

Registration Protocols Extensions  
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**Registration Data Access Protocol (RDAP) Reverse search capabilities**  
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Abstract

The Registration Data Access Protocol (RDAP) does not include query capabilities to find the list of domains related to a set of entities matching a given search pattern. Even if such capabilities, commonly referred to as reverse search, respond to some needs not yet readily fulfilled by the current Whois protocol, they have raised concern from two perspectives: server processing impact and data privacy. Anyway, the impact of the reverse queries on RDAP servers processing is the same of the standard searches and it can be reduced by implementing policies to deal with big result sets, while data privacy risks can be mitigated by RDAP access control functionalities. This document describes RDAP query extensions that allows clients to request a reverse search based on the domains-entities relationship.

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## [1.](#) Introduction

Reverse Whois is a service provided by many web applications that allows users to find domain names owned by an individual person or company starting from the owner details (like name, email). Even if the availability of this service might raise some objections due to potential privacy risks, ICANN itself, in its report about Next-Gen Registration Directory Service (RDS) [[ICANN](#)], states that it is allowed when driven by some permissible purposes (e.g. legal actions, criminal investigations) and if it provides adequate policies to enforce the requestor accreditation, authentication, authorization, and terms and conditions of data use.

It is well known that these features are not implemented in Whois [[RFC3912](#)], while they are in RDAP. In fact, RDAP relies on security features, available in the HTTP protocol, to support access control based on local policy [[RFC7481](#)].

Another objection to the implementation of Reverse Whois is connected with its impact on server processing. Since RDAP supports search queries, the impact of both standard and reverse searches can be mitigated by servers adopting ad hoc policies.



Reverse searches, such as finding the list of domain names associated to contacts, nameservers or DNSSEC keys, may be useful for registrars as well. Usually, registries adopt out-of-band mechanisms to provide results to registrars asking for reverse searches on their domains.

Possible reasons of such requests are:

- o the loss of synchronization between the registrar database and the registry database;
- o the need of such data to perform massive EPP updates (i.e. changing the contacts in a list of domains, etc.).

Currently, RDAP does not provide any way for a client to search for the collection of domains associated to an entity [[RFC7482](#)]. A query (lookup or search) on domains can return the array of entities related to a domain with different roles (registrant, registrar, administrative, technical, reseller, etc.), but the reverse operation is not allowed. Only reverse searches to find the collection of domains according to a nameserver (ldhName or ip) can be requested. Since entities can be in relationship with all RDAP objects [[RFC7483](#)], the availability of a reverse search can be common to all RDAP query paths.

The protocol described in this specification aims to extend the RDAP query functionalities to enable reverse search based on the domains-entities relationship (the classic Reverse Whois scenario). The extension is implemented by adding new path segments (i.e. search paths) and using a RESTful web service [[REST](#)]. The service is implemented using the Hypertext Transfer Protocol (HTTP) [[RFC7230](#)] and the conventions described in [RFC 7480](#) [[RFC7480](#)].

### **1.1. 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 [[RFC2119](#)].

## **2. RDAP Path Segment Specification**

The new search paths are OPTIONAL extensions of path segments defined in [RFC 7482](#) [[RFC7482](#)]. The search paths are (Figure 1):

Syntax: domains?entityHandle=<entity handle search pattern>

Syntax: domains?entityFn=<entity name search pattern>

Search patterns are the same as specified in paragraph [Section 3.2.3 of RFC 7482](#) [[RFC7482](#)].



`https://example.com/rdap/domains?entityHandle=CID-40*`

Figure 1: Example of RDAP query to find all domains related to an entity whose handle matches "CID-40\*"

Search results MAY be restricted to a specific entity role, simply by adding the parameter "entityRole" to the search path (Figure 2). Possible values for such parameter are those detailed in [Section 10.2.4 of RFC 7483](#) [RFC7483].

`https://example.com/rdap/domains?entityFn=Bobby*&entityRole=technical`

Figure 2: Example of RDAP query to find all domains related to a technical contact whose formatted name matches "Bobby\*"

FOR DISCUSSION: Should reverse search be based on other entity details like email, phone, country (code or name), city?

### **3. Implementation Considerations**

The implementation of the proposed extension is technically feasible because "handle" and "fn" segment paths are used as standard paths to search for entities. The risks to generate huge result sets are the same existing for the other standard searches and can be mitigated by adopting the same policy (e.g. restricting search functionalities, limiting the rate of search requests, truncating and paging the results, returning partial responses).

### **4. Implementation Status**

NOTE: Please remove this section and the reference to [RFC 7942](#) prior to publication as an RFC.

This section records the status of known implementations of the protocol defined by this specification at the time of posting of this Internet-Draft, and is based on a proposal described in [RFC 7942](#) [RFC7942]. The description of implementations in this section is intended to assist the IETF in its decision processes in progressing drafts to RFCs. Please note that the listing of any individual implementation here does not imply endorsement by the IETF. Furthermore, no effort has been spent to verify the information presented here that was supplied by IETF contributors. This is not intended as, and must not be construed to be, a catalog of available implementations or their features. Readers are advised to note that other implementations may exist.



According to [RFC 7942](#), "this will allow reviewers and working groups to assign due consideration to documents that have the benefit of running code, which may serve as evidence of valuable experimentation and feedback that have made the implemented protocols more mature. It is up to the individual working groups to use this information as they see fit".

#### **[4.1.](#) IIT-CNR/Registro.it**

Responsible Organization: Institute of Informatics and Telematics of National Research Council (IIT-CNR)/Registro.it

Location: <https://rdap.pubtest.nic.it/>

Description: This implementation includes support for RDAP queries using data from the public test environment of .it ccTLD. The RDAP server does not implement any security policy because data returned by this server are only for experimental testing purposes.

Level of Maturity: This is a "proof of concept" research implementation.

Coverage: This implementation includes all of the features described in this specification.

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### **[5.](#) Security Considerations**

Security services for the operations specified in this document are described in [RFC 7481](#) [[RFC7481](#)]. It is quite easy to imagine that, in order to be compliant with ICANN recommendations about its use, RDAP servers will provide reverse search, like other query capabilities, only to restricted communities. One realistic scenario for servers is to provide reverse search only for registrars searching for their own domains. Another one is to prevent users to start a reverse search from a registrant detail, by removing "registrant" from the possible values of the "entityRole" parameter.

### **[6.](#) IANA Considerations**

This document has no actions for IANA.

### **[7.](#) Acknowledgements**

The authors would like to acknowledge Scott Hollenbeck for his contribution to this document.





## **8. References**

### **8.1. Normative References**

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC3912] Daigle, L., "WHOIS Protocol Specification", [RFC 3912](#), DOI 10.17487/RFC3912, September 2004, <<https://www.rfc-editor.org/info/rfc3912>>.
- [RFC7230] Fielding, R., Ed. and J. Reschke, Ed., "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing", [RFC 7230](#), DOI 10.17487/RFC7230, June 2014, <<https://www.rfc-editor.org/info/rfc7230>>.
- [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, <<https://www.rfc-editor.org/info/rfc7480>>.
- [RFC7481] Hollenbeck, S. and N. Kong, "Security Services for the Registration Data Access Protocol (RDAP)", [RFC 7481](#), DOI 10.17487/RFC7481, March 2015, <<https://www.rfc-editor.org/info/rfc7481>>.
- [RFC7482] Newton, A. and S. Hollenbeck, "Registration Data Access Protocol (RDAP) Query Format", [RFC 7482](#), DOI 10.17487/RFC7482, March 2015, <<https://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, <<https://www.rfc-editor.org/info/rfc7483>>.

### **8.2. Informative References**

- [ICANN] Internet Corporation For Assigned Names and Numbers, "Final Report from the Expert Working Group on gTLD Directory Services: A Next-Generation Registration Directory Service (RDS)", June 2014, <<https://www.icann.org/en/system/files/files/final-report-06jun14-en.pdf>>.



- [REST] Fielding, R., "Architectural Styles and the Design of Network-based Software Architectures", 2000, <[http://www.restapitutorial.com/media/RESTful\\_Best\\_Practices-v1\\_1.pdf](http://www.restapitutorial.com/media/RESTful_Best_Practices-v1_1.pdf)>.
- [RFC7942] Sheffer, Y. and A. Farrel, "Improving Awareness of Running Code: The Implementation Status Section", [BCP 205](#), [RFC 7942](#), DOI 10.17487/RFC7942, July 2016, <<https://www.rfc-editor.org/info/rfc7942>>.

## **Appendix A. Change Log**

- 00: Initial version.  
01: Revised some sentences and references.

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