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Extensible Provisioning Protocol XRI I-Service Mapping
<epp-xri-isv-03.pdf>

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Abstract

This document describes an Extensible Provisioning Protocol (EPP) mapping
for the provisioning and management of XRI i-service objects, 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-
service 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:xriISV-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/xriISV-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-service 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-service objects are not covered by this document.

2. Object Attributes

An EPP XRI i-service 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-Service Identifiers

All EPP XRI i-service objects are uniquely identified by an identifier which MUST be server unique, or globally unique, subject to local server policies. XRI i-service identifiers are character strings with a specified minimum length, a specified maximum length, and a specified format. In EPP XML messages, XRI i-service identifiers use the "iServiceIdType" syntax described in [EPP AU].

2.2 XRI I-Service Types

All EPP XRI i-service objects MUST be associated with an i-service

type, which is a character string supplied by the EPP client when the object is created, for identifying the i-service to be subscribed. An XRI i-service type is an XRI identifier with a specified minimum length, a specified maximum length, and a specified format. XRI i- service types use the "xriType" type syntax described in [EPP AU].

2.3 XRI I-Service URIs

All EPP XRI i-service objects MAY be associated with zero or more concrete URIs, which MAY have "http://" and "https://" as transport, for identifying various access endpoints of XRI i-services subscribed.

2.4 XRI Authority 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].

2.5 Client Identifiers

All EPP clients are identified by a server-unique identifier. Client 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].

2.6 Status Values

An XRI i-service object MUST always have at least one associated   status value. Status values can be set only by the client that   sponsors an XRI i-service object and by the server on which the object resides. A client can change the status of an XRI i-service 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" or "terminated" status, subject to local server policies.

- 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 one exception, transform commands MUST be rejected when a
  pendingCreate, pendingDelete, pendingRenew, pendingTransfer, or
  pendingUpdate status is set. The 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.

  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.

- "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.

Other status combinations not expressly prohibited MAY be used.

2.7 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.

2.7 Validity Periods

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

3. EPP Command Mapping

A detailed description of the EPP syntax and semantics can be found
in [RFC 3730]. The command mappings described here are specifically
for use in provisioning and managing XRI i-service objects via EPP.

3.1 EPP Query Commands

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

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 <xriISV:check> element that identifies the XRI i-
service namespace and the location of the XRI i-service schema. The
<xriISV:check> element contains the following child elements:

* One or more <xriISV:id> elements that contain the identifiers of
  the XRI i-service 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:      <xriISV:check
C:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
C:       xriISV-1.0.xsd">
C:        <xriISV:id>CONTACT-SERVICE-1</xriISV:id>
C:        <xriISV:id>SINGLE-SIGN-ON-SERVICE-2</xriISV:id>
C:        <xriISV:id>REPUTATION-SERVICE-3</xriISV:id>
C:        <xriISV:id>EMAIL-SERVICE-4</xriISV:id>
C:      </xriISV:check>
C:    </check>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

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

- An <xriISV:id> element that contains the identifier of the queried XRI
  i-service 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 <xriISV: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:      <xriISV:chkData
S:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
S:       xriISV-1.0.xsd">
S:        <xriISV:cd>
S:          <xriISV:id avail="0">
S:            CONTACT-SERVICE-1</xriISV:id>
S:          <xriISV:reason>Reserved</xriISV:reason>
S:        </xriISV:cd>
S:        <xriISV:cd>
S:          <xriISV:id avail="1">
S:            SINGLE-SIGN-ON-SERVICE-2</xriISV:id>
S:        </xriISV:cd>
S:        <xriISV:cd>
S:          <xriISV:id avail="0">
S:            REPUTATION-SERVICE-3</xriISV:id>
S:          <xriISV:reason>Not authorized</xriISV:reason>
S:        </xriISV:cd>
S:        <xriISV:cd>
S:          <xriISV:id avail="0">
S:            EMAIL-SERVICE-4</xriISV:id>
S:        </xriISV:cd>
S:      </xriISV: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-service object. In addition to the standard EPP command elements, the
<info> command MUST contain an <xriISV:info> element that identifies the XRI
i-service namespace and the location of the XRI i-service schema. The
<xriISV:info> element contains the following child elements:

   • An <xriISV:id> element that contains the identifier of the XRI i-
     service 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:        <xriISV:info
C:         xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
C:         xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
C:         xriISV-1.0.xsd">
C:          <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
C:        </xriISV: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 <xriISV:infData> element that identifies the
XRI i-service namespace and the location of the XRI i-service schema. The
<xriISV:infData> element contains the following child elements:

- An <xriISV:id> element that contains the i-service that is used as the
  identifier of the XRI i-service object.

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

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

- An <xriISV:type> element that contains the identifier of the service
  type subscribed by the XRI i-service object.

- Zero or more <xriISV:uri> elements that specify the designated URIs
  for identifying various access endpoints of XRI i-services subscribed.

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

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

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

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

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

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

- An <xriISV:exDate> element that contains the date and time dentifying
  the end of the XRI i-service object's registration period.

- An OPTIONAL <xriISV:trDate> element that contains the date and time of the most recent successful XRI i-service object transfer. This element MUST NOT be provided if the XRI i-service object has never been transferred. Note that XRI i-service objects MUST NOT be transferred directly; XRI i-service objects MUST be transferred implicitly when the XRI i-service object's superordinate XRI authority object is transferred. XRI i-service objects that are 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:      <xriISV:infData
S:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
S:       xriISV-1.0.xsd">
S:        <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
S:        <xriISV:roid>ISV_1002-NEUSTAR</xriISV:roid>
S:        <xriISV:status s="clientDeleteProhibited"/>
S:        <xriISV:status s="clientUpdateProhibited"/>
S:
<xriISV:type>xri://$resolution*local/(+isso)*($v/1.0)</xriISV:type>
S:        <xriISV:uri>https://isso.2idi.com/=foo.bar</xriISV:uri>
S:        <xriISV:uri>http://isso.2idi.com/=foo.bar</xriISV:uri>
S:        <xriISV:authId>AUTHORITY</xriISV:authId>
S:        <xriISV:clID>ClientY</xriISV:clID>
S:        <xriISV:crID>ClientX</xriISV:crID>
S:        <xriISV:crDate>2005-05-03T22:00:00.0Z</xriISV:crDate>
S:        <xriISV:upID>ClientX</xriISV:upID>
S:        <xriISV:upDate>2005-05-05T09:00:00.0Z</xriISV:upDate>
S:        <xriISV:exDate>2006-05-03T22:00:00.0Z</xriISV:exDate>
S:        <xriISV:trDate>2005-05-04T09:00:00.0Z</xriISV:trDate>
S:      </xriISV: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

Transfer semantics do not directly apply to XRI i-service objects, so there is no mapping defined for the EPP <transfer> query command.

3.2 EPP Transform Commands

EPP provides four commands to transform XRI i-service objects: <create> to create an instance of an XRI i-service object, <delete> to delete an instance of an XRI i-service object, <renew> to extend the validity period of an XRI i-service object, and <update> to change information associated with an XRI i-service object. This document does not define an XRI i-service object mapping for the EPP <transfer> command.

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

- A REQUIRED <xriISV:id> element that specifies the identifier of the XRI i-service object to be created in the repository.

- A REQUIRED <xriISV:type> element that contains the identifier of the service type subscribed by the XRI i-service object.

- A REQUIRED <xriISV: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-service object. It contains the following child elements:

    o A REQUIRED <xriISV:authId> element that specifies the dentifier of the XRI authority object.

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

Example <create> command for XRI i-services supplied by the client:

```
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:      <xriISV:create
C:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
C:       xriISV-1.0.xsd">
C:        <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
C:
<xriISV:type>xri://$resolution*local/(+isso)*($v/1.0)</xriISV:type>
C:        <xriISV:authority>
C:          <xriISV:authId>AUTHORITY</xriISV:authId>
C:          <xriISV:authInfo>
C:            <xriISV:pw>2fooBAR</xriISV:pw>
C:          </xriISV:authInfo>
C:        </xriISV:authority>
C:        <xriISV:period unit="y">2</xriISV:period>
C:      </xriISV: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 <xriISV:creData> element that
identifies the XRI i-service namespace and the location of the XRI i-service
schema. The <xriISV:creData> element contains the following child elements:

- An <xriISV:id> element that contains the identifier of the XRI i-
  service object created.

- An <xriISV:type> element that contains the identifier of the service
  type subscribed by the XRI i-service object.

- Zero or more <xriISV:uri> elements that specify the designated URIs
  for identifying various access endpoints of XRI i-services subscribed.

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

- An <xriISV:exDate> element that contains the date and time identifying
  the end of the XRI i-service 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:      <xriISV:creData
S:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
S:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
S:       xriISV-1.0.xsd">
S:        <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
S:
<xriISV:type>xri://$resolution*local/(+isso)*($v/1.0)</xriISV:type>
S:        <xriISV:uri>https://isso.2idi.com/=foo.bar</xriISV:uri>
S:        <xriISV:uri>http://isso.2idi.com/=foo.bar</xriISV:uri>
S:        <xriISV:crDate>2005-05-02T22:00:00.0Z</xriISV:crDate>
S:        <xriISV:exDate>2007-05-02T22:00:00.0Z</xriISV:exDate>
S:      </xriISV: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 delete an XRI i-service object. In addition to the standard EPP
command elements, the <delete> command MUST contain an <xriISV:delete>
element that identifies the XRI i-service namespace and the location of the
XRI i-service schema. The <xriISV:delete> element contains the following
child elements:

- An <xriISV:id> element that contains the identifier of the XRI i-
  service 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:      <xriISV:delete
C:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
C:       xriISV-1.0.xsd">
C:        <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
C:      </xriISV: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-service object. In
addition to the standard EPP command elements, the <renew> command MUST
contain an <xriISV:renew> element that identifies the XRI i- service
namespace and the location of the XRI i-service schema. The <xriISV:renew>
element contains the following child elements:

- An <xriISV:id> element that contains the identifier of the XRI i-
  service object whose validity period is to be extended.

- An <xriISV: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 <xriISV:period> element that contains the number of units to be added to the registration period of the XRI i-service 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:      <xriISV:renew
C:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
C:       xriISV-1.0.xsd">
C:        <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
C:        <xriISV:curExpDate>2006-05-03</xriISV:curExpDate>
C:        <xriISV:period unit="y">5</xriISV:period>
C:      </xriISV: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 <xriISV:renData> element that identifies the XRI i-service namespace and the location of the XRI i-service schema. The <xriISV:renData> element contains the following child elements:

- An <xriISV:id> element that contains the identifier of the XRI i-service object whose validity period has been extended.

- An <xriISV:exDate> element that contains the date and time identifying the end of the XRI i-service object's registrationperiod.

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:       <xriISV:renData
```

```
S:          xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
S:          xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
S:          xriISV-1.0.xsd">
S:           <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
S:           <xriISV:exDate>2011-05-03T22:00:00.0Z</xriISV:exDate>
S:         </xriISV: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 do not directly apply to XRI i-service objects, so
there is no mapping defined for the EPP <transfer> command. XRI i-service
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.

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

  - An <xriISV:id> element that contains the i-service that is used as the
    identifier of the XRI i-service object to be updated.

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

  - An OPTIONAL <xriISV:rem> element that contains attribute values to be
    removed from the object.

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

  - One or more <xriISV: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:      <xriISV:update
C:       xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-1.0"
C:       xsi:schemaLocation="urn:ietf:params:xml:ns:xriISV-1.0
C:       xriISV-1.0.xsd">
C:        <xriISV:id>SINGLE-SIGN-ON-SERVICE-1</xriISV:id>
C:        <xriISV:add>
C:          <xriISV:status s="clientUpdateProhibited" lang="en">
C:          </xriISV:status>
C:        </xriISV:add>
C:        <xriISV:rem>
C:          <xriISV:status s="clientHold"/>
C:          <xriISV:status s="clientRenewProhibited"/>
C:        </xriISV:rem>
C:      </xriISV: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:xriISV-1.0"
        xmlns:xriISV="urn:ietf:params:xml:ns:xriISV-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-Service provisioning.
    </documentation>
  </annotation>

<!--
Child elements found in EPP commands.
-->
  <element name="check"  type="xriISV:mIdType"/>
  <element name="create" type="xriISV:createType"/>
  <element name="delete" type="xriISV:sIdType"/>
  <element name="info"   type="xriISV:infoType"/>
  <element name="renew"  type="xriISV:renewType"/>
  <element name="update" type="xriISV:updateType"/>

<!--
Child element of commands that require a single i-service identifier
-->
  <complexType name="sIdType">
    <sequence>
      <element name="id"  type="xriCommon:iServiceIdType"/>
    </sequence>
  </complexType>
```

```
<!--
Child element of commands that accept multiple i-service identifiers
-->
  <complexType name="mIdType">
    <sequence>
      <element name="id" type="xriCommon:iServiceIdType"
       maxOccurs="unbounded"/>
    </sequence>
  </complexType>

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

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

<!--
Child elements of the <info> command.
-->
  <complexType name="infoType">
    <sequence>
      <element name="id"        type="xriCommon:iServiceIdType"/>
    </sequence>
  </complexType>

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

<!--
Child elements of the <update> command.
-->
  <complexType name="updateType">
    <sequence>
      <element name="id"        type="xriCommon:iServiceIdType"/>
      <element name="add"       type="xriISV:addRemType" minOccurs="0"/>
```

```xml
          <element name="rem"         type="xriISV:addRemType" minOccurs="0"/>
      </sequence>
    </complexType>

<!--
Data elements that can be added or removed.
-->
    <complexType name="addRemType">
      <sequence>
        <element name="status" type="xriISV:statusType" maxOccurs="8"/>
      </sequence>
    </complexType>

<!--
Child response elements.
-->
    <element name="chkData" type="xriISV:chkDataType"/>
    <element name="creData" type="xriISV:creDataType"/>
    <element name="infData" type="xriISV:infDataType"/>
    <element name="panData" type="xriISV:panDataType"/>
    <element name="renData" type="xriISV:renDataType"/>

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

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

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

<!--
<create> response elements.
-->
    <complexType name="creDataType">
      <sequence>
        <element name="id"      type="xriCommon:iServiceIdType"/>
        <element name="type"    type="xriCommon:xriType"/>
        <element name="uri"     type="anyURI"
```

```
                             minOccurs="0" maxOccurs="unbounded"/>
        <element name="crDate"   type="dateTime"/>
        <element name="exDate"   type="dateTime"/>
      </sequence>
    </complexType>

<!--
<info> response elements.
-->
    <complexType name="infDataType">
      <sequence>
        <element name="id"       type="xriCommon:iServiceIdType"/>
        <element name="roid"     type="eppcom:roidType"/>
        <element name="status"   type="xriISV:statusType" maxOccurs="10"/>
        <element name="type"     type="xriCommon:xriType"/>
        <element name="uri"      type="anyURI"
                        minOccurs="0" maxOccurs="unbounded"/>
        <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="id"       type="xriCommon:iServiceIdType"/>
        <element name="exDate"   type="dateTime"/>
      </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="xriISV:statusValueType"
           use="required"/>
          <attribute name="lang" type="language"
           default="en"/>
        </extension>
      </simpleContent>
    </complexType>

    <simpleType name="statusValueType">
      <restriction base="token">
        <enumeration value="clientDeleteProhibited"/>
```

```xml
        <enumeration value="clientHold"/>
        <enumeration value="clientRenewProhibited"/>
        <enumeration value="clientUpdateProhibited"/>
        <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="serverUpdateProhibited"/>
      </restriction>
    </simpleType>
<!--
Pending action notification response elements.
-->
    <complexType name="panDataType">
      <sequence>
        <element name="id"      type="xriISV:paIdType"/>
        <element name="paTRID"  type="epp:trIDType"/>
        <element name="paDate"  type="dateTime"/>
      </sequence>
    </complexType>

    <complexType name="paIdType">
      <simpleContent>
        <extension base="xriCommon:iServiceIdType">
          <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

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-number namespace:

     URI: urn:ietf:params:xml:ns:xriISV-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-number XML schema:

   URI: urn:ietf:params:xml:schema:xriISV-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-
service 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.

8. Acknowledgements

TBD

9. References

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[RFC 3339] Klyne, G. and C. Newman, "Date and Time on the Internet: Timestamps", RFC 3339, July 2002.

[RFC 3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, January 2004.

[RFC 3730] Hollenbeck, S., "Extensible Provisioning Protocol (EPP)", RFC 3730, March 2004.

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[XML SCHEMA] Thompson, H., Beech, D., Maloney, M., and N. Mendelsohn, "XML Schema Part 1: Structures", W3C Recommendation <http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/>, October 2004.

[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>

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