

Network Working Group
Internet-Draft
Obsoletes: [2870](#) (if approved)
Intended status: Best Current Practice
Expires: August 15, 2014

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February 11, 2014

DNS Root Name Service Protocol and Deployment Requirements
draft-iab-2870bis-01.txt

Abstract

The DNS Root Name service is a critical part of the Internet architecture. The protocol and deployment requirements expected to be implemented for the DNS root name service are defined in this document. Operational requirements are out of scope.

Status of This Memo

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[1.](#) Introduction

[RFC2870] discusses protocol and operational requirements for root name servers for Internet's domain name system(DNS) protocol [[RFC1035](#)]. Since its publication, both protocol and operational requirements have evolved. In the modern Internet it makes more sense to separate the two sets of requirements into two documents. The operational requirements are defined in [[RSSAC-001](#)]. This document defines the protocol requirements and some deployment requirements.

The root servers are authoritative servers of the unique [[RFC2826](#)] root zone (".") [[ROOTZONE](#)]. They currently also serve the root-servers.net zone and the zone for the .arpa top-level domain[ARPAZONE]. This document describes the external interface of the root name servers from a protocol viewpoint of the service. It specifies basic requirements for the Internet that DNS clients meet when interacting with a root name service over the public Internet.

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in [BCP 14](#), [[RFC2119](#)].

[1.1.](#) [RFC 2870](#) as Historic

This document obsoletes and reclassifies [[RFC2870](#)] as Historic.

This document and [[RSSAC-001](#)] together functionally replace [[RFC2870](#)].

[2.](#) Protocol Requirements

This section describes the minimum high-level protocol requirements. Operative details are documented in [[RSSAC-001](#)] and implementation is left to the operators of the root name service.

The root name service:

MUST implement core DNS [[RFC1035](#)] and clarifications to the DNS [[RFC2181](#)].

MUST support IPv4[RFC0791] and IPv6[RFC2460] transport of DNS queries and responses.

MUST support UDP[RFC0768] and TCP[RFC0793] transport of DNS queries and responses.

MUST generate checksums when sending UDP datagrams and MUST verify checksums when receiving UDP datagrams containing a non-zero checksum.

MUST implement DNSSEC[RFC4035], as an authoritative name service.

3. Deployment Requirements

The root name service:

MUST answer queries from any entity conforming to [[RFC1122](#)] with a valid IP address.

MUST serve the unique [[RFC2826](#)] root zone[ROOTZONE].

MAY also serve the root-servers.net zone, and the zone for the .arpa top-level domain [[ARPAZONE](#)], [[RFC3172](#)].

4. Security Considerations

This document does not specify a new protocol. However, the root name service is a key component of the Internet architecture and play a key role into the overall security of the Internet[RFC2826]. Specific security considerations on the DNS protocols are discussed in their respective specifications. The security considerations on the operational side of the root name servers are discussed in [[RSSAC-001](#)].

5. IANA Considerations

This document has no action for IANA.

6. Acknowledgements

Some text was taken from [[RFC2870](#)]. The editors of this document would like to sincerely thank the following individuals for valuable contributions to the text: Andrew Sullivan, Simon Perreault, Jean-

Philippe Dionne, Dave Thaler, Russ Housley, Alissa Cooper, Joe Abley, Joao Damas, Daniel Karrenberg, Jacques Latour, Eliot Lear and Bill Manning.

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