Governing the "Ungovernable"

One Giant Leap for the RSS in 2021

Robert Carolina, General Counsel

Internet Systems Consortium   @Rob2yall

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About ISC

- Non-profit organization

- Managed Open Source
  - BIND (DNS)
  - ISC DHCP (DHCP)
  - Kea (DCP)

- Root Server Operator
  - F-Root
    - >300 root instances globally
    - Including Edinburgh, London, and Manchester

About the presenter

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

- Internet governance
  - Assisted in developing RSSAC058 & '059

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
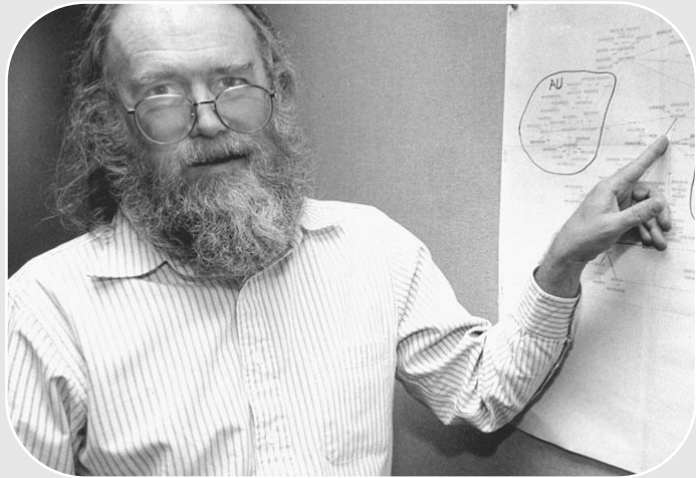
A Brief History of the Root Server System
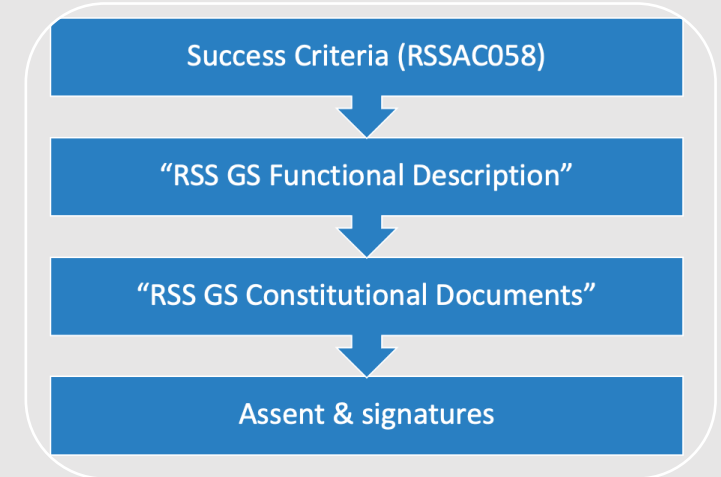
- As told by a lawyer

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"

↓

"RSS GS Constitutional Documents"

↓

Assent & signatures

RSS governance breakthrough

- RSSAC058 Success Criteria

Converging to agreement. By R Carolina, ISC (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?

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

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`

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

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: new letters {J,K,L,M}
  - J & K to NSI
  - L & M to USC
  - K moved to RIPE (EU)
  - M moved to WIDE (Japan)

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

Root Server Operators (2022)

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 1,530+ root server instances (including Anycast instances) located in 100+ sovereign states
- Operates 24x7x365 without interruption …publishing the Root Zone globally at no charge

NIS 2: The [Accidental?] RSS Killer?

Or maybe not

NIS2 – why {was,is} it a problem?

- Geographic scope of regulation
- Commission 2020 draft would (among many other things) mandate the regulation of…

  … <u>everyone</u> who provides

  … root server services

  … to people in the EU.

NIS2 – why {was,is} it a problem?

- The RSS is a globally unified "system"
  - Massively distributed highly resilient service
- <u>All 12 RSOs</u> manage (some) equipment in the EU
- People in the EU
  - query root servers geo-located <u>inside & outside</u> the EU
  - query root servers <u>operated by all 12</u> of the RSOs

∴ Regulating operators of root servers that deliver service to people in the EU 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… … creates pressure to fracture operations along border lines … which in turn threatens 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 – 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):
  <u>Excludes root servers from coverage</u>

- Awaiting results of the trilogue procedure

Breakthrough in RSS Governance

RSSAC058 Success Criteria

The RSS governance challenge

Is there an RSS governance structure today?

The RSS governance challenge

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 entities like companies, government departments, etc.

The RSS governance challenge

Is there an RSS governance structure today?

Yes!

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

We can improve it; update it; make it better.

"We choose to go to the Moon..."

... not because it is easy.

- RSOs start work to design a better governance structure
- Convene a series of workshops (2015-18) that lead to...
  - RSSAC037 "A Proposed Governance Model for the DNS Root Server System" (2018, 50 pages)
  - RSSAC038 (3 <u>recommendations to ICANN Board</u>)

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

"We have lift-off!"

- In response to RSSAC recommendations, the ICANN Board:
  - Consults with the community
  - Invites stakeholders to send representatives to: the Root Server System Governance Working Group (RSS GWG)
  - Instructs RSS GWG to propose a model governance structure that embraces RSSAC037, '042, etc.

"Houston, we have a problem"

- RSS GWG interim draft (2021Q2)
  - Diverges (far) from RSSAC037
  - Unrest among RSOs & some other stakeholders

- How to advance a productive conversation?
  - Option 1: Everyone shout at each other
  - Option 2: Trial & error – look at other structures for inspiration
  - 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 structured dialogue

"One Giant Leap…"

- Option 3! Let's define Success Criteria
- RSSAC published (17 Nov 2021)
  - RSSAC058: Success Criteria for the RSS Governance Structure (21 pages)
  - RSSAC059 (4 recommendations to ICANN Board)
- ICANN Board (18 Nov 2021, special meeting) embraced and promoted these

Looking back on a history of RSS 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)

Looking back on a history of RSS 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 forward to a future of RSS governance success

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

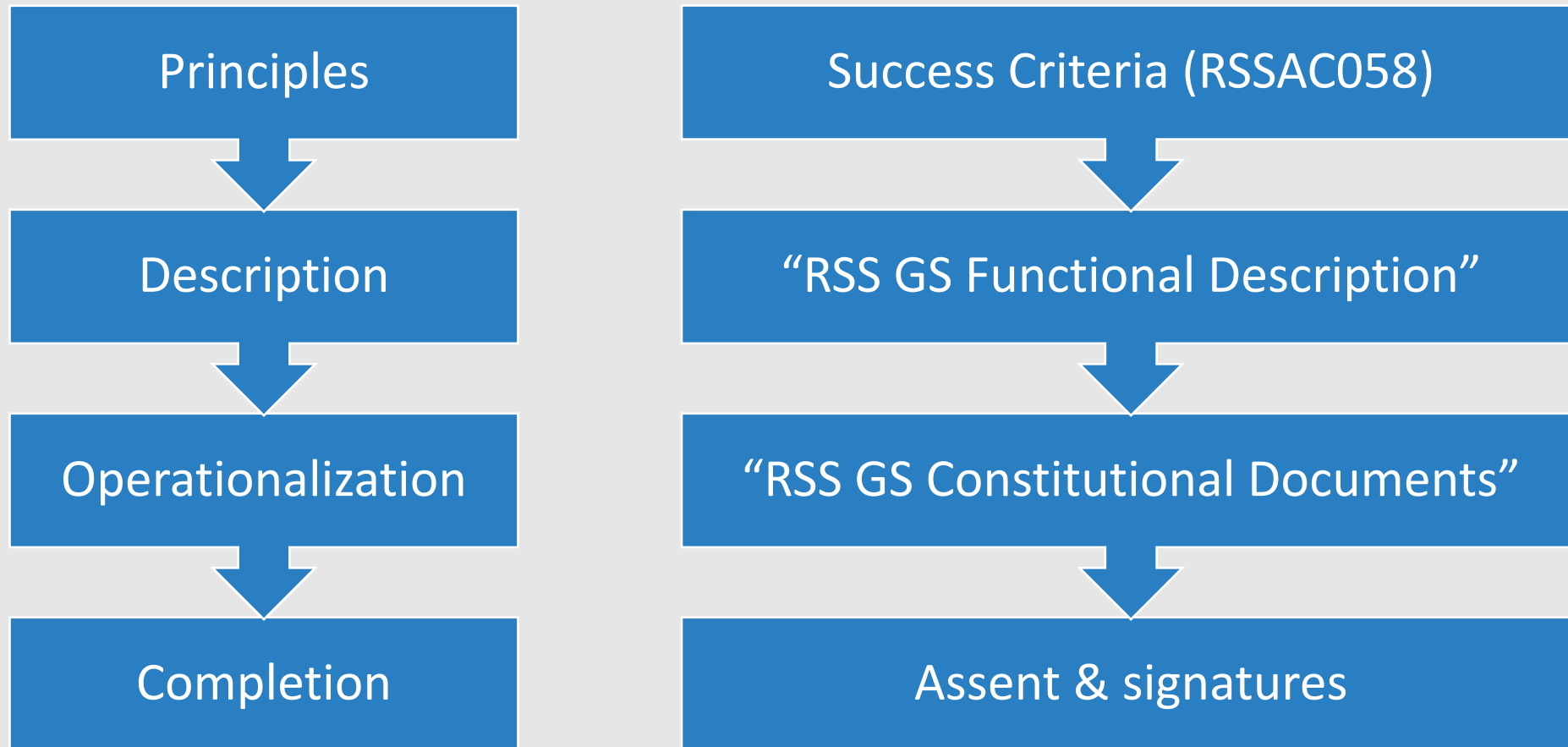   – RSSAC058 (2021) §1.2 (emphasis added)

Success criteria: categories

- 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 Functional Description of the system sufficiently detailed to move everyone forward; avoid "somebody else will figure that out later"
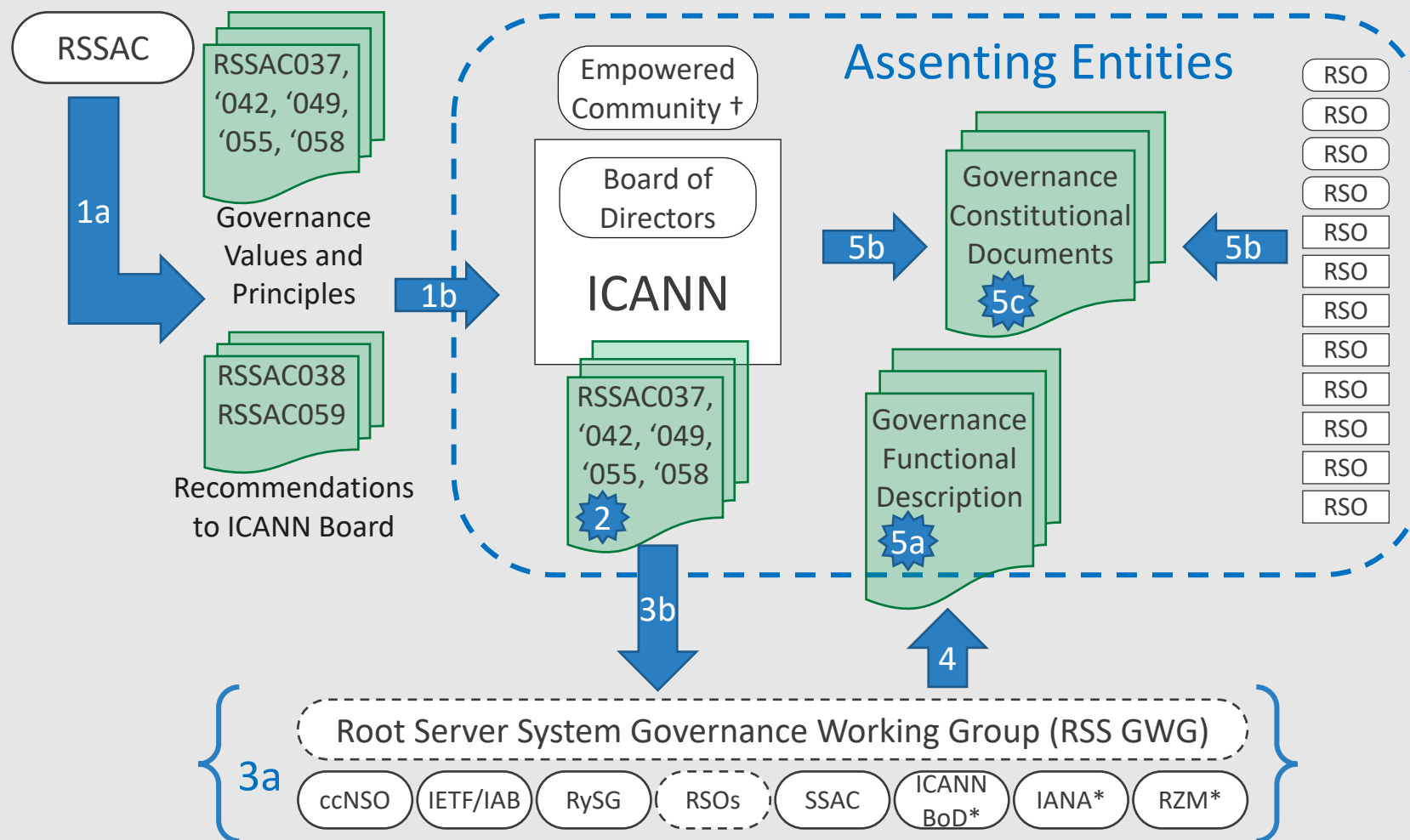
Success criteria: finding balance

- Nearly all criteria are principles-based
- Some (especially Part A) are in tension with one another
  - Example:
    - A.1: Accountability & Transparency; vs
    - A.2: RSO autonomy and independence
  - A Functional Description of the structure will not achieve super-strong embodiment of ALL of the Part A criteria
- Finding an appropriate balance
  <u>requires good faith negotiation</u>

Converging to agreement: substance

Principles	**Success Criteria (RSSAC058)**
↓	↓
Description	**"RSS GS Functional Description"**
↓	↓
Operationalization	**"RSS GS Constitutional Documents"**
↓	↓
Completion	**Assent & signatures**

Converting to agreement: process

1. RSOs, via RSSAC: a) publish Governance Principles and b) invite ICANN Board to propose implementation
2. ICANN Board consults community, embraces the Principles
3. ICANN Board a) invites stakeholders to send representatives to RSS GWG to work on model structure that b) embraces the Principles
4. GWG proposes a Functional Description that implements the Governance Principles
5. Assenting Entities: a) refine & finalize Functional Description, b) create Constitutional Documents, and c) conclude arrangements

Key:
- | X | Incorporated entity
- (X) Association, department, or function
- ⌐ X ¬ Committee, ad hoc group
- ∗ Liaison
- † The Empowered Community will be an Assenting Entity if ICANN Bylaws require amendment

Thank you!

Robert Carolina
General Counsel, ISC

Twitter:
 @Rob2Yall

LinkedIn:
 https://www.linkedin.com/in/robertcarolina/

Main website: https://www.isc.org

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