

Network Working Group  
Request for Comments: 5144  
Category: Standards Track

A. Newton  
American Registry for Internet Numbers  
M. Sanz  
DENIC eG  
February 2008

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 . . . . .	3
2.	Document Terminology . . . . .	3
3.	Domain Availability Check Registry . . . . .	3
3.1.	Schema Description . . . . .	4
3.1.1.	The <domain> Result . . . . .	4
3.1.2.	Support for <iris:lookupEntity> . . . . .	7
3.2.	DCHK Formal XML Syntax . . . . .	7
3.3.	Blocks Extensible Exchange Protocol (BEEP) Transport Compliance . . . . .	12
3.3.1.	Message Pattern . . . . .	12
3.3.2.	Server Authentication . . . . .	12
3.4.	URI Resolution . . . . .	13
3.4.1.	Application Service Label . . . . .	13
3.4.2.	Bottom-Up Resolution . . . . .	13
3.4.3.	Top-Down Resolution . . . . .	13
4.	Internationalization Considerations . . . . .	13
5.	IANA Considerations . . . . .	14
5.1.	XML Namespace Registration . . . . .	14
5.2.	XML Schema Registration . . . . .	14
5.3.	S-NAPTR Registration . . . . .	14
5.4.	BEEP Registration . . . . .	15
6.	Security Considerations . . . . .	15
7.	References . . . . .	15
7.1.	Normative References . . . . .	15
7.2.	Informative References . . . . .	16

## 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>
</element>
```

```
    </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.

## Authors' Addresses

Andrew L. Newton  
American Registry for Internet Numbers  
3635 Concorde Parkway, Suite 200  
Chantilly, VA 20151  
USA

Phone: +1 703 227 9884  
EMail: [andy@arin.net](mailto:andy@arin.net)  
URI: <http://www.arin.net/>

Marcos Sanz  
DENIC eG  
Kaiserstrasse 75-77  
D-60329 Frankfurt  
Germany

EMail: [sanz@denic.de](mailto:sanz@denic.de)  
URI: <http://www.denic.de/>



## Full Copyright Statement

Copyright (C) The IETF Trust (2008).

This document is subject to the rights, licenses and restrictions contained in BCP 78, and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

## Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in BCP 78 and BCP 79.

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at <http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at [ietf-ipr@ietf.org](mailto:ietf-ipr@ietf.org).

