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# 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 Type | _NODE NAME | Reference |
|---|---|---|
| SRV | _{DNS 'protocol' node name} | {citation for the document 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 Type | _NODE NAME | Reference |
|---|---|---|
| URI | _{DNS 'protocol' or Enumservice node name} | {citation for the document 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
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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.

## 6. References

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