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# The .alt Special-Use Top-Level Domain

## Abstract

This document reserves a Top-Level Domain (TLD) label "alt" to be used in non-DNS contexts. It also provides advice and guidance to developers creating alternative namespaces.

## 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/rfc9476.



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## 1. Introduction

Many Internet protocols need to name entities. Names that look like DNS names (a series of labels separated with dots) have become common, even in systems that are not part of the global DNS administered by IANA. This document reserves the top-level label "alt" (short for "alternative") as a special-use domain name [RFC6761]. This top-level label can be used as the final (rightmost) label to signify that the name is not rooted in the global DNS and that it should not be resolved using the DNS protocol.

Throughout the rest of this document, the top-level "alt" label is shown as ".alt" to match the common presentation form of DNS names.

As detailed in Section 3.1, IANA has added the .alt name to the "Special-Use Domain Name" registry. IANA sets aside names in that registry, as described in <https://www.iana.org/domains/reserved>.

The techniques in this document are primarily intended to address some of the issues discussed in [RFC8244], which contains additional background on the issues with special-use domain names.

In this document, ".alt" was chosen for the special-use domain name instead of something like "alt.arpa" so that systems that use the name do not have to worry that a parent of their name would be resolved if the name leaked to the Internet. Historically, some systems that want to use non-DNS names wanted the entire name to be not in the DNS, and reserving ".alt" fulfills that use case.

### 1.1. Terminology

This document assumes familiarity with DNS terms; please see [RFC8499]. Terminology that is specific to this document is:

DNS name: Domain names that are intended to be used with DNS resolution, either in the global DNS or in some other context.

DNS context: The namespace anchored at the globally unique DNS root and administered by IANA. This is the namespace or context that "normal" DNS uses.

non-DNS context: Any other (alternative) namespace.

pseudo-TLD: A label that appears in a fully qualified domain name in the position of a TLD, which is not part of the global DNS. This term is not intended to be pejorative.

TLD: See the definition in Section 2 of [RFC8499].

### 1.2. Requirements Terminology

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. The .alt Namespace

This document reserves the .alt label for use as an unmanaged pseudo-TLD namespace. The .alt label can be used in any domain name as a pseudo-TLD to signify that this is an alternative (non-DNS) namespace and should not be looked up in a DNS context.

This document uses ".alt" for the pseudo-TLD in the presentation format for the DNS, corresponding to a 0x03616c7400 suffix in DNS wire format. The on-the-wire formats for non-DNS protocols might be different.

Because names beneath .alt are in an alternative namespace, they have no significance in the regular DNS context. DNS stub and recursive resolvers do not need to look them up in the DNS context.

DNS resolvers that serve the DNS protocol and non-DNS protocols at the same time might consider .alt like a DNS entry in the "Transport-Independent Locally-Served DNS Zone Registry" that is part of IANA's "Locally-Served DNS Zones" registry, except that .alt is always used to denote names that are to be resolved by non-DNS protocols. Note that this document does not request adding .alt to these registries because .alt, by this specification, is not a DNS name.

Note that using .alt as a pseudo-TLD does not mandate how the non-DNS protocol will handle the name. To maximize compatibility with existing applications, it is suggested, but not required, that non-DNS protocols using names that end in .alt follow DNS name syntax. If the non-DNS protocol has a wire format like the DNS wire format, it might append the null label at the end of the name, but it also might not. This document does not make any suggestion for how non-DNS protocols deal with the wire format of their names.

Groups wishing to create new alternative namespaces may create their alternative namespace under a label that names their namespace under the .alt pseudo-TLD. This document defines neither a registry nor a governance model for the .alt namespace, as it is not managed by the IETF or IANA. There is no guarantee of unambiguous mappings from names to name resolution mechanisms. Mitigation or resolution of collisions that occur under .alt are outside the scope of this document and outside the IETF's remit. Users are advised to consider the associated risks when using names under .alt.

Regardless of the expectations above, names in the .alt pseudo-TLD will leak outside the context in which they are valid. Decades of experience show that such names will appear at recursive resolvers and will thus also appear at the root servers for the global DNS.

Sending traffic to the root servers that is known to always elicit an NXDOMAIN response, such as queries for names ending in .alt, wastes

resources on both the resolver and the root server. Caching resolvers performing aggressive use of DNSSEC-validated caches (described in [RFC8198]) may mitigate this by synthesizing negative answers from cached NSEC records for names under .alt. Similarly, caching resolvers using QNAME minimization (described in [RFC9156]) will cause less of this traffic to the root servers because the negative responses will cover all names under .alt.

Currently deployed projects and protocols that are using pseudo-TLDs are recommended to move under the .alt pseudo-TLD, but this is not a requirement. Rather, the .alt pseudo-TLD is being reserved so that current and future projects of a similar nature have a designated place to create alternative resolution namespaces that will not conflict with the regular DNS context.

## 3. IANA Considerations

### 3.1. Special-Use Domain Name Registry

The IANA has added the .alt name to the "Special-Use Domain Name" registry [RFC6761] with a reference to this RFC.

### 3.2. Domain Name Reservation Considerations

This section exists to meet the requirements of [RFC6761]. The questions posed in [RFC6761] were largely written assuming a DNS resolution system, and so some of the questions are not especially relevant or well suited.

1. Users might or might not recognize that names in the .alt pseudo-TLD as special.

2. Application software that uses alternative namespaces in the .alt pseudo-TLD are expected to have their own processing rules for their own names, probably in specialized resolver APIs, libraries, and/or application software. Application software that is not specifically designed to use names in the .alt pseudo-TLD are not expected to make their software recognize these names as special.

3. Developers of name resolution APIs and libraries that are specifically designed to implement resolution of an alternative name resolution system are expected to recognize names in the .alt pseudo-TLD as special and thus perform resolution of those names. The exact mechanism used by the name resolution APIs and libraries will obviously depend on the particular alternative resolution system. Regular DNS resolution APIs and libraries are not expected to recognize or treat names in the .alt pseudo-TLD differently.

4. Caching DNS servers SHOULD NOT recognize names in the .alt pseudo-TLD as special and SHOULD NOT perform any special handling with them.

5. Authoritative DNS servers SHOULD NOT recognize names in the .alt pseudo-TLD as special and SHOULD NOT perform any special handling

with them.

6. DNS server operators will treat names in the .alt pseudo-TLD as they would names in any other TLD not in the global DNS. DNS server operators may be aware that queries for names ending in .alt are not DNS names and that queries for those names were leaked into the DNS context. This information can be useful for support or debugging purposes.

7. It is not possible for DNS registries/registrars to register DNS names in the .alt pseudo-TLD as the .alt will not exist in the global DNS root.

## 4. Privacy Considerations

This document reserves .alt to be used to indicate that a name is not a DNS name. Unfortunately, these queries will undoubtedly leak into the global DNS. This is a general problem with alternative namespaces and not confined to names ending in .alt.

For example, a value such as "example.alt" could easily cause a privacy issue for any names in that namespace that are leaked to the Internet. In addition, if a name ending in .alt is sufficiently unique, long-lasting, and frequently leaks into the global DNS, then regardless of how the name is constructed, it can act similar to a web cookie with all the associated downsides of identification or re-identification.

## 5. Security Considerations

Because names in the .alt pseudo-TLD are explicitly outside of the DNS context, it is impossible to rely on any DNS-related security considerations. Care must be taken when mapping the pseudo-TLD into its corresponding non-DNS name resolution system in order to get whatever security is offered by that system.

## 6. References

### 6.1. Normative References


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### 6.2. Informative References


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[RFC9156] Bortzmeyer, S., Dolmans, R., and P. Hoffman, "DNS Query Name Minimisation to Improve Privacy", RFC 9156, DOI 10.17487/RFC9156, November 2021, <https://www.rfc-editor.org/info/rfc9156>.


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