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AXFR message type for DNS NOTIFY
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Abstract

This document defines a new AXFR message type for DNS NOTIFY messages. The message instructs a secondary server to perform an AXFR zone transfer of a zone.

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1. Introduction

DNS NOTFY[RFC1996] describes a method to inform secondary name servers that a zone has changed. Upon receipt of a NOTIFY(SOA) message, a secondary will query the primary server for the SOA of the zone, and perform an IXFR[RFC1995] or AXFR[RFC5936] zone transfer if the SOA SERIAL has been incremented since the last time the zone was fetched.

There are cases when it is desirable to force a secondary server to perform an AXFR zone transfer. Example scenarios are an incorrectly synchronized database on a secondary server due to a software bug, or an operator incidentally wanting to propagate changes to a zone without updating the SOA SERIAL.

Most authoritative DNS server software supports performing a forced AXFR zone transfer. However, this can only be initiated by the operator of the DNS server, and secondary servers for a zone may not be managed by the same operator as the primary server(s). This document defines a new NOTIFY(AXFR) message type, used to initiate forced AXFR transfers by secondary servers from a primary server of a zone.

2. 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.

3. Protocol sequence

3.1. Initiation

When a primary server wants its secondary servers to perform an AXFR zone transfer, it sends a NOTIFY message with the following characteristics to each secondary server:

```
query ID:   (new)
op:         NOTIFY (4)
resp:       NOERROR
flags:      AA
qcount:     1
qname:      (zone name)
qclass:     (zone class)
qtype:      T_AXFR
```

3.2. Secondary server behaviour

When a secondary server receives a NOTIFY(AXFR) request from one of its locally designated primaries for the zone enclosing the given QNAME, with QTYPE=AXFR and QR=0, it SHOULD perform an AXFR zone transfer from one of its configured primary servers. It will also send a NOTIFY response back to the NOTIFY request’s source, with the following characteristics:

```
query ID:   (same)
op:         NOTIFY (4)
resp:       NOERROR
flags:      QR AA
qcount:     1
qname:      (zone name)
qclass:     (zone class)
qtype:      T_AXFR
```

If the secondary server, for the zone enclosing the given QNAME, is configured as a primary server for other secondary servers, it MUST also send a NOTIFY(AXFR) request to each of its configured secondaries. This ensures that an entire chain of secondary servers is synchronized in concert.

4. IANA considerations

This document has no IANA actions.

5. Security considerations

A NOTIFY(AXFR) request with a forged IP/UDP source address can cause a secondary to send spurious AXFR requests to its primary servers, leading to a denial of service attack if the forged requests are sent very often. To counter this, secondary servers MUST rate-limit how often they will request an AXFR from their primaries.

If a primary server has many secondaries, requesting all of them to perform an AXFR simultaneously may cause the primary to become overloaded. The sending out of NOTIFY(AXFR) requests to secondary servers SHOULD be splayed to reduce this thundering herd effect.

6. Normative References

[RFC1995] Ohta, M., "Incremental Zone Transfer in DNS", RFC 1995, DOI 10.17487/RFC1995, August 1996, <https://www.rfc-editor.org/info/rfc1995>.

[RFC1996] Vixie, P., "A Mechanism for Prompt Notification of Zone Changes (DNS NOTIFY)", RFC 1996, DOI 10.17487/RFC1996, August 1996, <https://www.rfc-editor.org/info/rfc1996>.

[RFC5936] Lewis, E. and A. Hoenes, Ed., "DNS Zone Transfer Protocol (AXFR)", RFC 5936, DOI 10.17487/RFC5936, June 2010, <https://www.rfc-editor.org/info/rfc5936>.

7. 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>.

[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>.

Appendix A. Acknowledgements

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