Resource Record for Signaling Transport for DNS to Authority Servers

Abstract

This Internet Draft proposes an RRTYPE to signal explicit support
for transport types for DNS service. This new RRTYPE is "DNST". The
available transports to signal are TCP and UDP on port 53 (DNS), and
DoT (DNS over TLS) transport using TCP port 853.

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

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1. Introduction

2. Conventions and Definitions

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.

3. Background

DNS over TLS is defined in [RFC7858]. However, there is no explicit
signaling for when DoT should be used. Without explicit signaling,
there is no protection against downgrade attacks by an on-path
attacker.

4. Remove Before Publication

Notes on design decisions, including the decision NOT to use an
SVCB-compatible format:

  *NS records MUST point to non-CNAME records. Thus, there is no
   need for the SVCB "Alias-form" behavior. DNST does not support
   aliasing,

  *DNST allows for explicit rejection of default transport (UDP/53
   and TCP/53)

  *DNST allows explicit signaling of DoT

*There is no need for alternate port numbers for UDP or TCP port
    53, or for DoT port 853.

   *There is no need for DoH, since the expected clients are limited
    to DNS resolvers.

5. DNS Transport RRTYPE

   The solution to this problem is to introduce a method for explicit
   signaling for when DoT is available. When combined with TLSA
   [RFC6698] records for the corresponding DNS server name, any client
   wishing to use DoT is able to know that it is available, and can
   detect and avoid any attempts at transport downgrade.

   This document defines the RRTYPE value {TBD} with mnemonic name DNST
   ("DNS Transport"). This consists of a set of flags indicating
   supported transport for the DNS server at the owner name. The flag
   bits represent transports:

     *UDP on port 53

     *TCP on port 53

     *DoT (DNS over TLS) on port 853

6. Restrictions

   The DNST record may occur anywhere, including at the apex of a DNS
   zone, and may co-exist with any other type that also permits other
   types.

7. Wire Format

   The RDATA wire format is an 8-bit octet of flag bits.

| UDP | TCP | DOT | 5 unused bits |

8. Presentation Format

OWNER CLASS TTL DNST [UDP] [TCP] [DOT]

   At least one of the transport types must be present.

9. Additional Processing

   The authoritative server MAY/SHOULD return both the DNST record(s)
   and any/all A and AAAA records with the same owner name. This
   reduces the number of queries the resolver would otherwise have to
   make (i.e. two additional queries for A and AAAA record types).

10. Security Considerations

The DNST record MUST be in a DNSSEC-signed zone. This ensures
protection against downgrade attacks on the transport signaling.

11. IANA Considerations

IANA is directed to add a new record to the DNS RRTYPES table to add
the entry "DNST" with value "TBD", referencing this document.

12. Normative References

[RFC6698] Hoffman, P. and J. Schlyter, "The DNS-Based
           Authentication of Named Entities (DANE) Transport Layer
           Security (TLS) Protocol: TLSA", RFC 6698, DOI 10.17487/
           RFC6698, August 2012, <https://www.rfc-editor.org/info/
           rfc6698>.

[RFC7858] Hu, Z., Zhu, L., Heidemann, J., Mankin, A., Wessels, D.,
           and P. Hoffman, "Specification for DNS over Transport
           Layer Security (TLS)", RFC 7858, DOI 10.17487/RFC7858,
           May 2016, <https://www.rfc-editor.org/info/rfc7858>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC
           2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174,
           May 2017, <https://www.rfc-editor.org/info/rfc8174>.

13. Informative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
           Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/
           RFC2119, March 1997, <https://www.rfc-editor.org/info/
           rfc2119>.

Appendix A. Acknowledgments

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