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Domain Registry Grace Period Mapping for the Extensible Provisioning Protocol (EPP)

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Abstract

This document describes an Extensible Provisioning Protocol (EPP) extension mapping for the management of Domain Name System (DNS) domain names subject to "grace period" policies defined by the Internet Corporation for Assigned Names and Numbers (ICANN). Grace period policies exist to allow protocol actions to be reversed or otherwise revoked during a short period of time after the protocol action has been performed. Specified in XML, this mapping extends the EPP domain name mapping to provide additional features required for grace period processing.

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1. Introduction

This document describes an extension mapping for version 1.0 of the Extensible Provisioning Protocol (EPP) described in RFC 3730 [1]. This mapping, an extension of the domain name mapping described in RFC 3731 [2], is specified using the Extensible Markup Language (XML) 1.0 [3] and XML Schema notation ([4], [5]).

The EPP core protocol specification [1] 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.

Over the course of several months in 2002, The Internet Corporation for Assigned Names and Numbers (ICANN) developed an implementation proposal to provide a "grace period" for Domain Name System (DNS) domain name recovery (or redemption) before a domain name is purged from the repository of the authoritative registry for the domain name. This mapping extends the EPP domain <update> command to initiate the redemption process for a domain name that has entered the Redemption Grace Period (RGP) and it extends the EPP domain <info> response to identify the status of domains that have entered various grace periods defined by ICANN policy.

In March 2003, ICANN published a task force report describing other domain registry grace periods related to EPP operations. This mapping describes extension status values to note the grace periods described in the report, including:

- An "add grace period" after the initial registration of a domain name. If the domain name is deleted by the registrar during this period, the registry provides a credit to the registrar for the cost of the registration.

- An "auto-renew grace period" after a domain name registration period expires and is extended (renewed) automatically by the registry. If the domain name is deleted by the registrar during this period, the registry provides a credit to the registrar for the cost of the renewal.

- A "renew grace period" after a domain name registration period is explicitly extended (renewed) by the registrar. If the domain name is deleted by the registrar during this period, the registry provides a credit to the registrar for the cost of the renewal.

- o A "transfer grace period" after the successful transfer of domain name registration sponsorship from one registrar to another registrar. If the domain name is deleted by the new sponsoring registrar during this period, the registry provides a credit to the registrar for the cost of the transfer.

Each grace period exists for a specific period of time that is typically measured in days. The duration of each grace period is a matter of registry operational policy that is not addressed in this document.

1.1. 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 BCP 14, RFC 2119 [6].

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 is provided only to illustrate element relationships and is 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.

2. Redemption Grace Period State Diagram

The Redemption Grace Period (RGP) involves several domain state transitions as a domain name moves through the redemption process:

1. A domain is initially in the EPP "ok" status, or some other status that allows processing of the EPP <delete> command.

2. A <delete> command is received and processed for the domain name.

3. RGP begins once the <delete> command is processed successfully. The EPP status changes to "pendingDelete", and the RGP status is initialized to "redemptionPeriod". The domain remains in this state until either a <restore> operation is requested or the redemption period elapses.

4. A <restore> operation can be requested using the extended EPP <update> command. Go to step 8 if the redemption period elapses before a <restore> request is received.

5. If the <restore> is successful, the Registry waits to receive a restore report from the registrar for a period of time defined by the Registry. The EPP status remains "pendingDelete" and the RGP status changes to "pendingRestore". While this extension defines a method to deliver a restore report via EPP, an out-of-band mechanism (such as a web site) can also be used to deliver restore reports.

6. The domain name returns to the redemption period state (state 3) if a restore report is not received.

7. If a restore report is received the EPP status returns to "ok" (or whatever it was prior to processing the <delete> command), and the RGP status is removed completely.

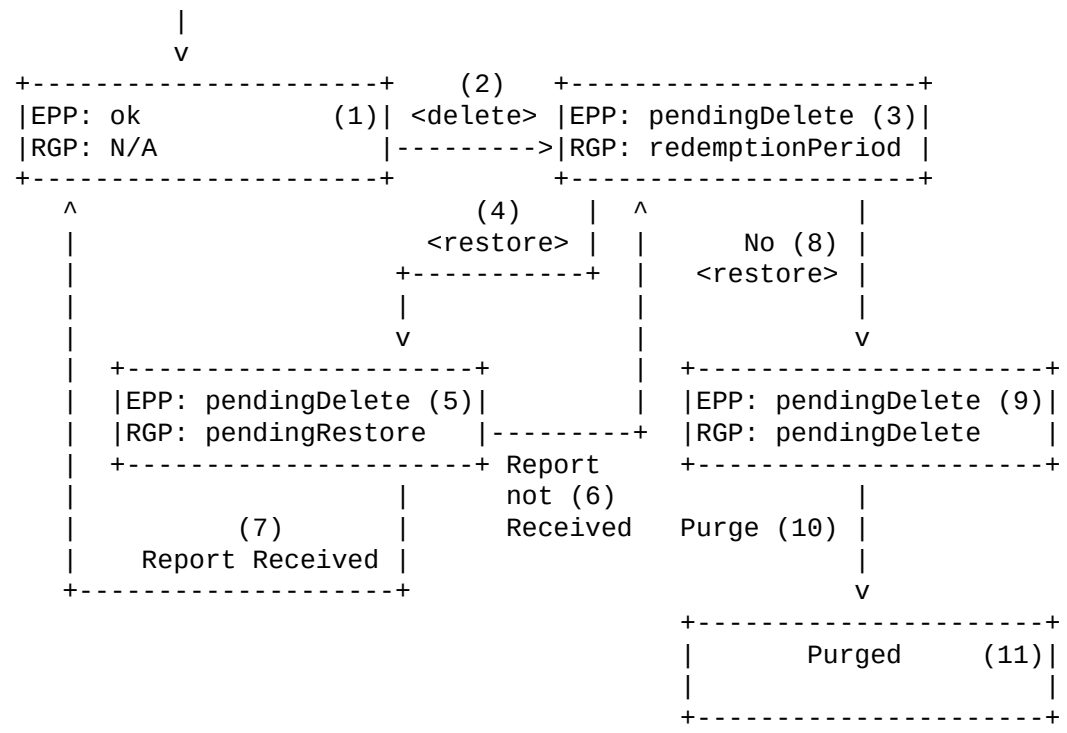
8. The redemption period elapses before a <restore> request is received.

9. The EPP status remains "pendingDelete" and the RGP status changes to "pendingDelete". The domain name remains in this state for a period of time defined by the Registry.

10. The domain name is purged once the pending delete period elapses.

11. The domain name is available for re-registration.

Figure 1: RGP State Diagram



3. Object Attributes

This extension adds additional elements to the EPP domain name mapping [2]. Only new element descriptions are described here.

3.1. Status Values

This extension defines new status values to represent the different states that a domain name can be in as a result of grace period processing. These are:

addPeriod: This grace period is provided after the initial registration of a domain name. If the domain name is deleted by the registrar during this period, the registry provides a credit to the registrar for the cost of the registration.

autoRenewPeriod: This grace period is provided after a domain name registration period expires and is extended (renewed) automatically by the registry. If the domain name is deleted by the registrar during this period, the registry provides a credit to the registrar for the cost of the renewal.

renewPeriod: This grace period is provided after a domain name registration period is explicitly extended (renewed) by the registrar. If the domain name is deleted by the registrar during this period, the registry provides a credit to the registrar for the cost of the renewal.

transferPeriod: This grace period is provided after the successful transfer of domain name registration sponsorship from one registrar to another registrar. If the domain name is deleted by the new sponsoring registrar during this period, the registry provides a credit to the registrar for the cost of the transfer.

redemptionPeriod: This status value is used to describe a domain for which a <delete> command has been received, but the domain has not yet been purged because an opportunity exists to restore the domain and abort the deletion process.

pendingRestore: This status value is used to describe a domain that is in the process of being restored after being in the redemptionPeriod state.

pendingDelete: This status value is used to describe a domain that has entered the purge processing state after completing the redemptionPeriod state. A domain in this status MUST also be in the pendingDelete status described in the EPP domain mapping [2].

3.2. Registration Data and Supporting Information

This extension allows a client to provide copies of registration data (whois [9] data, for example) and supporting information in a restore report as required by the RGP process. No specific format is required by this extension; both free text and XML markup MAY be used.

Operators of servers that provide registration data might find it useful to provide grace period status values in their responses to client queries. This information can be useful to people who want to understand the operations that can be performed on a domain name at any give time.

3.3. Dates and Times

Date and time attribute values MUST be represented in Universal Coordinated Time (UTC) using the Gregorian calendar. The extended date-time form using upper case "T" and "Z" characters defined in RFC 3339 [7] MUST be used to represent date-time values as XML Schema does not support truncated date-time forms or lower case "T" and "Z" characters.

3.4. Client Statements

The RGP process requires a client to make two statements regarding the data included in a restore report. No specific format is required by this extension; both free text and XML markup MAY be used. English is the default language used within the statements, but other languages MAY be used.

4. EPP Command Mapping

A detailed description of the EPP syntax and semantics can be found in the EPP core protocol specification [1]. The command mappings described here are specifically for use in implementing redemption grace period processes via EPP.

4.1. EPP Query Commands

EPP provides three commands to retrieve object information: <check> to determine if an object is known to the server, <info> to retrieve detailed information associated with an object, and <transfer> to retrieve object transfer status information.

4.1.1. EPP <check> Command

This extension does not add any elements to the EPP <check> command or <check> response described in the EPP domain mapping [2].

4.1.2. EPP <info> Command

This extension does not add any elements to the EPP <info> command described in the EPP domain mapping [2]. 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 [2]. In addition, the EPP <extension> element MUST contain a child <rgp:infData> element that identifies the registry grace period namespace and the location of the registry grace period schema. The <rgp:infData> element contains a single <rgp:rgpStatus> element that contains a single attribute "s" whose value describes the current grace period status of the domain. Possible status values are described in section Section 3.1.

Example <info> response for "addPeriod" status:

```
S:<?xml version="1.0" encoding="UTF-8" standalone="no"?>
S:<epp xmlns="urn:ietf:params:xml:ns:epp-1.0"
S:     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
S:     xsi:schemaLocation="urn:ietf:params:xml:ns:epp-1.0
S:     epp-1.0.xsd">
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:       xsi:schemaLocation="urn:ietf:params:xml:ns:domain-1.0
S:       domain-1.0.xsd">
S:        <domain:name>example.com</domain:name>
S:        <domain:roid>EXAMPLE1-REP</domain:roid>
S:        <domain:status s="ok"/>
S:        <domain:registrant>jd1234</domain:registrant>
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:host>ns1.example.com</domain:host>
S:        <domain:host>ns2.example.com</domain:host>
S:        <domain:clID>ClientX</domain:clID>
S:        <domain:crID>ClientX</domain:crID>
S:        <domain:crDate>2003-11-26T22:00:00.0Z</domain:crDate>
S:        <domain:exDate>2005-11-26T22:00:00.0Z</domain:exDate>
S:        <domain:authInfo>
S:          <domain:pw>2fooBAR</domain:pw>
S:        </domain:authInfo>
S:      </domain:infData>
S:    </resData>
S:    <extension>
S:      <rgp:infData xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:rgp-1.0
S:       rgp-1.0.xsd">
S:        <rgp:rgpStatus s="addPeriod"/>
S:      </rgp:infData>
S:    </extension>
S:    <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>54322-XYZ</svTRID>
S:    </trID>
```

```
S:  </response>
S:</epp>
```

Example <info> response for "redemptionPeriod" status:

```
S:<?xml version="1.0" encoding="UTF-8" standalone="no"?>
S:<epp xmlns="urn:ietf:params:xml:ns:epp-1.0"
S:     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
S:     xsi:schemaLocation="urn:ietf:params:xml:ns:epp-1.0
S:     epp-1.0.xsd">
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:       xsi:schemaLocation="urn:ietf:params:xml:ns:domain-1.0
S:       domain-1.0.xsd">
S:        <domain:name>example.com</domain:name>
S:        <domain:roid>EXAMPLE1-REP</domain:roid>
S:        <domain:status s="pendingDelete"/>
S:        <domain:registrant>jd1234</domain:registrant>
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:host>ns1.example.com</domain:host>
S:        <domain:host>ns2.example.com</domain:host>
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:      <rgp:infData xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:rgp-1.0
S:       rgp-1.0.xsd">
S:        <rgp:rgpStatus s="redemptionPeriod"/>
```

```
S:      </rgp:infData>
S:    </extension>
S:    <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>54322-XYZ</svTRID>
S:    </trID>
S:  </response>
S:</epp>
```

Example <info> response extension for "pendingRestore" status (note that only the extension element changes from the first example):

```
S:<extension>
S:  <rgp:infData xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
S:   xsi:schemaLocation="urn:ietf:params:xml:ns:rgp-1.0
S:   rgp-1.0.xsd">
S:    <rgp:rgpStatus s="pendingRestore"/>
S:  </rgp:infData>
S:</extension>
```

Example <info> response extension for "pendingDelete" status (note that only the extension element changes from the first example):

```
S:<extension>
S:  <rgp:infData xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
S:   xsi:schemaLocation="urn:ietf:params:xml:ns:rgp-1.0
S:   rgp-1.0.xsd">
S:    <rgp:rgpStatus s="pendingDelete"/>
S:  </rgp:infData>
S:</extension>
```

4.1.3. EPP <transfer> Command

This extension does not add any elements to the EPP <transfer> command or <transfer> response described in the EPP domain mapping [2].

4.2. EPP Transform Commands

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

4.2.1. EPP <create> Command

This extension does not add any elements to the EPP <create> command or <create> response described in the EPP domain mapping [2].

4.2.2. EPP <delete> Command

This extension does not add any elements to the EPP <delete> command or <delete> response described in the EPP domain mapping [2].

4.2.3. EPP <renew> Command

This extension does not add any elements to the EPP <renew> command or <renew> response described in the EPP domain mapping [2].

4.2.4. EPP <transfer> Command

This extension does not add any elements to the EPP <transfer> command or <transfer> response described in the EPP domain mapping [2].

4.2.5. EPP <update> Command

This extension defines additional elements to extend the EPP <update> command and response described in the EPP domain mapping [2] for redemption grace period processing.

The EPP <update> command provides a transform operation that allows a client to change the state of a domain object. The registry grace period extension modifies base update processing to support redemption of domain names for which a <delete> command has been processed, but the name has not yet been purged.

Section 3.2.5 of the EPP domain mapping describes the elements that have to be specified within an <update> command. The requirement to provide at least one <domain:add>, <domain:rem>, or <domain:chg> element is updated by this extension such that at least one empty <domain:add>, <domain:rem>, or <domain:chg> element MUST be present if this extension is specified within an <update> command. This requirement is updated to disallow the possibility of modifying a domain object as part of redemption grace period recovery processing.

In addition to the EPP command elements described in the EPP domain mapping [2], the <update> command MUST contain an <extension> element. The <extension> element MUST contain a child <rgp:update> element that identifies the registry grace period namespace and the location of the registry grace period schema. The <rgp:update>

element contains a single <rgp:restore> element that contains an OPTIONAL <rgp:report> element that MAY be used to deliver a redemption grace period restore report.

The <rgp:restore> element contains a REQUIRED "op" attribute that describes the redemption grace period operation being requested. Two values are defined: "request" is used to identify a restore request that does not include a restore report, and "report" is used to identify a restore request that contains a restore report. A report MAY be submitted more than once if corrections are required. If the value of the "op" attribute is "request" an <rgp:report> element MUST NOT be present. If the value of the "op" attribute is "report" an <rgp:report> element MUST be present.

The <rgp:report> element contains the following child elements:

- An <rgp:preData> element that contains a copy of the registration data that existed for the domain name prior to the domain name being deleted. This element MAY contain both text and XML markup.

- An <rgp:postData> element that contains a copy of the registration data that exists for the domain name at the time the restore report is submitted. This element MAY contain both text and XML markup.

- An <rgp:delTime> element that contains the date and time when the domain name delete request was sent to the server.

- An <rgp:resTime> element that contains the date and time when the original <rgp:restore> command was sent to the server.

- An <rgp:resReason> element that contains a brief explanation of the reason for restoring the domain name.

- An <rgp:statement> element that contains a text statement that the client has not restored the domain name in order to assume the rights to use or sell the domain name for itself or for any third party. Supporting information related to this statement MAY be supplied in the <rgp:other> element described below. An OPTIONAL "lang" attribute MAY be present to identify the language if English (value "en") is not used to represent the statement.

- A second <rgp:statement> element that contains a text statement that the information in the restore report is factual to the best of the client’s knowledge. An OPTIONAL "lang" attribute MAY be present to identify the language if English (value "en") is not used to represent the statement.

- An OPTIONAL <rgp:other> element that contains any information needed to support the statements provided by the client. This element MAY contain both text and XML markup.

More detailed information describing the information required to be provided in a restore report is available from ICANN.

Example <update> command without a restore report:

```
C:<?xml version="1.0" encoding="UTF-8" standalone="no"?>
C:<epp xmlns="urn:ietf:params:xml:ns:epp-1.0"
C:     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
C:     xsi:schemaLocation="urn:ietf:params:xml:ns:epp-1.0
C:     epp-1.0.xsd">
C:  <command>
C:    <update>
C:      <domain:update
C:       xmlns:domain="urn:ietf:params:xml:ns:domain-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:domain-1.0
C:       domain-1.0.xsd">
C:        <domain:name>example.com</domain:name>
C:        <domain:chg/>
C:      </domain:update>
C:    </update>
C:    <extension>
C:      <rgp:update xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:rgp-1.0
C:       rgp-1.0.xsd">
C:        <rgp:restore op="request"/>
C:      </rgp:update>
C:    </extension>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

Example <update> command with a restore report:

```
C:<?xml version="1.0" encoding="UTF-8" standalone="no"?>
C:<epp xmlns="urn:ietf:params:xml:ns:epp-1.0"
C:     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
C:     xsi:schemaLocation="urn:ietf:params:xml:ns:epp-1.0
C:     epp-1.0.xsd">
C:  <command>
C:    <update>
C:      <domain:update
C:       xmlns:domain="urn:ietf:params:xml:ns:domain-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:domain-1.0
C:       domain-1.0.xsd">
```

```
C:        <domain:name>example.com</domain:name>
C:        <domain:chg/>
C:      </domain:update>
C:    </update>
C:    <extension>
C:      <rgp:update xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:rgp-1.0
C:       rgp-1.0.xsd">
C:        <rgp:restore op="report">
C:          <rgp:report>
C:            <rgp:preData>Pre-delete registration data goes here.
C:            Both XML and free text are allowed.</rgp:preData>
C:            <rgp:postData>Post-restore registration data goes here.
C:            Both XML and free text are allowed.</rgp:postData>
C:            <rgp:delTime>2003-07-10T22:00:00.0Z</rgp:delTime>
C:            <rgp:resTime>2003-07-20T22:00:00.0Z</rgp:resTime>
C:            <rgp:resReason>Registrant error.</rgp:resReason>
C:            <rgp:statement>This registrar has not restored the
C:            Registered Name in order to assume the rights to use
C:            or sell the Registered Name for itself or for any
C:            third party.</rgp:statement>
C:            <rgp:statement>The information in this report is
C:            true to best of this registrar's knowledge, and this
C:            registrar acknowledges that intentionally supplying
C:            false information in this report shall constitute an
C:            incurable material breach of the
C:            Registry-Registrar Agreement.</rgp:statement>
C:            <rgp:other>Supporting information goes
C:            here.</rgp:other>
C:          </rgp:report>
C:        </rgp:restore>
C:      </rgp:update>
C:    </extension>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

When an extended <update> command without a restore report has been processed successfully, the EPP response is as described in the EPP domain mapping [2] except that an extension element is added to describe grace period status as a result of processing the <update> command. The extension element contains a single child element (<upData>) that itself contains a single child element (<rgpStatus>) that contains a single attribute "s" whose value MUST be "pendingRestore" if the <restore> request has been accepted.

Example "restore request" <update> response:

```
S:<?xml version="1.0" encoding="UTF-8" standalone="no"?>
S:<epp xmlns="urn:ietf:params:xml:ns:epp-1.0"
S:     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
S:     xsi:schemaLocation="urn:ietf:params:xml:ns:epp-1.0
S:     epp-1.0.xsd">
S:  <response>
S:    <result code="1000">
S:      <msg lang="en">Command completed successfully</msg>
S:    </result>
S:    <extension>
S:      <rgp:upData xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:rgp-1.0
S:       rgp-1.0.xsd">
S:        <rgp:rgpStatus s="pendingRestore"/>
S:      </rgp:upData>
S:    </extension>
S:    <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>54321-XYZ</svTRID>
S:    </trID>
S:  </response>
S:</epp>
```

When an extended <update> command with a restore report has been processed successfully, the EPP response is as described in the EPP domain mapping [2] with no registry grace period extension. Registry grace period extension is not required because acceptance of the restore report completes redemption grace period processing.

5. 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. 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:rgp-1.0"
        xmlns:rgp="urn:ietf:params:xml:ns:rgp-1.0"
        xmlns="http://www.w3.org/2001/XMLSchema"
        elementFormDefault="qualified">
```

```
    <annotation>
      <documentation>
        Extensible Provisioning Protocol v1.0
        domain name extension schema for registry grace period
        processing.
      </documentation>
    </annotation>

  <!--
  Child elements found in EPP commands.
  -->
    <element name="update" type="rgp:updateType"/>

  <!--
  Child elements of the <update> command for the
  redemption grace period.
  -->
    <complexType name="updateType">
      <sequence>
        <element name="restore" type="rgp:restoreType"/>
      </sequence>
    </complexType>

    <complexType name="restoreType">
      <sequence>
        <element name="report" type="rgp:reportType"
         minOccurs="0"/>
      </sequence>
      <attribute name="op" type="rgp:rgpOpType" use="required"/>
    </complexType>

  <!--
  New redemption grace period operations can be defined
  by adding to this enumeration.
  -->
    <simpleType name="rgpOpType">
      <restriction base="token">
        <enumeration value="request"/>
        <enumeration value="report"/>
      </restriction>
    </simpleType>

    <complexType name="reportType">
      <sequence>
        <element name="preData" type="rgp:mixedType"/>
        <element name="postData" type="rgp:mixedType"/>
        <element name="delTime" type="dateTime"/>
        <element name="resTime" type="dateTime"/>
```

```
        <element name="resReason" type="rgp:reportTextType"/>
        <element name="statement" type="rgp:reportTextType"
         maxOccurs="2"/>
        <element name="other" type="rgp:mixedType"
         minOccurs="0"/>
      </sequence>
    </complexType>

    <complexType name="mixedType">
      <complexContent mixed="true">
        <restriction base="anyType">
          <sequence>
            <any processContents="lax"
             minOccurs="0" maxOccurs="unbounded"/>
          </sequence>
        </restriction>
      </complexContent>
    </complexType>

    <complexType name="reportTextType">
      <complexContent mixed="true">
        <restriction base="anyType">
          <sequence>
            <any processContents="lax"
             minOccurs="0" maxOccurs="unbounded"/>
          </sequence>
          <attribute name="lang" type="language" default="en"/>
        </restriction>
      </complexContent>
    </complexType>

  <!--
  Child response elements.
  -->
    <element name="infData" type="rgp:respDataType"/>
    <element name="upData" type="rgp:respDataType"/>

  <!--
  Response elements.
  -->
    <complexType name="respDataType">
      <sequence>
        <element name="rgpStatus" type="rgp:statusType"
         maxOccurs="unbounded"/>
      </sequence>
    </complexType>

  <!--
```

```
   Status is a combination of attributes and an optional
   human-readable message that may be expressed in languages
   other than English.
   -->
     <complexType name="statusType">
       <simpleContent>
         <extension base="normalizedString">
           <attribute name="s" type="rgp:statusValueType"
            use="required"/>
           <attribute name="lang" type="language" default="en"/>
         </extension>
       </simpleContent>
     </complexType>

     <simpleType name="statusValueType">
       <restriction base="token">
         <enumeration value="addPeriod"/>
         <enumeration value="autoRenewPeriod"/>
         <enumeration value="renewPeriod"/>
         <enumeration value="transferPeriod"/>
         <enumeration value="pendingDelete"/>
         <enumeration value="pendingRestore"/>
         <enumeration value="redemptionPeriod"/>
       </restriction>
     </simpleType>

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

6. 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 [10]. Conformant XML processors recognize both UTF-8 and UTF-16 [11]. 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 in environments where parser encoding support incompatibility exists.

As an extension of the EPP domain mapping [2], the elements, element content, attributes, and attribute values 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.

7. IANA Considerations

This document uses URNs to describe XML namespaces and XML schemas conforming to a registry mechanism described in RFC 3688 [8]. Two URI assignments were requested and have been registered by the IANA.

Registration request for the registry grace period namespace:

URI: urn:ietf:params:xml:ns:rgp-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 registry grace period XML schema:

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

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

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

8. Security Considerations

The mapping extensions described in this document do not provide any security services beyond those described by EPP [1], the EPP domain name mapping [2], and protocol layers used by EPP. The security considerations described in these other specifications apply to this specification as well.

As with other domain object updates, redemption of a deleted domain object MUST be restricted to the sponsoring client as authenticated using the mechanisms described in sections 2.9.1.1 and 7 of RFC 3730 [1]. Any attempt to recover a deleted domain object by any client other than the sponsoring client MUST be rejected with an appropriate EPP authorization error.

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