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RFC 9167
Registry Maintenance Notification for the Extensible Provisioning Protocol (EPP)

Abstract

This document describes an Extensible Provisioning Protocol (EPP) extension called "Registry Maintenance Notification", which is used by EPP servers to notify EPP clients and allow EPP clients to query EPP servers regarding maintenance events.

Status of This Memo

This is an Internet Standards Track document.

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1. Introduction

The Extensible Provisioning Protocol (EPP), as defined in [RFC5730], is a protocol whose original motivation is to provide a standard Internet domain name registration protocol for use between registries and registrars.

Registries routinely update systems to ensure a higher quality of service, implement new services, or upgrade protocols to the latest standards. These updates are pushed to various registry environments during time frames communicated to registrars as "maintenance events". Maintenance events may require making services unavailable for some limited time while the upgrade happens. Registries usually inform registrars about maintenance events in various formats, none of which are standardized between registries.

The DNS namespace expansion has led to many additional registries that registrars must interact with, adding more maintenance events and formats. It is now desirable to provide an efficient approach to notify registrars.

This document describes an extension mapping for version 1.0 of the EPP to provide a mechanism by which EPP servers may notify EPP clients of and allow EPP clients to query EPP servers on upcoming maintenance events.

1.1. Terminology and Definitions

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**NOT RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

XML [W3C.REC-xml-20081126] is case sensitive. Unless stated otherwise, XML specifications and examples provided in this document **MUST** be interpreted in the character case presented in order to develop a conforming implementation.

The XML namespace prefix "maint" is used for the namespace "urn:ietf:params:xml:ns:epp:maintenance-1.0", 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.

"ote" is an abbreviation for "Operational Test and Evaluation".

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 protocol.

2. Migrating to Newer Versions of This Extension

Servers that implement this extension **SHOULD** provide a way for clients to progressively update their implementations when a new version of the extension is deployed. A newer version of the extension is expected to use an XML namespace with a higher version number than the prior versions.

Servers **SHOULD** (for a temporary migration period up to server policy) provide support for older versions of the extension in parallel to the newest version and allow clients to execute their preferred version of the <info> command based on the maintenance <objURI> elements of the server <greeting>. The version of the maintenance <info> response **MUST** match the version of the maintenance <info> command executed by the server.

Servers **MUST** return a Registry Maintenance Notification poll message matching the newest negotiated version of the maintenance extension, based on an intersection of the maintenance <objURI> elements in the server <greeting> and the client <login> command. If the intersection of the maintenance <objURI> elements of the server <greeting> and the client <login> command results in an empty set, the server **MUST** return the newest version of the Registry Maintenance Notification poll message supported by the server based on "Usage with Poll-Message EPP Responses" in Section 6 of [RFC9038].

3. Object Attributes

3.1. Internationalized Domain Names

Names of affected hosts **MUST** be provided in A-label form, according to [RFC5891].

3.2. Dates and Times

All date and time attribute values **MUST** be expressed in Universal Coordinated Time (UTC) using the Gregorian calendar. The date-time format defined as "date-time" in [RFC3339], with time-offset="Z", **MUST** be used.

3.3. Maintenance Elements

The <maint:item> element describes a single registry maintenance event during a specific period. This element is used in a maintenance item EPP <info> command and response as well as in a <poll> response.

If an element is not marked as optional, it is mandatory.

<maint:id>
> The server-unique identifier for the maintenance event with the **OPTIONAL** "name" attribute that includes a human-readable name of the event. The server-unique identifier **SHALL NOT** be changed if the event is updated or deleted. When the "name" attribute is set, the **OPTIONAL** "lang" attribute, per the language structure in [RFC5646], **MAY** be present to identify the language if the negotiated value is something other than the default value of "en" (English).

<maint:type>
> Zero or more **OPTIONAL** types of the maintenance event, with the possible set of values defined by server policy, such as "Routine Maintenance", "Software Update", "Software Upgrade", or "Extended Outage". The **OPTIONAL** "lang" attribute **MAY** be present to identify the language if the negotiated value is something other than the default value of "en" (English).

<maint:pollType>
> The **OPTIONAL** <maint:pollType> element for a Registry Maintenance Notification poll message; values **MUST** be "create", "update", "delete", "courtesy", or "end". For the "create" and "update" types, the server includes the state of the maintenance event after the creation or update. For the "delete" type, the server includes the state of the event before the delete. The "courtesy" provides a reminder of an event, and the "end" provides a notification of the end of the event without updating the maintenance object and includes the latest state of the event. This element **MUST** be present only for poll messages.

<maint:systems>
> One or more <maint:system> elements that are affected by the maintenance event.
>
> <maint:system>
> > The <maint:system> element contains the following child elements:
> >
> > <maint:name>
> > > The name of the affected system, such as "EPP", "WHOIS", "DNS", "Portal", "RDAP", etc.
> >
> > <maint:host>
> > > The **OPTIONAL** affected maintained system's hostname, which **SHALL** be in A-label form, according to [RFC5891].
> >
> > <maint:impact>
> > > The impact level; the values **MUST** be "full", "partial", or "none". If access is expected to be intermittently unavailable, it is "partial". If access is expected to be completely unavailable, it is "full". If access is not affected, it is "none".

<maint:environment>
> The type of the affected system; the attribute "type" is **REQUIRED** and **MUST** be "production", "ote", "staging", "dev", or "custom". For extensibility, the <maint:environment> element includes the **OPTIONAL** "name" attribute that can define the name of the custom environment when the <maint:environment> element "type" attribute has the "custom" value. For example, for the custom "marketing" environment, the <maint:environment> element should be: <maint:environment type="custom" name="marketing"/>.

<maint:start>
   The date and time of the start of the maintenance event.

<maint:end>
   The date and time of the end of the maintenance event. The <maint:end> element **MUST** be
   greater than the <maint:start> element.

<maint:reason>
   The reason behind the maintenance event; the values **MUST** be either "planned" or
   "emergency".

<maint:detail>
   The **OPTIONAL** URI to the detailed maintenance event description, formatted according to
   [RFC3986].

<maint:description>
   Zero or more **OPTIONAL** free-form descriptions of the maintenance event, usable without
   creating and traversing an external resource as defined by the <maint:detail> element. The
   OPTIONAL "lang" attribute **MAY** be present to identify the language if the negotiated value is
   something other than the default value of "en" (English). The **OPTIONAL** "type" attribute **MAY** be
   present to identify the format of the description. It **MUST** be either "plain" for plain text or
   "html" for HTML text, as defined in [HTML5], and XML-escaped, with a default value of "plain".

<maint:tlds>
   The **OPTIONAL** <maint:tlds> element contains one or more <maint:tld> child elements. If the
   <maint:tlds> is not present, the entire system is affected.

   <maint:tld>
      The affected top-level domain or registry zone, which **SHALL** be in A-label form, according
      to [RFC5891].

<maint:intervention>
   The **OPTIONAL** <maint:intervention> element contains the following child elements:

   <maint:connection>
      The value **SHALL** be boolean and indicates if a client needs to perform a connection-
      related action such as a reconnect. The attribute should only be used as a flag to
      indicate connections will be affected. Servers **SHOULD** include a description of how the
      connections are affected in the <maint:description> element or use the <maint:detail>
      element above.

   <maint:implementation>
      The value **SHALL** be boolean and indicates if a client needs to perform an
      implementation-related action such as a code change. The attribute should only be used
      as a flag to indicate implementation will be affected. Servers **SHOULD** include a
      description of how the implementation is affected in the <maint:description> element
      or use the <maint:detail> element above.

<maint:crDate>
> The date and time of the maintenance object creation.

<maint:upDate>
> The **OPTIONAL** date and time of the most recent maintenance object modification. This element **MUST NOT** be present if the maintenance object has never been modified.

4. 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 used to notify registrars of registry maintenance events and object mapping.

4.1. EPP Query Commands

EPP [RFC5730] 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.

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

4.1.1. EPP <info> Command

EPP provides the <info> command that is used to retrieve registry maintenance information. In addition to the standard EPP command elements, the <info> command **MUST** contain a <maint:info> element that identifies the maintenance namespace.

The <maint:info> element **MUST** contain a child element. It is either the <maint:id> child element, described in Section 4.1.1.1, to query for a specific maintenance item or the <maint:list> child element, described in Section 4.1.1.2, to query all maintenance items.

4.1.1.1. Info Maintenance Item

The information regarding a specific maintenance item can be retrieved by using the <info> command with the <maint:info> element and the <maint:id> child element, defined in Section 3.3. If the maintenance identifier does not exist, the server **MUST** return an EPP error result code of 2303 ("Object does not exist") [RFC5730].

The following is an example of retrieving a specific maintenance item in an <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:      <maint:info
C:        xmlns:maint="urn:ietf:params:xml:ns:epp:maintenance-1.0">
C:        <maint:id>2e6df9b0-4092-4491-bcc8-9fb2166dcee6</maint:id>
C:      </maint:info>
C:    </info>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

When an <info> command has been processed successfully, the EPP <resData> element **MUST** contain a child <maint:infData> element that identifies the maintenance namespace. The <maint:infData> element contains the <maint:item> element defined in Section 3.3.

The following is an example of returning a specific maintenance item in an <info> response.

```
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:        <maint:infData
S:          xmlns:maint="urn:ietf:params:xml:ns:epp:maintenance-1.0">
S:           <maint:item>
S:             <maint:id>2e6df9b0-4092-4491-bcc8-9fb2166dcee6
S:             </maint:id>
S:             <maint:type lang="en">Routine Maintenance</maint:type>
S:             <maint:systems>
S:               <maint:system>
S:                 <maint:name>EPP</maint:name>
S:                 <maint:host>epp.registry.example
S:                 </maint:host>
S:                 <maint:impact>full</maint:impact>
S:               </maint:system>
S:             </maint:systems>
S:             <maint:environment type="production"/>
S:             <maint:start>2021-12-30T06:00:00Z</maint:start>
S:             <maint:end>2021-12-30T07:00:00Z</maint:end>
S:             <maint:reason>planned</maint:reason>
S:             <maint:detail>
S:               https://www.registry.example/notice?123
S:             </maint:detail>
S:             <maint:description lang="en">free-text
S:             </maint:description>
S:             <maint:description lang="de">Freitext
S:             </maint:description>
S:             <maint:tlds>
S:               <maint:tld>example</maint:tld>
S:               <maint:tld>test</maint:tld>
S:             </maint:tlds>
S:             <maint:intervention>
S:               <maint:connection>false</maint:connection>
S:               <maint:implementation>false</maint:implementation>
S:             </maint:intervention>
S:             <maint:crDate>2021-11-08T22:10:00Z</maint:crDate>
S:           </maint:item>
S:         </maint:infData>
S:      </resData>
S:      <trID>
S:         <clTRID>ABC-12345</clTRID>
S:         <svTRID>54321-XYZ</svTRID>
S:      </trID>
S:   </response>
S:</epp>
```

4.1.1.2. Info Maintenance List

The information for a list of maintenance items can be retrieved by using the <info> command
with the <maint:info> element and the empty <maint:list> child element. Server policy
determines if completed maintenance events will be included in the list of maintenance items.

The following is an example of retrieving the list of maintenance items in an <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:      <maint:info
C:        xmlns:maint="urn:ietf:params:xml:ns:epp:maintenance-1.0">
C:        <maint:list/>
C:      </maint:info>
C:    </info>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

When an <info> command has been processed successfully, the EPP <resData> element **MUST** contain a child <maint:infData> element that identifies the maintenance namespace. The <maint:infData> element contains the <maint:list> element with zero or more <maint:listItem> child elements. The <maint:listItem> element contains the following child elements:

<maint:id>
> The <maint:id> element defined in Section 3.3.

<maint:start>
> The <maint:start> element defined in Section 3.3.

<maint:end>
> The <maint:end> element defined in Section 3.3.

<maint:crDate>
> The <maint:crDate> element defined in Section 3.3.

<maint:upDate>
> The **OPTIONAL** <maint:upDate> element defined in Section 3.3.

The following is an example of returning the list of maintenance items in an <info> response.

```
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:        <maint:infData
S:          xmlns:maint="urn:ietf:params:xml:ns:epp:maintenance-1.0">
S:          <maint:list>
S:            <maint:listItem>
S:              <maint:id>2e6df9b0-4092-4491-bcc8-9fb2166dcee6
S:              </maint:id>
S:              <maint:start>2021-12-30T06:00:00Z</maint:start>
S:              <maint:end>2021-12-30T07:00:00Z</maint:end>
S:              <maint:crDate>2021-11-08T22:10:00Z</maint:crDate>
S:            </maint:listItem>
S:            <maint:listItem>
S:              <maint:id>91e9dabf-c4e9-4c19-a56c-78e3e89c2e2f
S:              </maint:id>
S:              <maint:start>2021-12-15T04:30:00Z</maint:start>
S:              <maint:end>2021-12-15T05:30:00Z</maint:end>
S:              <maint:crDate>2021-11-08T22:11:00Z</maint:crDate>
S:              <maint:upDate>2021-11-17T15:00:00Z</maint:upDate>
S:            </maint:listItem>
S:          </maint:list>
S:        </maint:infData>
S:      </resData>
S:      <trID>
S:         <clTRID>ABC-12345</clTRID>
S:         <svTRID>54321-XYZ</svTRID>
S:      </trID>
S:   </response>
S:</epp>
```

4.1.2. EPP <poll> Command

The EPP <poll> command and response are defined in Section 2.9.2.3 of [RFC5730]. The Registry Maintenance Notification is included in the EPP <poll> response in [RFC5730].

There are five types of poll messages for the Registry Maintenance Notification, defined by the <maint:pollType> element in Section 3.3. A poll message might be generated when a maintenance event is created, updated, or deleted. A courtesy poll message can be sent as a reminder of an upcoming maintenance event. An end poll message can be sent when the maintenance event is completed. In the case of a message specific to Registry Maintenance, a <maint:infData> element that identifies the maintenance namespace will be included within the <resData> element of the standard <poll> response. The <maint:infData> element contains the <maint:item> element defined in Section 3.3.

The following is an example of a <poll> 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:    <poll op="req"/>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

Example <poll> 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="1301">
S:      <msg>Command completed successfully; ack to dequeue</msg>
S:    </result>
S:  <msgQ count="1" id="12345">
S:    <qDate>2021-11-08T22:10:00Z</qDate>
S:    <msg lang="en">Registry Maintenance Notification</msg>
S:  </msgQ>
S:  <resData>
S:    <maint:infData
S:      xmlns:maint="urn:ietf:params:xml:ns:epp:maintenance-1.0">
S:        <maint:item>
S:          <maint:id>2e6df9b0-4092-4491-bcc8-9fb2166dcee6</maint:id>
S:          <maint:pollType>create</maint:pollType>
S:          <maint:systems>
S:            <maint:system>
S:              <maint:name>EPP</maint:name>
S:              <maint:host>epp.registry.example
S:              </maint:host>
S:              <maint:impact>full</maint:impact>
S:            </maint:system>
S:          </maint:systems>
S:          <maint:environment type="production"/>
S:          <maint:start>2021-12-30T06:00:00Z</maint:start>
S:          <maint:end>2021-12-30T07:00:00Z</maint:end>
S:          <maint:reason>planned</maint:reason>
S:          <maint:detail>
S:            https://www.registry.example/notice?123
S:          </maint:detail>
S:          <maint:tlds>
S:            <maint:tld>example</maint:tld>
S:            <maint:tld>test</maint:tld>
S:          </maint:tlds>
S:          <maint:intervention>
S:            <maint:connection>false</maint:connection>
S:            <maint:implementation>false</maint:implementation>
S:          </maint:intervention>
S:          <maint:crDate>2021-11-08T22:10:00Z</maint:crDate>
S:        </maint:item>
S:    </maint:infData>
S:  </resData>
S:  <trID>
S:    <clTRID>ABC-12345</clTRID>
S:    <svTRID>54321-XYZ</svTRID>
S:  </trID>
S:  </response>
S:</epp>
```

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.

This extension does not add any elements to the EPP <create>, <delete>, <renew>, <transfer>, and <update> commands.

5. Formal Syntax

The EPP Registry Maintenance Notification schema is presented here.

The formal syntax is a complete schema representation of the object mapping suitable for automated validation of EPP XML instances. The <CODE BEGINS> and <CODE ENDS> tags are not part of the schema; they are used to note the beginning and end of the schema for URI registration purposes.

5.1. Registry Maintenance Notification EPP Mapping Schema

```
<CODE BEGINS>
<?xml version="1.0" encoding="UTF-8"?>
  <schema targetNamespace="urn:ietf:params:xml:ns:epp:
    maintenance-1.0"
    xmlns:eppcom="urn:ietf:params:xml:ns:eppcom-1.0"
    xmlns:epp="urn:ietf:params:xml:ns:epp-1.0"
    xmlns:maint="urn:ietf:params:xml:ns:epp:maintenance-1.0"
    xmlns="https://www.w3.org/2001/XMLSchema"
    elementFormDefault="qualified">
  <!--
  Import common element types
  -->
  <import namespace="urn:ietf:params:xml:ns:eppcom-1.0"/>
  <import namespace="urn:ietf:params:xml:ns:epp-1.0"/>
  <annotation>
    <documentation>
      Extensible Provisioning Protocol v1.0
      Registry Maintenance Notification Mapping Schema.
    </documentation>
  </annotation>
  <!--
  Child elements found in EPP commands.
  -->
  <element name="info" type="maint:infoType"/>
  <!--
   Child elements of the <info> command.
  -->
  <complexType name="infoType">
    <sequence>
      <choice>
        <element name="list"/>
        <element name="id" type="maint:idType"/>
      </choice>
    </sequence>
  </complexType>
  <!--
  Human-readable text may describe the maintenance
  -->
  <complexType name="idType">
    <simpleContent>
      <extension base="token">
        <attribute name="name" type="token"/>
        <attribute name="lang" type="language" default="en"/>
      </extension>
    </simpleContent>
  </complexType>
  <!--
   Info Response element
  -->
  <element name="infData" type="maint:infDataType"/>
  <!--
   <info> response elements.
  -->
  <complexType name="infDataType">
    <choice>
      <element name="list" type="maint:listDataType"/>
      <element name="item" type="maint:maintDataType"/>
```

```
      </choice>
    </complexType>
    <!--
     Attributes associated with the list info response
    -->
    <complexType name="listDataType">
      <sequence>
        <element name="listItem" type="maint:maintItemType"
         minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
    </complexType>
    <!--
     Attributes associated with the list item info response
    -->
    <complexType name="maintItemType">
      <sequence>
        <element name="id" type="maint:idType"/>
        <element name="start" type="dateTime"/>
        <element name="end" type="dateTime"/>
        <element name="crDate" type="dateTime"/>
        <element name="upDate" type="dateTime" minOccurs="0"/>
      </sequence>
    </complexType>
    <!--
     Attributes associated with the maintenance info response
    -->
    <complexType name="maintDataType">
      <sequence>
        <element name="id" type="maint:idType"/>
        <element name="type" type="maint:typeType" minOccurs="0"
         maxOccurs="unbounded"/>
        <element name="pollType" type="maint:pollType" minOccurs="0"/>
        <element name="systems" type="maint:systemsType"/>
        <element name="environment" type="maint:envType"/>
        <element name="start" type="dateTime"/>
        <element name="end" type="dateTime"/>
        <element name="reason" type="maint:reasonEnum"/>
        <element name="detail" type="anyURI" minOccurs="0"/>
        <element name="description" type="maint:descriptionType"
         minOccurs="0" maxOccurs="unbounded"/>
        <element name="tlds" type="maint:tldsType" minOccurs="0"/>
        <element name="intervention" type="maint:interventionType"
         minOccurs="0"/>
        <element name="crDate" type="dateTime"/>
        <element name="upDate" type="dateTime" minOccurs="0"/>
      </sequence>
    </complexType>
    <!--
     systems element
    -->
    <complexType name="systemsType">
      <sequence>
        <element name="system" type="maint:systemType"
         maxOccurs="unbounded"/>
      </sequence>
    </complexType>
    <!--
     Enumerated list of poll types
```

```
      -->
      <simpleType name="pollType">
        <restriction base="token">
          <enumeration value="create"/>
          <enumeration value="update"/>
          <enumeration value="delete"/>
          <enumeration value="courtesy"/>
          <enumeration value="end"/>
        </restriction>
      </simpleType>
      <!--
       Enumerated list of impacts
      -->
      <simpleType name="impactEnum">
        <restriction base="token">
          <enumeration value="none"/>
          <enumeration value="partial"/>
          <enumeration value="full"/>
        </restriction>
      </simpleType>
      <!--
       description element
      -->
      <complexType name="descriptionType">
        <simpleContent>
          <extension base="string">
            <attribute name="lang" type="language" default="en"/>
            <attribute name="type" type="maint:descEnum" default="plain"
            />
          </extension>
        </simpleContent>
      </complexType>
      <!--
       Enumerated list of description mime types
      -->
      <simpleType name="descEnum">
        <restriction base="token">
          <enumeration value="plain"/>
          <enumeration value="html"/>
        </restriction>
      </simpleType>
      <!--
       type element
      -->
      <complexType name="typeType">
        <simpleContent>
          <extension base="string">
            <attribute name="lang" type="language" default="en"/>
          </extension>
        </simpleContent>
      </complexType>
      <!--
       system element
      -->
      <complexType name="systemType">
        <sequence>
          <element name="name" type="token"/>
          <element name="host" type="eppcom:labelType" minOccurs="0"/>
```

```
        <element name="impact" type="maint:impactEnum"/>
      </sequence>
    </complexType>
    <!--
     Enumerated list of environments
    -->
    <simpleType name="envEnum">
      <restriction base="token">
        <enumeration value="production"/>
        <enumeration value="ote"/>
        <enumeration value="staging"/>
        <enumeration value="dev"/>
        <enumeration value="custom"/>
      </restriction>
    </simpleType>
    <!--
     environment element
    -->
    <complexType name="envType">
      <simpleContent>
        <extension base="token">
          <attribute name="type" type="maint:envEnum" use="required"/>
          <attribute name="name" type="token" use="optional"/>
        </extension>
      </simpleContent>
    </complexType>
    <!--
     Enumerated list of reasons
    -->
    <simpleType name="reasonEnum">
      <restriction base="token">
        <enumeration value="planned"/>
        <enumeration value="emergency"/>
      </restriction>
    </simpleType>
    <!--
     tlds element
    -->
    <complexType name="tldsType">
      <sequence>
        <element name="tld" type="eppcom:labelType"
         maxOccurs="unbounded"/>
      </sequence>
    </complexType>
    <!--
     intervention element
    -->
    <complexType name="interventionType">
      <sequence>
        <element name="connection" type="boolean"/>
        <element name="implementation" type="boolean"/>
      </sequence>
    </complexType>
    <!--
     End of schema.
    -->
    </schema>
```

```
<CODE ENDS>
```

6. IANA Considerations

6.1. XML Namespace

This document uses URNs to describe XML namespaces and XML schemas conforming to a registry mechanism defined in [RFC3688].

The following entry has been registered as an XML namespace:

URI: urn:ietf:params:xml:ns:epp:maintenance-1.0
Registrant Contact: IESG
XML: None. Namespace URIs do not represent an XML specification.

The following entry has been registered to the XML maintenance schema:

URI: urn:ietf:params:xml:schema:epp:maintenance-1.0
Registrant Contact: IESG
XML: See the "Formal Syntax" section of this document.

6.2. EPP Extension Registry

The following entry has been added to the "Extensions for the Extensible Provisioning Protocol (EPP)" registry, described in [RFC7451]:

Name of Extension: Registry Maintenance Notification for the Extensible Provisioning Protocol (EPP)
Document status: Standards Track
Reference: RFC 9167
Registrant Name and Email Address: IESG <iesg@ietf.org>
TLDs: Any
IPR Disclosure: None
Status: Active
Notes: None

7. Security Considerations

The security considerations of [RFC5730] apply in this document. Additionally, a server **MUST** only provide maintenance information to clients that are authorized. Suppose a client queries a maintenance identifier that it is not authorized to access per Section 4.1.1.1, "Info Maintenance Item". In that case, the server **SHOULD** return an EPP error result code of 2201 ("Authorization error") or 2303 ("Object does not exist") [RFC5730]. The list of top-level domains or registry zones

returned in the "Info Maintenance Item" response **SHOULD** be filtered based on the top-level domains or registry zones for which the client is authorized. Authorization of poll messages is done at the time of poll message insertion and not at the time of poll message consumption.

8. References

8.1. Normative References

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8.2. Informative References

[RFC3688]

Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, DOI 10.17487/RFC3688, January 2004, <https://www.rfc-editor.org/info/rfc3688>.

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