Internet Engineering Task Force
Internet-Draft
Intended status: Informational
Expires: September 7, 2015

S. Olmstead-Wilcox
J. Latour
CIRA
JF. Tremblay
Viagenie

March 6, 2015

CIRA IDN EPP Extension
draft-wilcox-cira-idn-eppext-00

Abstract

The Canadian Internet Registration Authority (CIRA), administering the .CA country-code top-level domain, offers internationalized domain names (IDN) in French, one of Canada's official languages. CIRA's Extensible Provisioning Protocol (EPP) services have been augmented with an IDN EPP extension in order to support registrars desiring to register internationalized domains using French characters as bundled domains.

This document defines the extension to the Extensible Provisioning Protocol used at CIRA to support IDN operations.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on September 7, 2015.

Copyright Notice

Table of Contents

1. Introduction

This document describes an extension to the Extensible Provisioning Protocol (EPP) providing support for the internationalization of domain names (IDN) and other related functions. This EPP extension is used at the Canadian Internet Registration Authority (CIRA) to support IDN operations for French, one of Canada's official languages.

The design of this EPP extension is based on a number of requirements from the CIRA registry. A first requirement is to exchange IDN labels with registrars during create operations. There is also a need to exchange information about the set of characters supported by the registry. This set is called a repertoire throughout the document, as a synonym with IDN-table.

Registry policies often prevent the registration of similar-looking IDN labels by different registrants. CIRA policies allow each IDN label to be registered independently, removing the need for a registration bundle structure as described in [RFC4290] or more recently in [ID.draft-kong-eppext-bundling-registration]. The policies also specify that all the label variants must be linked to a single registrant-registrar pair, even if some variants aren't registered.

In order to support this, a simple list of label variants is used. No zone information or registration information is included in that list. By providing such list to a registrar, a registry has the capacity to inform a registrar of the possible label variants without relying on the accurate processing of complex Label Generation Rulesets (LGR) on the registrar side, minimizing risks of errors.

The CIRA IDN EPP extension defines three objects named createType, infDataType and checkType, respectively used in <create>, <info> and <check> EPP commands. These objects contain elements describing a "repertoire", as a set of variant Unicode code points, an IDN label in U-label form and "domainVariants", a list of variant labels accepted by the registry (also called bundle). A new type named repertoireType is also defined. This type is used to carry a set of variant Unicode code points supported by a registry.

2. Operational Requirements

This section explains the rationale and detailed requirements behind CIRA's EPP extension for IDN.

2.1. IDN Labels

The first requirement relating to IDN support is to allow registrars to specify a U-label string in a create operation. For this purpose a new element is required, in this case called 'u-label'.

2.2. Repertoires

French being the first IDN language supported at CIRA, it would be possible to accept EPP create operations without other information than the U-label and to consider the French character set as the default for all operations, which would include the base English character set already in place. However CIRA did not want to preclude the possibility to add support for other languages in the future or to add supplementary constrained character sets. The registrars are therefore required to specify the character set in every create operation.

The character set is being specified in a repertoire type as a string. The name 'repertoire' as used here represents the set of code points variants accepted by policy by the registry for a specific language. This has the same meaning as the definition of idn:table identifier defined in [ID.draft-kong-eppext-bundling-registration].

The string used to identify a repertoire may be similar in content to a language tag, but shouldn't be confused with a language, as the character set approved by policy by a registry may represent a subset of an official language's character set. See section 1.3 of [RFC4290] for a more detailed discussion on possible confusion in usage.

2.3. French IDN Characters Variants

The code points below are included in the implementation of French IDN by CIRA. Each French accented character is considered a variant of the base character.

Code Point	French Character	Base Character
U+00E0	LATIN SMALL LETTER A WITH GRAVE	a
U+00E2	LATIN SMALL LETTER A WITH CIRCUMFLEX	a
U+00E7	LATIN SMALL LETTER C WITH CEDILLA	c
U+00E8	LATIN SMALL LETTER E WITH GRAVE	e
U+00E9	LATIN SMALL LETTER E WITH ACUTE	e
U+00EA	LATIN SMALL LETTER E WITH CIRCUMFLEX	e
U+00EB	LATIN SMALL LETTER E WITH DIAERESIS	e
U+00EE	LATIN SMALL LETTER I WITH CIRCUMFLEX	i
U+00EF	LATIN SMALL LETTER I WITH DIAERESIS	i
U+00F4	LATIN SMALL LETTER O WITH CIRCUMFLEX	o
U+00F9	LATIN SMALL LETTER U WITH GRAVE	u
U+00FB	LATIN SMALL LETTER U WITH CIRCUMFLEX	u
U+00FC	LATIN SMALL LETTER U WITH DIAERESIS	u
U+00FF	LATIN SMALL LETTER Y WITH DIAERESIS	y
U+00E6	LATIN SMALL LETTER AE	ae
U+0153	LATIN SMALL LIGATURE OE	oe

Figure 1: Variant code points for French IDN at CIRA

2.4. Bundling and Registration Policy

A group of label variants referring to the same canonical base label (without accented characters) is named a bundle in this document. This definition is similar to the definition of registration bundle provided in [RFC4290], with the difference that it isn't used for registration at CIRA but only to retrieve information through an EPP <info> operation.

Concurrent registration of different labels in a bundle is not required by CIRA policy. The registration of individual variants remains independent, with the requirement that the registrar-registrant pair remains the same for every label in the bundle. Once a single variant has been registered, registration of a variant by different registrant or registrar is prevented. This includes the registration of canonical names from a period preceding IDN support.

In a way similar to registration, transfers are handled on a per-label basis. All labels within a bundle must be transferred within 5 days otherwise the transfer is canceled.

Label variants, besides being independently registered, are also allowed to have different lifetimes, expiration times and server information. The limitations on the bundle are managed using the

earliest registration date to the latest expiry date for all labels in a single bundle. An expired variant part of a non-expired bundle is considered 'withheld' and cannot be registered except by the same registrant-registrar pair.

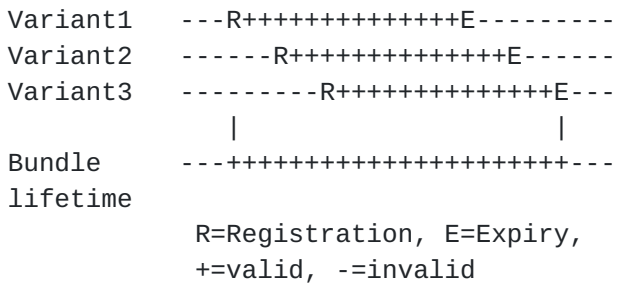

Figure 2: Bundle lifetime

In the context of CIRA, the bundle object will provide additional information regarding the canonical base label, the registrar and the registrant. Several fields relating to important dates, such as creation date, last update, transfer date and expiration are also included. The bundle object is not used for registration and transfers.

2.5. Domain Lists

Because of the limitations on variant registration described above, it is desirable for the registry to specify the exact list of allowed label variants. A registrar could, for example, use that list to display information to prospective registrants or to explain registration errors in a registrant-facing interface.

The CIRA IDN EPP extension adds support for a domainList element returned as a result to Info operations. The domainList contains a list of allowed label variants based on the requested label.

Using a list is simpler to implement for registrars and does not require them to process complex rules (or Label Generation Rulesets) as defined in [ID.draft-davies-idntables]. This limits implementation errors in the parsing of these rules and the need to refresh and process them on a regular basis.

3. Object Elements

In order to cover the requirements described above, five elements are defined in this EPP extension. Elements u-label, repertoire and domainVariants are defined as part of the base CIRA IDN extension. The repertoire identifies a character table (idn-table) and the

domainVariants carries a list of label variants. The two other elements, bundleDomain and info, are used in the bundle manipulation part of the extension.

3.1. U-Labels

The u-label element is an optional parameter used to specify explicitly the value of a U-label. It will be validated against the A-label value found in the domain:name attribute. It is based on the type labelType.

```
<element name="u-label" type="eppcom:labelType" minOccurs="0"/>
```

3.2. Repertoires

The repertoire element is based on the repertoireType type defined in the extension and is a simple string token limited to 2 characters. The attribute value is linked to a character table describing which code points are valid for this language.

```
<element name="repertoire" type="cira-idn:repertoireType" />
<simpleType name="repertoireType">
  <restriction base="token">
    <length value="2"/>
  </restriction>
</simpleType>
```

3.3. DomainVariants

The optional domainVariants element is based on the domainList type, which is a sequence of elements of labelType. Each label enumerated in domainVariants represents the possible label variants for a base domain.

```
<element name="domainVariants"
         type="cira-idn:domainList"
         minOccurs="0" />
<complexType name="domainList">
  <sequence>
    <element name="name"
             type="eppcom:labelType"
             maxOccurs="unbounded" />
  </sequence>
</complexType>
```

3.4. BundleDomains

The bundleDomains element uses the same domainList type as domainVariants and is used in a similar way, but in a bundle object rather than in a ciraIdnInfo object. The exact usage is described below in the extension objects section.

```
<element name="bundleDomains" type="cira-idn:domainList"/>
```

3.5. Info

The info element is based on the infoType type, built out of a label type and a repertoire id. This is similar to the u-label and repertoire types defined above, but this composed type is only used in bundle objects and may contain either a u-label or an a-label.

```
<element name="info" type="cira-idn-bundle:infoType" />
<complexType name="infoType">
 <sequence>
   <element name="name" type="eppcom:labelType" />
   <element name="repertoire"
            type="cira-idn:repertoireType"
            minOccurs="0"/>
 </sequence>
</complexType>
```

4. EPP Extension Object

4.1. The ciraIdnCheck Object

The ciraIdnCheck object is used in <check> commands requests to specify which repertoire (language) is used. Multiple repertoire elements may be specified if needed.

```
<element name="ciraIdnCheck" type="cira-idn:checkType" />
<complexType name="checkType">
  <sequence>
    <element name="repertoire" type="cira-idn:repertoireType" />
  </sequence>
</complexType>
```

4.2. The ciraIdnInfo Object

The ciraIdnInfo object is used in <info> command responses to a client when multiple IDN labels variants exist according to the registry policies.

```
<element name="ciraIdnInfo" type="cira-idn:infDataType" />
<complexType name="infDataType">
  <sequence>
    <element name="domainVariants"
             type="cira-idn:domainList"
             minOccurs="0" />
  </sequence>
</complexType>
```

4.3. The ciraIdnCreate Object

The ciraIdnInfo object is used in <info> command responses to a client when multiple IDN labels variants exist according to the registry policies.

```
<element name="ciraIdnCreate" type="cira-idn:createType"/>
  <complexType name="createType">
  <sequence>
    <element name="repertoire" type="cira-idn:repertoireType" />
    <element name="u-label" type="eppcom:labelType" minOccurs="0"/>
  </sequence>
</complexType>
```

5. EPP Command Mapping

5.1. EPP Query Commands

5.1.1. EPP <check> Command

The following is an example of IDN EPP Domain Check transaction in which the client includes the ciraIdnCheck object in the request:

```
C: <?xml version="1.0" encoding="UTF-8"?>
C: <epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
C:   <command>
C:     <check>
C:       <domain:check
           xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
C:         <domain:name>abc123.ca</domain:name>
C:         <domain:name>xyz987.ca</domain:name>
C:         <domain:name>xn--r-wfan6a.ca</domain:name>
C:       </domain:check>
C:     </check>
C:     <extension>
C:       <cira-idn:ciraIdnCheck
             xmlns:cira-idn="urn:ietf:params:xml:ns:cira-idn-1.0">
C:         <cira-idn:repertoire>fr</cira-idn:repertoire>
C:       </cira-idn:ciraIdnCheck>
```

```
C:     </extension>
C:     <clTRID>ABC-12346</clTRID>
C:   </command>
C: </epp>

S: <?xml version="1.0" encoding="UTF-8"?>
S: <epp xmlns:cira="urn:ietf:params:xml:ns:cira1.0"
S:      xmlns="urn:ietf:params:xml:ns:epp-1.0"
S:      xmlns:host="urn:ietf:params:xml:ns:host- 1.0"
S:      xmlns:poll="urn:ietf:params:xml:ns:poll1.0"
S:      xmlns:contact="urn:ietf:params:xml:ns:contact1.0"
S:      xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
S:   <response>
S:     <result code="1000">
S:       <msg>Command completed successfully</msg>
S:     </result>
S:     <resData>
S:     <domain:chkData>
S:       <domain:cd>
S:         <domain:name avail="true">abc123.ca</domain:name>
S:       </domain:cd>
S:       <domain:cd>
S:         <domain:name avail="true">xyz987.ca</domain:name>
S:       </domain:cd>
S:       <domain:cd>
S:         <domain:name avail="false">xn--r-wfan6a.ca</domain:name>
S:         <domain:reason>Withheld</domain:reason>
S:       </domain:cd>
S:     </domain:chkData>
S:   </resData>
S:   <trID>
S:     <clTRID>ABC-12346</clTRID>
S:     <svTRID>CIRA-000000000312-0000000003</svTRID>
S:   </trID>
S: </response>
S: </epp>
```

This command returns successful completions responses as specified in [RFC5730] if no error occurred, usually with a code 1000.

If the request is invalid, return code 2005 is used. The error value is set to 8309 if the specified repertoire is invalid and to 8001 if the label contains invalid characters or cannot be converted.

5.1.2. EPP <info> Command

The base CIRA IDN extension does not modify the EPP <info> command sent by the client. In the case of a bundle command, a cira-idn-bundle-info object is added to the request. The two cases are covered below.

5.1.2.1. EPP <info> command for an IDN domain

If the queried domain is an IDN domain in A-label format, the response is modified to include a ciraIdnInfo object containing all the valid label variants for the domain, including the base label.

```
C: <?xml version="1.0" encoding="UTF-8" standalone="no"?>
C: <epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
C:   <command>
C:     <info>
C:       <domain:info
          xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
C:         <domain:name hosts="all">xn--r-wfan6a.ca</domain:name>
C:         <domain:authInfo>
C:           <domain:pw>password</domain:pw>
C:         </domain:authInfo>
C:       </domain:info>
C:     </info>
C:     <clTRID>ABC-12345</clTRID>
C:   </command>
C: </epp>

S: <?xml version="1.0" encoding="UTF-8"?>
S: <epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
S:   <response>
S:     <result code="1000">
S:       <msg>Command completed successfully</msg>
S:     </result>
S:     <resData>
S:     <domain:infData
        xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
S:       <domain:name>xn--r-wfan6a.ca</domain:name>
S:       <domain:roid>CIRA-lifecycle-00122</domain:roid>
S:       <domain:status s="serverUpdateProhibited">
          change registrant
         </domain:status>
S:       <domain:status s="serverDeleteProhibited" />
S:       <domain:status s="serverRenewProhibited" />
S:       <domain:status s="serverTransferProhibited" />
S:       <domain:status s="serverHold" />
S:       <domain:registrant>rant003</domain:registrant>
```

```
S:       <domain:contact type="admin">admin003</domain:contact>
S:       <domain:contact type="tech">tech003</domain:contact>
S:       <domain:ns>
S:          <domain:hostObj>ns1.example.ca</domain:hostObj>
S:          <domain:hostObj>ns2.example.ca</domain:hostObj>
S:       </domain:ns>
S:       <domain:host>ns1.pc-case3.ca</domain:host>
S:       <domain:host>ns2.pc-case3.ca</domain:host>
S:       <domain:clID>rar600</domain:clID>
S:       <domain:crID>rar600</domain:crID>
S:       <domain:crDate>2012-12-08T16:25:01.0Z</domain:crDate>
S:       <domain:exDate>2012-12-08T16:25:01.0Z</domain:exDate>
S:       <domain:authInfo>
S:         <domain:pw>password2</domain:pw>
S:       </domain:authInfo>
S:     </domain:infData>
S:   </resData>
S:   <extension>
S:     <cira-idn:ciraIdnInfo
          xmlns:cira-idn="urn:ietf:params:xml:ns:cira-idn-
S:       <cira-idn:domainVariants>
S:         <cira-idn:name>xn--r-wfan6a.ca</cira-idn:name>
S:         <cira-idn:name>xn--cir-cla.ca</cira-idn:name>
S:         <cira-idn:name>cira.ca</cira-idn:name>
S:       </cira-idn:domainVariants>
S:     </cira-idn:ciraIdnInfo>
S:   </extension>
S:     <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>cira-000002-0000000005</svTRID>
S:     </trID>
S:   </response>
S: </epp>
```

This command returns successful completions responses as specified in [RFC5730] if no error occurred, usually with a code 1000. [[C2: Error codes and error values to be completed. -- JFT]]

5.1.2.2. EPP <info> command with a bundle object

A client querying bundle information will include a cira-idn-bundle:info object in the request. The server will reply with a bundle object.

```
C: <?xml version="1.0" encoding="UTF-8" standalone="no"?>
C: <epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
C: <command>
C:   <info>
```

```
C:     <cira-idn-bundle:info
C:      xmlns:cira-idnbundle=
        "urn:ietf:params:xml:ns:cira-idn-bundle-1.0">
C:       <cira-idn-bundle:name>
C:         xn--valuation-93a.ca
C:       </cira-idn-bundle:name>
C:       <cira-idn-bundle:repertoire>fr</cira-idn-bundle:repertoire>
C:     </cira-idn-bundle:info>
C:   </info>
C:   <clTRID>
C:     ABC-12345
C:   </clTRID>
C: </command>
C: </epp>

S: <epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
S:   <response>
S:     <result code="1000">
S:       <msg>Command completed successfully</msg>
S:     </result>
S:     <resData>
S:       </resData>
S:       <extension>
S:       <cira-idn-bundle:infData
S:           xmlns:cira-idn=
S:           "urn:ietf:params:xml:ns:cira-idn-1.0"
S:           xmlns:cira-idn-bundle=
S:           "urn:ietf:params:xml:ns:cira-idn-bundle-1.0" >
S:         <cira-idn-bundle:canonicalDomainName>
S:           evaluation.ca
S:         </cira-idn-bundle:canonicalDomainName>
S:         <cira-idn-bundle:roid>CIRA-123</cira-idn-bundle:roid>
S:         <cira-idn-bundle:clID>rar600</cira-idn-bundle:clID>
S:         <cira-idn-bundle:registrant>
S:           rant600
S:         </cira-idn-bundle:registrant>
S:         <cira-idn-bundle:crID>rar600</cira-idn-bundle:crID>
S:         <cira-idn-bundle:crDate>
S:           2012-12-08T16:25:01.0Z
S:         </cira-idn-bundle:crDate>
S:         <cira-idn-bundle:upID>rar600</cira-idn-bundle:upID>
S:         <cira-idn-bundle:upDate>
S:           2012-12-08T17:25:01.0Z
S:         </cira-idn-bundle:upDate>
S:         <cira-idn-bundle:bundleDomains>
S:           <cira-idn:name>evaluation.ca</cira-idn:name>
S:           <cira-idn:name>xn--valuation-93a.ca</cira-idn:name>
S:           <cira-idn:name>xn--valution-2ya9f.ca</cira-idn:name>
```

```
S:         </cira-idn-bundle:bundleDomains>
S:       </cira-idn-bundle:infData>
S:     </extension>
S:     <trID>
S:       <clTRID>ABC-12345</clTRID>
S:       <svTRID>cira-000002-0000000005</svTRID>
S:     </trID>
S:   </response>
S: </epp>
```

5.1.3. EPP <poll> Command

The EPP <poll> command is not modified by this extension.

5.1.4. EPP <transfer> Command

The transfer command is not modified by this extension. The domain:name element may contain an IDN domain in A-label format.

5.2. EPP Transform Commands

5.2.1. EPP <create> Command

The create command from the client is extended with a ciraIdnCreate object containing the repertoire information and the U-Label for the domain to create. The server answer will contain the A-label of the created domain in the domain:name element. The server answer is not modified by this extension except for return codes.

Return code 8001 is returned by the server when the domain name contains invalid characters or when the A-label cannot be converted successfully to a valid U-label. Error code 8309 is used for an invalid repertoire and 8310 is used when the A-label does not match the U-label.

```
C: <?xml version="1.0" encoding="UTF-8" standalone="no"?>
C: <epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
C:   <command>
C:     <create>
C:       <domain:create
C:        xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
C:         <domain:name>xn--r-wfan6a.ca</domain:name>
C:         <domain:period unit="y">2</domain:period>
C:         <domain:ns>
C:           <domain:hostObj>hostname.example.net</domain:hostObj>
C:           <domain:hostObj>hostname.example.com</domain:hostObj>
C:         </domain:ns>
C:         <domain:registrant>contactid-1</domain:registrant>
```

```
C:         <domain:contact type="admin">contactid-1</domain:contact>
C:           <domain:contact type="tech">nbguy</domain:contact>
C:           <domain:contact type="tech">nbtech</domain:contact>
C:           <domain:contact type="tech">nbadmin</domain:contact>
C:         <domain:authInfo>
C:           <domain:pw>password</domain:pw>
C:         </domain:authInfo>
C:       </domain:create>
C:     </create>
C:     <extension>
C:         <cira-idn:ciraIdnCreate
C:          xmlns:cira-idn="urn:ietf:params:xml:ns:cira-idn-1.0">
C:         <cira-idn:repertoire>fr</cira-idn:repertoire>
C:         <cira-idn:u-label>cira.ca</cira-idn:u-label>
C:       </cira-idn:ciraIdnCreate>
C:     </extension>
C:     <clTRID>ABC-12345</clTRID>
C:   </command>
C: </epp>

S: <?xml version="1.0" encoding="UTF-8" standalone="no"?>
S: <epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
S:   <response>
S:     <result code="1000">
S:       <msg>Command completed successfully</msg>
S:     </result>
S:     <resData>
S:       <domain:creData
S:        xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
S:         <domain:name>xn--r-wfan6a.ca</domain:name>
S:         <domain:crDate>2012-08-27T17:52:21.0Z</domain:crDate>
S:         <domain:exDate>2014-08-27T17:52:01.0Z</domain:exDate>
S:       </domain:creData>
S:     </resData>
S:     <trID>
S:       <clTRID>ABC-12345</clTRID>
S:       <svTRID>CIRA-000001-0000000133</svTRID>
S:     </trID>
S:   </response>
S: </epp>
```

5.2.2. EPP <delete> Command

The EPP <delete> command is not modified by this extension.

5.2.3. EPP <renew> Command

The EPP <renew> command is not modified by this extension.

5.2.4. EPP <transfer> Command

The EPP <transfer> command is not modified by this extension. The domain:name element may contain an IDN domain in A-label format. New new error codes and error values may be returned based on IDN processing.

5.2.5. EPP <update> Command

The EPP <update> command is not modified by this extension. The domain:name element may contain an IDN domain in A-label format. New error codes and error values may be returned based on IDN processing.

The server returns code 8001 when the domain name contains invalid characters or when the A-label cannot be converted successfully to a valid U-label. Error code 8309 is used for an invalid repertoire and 8317 is used when the request fails due to a syntax error or a policy violation error.

6. Formal Syntax

Below are the XML schemas for cira-idn-1.0 and cira-idn-bundle-1.0. These two schemas were developed separately and are almost independent of each other, except for the latter borrowing the domainList type of the former.

6.1. Schema for cira-idn-1.0

```
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:ietf:params:xml:ns:cira-idn-1.0"
 xmlns:cira-idn="urn:ietf:params:xml:ns:cira-idn-1.0"
 xmlns:eppcom="urn:ietf:params:xml:ns:eppcom-1.0"
 xmlns="http://www.w3.org/2001/XMLSchema"
 elementFormDefault="qualified">

  <!--
   Import common element types.
  -->
  <import namespace="urn:ietf:params:xml:ns:eppcom-1.0"
          schemaLocation="eppcom-1.0.xsd" />

  <annotation>
    <documentation>
      Extensible Provisioning Protocol v1.0
```

```
      extension schema for IDN domain name in the .CA registry
    </documentation>
  </annotation>

  <element name="ciraIdnCreate" type="cira-idn:createType" />
  <element name="ciraIdnInfo" type="cira-idn:infDataType" />
  <element name="ciraIdnCheck" type="cira-idn:checkType" />

  <!--
   Child elements of the <create> command.
   -->
  <complexType name="createType">
  <sequence>
    <element name="repertoire" type="cira-idn:repertoireType" />
    <element name="u-label" type="eppcom:labelType" minOccurs="0"/>
  </sequence>
  </complexType>

  <simpleType name="repertoireType">
    <restriction base="token">
      <length value="2"/>
    </restriction>
  </simpleType>

  <!--
   Child elements of the <info> command.
   -->

  <complexType name="infDataType">
    <sequence>
      <element name="domainVariants"
       type="cira-idn:domainList" minOccurs="0" />
    </sequence>
  </complexType>

  <complexType name="domainList">
    <sequence>
      <element name="name" type="eppcom:labelType
                maxOccurs="unbounded" />
    </sequence>
  </complexType>

    <!--
    Child elements of the <check> command.
     -->

    <complexType name="checkType">
      <sequence>
```

```
          <element name="repertoire" type="cira-idn:repertoireType" />
        </sequence>
      </complexType>

      <!--
      End of schema.
      -->
   </schema>
```

6.2. Schema for cira-idn-bundle-1.0

```
<?xml version="1.0" encoding="UTF-8"?>
  <schema
  targetNamespace="urn:ietf:params:xml:ns:cira-idn-bundle-1.0"
  xmlns:cira-idn-bundle="urn:ietf:params:xml:ns:cira-idn-bundle-1.0"
  xmlns:eppcom="urn:ietf:params:xml:ns:eppcom-1.0"
  xmlns:cira-idn="urn:ietf:params:xml:ns:cira-idn-1.0"
  xmlns="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <!--
   Import common element types.
   -->
  <import namespace="urn:ietf:params:xml:ns:eppcom-1.0"
          schemaLocation="eppcom-1.0.xsd" />
  <import namespace="urn:ietf:params:xml:ns:cira-idn-1.0"
          schemaLocation="cira-idn-1.0.xsd" />

  <annotation>
    <documentation>
      Extensible Provisioning Protocol v1.0
      bundle schema for framework for
      provisioning of cira idn bundle
      information.
    </documentation>
  </annotation>

  <!--
   Child elements found in EPP commands.
   -->
  <element name="info" type="cira-idn-bundle:infoType" />
    <!--
    Child elements of the <info> commands.
    -->

    <complexType name="infoType">
      <sequence>
```

```
          <element name="name" type="eppcom:labelType" />
          <element name="repertoire"
           type="cira-idn:repertoireType" minOccurs="0"/>
        </sequence>
      </complexType>

      <!--
      Child response elements.
      -->
      <element name="infData" type="cira-idn-bundle:infDataType" />
      <!--
      <info> response elements.
      -->
      <complexType name="infDataType">
        <sequence>
          <element name="canonicalDomainName"
                   type="eppcom:labelType" />
          <element name="roid" type="eppcom:roidType" />
          <element name="clID" type="eppcom:clIDType"/>
          <element name="registrant" type="eppcom:clIDType"
                   minOccurs="0"/>
          <element name="crID" type="eppcom:clIDType"
                   minOccurs="0" />
          <element name="crDate" type="dateTime"
               minOccurs="0" />
          <element name="upID" type="eppcom:clIDType"
               minOccurs="0" />
          <element name="upDate" type="dateTime"
               minOccurs="0" />
          <element name="trDate" type="dateTime"
               minOccurs="0" />
          <element name="bundleDomains" type="cira-idn:domainList"/>
        </sequence>
      </complexType>
      <!--
      End of schema.
      -->
    </schema>
```

7. Security Considerations

For domain labels containing a large number of IDN characters, the list of label variants can be large. For the French repertoire, the largest variant code point is from the e character and has 5 variants (including the base one). For a label size of 64 characters, the list of label variants may reach up to 320 entries. The current schema does not place a limit on the size of domainVariants element, but implementations may want limit its size for performance purpose.

8. IANA Considerations

The CIRA IDN EPP extension is to be added to the EPP extension registry as specified in [RFC7451]. Below is the registration template.

-----BEGIN FORM-----
Name of Extension:
"CIRA IDN EPP Extension"

Document Status:
Informational

Reference:
draft-wilcox-cira-idn-eppext

Registrant Name and Email Address:
.CA Registry Operations, regops@cira.ca

TLDs: .ca

IPR Disclosure: TBD

Status: Active

Notes: None
-----END FORM-----

[[C1: To be completed as needed. -- JFT]]

9. Acknowledgments

The authors would like to thank Marc Blanchet and Audric Schiltknecht for suggestions and revisions.

10. References

10.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC5730] Hollenbeck, S., "Extensible Provisioning Protocol (EPP)", STD 69, RFC 5730, August 2009.

[RFC5731] Hollenbeck, S., "Extensible Provisioning Protocol (EPP) Domain Name Mapping", STD 69, RFC 5731, August 2009.

[RFC5890] Klensin, J., "Internationalized Domain Names for Applications (IDNA): Definitions and Document Framework", RFC 5890, August 2010.

[RFC5891] Klensin, J., "Internationalized Domain Names in Applications (IDNA): Protocol", RFC 5891, August 2010.

[RFC5892] Faltstrom, P., "The Unicode Code Points and Internationalized Domain Names for Applications (IDNA)", RFC 5892, August 2010.

10.2. Informative References

[RFC3743] Konishi, K., Huang, K., Qian, H., and Y. Ko, "Joint Engineering Team (JET) Guidelines for Internationalized Domain Names (IDN) Registration and Administration for Chinese, Japanese, and Korean", RFC 3743, April 2004.

[RFC4290] Klensin, J., "Suggested Practices for Registration of Internationalized Domain Names (IDN)", RFC 4290, December 2005.

[RFC7451] Hollenbeck, S., "Extension Registry for the Extensible Provisioning Protocol", RFC 7451, February 2015.

[iana-idn-tables]
"Repository of IDN Practices",
<https://www.iana.org/domains/idn-tables>.

[icann-idn-guidelines]
"Guidelines For The Implementation Of Internationalized Domain Names", April 2007,
<http://www.icann.org/en/topics/idn/idn-guidelines-26apr07.pdf>.

[icann-epp-extentions]
"Proprietary EPP Extensions", December 2012,
<http://newgtlds.icann.org/en/applicants/advisories/epp-extensions-21dec12-en>.

[ID.draft-davies-idntables]
Davies, K. and A. Freytag, "Representing Label Generation Rulesets using XML", January 2015,
<http://tools.ietf.org/html/draft-davies-idntables>.

[ID.draft-ietf-eppext-idnmap]
Obispo, F. and L. Munoz, "Internationalized Domain Name Mapping Extension for the Extensible Provisioning Protocol (EPP)", January 2015, <http://tools.ietf.org/html/draft-ietf-eppext-idnmap>.

[ID.draft-kong-eppext-bundling-registration]
Kong, N., Yao, J., Li, X., Xie, J., and W. Tan, "Extensible Provisioning Protocol (EPP) Domain Name Mapping Extension for Bundling Registration", October 2014, <http://tools.ietf.org/html/draft-kong-eppext-bundling-registration>.

Authors' Addresses

Stuart Olmstead-Wilcox
CIRA
350 Sparks Street, Suite 306
Ottawa, ON K1R 7S8
Canada

Email: stuart.olmstead-wilcox@cira.ca

Jacques Latour
CIRA
350 Sparks Street, Suite 306
Ottawa, ON K1R 7S8
Canada

Email: jacques.latour@cira.ca

Jean-Francois Tremblay
Viagenie

Email: jean-francois.tremblay@viagenie.ca