

RSSAC Statement on Root Server Operator Independence

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The stability of the Internet and its ability to become the successful platform that has enabled innovation is largely due to the way it has been operated and governed. More specifically, the Internet is a globally distributed network run as a collaboration between organizations. This highly decentralized governance model has prevented any single organization from capturing and controlling the Internet.

The Internet relies heavily upon the Domain Name System (DNS), which includes a globally unique public namespace derived from a unique root zone¹ managed by the IANA and served by the Root Server Operators (RSOs). The stability of serving the DNS root zone reflects the stability of the Internet. As such, the governance of this critical function has followed the same governance principles of the Internet itself, which is a collaboration of independent organizations.

RSOs serve the same zone data and utilize the same set of standard protocols.² All RSOs work towards the common goal of serving the DNS root zone in a secure, unbiased, and robust fashion. They honor the same basic service expectations, and do not operate in isolation. Coordination among RSOs to evolve the RSS and maintain the security and integrity of the system occurs regularly. This coordination enables each RSO to independently make informed decisions ensuring diversity of operational parameters, while also adhering to standards and service expectations.³

Principle 10 of RSSAC037 states, "RSOs must be autonomous and independent," and this must be preserved in future RSS governance models. RSOs must remain independent from each other as well as from any overarching organization, government, or community. This serves to prevent capture of the RSS by an entity that may diverge from the guiding principles of the RSS as set forth in RSSAC037.

The rest of this document further illustrates important aspects of RSO independence.

Organizational Independence

RSOs come from many sectors including; academic, commercial, non-commercial, and governmental organizations. Independence and diversity among RSOs allows them to have their own management philosophies, organizational structures, objectives, and policies which reflect differing perspectives. These perspectives allow for different ideas on how to work towards common goals and allow for research and cooperation between these sectors which, over time, allow for growth and resiliency of the RSS.

¹ See RFC 2826

² See RSSAC020: RSSAC Statement on Client Side Reliability of Root DNS Data

³ See RSSAC001 and RFC 7720

RSOs operate in different legal jurisdictions, this allows the RSS to not fall under any single legal structure or regulatory regime. Although independent RSOs adhere to industry best practices for security and stability, independence between RSOs provides varied physical and technical security policies, and requirements based on their operating jurisdictions.

Organizational independence allows RSOs to conduct business with organizations, other businesses, and research institutions of their choice. These diverse business practices allow for each RSO to maintain diversity within their own network, and enter into contracts and agreements. RSOs have independent and diverse management structures so that failures in one RSO's management style will not affect the entire set of RSOs.

Organizational independence between RSOs prevents one governing body from making technical or policy decisions which may in turn lessen diversity and cause system-wide damage to the RSS. Independence in this respect empowers RSOs to maintain an ethos demonstrating a commitment to the common good of the Internet. Failure or capture of one RSO by an entity that does not follow the principles and ethos as set forth in RSSAC037 will not cause the failure of the greater RSS.

The RSOs must remain independent from each other as well as from any overarching entity in order to prevent capture. While the RSOs must remain independent, they will continue to work cooperatively with the Internet community.

Financial Independence

Financial independence allows RSOs to utilize funds in accordance with their own remit. This is essential for allowing RSOs to be diverse in how they provide their service. RSOs may ask for advice or give advice to other RSOs on how to enhance their service financially, but the ultimate responsibility is with each RSO to decide how and what to fund within their own organization.

The diversity and independence of financial spending among RSOs must be maintained such that any failure of a single RSO, or failure of a single economy or commercial market does not affect the entire RSS.

Architecture and Engineering Design

Independence among RSOs has allowed each RSO to design and implement their own service architectures to encourage network diversity and prevent homogeneous network topologies. Potential design flaws and weaknesses are not shared among operators, reducing the effect of an attack on a specific design feature to only those operators that are vulnerable. RSOs intentionally cooperate to ensure design choices across the RSS remain different.

Each RSO has independent choice of which hardware, software, network providers, and locations to use in their respective architectures. RSOs are able to employ their own information assurance architectures for the security of their networks and server configurations, which prevents a single attack from affecting the whole RSS. Configurations of servers within and among RSOs may be different as long as they provide the same service capabilities. Network parameters such as Maximum Transmission Unit (MTU) and truncation limits are diverse as

well. Software vulnerabilities and misconfigurations will only affect certain instances and not the entire RSS.

By maintaining independence in design decision making, RSOs ensure their service architectures maintain stability through diversity.

Network Operations and Administration

RSOs develop and maintain independent and diverse operating environments and procedures. Operational diversity reduces the risk that an attack against a single RSO would have a material impact on the RSS. Scheduled service interruptions, maintenance, and upgrades are done independently within and among RSOs across multiple time zones, therefore, they have limited to no operational impact on the service provided by the RSS.

Independence in network operations and administration reduces the risk of a single point of failure.

Conclusion

RSO independence is a vital quality of the RSS that must be preserved for the purposes recognized in this publication and to ensure the stability, security, and resilience of the DNS.