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Redacted Fields in the Registration Data Access Protocol (RDAP) Response

Abstract

This document describes an RDAP extension for explicitly identifying redacted RDAP response fields, using JSONPath as the default expression language.

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1. Introduction

This document describes an RDAP extension for explicitly identifying redacted RDAP response fields, using JSONPath as the default expression language. A redacted RDAP field is one that has data removed from the RDAP response due to the lack of client privilege to receive the field. This extension can be used to identify redacted RDAP fields in any RDAP object class, as defined in [RFC7483], or RDAP fields defined in RDAP extensions. Because an RDAP response may exclude a field due to either the lack of data or based on the lack of RDAP client privileges, this extension is used to explicitly specify which RDAP fields are not included in the RDAP response due to redaction. It thereby provides a capability for disambiguation between redaction and possible other reasons for data or field absence.

JSONPath, as defined in [I-D.ietf-jsonpath-base], is used as the default expression language to reference RDAP fields that have been redacted. The redacted JSON fields will either be removed or have empty values in the RDAP response. JSON is defined by [RFC8259].

2. Conventions Used in This Document

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.

The JSON examples include extra line breaks and whitespace. For instance, the JSONPath expressions are broken out into multiple lines when required for illustration.

3. Redaction Methods

Redaction in RDAP can be handled in multiple ways. The use of placeholder text for the values of the RDAP fields, such as the placeholder text "XXXX", MUST NOT be used for redaction. A placeholder text value will not match the format requirements of each of the RDAP fields and provides an inconsistent and unreliable redaction signal. This section covers the redaction methods that can be used with the redaction signaling defined in [Section 4.2](#).

RDAP responses, as defined in [[RFC7483](#)], include a mix of JSON objects and JSON arrays, where JSON arrays are heavily used for entity objects with [jCard](#) [[RFC7095](#)]. [jCard](#) [[RFC7095](#)] is a JSON representation of [vCard](#) [[RFC6350](#)] that inherits its dependency on arrays. An example is the [vCard](#) [[RFC6350](#)] "ADR" property / [jCard](#) [[RFC7095](#)] "adr" property that defines a sequence of address components. According to [[RFC6350](#)], when an "ADR" property component value is missing, the associated component separator MUST still be specified. [jCard](#) [[RFC7095](#)] extends the use of arrays with each individual vCard property being represented by an array of three fixed elements, followed by one or more additional elements. The mix of JSON objects and JSON arrays impacts the methods used for redaction in RDAP. The redaction of RDAP fields fall into the two categories of [Redaction by Removal Method](#) ([Section 3.1](#)) and [Redaction by Empty Value Method](#) ([Section 3.2](#)), defined in the following sub-sections.

3.1. Redaction by Removal Method

The Redaction by Removal Method is when the RDAP field is removed from the RDAP response, which is the preferred method. The Redaction by Removal Method can be done for all RDAP response fields other than the JSON arrays used with [jCard](#) [[RFC7095](#)]. When an RDAP object is redacted by removal, all of the RDAP object's child fields are also removed. Only the redacted RDAP object needs to be referenced in the list of redacted fields, as defined in [Section 4.2](#). An example of redacting an RDAP object is removing the administrative contact from the RDAP response and including the following "redacted" member:

```

"redacted": [
  {
    "name": "Administrative Contact",
    "path": "$.entities[?(@.roles[0]=='administrative')]",
    "method": "removal"
    "reason": "Client request"
  }
]

```

The Redaction by Removal Method MUST NOT be used to remove a field from a [jCard \[RFC7095\]](#) fixed array position, which will result in a non-conformant [jCard \[RFC7095\]](#) array definition.

3.2. Redaction by Empty Value Method

The Redaction by Empty Value Method is when a redacted field is not removed, but its value is set to an empty value, such as "" for a [jCard \[RFC7095\]](#) Text ("text") property or null for non-Text ("text") properties. The empty [jCard \[RFC7095\]](#) values (" " or null) are referenced in the "redacted" member in place of the [jCard \[RFC7095\]](#) property name, such as referencing the "fn" jCard property value at position 3 instead of referencing the "fn" jCard property name at position 0. The Redaction by Empty Value Method SHOULD be used only when redacting JSON response fields that use [jCard \[RFC7095\]](#) arrays. Optional [jCard \[RFC7095\]](#) properties SHOULD use the [Redaction by Removal Method \(Section 3.1\)](#) to redact the entire property. The required [jCard \[RFC7095\]](#) "fn" property, defined in section 6.2.1 of [vCard \[RFC6350\]](#), MUST use the Redaction by Empty Value Method to redact the property value. Removing the "fn" property would violate [vCard \[RFC6350\]](#) and removing the property value would violate the fixed array positions defined in [jCard \[RFC7095\]](#).

An example of the redacted field "fn" jCard property using the Redaction by Empty Value Method:

```

[
  "fn",
  {},
  "text",
  ""
]

```

An example of the "redacted" member for the redacted "fn" jCard property value, which is array position 3:

```

"redacted": [
  {
    "name": "Registrant Name",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[0]=='fn')][3]",
    "pathLang": "jsonpath",
    "method": "emptyValue"
    "reason": "Server policy"
  }
]

```

4. Redacted RDAP Response

4.1. RDAP Conformance

RDAP responses that contain values described in this document MUST indicate conformance with this specification by including an `rdapConformance` ([[RFC7483](#)]) value of "redacted_0". The information needed to register this value in the RDAP Extensions Registry is described in [Section 6.1](#).

Example `rdapConformance` member with the redacted extension:

```

"rdapConformance" :
[
  "rdap_level_0",
  "redacted_0"
]

```

4.2. "redacted" Member

The "redacted" member MUST be added to the RDAP response when there are redacted fields. The "redacted" member contains an array of redacted objects with the following child members:

"name": A logical name for the redacted field. The logical name used for the redacted field is up to server policy. Conventions used for the chosen logical names MAY be defined in other documents to meet the needs of different RDAP services or industries.

"path": The JSON expression of the redacted field, using the expression language defined by the "pathLang" member. The JSON expression references a removed JSON field or an empty field value based on [Section 3](#).

"pathLang":

OPTIONAL JSON path expression language used, with the default value of "jsonpath" for JSONPath ([\[I-D.ietf-jsonpath-base\]](#)). Other JSON path expression languages MAY be used based on server policy.

"method": OPTIONAL redaction method used with "removal" indicating the [Redaction By Removed Method \(Section 3.1\)](#) and "emptyValue" indicating the [Redaction by Empty Value Method \(Section 3.2\)](#), with the default value of "removal".

"reason": OPTIONAL human readable reason(s) for the redacted field in the language defined by the [\[RFC7483\]](#) "lang" member. The default language is "en" if the [\[RFC7483\]](#) "lang" member is not specified. The "reason" member is provided for informational purposes and MUST NOT be a client processing dependency.

Example unredacted version of RDAP response:

```
{
  "rdapConformance": [
    "rdap_level_0"
  ],
  "objectClassName": "domain",
  "handle": "ABC123",
  "ldhName": "example.com",
  "securedNS": {
    "delegationSigned": false
  },
  "notices": [
    {
      "title": "Terms of Use",
      "description": [
        "Service subject to Terms of Use."
      ],
      "links": [
        {
          "rel": "self",
          "href": "https://www.example.com/terms-of-use",
          "type": "text/html",
          "value": "https://www.example.com/terms-of-use"
        }
      ]
    }
  ],
  "nameservers": [
    {
      "objectClassName": "nameserver",
      "ldhName": "ns1.example.com"
    },
    {
      "objectClassName": "nameserver",
      "ldhName": "ns2.example.com"
    }
  ],
  "entities": [
    {
      "objectClassName": "entity",
      "handle": "123",
      "roles": [
        "registrar"
      ],
      "publicIds": [
        {
          "type": "IANA Registrar ID",
          "identifier": "1"
        }
      ]
    }
  ],
}
```

```
"vcardArray": [  
  "vcard",  
  [  
    [  
      "version",  
      {},  
      "text",  
      "4.0"  
    ],  
    [  
      "fn",  
      {},  
      "text",  
      "Example Registrar Inc."  
    ],  
    [  
      "adr",  
      {},  
      "text",  
      [  
        "",  
        "Suite 100",  
        "123 Example Dr.",  
        "Dulles",  
        "VA",  
        "20166-6503",  
        "US"  
      ]  
    ],  
    [  
      "email",  
      {},  
      "text",  
      "contact@organization.example"  
    ],  
    [  
      "tel",  
      {  
        "type": "voice"  
      },  
      "uri",  
      "tel:+1.7035555555;ext=1234"  
    ],  
    [  
      "tel",  
      {  
        "type": "fax"  
      },  
      "uri",
```



```

        "tel:+1.7035555556"
    ]
]
],
"entities": [
    {
        "objectClassName": "entity",
        "roles": [
            "abuse"
        ],
        "vcardArray": [
            "vcard",
            [
                [
                    "version",
                    {},
                    "text",
                    "4.0"
                ],
                [
                    "fn",
                    {},
                    "text",
                    "Abuse Contact"
                ],
                [
                    "email",
                    {},
                    "text",
                    "abuse@organization.example"
                ],
                [
                    "tel",
                    {
                        "type": "voice"
                    },
                    "uri",
                    "tel:+1.7035555555;ext=1234"
                ]
            ]
        ]
    }
]
},
{
    "roles": [
        "registrant"
    ],
    "vcardArray": [

```

```
"vcard",
[
  [
    "version",
    {},
    "text",
    "4.0"
  ],
  [
    "fn",
    {},
    "text",
    "Registrant User"
  ],
  [
    "org",
    {},
    "text",
    "Example Inc."
  ],
  [
    "adr",
    {},
    "text",
    [
      "",
      "Suite 1235",
      "4321 Rue Somewhere",
      "Quebec",
      "QC",
      "G1V 2M2",
      "Canada"
    ]
  ],
  [
    "email",
    {},
    "text",
    "registrant.user@example.com"
  ],
  [
    "tel",
    {
      "type": "voice"
    },
    "uri",
    "tel:+1-555-555-1235;ext=123"
  ],
  [
```

```

        "tel",
        {
            "type": "fax"
        },
        "uri",
        "tel:+1-555-555-5321"
    ]
}
],
{
    "roles": [
        "technical"
    ],
    "vcardArray": [
        "vcard",
        [
            [
                "version",
                {},
                "text",
                "4.0"
            ],
            [
                "fn",
                {},
                "text",
                "Technical User"
            ],
            [
                "org",
                {},
                "text",
                "Example Inc."
            ],
            [
                "adr",
                {},
                "text",
                [
                    "",
                    "Suite 1234",
                    "4321 Rue Somewhere",
                    "Quebec",
                    "QC",
                    "G1V 2M2",
                    "Canada"
                ]
            ]
        ]
    ],

```

```

[
  "email",
  {},
  "text",
  "technical.user@example.com"
],
[
  "tel",
  {
    "type": "voice"
  },
  "uri",
  "tel:+1-555-555-1234;ext=321"
],
[
  "tel",
  {
    "type": "fax"
  },
  "uri",
  "tel:+1-555-555-4321"
]
]
},
{
  "roles": [
    "administrative"
  ],
  "vcardArray": [
    "vcard",
    [
      [
        "version",
        {},
        "text",
        "4.0"
      ],
      [
        "fn",
        {},
        "text",
        "Administrative User"
      ],
      [
        "org",
        {},
        "text",
        "Example Inc."
      ]
    ]
  ]
}

```

```

    ],
    [
      "adr",
      {},
      "text",
      [
        "",
        "Suite 1236",
        "4321 Rue Somewhere",
        "Quebec",
        "QC",
        "G1V 2M2",
        "Canada"
      ]
    ],
    [
      "email",
      {},
      "text",
      "administrative.user@example.com"
    ],
    [
      "tel",
      {
        "type": "voice"
      },
      "uri",
      "tel:+1-555-555-1236;ext=789"
    ],
    [
      "tel",
      {
        "type": "fax"
      },
      "uri",
      "tel:+1-555-555-6321"
    ]
  ]
}
],
"events": [
  {
    "eventAction": "registration",
    "eventDate": "1997-06-03T00:00:00Z"
  },
  {
    "eventAction": "last changed",
    "eventDate": "2020-05-28T01:35:00Z"
  }
]

```

```
    },
    {
      "eventAction": "expiration",
      "eventDate": "2021-06-03T04:00:00Z"
    }
  ],
  "status": [
    "server delete prohibited",
    "server update prohibited",
    "server transfer prohibited",
    "client transfer prohibited"
  ]
}
```

Example redacted version of RDAP response:

```
{
  "rdapConformance": [
    "rdap_level_0",
    "redacted_0"
  ],
  "objectClassName": "domain",
  "ldhName": "example.com",
  "securedDNS": {
    "delegationSigned": false
  },
  "notices": [
    {
      "title": "Terms of Use",
      "description": [
        "Service subject to Terms of Use."
      ],
      "links": [
        {
          "rel": "self",
          "href": "https://www.example.com/terms-of-use",
          "type": "text/html",
          "value": "https://www.example.com/terms-of-use"
        }
      ]
    }
  ],
  "nameservers": [
    {
      "objectClassName": "nameserver",
      "ldhName": "ns1.example.com"
    },
    {
      "objectClassName": "nameserver",
      "ldhName": "ns2.example.com"
    }
  ],
  "entities": [
    {
      "objectClassName": "entity",
      "handle": "123",
      "roles": [
        "registrar"
      ],
      "publicIds": [
        {
          "type": "IANA Registrar ID",
          "identifier": "1"
        }
      ]
    }
  ],
}
```

```
"vcardArray": [  
  "vcard",  
  [  
    [  
      "version",  
      {},  
      "text",  
      "4.0"  
    ],  
    [  
      "fn",  
      {},  
      "text",  
      "Example Registrar Inc."  
    ],  
    [  
      "adr",  
      {},  
      "text",  
      [  
        "",  
        "Suite 100",  
        "123 Example Dr.",  
        "Dulles",  
        "VA",  
        "20166-6503",  
        "US"  
      ]  
    ],  
    [  
      "email",  
      {},  
      "text",  
      "contact@organization.example"  
    ],  
    [  
      "tel",  
      {  
        "type": "voice"  
      },  
      "uri",  
      "tel:+1.7035555555"  
    ],  
    [  
      "tel",  
      {  
        "type": "fax"  
      },  
      "uri",
```



```

        "tel:+1.7035555556"
    ]
]
],
"entities": [
    {
        "objectClassName": "entity",
        "roles": [
            "abuse"
        ],
        "vcardArray": [
            "vcard",
            [
                [
                    "version",
                    {},
                    "text",
                    "4.0"
                ],
                [
                    "fn",
                    {},
                    "text",
                    "Abuse Contact"
                ],
                [
                    "email",
                    {},
                    "text",
                    "abuse@organization.example"
                ],
                [
                    "tel",
                    {
                        "type": "voice"
                    },
                    "uri",
                    "tel:+1.7035555555"
                ]
            ]
        ]
    }
]
},
{
    "roles": [
        "registrant"
    ],
    "vcardArray": [

```

```

"vcard",
[
  [
    "version",
    {},
    "text",
    "4.0"
  ],
  [
    "fn",
    {},
    "text",
    ""
  ],
  [
    "adr",
    {},
    "text",
    [
      "",
      "",
      "",
      "",
      "QC",
      "",
      "Canada"
    ]
  ]
]
],
{
  "roles": [
    "technical"
  ],
  "vcardArray": [
    "vcard",
    [
      [
        "version",
        {},
        "text",
        "4.0"
      ],
      [
        "fn",
        {},
        "text",
        ""
      ]
    ]
  ]
}

```

```

    ],
    [
        "org",
        {},
        "text",
        "Example Inc."
    ],
    [
        "adr",
        {},
        "text",
        [
            "",
            "Suite 1234",
            "4321 Rue Somewhere",
            "Quebec",
            "QC",
            "G1V 2M2",
            "Canada"
        ]
    ]
]
]
}
],
"events": [
    {
        "eventAction": "registration",
        "eventDate": "1997-06-03T00:00:00Z"
    },
    {
        "eventAction": "last changed",
        "eventDate": "2020-05-28T01:35:00Z"
    },
    {
        "eventAction": "expiration",
        "eventDate": "2021-06-03T04:00:00Z"
    }
],
"status": [
    "server delete prohibited",
    "server update prohibited",
    "server transfer prohibited",
    "client transfer prohibited"
],
"redacted": [
    {
        "name": "Registry Domain ID",
        "path": "$.handle",

```

```

    "pathLang": "jsonpath",
    "method": "removal",
    "reason": "Server policy"
  },
  {
    "name": "Registrant Name",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[0]=='fn')][3]",
    "pathLang": "jsonpath",
    "method": "emptyValue",
    "reason": "Server policy"
  },
  {
    "name": "Registrant Organization",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[0]=='org')]",
    "pathLang": "jsonpath",
    "method": "removal",
    "reason": "Server policy"
  },
  {
    "name": "Registrant Street",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[0]=='adr')][3][:3]",
    "pathLang": "jsonpath",
    "method": "emptyValue",
    "reason": "Server policy"
  },
  {
    "name": "Registrant City",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[0]=='adr')][3][3]",
    "pathLang": "jsonpath",
    "method": "emptyValue",
    "reason": "Server policy"
  },
  {
    "name": "Registrant Postal Code",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[0]=='adr')][3][5]",
    "pathLang": "jsonpath",
    "method": "emptyValue",
    "reason": "Server policy"
  },
  {
    "name": "Registrant Email",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[0]=='email')]",
    "method": "removal",

```

```

    "reason": "Server policy"
  },
  {
    "name": "Registrant Phone",
    "path": "$.entities[?(@.roles[0]=='registrant')].
      vcardArray[1][?(@[1].type=='voice')]",
    "method": "removal",
    "reason": "Server policy"
  },
  {
    "name": "Technical Name",
    "path": "$.entities[?(@.roles[0]=='technical')].
      vcardArray[1][?(@[0]=='fn')][3]",
    "method": "emptyValue",
    "reason": "Server policy"
  },
  {
    "name": "Technical Email",
    "path": "$.entities[?(@.roles[0]=='technical')].
      vcardArray[1][?(@[0]=='email')]",
    "method": "removal",
    "reason": "Server policy"
  },
  {
    "name": "Technical Phone",
    "path": "$.entities[?(@.roles[0]=='technical')].
      vcardArray[1][?(@[1].type=='voice')]",
    "method": "removal",
    "reason": "Server policy"
  },
  {
    "name": "Technical Fax",
    "path": "$.entities[?(@.roles[0]=='technical')].
      vcardArray[1][?(@[1].type=='fax')]",
    "reason": "Client request"
  },
  {
    "name": "Administrative Contact",
    "path": "$.entities[?(@.roles[0]=='administrative')]",
    "method": "removal",
    "reason": "Client request"
  }
]
}

```

5. JSONPath Considerations

[JSONPath](#) [[I-D.ietf-jsonpath-base](#)] is the default JSON path expression language. This section covers considerations for servers using [[I-D.ietf-jsonpath-base](#)] to identify redacted RDAP fields with the "path" member of redacted objects in the "redacted" member. The list of JSONPath considerations include:

1. Use absolute paths with the '\$' JSONPath element. An example is "\$.handle" for the "Registry Domain ID".
2. Validate a JSONPath expression using a non-redacted RDAP response, where evaluating the expression results in returning the redacted field.
3. Reference the removed object field when redacting an entire object by the [Redaction by Removal Method](#) ([Section 3.1](#)), where all of the object's child fields are explicitly removed. An example is "\$.entities[?(@.roles[0]=='administrative')]" for the entire "Administrative Contact".
4. Reference the removed field when using the [Redaction by Removal Method](#) ([Section 3.1](#)). An example is "\$.handle" for the "Registry Domain ID".
5. Reference index 0 of the [jCard](#) [[RFC7095](#)] property array, which is the [jCard](#) [[RFC7095](#)] "name" property, with a filter expression containing the name of the field, when redacting a [jCard](#) [[RFC7095](#)] field using the [Redaction by Removal Method](#) ([Section 3.1](#)). An example is "\$.entities[?(@.roles[0]=='registrant')].vcardArray[1][?(@[0]=='email')]" for the "Registrant Email".
6. Reference [jCard](#) [[RFC7095](#)] field value or values redacted by array index 3 and greater, when redacting a [jCard](#) [[RFC7095](#)] field using the [Redaction by Empty Value Method](#) ([Section 3.2](#)). The [jCard](#) [[RFC7095](#)] property array index 3 and greater contain the property values, where the property values set with an empty value are referenced directly in place of the [jCard](#) [[RFC7095](#)] property name. Servers can then systematically redact [jCard](#) [[RFC7095](#)] field value or values based on the JSONPath expressions and clients will directly know which [jCard](#) [[RFC7095](#)] property values have been redacted. An example is "\$.entities[?(@.roles[0]=='registrant')].vcardArray[1][?(@[0]=='fn')][3]" for the "Registrant Name" or "\$.entities[?(@.roles[0]=='registrant')].vcardArray[1][?(@[0]=='adr')][3][5]" for the "Registrant Postal Code".

6. IANA Considerations

6.1. RDAP Extensions Registry

IANA is requested to register the following value in the RDAP Extensions Registry:

Extension identifier: redacted_0

Registry operator: Any

Published specification: This document.

Contact: IESG <iesg@ietf.org>

Intended usage: This extension identifies the redacted fields in an RDAP response.

7. Security Considerations

The server including a redacted signal provides an unauthorized client additional information related to the existence of data. Servers MAY exclude the redacted members for RDAP fields that are considered a privacy issue in providing a data existence signal.

8. Acknowledgements

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9. References

9.1. Normative References

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