

RSSAC and the Root Server System

Fred Baker, RSSAC Chair
August 2020

What is RSSAC?

- The role of the Root Server System Advisory Committee (“RSSAC”) is to advise the ICANN community and Board on matters relating to the operation, administration, security, and integrity of the Internet's Root Server System.
- (This is a very narrow scope!)

What RSSAC Does and Does Not Do?

- The ICANN Community is composed of 10 different committees. The Root Server System Advisory Committee (RSSAC) is one of them.
- RSSAC produces advice – primarily to the Board but also to other ICANN bodies and other organizations involved in the overall DNS business.
- Root Server Operators are represented inside RSSAC, but RSSAC does not involve itself in operational matters.

A Few Acronyms

RSS

- Root Server System

RS

- Root Server

RSO

- Root Server Operator

SF

- Secretariat Function

SAPF

- Strategy, Architecture, and Policy Function

DRF

- Designation and Removal Function

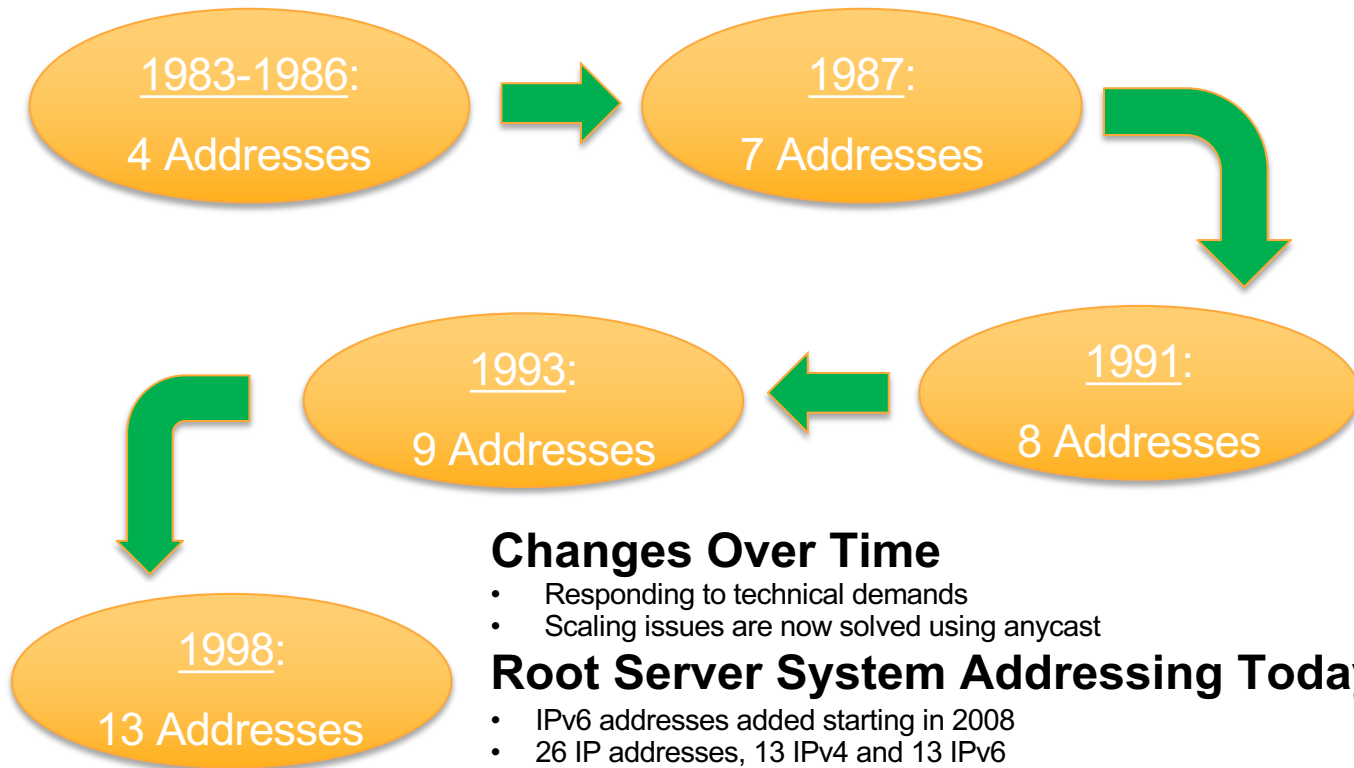
PMMF

- Performance Monitoring and Measurement Function

FF

- Financial Function

Growth of the Root Server System



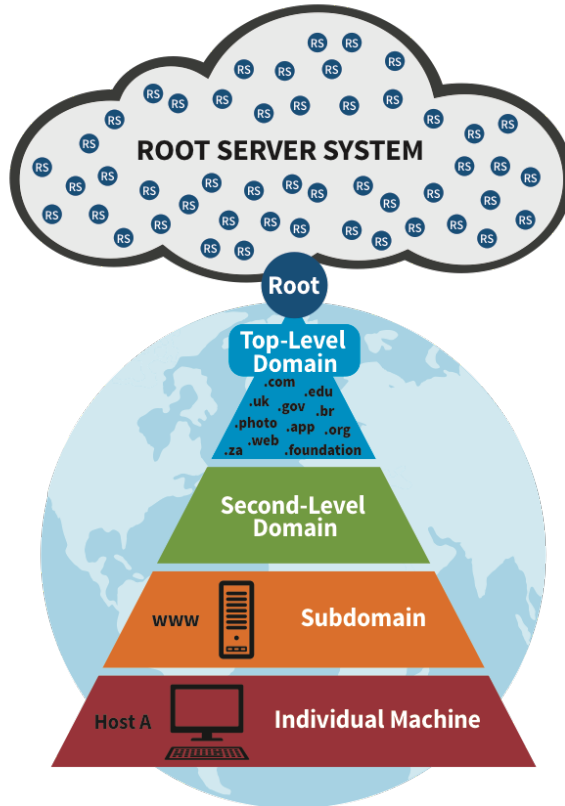
Changes Over Time

- Responding to technical demands
- Scaling issues are now solved using anycast

Root Server System Addressing Today

- IPv6 addresses added starting in 2008
- 26 IP addresses, 13 IPv4 and 13 IPv6
- Served from over 1000 physical Instances

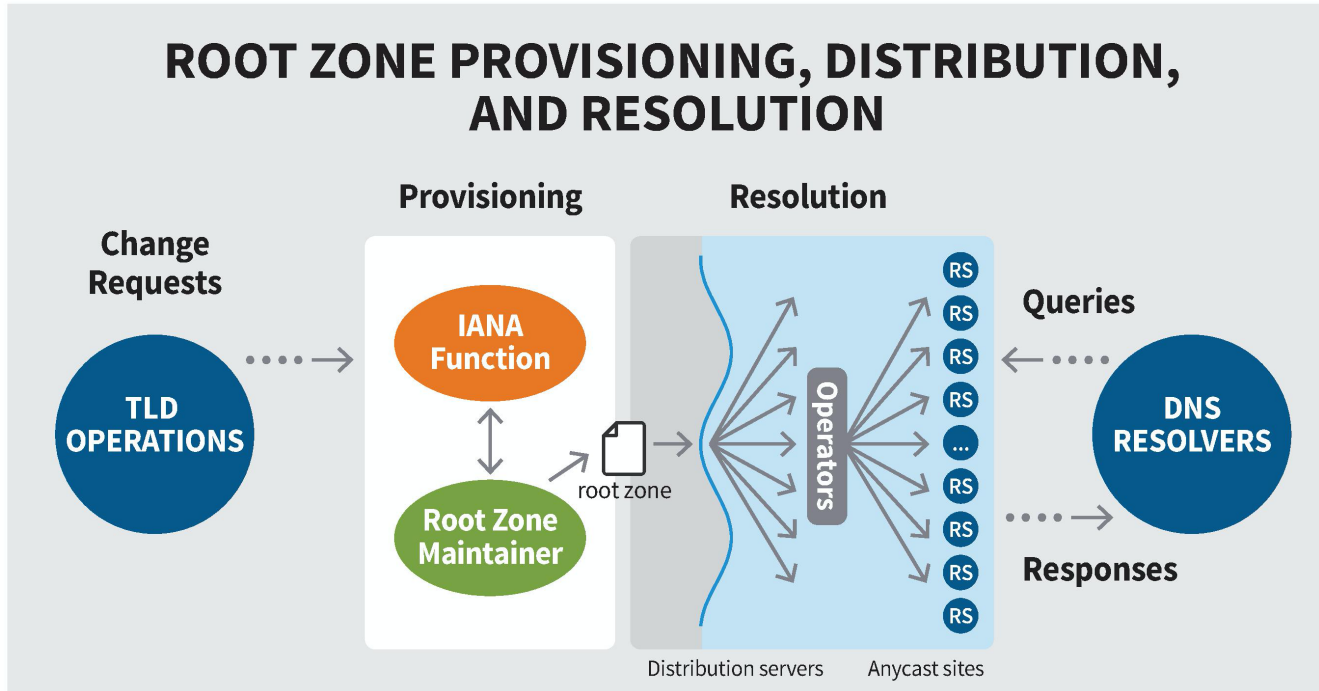
Global DNS Root Services



1000+ DNS root server instances in the global DNS root cloud

1. Cogent Communications
2. ICANN
3. Internet Systems Consortium
4. NASA Ames Research Center
5. Netnod
6. Réseaux IP Européens Network Coordination Centre
7. University of Maryland
8. University of Southern California, Information Sciences Institute
9. U.S. Department of Defense Network Information Center
10. U.S. Army Research Laboratory
11. Verisign, Inc.
12. WIDE Project and Japan Registry Services

Root Zone Management



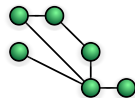
Some Modern Refinements to DNS

DNSSEC (security extensions)



- Cryptographic signatures on DNS data
- Reduces risk of “spoofing”
- Resolver should validate the answers
- IANA holds the keys
- Root server operators only serve the data

Anycast



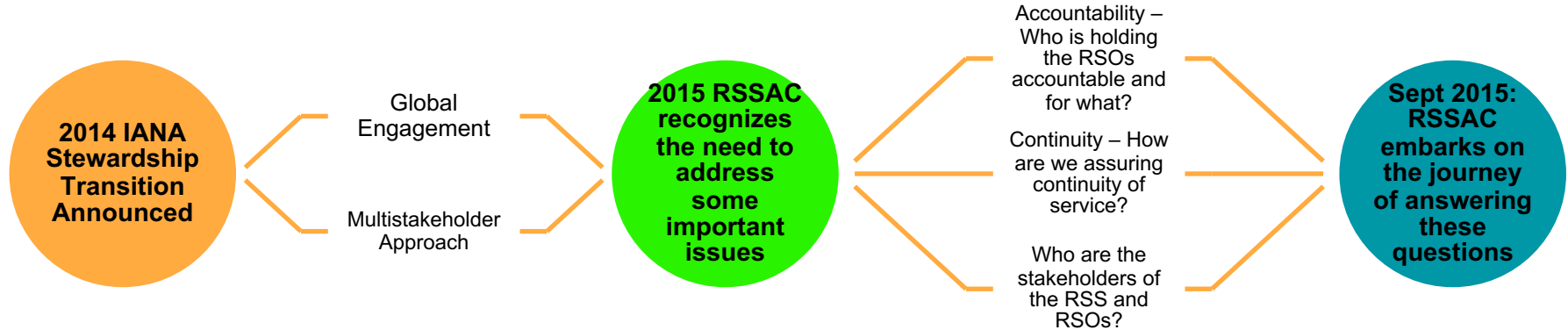
- Multiple servers share a single IP address
- Improves latency and resilience
- Protects against DDoS attacks

Myths Corrected

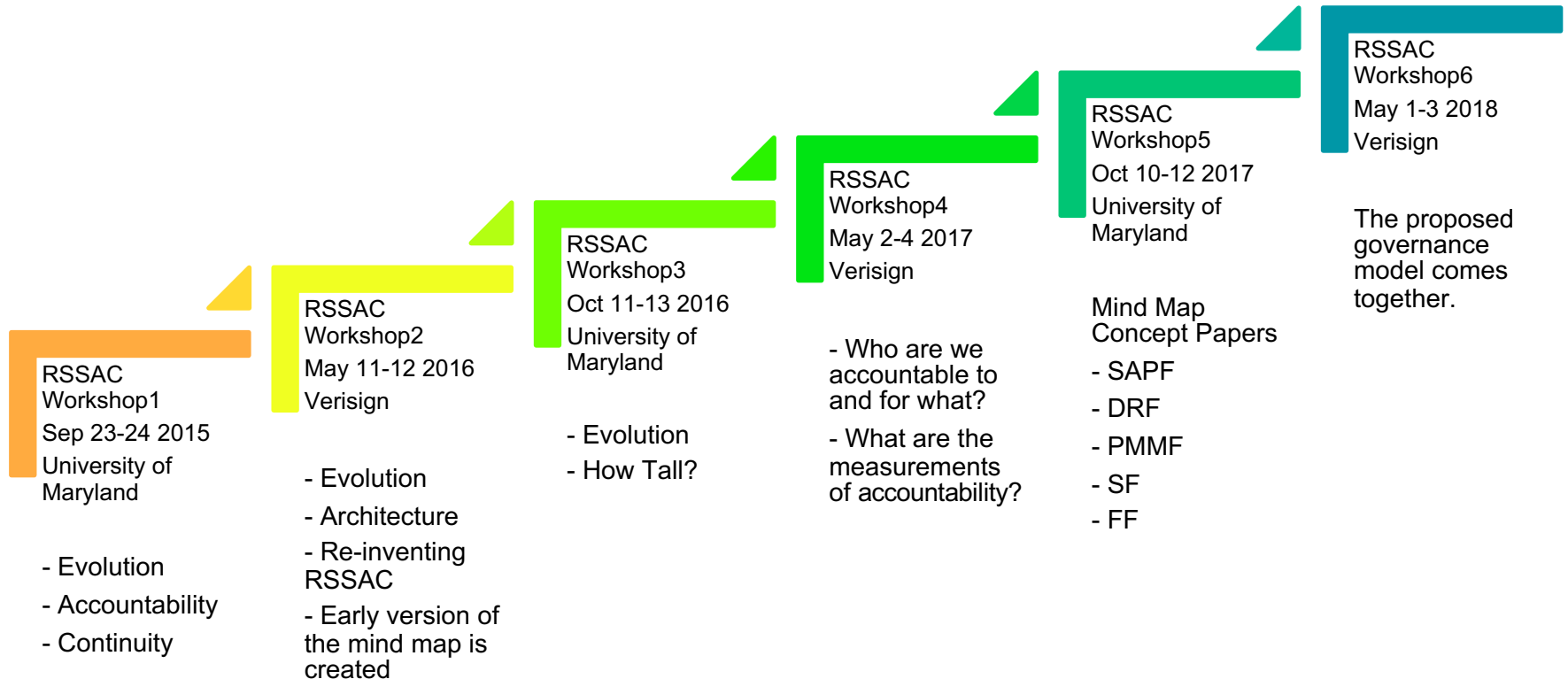
Myth	Reality
Root servers control where Internet traffic goes.	Routers control where Internet traffic goes.
Root server operators can easily change the root zone content, including removing a TLD.	DNSSEC validation would reveal any tampering with root server responses, including the removal of a TLD.
Administration of the root zone and service provision are the same thing.	Administration of the root zone is separate from service provision.
The root server identities have special meaning.	None of the root server identities are special.
There are only 13 root servers.	There are more than 1000 servers globally, but only 13 technical identities.
ICANN controls the root server operators.	Every root server operator has been operating longer than ICANN and owes no allegiance to ICANN.

Root Server System Evolution

Our initial impetus “to workshop”



The Workshop Timeline and What Happened



Root Server System Principles

• To remain a global network, the Internet requires a globally unique public namespace.

Principle 1

• IANA is the source of DNS root data.

Principle 2

• The RSS must be a stable, reliable, and resilient platform for the DNS service to all users.

Principle 3

• Diversity of the root server operations is a strength of the overall system.

Principle 4

• Architectural changes should result from technical evolution and demonstrated technical need.

Principle 5

• The IETF defines technical operation of the DNS protocol.

Principle 6

• RSOs must operate with integrity and an ethos demonstrating a commitment to the common good of the Internet.

Principle 7

• RSOs must be transparent.

Principle 8

• RSOs must collaborate and engage with the stakeholder community.

Principle 9

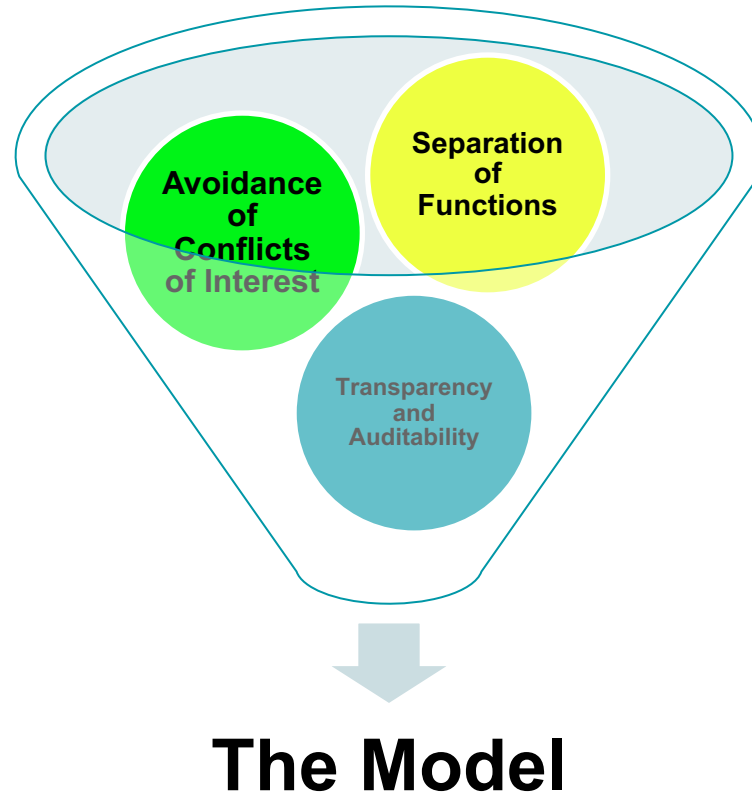
• RSOs must be autonomous and independent.

Principle 10

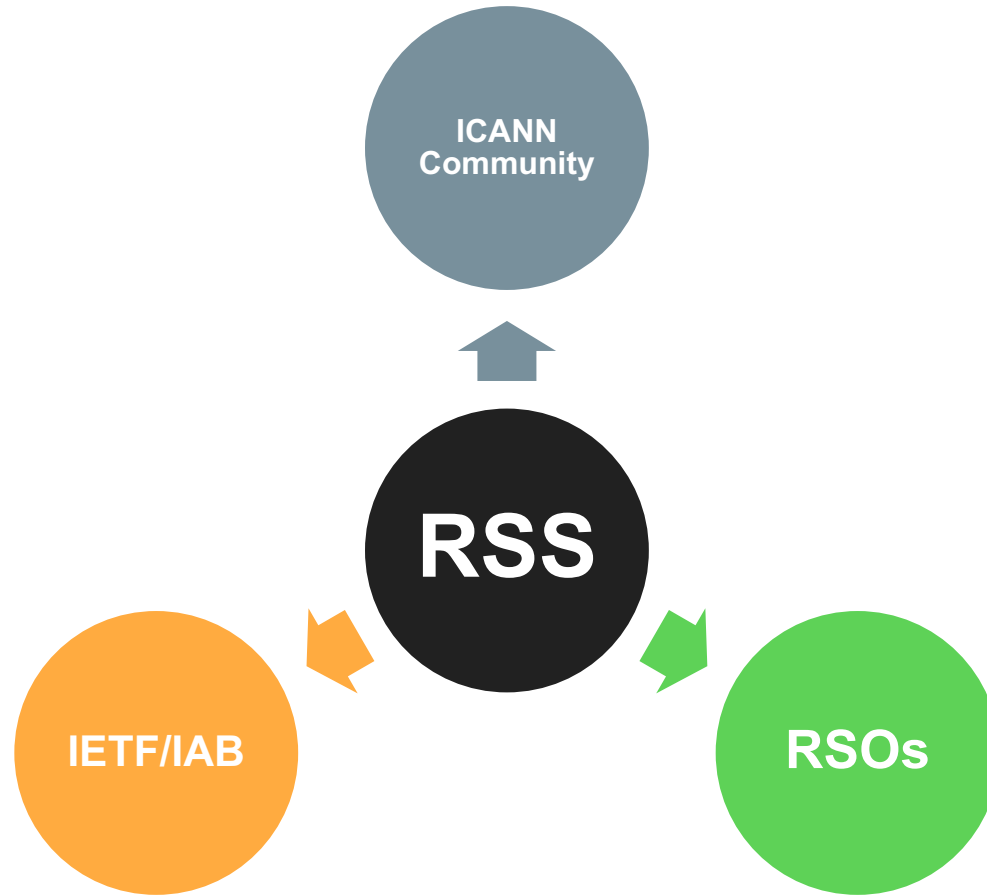
• RSOs must be neutral and impartial

Principle 11

Model Design Principle

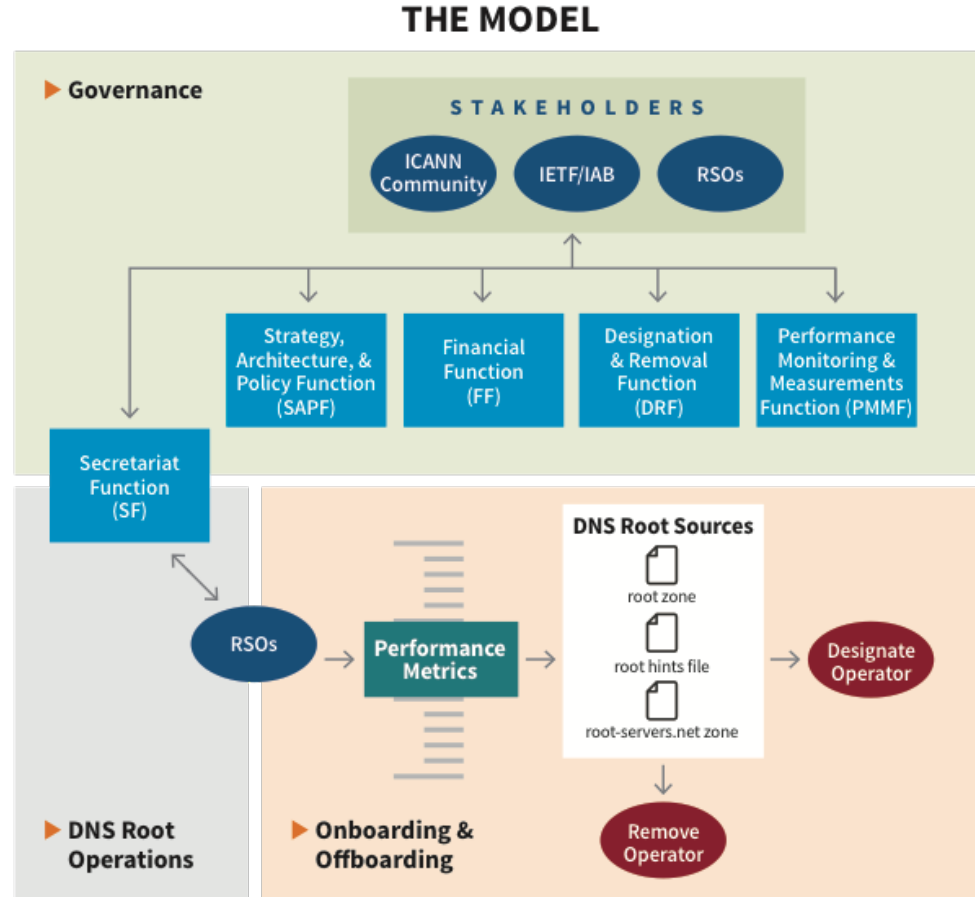


Stakeholders

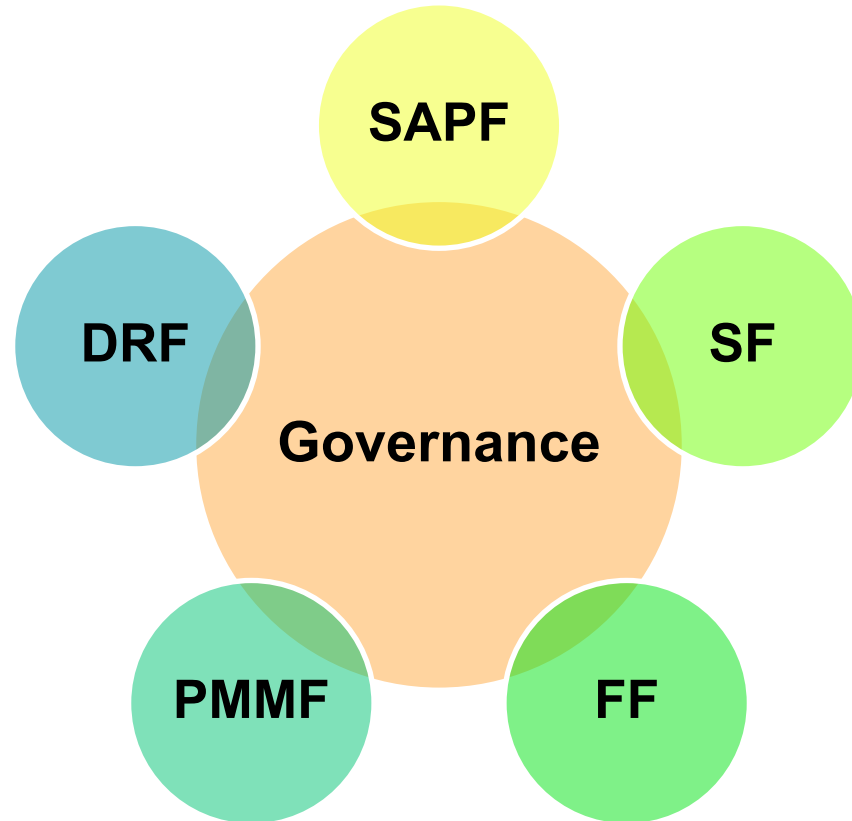


Governance:

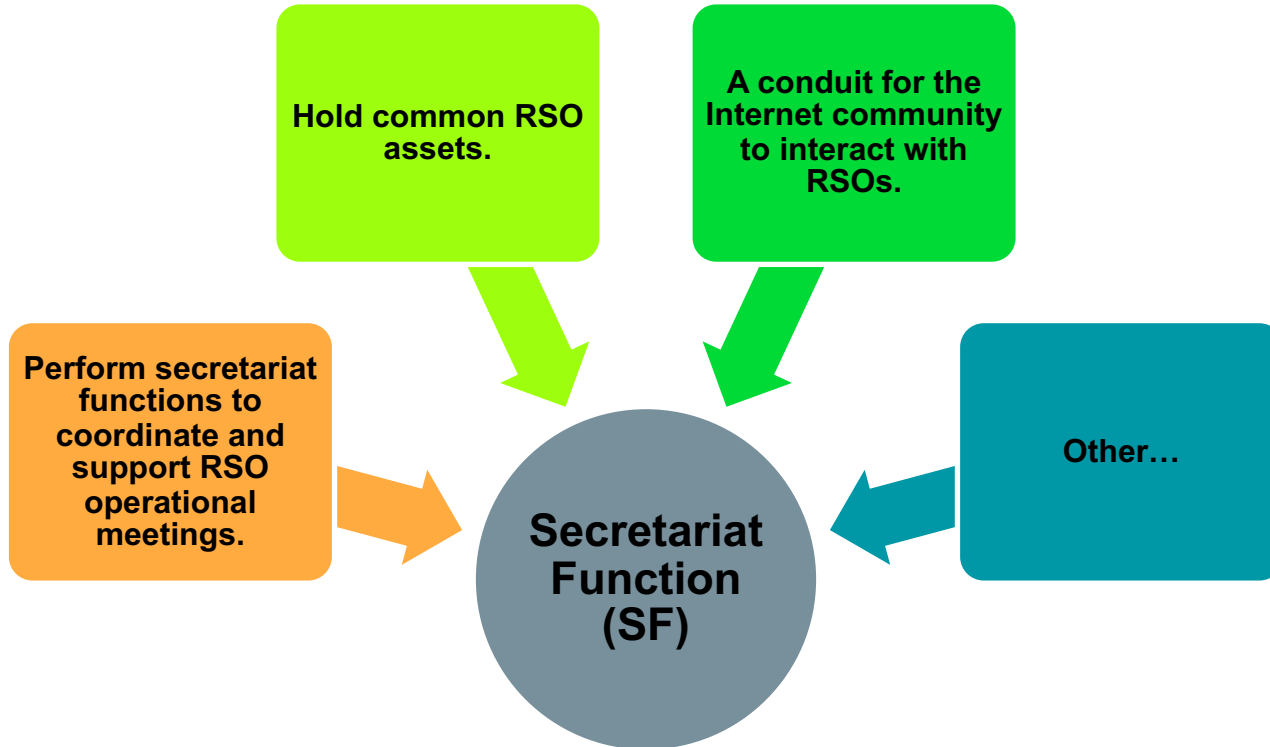
An interplay of three constructs operating in parallel



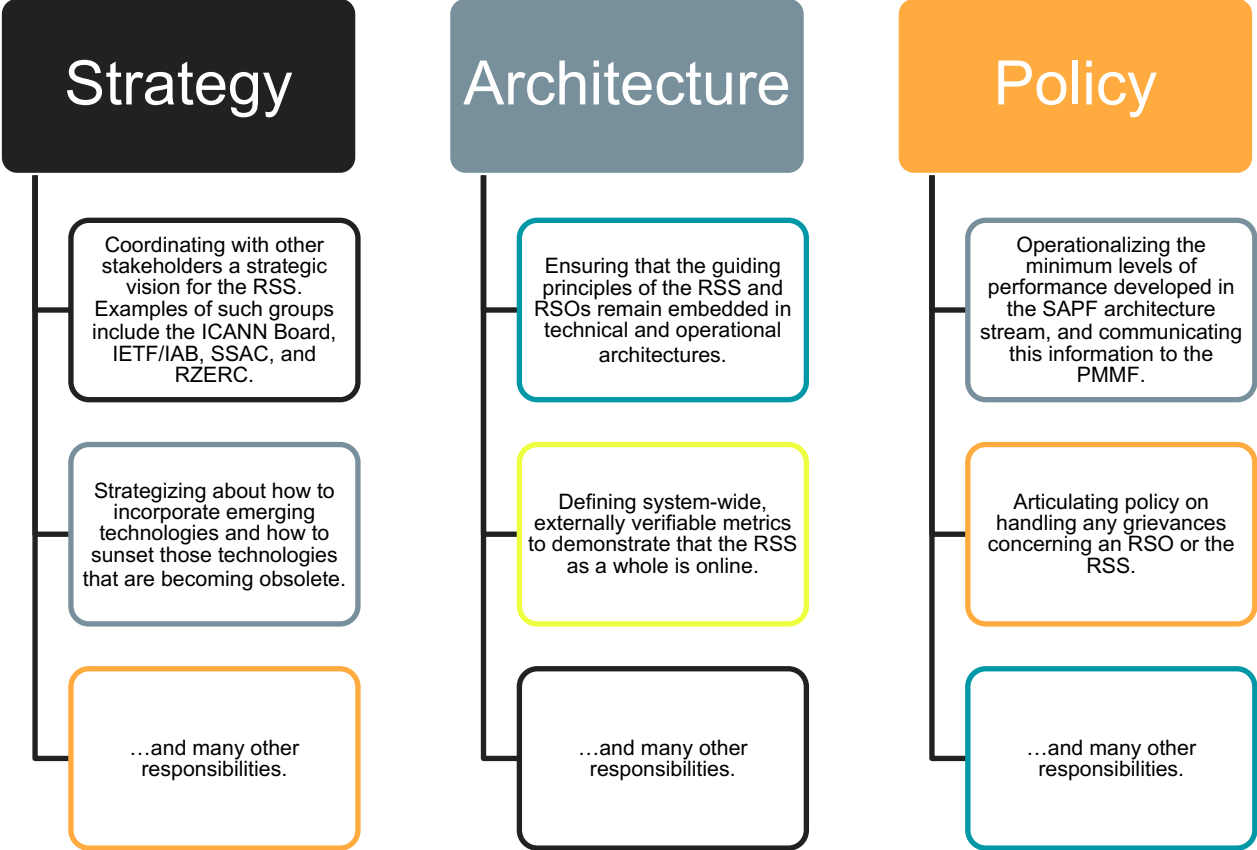
Governance: A balance of interplay of separate functions



Secretariat Function (SF)



Strategy Architecture and Policy Function (SAPF)

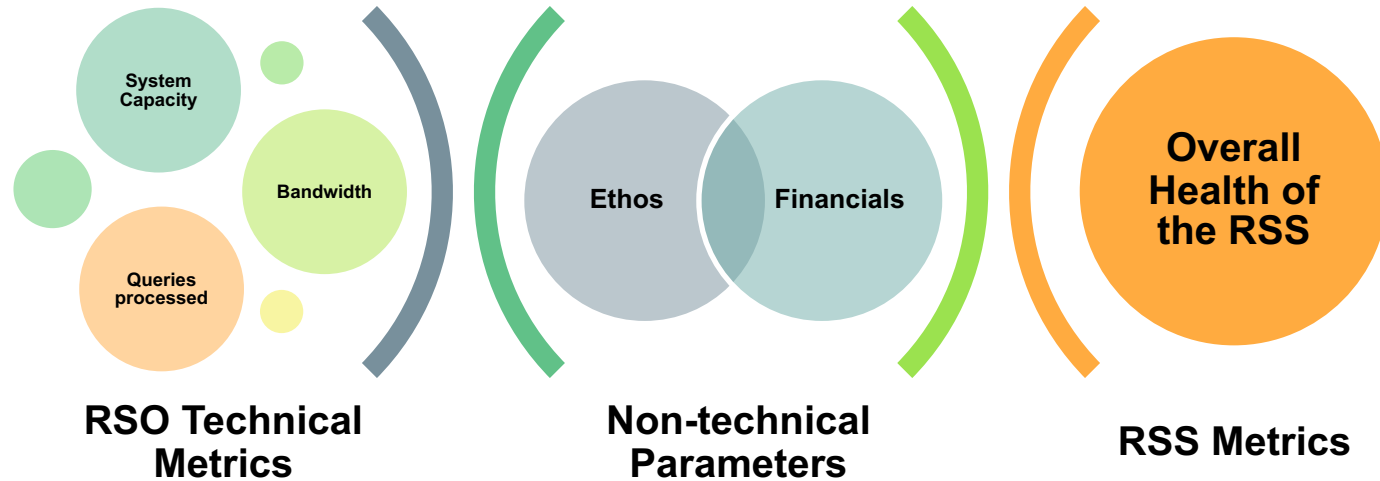


Designation and Removal Function (DRF)

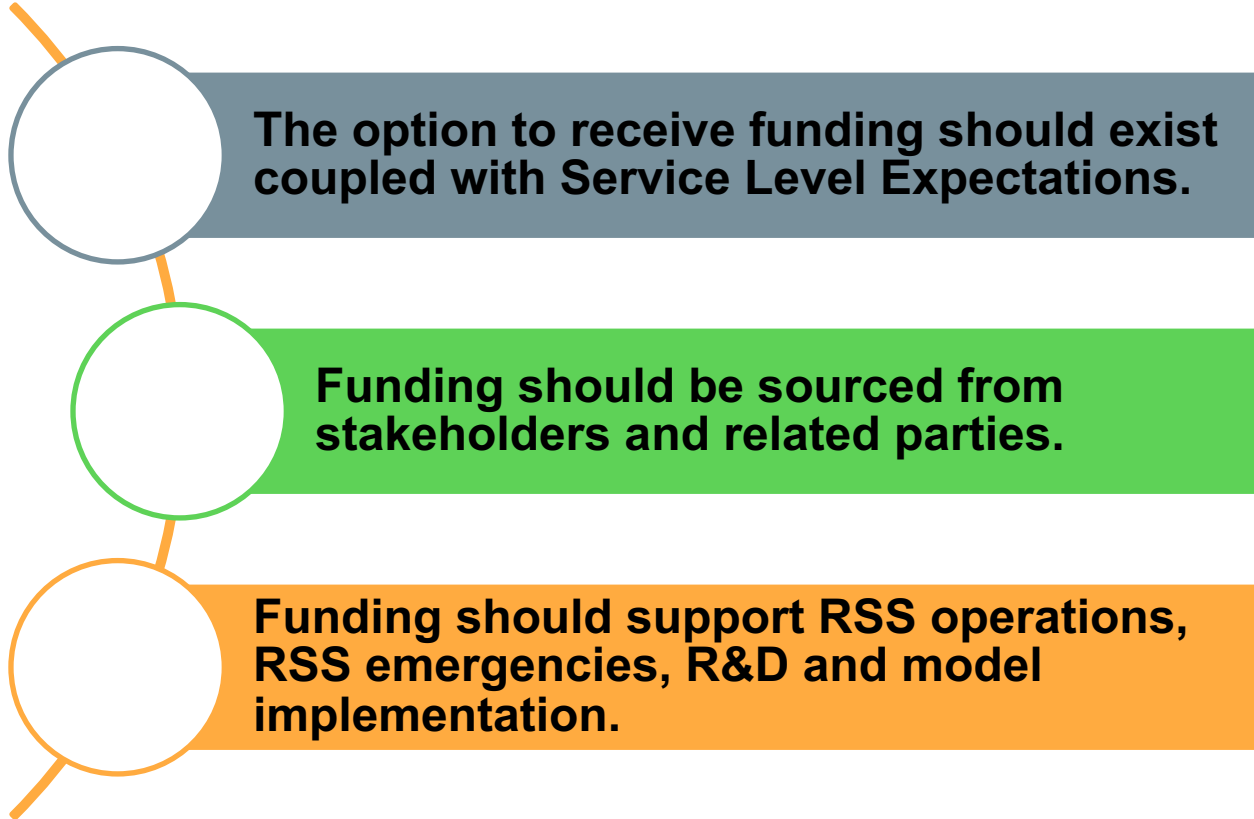


Performance Monitoring and Measurements Function (PMMF)

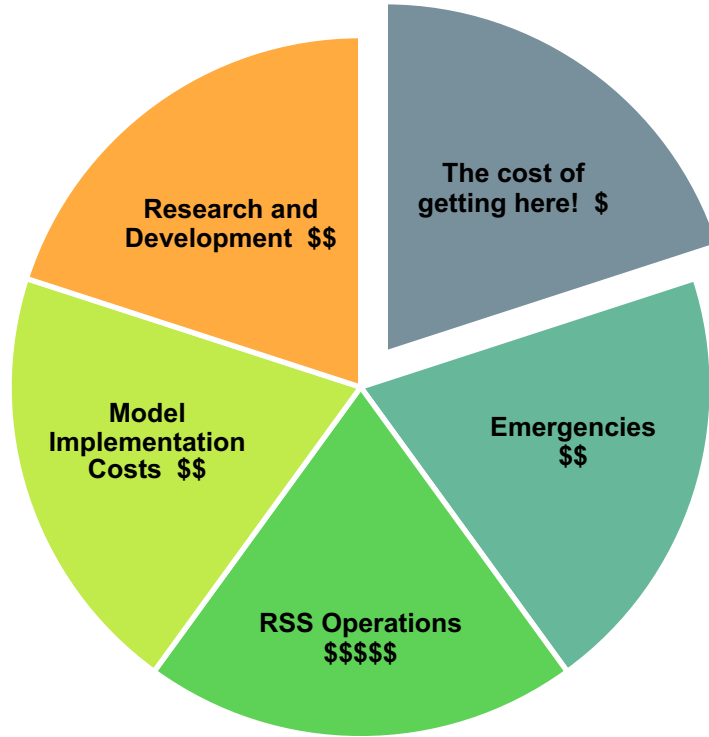
A sample of what could be measured and monitored



Financial Function (FF)

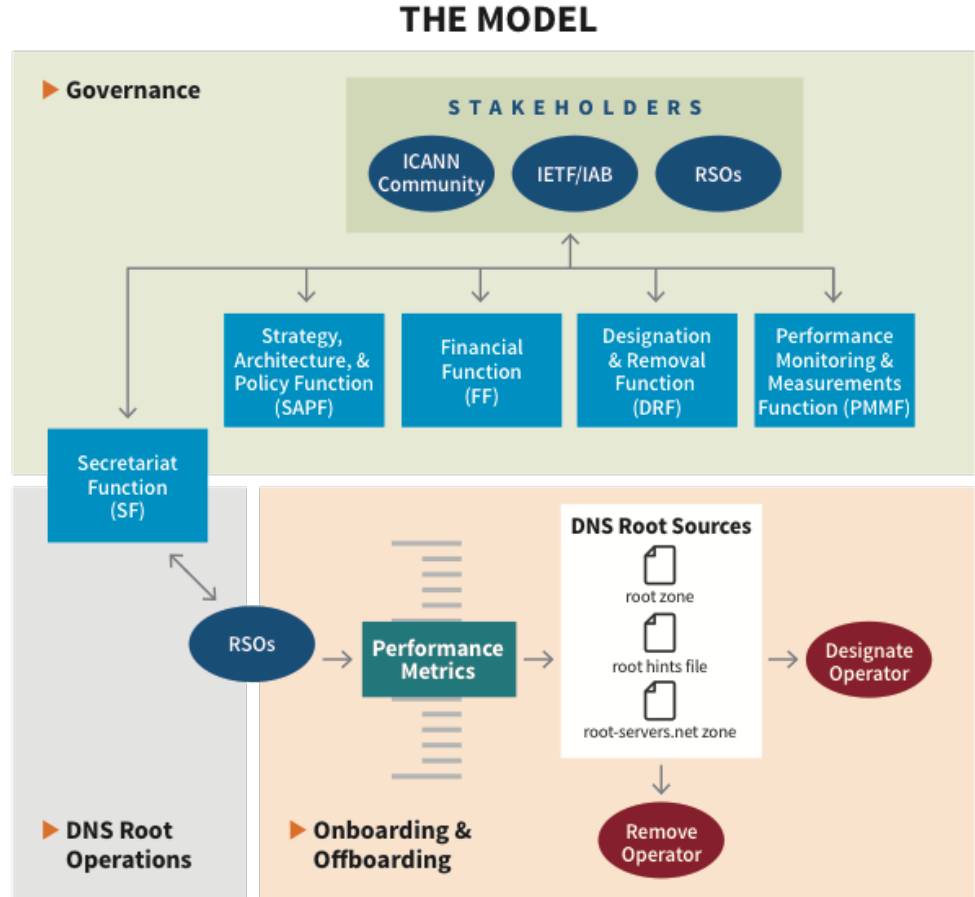


Financial Function (FF)



Manifesting the Model:

A Set of Three Recommendations



Recommendations

Recommendation 1

- The RSSAC recommends that the ICANN Board initiate a process to produce a final version of the Model for implementation.

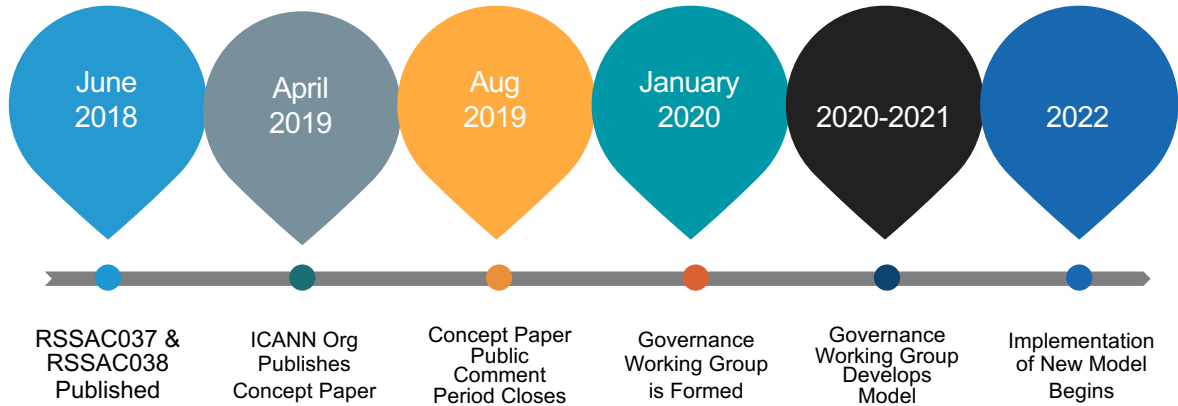
Recommendation 2

- Use the provided methodology (or a similar one) to cost out the implementation and operations of the Model

Recommendation 3

- Implement the Model based upon the principles of accountability, transparency, sustainability, and service integrity.

Root Server System Evolution Timeline



Governance Working Group (GWG)

- Composed of representatives from the RSOs, ccTLD Name Supporting Organization (ccNSO), the Internet Architecture Board (IAB), Registry Stakeholder Group, and the Security and Stability Advisory Committee (SSAC)
 - Liasons from the ICANN Board, the IANA, and the Root Zone Maintainer (RZM)
- Tasked with working out the details of the Model
- The Concept Paper tasks the GWG with
 - Committing to a timeline with clear milestones
 - Working openly and transparently
 - Seeking informed contributions when necessary
 - Embracing the principles outlined in RSSAC037
 - Refer to RSSAC037, Concept Paper, and Public Comment feedback as references

More Information

- RSSAC Website
 - <https://www.icann.org/groups/rssac>
- RSSAC Publications
 - <https://www.icann.org/groups/rssac/documents>
- RSSAC FAQ
 - <https://www.icann.org/groups/rssac/faq> (English)
 - <https://www.icann.org/zh/system/files/files/rssac-faq-05mar18-zh.pdf> (中文)
- Questions to the RSSAC
 - ask-rssac@icann.org
- IANA Root Zone Management Processes
 - <https://www.iana.org/domains/root>

Thank you!