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Internationalized Domain Name Mapping Extension for the Extensible  
Provisioning Protocol (EPP)  
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## Abstract

This document describes an Extensible Provisioning Protocol (EPP) extension mapping for the provisioning of Internationalized Domain Names (IDN) stored in a shared central repository. This mapping extends the EPP domain name mapping to provide additional features required to implement registrations of domain names in characters sets other than ASCII.

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## 1. Introduction

The EPP protocol provides a complete description of EPP command and response structures. A thorough understanding of the base protocol specification is necessary to understand the mapping described in this document.

This document is written in consideration with the Guidelines for Extending the Extensible Provisioning Protocol as defined in [RFC3735].

To comply with the Guidelines for the Implementation of Internationalized Domain Names [1], it is required to associate each label to be registered with a single script, as defined by the code division of the Unicode code chart. This requirement imposes a challenge for registries using the EPP protocol, since there is no such field currently in the domain name mapping to allow for this information to be exchanged.

In addition, registries intending to comply with the recommendation of section 4.1 [RFC5891] of the IDNA2008 protocol, which implies the verification of both the name in ASCII Compatible Encoding and Unicode form, will be able to do so using this extension.

This extension adds two additional data element to the EPP Domain Name mapping, to allow for association of a domain name to an IDN

table identifier, and a the domain name in Unicode Normalization Form C (NFC [2]).

## 2. Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

XML is case sensitive. Unless stated otherwise, XML specifications and examples provided in this document MUST be interpreted in the character case representation presented in order to develop a conforming specification.

"idn-1.0" is used as an abbreviation for "urn:ietf:params:xml:ns:idn-1.0". The XML namespace prefix "idn" is used, but implementations MUST NOT depend on it and instead employ a proper namespace-aware XML parser and serializer to interpret and output the XML documents.

## 3. EPP Command Mapping

A detailed description of the EPP syntax and semantics can be found in [RFC5730].

### 3.1. EPP Query Commands

This extension does not add any elements to the EPP <check>, <poll>, or <transfer> commands or responses.

#### 3.1.1. EPP <info> Command

This extension does not add any elements to the EPP <info> command, but does include elements in the response, when the extension has been selected during a <login> command.

Example <info> command:

```
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
C:        xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
C:          <domain:name>xn--espaol-zwa.example.com</domain:name>
C:          <domain:authInfo>
C:            <domain:pw>2fooBAR</domain:pw>
C:          </domain:authInfo>
C:        </domain:info>
C:      </info>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

When the info command has been processed successfully, and the domain name is an IDN, the server must include in the <extension> section of the EPP response an <idn:data> element with the following elements:

- o A <idn:table> element that contains the IDN table identifier.
- o A <idn:uname> element that contains the domain name in Unicode NFC form.

Example <info> response for an authorized client:

```
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:infData
S:        xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
S:        <domain:name>xn--espaol-zwa.example.com</domain:name>
S:        <domain:roid>EXAMPLE1-REP</domain:roid>
S:        <domain:status s="ok"/>
S:        <domain:registrar>jdl1234</domain:registrar>
S:        <domain:contact type="admin">sh8013</domain:contact>
S:        <domain:contact type="tech">sh8013</domain:contact>
S:        <domain:ns>
S:          <domain:hostObj>ns1.example.com</domain:hostObj>
S:          <domain:hostObj>ns1.example.net</domain:hostObj>
S:        </domain:ns>
S:        <domain:clID>ClientX</domain:clID>
S:        <domain:crID>ClientY</domain:crID>
S:        <domain:crDate>1999-04-03T22:00:00.0Z</domain:crDate>
S:        <domain:upID>ClientX</domain:upID>
S:        <domain:upDate>1999-12-03T09:00:00.0Z</domain:upDate>
S:        <domain:exDate>2005-04-03T22:00:00.0Z</domain:exDate>
S:        <domain:trDate>2000-04-08T09:00:00.0Z</domain:trDate>
S:        <domain:authInfo>
S:          <domain:pw>2fooBAR</domain:pw>
S:        </domain:authInfo>
S:      </domain:infData>
S:    </resData>
S:    <extension>
S:      <idn:data xmlns:idn="urn:ietf:params:xml:ns:idn-1.0">
S:        <idn:table>es</idn:table>
S:        <idn:uname>espa&#xF1;ol.example.com</idn:uname>
S:      </idn:data>
S:    </extension>
S:    <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>54322-XYZ</svTRID>
S:    </trID>
S:  </response>
S:</epp>
```

### 3.2. EPP Transform Commands

This extension does not add any elements to the EPP <delete>, <renew>, or <transfer> commands or responses.

#### 3.2.1. EPP <create> Command

This extension defines additional elements for the EPP <create> command.

If the domain name is an IDN, the EPP command MUST contain an <extension> element, which MUST contain a child <idn:data> element with the following child elements:

- o A <idn:table> element that contains the IDN table identifier as provided by the server.
- o An optional <idn:uname> element that contains the domain name to be registered in Unicode NFC.

Example <create> command:

```
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--espaol-zwa.example.com</domain:name>
C:        <domain:period unit="y">2</domain:period>
C:        <domain:ns>
C:          <domain:hostObj>ns1.example.net</domain:hostObj>
C:          <domain:hostObj>ns2.example.net</domain:hostObj>
C:        </domain:ns>
C:        <domain:registrant>jdl1234</domain:registrant>
C:        <domain:contact type="admin">sh8013</domain:contact>
C:        <domain:contact type="tech">sh8013</domain:contact>
C:        <domain:authInfo>
C:          <domain:pw>2fooBAR</domain:pw>
C:        </domain:authInfo>
C:      </domain:create>
C:    </create>
C:    <extension>
C:      <idn:data xmlns:idn="urn:ietf:params:xml:ns:idn-1.0">
C:        <idn:table>es</idn:table>
C:        <idn:uname>espa&#xF1;ol.example.com</idn:uname>
C:      </idn:data>
C:    </extension>
C:    <clTRID>123456</clTRID>
C:  </command>
C:</epp>
```

The server MUST validate the name using the procedure described in section 4.2 of [RFC5891].

If the validation of the IDN name failed because it contained a code point not available in the specified IDN table, the server MUST return an EPP error 2306.

In the specific case that the <domain:name> provided did not map to the provided <idn:uname>, the server MUST respond with an EPP error 2005.

### 3.3. Formal Syntax

An EPP object mapping is specified in XML Schema notation. The formal syntax presented here is a complete schema representation of the object mapping suitable for automated validation of EPP XML instances.

```
<?xml version="1.0" encoding="UTF-8"?>
<schema xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:eppcom="urn:ietf:params:xml:ns:eppcom-1.0"
  xmlns:idn="urn:ietf:params:xml:ns:idn-1.0"
  targetNamespace="urn:ietf:params:xml:ns:idn-1.0"
  elementFormDefault="qualified">
  <annotation>
    <documentation>
      Extensible Provisioning Protocol v1.0 domain name extension
      schema for IDN Table selection.
    </documentation>
  </annotation>
  <import namespace="urn:ietf:params:xml:ns:eppcom-1.0"
    schemaLocation="eppcom-1.0.xsd"/>
  <!-- Child elements found in IDN -->
  <element name="data" type="idn:idnDataType"/>
  <complexType name="idnDataType">
    <sequence>
      <element name="table" type="eppcom:minTokenType"/>
      <element name="uname" type="eppcom:labelType"
        minOccurs="0"/>
    </sequence>
  </complexType>
  <!-- End of schema. -->
</schema>
```

#### 4. IANA Considerations

This document uses URNs to describe XML namespaces and XML schemas conforming to a registry mechanism described in [RFC3688]. Two URI assignments have been registered by the IANA.

Registration request for the contact namespace:

URI: urn:ietf:params:xml:ns:idn-1.0

Registrant Contact: See the "Author's Address" section of this document.

XML: None. Namespace URIs do not represent an XML specification.

Registration request for the contact XML schema:

URI: urn:ietf:params:xml:schema:idn-1.0

Registrant Contact: See the "Author's Address" section of this document.

XML: See the "Formal Syntax" section of this document.

## 5. Security Considerations

The mapping extensions described in this document do not provide any security services beyond those described by EPP [RFC5730] the EPP domain name mapping [RFC5731], and protocol layers used by EPP. The security considerations described in these other specifications apply to this specification as well.

## 6. References

### 6.1. 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.
- [RFC5891] Klensin, J., "Internationalized Domain Names in Applications (IDNA): Protocol", RFC 5891, August 2010.

### 6.2. Informational References

- [RFC3735] Hollenbeck, S., "Guidelines for Extending the Extensible Provisioning Protocol (EPP)", RFC 3735, March 2004.
- [RFC5731] Hollenbeck, S., "Extensible Provisioning Protocol (EPP) Domain Name Mapping", STD 69, RFC 5731, August 2009.

### 6.3. URIs

- [1] <http://www.icann.org/en/topics/idn/idn-guidelines-26apr07.pdf>
- [2] <http://www.unicode.org/reports/tr15/>

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