



RIPE NCC
RIPE NETWORK COORDINATION CENTER

DEMYSTIFYING IP REGISTRATION

ITU | SG17 Workshop, Geneva



The Internet is not what you think it is



The Internet is not the **web**, **social media** or any of the **applications** that run on top it. it's not even the **digital economy** or the **communication tools** we've all come to rely on.

The **Internet** is a foundational network of networks.



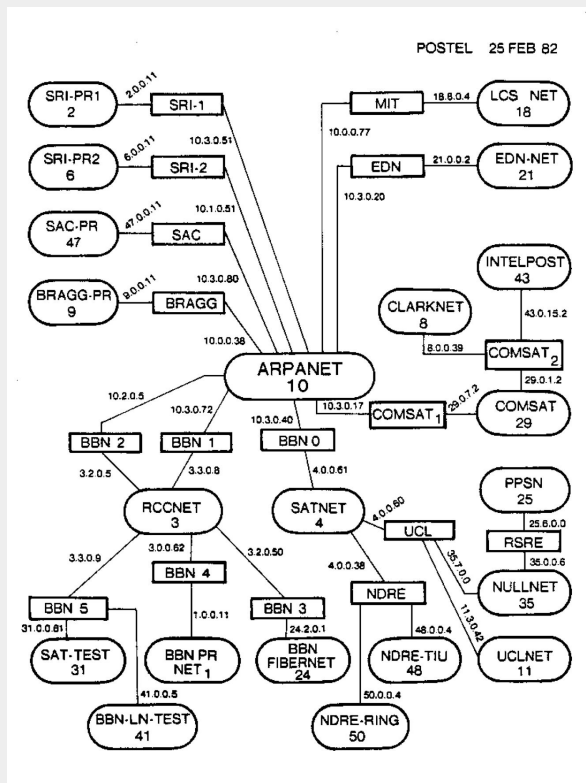
Sir Tim Berners-Lee and Vint Cerf - fathers of the Web and the Internet, respectively - at the World Wide Web Consortium's 20th Anniversary

The core principles behind the Internet

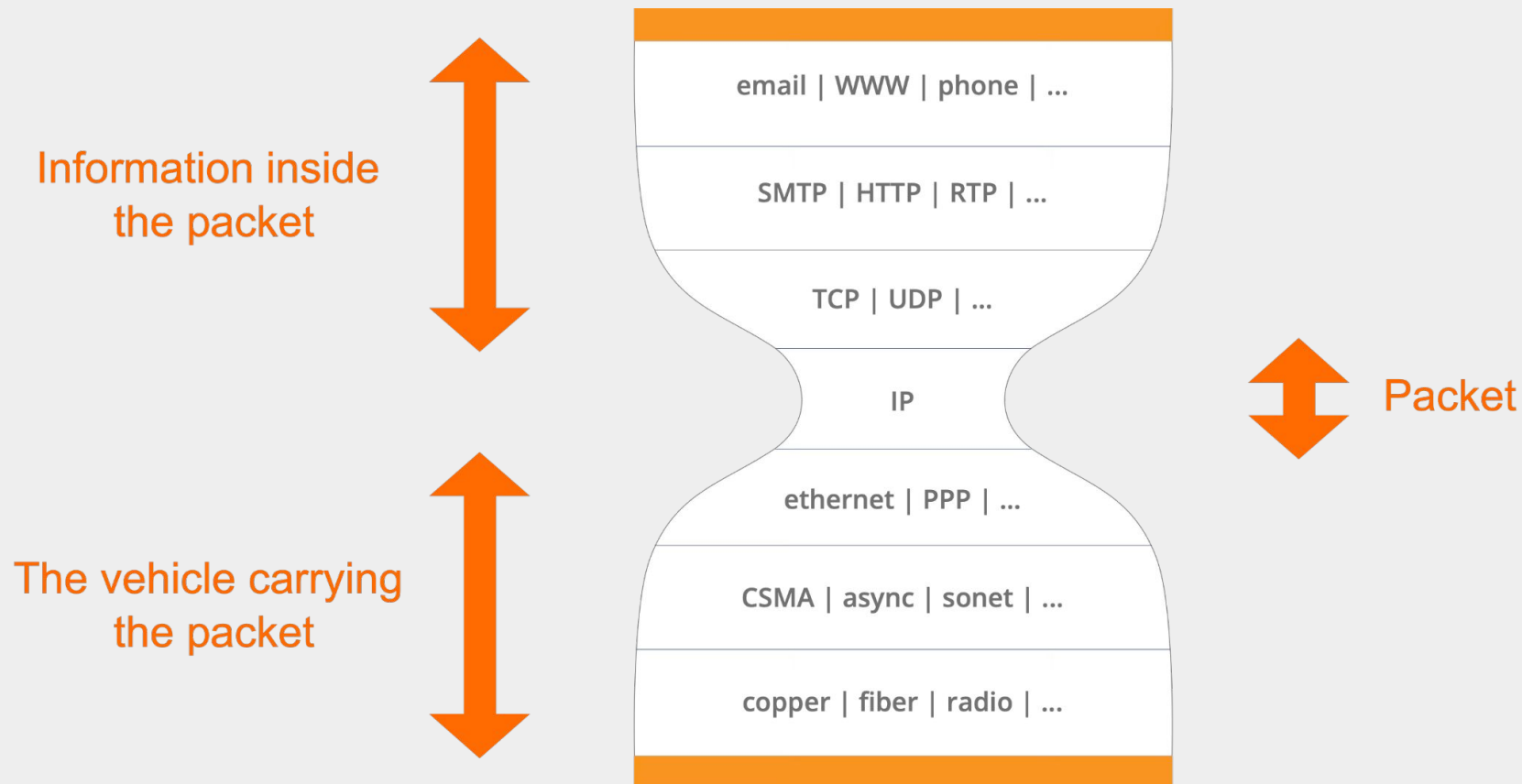


- **Open standards** that ensure devices can communicate seamlessly across networks with different underlying technologies worldwide
- Registration of global Internet identifiers, coordinated openly and without commercial control, **to guarantee global uniqueness.**

Together, they make the Internet a permissionless, global platform for innovation and communication.



The hourglass model



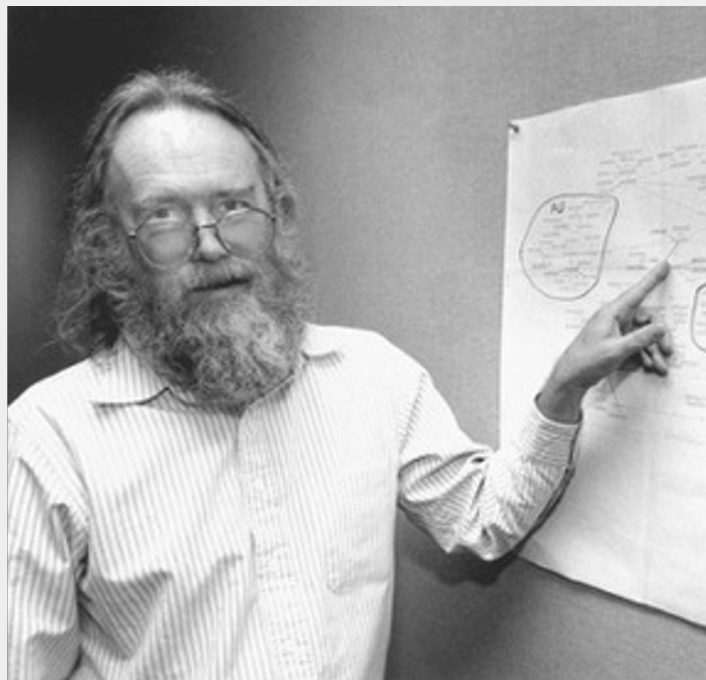


**So how do we make sure
the IP addresses are unique?**



1980s onwards

- The US Department of Defence contracted administration of names, numbers and protocols to the University of Southern California's ISI
- Run by **Jon Postel**, the function was called Internet Assigned Numbers Authority (**IANA**)
- The **RIR system** was formed in the early 1990s, starting with the RIPE NCC in 1992
- Internet number resource administration was split from the Domain Name System (DNS)

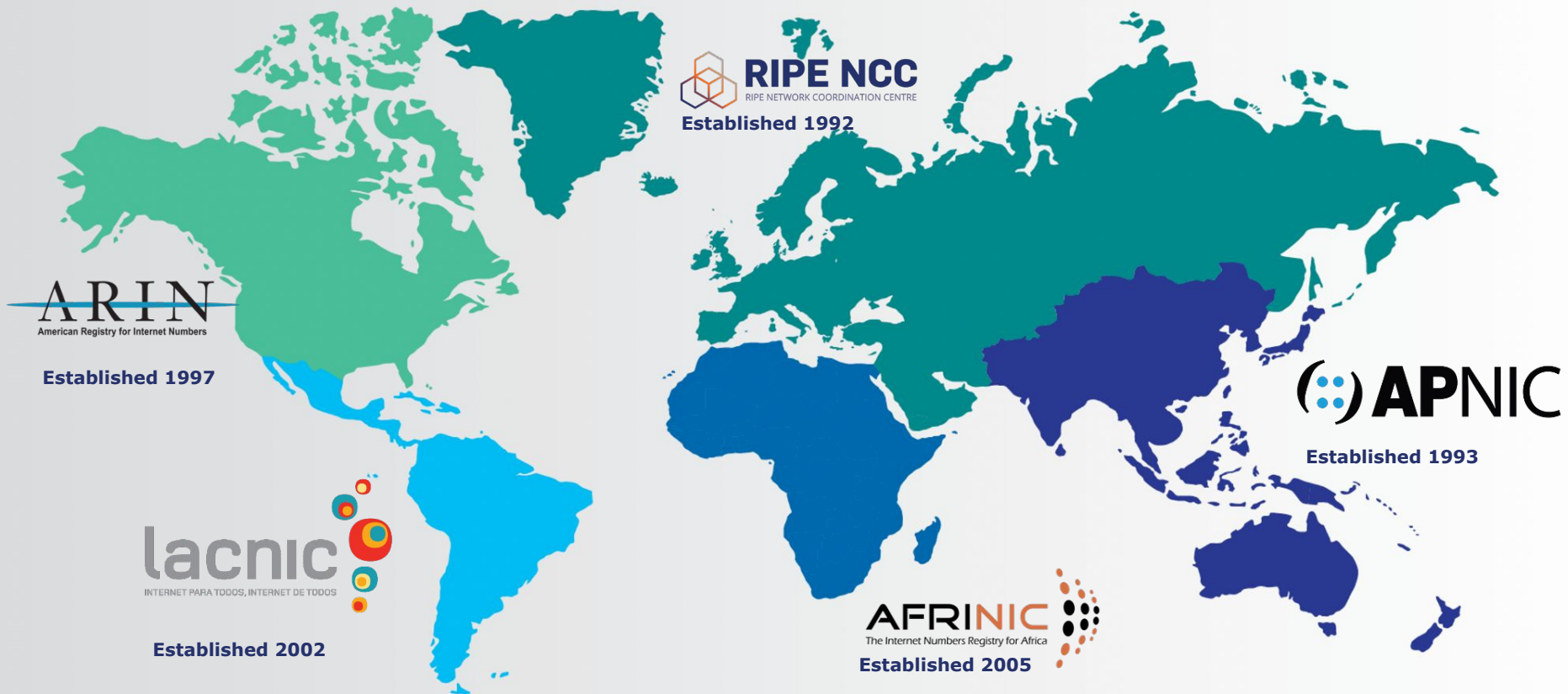


What is a Regional Internet Registry (RIR)?



RIR

Manages the allocation, administration and registration of Internet number resources in a specific region of the world.



ARIN
American Registry for Internet Numbers

Established 1997

lacnic
INTERNET PARA TODOS, INTERNET DE TODOS

Established 2002

RIPE NCC
RIPE NETWORK COORDINATION CENTRE
Established 1992

AFRINIC
The Internet Numbers Registry for Africa
Established 2005

APNIC
Established 1993

ARIN, serving Canada, many Caribbean and North Atlantic Islands, and the United States

LACNIC, serving Latin America and the Caribbean

AFRINIC, serving Africa and the Indian Ocean

RIPE NCC, serving Europe, the Middle East, and parts of Central Asia

APNIC, serving the Asia Pacific region

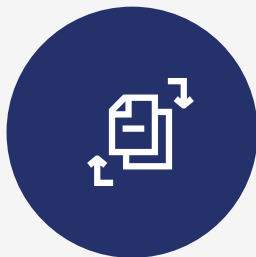


Registry first, and much more



Manage and distribute Internet number resources

- IPv4 and IPv6 addresses
- Autonomous System Numbers (ASNs)



Maintain Registries

- Maintain directory services including Whois, WhoWas and routing registries
- Provide reverse DNS



Internet Infrastructure

- Support Internet infrastructure through technical coordination
- Resource Public Key Infrastructure (RPKI)



Community Support

- Community-driven processes for policy development
- Training and capacity building



ABOUT INTERNET NUMBER RESOURCES

What We Mean By Internet Number Resources



IPv4

- 32-bit addresses written in dotted decimal notation
- There are $2^{32} = 4.4$ billion IPv4 addresses
- E.g. 205.150.58.7

IPv6

- 128-bit addresses written in hexadecimal notation
- There are $2^{128} =$ roughly 340 undecillion IPv6 addresses
- E.g. 2001:0503:0C27:0000:0000:0000:0000:0000

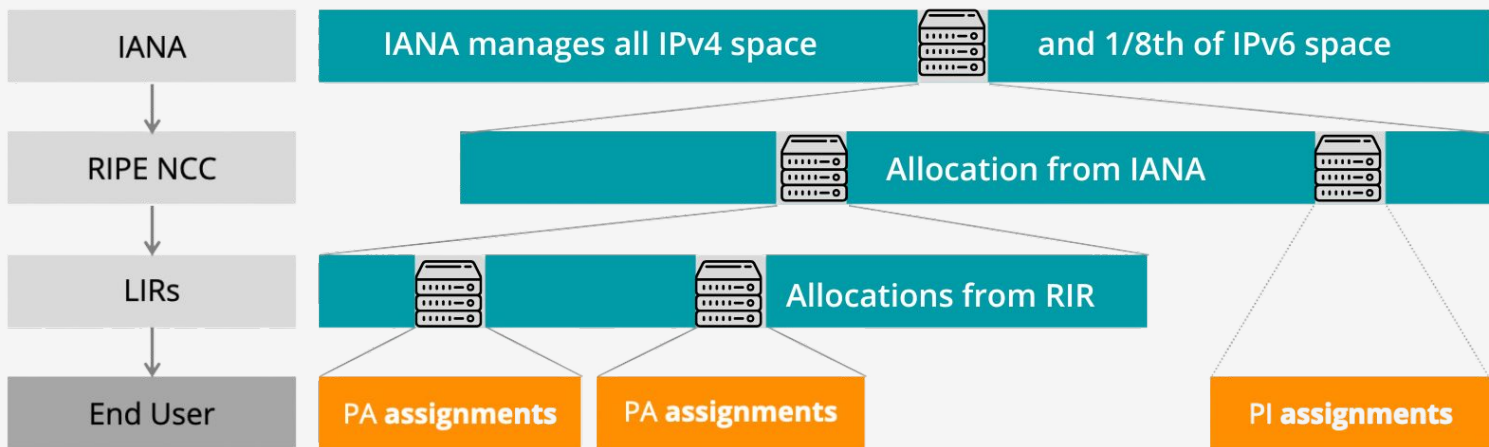
Autonomous Systems (ASes)

- An AS is a group of IP networks that share the same routing policy and administered by a single operator
- When exchanging exterior routing information, each AS is identified by a unique number: **the Autonomous System Number (ASN)**
- Network operators must have an ASN to control routing within their networks and to exchange routing information with other Internet Service Providers
- E.g. AS3333

How IP Addresses Are Issued



IP addresses are registered hierarchically



IP Addresses and Domain Names



Not the same thing! Two different systems that interact with one another.

IP Addresses

2001:0db8:85a3:0000:0000:8a2e:0370:7334

- Computers recognise numbers
- It identifies a device on the Internet
- Used for routing (moves information from a source to a destination)
- Every device directly connected to the Internet requires a unique IP address

Domain Names

www.ripe.net

- People recognise names
- Maps a host name to a unique IP address
- A means of storing and retrieving information about hostnames and IP addresses in a distributed database





GOVERNANCE AND POLICY DEVELOPMENT



Governance

All the RIRs are not-for-profit, membership-based organisations.



Independent
Not governmental
bodies or entities



Membership-based
Open to all Internet
number resource
holders (e.g. Internet
Service Providers,
governments,
universities,
corporations)



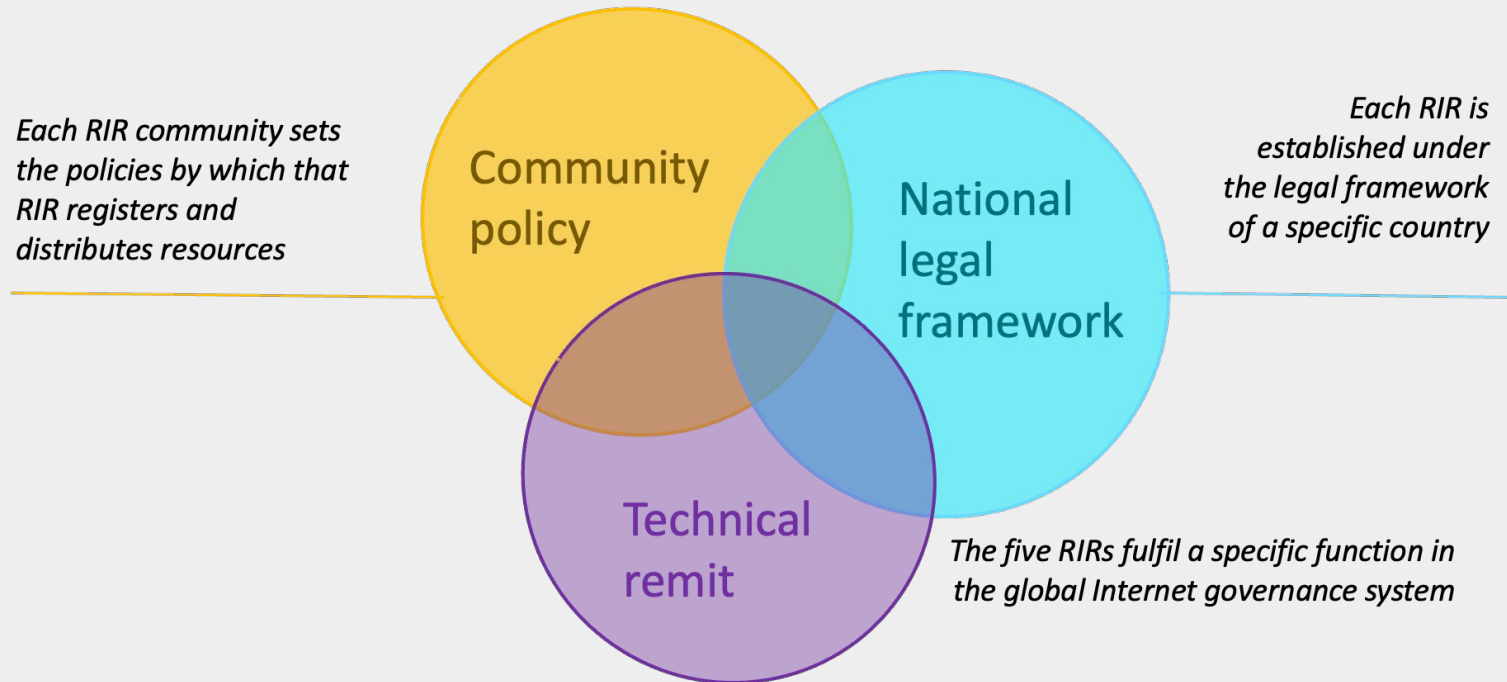
Not-for-profit
Funded by the
communities
Fees for services,
not for number
resources



Community-driven
Governing boards
elected by members
Open and transparent



Each RIR operates in accordance with three factors





Multistakeholder approach



RIR Policy Development Process



Inclusive

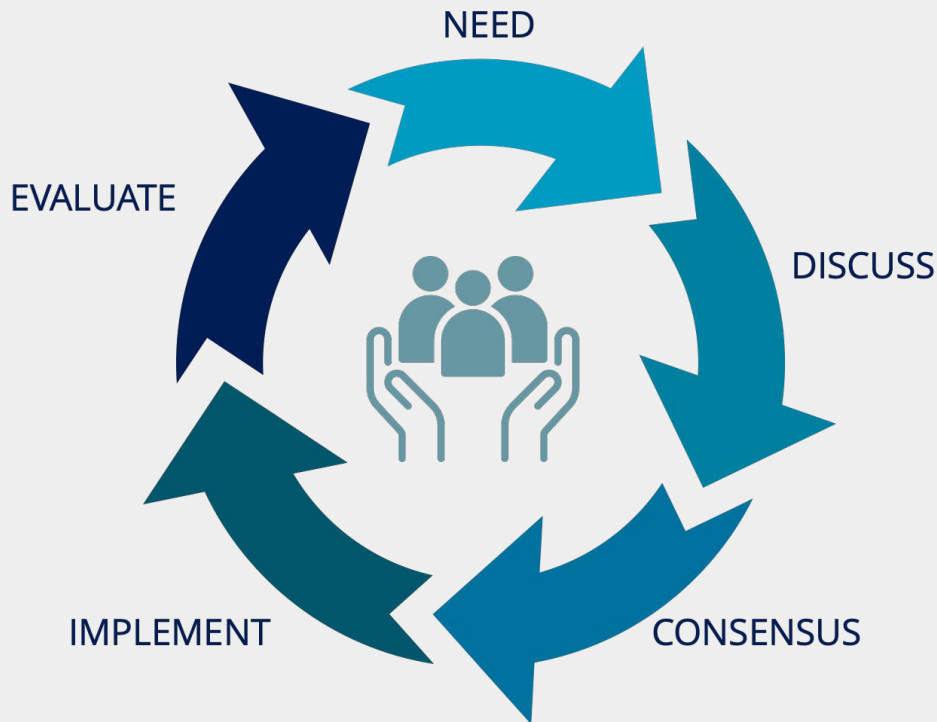
Anyone can participate - including you!

Bottom Up

The Internet communities propose and approve policies

Transparent

Decisions and policies are documented and published. Discussions take place on public mailing lists.

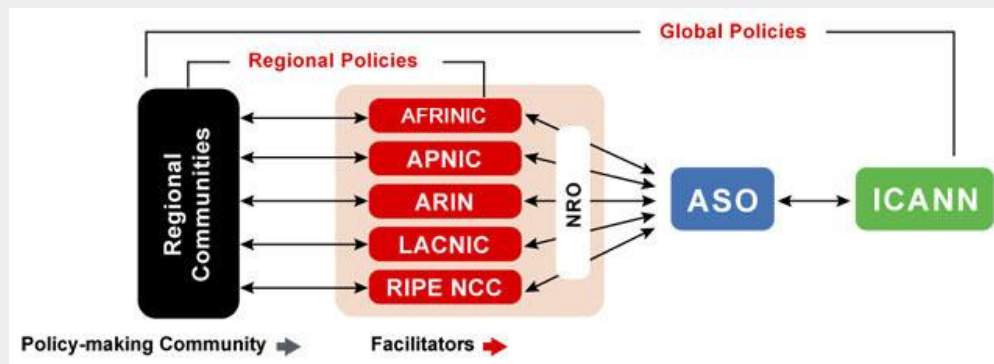


Global Policy Development Process



Global policies govern how IANA issues Internet number resources to the RIRs.

RIRs then distribute these Internet number resources to their members according to the **regional policies** developed by their respective communities.





Key Takeaways

The core principles behind the Internet



- **Know where to go:** Technical Coordination, Internet Standardisation, Internet Governance and Digital Governance are **NOT** the same thing.
- **Trust is at the heart of it:** Regional registries enabled by inclusive regional communities where everyone can participate in the bottom-up policy development cycle.
- **The Internet core:** Do not mix the internet plumbing with the applications and payloads that run on top of it.



Questions & Comments



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ICANN ASO AC (Address Council)

Who is it:	NRO Number Council
What is it?	Number Resource Advisory Council
How is it Organized?	15 Members [3 From Each Region] – 2 Elected at Large – 1 Appointed by RIR Board • RIR & ICANN Observers
Term of Office	Different for every RIR
What Does it Do?	Advise ICANN Board on Internet Numbers • Overseeing the Global Policy Development Process • Appoint ICANN Board Members (2) • Appoint member to ICANN NomCom (1)



ICANN | ASO
Address Supporting Organization

NRO Mission



To actively contribute to an **open, stable,** and **secure Internet** by:

- Providing and promoting a coordinated Internet number registry system
- Being an authoritative voice on the multistakeholder model and bottom-up policy process in Internet governance
- Coordinating and supporting joint activities of the RIRs