

ISC Report on F-Root's Compliance with RSSAC001v1



Version 1.0, 2022/09/16

This report constitutes ISC's compliance with Recommendation 1 of RSSAC001 - "*Service Expectations of Root Servers*" by documenting our responses to the expectations set out therein.

The numbered section headings below match the corresponding numbered sections of RSSAC001. Paragraphs in **bold type** starting [E.xxx] are direct quotes from the individual expectations documented therein.

3.1 Infrastructure

[E.3.1-A] Individual Root Server Operators are to publish or continue to publish operationally relevant details of their infrastructure, including service-delivery locations, addressing information and routing (e.g., origin autonomous system) information.

This information is published and regularly updated at <https://www.root-servers.org/>.

[E.3.1-B] Individual Root Servers will deliver the service in conformance to IETF standards and requirements as described in [RFC 7720](#) and any other IETF standards-defined Internet Protocol as deemed appropriate.

The F-Root system implements (and is configured to support) all of the requirements described in RFC 7720 and other relevant RFCs.

3.2 Service Accuracy

[E.3.2-A] Individual Root Servers will adopt or continue to implement the current DNS protocol and associated best practices through appropriate software and infrastructure choices.

F-Root systems implement the IETF RFCs for the current DNS core protocol, and ISC engineers participate in the ongoing development of DNS standards relating to the protocol itself and to the operation of DNS services.

[E.3.2-B] Individual Root Servers will serve accurate and current revisions of the root zone.

ISC is committed to publishing verbatim the IANA root zone as distributed by the Root Zone Maintainer.

All F-Root instances are updated as soon as possible within the constraints of the AXFR zone transfer protocol ([RFC 5936](#)) following receipt of a NOTIFY ([RFC 1996](#)) message from the Root Zone Maintainer.

[E.3.2-C] Individual Root Servers will continue to provide “loosely coherent” service across their infrastructure.

Subject to the above, the times during which individual instances are out of date (such that the data is “loosely coherent”) are intended to be minimal.

[E.3.2-D] All Root Servers will continue to serve precise, accurate zones as distributed from the Root Zone Maintainer.

The TSIG protocol ([RFC 6895](#)) is used to ensure the integrity of zone transfers, both between the RZM and F-Root’s distribution servers, and between those distribution servers and the individual instances.

3.3 Service Availability

[E.3.3-A] Individual Root Servers are to be deployed such that planned maintenance on individual infrastructure elements is possible without any measurable loss of service availability.

Planned maintenance is staggered such that only a small subset of instances are out of service at any one time.

[E.3.3-B] Infrastructure used to deploy individual Root Servers is to be significantly redundant, such that unplanned failures in individual components must not cause the corresponding service to become generally unavailable to the Internet.

ISC operates in excess of 70 individual instances, and a further 230+ are operated on our behalf under contract by Cloudflare. Unplanned failures of individual components cause no impact on the service’s general availability.

Our provisioning and orchestration systems are also redundantly configured.

[E.3.3-C] Each Root Server Operator shall publish documentation that describes the operator’s commitment to service availability through maintenance scheduling and its commitment to the notification of relevant operational events to the Internet community.

Notwithstanding the above, any planned maintenance that might affect the availability of F-Root as a whole will be announced on the ISC Twitter account ([@ISCdotORG](https://twitter.com/ISCdotORG)).

3.4 Service Capability

[E.3.4-A] Individual Root Server Operators will make all reasonable efforts to ensure that sufficient capacity exists in their deployed infrastructure to allow for substantial flash crowds or denial of service (DoS) attacks.

As described in §3.3 above the F-Root infrastructure is significantly redundant and has sufficient capacity to cope with traffic loads far in excess of its steady-state load.

[E.3.4-B] Each root server operator shall publish documentation on the capacity of their infrastructure, including details of current steady-state load and the maximum estimated capacity available.

Statistics on the query load on F-Root are available from <https://rssac-stats.isc.org/> (updated daily).

In the interest of system security we do not publish our maximum estimated capacity.

3.5 Operational Security

[E.3.5-A] Individual Root Server Operators will adopt or continue to follow best practices with regard to operational security in the operation of their infrastructure.

ISC follows best practices for operational security.

[E.3.5-B] Root Server Operators shall publish high-level business continuity plans with respect to their Root Server infrastructure.

ISC’s current BCP contains confidential company information. We will consider whether a future F-Root specific BCP can be made public.

3.6 Diversity of Implementation

[E.3.6-A] Each Root Server Operator shall publish documentation that describes key implementation choices (such as the type of DNS software used) to allow interested members of the Internet community to assess the diversity of implementation choices across the system as a whole.

ISC's F-Root instances run ISC BIND on FreeBSD.

Additional instances operated on our behalf under contract by Cloudflare run their own proprietary DNS software implementation.

3.7 Monitoring and Measurement

[E.3.7-A] Each Root Server Operator will adopt or continue to follow best current practices with respect to operational monitoring of elements within their infrastructure.

Every F-Root instance is continuously monitored for service availability, query load, and the freshness of the root zone.

[E.3.7-B] Each Root Server Operator will adopt or continue to perform measurements of query traffic received and shall publish statistics based on those measurements.

Daily aggregated statistics for the query load are published at <https://rssac-stats.isc.org/>.

3.8 Communication

[E.3.8.1-A] Individual Root Server Operators will continue to maintain functional communication channels between each other in order to facilitate coordination and maintain functional working relationships between technical staff.

ISC participates actively in the Root Server Operator community, via mailing lists and regular face-to-face meetings.

[E.3.8.1-B] All communications channels are to be tested regularly.

The emergency contact system used by the Root Server Operators is tested at each face-to-face meeting.

[E.3.8.2-A] Individual Root Server Operators shall publish administrative and operational contact information to allow users and other interested parties to escalate technical service concerns.

ISC's contact information is published on our website and in relevant WHOIS records.