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Redirection Service for Registration Data Access Protocol
draft-ietf-weirds-redirects-03

Abstract

The traditional WHOIS protocol has several important shortcomings, and over the past few years several approaches to a better Registration Data Access Protocol (RDAP) have been discussed and proposed.

It is worth noting that the term WHOIS is sometimes used interchangeably to mean either (a) the registration data itself or (b) the protocol used to access registration data

Among these shortcomings, different registries operate different WHOIS services. For users this means that several WHOIS queries to different registries may be necessary in order to obtain data for a given resource.

This document describes a redirection service for RDAP queries. This service allows clients to query a single RDAP service and expect either an authoritative answer or a redirection hint pointing to another, possibly authoritative, RDAP server.

The solution implemented proposed here applies to Regional Internet Registries(RIRs) and Domain Name Registries(DNRs).

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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Table of Contents

1. Introduction

A user interested in obtaining registration information for a given number or domain resource normally uses the WHOIS service provided by the RIRs and DNRs.

In order to avoid having to query several databases until obtaining an answer, some approaches have been discussed and implemented in the past, most notably the Joint WHOIS [lacnic-joint-whois] initiative. However, among other shortcomings, Joint WHOIS is implemented using proxies and server-side referrals.

The RDAP protocol (draft-ietf-weirds-using-http [I-D.ietf-weirds-using-http]) makes it comparatively easy to implement client-side redirects based on normal HTTP 1.1 semantics and behavior.

The goal of this I-D is to describe an implementation of an RDAP redirection service and to encourage discussion on the topic of redirects in this problem domain.

1.1. Requirements Language

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 [RFC2119].

2. Proposed Approach

2.1. The REST Approach to Web Services

While a full introduction to REST and RESTful interfaces is out of the scope of this document it is important to note that these interfaces employ the verbs defined in HTTP (GET, POST, HEAD, DELETE) and HTTP response codes to signal the semantics and outcomes of an operation.

As WHOIS is a read-only service only the GET and HEAD verbs are usually implemented.

HTTP status codes provide signaling for errors and other conditions, including the concept of "client-side redirection" as outlined below.

2.2. Query Redirection for RDAP Queries

Each RDAP server should answer directly only those queries for which it is authoritative. In this case, being authoritative equals "having direct access to a given registry database".

For all other queries, a RDAP server could provide a 301 MOVED PERMANENTLY redirect answer pointing to an URL hosted on a different RDAP server.

As all requests are to be performed employing HTTP GETs, a user agent can transparently follow the HTTP 30x redirection hints ([RFC2616]) until obtaining a non-error answer (HTTP 20x) or an unrecoverable error condition (HTTP 40x or 50x).

2.3. A Joint RDAP Tree through HTTP Redirection

When a registry does not have the authoritative answers to the user agent's query, user agent's query can be redirected to a redirection-only RDAP server which could provide the authoritative RDAP server address.

The redirect server is responsible for tracking and returning the authoritative sources for IP, AS, domain name, name server or entity queries. All the query format are described in the draft-ietf-weirds-rdap-query [I-D.ietf-weirds-rdap-query]. We will call this redirect server "the redirector".

The redirect server needs access to data sources that, given a queried resource, provide a pointer to the authoritative RDAP server. For lack of a better name, we will call this data source the "redirection table".

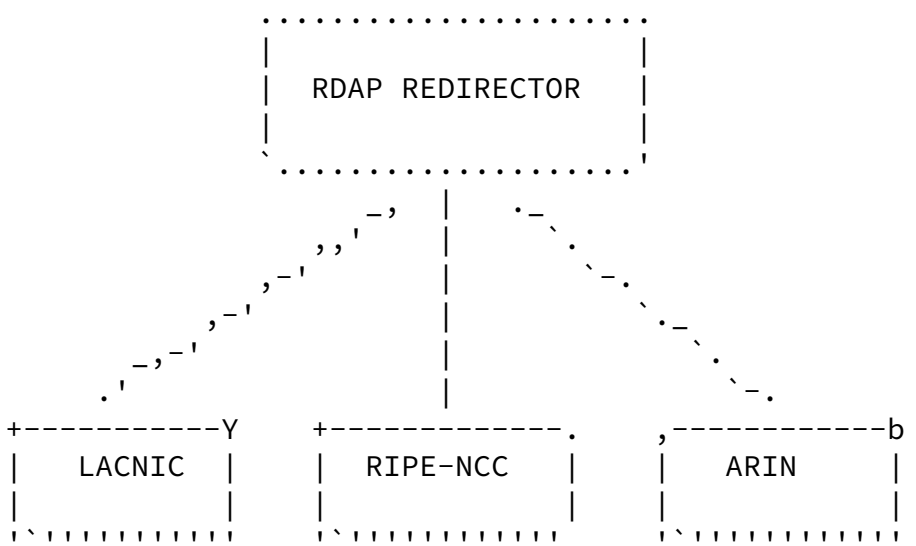
Assuming the redirector has access to a redirection table, the following pseudo code describes its expected behaviour:

```
while(true) {
    query = read_query_from_network()
    auth_rdap_svr = redirect_table_lookup (query.resource)
    if (auth_rdap_svr != null) {
         write_http_301(auth_rdap_svr)
    } else {
        write_http_404("resource not in redirect table")
    }
}
```

Redirector state machine

Figure 1

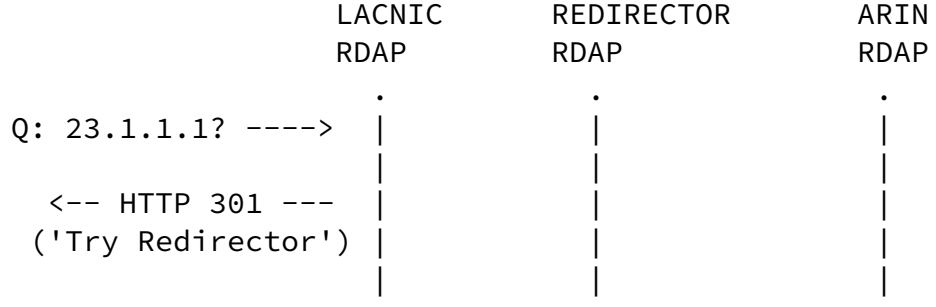
Figure 2 shows the general scheme of a single RDAP Redirection Service serving three different RIRs standalone RDAPs while providing a seamless query interface to clients.

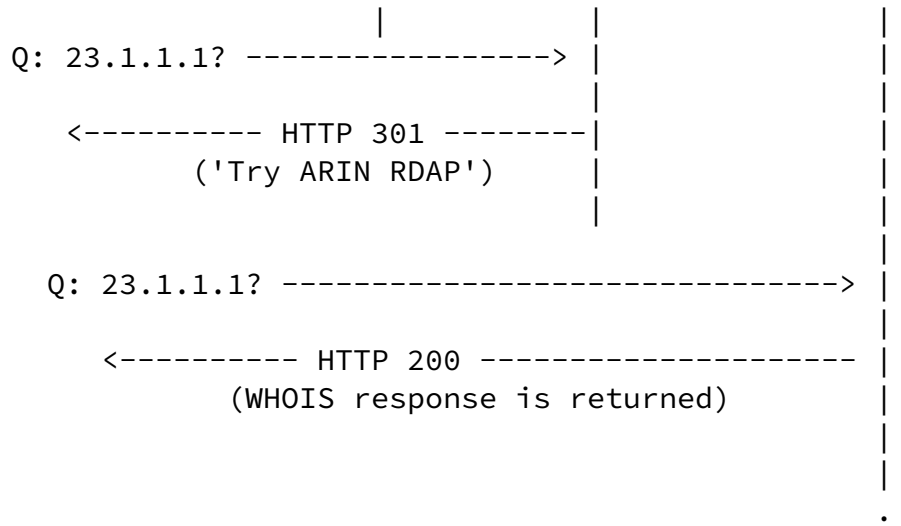


RDAP Joint WHOIS Tree.

Figure 2

Figure 3 shows how HTTP 301 redirection hints guide a client looking for registration data for the IPv4 address 23.1.1.1 (administered by ARIN) from LACNIC's WHOIS, the redirector and finally ARIN's WHOIS.





Querying WHOIS data for 23.1.1.1

Figure 3

2.4. The Redirection Table. The Bootstrap Problem.

For the redirection table lookup function, the redirector can either have pre-populated local table or have access to a service provided by some form of directory service. How either this local table or directory service is fed is known as the "bootstrapping problem".

The bootstrapping problem was initially declared out of scope of the WEIRDS WG. However, the problem has been discussed and several proposals have been presented (**insert references to Marc's docs**). Some of these solutions contemplate using the DNS tree as directory service while others, for the specific case of number resources, contemplate using IANA's XML registry files as seed files for a local redirection table.

The bootstrapping problem needs to be addressed differently for names and numbers as the coount of potential authoritative RDAP servers for names (huge) is vastly different from the count for numbers (currently 5).

2.5. Loops in Redirection

When redirection is used there is always the risk that bogus user-agents and applications or malicious user can create loops that in turn may become Denial of Service attacks.

Commonly used user agents (including HTTP libraries) have loop detection features that are deemed sufficient for breaking loops in RDAP.

2.6. Service Discovery

TBD

2.7. Security Considerations

HTTP 30x-based redirection could offer an attack vector for a Man-in-the-Middle type of attack, where the adversary modifies the redirection URL offered by the server to the client.

For example, an attacker able to modify HTTP traffic could modify the redirect URL from http://www.labs.lacnic.net/restwhois/rwhois_redir/ip/23.1.1.1 and change it into http://www.labs.somenic.net/restwhois/rwhois_redir/ip/23.1.1.1, where bogus information can be offered to the client.

This particular type of attack can be prevented by usint HTTPS for the RDAP connection. However, this certainly places a load burden upon the servers.

While security practices are outside the scope of this document, the authors believe it is important to identify such problematic use cases to any DNR or RIR that may implement the redirection WHOIS service.

3. References

3.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

3.2. Informative References

[I-D.ietf-weirds-rdap-query]
Newton, A. and S. Hollenbeck, "Registration Data Access

Protocol Query Format", draft-ietf-weirds-rdap-query-02 (work in progress), December 2012.

[I-D.ietf-weirds-using-http]
Newton, A., Ellacott, B., and N. Kong, "Using the Registration Data Access Protocol (RDAP) with HTTP", draft-ietf-weirds-using-http-01 (work in progress), December 2012.

[RFC2616] Fielding, R., Gettys, J., Mogul, J., Frystyk, H., Masinter, L., Leach, P., and T. Berners-Lee, "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999.

[lacnic-joint-whois]
LACNIC, "Joint WHOIS", 2005, <ftp://anonymous@ftp.registro.br/pub/gter/gter20/02-jwhois-lacnic.pdf>.

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