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Problem Statement for Fully Mapping One Name to Another Name
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Abstract

This document specifies the problems related to fully mapping one name to another name. With the emergence of internationalized domain names and new TLDs, it is often useful to redirect one domain name tree fully to another domain name tree. Current DNS protocols have not provided such ability to satisfy these requirements.

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[1.](#) Introduction

With the emergence of internationalized domain names and new TLDs, two names may be used to identify the same thing. In this case, it is useful to redirect one name space fully to another name space. There are many use cases for it. Some examples are shown below.

[1.1.](#) Use Case 1: Bundled domain names

Bundled domain names share the same TLD but their second level labels are variants, or have identical second level labels in specific TLDs. For example, Public Interest Registry, has implemented technical bundling of second level domains in .NGO and .ONG. So we have two kinds of bundled domain names. The first one is of the form "V-label.TLD" in which the second level labels (V-label) are variants sharing the same TLD; The second one is of the form "LABEL.V-tld" in which the second level labels (LABEL) are the same, but in different TLDs (V-tld). Bundled domain names usually need to map themselves and their descendants together.

For example:

example.com == example.net same label ending with different TLDs

color.com == colour.com different labels ending with the same TLD

1.2. Use Case 2: a company registers the same label in different TLDs.

With the emergence growth of gTLDs, it is very common for a registrant to register one label under many TLDs, but the registrant may just use one label under one TLD as the primary domain name, with others less important. The registrant may want to have all these domain names share similar or the same DNS resolution. So the DNS administrator wants a convenient method to configure these domain names in DNS.

2. Terminology

All the basic terms used in this specification are defined in the documents [[RFC1034](#)], [[RFC1035](#)], [[RFC3490](#)] and [[RFC6672](#)].

3. Problem Statement

With the emergence of internationalized domain names and new TLDs, a DNS operator often wishes to redirect one name space fully to another name space. A CNAME record can in some cases map a single name to another single name. If one domain name is mapped another domain name, the CNAME will be used for that name. A DNAME can map a name's descendants to descendants of another domain. If we want to map both a name and its descendants, there's no way to do so with current protocols. We need to design a mechanism to deal with this requirement.

3.1. Mapping a single name itself

A host can have many names. The Internet users need these multiple names to be resolved to the same IP address by a DNS server. CNAME record [[RFC1034](#)], an abbreviation of Canonical Name Records, is responsible for the aliases of the real host name of a computer. In some cases, the CNAME can work for these bundled domain names. But the CNAME only maps itself, not its descendants. The bundled names need to map both the name and its variants.

3.2. Mapping a name's descendants

In order to maintain the address-to-name mappings in a context of network renumbering, a DNAME record or Delegation Name record defined by [[RFC6672](#)] creates an alias for all of a name's subdomains. In

contrast, the CNAME record creates an alias only of a single name (and not of its subdomains). Like the CNAME record, the DNS lookup will continue by retrying the lookup with the new name.

A DNAME record is very much like a CNAME record, but while the CNAME record only applies for one name, with a DNAME record one can create aliases for all the the names in its subdomains.

3.3. Mapping a name and its descendants

The bundle of variant domain names requires mapping of a whole tree of the domain space to another domain. The current DNS protocols do not support this function.

3.4. Cloning a zone

A mechanism for processing master files or their equivalent in a DNS server could direct that server to exactly replicate the content of a DNS zone into one or more other DNS zones so that the content is reachable by multiple names at different zone apexes. A problem for this method is that it cannot deal with child names that are delegated.

4. Application handling of bundled names

Even if the DNS publishes records for all of the names in a bundle, applications frequently do not work because they do not recognize the names. One of the authors sampled names in the .CAT top-level-domain, which uses DNAME records to map versions of domain names with accented characters to the unaccented version. In most cases, web servers returned an error page or a default page for the accented versions of names, because they were not configured to recognize those names.

It would be technically straightforward in many cases for servers to automatically configure themselves to handle variant names. for example, if a web server received a request with an unrecognized name, it could do a DNS lookup on the name and if it found, say, a BNAME record, it could treat the request as equivalent to a request to the target of the BNAME.

This introduces security issues, described below.

5. IANA Considerations

There is no IANA consideration.

6. Security Considerations

The CNAME, DNAME, and proposed BNAME records [[BNAME](#)] all provide the ability to make a name or set of names "the same" as target names without cooperation or permission from the target. This could allow a malicious party to point a deceptive or misleading name at an innocent victim name. If applications automatically configured themselves to handle BNAMEs, this could create inadvertently deceptive web sites.

The CLONE record largely avoids this problem, since the set of alias names is under control of the owner of the target names.

7. Acknowledgements

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8. Change History

[[CREF1: RFC Editor: Please remove this section.]]

8.1. [draft-yao-bundled-name-problem-statement](#): Version 00

- o Problem Statement for Fully Mapping One Name to Another Name

8.2. [draft-yao-bundled-name-problem-statement](#): Version 01

- o Adding section "Application handling of bundled names"
- o Adding section "Security Considerations"
- o Refine the text

8.3. [draft-yao-bundled-name-problem-statement](#): Version 02

- o Refine the text

8.4. [draft-yao-bundled-name-problem-statement](#): Version 03

- o Refine use cases and the text

9. References

9.1. Normative References

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- [RFC3490] Faltstrom, P., Hoffman, P., and A. Costello, "Internationalizing Domain Names in Applications (IDNA)", [RFC 3490](#), DOI 10.17487/RFC3490, March 2003, <<http://www.rfc-editor.org/info/rfc3490>>.
- [RFC6672] Rose, S. and W. Wijngaards, "DNAME Redirection in the DNS", [RFC 6672](#), DOI 10.17487/RFC6672, June 2012, <<http://www.rfc-editor.org/info/rfc6672>>.

9.2. Informative References

- [BNAME] Yao, J., Lee, X., and P. Vixie, "Bundle DNS Name Redirection", [draft-yao-dnsext-bname-06.txt](#) (work in progress), 05 2016.

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