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Extensible Provisioning Protocol (EPP) Domain Name Mapping Extension for Bundling Registration

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Abstract

This document describes an extension of Extensible Provisioning Protocol (EPP) domain name mapping for the provisioning and management of bundling registration of domain names. Specified in XML, this mapping extends the EPP domain name mapping to provide additional features required for the provisioning of bundled domain names.

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1. Introduction

Bundled domain names are those who share the same TLD but whose second level labels are variants, or those who has identical second level labels for which certain parameters are shared in different TLDs. For example, Public Interest Registry, request to implement technical bundling of second level domains for .NGO and .ONG. So we have two kinds of bundled domain names. First one is in the form of "V-label.TLD" in which the second level labels (V-label) are variants sharing the same TLD; Second one is in the form of "LABEL.V-tld" in which the second level labels(LABEL) are same with the different TLDs (V-tld);

For the name variants, some registries adopt the policy that variant IDNs which are identified as equivalent are allocated or delegated to the same registrant. For example, the specified registration policy of Chinese Domain Name (CDN) is that a registrant can apply an original CDN in any forms: Simplified Chinese (SC) form, Traditional Chinese (TC) form, or other variant forms, then the corresponding variant CDN in SC form and that in TC form will also be delegated to the same registrant. All variant names in the same TLD contain same attributes.

The basic Extensible Provisioning Protocol (EPP) domain name mapping [RFC5731] provides the domain name registration one by one. It does not specify how to register the bindled names which share the same attributes.

In order to meet above requirements of the bundled names registration, this document describes an extension of the EPP domain name mapping [RFC5731] for the provisioning and management of bundled names.This document is specified using the Extensible Markup Language (XML) 1.0 as described in [W3C.REC-xml-20040204] and XML Schema notation as described in [W3C.REC-xmlschema-1-20041028] and [W3C.REC-xmlschema-2-20041028].

The EPP core protocol specification [RFC5730] provides a complete description of EPP command and response structures. A thorough understanding of the base protocol specification is necessary to understand the extension of mapping described in this document.

This document uses lots of the concepts of the IDN, so a thorough understanding of the IDNs for Application (IDNA, described in [RFC5890], [RFC5891], and [RFC5892]) and a thorough understanding of variant approach discussed in [RFC4290] are both required.

2. Terminology

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].

uLable is defined in [RFC 5890]. uLabel is expressed in this document as a number of characters with the format of U+XXXX where XXXX is a UNICODE point.

"b-dn-1.0" in this document is used as an abbreviation for urn:ietf:params:xml:ns:b-dn-1.0.

In examples, "C:" represents lines sent by a protocol client and "S:" represents lines returned by a protocol server. Indentation and white space in examples are provided only to illustrate element relationships and are not a REQUIRED feature of this specification.

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

3. Definitions

The following definitions are used in this document:

- o Registered Domain Name (RDN), represents the valid domain name that users submitted for registration by the first time.

- o Bundled Domain Name (BDN), represents the bundled domain name produced according to the bundled domain name registration policy.

4. Overview

Domain registries have traditionally adopted a registration model whereby metadata relating to a domain name, such as its expiration date and sponsoring registrar, are stored as properties of the domain object. The domain object is then considered an atomic unit of registration, on which operations such as update, renewal and deletion may be performed.

Bundled names, brought about the need for multiple domain names to be registered and managed as a single package. In this model, the

registry typically accepts a domain registration request (i.e. EPP domain <create> command) containing the domain name to be registered. This domain name is referred to as the RDN in this document. As part of the processing of the registration request, the registry generates a set of bundled names that are related to the RDN, either programmatically or with the guidance of registration policies, and place them in the registration package together with the RDN.

The bundled names have the same properties, such as expiration date and sponsoring registrar, by sharing one domain object. So when users update any property of a domain object within a bundle package, that property of all other domain objects in the bundle package will be updated at the same time.

5. Requirement for Bundling Registration of Names

The bundled names whether they are in the form of "V-label.TLD" or in the form of "LABEL.V-tld" should share some parameter or attributes assoicated with domain names. Typically, Bundled names will share the following parameters or attributes:

o Registrar Ownership
o Registration and Expiry Dates
o Registrant, Admin, Billing, and Technical Contacts
o Name Server Association
o Domain Status
o Applicable grace periods (Add Grace Period, Renewal Grace Period, Auto-Renewal Grace Period, Transfer Grace Period, and Redemption Grace Period)

Because the domain names are bundled and share the same parameters or attributes, the EPP command should do some processing for these requirements:

o When performing a domain check, either BDN or RDN can be queried for the EPP command, and will return the same response.
o When performing a domain info, either BDN or RDN can be queried, the same response will include both BDN and RDN information with the same attributes.
o When performing a domain Create, either BDN or RDN will be accepted. If the domain name is available, both BDN and RDN will be registered.
o When performing a domain Delete, either BDN or RDN will be accepted. If the domain name is available, both BDN and RDN will be deleted.
o When performing a domain renew, either BDN or RDN will be accepted. Upon a successful domain renewal,both BDN and RDN will have their expiry date extended by the requested term. Upon a successful domain renewal, both BDN and RDN will conform to the same renew grace period.

o When performing a domain transfer, either BDN or RDN will be accepted. Upon successful completion of a domain transfer request, both BDN and RDN will enter a pendingTransfer status. Upon approval of the transfer request, both BDN and RDN will be owned and managed by the same new registrant.
o When performing a domain update, either BDN or RDN will be accepted. Any modifications to contact associations, name server associations, domain status values and authorization information will be applied to both BDN and RDN.

6. Object Attributes

This extension defines following additional elements to the EPP domain name mapping [RFC5731]. All of these additional elements can be got from <domain:info> command.

6.1. RDN

The RDN is an ASCII name or an IDN with the A-label [RFC5890] form. In this document, its corresponding element is <b-dn:rdn>. An optional attribute "uLabel" associated with <b-dn:rdn> is used to represent the U-label [RFC5890] form. An optional boolean "activated" attribute, with a default true value, is used to indicate the presence of the label in the zone file.

For example: <b-dn:rdn uLabel="U+5B9E""U+4F8B".example> xn--fsq270a.example</b-dn:rdn>

6.2. BDN

The BDN is an ASCII name or an IDN with the A-label [RFC5890] form which is converted from the corresponding BDN. In this document, its corresponding element is <b-dn:bdn>. An optional attribute "uLabel" associated with <b-dn:bdn> is used to represent the U-label [RFC5890] form.

For example: <b-dn:bdn uLabel="U+5BE6""U+4F8B".example> xn--fsqz41a.example</b-dn:bdn>

7. EPP Command Mapping

A detailed description of the EPP syntax and semantics can be found in the EPP core protocol specification [RFC5730]. The command mappings described here are specifically for use in provisioning and managing bundled names via EPP.

7.1. EPP Query Commands

EPP provides three commands to retrieve domain information: <check> to determine if a domain object can be provisioned within a repository, <info> to retrieve detailed information associated with a domain object, and <transfer> to retrieve domain-object transfer status information.

7.1.1. EPP <check> Command

This extension does not add any element to the EPP <check> command or <check> response described in the EPP domain name mapping [RFC5731]. However, when either RDN or BDN is sent for check, response SHOULD contain both RDN and BDN information, which may also give some explanation in the reason field to tell the user that the associated domain name is a produced name according to some bundle domain name policy.

Example <check> 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:chkData
S:               xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
S:        <domain:cd>
S:                  <domain:name avail="1">
               xn--fsq270a.example</domain:name>
S:        </domain:cd>
S:        <domain:cd>
S:                  <domain:name avail="1">
               xn--fsqz41a.example</domain:name>
S:                  <domain:reason>This associated domain name is
            a produced name
                based on bundle name policy.</domain:reason>
S:        </domain:cd>
S:               </domain:chkData>
S:        </resData>
S:        <trID>
S:              <clTRID>ABC-12345</clTRID>
S:              <svTRID>54322-XYZ</svTRID>
S:        </trID>
S:      </response>
S:</epp>
```

7.1.2. EPP <info> Command

This extension does not add any element to the EPP <info> command described in the EPP domain mapping [RFC5731]. However, additional elements are defined for the <info> response.

When an <info> command has been processed successfully, the EPP <resData> element MUST contain child elements as described in the EPP domain mapping [RFC5731]. In addition, the EPP <extension> element SHOULD contain a child <b-dn:infData> element that identifies the extension namespace if the domain object has data associated with this extension and based on its service policy. The <b-dn:infData> element contains the <b-dn:bundle> which has the following child elements:

- An <b-dn:rdn> element that contains the RDN, along with the attributes described below.

- An OPTIONAL <b-dn:bdn> element that contains the BDN, along with the attributes described below.

The above elements contain the following attributes:

- An optional "uLabel" attribute represents the U-label of the element.

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--fsq270a.example</domain:name>
S:                <domain:roid>58812678-domain</domain:roid>
S:                <domain:status s="ok"/>
S:                <domain:registrant>123</domain:registrant>
S:                <domain:contact type="admin">123</domain:contact>
S:                <domain:contact type="tech">123</domain:contact>
S:                <domain:ns>
S:              <domain:hostObj>ns1.example.cn
                </domain:hostObj>
S:                </domain:ns>
S:                <domain:clID>ClientX</domain:clID>
```

```
S:                <domain:crID>ClientY</domain:crID>
S:                <domain:crDate>2011-04-03T22:00:00.0Z
                       </domain:crDate>
S:                <domain:exDate>2012-04-03T22:00:00.0Z
                       </domain:exDate>
S:                <domain:authInfo>
S:                      <domain:pw>2fooBAR</domain:pw>
S:                </domain:authInfo>
S:              </domain:infData>
S:        </resData>
S:        <extension>
S:              <b-dn:infData
S:               xmlns:b-dn="urn:ietf:params:xml:ns:b-dn-1.0">
S:                <b-dn:bundle>
S:                      <b-dn:rdn uLabel="U+5B9E""U+4F8B".example
S:                       >xn--fsq270a.example</b-dn:rdn>
S:                      <b-dn:bdn uLabel="U+5BE6""U+4F8B".example
S:                       >xn--fsqz41a.example</b-dn:bdn>
S:                </b-dn:bundle>
S:              </b-dn:infData>
S:        </extension>
S:        <trID>
S:              <clTRID>ABC-12345</clTRID>
S:              <svTRID>54322-XYZ</svTRID>
S:        </trID>
S:      </response>
S:</epp>
```

<info> Response for the unauthorized client has not been changed,see [RFC5731] for detail.

An EPP error response MUST be returned if an <info> command cannot be processed for any reason.

7.1.3. EPP <transfer> Query Command

This extension does not add any element to the EPP <transfer> command or <transfer> reponse described in the EPP domain mapping [RFC5731].

7.2. EPP Transform Commands

EPP provides five commands to transform domain objects: <create> to create an instance of a domain object, <delete> to delete an instance of a domain object, <renew> to extend the validity period of a domain object, <transfer> to manage domain object sponsorship changes, and <update> to change information associated with a domain object.

When theses commands have been processed successfully, the EPP <resData> element MUST contain child elements as described in the EPP domain mapping [RFC5731]. This EPP <extension> element SHOULD contain the <b-dn:bundle> which has the following child elements:

- An <b-dn:rdn> element that contains the RDN, along with the attributes described below.

- An OPTIONAL <b-dn:bdn> element that contains the BDN, along with the attributes described below.

The above elements contain the following attribute:

- An optional "uLabel" attribute represents the U-label of the element.

7.2.1. EPP <create> Command

This extension defines additional elements to extend the EPP <create> command described in the EPP domain name mapping [RFC5731] for bundled names registration.

In addition to the EPP command elements described in the EPP domain mapping [RFC5731], the <create> command SHALL contain an <extension> element. The <extension> element SHOULD contain a child <b-dn:create> element that identifies the bundle namespace and the location of the bundle name schema.

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--fsq270a.example</domain:name>
C:                <domain:period unit="y">2</domain:period>
C:                <domain:registrant>123</domain:registrant>
C:                <domain:contact type="admin">123</domain:contact>
C:                <domain:contact type="tech">123</domain:contact>
C:                <domain:authInfo>
C:                      <domain:pw>2fooBAR</domain:pw>
C:                </domain:authInfo>
C:              </domain:create>
C:        </create>
C:        <extension>
C:              <b-dn:create
C:               xmlns:b-dn="urn:ietf:params:xml:ns:b-dn-1.0">
C:             <b-dn:rdn uLabel="U+5B9E""U+4F8B".example>
C:                    xn--fsq270a.example</b-dn:rdn>
C:              </b-dn:create>
C:        </extension>
C:        <clTRID>ABC-12345</clTRID>
C:      </command>
C:</epp>
```

When an <create> command has been processed successfully, the EPP <creData> element MUST contain child elements as described in the EPP domain mapping [RFC5731]. In addition, the EPP <extension> element SHOULD contain a child <b-dn:creData> element that identifies the extension namespace if the domain object has data associated with this extension and based on its service policy. The <b-dn:creData> element contains the <b-dn:bundle> element.

Example <create> 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:creData
S:               xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
S:                <domain:name>xn--fsq270a.example</domain:name>
S:                <domain:crDate>1999-04-03T22:00:00.0Z</domain:crDate>
S:                <domain:exDate>2001-04-03T22:00:00.0Z</domain:exDate>
S:              </domain:creData>
S:        </resData>
S:        <extension>
S:              <b-dn:creData
S:               xmlns:b-dn="urn:ietf:params:xml:ns:b-dn-1.0">
S:                <b-dn:bundle>
S:                      <b-dn:rdn uLabel="U+5B9E""U+4F8B".example
S:                       >xn--fsq270a.example</b-dn:rdn>
S:                      <b-dn:bdn uLabel="U+5BE6""U+4F8B".example
S:                       >xn--fsqz41a.example</b-dn:bdn>
S:                </b-dn:bundle>
S:              </b-dn:creData>
S:        </extension>
S:        <trID>
S:              <clTRID>ABC-12345</clTRID>
S:              <svTRID>54322-XYZ</svTRID>
S:        </trID>
S:      </response>
S:</epp>
```

<create> Response for the unauthorized client has not been changed,see [RFC5731] for detail.

An EPP error response MUST be returned if an <create> command cannot be processed for any reason.

7.2.2. EPP <delete> Command

This extension does not add any element to the EPP <delete> command described in the EPP domain mapping [RFC5731]. However, additional elements are defined for the <delete> response.

When a <delete> command has been processed successfully, the EPP <delData> element MUST contain child elements as described in the EPP

domain mapping [RFC5731]. In addition, the EPP <extension> element SHOULD contain a child <b-dn:delData> element that identifies the extension namespace if the domain object has data associated with this extension and based on its service policy. The <b-dn:delData> element SHOULD contain the <b-dn:bundle> element.

Example <delete> response:

```
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:        <extension>
S:              <b-dn:delData
S:               xmlns:b-dn="urn:ietf:params:xml:ns:b-dn-1.0">
S:                <b-dn:bundle>
S:                      <b-dn:rdn uLabel="U+5B9E""U+4F8B".example>xn--
fsq270a.example</b-dn:rdn>
S:                      <b-dn:bdn uLabel="U+5BE6""U+4F8B".example>xn--
fsqz41a.example</b-dn:bdn>
S:                </b-dn:bundle>
S:              </b-dn:delData>
S:        </extension>
S:        <trID>
S:              <clTRID>ABC-12345</clTRID>
S:              <svTRID>54321-XYZ</svTRID>
S:        </trID>
S:      </response>
S:</epp>
```

An EPP error response MUST be returned if a <delete> command cannot be processed for any reason.

7.2.3. EPP <renew> Command

This extension does not add any element to the EPP <renew> command described in the EPP domain name mapping [RFC5731]. However, when either RDN or BDN is sent for renew, response SHOULD contain both RDN and BDN information. When the command has been processed successfully, the EPP <resData> element MUST contain child elements as described in the EPP domain mapping [RFC5731]. This EPP <extension> element SHOULD contain the <b-dn:renData> which contains <b-dn:bundle> element.

7.2.4. EPP <transfer> Command

This extension does not add any element to the EPP <transfer> command described in the EPP domain name mapping [RFC5731]. When the command has been processed successfully, the EPP <resData> element MUST contain child elements as described in the EPP domain mapping [RFC5731]. This EPP <extension> element SHOULD contain the <b-dn:trnData> which contains <b-dn:bundle> element.

7.2.5. EPP <update> Command

This extension does not add any element to the EPP <update> command described in the EPP domain name mapping [RFC5731]. When the command has been processed successfully, the EPP <resData> element MUST contain child elements as described in the EPP domain mapping [RFC5731]. This EPP <extension> element SHOULD contain the <b-dn:upData> which contains <b-dn:bundle> element.

8. Formal Syntax

An EPP object name mapping extension for bundled names 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. The BEGIN and END tags are not part of the schema; they are used to note the beginning and ending of the schema for URI registration purposes.

```
BEGIN
<?xml version="1.0"     encoding="UTF-8"?>

   <schema targetNamespace="urn:ietf:params:xml:ns:b-dn-1.0"
            xmlns:b-dn="urn:ietf:params:xml:ns:b-dn-1.0"
            xmlns:epp="urn:ietf:params:xml:ns:epp-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:iana:xml:ns:eppcom-1.0"
   schemaLocation="eppcom-1.0.xsd"/>
   <import namespace="urn:iana:xml:ns:epp-1.0"
   schemaLocation="epp-1.0.xsd"/>
   <annotation>
     <documentation>
           Extensible Provisioning Protocol v1.0
           Bundle Domain Extension Schema v1.0
```

```
        </documentation>
      </annotation>

      <!--
      Child elements found in EPP     commands.
      -->
      <element name="create" type="b-dn:createDataType"/>

      <!--
      Child elements of the <b-dn:create>     command
      All     elements must be present at     time of creation
      -->
      <complexType name="createDataType">
        <sequence>
              <element name="rdn" type="b-dn:rdnType"
               minOccurs="0" maxOccurs="unbounded" />
        </sequence>
      </complexType>


      <!--
      Child elements of the <b-dn:update>     command
      All     elements must be present at     time of creation
      -->

      <!--
      Child elements found in EPP     commands.
      -->
      <element name="infData" type="b-dn:trnDataType"/>
      <element name="delData" type="b-dn:trnDataType"/>
      <element name="creData" type="b-dn:trnDataType"/>
      <element name="renData" type="b-dn:trnDataType"/>
      <element name="trnData" type="b-dn:trnDataType"/>
      <element name="upData" type="b-dn:trnDataType"/>

      <complexType name="trnDataType">
        <sequence>
              <element name="bundle" type="b-dn:bundleType" />
        </sequence>
      </complexType>

      <!--
      <transfer> response     elements.
      All     elements must be present at     time of poll query
      -->
      <complexType name="bundleType">
        <sequence>
              <element name="rdn" type="b-dn:rdnType" />
```

```
              <element name="bdn" type="b-dn:rdnType"
                          minOccurs="0"   maxOccurs="unbounded" />

        </sequence>
      </complexType>

      <complexType name="rdnType">
        <simpleContent>
              <extension base="eppcom:labelType">
                <attribute name="uLabel" type="eppcom:labelType"/>

              </extension>
        </simpleContent>
      </complexType>

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

   END
```

9. Internationalization Considerations

EPP is represented in XML, which provides native support for encoding information using the Unicode character set and its more compact representations including UTF-8. Conformant XML processors recognize both UTF-8 and UTF-16. Though XML includes provisions to identify and use other character encodings through use of an "encoding" attribute in an <?xml?> declaration, use of UTF-8 is RECOMMENDED.

As an extension of the EPP domain name mapping, the elements, element content described in this document MUST inherit the internationalization conventions used to represent higher-layer domain and core protocol structures present in an XML instance that includes this extension.

10. IANA Considerations

This document uses URNs to describe XML namespaces and XML schemas conforming to a registry mechanism described in [RFC3688]. IANA is requested to assignment the following two URIs.

Registration request for the IDN namespace:

o URI: urn:ietf:params:xml:ns:b-dn-1.0

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

- o XML: None. Namespace URI does not represent an XML specification.

Registration request for the IDN XML schema:

- o URI: urn:ietf:params:xml:schema:b-dn-1.0

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

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

11. Security Considerations

The object mapping extension described in this document does not provide any other security services or introduce any additional considerations beyond those described by [RFC5730] or those caused by the protocol layers used by EPP.

12. Implementation Status

Note to RFC Editor: Please remove this section before publication.

- o CNNIC has implemented this extension in his EPP based Chinese domain name registration system.

- o Public Interest Registry, has requested to implement technical bundling of second level domains for .NGO and .ONG. This means that by registering and purchasing a domain in the .ngo TLD, for example, the NGO registrant is also registering and purchasing the corresponding name in the .ong TLD (and vice-versa for registrations in .ong).

13. Acknowledgements

The authors especially thank the authors of [RFC5730] and [RFC5731] and the following ones of CNNIC: Weiping Yang, Chao Qi. This draft extends the draft draft-kong-epp-idn-variants-mapping to support both forms of bundled names: V-label.TLD and LABEL.V-tld.

Useful comments were made by John Klensin, Scott Hollenbeck, Patrick Mevzek and Edward Lewis.

14. Change History

RFC Editor: Please remove this section.

14.1. draft-kong-epp-bundle-mapping: Version 00

- o EPP extensiton for bundled domain name registrations.

14.2. draft-kong-epp-bundle-mapping: Version 01

- o Change the proposed category from EXP to STD.
- o Add the section of Implementation Status.
- o Refine the text, and update the examples.

14.3. draft-kong-epp-bundle-mapping: Version 02

- o Refine the texts.

15. References

15.1. Normative References

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