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Security Services for the Registration Data Access Protocol
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Abstract

The Registration Data Access Protocol (RDAP) provides "RESTful" web services to retrieve registration metadata from domain name and regional internet registries. This document describes information security services and their application to RDAP.

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1. Introduction

The Registration Data Access Protocol (RDAP) core is specified in two documents: "Unified Registration Data Access Protocol Query Format" [I-D.ietf-weirds-rdap-query] and "JSON Responses for the Registry Data Access Protocol" [I-D.ietf-weirds-json-response]. One goal of RDAP is to provide security services that do not exist in the WHOIS [RFC3912] protocol, including authentication, availability, data confidentiality, data integrity, and non-repudiation (note: some of these might be a stretch).

This document describes each of these security services from the perspective of RDAP requirements and applicability. Where applicable, informational references to requirements for a WHOIS replacement service [RFC3707] are noted.

2. 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 RFC 2119 [RFC2119].

2.1. Acronyms and Abbreviations

DNR: Domain Name Registry

RDAP: Registration Data Access Protocol

RIR: Regional Internet Registry

3. Information Security Services and RDAP

RDAP itself does not include native security services. Instead, RDAP relies on features that are available in other protocol layers to provide needed security services including authentication, availability, data confidentiality, data integrity, and non-repudiation. A description of each of these security services can be found in RFC 4949 [RFC4949].

3.1. Authentication

WHOIS does not provide features to identify and authenticate clients. As noted in section 3.1.4.2 of RFC 3707 [RFC3707], there is utility in allowing server operators to offer "varying degrees of access depending on policy and need". Clients have to be identified and authenticated to provide that utility.

There are multiple ways to identify and authenticate RDAP clients. Candidate technologies include:

- HTTP Basic Authentication [RFC2617]: The "basic" scheme can be used to send a client's user name and password to a server in plaintext, based64-encoded form. If this scheme is used another protocol (such as HTTP Over TLS [RFC2818]) MUST be used to protect the client's credentials from disclosure while in transit.

- HTTP Digest Authentication [RFC2617]: The "digest" scheme can be used to authenticate a client without exposing the client's plaintext password.

- X.509 Digital Certificates [RFC5280]: The Transport Layer Security Protocol [RFC5246] includes an option to identify and authenticate clients who possess and present a valid X.509 digital certificate. Web clients do not typically possess digital certificates so this option is likely impractical.

- OAuth [I-D.ietf-oauth-v2]: The OAuth authorization framework describes a method for clients to access protected web resources using access tokens issued by a third party authorization server with the permission of the resource owner. If widely deployed it would permit clients to access servers without having to manage credentials on a per-server basis.

- (What else?)

3.2. Availability

An RDAP service has to be available to be useful (need to talk about denial of service, anycasting, and anything else that addresses availability).

3.3. Data Confidentiality

WHOIS does not provide the ability to encrypt data while in transit to protect it from inadvertent disclosure. Web services commonly use HTTP Over TLS [RFC2818] to provide that protection. Examples of data confidentiality utility include:

- Encryption to protect plaintext passwords exchanged when using the HTTP "basic" authentication scheme.

- Encryption to protect personal or otherwise sensitive data returned in response to RDAP queries.

- (What else?)

If data confidentiality is useful, we should also plan to review the JSON Web Encryption draft [I-D.ietf-jose-json-web-encryption].

3.4. Data Integrity

TBD: is there value in signed responses? If so, the work being done in the JOSE working group (such as what's described in the JSON Web Signature draft [I-D.ietf-jose-json-web-signature]) may be useful. There's no mention of a "signed response" requirement in RFC 3707.

3.5. Non-repudiation

TBD: does it make sense to talk about proof of integrity and data origin authentication for responses? It might in the context of law enforcement actions. Again, there's no requirement mentioned in RFC 3707.

4. IANA Considerations

This document does not specify any IANA actions.

5. Security Considerations

TBD

6. Acknowledgements

The authors would like to acknowledge the following individuals for their contributions to this document: Andrew Newton.

7. References

7.1. Normative References

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[RFC3912] Daigle, L., "WHOIS Protocol Specification", RFC 3912, September 2004.

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Appendix A. Change Log

Initial -00: Adopted as working group document.

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