History of records in the Registration Data Access Protocol
draft-ellacott-historical-rdap-00

Abstract

   The Registration Data Access Protocol (RDAP) provides current
   registration information. This document describes an RDAP query and
   response extension that allows retrieving historical registration
   records.

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   provisions of BCP 78 and BCP 79.

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1. Introduction

   The Registration Data Access Protocol (RDAP) offers simple search and
   responses as defined in [RFC7482] and [RFC7483] respectively. Both
   the search and response documents implicitly describe current
   registration information. This document provides an extension to
   RDAP allowing the discovery of historical registration information.

1.1. Terminology

   The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD,
   SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this
   document, are to be interpreted as described in [RFC2119].

2. JSON Responses

   The JSON responses described in [RFC7483] are extended with one
   additional object class, the History object class, described below.

2.1. The History Object Class

   The history object class is a container in which individual
   registration records are listed, together comprising a history of

   registration. The registration records are represented in the form
   given in [RFC7483], without change.

   The history object class can contain the following members:

   o objectClassName -- the string "history"

   o records -- an array of record objects, defined in the next
      subsection

   In addition, any of the common data structures defined in section 4
   of [RFC7483] may be included in accordance with the constraints of
   that section, with the following additional considerations.

   o Any "rdapConformance" structure in the topmost object of a
      response including a History object MUST include the string
      "history_0" to indicate to clients that the response conforms to
      this specification.

   o An events structure MAY be included, but none of the values
      defined in section 10.2.3 of [RFC7483] are suitable for a History
      object class. Future values in the "RDAP JSON Values" registry
      may be suitable, however.

2.2. The Record Data Structure

   The record data structure describes one historical registration
   record. It is an object containing the date range during which this
   record was current, and the record's content. The content of a
   historical record is a JSON response element as defined in [RFC7483].
   In this way, history is defined for all RDAP object classes, and may
   be extended to apply to non-standard or new RDAP object classes
   without requiring a revision to the history specification.

   The date range of the historical registration record consists of an
   element indicating the first moment at which the contained record was
   current, in the "applicableFrom" element, and an element indicating
   the first moment at which the contained record was no longer current,
   in the "applicableUntil" element. The date range is half-open,
   including the "applicableFrom" date but excluding the
   "applicableUntil" date. If the "applicableUntil" date is not
   included in the response, this indicates that the associated content
   was current at the time the response was generated.

   An example of the record data structure:

```
            {
                "applicableFrom": "2008-09-04T06:51:49Z",
                "applicableUntil": "2008-09-04T07:27:55Z",
                "content": {
                    "objectClassName": "ip network",
                    ...
                }
            }
```

3. RDAP Historical Path Segment Specification

Path segments for querying registration data are defined in [RFC7482]
for five resource types (ip, autnum, domain, nameserver, and entity).
In addition to these segments, this document defines one additional
path segment, 'history', for querying the historical data of any of
the five resource types, where supported by the server.

The history access specified in this document does not support
searches.

3.1. IP Network History Path Segment Specification

Syntax: "history/ip/<IP address>" or "history/ip/<CIDR prefix>/<CIDR
length>"

Queries for the history of IP networks follow the same form as for
the current registration of IP networks. However, while the current
registration query will select the "most-specific" or smallest IP
network that completely encompasses the query network, an historical
query selects all networks intersecting the query range.

A server MAY choose to limit the number of networks selected by a
query, by limiting the size of sub-networks, or the total number, or
some other means.

3.2. Autonomous System History Path Segment Specification

Syntax: "history/autnum/<autonomous system number>"

Queries for the history of an autonomous system number follow the
same form as for the current registration of autonomous system
numbers.

3.3. Domain History Path Segment Specification

Syntax: "history/domain/<domain name>"

Queries for the history of a domain registration. As with [RFC7482]
the domain is fully qualified, and SHOULD NOT be represented as a
mixture of A-labels and U-labels.

3.4. Nameserver History Path Segment Specification

Syntax: "history/nameserver/<nameserver name>"

Queries for the history of a nameserver. As with [RFC7482] the name
is a fully qualified host name represented in either A-label or
U-label format.

3.5. Entity History Path Segment Specification

Syntax: "history/entity/<handle>"

Queries for the history of an entity. The syntax of the handle is
specific to the registration provider.

4. Query Processing

The processing of queries proceeds as in [RFC7482] and [RFC7480].
Associated records, as documented in section 4.2 of [RFC7482],
contribute to the history of a registration record, and so any change
to the record or any of its associated records SHOULD be included in
the response to a history query.

A server MAY choose to limit the responses given to a history query.
For example, the date range of returned records may be restricted, or
the number of distinct records may be limited. A server MAY choose
to abridge history, such as eliding a short-lived record state. If a
server limites responses in this way, it SHOULD indicate to the user
that it has done so, either through the "help" path segment
documented in [RFC7482], or in a "notice" element as documented in
section 4.3 of [RFC7483] using an appropriate notice type such as
"result set truncated due to unexplainable reasons".

5. Internationalization Considerations

Character encoding considerations are described in section 6.1 of
[RFC7482].

6. IANA Considerations

The IANA is requested to add this document to the IANA RDAP
Extensions Registry.

TO BE REMOVED: This registration should take place at
<https://www.iana.org/assignments/rdap-extensions/rdap-extensions.xhtml>

Extension identifier: history_0

Registry operator: Asia Pacific Network Information Center

Published specification: TBD

Person & email address to contact for further information: Byron
Ellacott <mailto:bje@apnic.net>

Intended usage: This extension allows an RDAP operator to provide
historical registration data.

7. Security Considerations

Historical records may contain information which was inadvertently
entered into a record, and subsequently amended. It may contain
information which was removed by request of the information holder.
Additional privacy constraints may apply to data held for a long
period. Operators of a history-capable RDAP service SHOULD ensure
they have understood the privacy implications of this facility.

A query for historical records may consume more computing resources
than a query for current records. Implementations SHOULD take care
to offer operators the appropriate means to manage the operational
cost of a historical service, limiting query rates or response sizes
or both, where appropriate.

8. Acknowledgements

Substantial feedback on the initial draft was provided by Andrew
Newton of ARIN.

9. References

9.1. Normative References

[RFC7480]   Newton, A., Ellacott, B., and N. Kong, "HTTP Usage in the
            Registration Data Access Protocol (RDAP)", RFC 7480,
            DOI 10.17487/RFC7480, March 2015,
            <http://www.rfc-editor.org/info/rfc7480>.

   [RFC7482]   Newton, A. and S. Hollenbeck, "Registration Data Access
               Protocol (RDAP) Query Format", RFC 7482,
               DOI 10.17487/RFC7482, March 2015,
               <http://www.rfc-editor.org/info/rfc7482>.

   [RFC7483]   Newton, A. and S. Hollenbeck, "JSON Responses for the
               Registration Data Access Protocol (RDAP)", RFC 7483,
               DOI 10.17487/RFC7483, March 2015,
               <http://www.rfc-editor.org/info/rfc7483>.

9.2. Informative References

   [RFC2119]   Bradner, S., "Key words for use in RFCs to Indicate
               Requirement Levels", BCP 14, RFC 2119,
               DOI 10.17487/RFC2119, March 1997,
               <http://www.rfc-editor.org/info/rfc2119>.

Appendix A. An example History response

```
{
  "rdapConformance": [
    "history_0",
    "rdap_level_0"
  ],
  "notices": [
    {
      "title": "Example Only",
      "description": [
        "This is an example object only."
      ]
    }
  ],
  "objectClassName": "history",
  "records": [
    {
      "applicableFrom": "2009-01-20T07:00:00Z",
      "applicableUntil": "2017-01-20T07:00:00Z",
      "content": {
        "objectClassName": "entity",
        "handle": "POTUS",
        "vcardArray": [
          "vcard",
          [
            [ "version", {}, "text", "4.0" ],
            [ "fn", {}, "text", "Barack Obama" ]
          ]
        ]
      }
    },
    {
      "applicableFrom": "2017-01-20T07:00:00Z",
      "content": {
        "objectClassName": "entity",
        "handle": "POTUS",
        "vcardArray": [
          "vcard",
          [
            [ "version", {}, "text", "4.0" ],
            [ "fn", {}, "text", "Donald Trump" ]
          ]
        ]
      }
    }
  ]
}
```

In this example, the "POTUS" entity has two historical records. The
applicability range of the first record is left-closed, indicating
that the "POTUS" entity had the first record's contents at noon EST
on the 20th of January, 2009, and right-open, indicating that the
"POTUS" entity no longer had the first record's contents at noon EST
on the 20th of Janauary, 2017. The absence of a gap between the
"applicableUntil" date of the first record and the "applicableFrom"
date of the second record indicates that the record was updated,
while a gap may indicate that the record was removed, then a similar
record with the same key was subsequently added. The second record
has no "applicableUntil" element, which indicates that, as of the
time that this RDAP History response was prepared, the second record
was still in effect.

This example also suggests that this response elides a number of
previous versions of this record. A registry's local policy will
determine what historical registration information is available, and
may vary based on the identity of the entity retrieving the
information.

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