Special-Use Domain Names
draft-cheshire-dnsext-special-names-01

Abstract

   This document describes what it means to say that a DNS name is
   reserved for special use, when reserving such a name is appropriate,
   and the procedure for doing so.

Status of this Memo

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

   Internet-Drafts are working documents of the Internet Engineering
   Task Force (IETF). Note that other groups may also distribute working
   documents as Internet-Drafts. The list of current Internet-Drafts is
   at http://datatracker.ietf.org/drafts/current/.

   Internet-Drafts are draft documents valid for a maximum of six months
   and may be updated, replaced, or obsoleted by other documents at any
   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on July 16, 2011.

1. Introduction

   Certain individual IP addresses and IP address ranges are treated
   specially by network implementations, and consequently are not
   suitable for use as unicast addresses. For example, IPv4 addresses
   224.0.0.0 to 239.255.255.255 are multicast addresses [RFC2606], with
   224.0.0.1 being the "all hosts" multicast address [RFC1112]
   [RFC5771]. Another example is 127.0.0.1, the IPv4 "local host"
   address [RFC5735].

   Analogous to Special-Use IPv4 Addresses [RFC5735], DNS has its own
   concept of reserved names, such as "example.com", "example.net", and
   "example.org", or any name falling under the top level pseudo-domain
   "invalid" [RFC2606]. However, "Reserved Top Level DNS Names"
   [RFC2606] does not state whether implementations are expected to
   treat such names differently, and if so, in what way.

2. Applicability

   When IP multicast was created [RFC1112], implementations had to be
   updated to understand what a multicast address means and what to do
   with it. Adding IP multicast to a networking stack entailed more than
   merely adding the right routing table entries for those addresses.
   Moreover, supporting IP multicast entails some level of commonality
   that is consistent across all conformant hosts, independent of what
   networks those hosts may be connected to. While it is possible to
   build a private isolated network using whatever valid unicast IP
   addresses and routing topology you choose (regardless of whether
   those unicast IP addresses are already in use by other hosts on the
   public Internet) the IPv4 multicast address 224.0.0.1 is always the
   "all hosts" multicast address and that's not a local decision.

   Similarly, if a domain name has special properties that affect the
   way hardware and software implementations handle the name, which
   apply universally regardless of what network the implementation may
   be connected to, then that may be a candidate for having the IETF
   declare the name to be a Special-Use Domain Name and specify what
   special treatment implementations should give to that name. If
   declaring a given name to be special would result in no change to any
   implementations, then that suggests that the name may not be special
   in any material way, and it may be more appropriate to use the
   existing DNS mechanisms [RFC1034] to provide the desired delegation,
   data, or lack-of-data for the name in question. Where the desired
   behaviour can be achieved via the existing domain name registration
   processes, that process should be used. Reservation of a Special-Use
   Domain Names is not a mechanism for circumventing normal domain name
   registration processes.

[3](#). Procedure

If it is determined that special handling of a name is required in order to implement some desired new functionality, then an IETF "Standards Action" RFC [[RFC5226](#)] needs to be published describing the new functionality, and:

o The RFC needs to state how implementations determine that the special handling is required for any given name. This is typically done by stating that any fully-qualified domain names ending in a certain suffix (i.e. falling within a specified parent pseudo-domain) will receive the special behaviour. In effect this carves off a sub-tree of the DNS namespace in which the modified name treatment rules apply, analogous to how IP multicast [[RFC1112](#)] or IP link-local addresses [[RFC3927](#)] [[RFC4862](#)] carve off chunks of the IP address space in which their respective modified address treatment rules apply.

o The RFC needs to state, in each of the seven categories below, what special treatment, if any, is to be applied. If the answer in all seven categories is "none", then possibly no special treatment is required and requesting reservation of a Special-Use Domain Name may not be appropriate.

[4](#). Domain Name Reservation Considerations

An IETF "Standards Action" RFC specifying some new naming behaviour, which requires a Special-Use Domain Name be reserved to implement this desired new behaviour, needs to contain a "Domain Name Reservation Considerations" section giving answers in the following seven categories:

1. Users:

   Are human users expected to recognize these names as special and use them differently? In what way?

2. Application Software:

   Are writers of application software expected to make their software recognize these names as special and treat them differently? In what way? (e.g. if a human users enters such a name, should the application software reject it with an error message?)

3. Name Resolution APIs and libraries:

   Are writers of name resolution APIs and libraries expected to make
   their software recognize these names as special and treat them
   differently? If so, how?

4. Caching DNS Servers:

   Are developers of caching DNS name servers expected to make their
   implementations recognize these names as special and treat them
   differently? If so, how?

5. Authoritative DNS Servers:

   Are developers of authoritative DNS name servers expected to make
   their implementations recognize these names as special and treat
   them differently? If so, how?

6. DNS Server Operators:

   Does this reserved Special-Use Domain Name have any potential
   impact on DNS server operators? If they try to configure their
   authoritative DNS server as authoritative for this reserved name
   will compliant name server software reject it as invalid? Do DNS
   server operators need to know about that and understand why? Even
   if the name server software doesn't prevent them from using this
   reserved name, are there other ways that it may not work as
   expected, which the DNS server operator should be aware of?

7. DNS Registrars:

   How should DNS Registrars treat requests to register this reserved
   domain name? Should such requests be denied? Should such requests
   be allowed, but only to a specially-designated entity? (For
   example, the name "www.example.org" is reserved for documentation
   examples and is not available for registration; however, the name
   is in fact registered; and there is even a web site at that name,
   which states circularly that the name is reserved for use in
   documentation and cannot be registered!)

5. Security Considerations

   This document outlines the circumstances in which reserving a domain
   name for special-use is appropriate, and the procedure for having
   that Special-Use Domain Name recorded by IANA. Any document
   requesting such a Special-Use Domain Name needs to contain an
   appropriate "Security Considerations" section which describes any
   security issues relevant to that special use.

6. IANA Considerations

   IANA needs to create a new registry of Special-Use Domain Names.

   When IANA receives a request to record a new "Special-Use Domain
   Name" it should verify that the IETF "Standards Action" RFC [RFC5226]
   includes the required "Domain Name Reservation Considerations"
   section stating how the special meaning of this name affects the
   behaviour of hardware, software, and humans in the seven categories,
   and if so, record in the registry the Special-Use Domain Name and a
   reference to the RFC that documents it.

7. Informative References

   [RFC1034] Mockapetris, P., "Domain names - concepts and facilities",
              STD 13, RFC 1034, November 1987.

   [RFC1112] Deering, S., "Host extensions for IP multicasting", STD 5,
              RFC 1112, August 1989.

   [RFC2606] Eastlake, D. and A. Panitz, "Reserved Top Level DNS
              Names", BCP 32, RFC 2606, June 1999.

   [RFC3927] Cheshire, S., Aboba, B., and E. Guttman, "Dynamic
              Configuration of IPv4 Link-Local Addresses", RFC 3927,
              May 2005.

   [RFC4862] Thomson, S., Narten, T., and T. Jinmei, "IPv6 Stateless
              Address Autoconfiguration", RFC 4862, September 2007.

   [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an
              IANA Considerations Section in RFCs", BCP 26, RFC 5226,
              May 2008.

   [RFC5735] Cotton, M. and L. Vegoda, "Special Use IPv4 Addresses",
              BCP 153, RFC 5735, January 2010.

   [RFC5771]   Cotton, M., Vegoda, L., and D. Meyer, "IANA Guidelines for
               IPv4 Multicast Address Assignments", BCP 51, RFC 5771,
               March 2010.

Authors' Addresses

   Stuart Cheshire
   Apple Inc.
   1 Infinite Loop
   Cupertino, California 95014
   USA

   Phone: +1 408 974 3207
   Email: cheshire@apple.com

   Marc Krochmal
   Apple Inc.
   1 Infinite Loop
   Cupertino, California 95014
   USA

   Phone: +1 408 974 4368
   Email: marc@apple.com