RDAP Response Profile

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I. Introduction

In 2012, The Internet Engineering Task Force (IETF) chartered the WEIRDS (Web Extensible Internet Registration Data Services) working group to replace the WHOIS protocol with a RESTful data service that supports internationalization, a formal data model, and differential services. This working group concluded in early 2015 with the publication of RFC7480, RFC7481, RFC7482, RFC7483, and RFC7484 that define the Registry Data Access Protocol

(RDAP) as a standardized replacement for WHOIS. RDAP supports both Regional Internet Registries (RIRs) and Domain Name Registries (DNRs). Since 2015 other RDAP internet drafts and RFCs have been created including [RFC8056](#), [draft-ietf-regext-rdap-object-tag](#), and [draft-hollenbeck-regext-rdap-openid](#), and [draft-lozano-rdap-nameservers-sharing-name](#). The global set of RDAP RFCs and Internet Drafts are referred to as the RDAP Specifications.

The purpose of this document is to encapsulate the operational requirements specific to Registration Data Services (RDS) in a single document which in conjunction with the RDAP Technical Implementation Guide define a domain registry RDAP implementation. This document neither creates nor modifies existing policy, rather it maps current policy requirements to the RDAP implementation with flexibility to incorporate future policy changes with minimal reengineering.

II. Policy Mapping

This document specifies the RDAP Policy requirements from the ICANN Temporary Specification for gTLD Registration Data (the "Temporary Specification") effective 25 May 2018 which builds upon the existing legacy Whois requirements. The following source material forms the basis for the policy mapping used to create the RDAP Response Profile.

gTLD Base Registry Agreement (RA):
https://newgtlds.icann.org/sites/default/files/agreements/agreement-approved-31jul17-en.pdf

2013 Registrar Accreditation Agreement
https://www.icann.org/resources/pages/approved-with-specs-2013-09-17-en

Additional Whois Information Policy (AWIP),
https://www.icann.org/resources/pages/policy-awip-2014-07-02-en

Registry Registration Data Directory Services Consistent Labeling and Display Policy (CL&D),
https://www.icann.org/resources/pages/rdds-labeling-policy-2017-02-01-en

Temporary Specification for gTLD Registration Data –
https://www.icann.org/en/system/files/files/gtld-registration-data-temp-spec-17may18-en.pdf

III. Access Requirements

The RDAP implementation based on ICANN's Temporary Specification assumes multiple layers of access to RDS data. A basic, public layer provides access to some data, restricting access to most personal data, while one or more additional layers, available via future accreditation program allows access to additional elements from the registration data set.

Data from the registration data set can optionally be provided in the public layer provided that certain conditions are met (e.g., a registrant consents to full publication, or the registrant is not in the European Economic Area and the registrar optionally publishes additional data).

IV.   Display Requirements

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

1. General

1.1.   These requirements represent the minimum baseline for RDAP query responses. RDAP server operators MAY output additional RDDS fields, RDAP *events* or RDAP *roles* without further approval by ICANN.

1.2.   RDAP extensions

1.2.1.   RDAP extensions, if used, MUST be registered in the IANA's RDAP Extensions registry (https://www.iana.org/assignments/rdap-extensions/rdap-extensions.xhtml), as defined in RFC7480.

1.2.2.   RDAP extensions MUST NOT add browser executable code (e.g., Javascript) to the response.

2. Responses to Domain name RDAP queries

2.1.   Domain Name - The top-level domain object [RFC7483] in the RDAP response MUST contain the A-label format of the domain in the *ldhName* member [RFC7483].

2.2.   Registry Domain ID - The *domain* object *handle* in the RDAP response MUST contain the Repository Object Identifier (ROID of the domain object, *<domain:roid>* as defined in [RFC5731](#)) for the domain name object.

2.3.   Event Actions (Updated, Creation, Registry Expiry, Registrar Registration Expiration, Transfer dates)

   2.3.1.   The domain object in the RDAP response MUST contain the following events:
      2.3.1.1.   Event of *eventAction* type *registration*
      2.3.1.2.   Event of *eventAction* type *expiration*
      2.3.1.3.   Event of *eventAction* type *last update of RDAP database* with a value equal to the timestamp when the RDAP database was last updated

   2.3.2.   The domain object in the RDAP response MAY contain the following events:
      2.3.2.1.   An event of *eventAction* type *registrar expiration*.
      2.3.2.2.   Event of *eventAction* type *last changed* - The event of *eventAction* type *last changed* MUST be omitted if the domain name has not been updated since it was created
      2.3.2.3.   An event of *eventAction* type *transfer*, with the last date and time that the domain was transferred. The event of *eventAction* type *transfer* MUST be omitted if the domain name has not been transferred since it was created.

2.4.   Registrar (Registrar Entity)

   2.4.1.   Registrar - The *domain* object in the RDAP response MUST contain an *entity* with the *registrar* role (called registrar entity in this section) and a valid *fn* member MUST be present.

   2.4.2.   Registrar IANA ID - The *handle* of the *entity* MUST be equal to the IANA Registrar ID.

   2.4.3.   Registrar IANA ID - The *entity* with the *registrar* role in the RDAP response MUST contain a *publicIDs* member [[RFC7483](#)] to identify the IANA Registrar ID from the IANA's Registrar ID registry (https://www.iana.org/assignments/registrar-ids/registrar-ids.xhtml). The type value of the *publicID* object MUST be equal to IANA Registrar ID.

2.4.4.   Other members MAY be present in the *entity* (as specified in RFC6350, the vCard Format Specification and its corresponding JSON mapping RFC7095).

2.4.5.   Abuse Contact (email, phone) - An RDAP server MUST include an *entity* with the *abuse* role within the registrar *entity* which MUST include *tel* and *email* members, and MAY include other members.

2.5.   Reseller - The returned *domain* object in the RDAP response MAY contain an entity with the *reseller* role, if the domain name was registered through a reseller.

2.6.   Domain Status

2.6.1.   The top-level domain object in the RDAP response MUST contain at least one *status* member [RFC7483].

2.6.2.   The *status* member value MUST conform to the *Extensible Provisioning Protocol (EPP) and Registration Data Access Protocol (RDAP) Status Mapping* [RFC8056].

2.6.3.   A domain name RDAP response MUST contain a *notices* member with a *title* "EPP Status Codes", a *description* containing the string "For more information on domain status codes, please visit https://icann.org/epp" and a *links* member with the https://icann.org/epp URL.

2.7.   Contacts

2.7.1.   Contact (object) lookups if supported MUST support RDAP lookup requests for *entities* with any role within other objects using the *handle* (as described in 3.1.5 of RFC7482).

2.7.2.   If the RDAP service is provided by a registry that does not support contacts (for example thin registries) then the contact entities described in this section are not REQUIRED.

2.7.3.   Processing where subject to the GDPR is defined in the Temporary Specification - Appendix A - Section 2 and processing where not subject to the GDPR is defined in the Temporary Specification - Appendix B - Section 3.

2.7.4.   Registrant, Administrative, Technical, Other - The domain object in the RDAP response MUST contain entities with the registrant, administrative and technical roles and MAY contain other entities with corresponding

roles (such as billing) with a handle (ROID of the contact object, <contact:roid>, as defined in RFC5733) and valid members fn, adr, tel, email (as specified in RFC6350, the vCard Format Specification and its corresponding JSON mapping RFC7095).

2.7.4.1.   The following RDDS fields used to generate the adr member of the contact entities are REQUIRED to be included in the RDAP response: Street, City, Country.

2.7.4.2.   The following RDDS fields MUST be included in the adr member of the contact entities if the data exists: Organization, State/Province, Postal Code, Phone Ext, Fax, Fax Ext. If no data exists, the fields SHOULD NOT be included in the adr member.

2.7.5.   Redaction

2.7.5.1.   Registrant - Where processing is subject to the GDPR, the following MUST be omitted unless consent to publish has been provided and where processing is not subject to the GDPR MAY be omitted – the handle, fn and tel members of the (registrant) contact entity and the Street, City, Postal Code, Phone Ext, Fax and Fax Ext fields of the adr member in the RDAP response.

2.7.5.2.   Administrative, Technical, Other - Where processing is subject to the GDPR, the following MUST be omitted unless consent to publish has been provided and where processing is not subject to the GDPR MAY be omitted – the handle, fn and tel members of the (administrative, technical, other) contact entity and the Organization, Street, City, State/Province, Postal Code, Country, Phone Ext, Fax and Fax Ext fields of the adr member in the RDAP response.

2.7.5.3.   In an RDAP response where elements of the contact entity have been omitted, the contact entity MUST include a remarks element containing a title member with a value "REDACTED FOR PRIVACY" and a description member with a value "Some of the data in this object has been removed."

2.7.6.   Email – Where processing is subject to the GDPR the following MUST be applied and MAY be applied where not subject to the GDPR.

2.7.6.1.   Email (Registrar Only) - the value of the email member in the RDAP response MUST be an email address or link to a web form to facilitate email communication with the Registrant but MUST NOT identify the contact email address or the contact itself.

2.7.6.2.   Email (Registry Only) - the value of the email member in the RDAP response MUST be substantially similar to the following "Please query the RDDS service of the Registrar of Record

identified in this output for information on how to contact the Registrant of the queried domain name."

2.8. Name Server(s) - The *domain* object in the RDAP response MUST contain the name servers of the domain in the *nameservers* member.

    2.8.1. RDAP servers MUST support *nameserver* lookup queries based on the name server's name as specified in 3.1.4 of RFC7482.

    2.8.2. RDAP servers operated by Registries MUST support *nameserver* lookup queries based on IP address as defined in RFC7482 section 3.2.2.

    2.8.3. Each *nameserver* object MUST contain the following member: *ldhName*.

    2.8.4. The following members are Optional: *ipAddresses* [RFC7483], *unicodeName*, *handle* [RFC7483] (ROID of the host object, *<host:roid>* as defined in RFC5732), and *status*.

    2.8.5. In the case of a TLD in which name servers are specified as domain attributes, the *nameserver* object MUST NOT contain the following members: *handle* and *status*.

2.9. DNSSEC - The *domain* object in the RDAP response MUST contain a *secureDNS* member [RFC7483] including at least a *delegationSigned* element. Other elements (e.g. *dsData*) of the *secureDNS* member MUST be included, if the domain name is signed and the elements are stored in the Registry or Registrar database, as the case may be.

2.10. RDDS Inaccuracy - A domain name RDAP response MUST contain a *notices* member with a *title* "RDDS Inaccuracy Complaint Form", a *description* containing the string "URL of the ICANN RDDS Inaccuracy Complaint Form: https://www.icann.org/wicf" and a *links* member with the https://www.icann.org/wicf URL.

2.11. Registrar only requirements - the following requirements apply to registrars only.

    2.11.1. A Registrar MUST return an HTTP 404 response when the Registrar is not the Sponsoring Registrar for the domain name.

    2.11.2. The *domain* object *handle* in the RDAP response MUST contain the Repository Object Identifier (ROID of the domain object, *<domain:roid>* as defined in RFC5731) for the Domain Name object. For example, a

Registrar could obtain the ROID from the Registry via EPP and cache the information locally after creating or gaining a domain name via a transfer.

2.11.3.　The *entity handle* in the RDAP response MUST contain the Repository Object Identifier (ROID of the contact object, *<contact:roid>*, as defined in [RFC5733](#)) for the Contact object. For example, a Registrar could obtain the ROID from the Registry via EPP and cache the information locally. The RAA 2013 defines that this information MUST be shown if available from the Registry. If this information is not available from the Registry (e.g., a "thin" Registry), the *handle* MUST contain the unique identifier within the Registrar.

2.11.4.　The *eventAction* type *last changed* MUST reflect the date and time of the latest successful update known to the Registrar. Registrars are not required to constantly refresh this date from the Registry.

2.11.5.　The *status* element MUST reflect the latest known set of EPP statuses in the Registry. Registrars are not required to constantly refresh the EPP statuses from the Registry.

3.　Responses to Registrar RDAP queries

3.1.　Registrar object lookup using an entity query on the *fn* element MUST be supported

3.2.　Registrar (name, address, phone number, email) - In response to registrar queries, the returned RDAP response MUST be an *entity* with *registrar* role, with a *handle* and valid elements *fn*, *adr*, *tel*, *email*.

3.2.1.　Registrar (Street, City, Country) - The *adr* member in the RDAP response for a Registrar query MUST at least contain the following RDDS fields: Street, City, Country.

3.2.2.　Registrar (State/Province, Postal Code, Fax Number) - the following fields are optional in the *adr* member of the RDAP response: State/Province, Postal Code, Fax Number.

3.3.　Contacts (Admin, Technical) - The RDAP response SHOULD contain at least two *entities*, with the *administrative* and *technical* roles respectively within the *entity* with the *registrar* role. The *entities* with the *administrative* and *technical* roles

MUST contain a *handle* and valid *fn*, *tel*, *email* members, and MAY contain a valid *adr* element.

3.4. The RDAP response to a Registrar query MUST include an *eventAction* type *last update of RDAP database* with a value equal to the timestamp when the RDAP database was last updated.

4. Responses to Nameserver RDAP queries

4.1. Name Server (Name) - In response to Nameserver queries the returned RDAP response MUST include a *nameserver* object and contain a *ldhName* member.

4.2. IP Address(es) - If the name server record includes IP addresses then the *nameserver* object MUST contain a ipAddresses member listing all IPv4 and IPv6 glue records for the Nameserver.

4.3. Registrar (Name, IANA ID) - The Registrar RDDS field is Optional; if present in the response, it MUST be represented as an entity with the registrar role. The handle of the entity with the registrar role MUST be equal to the IANA Registrar ID. If the Registrar does not have an IANA ID then the handle of the entity with the registrar role MUST equal "not applicable". If the Registrar has an IANA ID, then the entity with the registrar role in the RDAP response MUST contain a publicIDs member with a type value equal to the IANA Registrar ID. If the Registrar does not have an IANA ID then the RDAP response MUST NOT contain a publicIDs member.

4.4. The RDAP response to a Name Server query MUST include an *eventAction* type *last update of RDAP database* with a value equal to the timestamp when the RDAP database was last updated.

Appendix A: RDAP IETF Standards

RDAP standards are a set of specifications, which together provide a complete RDAP service. Each specification is briefly described below.

RFC7480 - HTTP Usage in the Registration Data Access Protocol (RDAP)
https://www.rfc-editor.org/rfc/rfc7480.txt
Describes usage of HTTP transport for RDAP, error messages, RDAP extensions, rate limiting and internationalization with URIs.

RFC7481 - Security Services for the Registration Data Access Protocol (RDAP)
https://www.rfc-editor.org/rfc/rfc7481.txt
Covers access control, authentication, authorization, privacy, data confidentiality and RDAP services availability considerations.

RFC7482 - Registration Data Access Protocol (RDAP) Query Format
https://www.rfc-editor.org/rfc/rfc7482.txt
Defines the URL patterns for networks, autonomous systems, reverse DNS, name servers, registrars and entities queries. Also covers help requests, search (wildcards) and internationalization in requests.

RFC7483 - JSON Responses for the Registration Data Access Protocol (RDAP)
https://www.rfc-editor.org/rfc/rfc7483.txt
Defines JSON object classes for domains, name servers, entities, IP networks and autonomous system numbers. Describe answers to help queries, searches, JSON-embedded error codes and truncated answers.

RFC7484 - Finding the Authoritative Registration Data (RDAP) Service
https://www.rfc-editor.org/rfc/rfc7484.txt
Describes a method to find the authoritative server for RDAP data.

Appendix B: Other Technical References

RFC7485 - Inventory and Analysis of WHOIS Registration Objects
https://www.rfc-editor.org/rfc/rfc7485.txt

RFC8056 – Extensible Provisioning Protocol (EPP) and Registration Data Access Protocol (RDAP) Status Mapping
https://tools.ietf.org/html/rfc8056
Describes the mapping of the Extensible Provisioning Protocol (EPP) statuses with the statuses registered for us in the Registration Data Access Protocol (RDAP).

IANA RDAP JSON Values Registry
https://www.iana.org/assignments/rdap-json-values/rdap-json-values.xhtml
This registry defines valid values for RDAP JSON status, role, notices and remarks, event action, and domain variant relation, as defined in RFC7483.

IANA Bootstrap Service Registry for Domain Name Space
https://www.iana.org/assignments/rdap-dns/rdap-dns.xhtml

draft-lozano-rdap-nameservers-sharing-name - Nameserver objects sharing the same name, support for the Registration Data Access Protocol (RDAP)
https://tools.ietf.org/html/draft-lozano-rdap-nameservers-sharing-name
Describes a Registration Data Access Protocol (RDAP) extension that may be used to retrieve the registration information of a particular nameserver object sharing the name with other nameserver objects.

draft-ietf-regext-rdap-object-tag – Registration Data Access Protocol (RDAP) Object Tagging
https://tools.ietf.org/html/draft-ietf-regext-rdap-object-tag
Describes an update to RFC7484 by describing an operational practice that can be used to add structure to RDAP identifiers that makes it possible to identify the authoritative server for additional RDAP queries.

Federated Authentication for the Registration Data Access Protocol (RDAP) using OpenID Connect https://tools.ietf.org/html/draft-hollenbeck-regext-rdap-openid
Describes a federated authentication system for RDAP based on OpenID Connect.

jCard: The JSON Format for vCard
https://tools.ietf.org/html/rfc7095

vCard Format Specification

https://tools.ietf.org/html/rfc6350

EPP Status Code (ICANN)
https://www.icann.org/epp

Draft Final Report from the Expert Working Group on Internationalized Registration Data
https://gnso.icann.org/en/issues/ird/ird-draft-final-10mar15-en.pdf

Study to Evaluate Available Solutions for the Submission and Display of Internationalized Contact Data
https://www.icann.org/en/system/files/files/transform-dnrd-02jun14-en.pdf

Mozilla Included CA Certificate List
https://wiki.mozilla.org/CA:IncludedCAs

Appendix C: Policy References

gTLD Base Registry Agreement
https://newgtlds.icann.org/sites/default/files/agreements/agreement-approved-09jan14-en.htm

2013 Registrar Accreditation Agreement
https://www.icann.org/resources/pages/approved-with-specs-2013-09-17-en

Registry Registration Data Directory Services Consistent Labeling and Display Policy (CL&D),
https://www.icann.org/resources/pages/rdds-labeling-policy-2017-02-01-en

Temporary Specification for gTLD Registration Data –
https://www.icann.org/en/system/files/files/gtld-registration-data-temp-spec-17may18-en.pdf

ICANN Advisories
https://www.icann.org/resources/pages/advisories-2012-02-25-en

Advisory: Clarifications to the Registry Agreement, and the 2013 Registrar Accreditation
Agreement (RAA) regarding applicable Registration Data Directory Service (Whois)
Specifications (RDDS clarification Advisory)
https://www.icann.org/resources/pages/registry-agreement-raa-rdds-2015-04-27-en

Advisory: Registrar Implementation of the 2013 RAA's Whois Requirements
https://www.icann.org/news/announcement-2013-07-31-en

ICANN Consensus Policies
https://www.icann.org/resources/pages/registrars/consensus-policies-en

Additional Whois Information Policy
https://www.icann.org/resources/pages/policy-awip-2014-07-02-en

Final Report on the Thick Whois Policy Development Process
https://gnso.icann.org/en/issues/whois/thick-final-21oct13-en.pdf

ICANN Whois Marketing Restriction Policy
https://www.icann.org/resources/pages/registrars/consensus-policies/wmrp-en

Appendix D: RDS Fields (data element mappings)

Domain Name Responses:

RDS Field	RDAP Response Element
Domain Name	ldhName
Domain ID	handle
Updated Date	events.eventAction "last changed"
Creation Date	events.eventAction "registration"
Registry Expire Date	events.eventAction "expiration"
Domain Status	status object
Name Server	nameservers.ldhname
DNSSEC	secureDNS object
Internationalized Domain Name	unicodeName
Last update of RDS Database	Events.eventAction "last update of RDAP database"
Registrar	**Entities.role registrar**
Sponsoring Registrar	Entities.roles.registrar
Sponsoring Registrar IANA ID	publicIDs.identifier

Registrar Abuse Contact Email	Entities.role abuse email
Registrar Abuse Contact Phone	Entities.role abuse phone
Registrar Registration Expiration Date	events.eventAction "registrar expiration"
Registrar RDS Server	Links.object with rel:related
Reseller	Entities.roles reseller
Registrant	**Entities.role registrant**
Registrant ID	Entity.handle
Registrant Name	jCard "fn"
Registrant Organization	Org
Registrant Street	Grouped into adr member
Registrant City	
Registrant State/Province	
Registrant Postal Code	
Registrant Country	
Registrant Phone Number	Tel type parameter voice
Registrant Phone Number Ext	Ext
Registrant Fax	Tel type parameter Fax
Registrant Fax Ext	Ext
Registrant email	Email
Admin Contact	**Entities.role Administrative**

Admin ID	Entity.handle
Admin Name	jCard "fn"
Admin Organization	Org
Admin Street	Grouped into adr member
Admin City	
Admin State/Province	
Admin Postal Code	
Admin Country	
Admin Phone Number	Tel type parameter voice
Admin Phone Number Ext	Ext
Admin Fax	Tel type parameter Fax
Admin Fax Ext	Ext
Admin email	Email
Technical Contact	**Entities.role Technical**
Tech ID	Entity.handle
Tech Name	jCard "fn"
Tech Organization	Org
Tech Street	Grouped into adr member
Tech City	
Tech State/Province	
Tech Postal Code	
Tech Country	
Tech Phone Number	Tel type parameter voice

Tech Phone Number Ext	Ext
Tech Fax	Tel type parameter Fax
Tech Fax Ext	Ext
Tech email	Email

Registrar Responses:

RDS Field	RDAP Response Element
Registrar	jCard fn
Registrar Street	
Registrar City	
Registrar State/Province	Grouped into the adr member
Registrar Postal Code	
Registrar Country	
Registrar Phone	Tel with a type parameter voice
Registrar Fax	Tel with a type parameter fax
Registrar Email	email
Registrar admin/tech contact	Entity.role administrative or technical
administrative/technical contact	jCard fn
Contact Phone Number	Tel with a type parameter voice
Contact Fax Number	Tel with a type parameter fax
Contact Email	email
WHOIS Server /Referral URL	n/a

Name Server Responses:

RDS Field	RDAP Response Element
Server Name	nameserver.ldhName
IP Address	nameserver.ipAddresses
Registrar	Entities.roles registrar
WHOIS Server /Referral URL	n/a
Last update of RDAP database	events.eventAction "last update of RDAP database"