DNS AttrLeaf Changes:
Fixing Specifications That Use Underscored Node Names

Abstract

Using an underscore for a prefix creates a space for constrained
interoperation of resource records. Original uses of an underscore
character as a domain node name prefix were specified without the
benefit of an IANA registry. This produced an entirely uncoordinated
set of name-creation activities, all drawing from the same namespace.
A registry for these names has now been defined by RFC 8552.
However, the existing specifications that use underscored naming need
to be modified in order to be in line with the new registry. This
document specifies those changes. The changes preserve existing
software and operational practice, while adapting the specifications
for those practices to the newer underscore registry model.

Status of This Memo

This memo documents an Internet Best Current Practice.

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
BCPs 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/rfc8553.

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1. Introduction

   Original uses of an underscore character as a domain node name
   [RFC1035] prefix, which creates a space for constrained
   interpretation of resource records, were specified without the
   benefit of an IANA registry [IANA-reg]. This produced an entirely
   uncoordinated set of name-creation activities, all drawing from the
   same namespace. A registry has now been defined (see Section 4 of
   [RFC8552]); the RFC that defined it discusses the background for the
   use of underscored domain names [RFC8552].

The basic model for underscored name registration, as specified in
[RFC8552], is to have each registry entry be unique in terms of the
combination of a resource record type and a "global" (highest-level)
underscored node name; that is, the node name beginning with an
underscore that is the closest to the DNS root.

The specifications describing the existing uses of underscored naming
do not reflect the existence of this integrated registry. For the
new reader or the new editor of one of those documents, there is
currently nothing signaling that the underscored name(s) defined in
the document are now processed through an IANA registry. This
document remedies that, by marking such a published document with an
update that indicates the nature of the change.

Further, the documents that define the SRV [RFC2782] and URI
[RFC7553] DNS resource records provide a meta-template for
underscored name assignments, partially based on separate registries
[RFC6335]. For the portion that selects the global (highest-level)
underscored node name, this perpetuates uncoordinated assignment
activities by separate technical specifications, out of the same
namespace. This document remedies that by providing detail for
revisions to the SRV and URI specifications to bring their use in
line with the single, integrated "Underscored and Globally Scoped DNS
Node Names" registry.

The result of these changes preserves existing software and
operations practices while adapting the technical specifications to
the newer underscore registry model.

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.

2. Underscored RRset Use in Specifications

The use of underscored node names is specific to each RR TYPE that is
being scoped. Each name defines a place but does not define the
rules for what appears underneath that place, either as additional
underscored naming or as a leaf node with resource records. Details
for those rules are provided by specifications for individual RR
TYPEs. The sections below describe the way that existing underscored
names are used with the RR TYPEs that they name.

2.1. TXT RRset

     NOTE - Documents falling into this category include: [RFC5518],
        [RFC5617], [RFC6120], [RFC6376], [RFC6763], [RFC7208], and
        [RFC7489].

   This section provides a generic approach for changes to existing
   specifications that define straightforward use of underscored node
   names when scoping the use of a TXT RRset. The approach provides the
   information needed for adapting such specifications to the use of the
   IANA "Underscored and Globally Scoped DNS Node Names" registry
   [RFC8552]. Hence, the approach is meant both as an update to these
   existing specifications and as guidance for changes when those
   documents are revised.

   For any document that specifies the use of a TXT RRset under one or
   more underscored names, the global node name is expected to be
   registered in the IANA "Underscored and Globally Scoped DNS Node
   Names" registry [RFC8552]. An effort has been made to locate
   existing documents that do this, to register the global underscored
   node names, and to list them in the initial set of names added to the
   registry.

   If a public specification defines use of a TXT RRset and calls for
   the use of an underscored node name, here is a template of suggested
   text for registering the global underscored node name -- the one
   closest to the root -- that can be used through the IANA
   Considerations section of the specification:

     "Per [RFC8552], please add the following entry to the "Underscored
     and Globally Scoped DNS Node Names" registry:"

RR Type	_NODE NAME	Reference
TXT	_{DNS node name}	{citation for the document making the addition}

               Table 1: Entry for the "Underscored and Globally Scoped DNS
                      Node Names" Registry for TXT RR Use

2.2. SRV RRset

> NOTE - Documents falling into this category include:
>
>> [RFC3263], [RFC3529], [RFC3620], [RFC3832], [RFC3887],
>> [RFC3958], [RFC4120], [RFC4227], [RFC4386], [RFC4387],
>> [RFC4976], [RFC5026], [RFC5328], [RFC5389], [RFC5415],
>> [RFC5555], [RFC5679], [RFC5766], [RFC5780], [RFC5804],
>> [RFC5864], [RFC5928], and [RFC6186].

Specification of the SRV resource record [RFC2782] provides a
template for use of underscored node names. The global node name is
characterized as referencing the 'protocol' that is associated with
SRV RRset usage.

This section provides a generic approach for changes to existing
specifications that define the use of an SRV RRset. The approach
provides the information needed for adapting such specifications to
the use of the IANA "Underscored and Globally Scoped DNS Node Names"
registry [RFC8552]. Hence, the approach is meant both as an update
to these existing specifications and as guidance for changes when
those documents are revised.

For any document that specifies the use of an SRV RRset, the global
('protocol') underscored node name is expected to be registered in
the IANA "Underscored and Globally Scoped DNS Node Names" registry
[RFC8552]. An effort has been made to locate existing documents that
do this, to register the global underscored node names, and to list
them in the initial set of names added to the registry.

If a public specification defines use of an SRV RRset and calls for
the use of an underscored node name, here is a template of suggested
text for registering the global underscored node name -- the one
closest to the root -- that can be used through the IANA
Considerations section of the specification:

"Per [RFC8552], please add the following entry to the "Underscored
and Globally Scoped DNS Node Names" registry:

```
+----------+-----------------------+------------------------------+
| RR       | _NODE NAME            | Reference                    |
| Type     |                       |                              |
+----------+-----------------------+------------------------------+
| SRV      | _{DNS 'protocol'      | {citation for the document   |
|          | node name}            | making the addition}         |
+----------+-----------------------+------------------------------+
```

Table 2: Entry for the "Underscored and Globally Scoped DNS Node
               Names" Registry for SRV RR Use

2.3. URI RRset

Specification of the URI resource record [RFC7553] provides a
template for use of underscored node names. The global node name is
characterized as naming the 'protocol' that is associated with URI RR
usage or by reversing an Enumservice sequence [RFC6117].

This section provides a generic approach for changes to existing
specifications that define use of a URI RRset. The approach provides
the information needed for adapting such specifications to the use of
the IANA "Underscored and Globally Scoped DNS Node Names" registry
[RFC8552]. Hence, the approach is meant both as an update to these
existing specifications and as guidance for changes when those
documents are revised.

For any document that specifies the use of a URI RRset, the global
('protocol' or highest-level Enumservice) underscored node name is
expected to be registered in the IANA "Underscored and Globally
Scoped DNS Node Names" registry [RFC8552]. An effort has been made
to locate existing documents that do this, to register the global
underscored node names, and to list them in the initial set of names
added to the registry.

If a public specification defines use of a URI RRset and calls for
the use of an underscored node name, here is a template of suggested
text for registering the global underscored node name -- the one
closest to the root -- that can be used through the IANA
Considerations section of the specification:

"Per [RFC8552], please add the following entry to the "Underscored
and Globally Scoped DNS Node Names" registry:

```
+--------+----------------------------+----------------------------+
| RR     | _NODE NAME                 | Reference                  |
| Type   |                            |                            |
+--------+----------------------------+----------------------------+
| URI    | _{DNS 'protocol' or        | {citation for the document |
|        | Enumservice node name}     | making the addition}       |
+--------+----------------------------+----------------------------+
```

Table 3: Entry for the "Underscored and Globally Scoped DNS Node
Names" Registry for URI RR Use

3. Underscored Template Specifications

3.1. SRV Specification Changes

The specification for a domain name, under which an SRV resource
record [RFC2782] appears, provides a template for use of underscored
node names. The global underscored node name is characterized as
indicating the 'protocol' that is associated with SRV RR usage.

The text of [RFC2782] is changed as described below. In addition,
note that a normative reference to RFC 8552 is added to the
References section of RFC 2782.

   OLD:

The format of the SRV RR

 Here is the format of the SRV RR, whose DNS type code is 33:
      _Service._Proto.Name TTL Class SRV Priority Weight Port Target
 ...
 Proto
      The symbolic name of the desired protocol, with an underscore
      (_) prepended to prevent collisions with DNS labels that occur
      in nature. _TCP and _UDP are at present the most useful values
      for this field, though any name defined by Assigned Numbers or
      locally may be used (as for Service). The Proto is case
      insensitive.

   NEW:

      The format of the SRV RR

      Here is the format of the SRV RR, whose DNS type code is 33:

         "_Service._Proto.Name TTL Class SRV Priority Weight Port
         Target"

         _..._

      Proto

         The symbolic name of the desired protocol with an underscore
         (e.g., "_name") prepended to prevent collisions with DNS
         labels that occur in nature. _TCP and _UDP are at present
         the most useful values for this field. The Proto is case
         insensitive.

         The SRV RRset 'protocol' (global) underscored node name
         SHOULD be registered in the IANA "Underscored and Globally
         Scoped DNS Node Names" registry [RFC8552].

3.2. URI Specification Changes

   Specification for the domain name (under which a URI resource record
   [RFC7553] occurs) is similar to that for the SRV resource record
   [RFC2782], although the text refers only to 'service' name, rather
   than distinguishing 'service' from 'protocol'. Further, the URI RR
   specification permits alternative underscored naming schemes:

      One matches what is used for SRV, with the global underscored node
      name called 'protocol'.

      The other is based on a reversing of an Enumservice [RFC6117]
      sequence.

   Text of [RFC7553] is changed as described below. In addition, a
   normative reference to RFC 8552 is added to the References section of
   RFC 7553.

   OLD:

4.1. Owner Name, Class, and Type

The URI owner name is subject to special conventions.

Just like the SRV RR [RFC2782], the URI RR has service information
encoded in its owner name. In order to encode the service for a
specific owner name, one uses service parameters. Valid service
parameters are those registered by IANA in the "Service Name and
Transport Protocol Port Number Registry" [RFC6335] or as "Enumservice
---
Registrations [RFC6117]. The Enumservice Registration parameters are
reversed (i.e., subtype(s) before type), prepended with an underscore
(_), and prepended to the owner name in separate labels. The
underscore is prepended to the service parameters to avoid collisions
with DNS labels that occur in nature, and the order is reversed to
make it possible to do delegations, if needed, to different zones
(and therefore providers of DNS).

For example, suppose we are looking for the URI for a service with
ENUM Service Parameter "A:B:C" for host example.com. Then we would
query for (QNAME,QTYPE)=("_C._B._A.example.com","URI").

As another example, suppose we are looking for the URI for a service
with Service Name "A" and Transport Protocol "B" for host
example.com. Then we would query for
(QNAME,QTYPE)=("_A._B.example.com","URI").

   NEW:

   4.1. Owner Name, Class, and Type

   The URI owner name is subject to special conventions.

   As for the SRV RRset [RFC2782], the URI RRset global (highest-
   level) underscored node name SHOULD be registered in the IANA
   "Underscored and Globally Scoped DNS Node Names" registry
   [RFC8552].

   Just like the SRV RRset, the URI RRset has service information
   encoded in its owner name. In order to encode the service for
   a specific owner name, one uses service parameters. Valid
   service parameters are:

   + Those registered by IANA in the "Service Name and Transport
      Protocol Port Number Registry" [RFC6335]. The underscore is
      prepended to the service parameters to avoid collisions with

DNS labels that occur in nature, and the order is reversed
to make it possible to do delegations, if needed, to
different zones (and therefore providers of DNS).

+ Those listed in "Enumservice Registrations" [RFC6117]. The
   Enumservice Registration parameters are reversed (i.e.,
   subtype(s) before type), prepended with an underscore (e.g.,
   "_name"), and prepended to the owner name in separate
   labels. The highest-level (global) underscored Enumservice
   name becomes the global name per RFC 8552 to register.

For example, suppose we are looking for the URI for a service
with ENUM Service Parameter "A:B:C" for host example.com. Then
we would query for
(QNAME,QTYPE)=("_C._B._A.example.com","URI").

As another example, suppose we are looking for the URI for a
service with Service Name "A" and Transport Protocol "B" for
host example.com. Then we would query for
(QNAME,QTYPE)=("_A._B.example.com","URI").

3.3. DNSSEC Signaling Specification Changes

"Signaling Trust Anchor Knowledge in DNS Security Extensions
(DNSSEC)" [RFC8145] defines a use of DNS node names that effectively
consumes all names beginning with the string "_ta-" when using the
NULL RR in the query.

Text of Section 5.1, "Query Format", of RFC 8145 is changed as
described below. In addition, a normative reference to RFC 8552 is
added to the References section of RFC 8145.

OLD:

For example, a validating DNS resolver ...
                          QNAME=_ta-4444.

NEW:

For example, a validating DNS resolver ...   "QNAME=_ta-4444".

Under the NULL RR, an entry is registered in the IANA
"Underscored and Globally Scoped DNS Node Names" registry
[RFC8552] for all node names beginning with "_ta-".

4. IANA Considerations

   Although this document makes reference to IANA registries, it
   introduces no new IANA registries or procedures.

5. Security Considerations

   This memo raises no security issues.

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