rule>
    <rule context="eml:VoterIdentification">
      <assert test="eml:VoterName">VoterName is mandatory</assert>
      <assert test="eml:ElectoralAddress">ElectoralAddress is
mandatory</assert>
      <assert test="eml:Id[@Type='electoral roll number']">The Id element of
Voter must be present and have the Type "electoral roll number"</assert>
    </rule>
    <rule context="eml:Voter">
      <assert test="eml:CheckBox[@Type='include in sale of electoral
roll']">There must be a CheckBox with a type of "include in sale of
electoral roll"</assert>
    </rule>
  </pattern>
</schema>
```

320 - Inter Database

Description of Schema

This schema is used for messages requesting services from other electoral list databases. This can, for example, be used to de-dupe databases. The schema is in two parts, so a message will be either a request or a response.

A request starts with an `Action` code to identify the request being made. The `ActionDateTime` is used to specify when the action should be carried out. The `Source` and `Destination` are used as identifiers (either string or URI) and then there is an optional list of voters. The message can also be extended through the `xsd:any` element.

A response has a similar structure. It could be that the `Action` code is no longer required, so this is now optional. The `TransactionID` must match that given in the request. The `Result` is either a binary `Success` flag or a remark or both. Again, there is a date and time, but in this case it is the date and time at which the action took place.

Description of Changes

Change	Implementation
TransactionId removed as now part of the EML element.	change to EML

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 320-Inter DB</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

  </pattern>
</schema>
```

330 - Election List

Description of Schema

This schema is used for messages communicating the list of eligible voters for an election event or election within the event. This choice is allowed as frequently the same population will be able to vote at all elections within an event, but on other occasions the elections will have different lists.

One choice is therefore to send in one message a sequence of the election event name and ID, followed by an election rule ID and a list of voter registrations. The election rule indicates which voters in the register will be able to vote in this election event.

The other choice is to indicate the election, and optionally an individual contest, to which the voter list applies.

Partial lists are allowed through the use of the *Qualifier* element. So, for example, a list of postal voters can be produced. Any voter can have a *Blocked* element set against them with an optional *Reason* and *Channel*. This allows a list to be produced for a polling place indicating those that have already voted by another means or who have registered for a postal vote.

Description of Changes

Change	Implementation
New <i>Qualifier</i> element with <i>Channel</i> and <i>Comment</i> as children	change to EML
<i>ElectionEventName</i> replaced by new <i>Event</i> element	change to EML
<i>PollingPlace</i> added as child of <i>ElectionList</i>	change to EML
<i>Blocked</i> element added with <i>Reason</i> and <i>Channel</i> attributes.	change to EML
<i>VoterInformation</i> made optional	change to EML
xsd:any added	change to EML

ContestName must be present.	Schematron
ElectionList must have an Election child	Schematron
Reason attribute of Blocked is mandatory if value of Blocked is "yes".	Schematron
Id Type attribute must have the value "electoral roll number"	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 330-Election List</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:ElectionList">
      <assert test="eml:Election">The ElectionList must have an Election
child</assert>
    </rule>
    <rule context="eml:Election">
      <assert test="eml:ContestName">The contest name is mandatory</assert>
    </rule>
    <rule context="eml:Blocked[.='yes']">
      <assert test="@Reason">The reason attribute is mandatory if
Blocked='yes'</assert>
    </rule>
    <rule context="eml:VoterIdentification">
      <assert test="count(eml:Id)='1'">Only one Id element is allowed in the
VoterIdentification</assert>
      <assert test="eml:Id[@Type='electoral roll number']">The Id Type must
be 'electoral roll number'</assert>
    </rule>
  </pattern>
</schema>
```

340 - Polling Information

Description of Schema

The polling information messages defined by this schema are sent to voters to provide them with details of how to vote. It can also be sent to a distributor, so multiple sets of information are allowed.

One set of polling information may be sent to each voter for any election event, so the election event name is included. Some information about the voter may be included, for example to print on a polling card.

The `ElectionRuleId` can be included, and contact information for the benefit of a distributor.

Information about the elections and contests is included for the benefit of the voter. For each voting channel, this includes where to vote (which could be a polling station, URL for Internet voting, phone number for SMS voting etc) and the times that votes can be placed. Use of the `DisplayOrder` attribute on these allows the display or printing of information to be tailored from within the XML message.

Description of Changes

Change	Implementation
VotingPeriod moved from being a child of Polling to being a child of VotingInformation. This allows different voting periods for different channels. DisplayOrder attribute added.	change to EML
ElectionEventName replaced by new Event element	change to EML
Location replaced by new PollingPlace element	change to EML
Voter Id, Name and MailingAddress are all mandatory.	Schematron
The voter Id must be an "electoral roll number"	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 340-Polling Information</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:Voter">
      <assert test="eml:VoterName">The voter's name is mandatory</assert>
      <assert test="eml:Id[@Type='electoral roll number']">The voter's Id is
mandatory and must be an electoral roll number</assert>
    </rule>
    <rule context="eml:Polling">
      <assert test="eml:Contact/eml:MailingAddress">The mailing address is
mandatory</assert>
    </rule>
  </pattern>
</schema>
```

350a - Outgoing Generic Communication

Description of Schema

This schema provides a common structure for incoming communications. Individual message types can be designed based on extensions of this schema.

The voter must always provide a name and might provide one or more identifiers. These are shown as a restriction of the `VoterIdentificationStructure`. Contact details are also required, and it is expected that at least one of the allowed contact methods will be included. Inclusion of proxy information is optional.

The names of the election event, election and contest are optional. There is then an element in which a message can be placed in any of several different formats according to the channel being used.

Description of Changes

Change	Implementation
xsd:any made optional.	change to EML

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 350-Outgoing and Incoming Generic Communications</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>
  </pattern>
</schema>
```

350b - Incoming Generic Communication

This schema provides a common structure for outgoing communications. Individual message types can be designed based on extensions of this schema.

The voter's name must be provided and there can be one or more identifiers. These are shown as a restriction of the `VoterIdentificationStructure`. Contact details are also required, and it is expected that at least one of the allowed contact methods will be included. Inclusion of proxy information is optional.

The names of the election event, election and contest are optional. There is then an element in which a message can be placed in any of several different formats according to the channel being used.

Description of Changes

Change	Implementation
xsd:any made optional.	change to EML

The Schematron Schema

This is the same as 350a.

360a - Outgoing Channel Options

Description of Schema

This schema is used for messages offering a set of voting channels to the voter. It is an extension of schema 350a. A message conforming to this schema will include a list of allowed channels for a specific election event or election within the event.

Description of Changes

Change	Implementation
xsd:any made optional.	change to EML

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 360-Channel Options</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>
  </pattern>
</schema>
```

360b - Incoming Channel Options

Description of Schema

This schema is used for messages indicating a preferred channel. It may be sent in response to 360a or as an unsolicited message if this is supported within the relevant jurisdiction.

It is an extension of schema 350b, and indicates single preferred voting channel.

Description of Changes

Change	Implementation
Optional Proxy added	change to EML
xsd:any made optional.	change to EML

The Schematron Schema

This is the same as 360a.

410 - Ballots

Description of Schema

This schema is used for messages presenting the ballot to the voter or providing a distributor with the information required to print or display multiple ballots.

In the simplest case, a distributor can be sent information about the election event and a ballot ID to indicate the ballot to print.

In other cases, the full information about the elections will be sent with either an election rule ID to identify the voters to whom that election applies or a set of voter names and contact information. If the ballot is being sent directly to the voter, this information is not required.

The election information starts with the election event name and description. This is followed by information related to the contest and any other messages and information required. Note that each voter can only vote in a single contest per election, so only a single iteration of the `Contest` element is required.

A contest must have its name and ID and a list of options for which the voter can vote. There is also a set of optional information that will be required in some circumstances. Some of this is for display to the voter (`VotingInformation` and `Messages`) and some controls the ballot and voting process (`Rotation`, `VotingMethod`, `MaxVotes`, `MinVotes`, `MaxWriteIn`).

Description of Changes

Change	Implementation
ElectionEventName changed to Event	change to EML
Children of Options changed to allow a Candidate with additional information or an Option	change to EML
New element Qualified with a Reason attribute to allow equivalent of "pink" ballot paper	change to EML
Proxy added	change to EML
VoterContact renamed Contact for consistency	change to EML
MaxWriteIn is not used	Schematron
VotingInformation is mandatory	Schematron
MaxVotes is mandatory	Schematron
MinVotes is not used	Schematron
Candidate/QualifyingAddress is mandatory	Schematron
Logo is mandatory if there is an Affiliation	Schematron
There must be at least one Election	Schematron
The VoterName is mandatory	Schematron

The Ballot must have a Voter child	Schematron
The ProxyName is mandatory (if there is a proxy)	Schematron
The Proxy must have a contact address (if there is a proxy)	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 410-Ballots</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:Contest">
      <report test="eml:MinVotes">The element MinVotes should not be
used</report>
      <report test="eml:MaxWriteIn">The element MaxWriteIn should not be
used</report>
      <assert test="eml:MaxVotes">The element MaxVotes is mandatory</assert>
      <assert test="eml:VotingInformation">The element VotingInformation is
mandatory</assert>
    </rule>
    <rule context="eml:Ballot">
      <assert test="eml:Election">There must be at least one Election
element</assert>
      <assert test="eml:Voter">The element Ballot must have a Voter
child</assert>
    </rule>
    <rule context="eml:VoterIdentification">
      <assert test="eml:VoterName">The element VoterName is mandatory in a
VoterIdentification</assert>
    </rule>
    <rule context="eml:Candidate">
      <assert test="eml:QualifyingAddress">The candidate must have a
qualifying address</assert>
    </rule>
    <rule context="eml:Affiliation">
      <assert test="eml:Logo">The affiliation must have a logo</assert>
    </rule>
    <rule context="eml:Proxy">
      <assert test="eml:Name">The proxy must have a name</assert>
      <assert test="eml:Address">The proxy must have an address</assert>
    </rule>
  </pattern>
</schema>
```

420 - Authentication

Description of Schema

The authentication message defined by this schema may be used to authenticate a user during the voting process. Depending on the type of election, a voter's authentication may be required; the precise mechanism used may be channel and implementation specific. In some public elections the voter must be anonymous, in which case the prime method used for authentication is the voting token. The voting token can contain the information required to authenticate the voter's right to vote in a specific election or contest, without revealing the identity of the person voting. Either the `VToken` or the `VTokenQualified` must always be present in an authenticated message.

The other authentication elements are optional. The `VotingChannel` identifies the channel by which the voter has been authenticated, the `LoginMethod` allows additional information to be added about any channel specific authentication method used. `Language` and corresponds to the general description of that element.

Description of Changes

Change	Implementation
TransactionId removed - now in EML core	change to EML

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 420-Authentication</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

  </pattern>
</schema>
```

430 - Authentication Reply

Description of Schema

The authentication reply is a response to message 420. It indicates whether authentication succeeded using the `Authenticated` element, and might also present the ballot to the user. This is a restriction of the previous `Ballots` element to allow only a single ballot per reply.

Description of Changes

Change	Implementation
--------	----------------

TransactionId removed - now in EML core	change to EML
ElectionEventName changed to Event	change to EML
Under Ballot, the choice element between ElectionRuleId and Voter cannot occur	change to EML
VoterIdentification altered to use the new definition of VoterIdentificationStructure in EML core v0.5	change to EML

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 430-Authentication Response</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

  </pattern>
</schema>
```

440 - Cast Vote

Description of Schema

This message represents a cast vote, which comprises an optional voting token (which may be qualified) to ensure authorisation, information about the votes themselves, the name and ID of the reporting unit if applicable and a set of optional audit information.

The election event is identified, together with a set of elections (if multiple elections were included on the same ballot). For each election, the contest is identified, with a set of, possibly sealed, votes. The votes are sealed at this level if there is a chance that the message will be divided, for example so that votes in different elections can be counted in different locations.

For each contest, options are listed. It is allowed for no options to be selected as a means of invalidating the vote. For each option, either the option name and ID is provided or a write-in option name for elections where this is allowed. This may be accompanied by the value of the vote for that option, with an optional voting token (which, again, may be qualified). In some elections where it is only possible to vote for a single candidate, different voting tokens may be provided for each option. In this case, only the voting token is required.

Validation of authenticity of paper ballots is assumed to be done by a mechanism outside the scope of EML.

Description of Changes

Change	Implementation
--------	----------------

CastVoteStructure created for extension in 460	change to EML
ElectionEventName replaced by Event	change to EML
Value made optional and this area of Option simplified	change to EML
ID attribute of Option removed	change to EML
Option made optional to allow abstentions	change to EML
Optional BallotReference added (see 460)	change to EML
xsd:any made optional	change to EML
WriteInOptionName is not used	Schematron
AuditInformation must be present	Schematron
At least one VToken in the message	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 440-Cast Vote</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
      <assert test="//eml:ProcessingUnits/*">There must be at least one
processing unit in the audit information</assert>
      <assert test="//eml:VToken">There must be at least one VToken in the
message</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

    <rule context="eml:Option">
      <report test="eml:WriteInOptionName">Write in options are not
allowed</report>
    </rule>
  </pattern>
</schema>
```

450 - Vote Confirmation

Description of Schema

The vote confirmation message can be used to show that a vote has been accepted and provide a reference number in case of future queries. Display information can also be provided as well as additional structured information using `xsd:any`.

Description of Changes

Change	Implementation
ElectionEventName changed to Event	change to EML
xsd:any made optional	change to EML
ConfirmationReference made optional	change to EML
Messages made optional	change to EML

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 450-VoteConfirmation</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

  </pattern>
</schema>
```

460 - Votes

Description of Schema

This schema is used to define a message comprising a set of votes being transferred for counting. It is a set of `CastVote` elements from schema 440 with the addition of audit information for the voting system.

EML-UK Explanation and Rules

The element `ProposedRejection` with a value of "yes" or "no" may be used in the `xsd:any` of each `CastVote`.

Description of Changes

Change	Implementation
Optional <code>xsd:any</code> added	change to EML
<code>CastVote</code> made an extension of the <code>CastVoteStructure</code>	change to EML
<code>ProposedRejection</code> added	change to EML
<code>AuditInformation</code> must be present	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 460-Votes</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <ns prefix="emluk" uri="http://www.govtalk.gov.uk/people/elections"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
      <assert test="//eml:ProcessingUnits/*">There must be at least one
processing unit in the audit information</assert>
    </rule>
    <rule context="eml:Contact">
      <assert test="*">There must be at least one child of a contact
element</assert>
    </rule>

  </pattern>
</schema>
```

470 - V-Token Log

Description of Schema

The message defined by this schema is used to add a voting token (which may be qualified) to an audit log. The `VToken` or `VTokenQualified` is extended by the addition of a `Status` attribute with a value of `voted` or `unvoted`. In addition to sending single tokens as they are used, the schema can be used to validate a message sending multiple tokens optionally grouped by voting channel. This might be used instead of sending tokens as they used or, for example, to send the unused tokens at the end of an election. The logging system can also be identified for audit purposes.

Description of Changes

Change	Implementation
ElectionEventName replaced by Event	change to EML
The Status attribute of VToken and VTokenQualified changed to mandatory and made an xsd:string	change to EML
ElectionName must be present.	Schematron
VotingChannel must be present.	Schematron
AuditInformation must be present.	Schematron

The Schematron Schema

```
<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 470 - VToken Log</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
```

```

<ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
<pattern name="EML-UK">

  <rule context="eml:EML">
    <assert test='eml:Seal'>A Seal must be present</assert>
    <assert test="//eml:ProcessingUnits/*">There must be at least one
processing unit in the audit information</assert>
  </rule>
  <rule context="eml:Contact">
    <assert test="*">There must be at least one child of a contact
element</assert>
  </rule>

  <rule context="eml:VTokenLog">
    <assert test="eml:ElectionName">The election name is
mandatory</assert>
  </rule>
  <rule context="eml:VTokens">
    <assert test="eml:VotingChannel">The voting channel is
mandatory</assert>
  </rule>
</pattern>
</schema>

```

480 - Seal Log

Description of Schema

The message defined by this schema is used to log the use of each seal for audit purposes. There must be one message per seal, so, if two or more votes are sealed individually in one cast vote message, the corresponding number of log messages must be generated.

The message contains the name and ID of the event and election, the seal itself and possibly additional audit information.

Description of Changes

Change	Implementation
Event added	change to EML
AuditInformation must be present.	Schematron

The Schematron Schema

```

<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 480 - Seal Log</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
      <assert test="//eml:ProcessingUnits/*">There must be at least one
processing unit in the audit information</assert>
    </rule>
    <rule context="eml:Contact">

```

```

    <assert test="*">There must be at least one child of a contact
    element</assert>
  </rule>

</pattern>
</schema>

```

510 - Count

Description of Schema

The count message defined by this schema is used to communicate the results of the sets of contests that makes up one or more elections within an election event. It may also be used to communicate the count of a single reporting unit for amalgamation into a complete count. Note there is no communication of a "result" in terms of who got the most votes. This is seen as outside the scope of EML at the moment.

The message includes the election event name and ID, and for each election, the election ID, an optional reference to the election rule being used and information concerning the set of contests. The counting system is may also be identified for audit purposes.

In some cases, reporting for a contest may be required at a lower level (for example, for each county in a state). For this reason, reporting may be done at the level of the reporting unit, the total votes, or for a total vote and the breakdown according to the multiple reporting units.

Each contest indicates its name and ID, the maximum number of votes that each voter could cast, information about the votes cast for each option and the numbers of abstentions and rejected votes. The `RejectedVotes` element has `Reason` (optional) and `ReasonCode` (mandatory) attributes to indicate why the votes were rejected. The former is a textual description, and the latter a code.

For each option, the name, ID and number of valid votes is mandatory. These are optionally supplemented by an affiliation when the option is a (human) candidate.

Description of Changes

Change	Implementation
ElectionEventName replaced by Event	change to EML
AuditInformation must be present.	Schematron

The Schematron Schema

```

<?xml version="1.0"?>
<schema xmlns="http://www.ascc.net/xml/schematron">
  <title>EML-UK 510 - Count</title>
  <ns prefix="eml" uri="urn:oasis:names:tc:evs:schema:eml"/>
  <ns prefix="apd"
  uri="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"/>
  <pattern name="EML-UK">

    <rule context="eml:EML">
      <assert test='eml:Seal'>A Seal must be present</assert>
      <assert test="//eml:ProcessingUnits/*">There must be at least one
processing unit in the audit information</assert>
    </rule>

    <rule context="eml:Contact">

```

```
    <assert test="*">There must be at least one child of a contact  
element</assert>  
  </rule>  
  
  </pattern>  
</schema>
```


References

1. Election Mark-up Language (EML): e-Voting Process and Data Requirements
see <http://www.oasis-open.org/committees/election/>
2. Election Mark-up Language (EML): XML Schemas
see <http://www.oasis-open.org/committees/election/>
3. XML Schema 1.0
<http://www.w3.org/XML/Schema>
4. Address and Personal Details Schema
see http://www.govtalk.gov.uk/interoperability/draftschema_schema.asp?schemaid=92
5. RFC 2630 Cryptographic Message Syntax
<http://www.ietf.org/rfc/rfc2630.txt>
6. RFC 3161 Internet X.509 Public Key Infrastructure Time-Stamp Protocol (TSP)
<http://www.ietf.org/rfc/rfc3161.txt>
7. Open Source Software use within UK Government
http://www.govtalk.gov.uk/rfc/rfc_document.asp?docnum=429
8. The Schematron Assertion Language 1.5
<http://www.ascc.net/xml/schematron/>
9. ISO/IEC 19757 Document Schema Definition Languages
see <http://www.dSDL.org/>
10. XML Path Language (XPath) Version 1.0
<http://www.w3.org/TR/xpath>

Names and IDs for Local Elections May 2003

There are various items in the schemas with names and IDs. This is the interpretation for the May 2003 local elections:

Element	Name	ID
ElectionEvent	Local Elections 2003	LE2003
Qualifier	[Local Authority Name]	[Local Authority ID]
Election	Examples are: parish council county council borough council district council mayor	Example are: PC CC BC DC MAY
Contest	[Electoral Area Name]	[Electoral Area ID]

EML Externals Schema Document (non-normative)

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
  targetNamespace="urn:oasis:names:tc:evs:schema:eml"
  xmlns:apd="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="urn:oasis:names:tc:evs:schema:eml"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified"
  version="0.1" id="eml-externals">

  <xsd:annotation>
    <xsd:documentation>
      This schema references external schemas where the references might be
      changed for national use. The intention is that these schemas are used
      internationally.
    </xsd:documentation>
  </xsd:annotation>

  <xsd:import
    namespace="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"
    schemaLocation="AddressTypes-v1.xsd"/>
  <xsd:import
    namespace="http://www.govtalk.gov.uk/people/AddressAndPersonalDetails"
    schemaLocation="PersonalDetailsTypes-v1.xsd"/>

  <xsd:complexType name="AddressStructure">
    <xsd:complexContent>
      <xsd:extension base="apd:InternationalAddressStructure"/>
    </xsd:complexContent>
  </xsd:complexType>
  <xsd:complexType name="NameStructure">
    <xsd:complexContent>
      <xsd:extension base="apd:CitizenNameStructure"/>
    </xsd:complexContent>
  </xsd:complexType>
</xsd:schema>
```

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