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DNS data mapping for use in RESTful Provisioning Protocol (RPP)

Abstract

This document proposes an RESTful Provisioning Protocol (RPP) mapping for the provisioning of various DNS data. Specified in JSON, the mapping is decibes common DNS record types used for domain provisioning as well as giving advice on how to adopt future record types.

The RFC Editor will remove this note

About This Document

This note is to be removed before publishing as an RFC.

The latest revision of this draft can be found at https://github.com/christian-simmen/draft-simmen-rpp-dns-data. Status information for this document may be found at https://datatracker.ietf.org/doc/draft-simmen-rpp-dns-data/.

Discussion of this document takes place on the WG Working Group mailing list (mailto:rpp@ietf.org), which is archived at https://mailarchive.ietf.org/arch/browse/rpp/. Subscribe at https://www.ietf.org/mailman/listinfo/rpp/.

Source for this draft and an issue tracker can be found at https://github.com/christian-simmen/draft-simmen-rpp-dns-data.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on 19 December 2025.

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1. Introduction

In EPP host objects [RFC5732] are introduced. In the context of domain name service provisioning those objects are used as delegation information (NS) with optional GLUE (A) records. By the time of writing new transport protocols are used for DNS like DNS over HTTPS [RFC8484] or DNS over QUIC [RFC9250]. Along with this development the need for more fine grained delegation information is emerging. The DELEG record type [I-D.draft-ietf-deleg] can be seen as an example. Apart from plain delegation information other DNS related data like DNSSEC information is common to be provisioned through EPP [RFC5910].

1.1. Domain Names in DNS

DNS domain names are hierachically ordered label separated by a dot ".". Each label may represent the delegation of a subordinate namespace or a host name. DNS resource records [RFC1035] are expressed as a dataset containing:

"NAME" "CLASS" "TYPE" "TTL" "RDATA"

A set of resource records describes the behavior of namespace.

1.1.1. NAME

A server **MUST NOT** accept a NAME which is not a subordinate label to the provisioned domain name or "@" representing the provisioned domain itself.

1.1.2. CLASS

A client **SHOULD** omit the CLASS. The server **MUST** assume "IN" as CLASS of a transferred dataset an **MAY** decline other values.

1.1.3. TYPE

The TYPE of data present in the RDATA. This also implies the expected fields in RDATA.

1.1.4. TTL

A server **MUST** set a default value as TTL and **MAY** decline other values. A client **MAY** omit this value.

1.1.5. RDATA

The RDATA structure depends on the TYPE and **MUST** be expressed as a JSON object. Property names **MUST** follow the definition of the RDATA described by the coresponding RFC.

1.2. JSON mapping

1.2.1. Domain delegation

To enable domain delegation a server **MUST** support the "NS", "A" and "AAAA" record types ([RFC1035],[RFC3596]).

A minimal delegation can be expressed by adding an array of nameservers to the dns data of a domain:

TODO Discuss naming "nsdname" vs. "host" vs "nameserver"

```
{
  "domain": "example.com",
  "dns": [
    {
      "name": "@",
      "type": "NS",
      "rdata": {
        "nsdname": "a.iana-servers.net."
      }
    },
    {
      "name": "@",
      "type": "NS",
      "rdata": {
        "nsdname": "b.iana-servers.net."
      }
    }
  ]
}
```

If GLUE records are needed the client may add records of type "A" or "AAAA" :

```
{
  "domain": "example.com",
  "dns": [
    {
      "name": "@",
      "type": "NS",
      "rdata": {
        "nsdname": "a.iana-servers.net."
      }
    },
    {
      "name": "@",
      "type": "NS",
      "rdata": {
        "nsdname": "ns.example.com"
      }
    },
    {
      "name": "ns.example.com",
      "type": "A",
      "rdata": {
        "address": "1.2.3.4"
      }
    },
    {
      "name": "ns.example.com",
      "type": "AAAA",
      "rdata": {
        "address": "dead::beef"
      }
    }
  ]
}
```

1.2.2. DNSSEC

To enable DNSSEC provisioning a server **SHOULD** support either "DS" or "DNSKEY" or both record types. The records **MUST** be added to the "dns" array of the domain

```
    {
      "domain": "example.com",
      "dns": [
        {
          "name": "@",
          "type": "NS",
          "rdata": {
            "nsdname": "a.iana-servers.net."
          }
        },
        {
          "name": "@",
          "type": "NS",
          "rdata": {
            "nsdname": "b.iana-servers.net."
          }
        },
        {
          "name": "@",
          "type": "DS",
          "rdata": {
            "key_tag": "370",
            "algorithm": 13,
            "digest_type": 2,
            "digest":
"BE74359954660069D5C63D200C39F5603827D7DD02B56F120EE9F3A86764247C"
          }
        }
      ]
    }
```

```
    {
      "domain": "example.com",
      "dns": [
        {
          "name": "@",
          "type": "NS",
          "rdata": {
            "nsdname": "a.iana-servers.net."
          }
        },
        {
          "name": "@",
          "type": "NS",
          "rdata": {
            "nsdname": "b.iana-servers.net."
          }
        },
        {
          "name": "@",
          "type": "DNSKEY",
          "rdata": {
            "flags": 257,
            "protocol": 3,
            "algorithm": 13,
            "public_key":
"kXKkvWU3vGYfTJGl3qBd4qhiWp5aRs7YtkCJxD2d+t7KXqwahww5IgJtxJT2yFItlggazyfXqJEV
OmMJ3qT0tQ=="
          }
        }
      ]
    }
```

1.2.3. Other DNS data

A server **MAY** support additional RR types, e.g. to support delegation-less provisioning.

```
{
  "domain": "example.com",
  "dns": [
    {
      "name": "@",
      "type": "A",
      "rdata": {
        "address": "1.2.3.4"
      }
    },
    {
      "name": "www.example.com",
      "type": "A",
      "rdata": {
        "address": "1.2.3.4"
      }
    },
    {
      "name": "@",
      "type": "AAAA",
      "rdata": {
        "address": "dead::beef"
      }
    },
    {
      "name": "www.example.com",
      "type": "A",
      "rdata": {
        "address": "dead::beef"
      }
    },
    {
      "name": "@",
      "type": "MX",
      "rdata": {
        "preference": "10",
        "exchange": "mx1.example.com"
      }
    },
    {
      "name": "mx1.example.com",
      "type": "A",
      "rdata": {
        "address": "5.6.7.8"
      }
    },
    {
      "name": "@",
      "type": "MX",
      "rdata": {
        "preference": "20",
        "exchange": "mx2.example.net"
      }
    },
    {
      "name": "@",
      "type": "TXT",
```

```
      "rdata": {
        "txt_data": "v=spf1 -all"
      }
    }
  ]
}
```

TODO Discuss enforcement of FQDN in "name", "nsdname" and "exchange"

1.2.4. Future DNS record types

Future record types may be added in the same way

1.3. Signaling supported record types

The server **MUST** provide a list of supported record types to the client.

TODO Add signaling to general signaling of server capabilities

2. Conventions and Definitions

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.

3. Security Considerations

A server **SHOULD** choose the supported record types wisely and **MAY** restrict the number of accepted entries. Also see security considerations of [RFC4627].

4. IANA Considerations

This document has no IANA actions.

5. References

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5.2. Informative References

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Acknowledgments

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