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Extensible Provisioning Protocol XRI I-Name Mapping
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Abstract

This document describes an Extensible Provisioning Protocol (EPP) mapping for the provisioning and management of XRI i-names, stored in a shared centralized repository (a.k.a. XRI Registry). Specified in XML, the mapping defines EPP command syntax and semantics as applied to XRI i-name objects.

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 [RFC 2119].

In examples, "C:" represents lines sent by an EPP client and "S:" represents lines returned by an EPP server. Indentation and white space in examples is provided only to show element relationships and is not a REQUIRED feature of the proposal.

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.

Namespace Naming Convention

For the purpose of illustration, the target namespace defined in this document is designated using the IETF convention:

urn:ietf:params:xml:ns:xriINA-1.0

However, in the case that this document is not submitted to IETF as an Internet Draft, but used for NeuStar internal development only instead, the target namespace shall be denoted as a NeuStar specific character string, such as

http://www.neustar.biz/xrp/xriINA-1.0

The exact syntax of the NeuStar specific namespace denotation will be defined in other documents.

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1. Introduction

The OASIS Extensible Resource Identifiers (XRIs) [XRI] provide a standard means of abstractly identifying a resource independent of any particular concrete representation of that resource, or, in the case of a completely abstract resource, of any representation at all.

The OASIS XRI Data Interchange (XDI) specifications [XDI] define a standard for sharing, linking, and synchronizing data ("dataweb") over the Internet and other networks using XML documents and Extensible Resource Identifiers (XRIs).

The OASIS XRI abstract identifier and XDI data interchange protocols create a new layer of infrastructure that enables individuals and organizations to establish persistent Internet identities and form long-term, trusted peer-to-peer data sharing relationships.

An i-name is a human-friendly XRI intended for everyday use in browsers, email clients, web pages - anyplace a web address (URI) would appear today, for representing a person or an organization in the real world.

An i-number is a special type of XRI that differs from an i-name in one critical way: once assigned to a resource, it MUST NOT be reassigned. For this reason i-numbers are typically numbers and punctuation characters (similar to an IP address) and are thus much harder for humans to use.

An XRI authority represents the real world entity, and can be one of three types: personal authority, organizational authority and network authority. While XRI personal and organizational authorities share the same properties, XRI network authorities are special entities that provide XRI related services [EPP AU].

In addition to the standard XRI resolution services provided by XRI registries, valued-added third-party services, called i-services, can be subscribed for an XRI authority and its associated i-name/i-number objects.

The Extensible Provisioning Protocol (EPP) [RFC 3730] provides a complete description of EPP command and response structures for provisioning objects in a centralized repository.

This document describes an XRI i-name object mapping for version 1.0 of the Extensible Provisioning Protocol (EPP). This mapping is specified using the Extensible Markup Language (XML) 1.0 as described in [XML] and XML Schema notation as described in [XML SCHEMA]. Notification or delivery methods for XRI i-name objects are not covered by this document.

Object Attributes

An EPP XRI i-name object has attributes and associated values that may be viewed and modified by the sponsoring client or the server. This section describes each attribute type in detail. The formal syntax for the attribute values described here can be found in the "Formal Syntax" section of this document and in the appropriate normative references.

2.1 XRI I-Names

All EPP XRI i-name objects are uniquely identified by an i-name, which MUST be globally unique. XRI i-name are character strings with a specified minimum length, a specified maximum length, and a specified format. XRI i-names MAY be relative to the current registry and start with a "*". Or, at global or top level, XRI i- names MAY start with a "=" for personal i-names, or a "@" for organizational i-names. The syntax for XRI i-names described in this document MUST conform to the format specified in [XRI]. In EPP XML messages, XRI i-names use the "inameType" syntax described in [EPP AU].

At the time of this writing, the work on conformance requirements,policies and standards for internationalized i-names is still in   progress. A server MAY restrict allowable character sets for i- names. Additionally, a server MAY restrict allowable i-names to a particular top level i-names, secondary level community i-names, or other level i-names for which the server is authoritative.

2.2 XRI Authority and Identifiers

All EPP XRI authorities are identified by a server-unique identifer. XRI authority identifiers are character strings with a specified minimum length, a specified maximum length, and a specified format. Authority identifiers use the "authIdType" authority identifier syntax described in [EPP AU].

2.3 Client Identifiers

All EPP clients are identified by a server-unique identifier. Client
identifiers are character strings with a specified minimum length, a
specified maximum length, and a specified format. Client identifiers use
the "clIDType" client identifier syntax described in described in [RFC
3730].

2.4 Status Values

An XRI i-name object MUST always have at least one associated status value.
Status values can be set only by the client that sponsors an XRI i-name
object and by the server on which the object resides. A client can change
the status of an XRI i-name object using the EPP <update> command. Each
status value MAY be accompanied by a string of human-readable text that
describes the rationale for the status applied to the object.

A client MUST NOT alter status values set by the server. A server MAY alter
or override status values set by a client subject to local server policies.
The status of an object MAY change as a result of either a client-initiated
transform command or an action performed by a server operator.

Status values that can be added or removed by a client are prefixed with
"client". Corresponding status values that can be added or removed by a
server are prefixed with "server". Status values that do not begin with
either "client" or "server" are server-managed.

Status Value Descriptions:

- clientDeleteProhibited, serverDeleteProhibited

  Requests to delete the object MUST be rejected.

- clientHold, serverHold

  XRI resolution information MUST NOT be published for the object.

- clientRenewProhibited, serverRenewProhibited

  Requests to renew the object MUST be rejected, except that the object
  is in "pendingDelete" status, subject to local server policies.

- clientTransferProhibited, serverTransferProhibited

  Requests to transfer the object MUST be rejected.

- clientUpdateProhibited, serverUpdateProhibited

  Requests to update the object (other than to remove this status) MUST be
  rejected.

- ok

This is the normal status value for an object that has no pending operations or prohibitions. This value is set and removed by the server as other status values are added or removed.

- pendingCreate, pendingDelete, pendingRenew, pendingTransfer, pendingUpdate

A transform command has been processed for the object, but the action has not been completed by the server. Server operators can delay action completion for a variety of reasons, such as to allow for human review or third-party action. A transform command that is processed, but whose requested action is pending, is noted with response code 1001.

With two exceptions, transform commands MUST be rejected when a pendingCreate, pendingDelete, pendingRenew, pendingTransfer, or pendingUpdate status is set. One exception is that a <renew> command to renew an expiring object MAY be processed while an object is in "pendingDelete" status, subject to local server policies. The other exception is that a <transfer> command to approve, reject, or cancel a transfer MAY be processed while an object is in "pendingTransfer" status set by the server for an XRI i-name <transfer> request. Transform commands MUST be rejected if the "pendingTransfer" status is added via an EPP <transfer> request command on the XRI authority object associated by the XRI i-name object.

When the requested action has been completed, the pendingCreate, pendingDelete, pendingRenew, pendingTransfer, or pendingUpdate status value MUST be removed. All clients involved in the transaction MUST be notified using a service message that the action has been completed and that the status of the object has changed.

- "ok" status MUST NOT be combined with any other status.

- "pendingDelete" status MUST NOT be combined with either "clientDeleteProhibited" or "serverDeleteProhibited" status.

- "pendingRenew" status MUST NOT be combined with either

- "clientRenewProhibited" or "serverRenewProhibited" status.

- "pendingTransfer" status MUST NOT be combined with either

- "clientTransferProhibited" or "serverTransferProhibited" status. The

- one exception is the "pendingTransfer" status is added via an EPP

- <transfer> request command on the XRI authority object associated

- with the XRI i-name object, instead of an EPP <transfer> command on

- the XRI i-name object itself.

- "pendingUpdate" status MUST NOT be combined with either

- "clientUpdateProhibited" or "serverUpdateProhibited" status.

The pendingCreate, pendingDelete, pendingRenew, and pendingUpdate status values MUST NOT be combined with each other. The pendingTransfer status value MAY be combined with one of the pendingCreate, pendingDelete, pendingRenew, and pendingUpdate status values, if the pendingTransfer status is added via an EPP transfer> request command on the XRI authority object associated with the XRI i-name object, instead of an EPP <transfer> command on the XRI i-name object itself.

Other status combinations not expressly prohibited MAY be used.

2.5 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] 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.

2.6 Validity Periods

An XRI i-name object MAY have a specified validity period. If server policy supports XRI i-name object validity periods, the validity period is defined when an XRI i-name object is created, and it MAY be extended by the EPP <renew> or <transfer> commands. As a matter of server policy, this specification does not define actions to be taken upon expiration of an XRI i-name object's validity period.

Validity periods are measured in years or months with the appropriate units specified using the "unit" attribute. Valid values for the "unit" attribute are "y" for years and "m" for months. The minimum allowable period value is one decimal (1). The maximum allowable value is ninety-nine decimal (99). A server MAY support a lower maximum value.

2.7 Authorization Information

Subject to local server policies, a server MAY REQUIRE transfer tokens, which can be one-time, single-use passwords, to be used for facilitating XRI i-name transfer operations among clients, in addition to authorization information associated with XRI authority objects. If REQUIRED, transfer tokens MUST be specified by clients when a transfer is requested, or generated by the server for a transfer request; they MUST be provided to approve transfer requests. Transfer tokens are character strings with a specified minimum length, a specified maximum length, and a specified format. Transfer tokens use the "trTokenType" transfer token syntax described in the "Formal Syntax" section of this document.

3. EPP Command Mapping

Be pro-active in obtaining quotes for upcoming purchase requests and initiating the corresponding Purchase Requests for groups in and outside of Operations.

3.1 EPP Query Commands

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

3.1.1 EPP <check> Command

The EPP <check> command is used to determine if an object may be provisioned within a repository. It provides a hint that allows a client to anticipate the success or failure of provisioning an object using the <create> command. Object availability and provisioning conditions are a matter of server policy.

In addition to the standard EPP command elements, the <check> command MUST contain an <xriINA:check> element that identifies the XRI i-name namespace and the location of the XRI i-name schema. The <xriINA:check> element contains the following child elements:

* One or more <xriINA:iname> elements that contain thei names which are used as the identifiers of the XRI i-name objects to be queried.

Example <check> command:

```
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 epp-1.0.xsd">
C:  <command>
C:    <check>
C:      <xriINA:check
C:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:       xriINA-1.0.xsd">
C:        <xriINA:iname>=John.Doe</xriINA:iname>
C:        <xriINA:iname>@Foo*Bar</xriINA:iname>
C:        <xriINA:iname>=My.Name</xriINA:iname>
C:        <xriINA:iname>*Anyone</xriINA:iname>
C:      </xriINA:check>
C:    </check>
```

When a <check> command has been processed successfully, the EPP <resData>
element MUST contain a child <xriINA:chkData> element that identifies the
XRI i-name namespace and the location of the XRI i-name schema. The
<xriINA:chkData> element contains one or more <xriINA:cd> elements that
contain the following child elements:

- An <xriINA:iname> element that contains the i-namethat is used as the
  identifier of the queried XRI i-name object. This element MUST contain
  an "avail" attribute whose value indicates object availability (can it be
  provisioned or not) at the moment the <check> command was completed. A
  value of "1" or "true" means that the object can be provisioned. A value
  of "0" or "false" means that the object can not be provisioned.

- An OPTIONAL <xriINA:reason> element that MAY be provided when an object
  can not be provisioned. If present, this element contains server-
  specific text to help explain why the object can not be provisioned.
  This text MUST be represented in the response language previously
  negotiated with the client; an OPTIONAL "lang" attribute MAY be present
  to identify the language if the negotiated value is something other than
  the default value of "en" (English).

Example <check> 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 epp-1.0.xsd">
S:  <response>
S:    <result code="1000">
S:      <msg>Command completed successfully</msg>
S:    </result>
S:    <resData>
S:      <xriINA:chkData
S:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
S:       xriINA-1.0.xsd">
S:        <xriINA:cd>
S:          <xriINA:iname avail="1">=John.Doe</xriINA:iname>
S:        </xriINA:cd>
S:        <xriINA:cd>
S:          <xriINA:iname avail="0">@Foo*Bar</xriINA:iname>
S:          <xriINA:reason>Not authorized</xriINA:reason>
S:        </xriINA:cd>
S:        <xriINA:cd>
S:          <xriINA:iname avail="0">=My.Name</xriINA:iname>
S:          <xriINA:reason>Reserved</xriINA:reason>
S:        </xriINA:cd>
S:        <xriINA:cd>
S:          <xriINA:iname avail="1">*Anyone</xriINA:iname>
S:        </xriINA:cd>
S:      </xriINA:chkData>
S:    </resData>
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 <check> command can not be
processed for any reason.

3.1.2 EPP <info> Command

The EPP <info> command is used to retrieve information associated with an
XRI i-name object. In addition to the standard EPP command elements, the
<info> command MUST contain an <xriINA:info> element that identifies the XRI
i-name namespace and the location of the XRI i-name schema. The
<xriINA:info> element contains the following child elements:

* An <xriINA:iname> element that contains the i-name that is used as the
  identifier of the XRI i-name object to be queried.

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:     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
C:     xsi:schemaLocation="urn:ietf:params:xml:ns:epp-1.0 epp-1.0.xsd">
C:  <command>
C:    <info>
C:      <xriINA:info
C:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:       xriINA-1.0.xsd">
C:        <xriINA:iname>@Foo.Bar</xriINA:iname>
C:      </xriINA: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 <xriINA:infData> element that identifies the
XRI i-name namespace and the location of the XRI i-name schema. The
<xriINA:infData> element contains the following child elements:

An <xriINA:iname> element that contains the i-name that is used as   the
identifier of the XRI i-name object.

- An <xriINA:roid> element that contains the Repository Object IDentifier assigned to the XRI i-name object when the object was created.

- One or more <xriINA:status> elements that describe the status of the XRI i-name object.

- A REQUIRED <xriINA:authId> element that contains the identifier of the XRI authority object that contains the human or organizational social information associated with the XRI i-name object.

- An <xriINA:clID> element that contains the identifier of the sponsoring client.

- An <xriINA:crID> element that contains the identifier of the client that created the XRI i-name object.

- An <xriINA:crDate> element that contains the date and time of XRI i-name object creation.

- An OPTIONAL <xriINA:upID> element that contains the identifier of the client that last updated the XRI i-name object. This element MUST NOT be present if the XRI i-name object has never been modified.

- An OPTIONAL <xriINA:upDate> element that contains the date and time of the most recent XRI i-name object modification. This element MUST NOT be present if the XRI i-name object has never been modified.

- An <xriINA:exDate> element that contains the date and time identifying the end of the XRI i-name object's registration period.

- An OPTIONAL <xriINA:trDate> element that contains the date and time of the most recent successful XRI i-name object transfer. This element MUST NOT be provided if the XRI i-name object has never been transferred. Note that an XRI i-name object MAY be transfer directly, or implicitly when the XRI i-name object's superordinate XRI authority object is transferred. XRI i-name objects that subject to transfer when transferring an XRI authority object are listed in the response to an EPP <info> command performed on the XRI authority object.

Example <info> 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 epp-1.0.xsd">
S:  <response>
S:    <result code="1000">
S:      <msg>Command completed successfully</msg>
S:    </result>
S:    <resData>
S:      <xriINA:infData
S:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
```

```
S:        xriINA-1.0.xsd">
S:          <xriINA:iname>@Foo.Bar</xriINA:iname>
S:          <xriINA:roid>INA_1002-NEUSTAR</xriINA:roid>
S:          <xriINA:status s="clientDeleteProhibited"/>
S:          <xriINA:status s="clientUpdateProhibited"/>
S:          <xriINA:authId>AUTHORITY</xriINA:authId>
S:          <xriINA:clID>ClientY</xriINA:clID>
S:          <xriINA:crID>ClientX</xriINA:crID>
S:          <xriINA:crDate>2005-05-03T22:00:00.0Z</xriINA:crDate>
S:          <xriINA:upID>ClientX</xriINA:upID>
S:          <xriINA:upDate>2005-05-05T09:00:00.0Z</xriINA:upDate>
S:          <xriINA:exDate>2006-05-03T22:00:00.0Z</xriINA:exDate>
S:          <xriINA:trDate>2005-05-04T09:00:00.0Z</xriINA:trDate>
S:        </xriINA:infData>
S:      </resData>
S:      <trID>
S:        <clTRID>ABC-12346</clTRID>
S:        <svTRID>54321-XYZ</svTRID>
S:      </trID>
S:   </response>
S:</epp>
```

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

3.1.3 EPP <transfer> Query Command

The EPP <transfer> command provides a query operation that allows a client to determine real-time status of pending and completed transfer requests. In addition to the standard EPP command elements, the <transfer> command MUST contain an "op" attribute with value "query", and an <xriINA:transfer> element that identifies the XRI i- name namespace and the location of the XRI i-name schema. The <xriINA:transfer> element contains the following child elements:

- An <xriINA:iname> element that contains the i-name that is used as the identifier of the XRI i-name object to be queried.

- An OPTIONAL <xriINA:authInfo> element that contains authorization information of the XRI authority object associated with the XRI i-name object. If this element is not provided or if the authorization information is invalid, server policy determines if the command is rejected or if response information will be returned to the client.

Example <transfer> query command:

```
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:    <transfer op="query">
C:       <xriINA:transfer
```

```
C:        xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:        xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:        xriINA-1.0.xsd">
C:         <xriINA:iname>=John.Doe</xriINA:iname>
C:         <xriINA:authInfo>
C:           <xriINA:pw>2fooBAR</xriINA:pw>
C:         </xriINA:authInfo>
C:       </xriINA:transfer>
C:     </transfer>
C:     <clTRID>ABC-12345</clTRID>
C:   </command>
C:</epp>
```

When a <transfer> query command has been processed successfully, the EPP
<resData> element MUST contain a child <xriINA:trnData> element that
identifies the XRI i-name namespace and the location of the XRI i-name
schema. The xriINA:trnData> element contains the following child elements:

- An <xriINA:iname> element that contains the i-name that is used as the
  identifier of the XRI i-name object.

- An <xriINA:source> element that specifies the identifier of the XRI
  authority object associated with the XRI i-name object before the
  transfer operation is completed successfully.

- An <xriINA:target> element that specifies the identifier of the XRI
  authority object to be associated with the XRI i-name object after the
  transfer operation is completed successfully.

- An OPTIONAL <xri:trToken> element that contains the transfer token
  associated with the transfer request, if an <xri:trToken> element is
  specified by the client when the transfer is requested, or generated by
  the server for the transfer request. A server MAY return the
  <xri:trToken> element only to the client that requested the object
  transfer, subject to local server policies.

- An <xriINA:trStatus> element that contains the state of the most recent
  transfer request.

- An <xriINA:reID> element that contains the identifier of the client that
  requested the object transfer.

- An <xriINA:reDate> element that contains the date and time that the
  transfer was requested.

- An <xriINA:acID> element that contains the identifier of the client that
  SHOULD act upon the transfer request.

- An <xriINA:acDate> element that contains the date and time of a required
  or completed response. For a PENDING request, the value identifies the
  date and time by which a response is required before an automated
  response action will be taken by the server. For all other status types,
  the value identifies the date and time when the request was completed.

- An OPTIONAL <xriINA:exDate> element that contains the end of the XRI i-name object's validity period if the <transfer> command caused or causes a change in the validity period.

Example <transfer> query 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>Command completed successfully</msg>
S:    </result>
S:    <resData>
S:      <xriINA:trnData
S:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
S:       xriINA-1.0.xsd">
S:        <xriINA:iname>=John.Doe</xriINA:iname>
S:        <xriINA:source>OLD-AUTHORITY</xriINA:source>
S:        <xriINA:target>NEW-AUTHORITY</xriINA:target>
S:        <xriINA:trToken>OneTimePass</xriINA:trToken>
S:        <xriINA:trStatus>pending</xriINA:trStatus>
S:        <xriINA:reID>ClientX</xriINA:reID>
S:        <xriINA:reDate>2005-05-06T22:00:00.0Z</xriINA:reDate>
S:        <xriINA:acID>ClientY</xriINA:acID>
S:        <xriINA:acDate>2005-05-11T22:00:00.0Z</xriINA:acDate>
S:        <xriINA:exDate>2009-05-03T22:00:00.0Z</xriINA:exDate>
S:      </xriINA:trnData>
S:    </resData>
S:    <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>54322-XYZ</svTRID>
S:    </trID>
S:  </response>
S:</epp>
```

Note that the response to an EPP <transfer> query command on an XRI i-name object contains transfer information related to the XRI i-name object itself. It does not contain transfer information resulted by EPP <transfer> commands on the XRI authority object associated with the XRI i-name object.

3.2 EPP Transform Commands

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

Transform commands are typically processed and completed in real time.
Server operators MAY receive and process transform commands, but defer
completing the requested action if human or third-party review is required
before the requested action can be completed. In such situations the server
MUST return a 1001 response code to the   client to note that the command
has been received and processed, but the requested action is pending. The
server MUST also manage the status of the object that is the subject of the
command to reflect the initiation and completion of the requested action.
Once the action has been completed, all clients involved in the transaction

MUST be notified using a service message that the action has been completed
and that the status of the object has changed.

3.2.1 EPP <create> Command

The EPP <create> command provides a transform operation that allows a client
to create an XRI i-name object. In addition to the standard EPP command
elements, the <create> command MUST contain an <xriINA:create> element that
identifies the XRI i-name namespace and the location of the XRI i-name
schema. The <xriINA:create> element contains the following child elements:

* A REQUIRED <xriINA:authority> element that specifies the identifier and
  authorization information of the XRI authority object that contains the
  human or organizational social information associated with the XRI i-name
  object. It contains the following child elements:

* A REQUIRED <xriINA:authId> element that specifies the identifier of the
  XRI authority object.

* An OPTIONAL <xriINA:authInfo> element that contains authorization
  information associated with the XRI authority object. If this element is
  not provided or if the authorization information is invalid, server
  policy determines if the command is   rejected or if response
  information will be returned to the client.

* An OPTIONAL <xriINA:period> element that contains the initial
  registration period of the XRI i-name object. A server MAY define a
  default initial registration period if not specified by the client.

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:    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:    <create>
C:      <xriINA:create
C:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
```

```
C:         xriINA-1.0.xsd">
C:          <xriINA:iname>@Foo.Bar</xriINA:iname>
C:          <xriINA:authority>
C:            <xriINA:authId>AUTHORITY</xriINA:authId>
C:            <xriINA:authInfo>
C:              <xriINA:pw>2fooBAR</xriINA:pw>
C:            </xriINA:authInfo>
C:          </xriINA:authority>
C:          <xriINA:period unit="y">2</xriINA:period>
C:        </xriINA:create>
C:      </create>
C:      <clTRID>ABC-12345</clTRID>
C:    </command>
C:</epp>
```

When a <create> command has been processed successfully, the EPP <resData>
element MUST contain a child <xriINA:creData> element that identifies the
XRI i-name namespace and the location of the XRI i-name schema. The
<xriINA:creData> element contains the following child elements:

* An <xriINA:iname> element that contains the i-name that is used as the
   identifier of the XRI i-name object created.

This document uses URNs to describe XML namespaces and XML schemas
conforming to a registry mechanism described in [RFC 3688]. If the ISEG
approves this memo for publication, then two URI assignments will be
requested.

* An <xriINA:exDate> element that contains the date and time identifying
   the end of the XRI i-name object's registration period.

Example <create> 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>Command completed successfully</msg>
S:    </result>
S:    <resData>
S:      <xriINA:creData
S:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
S:       xriINA-1.0.xsd">
S:        <xriINA:iname>@Foo.Bar</xriINA:iname>
S:        <xriINA:crDate>2005-05-02T22:00:00.0Z</xriINA:crDate>
S:        <xriINA:exDate>2007-05-02T22:00:00.0Z</xriINA:exDate>
S:      </xriINA:creData>
S:    </resData>
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 <create> command can not be
processed for any reason.

3.2.2 EPP <delete> Command

The EPP <delete> command provides a transform operation that allows a client
to terminate an XRI i-name object. In addition to the standard EPP command
elements, the <delete> command MUST contain an <xriINA:delete> element that
identifies the XRI i-name namespace and the location of the XRI i-name
schema. The <xriINA:delete> element contains the following child elements:

- An <xriINA:iname> element that contains the i-name that is used as the
  identifier of the XRI i-name object to be deleted.

Example <delete> command:

```
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:    <delete>
C:      <xriINA:delete
C:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:       xriINA-1.0.xsd">
C:        <xriINA:iname>*Foo.Bar</xriINA:iname>
C:      </xriINA:delete>
C:    </delete>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

When a <delete> command has been processed successfully, a server MUST
respond with an EPP response with no <resData> 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:     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:     <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 can not be
processed for any reason.

3.2.3 EPP <renew> Command

The EPP <renew> command provides a transform operation that allows a client
to extend the validity period of an XRI i-name object. In addition to the
standard EPP command elements, the <renew> command MUST contain a
<xriINA:renew> element that identifies the XRI i-name namespace and the
location of the XRI i-name schema. The <xriINA:renew> element contains the
following child elements:

- An <xriINA:iname> element that contains the i-name that is used as the
  identifier of the XRI i-name object whose validity period is to be
  extended.

- An <xriINA:curExpDate> element that contains the date on which the
  current validity period ends. This value ensures that repeated <renew>
  commands do not result in multiple unanticipated successful renewals.

- An OPTIONAL <xriINA:period> element that contains the number of units to
  be added to the registration period of the XRI i-name object. The number
  of units available MAY be subject to limits imposed by the server.

Example <renew> command:

```
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:    <renew>
C:      <xriINA:renew
C:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:       xriINA-1.0.xsd">
C:        <xriINA:iname>@Foo.Bar</xriINA:iname>
C:        <xriINA:curExpDate>2006-05-03</xriINA:curExpDate>
C:        <xriINA:period unit="y">5</xriINA:period>
C:      </xriINA:renew>
C:    </renew>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
```

```
C:</epp>
```

When a <renew> command has been processed successfully, the EPP <resData> element MUST contain a child <xriINA:renData> element that identifies the XRI i-name namespace and the location of the XRI i-name schema. The <xriINA:renData> element contains the following child elements:

- An <xriINA:iname> element that contains the i-name that is used as the identifier of the XRI i-name object whose validity period has been extended.

- An <xriINA:exDate> element that contains the date and time identifying the end of the XRI i-name object's registration period.

Example <renew> 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>Command completed successfully</msg>
S:    </result>
S:    <resData>
S:      <xriINA:renData
S:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
S:       xriINA-1.0.xsd">
S:        <xriINA:iname>@Foo.Bar</xriINA:iname>
S:        <xriINA:exDate>2011-05-03T22:00:00.0Z</xriINA:exDate>
S:      </xriINA:renData>
S:    </resData>
S:    <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>54322-XYZ</svTRID>
S:    </trID>
S:  </response>
S:</epp>
```

An EPP error response MUST be returned if a <renew> command can not be processed for any reason.

3.2.4 EPP <transfer> Command

Transfer semantics can directly apply to XRI i-name objects. It also can be applied indirectly via XRI authority objects [EPP AU], as XRI i-name objects are subordinate to an existing superordinate XRI authority object, and as such they are subject to transfer when an XRI authority object is transferred.

The EPP <transfer> command provides a direct transform operation that allows
a client to manage requests to transfer the sponsorship and/or the XRI
authority association of an XRI i-name object. In addition to the standard
EPP command elements, the <transfer> command MUST contain a
<xriINA:transfer> element that identifies the XRI i-name   namespace and
the location of the XRI i-name schema. The <xriINA:transfer> element
contains the following child elements:

* An <xriINA:iname> element that contains the i-name that is used as the
  identifier of the XRI i-name object for which a transfer request is to be
  created, approved, rejected, or cancelled.

* An OPTIONAL <xriINA:target> element that specifies the identifier and
  authorization information of the new XRI authority object that contains
  the human or organizational social information to be associated with the
  XRI i-name object after the transfer is completed successfully. This
  element can only be used when a transfer is   requested, and it MUST be
  ignored if used otherwise. It contains the following child elements:

* A REQUIRED <xriINA:authId> element that specifies the identifier of the
  XRI authority object.

* An OPTIONAL <xriINA:authInfo> element that contains authorization
  information associated with the XRI authority object. If this element is
  not provided or if the authorization information is invalid, server
  policy determines if the command is   rejected or if response
  information will be returned to the client.

* An OPTIONAL <xriINA:period> element that contains the number of units to
  be added to the registration period of the XRI i-name object at
  completion of the transfer process. This element can only be used when a
  transfer is requested, and it MUST be ignored if used otherwise. The
  number of units available MAY be subject to limits   imposed by the
  server.

* An OPTIONAL <xri:trToken> element that contains the transfer token
  associated with the transfer request, subject to local server policies.
  If transfer tokens MUST be used to facilitate transfer operations among
  clients, this element is REQUIRED when a transfer is requested, if
  transfer tokens are not generated by the server; this element is also
  REQUIRED when a transfer is to be approved. This element MUST be ignored
  if used otherwise.

* An OPTIONAL <xriINA:authInfo> element that contains authorization
  information of the XRI authority object associated with the XRI i-name
  object. This element is REQUIRED when a transfer is approved.
  Otherwise, if this element is not provided or if the authorization
  information is invalid, server policy determines if the command is
  rejected or if response information will be returned to the client.

Every EPP <transfer> command MUST contain an "op" attribute that identifies
the transfer operation to be performed. Valid values, definitions, and
authorizations for all attribute values are defined in [RFC 3730].

Example <transfer> request command:

```
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:    <transfer op="request">
C:      <xriINA:transfer
C:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:       xriINA-1.0.xsd">
C:        <xriINA:iname>*Foo.Bar</xriINA:iname>
C:        <xriINA:target>
C:          <xriINA:authId>NEW-AUTHORITY</xriINA:authId>
C:          <xriINA:authInfo>
C:            <xriINA:pw>F00Bar2</xriINA:pw>
C:          </xriINA:authInfo>
C:        </xriINA:target>
C:        <xriINA:period unit="y">2</xriINA:period>
C:        <xriINA:trToken>OneTimePass</xriINA:trToken>
C:      </xriINA:transfer>
C:    </transfer>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

Example <transfer> approve command:

```
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:    <transfer op="approve">
C:      <xriINA:transfer
C:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:       xriINA-1.0.xsd">
C:        <xriINA:iname>*Foo.Bar</xriINA:iname>
C:        <xriINA:trToken>OneTimePass</xriINA:trToken>
C:        <xriINA:authInfo>
C:          <xriINA:pw>2fooBAR</xriINA:pw>
C:        </xriINA:authInfo>
C:      </xriINA:transfer>
C:    </transfer>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

When a <transfer> command has been processed successfully, the EPP <resData>
element MUST contain a child <xriINA:trnData> element that identifies the
XRI i-name namespace and the location of the XRI i-name schema. The

<xriINA:trnData> element contains the same child elements defined for a transfer query response.

Example <transfer> 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="1001">
S:      <msg>Command completed successfully; action pending</msg>
S:    </result>
S:    <resData>
S:      <xriINA:trnData
S:       xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
S:       xriINA-1.0.xsd">
S:        <xriINA:iname>*Foo.Bar</xriINA:iname>
S:        <xriINA:source>OLD-AUTHORITY</xriINA:source>
S:        <xriINA:target>NEW-AUTHORITY</xriINA:target>
S:        <xriINA:trToken>OneTimePass</xriINA:trToken>
S:        <xriINA:trStatus>pending</xriINA:trStatus>
S:        <xriINA:reID>ClientX</xriINA:reID>
S:        <xriINA:reDate>2005-05-06T22:00:00.0Z</xriINA:reDate>
S:        <xriINA:acID>ClientY</xriINA:acID>
S:        <xriINA:acDate>2005-05-11T22:00:00.0Z</xriINA:acDate>
S:        <xriINA:exDate>2009-05-03T22:00:00.0Z</xriINA:exDate>
S:      </xriINA:trnData>
S:    </resData>
S:    <trID>
S:      <clTRID>ABC-12345</clTRID>
S:      <svTRID>54322-XYZ</svTRID>
S:    </trID>
S:  </response>
S:</epp>
```

An EPP error response MUST be returned if a <transfer> command can not be processed for any reason.

Note that if an EPP <transfer> request is processed successfully, the XRI authority objects involved in the transfer operation, both the current authority associated with the XRI i-name object, and the new authority to be associated with the XRI i-name object, MUST be set with a "pendingINameTransfer" status by the server. The "pendingINameTransfer" status MUST be removed by the server after the transfer request is approved, rejected or cancelled.

3.2.5 EPP <update> Command

The EPP <update> command provides a transform operation that allows a client to modify the attributes of an XRI i-name object. In addition to the

standard EPP command elements, the <update> command MUST contain an
<xriINA:update> element that identifies the XRI i-name namespace and the
location of the XRI i-name schema. The
<xriINA:update> element contains the following child elements:

- An <xriINA:iname> element that contains the i-name that is used as the
  identifier of the XRI i-name object to be updated.

- An OPTIONAL <xriINA:add> element that contains attribute values to be
  added to the object.

- An OPTIONAL <xriINA:rem> element that contains attribute values to be
  removed from the object. The <xriINA:rem> element contains the following
  child elements:

- At least one <xriINA:add> or <xriINA:rem> element MUST be provided. The
  <xriINA:add> and <xriINA:rem> elements contains the following child
  elements:

One or more <xriINA:status> elements that contain status values to be
associated with or removed from the object. When specifying a value to be
removed, only the attribute value is significant; element text is not
required to match a value for removal.

Example <update> command:

```
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:        <xriINA:update
C:         xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
C:         xsi:schemaLocation="urn:ietf:params:xml:ns:xriINA-1.0
C:         xriINA-1.0.xsd">
C:          <xriINA:iname>=John.Doe</xriINA:iname>
C:          <xriINA:add>
C:            <xriINA:status s="clientUpdateProhibited" lang="en">
C:            </xriINA:status>
C:          </xriINA:add>
C:          <xriINA:rem>
C:            <xriINA:status s="clientHold"/>
C:            <xriINA:status s="clientRenewProhibited"/>
C:          </xriINA:rem>
C:        </xriINA:update>
C:     </update>
C:     <clTRID>ABC-12345</clTRID>
C:   </command>
C:</epp>
```

When an <update> command has been processed successfully, a server MUST
respond with an EPP response with no <resData> element.

Example <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>Command completed successfully</msg>
S:    </result>
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 an <update> command can not be processed for any reason.

4. Formal Syntax

An EPP object mapping is specified in XML Schema notation. The formal syntax presented here, in addition to the EPP base schemas [RFC 3730] and EPP XRI base schema [EPP AU], 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:xriINA-1.0"
        xmlns:xriINA="urn:ietf:params:xml:ns:xriINA-1.0"
        xmlns:xriCommon="urn:ietf:params:xml:ns:xriCommon-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:ietf:params:xml:ns:epp-1.0"
         schemaLocation="epp-1.0.xsd"/>
  <import namespace="urn:ietf:params:xml:ns:eppcom-1.0"
         schemaLocation="eppcom-1.0.xsd"/>
  <import namespace="urn:ietf:params:xml:ns:xriCommon-1.0"
         schemaLocation="xriCommon-1.0.xsd"/>

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

```
      XML schema for XRI I-Name provisioning.
    </documentation>
  </annotation>

<!--
Child elements found in EPP commands.
-->
  <element name="check"    type="xriINA:mIdType"/>
  <element name="create"   type="xriINA:createType"/>
  <element name="delete"   type="xriINA:sIdType"/>
  <element name="info"     type="xriINA:infoType"/>
  <element name="renew"    type="xriINA:renewType"/>
  <element name="transfer" type="xriINA:transferType"/>
  <element name="update"   type="xriINA:updateType"/>
<!--
Child element of commands that require a single i-name
-->
  <complexType name="sIdType">
    <sequence>
      <element name="iname"  type="xriCommon:inameType"/>
    </sequence>
  </complexType>

<!--
Child element of commands that accept multiple i-names
-->
  <complexType name="mIdType">
    <sequence>
      <element name="iname" type="xriCommon:inameType"
       maxOccurs="unbounded"/>
    </sequence>
  </complexType>

<!--
Child elements of the <create> command.
-->
  <complexType name="createType">
    <sequence>
      <element name="iname"     type="xriCommon:inameType"/>
      <element name="authority" type="xriINA:authorityType"/>
      <element name="period"    type="xriINA:periodType"
       minOccurs="0"/>
    </sequence>
  </complexType>

  <complexType name="authorityType">
    <sequence>
      <element name="authId"   type="xriCommon:authIdType"/>
      <element name="authInfo" type="xriINA:authInfoType" minOccurs="0"/>
    </sequence>
  </complexType>

<!--
Child elements of the <info> command.
-->
  <complexType name="infoType">
    <sequence>
```

```
          <element name="iname"  type="xriCommon:inameType"/>
       </sequence>
     </complexType>

<!--
Child elements of the <renew> command.
-->
   <complexType name="renewType">
     <sequence>
       <element name="iname"      type="xriCommon:inameType"/>
       <element name="curExpDate" type="date"/>
       <element name="period"     type="xriINA:periodType" minOccurs="0"/>
     </sequence>
   </complexType>

<!--
Child elements of the <transfer> command.
-->
   <complexType name="transferType">
     <sequence>
       <element name="iname"    type="xriCommon:inameType"/>
       <element name="target"   type="xriINA:authorityType"
        minOccurs="0"/>
       <element name="period"   type="xriINA:periodType"
        minOccurs="0"/>
       <element name="trToken"  type="xriCommon:trTokenType"
        minOccurs="0"/>
       <element name="authInfo" type="xriINA:authInfoType"
        minOccurs="0"/>
     </sequence>
   </complexType>

<!--
Child elements of the <update> command.
-->
   <complexType name="updateType">
     <sequence>
       <element name="iname" type="xriCommon:inameType"/>
       <element name="add"   type="xriINA:addRemType" minOccurs="0"/>
       <element name="rem"   type="xriINA:addRemType" minOccurs="0"/>
     </sequence>
   </complexType>

<!--
Data elements that can be added or removed.
-->
   <complexType name="addRemType">
     <sequence>
       <element name="status" type="xriINA:statusType" maxOccurs="12"/>
     </sequence>
   </complexType>

<!--
Child response elements.
-->
   <element name="chkData" type="xriINA:chkDataType"/>
   <element name="creData" type="xriINA:creDataType"/>
```

```
    <element name="infData" type="xriINA:infDataType"/>
    <element name="panData" type="xriINA:panDataType"/>
    <element name="renData" type="xriINA:renDataType"/>
    <element name="trnData" type="xriINA:trnDataType"/>

<!--
<check> response elements.
-->
  <complexType name="chkDataType">
    <sequence>
      <element name="cd" type="xriINA:checkType"
       maxOccurs="unbounded"/>
    </sequence>
  </complexType>

  <complexType name="checkType">
    <sequence>
      <element name="iname" type="xriINA:checkIdType"/>
      <element name="reason"  type="eppcom:reasonType"
       minOccurs="0"/>
    </sequence>
  </complexType>

  <complexType name="checkIdType">
    <simpleContent>
      <extension base="xriCommon:inameType">
        <attribute name="avail" type="boolean"
         use="required"/>
      </extension>
    </simpleContent>
  </complexType>

<!--
<create> response elements.
-->
  <complexType name="creDataType">
    <sequence>
      <element name="iname" type="xriCommon:inameType"/>
      <element name="crDate"  type="dateTime"/>
      <element name="exDate"  type="dateTime"/>
    </sequence>
  </complexType>

<!--
<info> response elements.
-->
  <complexType name="infDataType">
    <sequence>
      <element name="iname"     type="xriCommon:inameType"/>
      <element name="roid"      type="eppcom:roidType"/>
      <element name="status"    type="xriINA:statusType" maxOccurs="12"/>
      <element name="authId"    type="xriCommon:authIdType"/>
      <element name="clID"      type="eppcom:clIDType"/>
      <element name="crID"      type="eppcom:clIDType"/>
      <element name="crDate"    type="dateTime"/>
      <element name="upID"      type="eppcom:clIDType" minOccurs="0"/>
      <element name="upDate"    type="dateTime" minOccurs="0"/>
```

```
      <element name="exDate"    type="dateTime"/>
      <element name="trDate"    type="dateTime" minOccurs="0"/>
    </sequence>
  </complexType>

<!--
<renew> response elements.
-->
  <complexType name="renDataType">
    <sequence>
      <element name="iname"    type="xriCommon:inameType"/>
      <element name="exDate"   type="dateTime"/>
    </sequence>
  </complexType>

<!--
<transfer> response elements.
-->
  <complexType name="trnDataType">
    <sequence>
      <element name="iname"    type="xriCommon:inameType"/>
      <element name="source"   type="xriCommon:authIdType"/>
      <element name="target"   type="xriCommon:authIdType"/>
      <element name="trToken"  type="xriCommon:trTokenType"
       minOccurs="0"/>
      <element name="trStatus" type="eppcom:trStatusType"/>
      <element name="reID"     type="eppcom:clIDType"/>
      <element name="reDate"   type="dateTime"/>
      <element name="acID"     type="eppcom:clIDType"/>
      <element name="acDate"   type="dateTime"/>
      <element name="exDate"   type="dateTime"
       minOccurs="0"/>
    </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="xriINA:statusValueType"
         use="required"/>
        <attribute name="lang" type="language"
         default="en"/>
      </extension>
    </simpleContent>
  </complexType>

  <simpleType name="statusValueType">
    <restriction base="token">
      <enumeration value="clientDeleteProhibited"/>
      <enumeration value="clientHold"/>
      <enumeration value="clientRenewProhibited"/>
      <enumeration value="clientTransferProhibited"/>
      <enumeration value="clientUpdateProhibited"/>
```

```xml
        <enumeration value="ok"/>
        <enumeration value="pendingCreate"/>
        <enumeration value="pendingDelete"/>
        <enumeration value="pendingUpdate"/>
        <enumeration value="pendingTransfer"/>
        <enumeration value="serverDeleteProhibited"/>
        <enumeration value="serverHold"/>
        <enumeration value="serverRenewProhibited"/>
        <enumeration value="serverTransferProhibited"/>
        <enumeration value="serverUpdateProhibited"/>
      </restriction>
    </simpleType>

<!--
Pending action notification response elements.
-->
    <complexType name="panDataType">
      <sequence>
        <element name="iname" type="xriINA:paIdType"/>
        <element name="paTRID"  type="epp:trIDType"/>
        <element name="paDate"  type="dateTime"/>
      </sequence>
    </complexType>

    <complexType name="paIdType">
      <simpleContent>
        <extension base="xriCommon:inameType">
          <attribute name="paResult" type="boolean"
           use="required"/>
        </extension>
      </simpleContent>
    </complexType>

<!--
Auth Info type.
-->
    <complexType name="authInfoType">
      <choice>
        <element name="pw"  type="eppcom:pwAuthInfoType"/>
        <element name="ext" type="eppcom:extAuthInfoType"/>
      </choice>
    </complexType>

<!--
Period type.
-->
    <complexType name="periodType">
      <simpleContent>
        <extension base="xriCommon:pLimitType">
          <attribute name="unit" type="xriCommon:pUnitType"
           use="required"/>
        </extension>
      </simpleContent>
    </complexType>

<!--
End of schema.
```

```
-->
</schema>
END
```

5. Internationalization Considerations

At the time of this writing, the work on conformance requirements, policies
and standards for internationalized i-names is still in progress. A server
MAY restrict allowable character sets for i-names. Additionally, a server
MAY restrict allowable i-names to a particular top level i-names, secondary
level community i-names, or other level i-names for which the server is
authoritative.

Otherwise, this memo introduces no international considerations beyond those
introduced in [RFC 3730].

6. IANA Considerations

This document uses URNs to describe XML namespaces and XML schemas
conforming to a registry mechanism described in [RFC 3688]. If the ISEG
approves this memo for publication, then two URI assignments will be
requested.

Registration request for the EPP XRI i-name namespace:

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

Registrant Contact: See the "Authors' Addresses" section of this
document.

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

Registration request for the EPP XRI i-name XML schema:

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

Registrant Contact: See the "Authors' Addresses" section of this
document.

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

7. Security Considerations

The mapping extensions described in this document do not provide any
security services beyond those described by EPP [RFC 3730]. Security
considerations related to XRI and XDI are described in [XRI] and [XDI].

As with other EPP object transforms, the EPP transform operations described
in this document MUST be restricted to the sponsoring client as
authenticated using the mechanisms described in sections 2.9.1.1 and 7 of
[RFC 3730]. Any attempt to perform a transform operation on an XRI i-name
by any client other than the sponsoring client MUST be rejected with an
appropriate EPP authorization error. Please consult [RFC 3730] for a
discussion of EPP-specific security issues.

Special consideration MUST be given in handling unsolicited transfer
requests for XRI i-names, as submission of those requests do not require
authorization information. Excessive number of unsolicited transfer
requests could result in performance issues to the server by generating
large amount of notification messages.

Additionally, special consideration SHOULD be given to EPP transfer
operations on XRI i-name objects. Transfer tokens MAY be used for enhancing
security of transfer operations, preventing passive or accidental approvals,
and enabling clients involved to be cooperative in facilitating transfer
operations.

8. Acknowledgements

TBD

9. References

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[XDI] OASIS XRI Data Interchange (XDI) <http://www.oasis-
    open.org/committees/xdi>

[XRI] OASIS Extensible Resource Identifier (XRI) <http://www.oasis-
    open.org/committees/xri>

10.   Appendix A - Authors' Addresses

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Acknowledgement