        A Domain Availability Check (DCHK) Registry Type for
          the Internet Registry Information Service (IRIS)

Status of This Memo

   This document specifies an Internet standards track protocol for the
   Internet community, and requests discussion and suggestions for
   improvements. Please refer to the current edition of the "Internet
   Official Protocol Standards" (STD 1) for the standardization state
   and status of this protocol. Distribution of this memo is unlimited.

Abstract

   This document describes a lightweight domain availability service
   using the Internet Registry Information Service (IRIS) framework and
   the data model of the IRIS Domain Registry (DREG) service.

Table of Contents

1. Introduction

   This document describes a lightweight service for checking the
   availability of domain names. This service is based on the IRIS
   framework and uses the data model defined by RFC 3982 [7]. By doing
   this, the domain availability service has the advantages provided by
   IRIS and DREG, such as well-known methods for server navigation,
   structured queries and results, and layered extensibility.

   The use of IRIS for this service also allows seamless integration
   between the domain availability service and the service provided by
   DREG. This allows a user to find the availability status of a domain
   and reference the full registration information in DREG.

   The data model in this service (called a registry schema in IRIS
   terms) is a strict subset of the DREG data model. This enables
   implementors to directly reuse DREG code paths and allows operators
   to deploy the service in either the same server processes as a DREG
   service (same host and port) or in a different server process
   (different port) or machine (different host).

   As an example, an operator may wish to deploy both types of service
   on the same set of machines. As time goes on, the operator may then
   decide to segregate the services, placing the domain availability
   service on one set of machines and the DREG service on a separate set
   of machines with a stricter set of controls. Either deployment
   scenario is transparent to the end user and always appears to be
   seamlessly complementary.

   When coupled with [9], this domain availability service is
   lightweight and extremely efficient for high-volume, public-facing
   service.

2. Document Terminology

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted as described in RFC 2119 [2].

3. Domain Availability Check Registry

   The data model used for the domain availability check (DCHK) service
   is a strict subset of the DREG data model. This section describes
   the DCHK registry type.

3.1. Schema Description

   References to XML elements with no namespace qualifier are from the
   schema defined in Section 3.2. References to elements and attributes
   with the "iris" XML namespace qualifier are from the schema defined
   in IRIS [6].

   The schema present in this document is tied to the protocol version
   associated with the XML namespace URI defined in Section 5.2.
   Extensions to the present DCHK schema are allowed, though not
   recommended, but would require a new version. Please refer to RFC
   3981 [6] for more details about versioning the IRIS protocol.

   The descriptions contained within this section refer to XML elements
   and attributes and their relation to the exchange of data within the
   protocol. These descriptions also contain specifications outside the
   scope of the formal XML syntax. Therefore, this section will use
   terms defined by RFC 2119 [2] to describe the specification outside
   the scope of the formal XML syntax. While reading this section,
   please reference Section 3.2 for needed details on the formal XML
   syntax.

3.1.1. The <domain> Result

   An example of a <domain> result:

   <domain
     authority="iana.org" registryType="dchk1"
     entityClass="domain-name" entityName="example.com">
     <domainName>example.com</domainName>
     <status><active/></status>
   </domain>

                         <domain> Example

   The <domain> result represents an instance of a domain assignment.
   The children of the <domain> element are as follows:

   o <domainName> - the full name of the domain as it is in DNS. The
      contents of this element MUST be a domain name as specified by RFC
      1035 [1].

   o <idn> - the name of the domain in nameprep form, if applicable.
      See RFC 3491 [3].

   o <status> - this element may contain child elements representing
      domain status information. It defines the following status types:

* <active> - available via DNS (either via delegation or direct
  publication).

* <inactive> - unavailable via DNS.

* <dispute> - registrant assignment is in dispute.

* <addPeriod> - the domain is in the grace period after creation
  or activation (see RFC 3915 [5]).

* <renewPeriod> - the domain is in the grace period after renewal
  (see RFC 3915 [5]).

* <autoRenewPeriod> - the domain is in the grace period after
  automatic renewal (see RFC 3915 [5]).

* <transferPeriod> - the domain is in the grace period after
  transfer (see RFC 3915 [5]).

* <redemptionPeriod> - the domain is in the grace period after
  deletion (see RFC 3915 [5]).

* <policyCompliant> - the domain is considered compliant
  according to a given policy specified by the substatus
  identifier.

* <policyNoncompliant> - the domain is not considered compliant
  according to a given policy specified by the substatus
  identifier.

* <reserved> - the domain is reserved and is not available for
  registration under normal registration procedures.

* <create> - specifies the creation of the domain in the
  registration system. This status is usually further refined by
  the disposition attribute.

* <delete> - specifies the deletion of the domain in the
  registration system. This status is usually further refined by
  the disposition attribute.

* <renew> - specifies the renewal of domain registration. This
  status is usually further refined by the disposition attribute.

* <restore> - specifies the restoration to the previous state of
  the domain before it was deleted. This status is usually
  further refined by the disposition attribute.

          * <transfer> - specifies the transfer of the domain from one
            responsible or owning entity in the registration system to
            another. This status is usually further refined by the
            disposition attribute.

          * <update> - specifies a general modification of the domain
            information. This status is usually be further refined by the
            disposition attribute.

          * <other> - specifies a registration system specific status of
            the domain.

     o <registrationReference> - an element containing an entity
       reference, the referent of which MUST be either a <domain>
       (Section 3.1.1) or a <domain> as defined by RFC 3982 [7]. The
       intent of this element is to point to the downstream registration
       reference. Therefore, if this is a result given back by a domain
       registry, it should point to the domain in the domain registrar or
       registrant service.

     o <createdDateTime> - an element containing the date and time of the
       creation of this domain.

     o <initialDelegationDateTime> - an element containing the date and
       time of the initial delegation of this domain.

     o <expirationDateTime> - an element containing the date and time of
       the expiration of this domain.

     o <lastDatabaseUpdateDateTime> - an element containing the date and
       time of the last actualization of the database that is the source
       for this result.

     o <iris:seeAlso> - an element containing an entity reference
       specifying a referent that is indirectly associated with this
       domain.

3.1.1.1. Domain Status Type

   Each element of type 'domainStatusType' has the following
   composition:

     o <appliedDate> - an optional child element containing the date
       applicable to creation of the status.

     o <ticket> - an optional child element containing a service ticket
       identifier relevant to the status.

   o <description> - zero or more child elements with text to describe
      the status in natural language. Each of these elements MUST have
      a 'language' attribute describing the language of the description
      element.

   o <subStatus> - a child element indicating further status
      information. Values for this element are not defined by this
      specification. This child element has a required 'authority'
      attribute to indicate the origin of the specification of the value
      of this element.

   o 'actor' - an optional attribute indicating the acting entity for
      which this status is applied. The values may be "registry",
      "registrar", or "registrationServiceProvider".

   o 'disposition' - an optional attribute indicating the nature of
      this status. The values may be "pending" or "prohibited".

   o 'scope' - an optional attribute indicating the context or origin
      of the status value.

3.1.2. Support for <iris:lookupEntity>

   The following types of entity classes are recognized by the
   <lookupEntity> query of IRIS for this registry:

   o domain-name - the fully qualified name of a domain. This is a
      domain name as specified by RFC 1035 [1]. Yields a <domain>
      (Section 3.1.1) in the response.

   o idn - the fully qualified name of a domain in nameprep form (see
      RFC 3491 [3]). Yields a <domain> (Section 3.1.1) in the response.

3.2. DCHK Formal XML Syntax

   This registry schema is specified in the XML Schema notation (see
   [10] and [11]). The formal syntax presented here is a complete
   schema representation of an XML instance when combined with the
   formal schema syntax of IRIS.

   <?xml version="1.0"?>
   <schema xmlns="http://www.w3.org/2001/XMLSchema"
     xmlns:dchk="urn:ietf:params:xml:ns:dchk1"
     xmlns:iris="urn:ietf:params:xml:ns:iris1"
     targetNamespace="urn:ietf:params:xml:ns:dchk1"
     elementFormDefault="qualified" >

```
     <import namespace="urn:ietf:params:xml:ns:iris1" />

     <annotation>
       <documentation>
         Domain availability check schema
         derived from IRIS schema
       </documentation>
     </annotation>

     <!-- ====================================== -->
     <!--                                        -->
     <!-- Result Types                           -->
     <!--                                        -->
     <!-- ====================================== -->

     <!--                                        -->
     <!-- Domain                                 -->
     <!--                                        -->

     <complexType
       name="domainType">
       <complexContent>
         <extension
           base="iris:resultType">
           <sequence>
             <element
               name="domainName"
               type="token" />
             <element
               name="idn"
               type="token"
               minOccurs="0"
               maxOccurs="1" />
             <element name="status"
               minOccurs="0"
               maxOccurs="1">
               <complexType>
                 <choice minOccurs="0" maxOccurs="unbounded">
                   <element
                     name="active"
                     type="dchk:domainStatusType" />
                   <element
                     name="inactive"
                     type="dchk:domainStatusType" />
                   <element
                     name="dispute"
                     type="dchk:domainStatusType" />
                   <element
```

```
                    name="renew"
                    type="dchk:domainStatusType" />
                  <element
                    name="addPeriod"
                    type="dchk:domainStatusType" />
                  <element
                    name="renewPeriod"
                    type="dchk:domainStatusType" />
                  <element
                    name="autoRenewPeriod"
                    type="dchk:domainStatusType" />
                  <element
                    name="transferPeriod"
                    type="dchk:domainStatusType" />
                  <element
                    name="redemptionPeriod"
                    type="dchk:domainStatusType" />
                  <element
                    name="restore"
                    type="dchk:domainStatusType" />
                  <element
                    name="policyCompliant"
                    type="dchk:domainStatusType" />
                  <element
                    name="policyNoncompliant"
                    type="dchk:domainStatusType" />
                  <element
                    name="reserved"
                    type="dchk:domainStatusType" />
                  <element
                    name="create"
                    type="dchk:domainStatusType" />
                  <element
                    name="delete"
                    type="dchk:domainStatusType" />
                  <element
                    name="transfer"
                    type="dchk:domainStatusType" />
                  <element
                    name="update"
                    type="dchk:domainStatusType" />
                  <element
                    name="other"
                    type="dchk:domainStatusType" />
                </choice>
              </complexType>
            </element>
            <element
```

```
                 name="registrationReference"
                 type="iris:entityType"
                 minOccurs="0"
                 maxOccurs="1" />
             <element
               name="createdDateTime"
               type="dateTime"
               minOccurs="0"
               maxOccurs="1" />
             <element
               name="initialDelegationDateTime"
               type="dateTime"
               minOccurs="0"
               maxOccurs="1" />
             <element
               name="expirationDateTime"
               type="dateTime"
               minOccurs="0"
               maxOccurs="1" />
             <element
               name="lastDatabaseUpdateDateTime"
               type="dateTime"
               minOccurs="0"
               maxOccurs="1" />
             <element
               ref="iris:seeAlso"
               minOccurs="0"
               maxOccurs="unbounded" />
           </sequence>
         </extension>
       </complexContent>
     </complexType>

     <element
       name="domain"
       type="dchk:domainType"
       substitutionGroup="iris:result" />

     <complexType
       name="domainStatusType">
       <sequence>
         <element
           name="appliedDate"
           type="dateTime"
           minOccurs="0"
           maxOccurs="1" />
         <element
           name="ticket"
```

```
                      type="token"
                      minOccurs="0"
                      maxOccurs="unbounded" />
                  <element
                    name="description"
                    minOccurs="0"
                    maxOccurs="unbounded">
                    <complexType>
                      <simpleContent>
                        <extension
                          base="string">
                          <attribute
                            name="language"
                            type="language"
                            use="required" />
                        </extension>
                      </simpleContent>
                    </complexType>
                  </element>
                  <element
                    name="subStatus"
                    minOccurs="0"
                    maxOccurs="1">
                    <complexType>
                      <simpleContent>
                        <extension
                          base="token">
                          <attribute
                            type="token"
                            use="required"
                            name="authority"/>
                        </extension>
                      </simpleContent>
                    </complexType>
                  </element>
                </sequence>
                <attribute
                  name="actor">
                  <simpleType>
                    <restriction
                      base="string">
                      <enumeration
                        value="registry"/>
                      <enumeration
                        value="registrar"/>
                      <enumeration
                        value="registrationServiceProvider"/>
                    </restriction>
```

```
              </simpleType>
          </attribute>
          <attribute
            name="disposition">
            <simpleType>
              <restriction
                base="string">
                <enumeration
                  value="prohibited"/>
                <enumeration
                  value="pending"/>
              </restriction>
            </simpleType>
          </attribute>
          <attribute
            name="scope"
            type="token" />
      </complexType>
    </schema>
```

                         Figure 1: dchk.xsd

3.3. Blocks Extensible Exchange Protocol (BEEP) Transport Compliance

   All DCHK clients and servers MUST implement the Lightweight UDP
   Transport Protocol (IRIS-LWZ) [9]. The use of other transports like
   the XML Pipelining with Chunks (IRIS-XPC) transport [12] or the BEEP
   transport [8] is optional and completely at the discretion of the
   server operator. The XPC transport is in any case preferable to the
   BEEP transport.

   IRIS allows several extensions of the core capabilities. This
   section outlines those extensions allowable by IRIS-BEEP [8].

3.3.1. Message Pattern

   This registry type uses the default message pattern as described in
   IRIS-BEEP [8].

3.3.2. Server Authentication

   This registry type uses the default server authentication method as
   described in IRIS-BEEP [8].

3.4. URI Resolution

3.4.1. Application Service Label

   The application service label associated with this registry type MUST
   be "DCHK1". This is the abbreviated form of the URN for this
   registry type, urn:ietf:params:xml:ns:dchk1.

3.4.2. Bottom-Up Resolution

   The bottom-up alternative resolution method MUST be identified as
   'bottom' in IRIS URI's. Its process is identical to the 'bottom'
   process described by RFC 3982 [7].

3.4.3. Top-Down Resolution

   The top-down alternative resolution method MUST be identified as
   'top' in IRIS URI's. Its process is identical to the 'top' process
   described by RFC 3982 [7].

4. Internationalization Considerations

   Implementors should be aware of considerations for
   internationalization in IRIS [6].

   Clients needing to localize the data tags in this protocol should
   take note that localization is only needed on the names of XML
   elements and attributes, with the exception of elements containing
   date and time information. The schema for this registry has been
   designed so that clients need not interpret the content of elements
   or attributes for localization, other than those elements containing
   date and time information.

   Clients should also make use of the <language> elements provided in
   many of the results. Results containing internationalized data can
   be accompanied by these elements in order to aid better localization
   of the data by the user.

   All date and time elements make use of the XML Schema [10] data type
   "dateTime". If their contents are Coordinated Universal Time (UTC)
   timestamps, they MUST be specified by using the capitalized 'Z'
   indicator (instead of 'z').

5. IANA Considerations

5.1. XML Namespace Registration

   This document makes use of the XML registry specified in RFC 3688
   [4]. Accordingly, IANA has made the following registration:

   o XML Namespace URN/URI:

      * urn:ietf:params:xml:ns:dchk1

   o Contact:

      * Andrew Newton <andy@hxr.us>

      * Marcos Sanz <sanz@denic.de>

   o XML:

      * None.

5.2. XML Schema Registration

   This document makes use of the XML registry specified in RFC 3688
   [4]. Accordingly, IANA has made the following registration:

   o XML Schema URN/URI:

      * urn:ietf:params:xml:schema:dchk1

   o Contact:

      * Andrew Newton <andy@hxr.us>

      * Marcos Sanz <sanz@denic.de>

   o XML:

      * The XML Schema specified in Section 3.2

5.3. S-NAPTR Registration

   The following Sraightforwarad-NAPTR (S-NAPTR) application service
   label has been registered with IANA according to the IANA
   considerations defined in IRIS [6]:

      DCHK1

5.4. BEEP Registration

   The following BEEP Profile URI has been registered with IANA, in
   addition to the registration provided in IRIS-BEEP [8].

      http://iana.org/beep/iris1/dchk1

6. Security Considerations

   Being a proper subset of RFC 3982 [7], the registry described in this
   document introduces no security considerations beyond those
   documented in RFC 3981 [6].

7. References

7.1. Normative References

   [1]   Mockapetris, P., "Domain names - implementation and
          specification", STD 13, RFC 1035, November 1987.

   [2]   Bradner, S., "Key words for use in RFCs to Indicate Requirement
          Levels", BCP 14, RFC 2119, March 1997.

   [3]   Hoffman, P. and M. Blanchet, "Nameprep: A Stringprep Profile
          for Internationalized Domain Names (IDN)", RFC 3491,
          March 2003.

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

   [5]   Hollenbeck, S., "Domain Registry Grace Period Mapping for the
          Extensible Provisioning Protocol (EPP)", RFC 3915,
          September 2004.

   [6]   Newton, A. and M. Sanz, "IRIS: The Internet Registry
          Information Service (IRIS) Core Protocol", RFC 3981,
          January 2005.

   [7]   Newton, A. and M. Sanz, "IRIS: A Domain Registry (dreg) Type
          for the Internet Registry Information Service (IRIS)",
          RFC 3982, January 2005.

   [8]   Newton, A. and M. Sanz, "Using the Internet Registry
          Information Service (IRIS) over the Blocks Extensible Exchange
          Protocol (BEEP)", RFC 3983, January 2005.

   [9]   Newton, A., "A Lightweight UDP Transfer Protocol for the
          Internet Registry Information Service", RFC 4993, August 2007.

   [10] World Wide Web Consortium, "XML Schema Part 2: Datatypes",
         W3C XML Schema, October 2004,
         <http://www.w3.org/TR/xmlschema-2/>.

   [11] World Wide Web Consortium, "XML Schema Part 1: Structures",
         W3C XML Schema, October 2004,
         <http://www.w3.org/TR/xmlschema-1/>.

7.2. Informative References

   [12] Newton, A., "XML Pipelining with Chunks for the Internet
         Registry Information Service", RFC 4992, August 2007.

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