Governing the "Ungovernable"

One Giant Leap for the RSS in 2021

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About the presenter

- Lawyer
  - General Counsel, ISC
  - 30+ year focus on law as applied to information & communications technologies
  - 20+ years teaching legal & regulatory aspects of cyber security, Royal Holloway University of London MSc program

- Internet governance
  - Assisted in development of RSSAC058 & '059
  - RSSAC representative to Workstream 2 Cross-Community Working Group

All of my comments are personal and do not necessarily represent the opinion of ISC, any other Root Server Operator (RSO), or anyone else for that matter.

Today's agenda
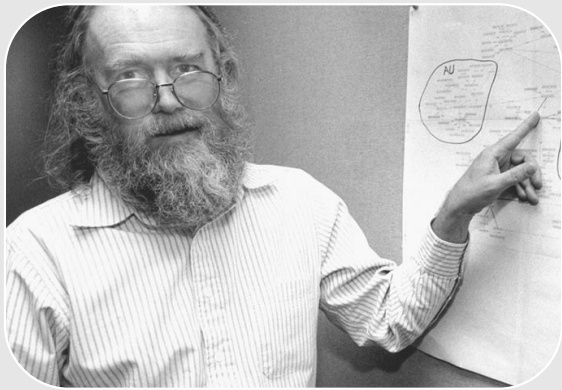
A Brief History of the Root Server System

- As told by a lawyer

Jon Postel at work, 1994. Photo by Irene Fertik, USC News Service. Wikimedia.

Sovereign State effort to regulate the RSS

- Draft EU NIS2 Directive

European Parliament, Strasbourg. Photo by JLogan, 2006. Public domain. Wikimedia.

Success Criteria (RSSAC058)

"RSS GS Functional Description" (Draft Model)

"RSS GS Constitutional Documents"

Agreement & signatures

Transition to the new structure

RSS governance breakthrough

- RSSAC058 Success Criteria

Process of concluding a new governance structure. By R Carolina, NANOG84 (2022).

A Brief History of the Root Server System (RSS)*

As told by a lawyer – quickly

* See RSSAC023v2: History of the Root Server System (2020)

Who are the Root Server Operators?

Chart from RSSAC023v2: History of the Root Server System (2020)

Name	IP Address	Software	Organization
SRI-NIC	10.0.0.51 26.0.0.73	JEEVES	SRI International
ISIB[12]	10.3.0.52	JEEVES	Information Sciences Institute, USC
ISIC	10.0.0.52	JEEVES	Information Sciences Institute, USC
BRL-AOS	192.5.25.82 128.20.1.2	BIND	Ballistic Research Laboratory, U.S. Army

- 1984:
  - Jon Postel & Paul Mockapetris set up first ARPANET DNS Root Server at USC (California) on a PDP-10
- 1985:
  - Added SRI
  - US Army BRL starts to host one on a UNIX machine (MILNET)
  - 4 Root Servers & 3 RSOs

Who are the Root Server Operators?

- In October 1991
  - 6 Root Servers
  - 6 RSOs

Chart from RSSAC023v2: History of the Root Server System (2020)

Name	IP Address	Organization
NS.NIC.DDN.MIL	192.112.36.4	Network Solutions, Inc.
KAVA.NISC.SRI.COM	192.33.33.24	SRI International
C.NYSER.NET	192.33.4.12	NYSERnet
TERP.UMD.EDU	128.8.10.90	University of Maryland
NS.NASA.GOV	128.102.16.10 192.52.195.10	NASA Ames Research Center
NIC.NORDU.NET	192.36.148.17	NORDUnet
AOS.BRL.MIL	192.5.25.82	Ballistic Research Laboratory, U.S. Army

Who are the Root Server Operators?

- 1994: `NS.ISC.ORG`

- 1995:
  - 9 Root Servers
  - 9 RSOs
  - Renamed:

    `x.ROOT-SERVERS.NET`

    $x \in \{A,B,C,D,E,F,G,H,I\}$

Chart from RSSAC023v2: History of the Root Server System (2020)

Original Name	New Name	Organization
NS.INTERNIC.NET	A.ROOT-SERVERS.NET	InterNIC (operated by NSI)
NS1.ISI.EDU	B.ROOT-SERVERS.NET	Information Sciences Institute, USC
C.PSI.NET	C.ROOT-SERVERS.NET	PSINet
TERP.UMD.EDU	D.ROOT-SERVERS.NET	University of Maryland
NS.NASA.GOV	E.ROOT-SERVERS.NET	NASA Ames Research Center
NS.ISC.ORG	F.ROOT-SERVERS.NET	Internet Software Consortium
NS.NIC.DDN.MIL	G.ROOT-SERVERS.NET	GSI (operated by NSI)
AOS.ARL.ARMY.MIL	H.ROOT-SERVERS.NET	U.S. Army Research Lab
NIC.NORDU.NET	I.ROOT-SERVERS.NET	NORDUnet

A few Letter changes (1997-2002)…

- 1997: added `{J,K,L,M}`
  - J & K to NSI
  - L & M to USC

  - K-Root moved to RIPE (EU)

  - M-Root moved to WIDE (Japan)

- 1998:
  - ICANN founded
  - L-Root moved to ICANN
- 2000:
  - Verisign acquires NSI (A-Root & J-Root)
  - I-Root moved to Netnod
- 2002:
  - Cogent acquires PSINet operations (C-Root)

Changes to the surrounding environment...

- 2002:
  - F-Root first root server to be anycasted internationally

- 2014-16:
  - IANA function transitions from US Gov't to ICANN

Root Server Operators (January 2022)

Chart from RSSAC023v2: History of the Root Server System (2020)

Hostname	IP Addresses	Operator
A.ROOT-SERVERS.NET	198.41.0.4 2001:503:ba3e::2:30	Verisign, Inc.
B.ROOT-SERVERS.NET	199.9.14.201 2001:500:200::b	University of Southern California, Information Sciences Institute
C.ROOT-SERVERS.NET	192.33.4.12 2001:500:2::c	Cogent Communications
D.ROOT-SERVERS.NET	199.7.91.13 2001:500:2d::d	University of Maryland
E.ROOT-SERVERS.NET	192.203.230.10 2001:500:a8::e	NASA Ames Research Center
F.ROOT-SERVERS.NET	192.5.5.241 2001:500:2f::f	Internet Systems Consortium, Inc.
G.ROOT-SERVERS.NET	192.112.36.4 2001:500:12::d0d	Defense Information Systems Agency
H.ROOT-SERVERS.NET	198.97.190.53 2001:500:1::53	U.S. Army Research Lab
I.ROOT-SERVERS.NET	192.36.148.17 2001:7fe::53	Netnod
J.ROOT-SERVERS.NET	192.58.128.30 2001:503:c27::2:30	Verisign, Inc.
K.ROOT-SERVERS.NET	193.0.14.129 2001:7fd::1	RIPE NCC
L.ROOT-SERVERS.NET	199.7.83.42 2001:500:9f::42	ICANN
M.ROOT-SERVERS.NET	202.12.27.33 2001:dc3::35	WIDE Project and JPRS

RSS today (in numbers)

- 12 operators (RSOs)
- Using 13 root letter addresses
  `{A,B,C,…,M}.ROOT-SERVERS.NET`
- Resolving to 1,525+ root server instances (including Anycast instances)
- Located in 100+ sovereign states
- Operate 24x365 without interruption
  … publishing the Root Zone globally at no charge

NIS 2: The [Accidental?] RSS Killer?

Or maybe not

NIS2 – what is it?

- The (first) NIS Directive (NIS 1)
  - "DIRECTIVE (EU) 2016/1148 … of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union"
  - Scope: cyber defence of critical national infrastructure
    - Did not apply to DNS services, as such
- NIS2 (European Commission draft, late 2020)
  - Includes DNS services (and many other things)
    - <u>Specifically includes root servers</u> as a subject of regulation
    - Small business exception does not apply to RSOs

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NIS2 – why {was,is} it a problem?

- Geographic scope of regulation
- Commission 2020 draft would mandate
  - Regulation of <u>everyone</u> who provides
  - root server services
  - to people in the EU

NIS2 – why {was,is} it a problem?

- BUT the RSS is a globally unified "system"
  - Massively distributed highly resilient database service
    - All RSOs manage (some) equipment in the EU

  - People in the EU
    - query root servers geo-located inside & outside the EU
    - query root servers <u>operated by all 12</u> of the RSOs

  - Regulating <u>people who operate</u> root servers delivering service to <u>people in the EU</u> means <u>regulating ALL 12 of them</u>

NIS2 – why {was,is} it a problem?

- The slippery slope of national regulation
  - IF EU Member States S_1, S_2, …, S_{27} can each regulate the RSS…
    … THEN why not Sovereign States S_{28}, S_{29}, S_{30}, …, S_{191}, S_{192}?

  - Risk of conflicting standards, reporting requirements, etc
    - Regulatory interventions from multiple Sovereign States…
      … would create pressure to fracture operations along border lines
      … which would in turn threaten unity and resilience of the RSS

> Isn't this the type of issue that the <u>multi-stakeholder model</u> is designed to resolve?

NIS2 – was this intentional?

There is (some) evidence

… that (some) people in the European Commission

… <u>did not intend</u> to regulate <u>all 12 global RSOs</u>

- Commission reports repeatedly reference the two RSOs whose place of business is in the EU (RIPE and Netnod)

NIS2 – European Parliament view

"Root name servers should be out of scope; <u>regulating them</u> is contrary to the EU's vision of a 'single, open, neutral, free, secure and un-fragmented network' and <u>could encourage and empower states advocating for a top-down, state-controlled Internet governance approach</u>, instead of the multi-stakeholder approach."
 – Report of the Parliamentary Rapporteur (May 2021) (emphasis added)

- Committee on Industry, Research and Energy (ITRE)
  agrees and adopts the report (October 2021) (vote: 70-3-1)

- Parliamentary redraft of NIS2 (November 2021):
  Removes root servers from coverage

NIS2 – European Council view

- Apparently wanted to re-introduce (some?) RSOs into the draft directive
  - But how can one draw a principled line between who is "in" and who is "out"? (See previous slides)

- Best guess:
  - Council unlikely to overcome the strong view of the European Parliament to keep RSOs out of scope

    … but it's not over until it's over

NIS2 – what's next?

- 2022: trilogue discussions commenced
  - European Parliament and
  - European Council

  try to reach agreement on content of the Directive

  - with assistance from European Commission

Breakthrough in RSS Governance

The RSS governance challenge

There is no governance structure
for the RSS

Or IS there?*

* Foreshadowing

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One Small Step…

- The RSOs (2015-18):
    - Recognize "We should do something about governance"
    - Carry out as series of governance workshops that lead to…
    - RSSAC037 "A Proposed Governance Model for the DNS Root Server System" (2018, 50 pages)
        - Plus RSAC038 (3 recommendations for dealing with '037)

    RSSAC? The Root Server System Advisory Committee
    - Provides advice to ICANN Board; issues publications
    - 12 voting seats (1/RSO) plus ICANN liaisons/observers/staff

One Small Step…

- Responding to RSSAC recommendations, the ICANN Board
    - Charters the Root Server System Governance Working Group (RSS GWG)
    - Gives RSS GWG the task of <u>proposing</u> a model RSS governance structure that takes account of RSSAC037, etc.

- RSS GWG
    - Commences work in January 2020
    - Produces a <u>draft</u> model in early 2021

One Small Step...

- The RSOs read the GWG draft model…

  And <u>now</u> things get really interesting

  really fast….

Feedback to the GWG draft model

- RSS GWG draft model diverges (far) from '037
  - Unrest among many RSOs

- How to structure a productive conversation with GWG?
  - Option 1: Everyone shout at each other
  - Option 2: Trial & error – look other structures for inspiration
    - "Is this GS better/worse? What about this one? Or this one?"

  - Option 3: Create a framework to analyze proposals
    - Draw up a list of what the RSOs believe a good model should include
    - Use this to develop a structured dialogue

One Giant Leap…

- Option 3 chosen. Result? 2 new RSSAC publications
  - RSSAC058 "Success Criteria for the RSS Governance Structure" (17 November 2021, 21 pages)
  - RSSAC059 (17 November 2021, 4 recommendations)

- FROM: first informal RSO discussions
  TO: unanimous (12-0) approval of RSSAC058 & '059
  - 22+ hours of meeting/workshop over 15+ online sessions
  - attended by 15-40 RSO leaders, staff, liaisons, observers, etc,
  - finished in 7 calendar months.

One Giant Leap…

- ICANN Board (November 2021)

  - Accepted RSSAC058 & '059 within days of publication

  - Transmitted these to RSS GWG with a positive endorsement and a guidance note

What does it say?

Acknowledges a current reality

Is there an RSS governance structure today?

Acknowledges a current reality

To find the answer, contrast:

A technical standard:

- Describes: what technical systems do
- Goal: influence design of systems

A governance structure:

- Describes: what <u>people</u>* are supposed to do
- Goal: influence the behaviour of <u>people</u>*

* In this context, "people" includes organizations like companies, government departments, etc.

Acknowledges a current reality

Is there an RSS governance structure today?

Yes!

It's governance, Jim, but not as we know it.

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History of governance success

"Over the course of decades, the Root Server Operators (RSOs):

- while <u>acting collectively</u> with one another;
- while <u>acting collaboratively</u> with the other RSS Stakeholders;
- while remaining <u>individually independent</u>,
- have <u>defined the core principles</u> that govern how the DNS root service should operate;
- have <u>delivered the DNS root service</u> in accordance with those same governing principles; and
- have <u>served (as a group) to maintain trust in the integrity</u> of that service."

– RSSAC058 (2021) §1.2 (emphasis added)
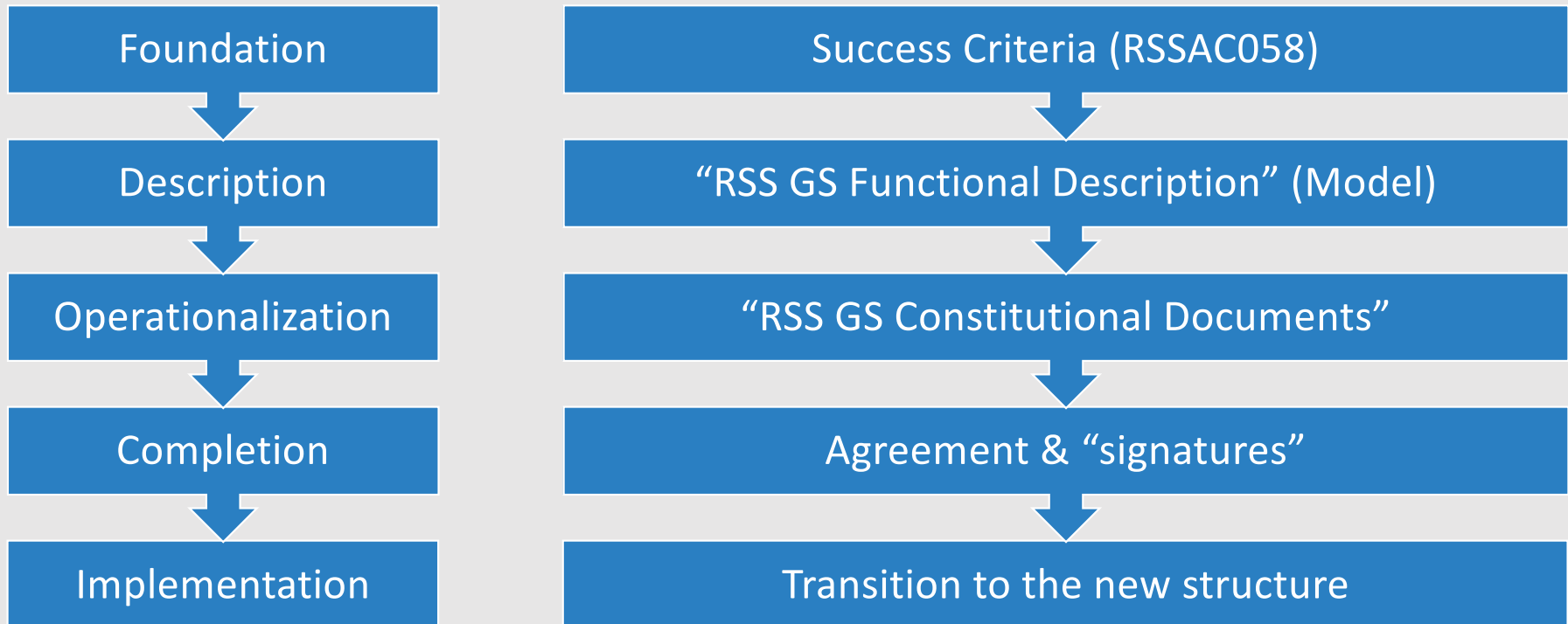
History of governance success

"From the very early days of the DNS, before the establishment of ICANN, the RSOs have undertaken <u>both an operational and a collective governance role</u> in delivering the DNS root service. In addition to technical expertise, they have worked to assure a stable single Internet <u>by defending the principles</u> that make the RSS successful <u>against all who threaten those principles</u>, and <u>maintaining global trust in the service</u>…."

    – RSSAC058 (2021) §1.2 (emphasis added)

Looking to a governance future

"… The <u>continuing status</u> of RSOs as autonomous and independent entities, <u>with a significant voice in governance</u>, remains an important principle for the success of the RSS Governance Structure (RSS GS)."
    – RSSAC058 (2021) §1.2 (emphasis added)

Process of moving to a new RSS GS

Foundation	Success Criteria (RSSAC058)
↓	↓
Description	"RSS GS Functional Description" (Model)
↓	↓
Operationalization	"RSS GS Constitutional Documents"
↓	↓
Completion	Agreement & "signatures"
↓	↓
Implementation	Transition to the new structure

Success criteria – classification

- Three categories
  - A: Substantive Criteria
    - 9 major categories & 46 sub-categories
    - Rights & responsibilities; checks & balances
  - B: Transition Process Criteria
    - 3 major categories & 2 sub-categories
    - Maintain stability; define when transition starts
  - C: Clear Statement Criteria
    - 4 major categories & 4 sub-categories
    - Make the RSS GS Functional Description sufficiently detailed to move everyone forward; avoid "we'll figure that out later"

Success criteria – finding balance

- Some criteria (especially Part A substantive criteria) are in tension with one another
    - Example:
    A.1: Accountability & Transparency
        vs
    A.2: RSO autonomy and independence

    - An RSS GS Functional Description will not achieve super-strong embodiment of ALL of the Part A criteria
    - Finding an appropriate balance requires negotiation

Success criteria – a few highlights

- A.1 (Accountability and Transparency) includes:

  - A.1.1.1: "The [governance structure] must include provision for <u>cyber incident oversight and disclosure</u> obligations, and <u>codify security threat and vulnerability information sharing</u> amongst RSOs and the [governance body to be created]."

  (emphasis added)

Success criteria – a few highlights

- A.3 (Financial Function) includes:

  - A.3.4.3: "Methods of raising funds to support the RSS should, to the extent practicable, <u>preserve the status of the RSS as a public good</u>: made available for no charge at point of use."

  - A.3.5: "To align properly with the goals of Internet governance generally <u>the [governance body to be created] must operate on a not-for-profit basis</u>."

    (emphasis added)

Success criteria – a few highlights

- A.3 (Financial Function) includes:

  - A.3.7: "While the [governance system] must provide opportunities to finance RSOs, there must be no obligation imposed upon RSOs to accept all or any such sources of funding. …"

Success criteria – a few highlights

- B.1 (Transition to new RSS GS is conditional upon prior settlement of all RSS GS Constitutional Documents):

    - "Parties who will be governed by a new (or revised) RSS GS must have appropriate and enforceable assurance that the governance structure is <u>fully implemented in RSS GS Constitutional Documents prior to transition</u> from existing governance structure to the new form. <u>Checks & balances need to be clear before</u> the new structure moves into force."

    (emphasis added)

Success criteria – a few highlights

- B.2 (Operational stability during transition to RSS GS):

  - "Any RSS GS Functional Description must contain a clear statement that the process of transitioning from any current RSS governance to any new RSS GS must take extraordinary care not to disrupt the proper functioning of the RSS."

Next steps:

- RSS GWG
  - 2 December 2021. Accepted RSSAC058 & '059 into work plan; requested RSO input on possible changes to RSS GWG working structure.
  - 17 January 2022. Transmitted a letter to the ICANN Board asking the Board to amend the RSS GWG Charter to:
    - (1) Invite all 12 RSOs to join RSS GWG; and
    - (2) Amend RSS GWG decision-making procedures
      - From: Decide by consensus (if possible); or (if no consensus) decide by majority vote
      - To: Decide by consensus only

Next steps:

- ICANN Board
  - Positive response to RSS GWG – encouraged them to engage with all RSOs asap pending process documentation

- ICANN Board & RSSAC at ICANN 73
  - 7 March 2022. Very positive and mutually supportive joint session.

Next steps:

- All parties
  - Some GWG constituencies are in the process of appointing replacement representatives for retiring members (including the current Chair)
  - RSOs are selecting additional representatives for GWG
  - RSS GWG work sessions due to restart in April 2022, electing new Chair, etc

Thank you!

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Software downloads:
https://www.isc.org/download or
https://downloads.isc.org

Presentations:
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Main GitLab: https://gitlab.isc.org