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RFC 9877
Registration Data Access Protocol (RDAP) Extension for Geofeed Data

Abstract

This document defines a new Registration Data Access Protocol (RDAP) extension, "geofeed1", for indicating that an RDAP server hosts geofeed URLs for its IP network objects. It also defines a new media type and a new link relation type for the associated link objects included in responses.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at https://www.rfc-editor.org/info/rfc9877.

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1. Introduction

[RFC8805] and [RFC9632] detail the IP geolocation feed (commonly known as 'geofeed') file format and associated access mechanisms. While [RFC9632] describes how a registry can make geofeed URLs available by way of a Routing Policy Specification Language (RPSL) [RFC2622] service, the Regional Internet Registries (RIRs) have deployed Registration Data Access Protocol (RDAP) ([RFC7480], [RFC7481], [RFC9082], [RFC9083]) services as successors to RPSL for Internet number resource registrations, and maintaining feature parity between the two services supports client transition from RPSL to RDAP in this context. To that end, this document specifies

how geofeed URLs can be accessed through RDAP. It defines a new RDAP extension, "geofeed1", for indicating that an RDAP server hosts geofeed URLs for its IP network objects, as well as a new media type and a new link relation type for the associated link objects.

Fetching and making use of geofeed data is out of scope for the purposes of this document. See [RFC8805] and [RFC9632] for further details.

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.

Indentation and whitespace in examples are provided only to illustrate element relationships, and they are not a required feature of this specification.

"..." in examples is used as shorthand for elements defined outside of this document.

2. Specification

2.1. Media Type for a Geofeed Link

[RFC9632] requires a geofeed file to be a UTF-8 [RFC3629] comma-separated values (CSV) file, with a series of "#" comments at the end for the optional Resource Public Key Infrastructure (RPKI) [RFC6480] signature. At first glance, the "text/csv" media type seems like a good candidate for a geofeed file, since it supports the "#" comments needed for including the RPKI signature.

However, although the CSV geofeed data could be viewed directly by a user such that the "text/csv" media type was appropriate, the most common use case will involve it being processed by some sort of application first, in order to facilitate subsequent IP address lookup operations. Therefore, using a new "application" media type with a "geofeed" subtype (Section 4.2.5 of [RFC6838]) for the geofeed data is preferable to using "text/csv".

To that end, this document registers a new "application/geofeed+csv" media type in the IANA "Media Types" registry (see Section 6.3), and a new "+csv" suffix in the IANA "Structured Syntax Suffixes" registry (see Section 6.4).

2.2. Geofeed Link

An RDAP server that hosts geofeed URLs for its IP network objects (Section 5.4 of [RFC9083]) may include link objects for those geofeed URLs in IP network objects in its responses. These link objects are added to the "links" member of each object (Section 4.2 of [RFC9083]).

In RDAP, the "value", "rel", and "href" JSON members are required for any link object. Additionally, for a geofeed link object, the "type" JSON member is **RECOMMENDED**. The geofeed-specific components of a link object are like so:

"rel":

The link relation type is set to "geofeed". This is a new link relation type for IP geolocation feed data, registered in the IANA "Link Relations" registry (see Section 6.2) by this document.

"href": The target URL is set to the HTTPS URL of the geofeed file (Section 6 of [RFC9632]) for an IP network.

"type": "application/geofeed+csv" (see Section 2.1).

An IP network object returned by an RDAP server **MAY** contain zero or more geofeed link objects, though typically an IP network will have either zero or only one. The scenario where more than one geofeed link object could be returned is when the server is able to represent that data in multiple languages. In such a case, the server **SHOULD** provide "hreflang" members for the geofeed link objects. Except for the multiple-languages scenario, the server **SHOULD NOT** return more than one geofeed link object.

2.3. Extension Identifier

This document defines a new extension identifier, "geofeed1", for use by servers that host geofeed URLs for their IP network objects and include geofeed URL link objects in their responses to clients in accordance with Section 2.2. A server that uses this extension identifier **MUST** include it in the "rdapConformance" array (Section 4.1 of [RFC9083]) for any lookup or search response containing an IP network object, as well as in the help response. Here is an elided example of this inclusion:

```
{
    "rdapConformance": [ "rdap_level_0", "geofeed1", ... ],
    ...
}
```

If the server includes "geofeed1" in the "rdapConformance" array, then for any response concerning a particular IP network object for which the server possesses a geofeed URL and is able to return it to the client (i.e., the server is not compelled to omit it due to regulatory constraints or similar), the server **MUST** include a corresponding geofeed link object in the response.

An RDAP server may make use of the "application/geofeed+csv" media type and the "geofeed" link relation defined in this specification in its responses without including the "geofeed1" extension identifier in those responses, because RDAP servers are free to use any registered media type or link relation in a standard response without implementing any particular extension. The additional value of including the extension identifier in the "rdapConformance" array is that it signals to the client that the server hosts geofeed URLs for its IP network objects. This is useful where a client receives an IP network object without a geofeed link object, because in that case the client can infer that no geofeed data is available for that object, since the server would have provided it if it were available.

Although a server may use registered media types in its link objects without any restrictions, it is useful to define new RDAP extensions for those media types in order for the server to communicate to clients that it will make data for that type accessible. This is the same as what the server does with the "geofeed1" extension identifier.

The "1" in "geofeed1" denotes that this is version 1 of the geofeed extension. New versions of the geofeed extension will use different extension identifiers.

2.4. Example

The following is an elided example of an IP network object with a geofeed link object:

```
{
    "objectClassName": "ip network",
    "handle": "XXXX-RIR",
    "startAddress": "2001:db8::",
    "endAddress": "2001:db8:0:ffff:ffff:ffff:ffff:ffff",
    "ipVersion": "v6",
    "name": "NET-RTR-1",
    "type": "DIRECT ALLOCATION",
    "country": "AU",
    "parentHandle": "YYYY-RIR",
    "status": [ "active" ],
    "links":
     [
        {
            "value": "https://example.net/ip/2001:db8::/48",
            "rel": "self",
            "href": "https://example.net/ip/2001:db8::/48",
            "type": "application/rdap+json"
        },
        {
            "value": "https://example.net/ip/2001:db8::/48",
            "rel": "geofeed",
            "href": "https://example.com/geofeed",
            "type": "application/geofeed+csv"
        },
        ...
    ],
    ...
}
```

3. Operational Considerations

When an RDAP client performs an IP network lookup, per Section 3.1.1 of [RFC9082], the RDAP server is required to return the most-specific IP network object that covers the IP address range provided by the client. That IP network object may not have an associated geofeed link, but it is possible that a less-specific IP network object does have such a link. Clients attempting to retrieve geofeed data for a given IP address range via RDAP should consider whether to retrieve the parent object for the initial response (and so on, recursively) in the event that the initial

response does not contain geofeed data. Conversely, server operators should consider interface options for resource holders in order to support the provisioning of geofeed links for all networks covered by the associated data.

It is common for a resource holder to maintain a single geofeed file containing the geofeed data for all of their resources. The resource holder then updates each of their network object registrations to refer to that single geofeed file. As with geofeed references in inetnum objects (per [RFC9632]), clients who find a geofeed link object within an IP network object and opt to retrieve the data from the associated link **MUST** ignore any entry where the entry's IP address range is outside the IP network object's address range.

Section 3.2 of [RFC8805] recommends that consumers of geofeed data verify that the publisher of the data is authoritative for the relevant resources. The RDAP bootstrap process [RFC9224] helps clients with this recommendation, since a client following that process will be directed to the RDAP server that is able to make authoritative statements about the disposition of the relevant resources.

To prevent undue load on RDAP and geofeed servers, clients fetching geofeed data using these mechanisms **MUST NOT** do frequent real-time lookups. See Section 6 of [RFC9632] for further details.

4. Privacy Considerations

All the privacy considerations from Section 7 of [RFC9632] apply to this document. In particular, the service provider publishing the geofeed file **MUST** take care not to expose the location of any individual.

Many jurisdictions have laws or regulations that restrict the use of "personal data", per the definition in [RFC6973]. Given that, registry operators should ascertain whether the regulatory environment in which they operate permits implementation of the functionality defined in this document.

5. Security Considerations

Section 6 of [RFC9632] documents several security considerations that are equally relevant in the RDAP context.

A geofeed file **MUST** be referenced with an HTTPS URL, per Section 6 of [RFC9632]. The geofeed file may also contain an RPKI signature, per Section 5 of [RFC9632].

Besides that, this document does not introduce any new security considerations past those already discussed in the RDAP protocol specifications ([RFC7481], [RFC9560]).

6. IANA Considerations

6.1. RDAP Extensions Registry

IANA has registered the following value in the "RDAP Extensions" registry at [RDAP-EXTENSIONS]:

Extension Identifier: geofeed1
Registry Operator: Any
Specification: RFC 9877
Contact: IETF <iesg@ietf.org>
Intended Usage: This extension describes version 1 of a method to access the IP geolocation feed data through RDAP.

6.2. Link Relations Registry

IANA has registered the following value in the "Link Relations" registry at [LINK-RELATIONS]:

Relation Name: geofeed
Description: Refers to a resource with IP geofeed location information related to the link context.
Reference: RFC 9877

6.3. Media Types Registry

IANA has registered the following media type in the "Media Types" registry at [MEDIA-TYPES]:

Type name: application

Subtype name: geofeed+csv

Required parameters: N/A

Optional parameters: "charset" is an optional parameter for "text/csv", but it is not used for "application/geofeed+csv" because the geofeed content is always in UTF-8 (Section 2.1 of [RFC8805]).

Encoding considerations: See Section 2 of [RFC9632].

Security considerations: See Section 5 of RFC 9877.

Interoperability considerations: There are no known interoperability problems regarding this media format.

Published specification: RFC 9877.

Applications that use this media type: Implementations of the Registration Data Access Protocol (RDAP) Extension for Geofeed Data. Furthermore, any application that processes the CSV geofeed data.

Additional information: This media type is a product of the IETF REGEXT Working Group. The REGEXT charter, information on the REGEXT mailing list, and other documents produced by the REGEXT Working Group can be found at [REGEXT].

Person & email address to contact for further information:
REGEXT Working Group <regext@ietf.org>

Intended usage: COMMON

Restrictions on usage: None

Authors: Tom Harrison, Jasdip Singh

Author/Change controller: IETF

6.4. Structured Syntax Suffixes Registry

IANA has registered the following value in the "Structured Syntax Suffixes" registry at [STRUCTURED-SYNTAX-SUFFIXES]:

Name: Comma-Separated Values (CSV)

+suffix: +csv

References: [RFC4180], [RFC7111]

Encoding Considerations: Same as "text/csv".

Interoperability Considerations: Same as "text/csv".

Fragment Identifier Considerations: The syntax and semantics of fragment identifiers specified for +csv **SHOULD** be as specified for "text/csv".

The syntax and semantics for fragment identifiers for a specific "xxx/yyy+csv" **SHOULD** be processed as follows:

- For cases defined in +csv, where the fragment identifier resolves per the +csv rules, then as specified for +csv.
- For cases defined in +csv, where the fragment identifier does not resolve per the +csv rules, then as specified for "xxx/yyy+csv".
- For cases not defined in +csv, then as specified for "xxx/yyy+csv".

Security Considerations: Same as "text/csv".

Contact: IETF <iesg@ietf.org>

Author/Change controller: IETF

7. References

7.1. Normative References

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7.2. Informative References

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[REGEXT] IETF, "Registration Protocols Extensions (regext)", <https://datatracker.ietf.org/wg/regext/>.

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[STRUCTURED-SYNTAX-SUFFIXES] IANA, "Structured Syntax Suffixes", <https://www.iana.org/assignments/media-type-structured-suffix/>.

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