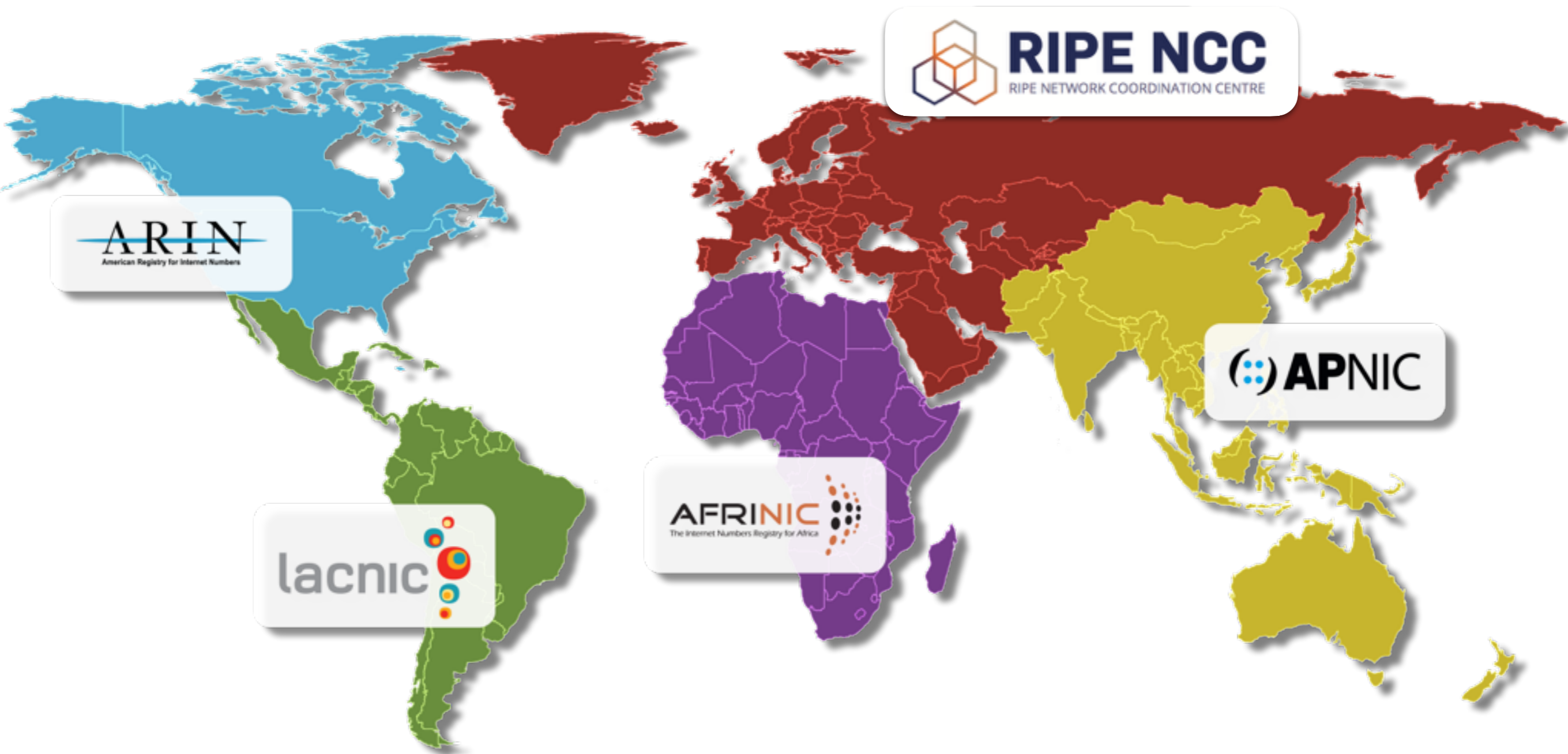




RIPE NCC
RIPE NETWORK COORDINATION CENTRE

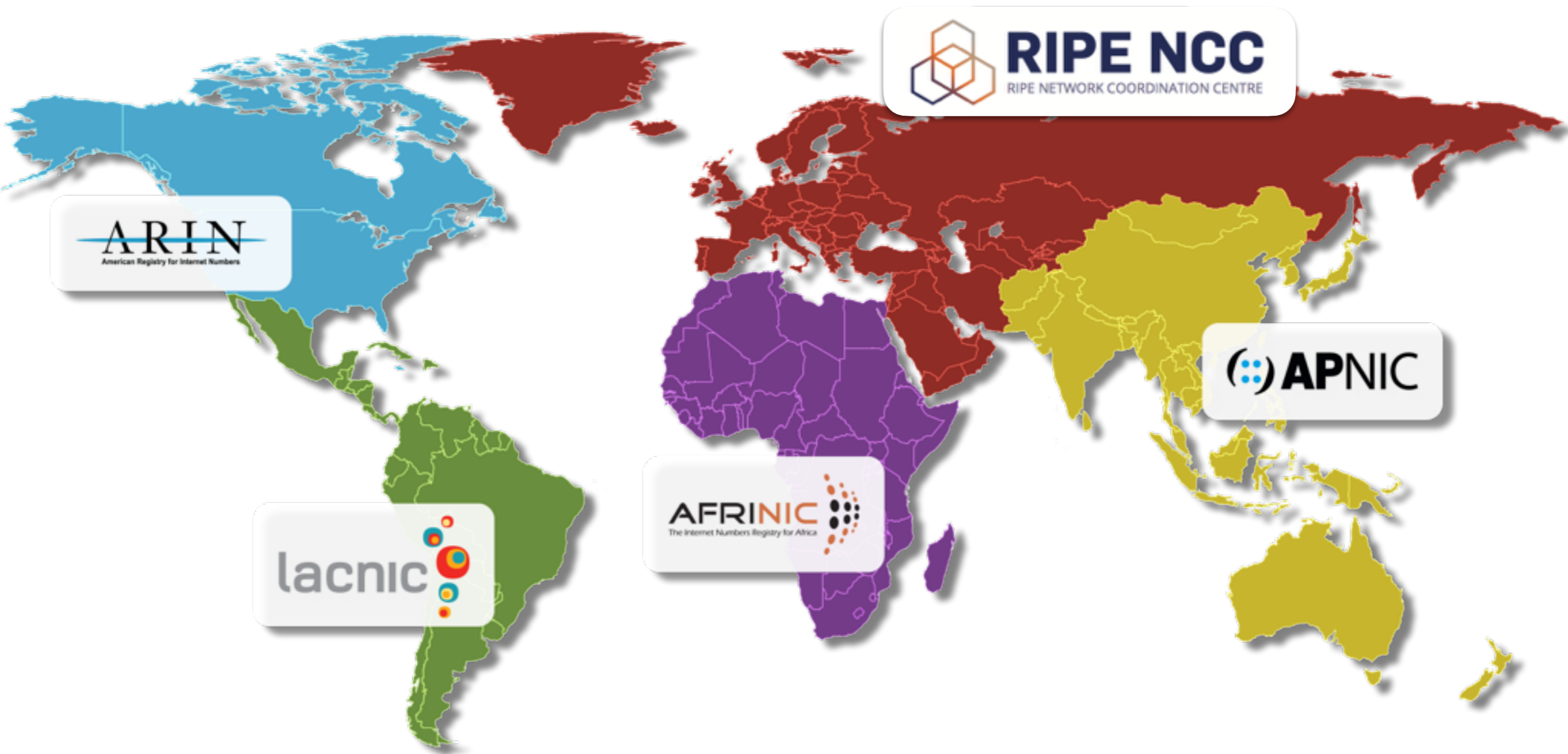
The Regional Internet Registry (RIR) System

Regional Internet Registry (RIR)



The Regional Internet Registry (RIR) and bottom-up community driven number resource management model

Regional Internet Registry (RIR)



The Regional Internet Registry (RIR) and bottom-up community driven number resource management model



Identification

Sender and Receiver Addresses

Internet Number Resources



110000000000000000000000001000110101

192.0.2.53



110000000000000000000000001000110100

192.0.2.52

IP version 4 (IPv4)

- Initially deployed: 1 January 1983.
- IPv4 addresses are 32-bit numbers. (4.2 Billion)
- Still the most commonly used version.

Internet Number Resources



192.0.2.52

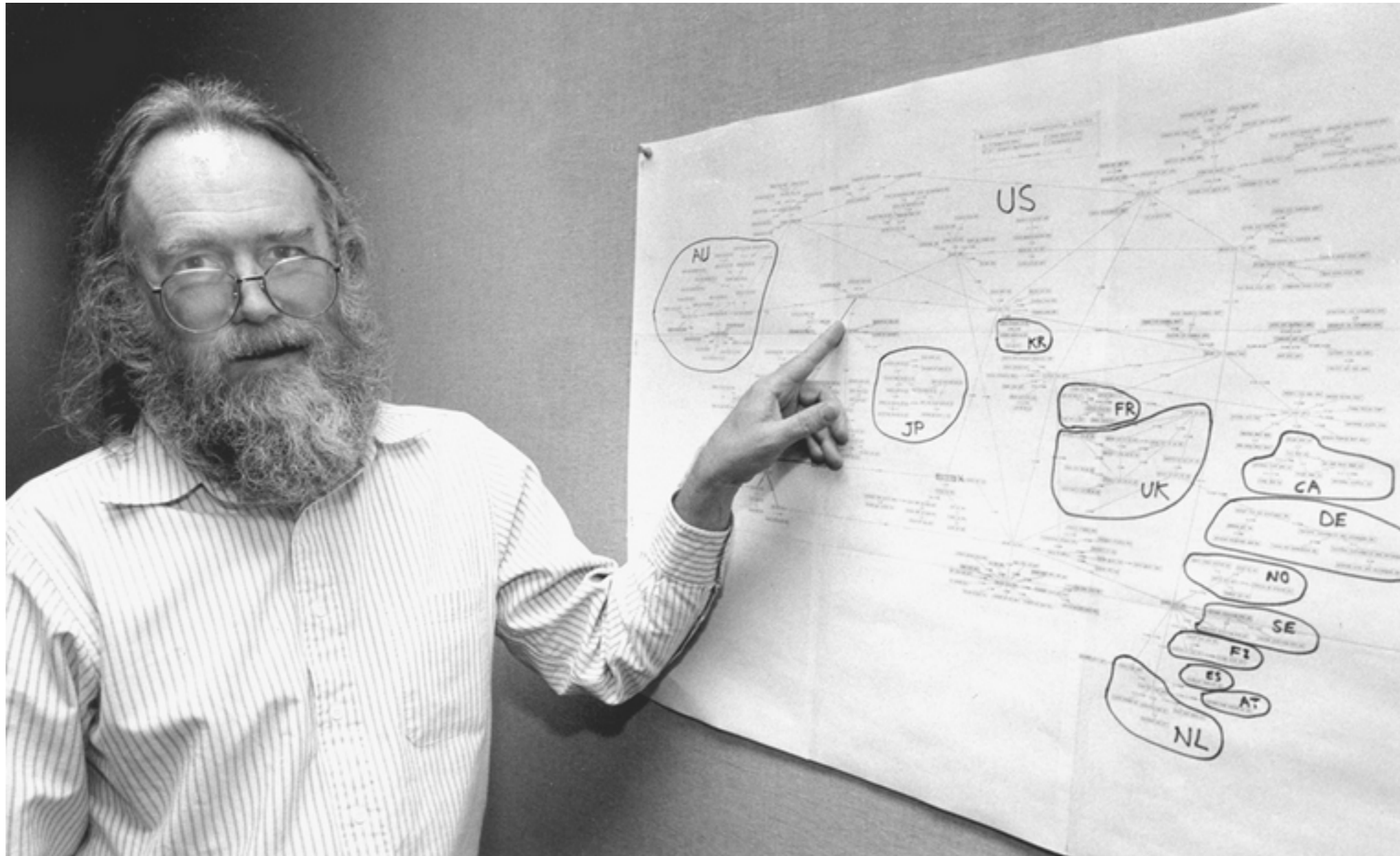


192.0.2.52



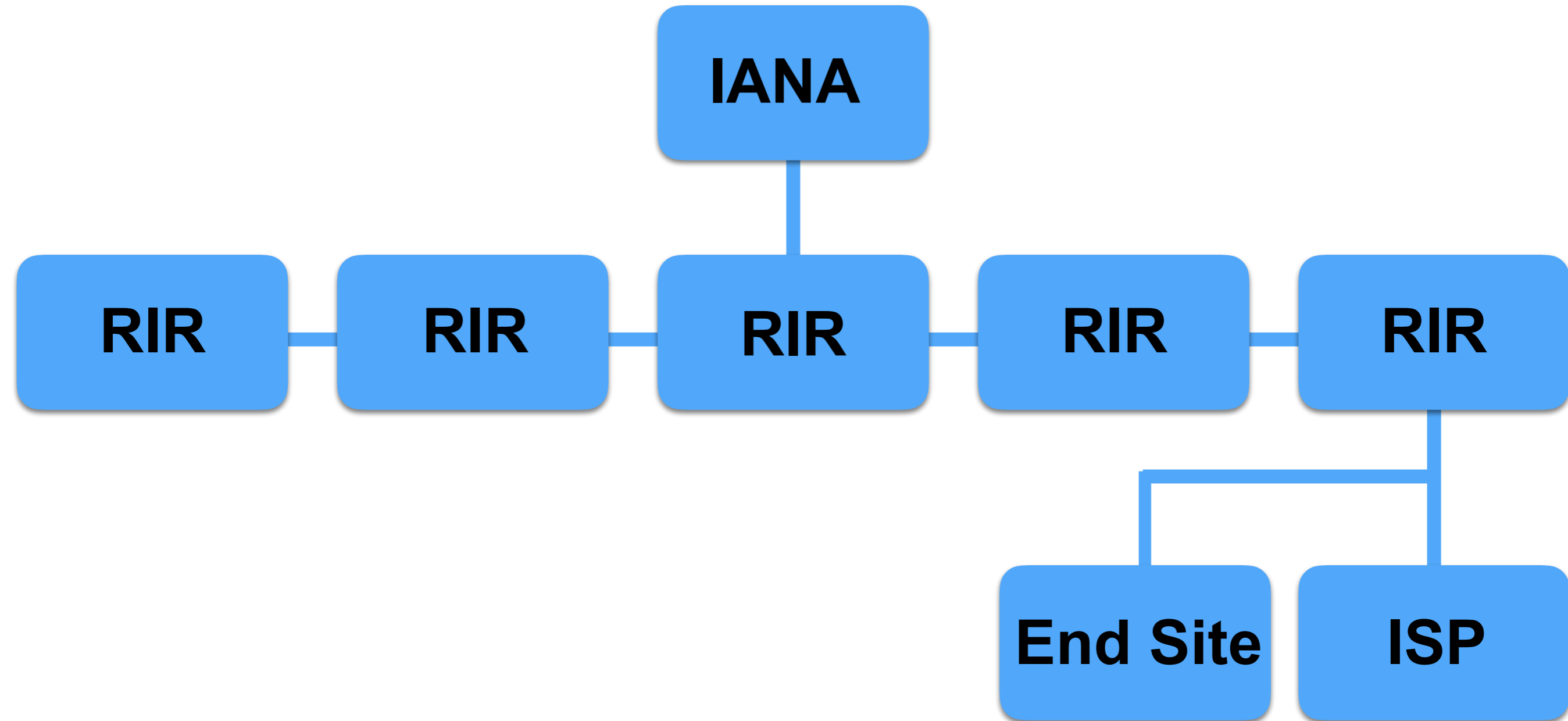
192.0.2.53

Internet Number Resource Management

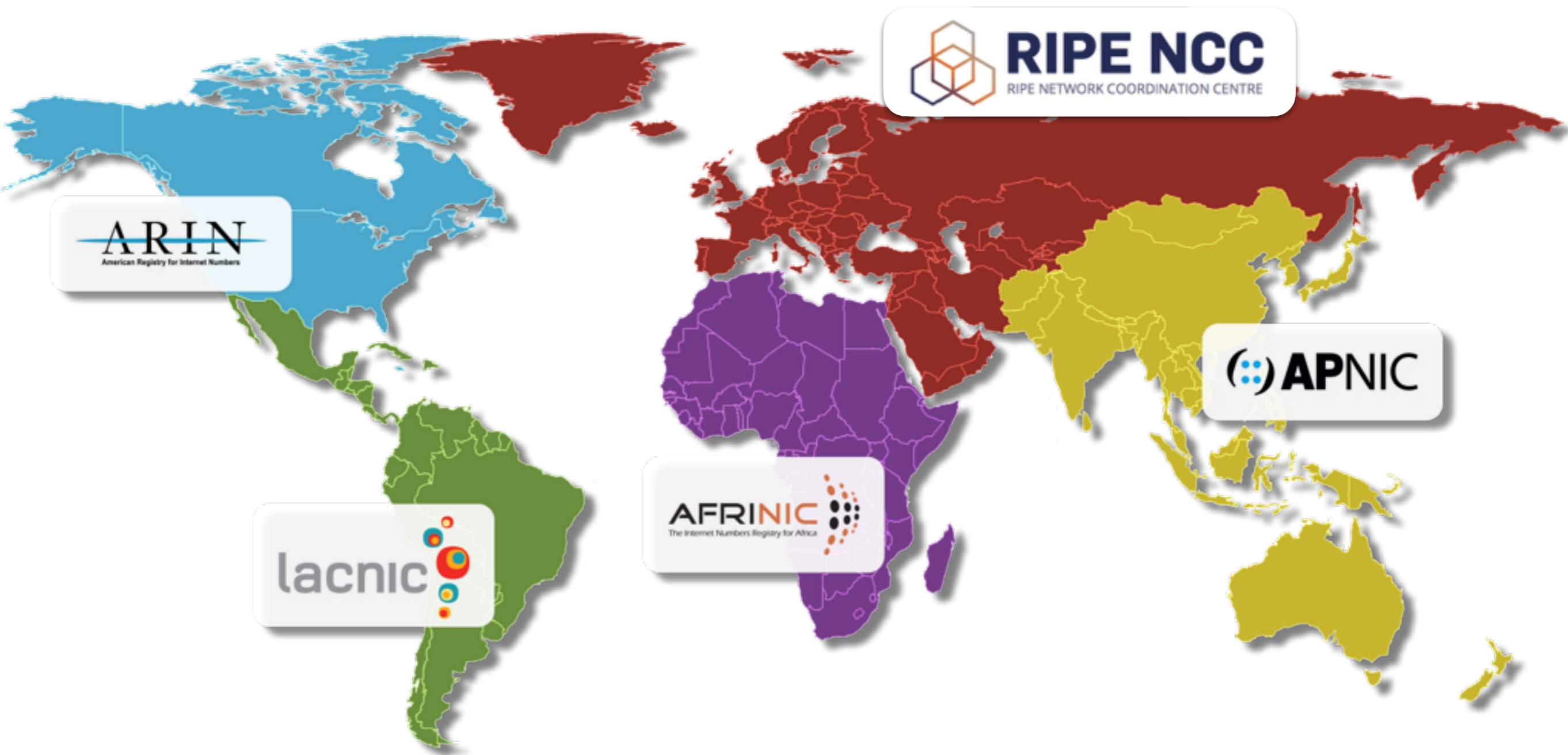


John Postal used to manually distribute IP addresses

Internet Number Resource Management



Regional Internet Registry (RIR)



The Regional Internet Registry (RIR) and **bottom-up community driven** number resource management model

RIPE Policy Development



The RIPE community develops and sets policies through a long established, open, bottom-up process of discussion and consensus-based decision making.

Where does it happen?

Policy development happens at RIPE Meetings (where RIPE Working Groups meet) and the RIPE Working Group mailing lists.

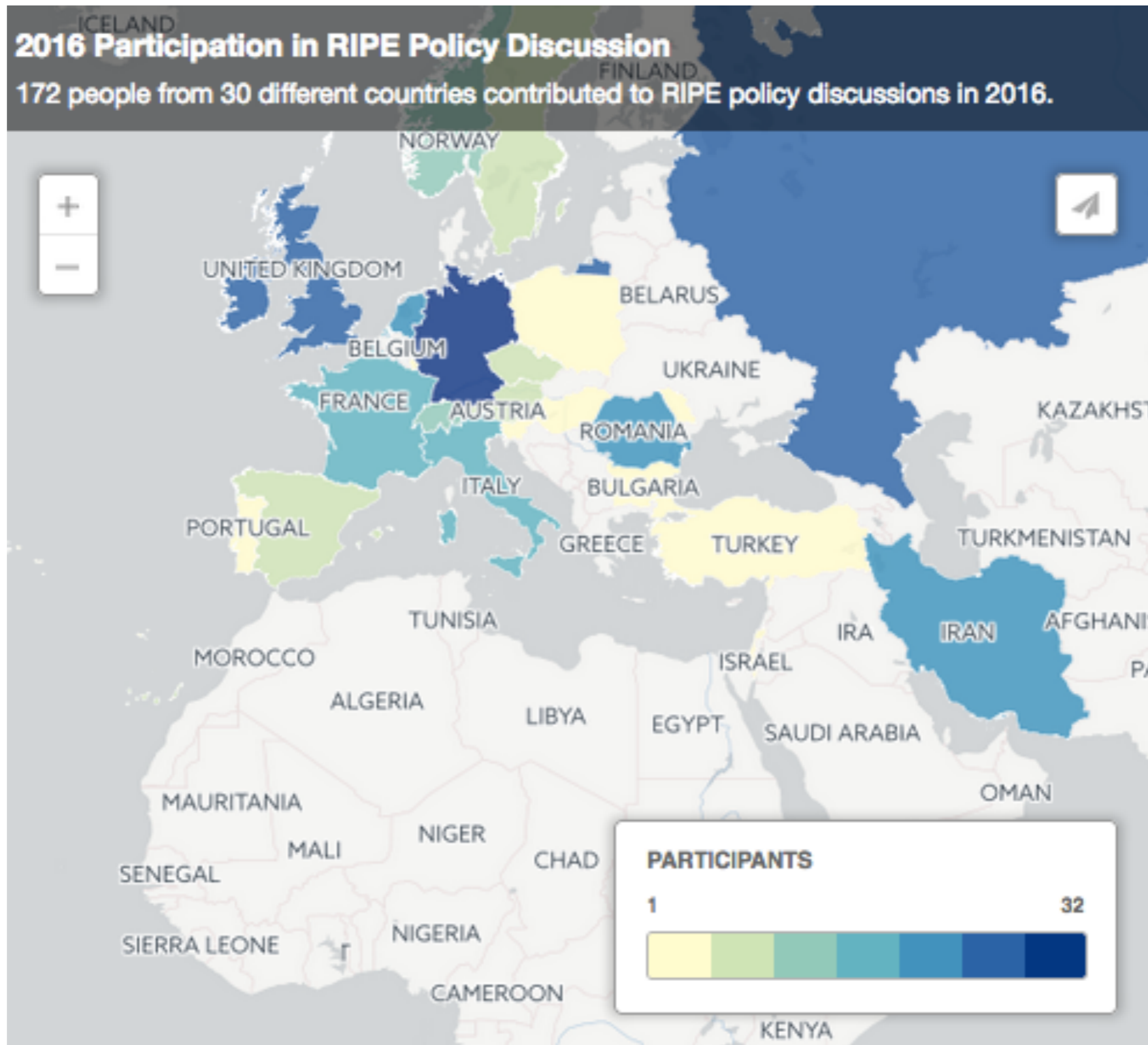
RIPE Policy Development



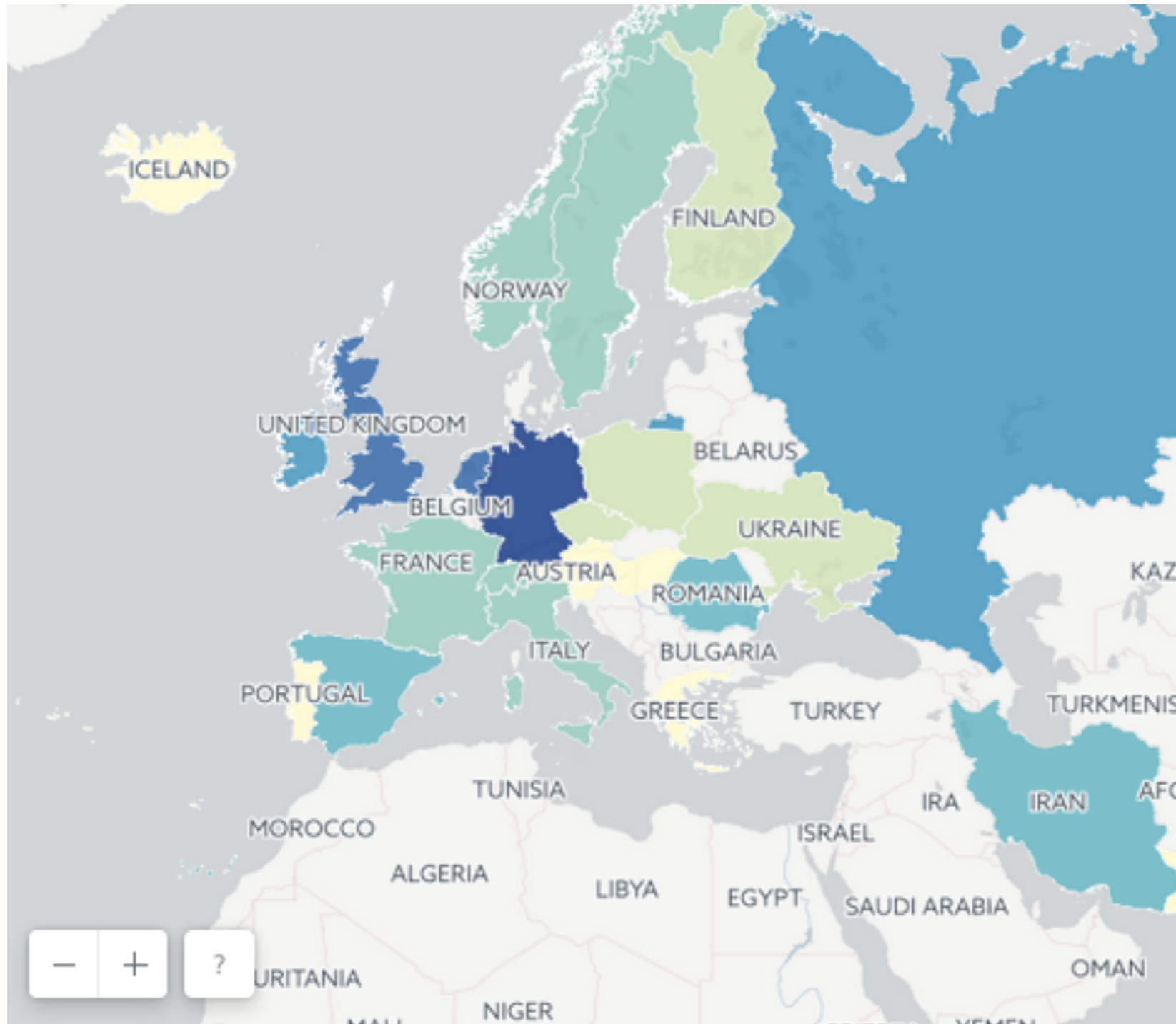
To promote and support the inclusive and open process:

- Everyone is welcome and encouraged to take part in the workings of RIPE by attending RIPE Meetings and participating on RIPE Working Group mailing lists;
- Mailing lists are publicly archived;
- The minutes of working group sessions at RIPE Meetings are publicly archived;
- All policies are formally documented and publicly available.

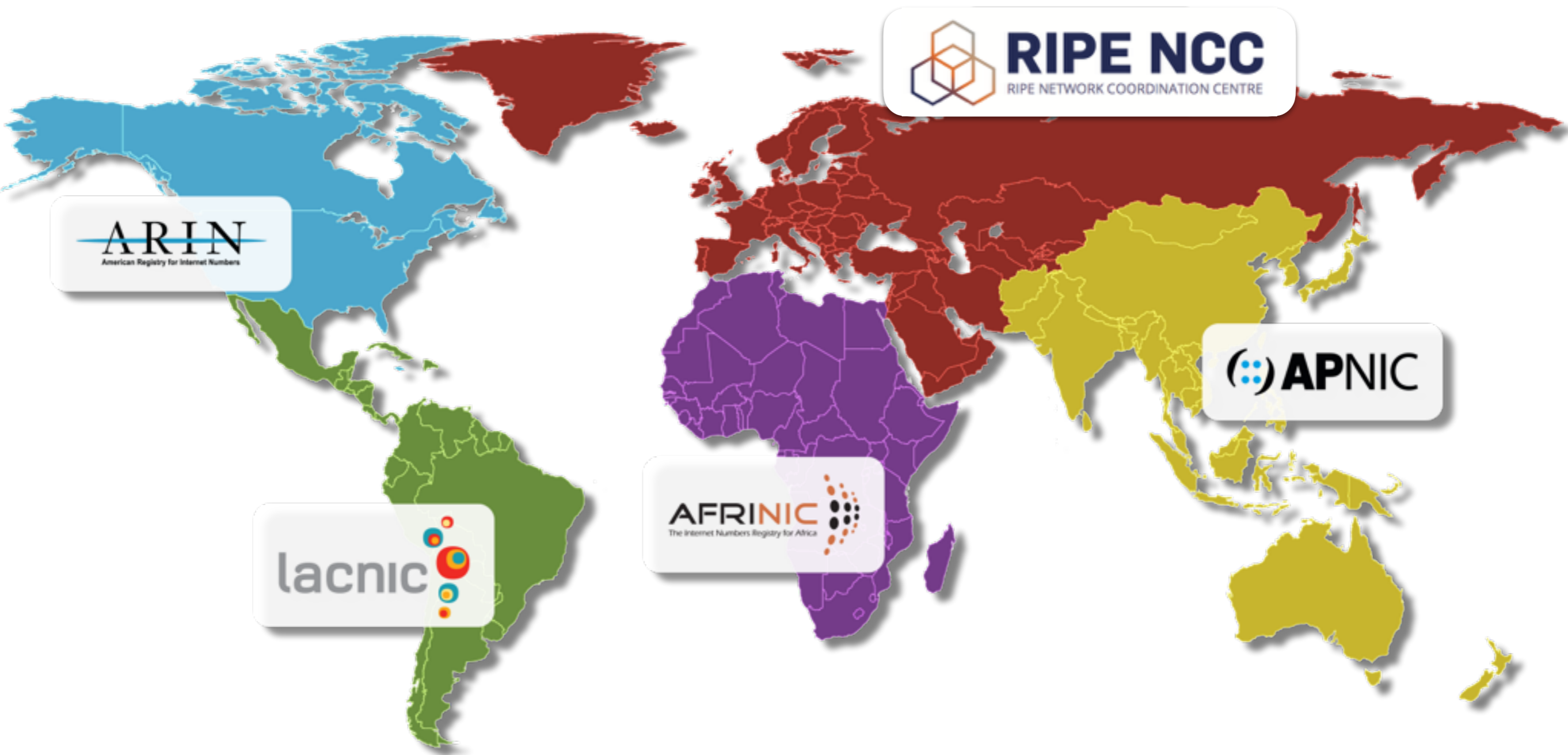
RIPE Policy Development - 2016



RIPE Policy Development - 2017



Regional Internet Registry (RIR)



The Regional Internet Registry (RIR) and bottom-up community driven **number resource management model**

Internet Number Resources



- Internet Protocol version 4 - IPv4
- Internet Protocol version 6 - IPv6
- Autonomous System Number - ASN

Internet Number Resources



110000000000000000000000000000001000110101

192.0.2.53



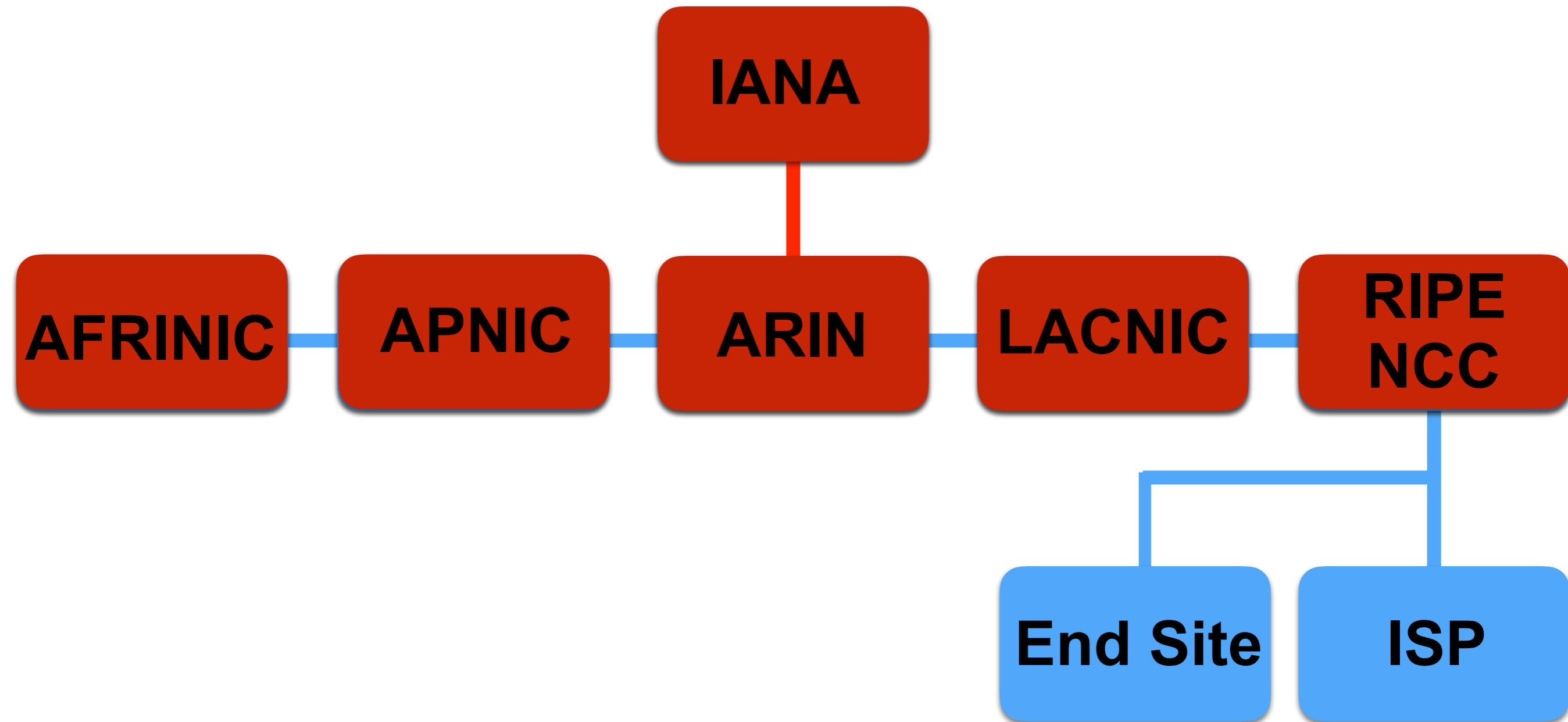
110000000000000000000000000000001000110100

192.0.2.52

IP version 4 (IPv4)

- Initially deployed: 1 January 1983.
- IPv4 addresses are 32-bit numbers. (4.2 Billion)
- Still the most commonly used version.

IPv4 Depletion



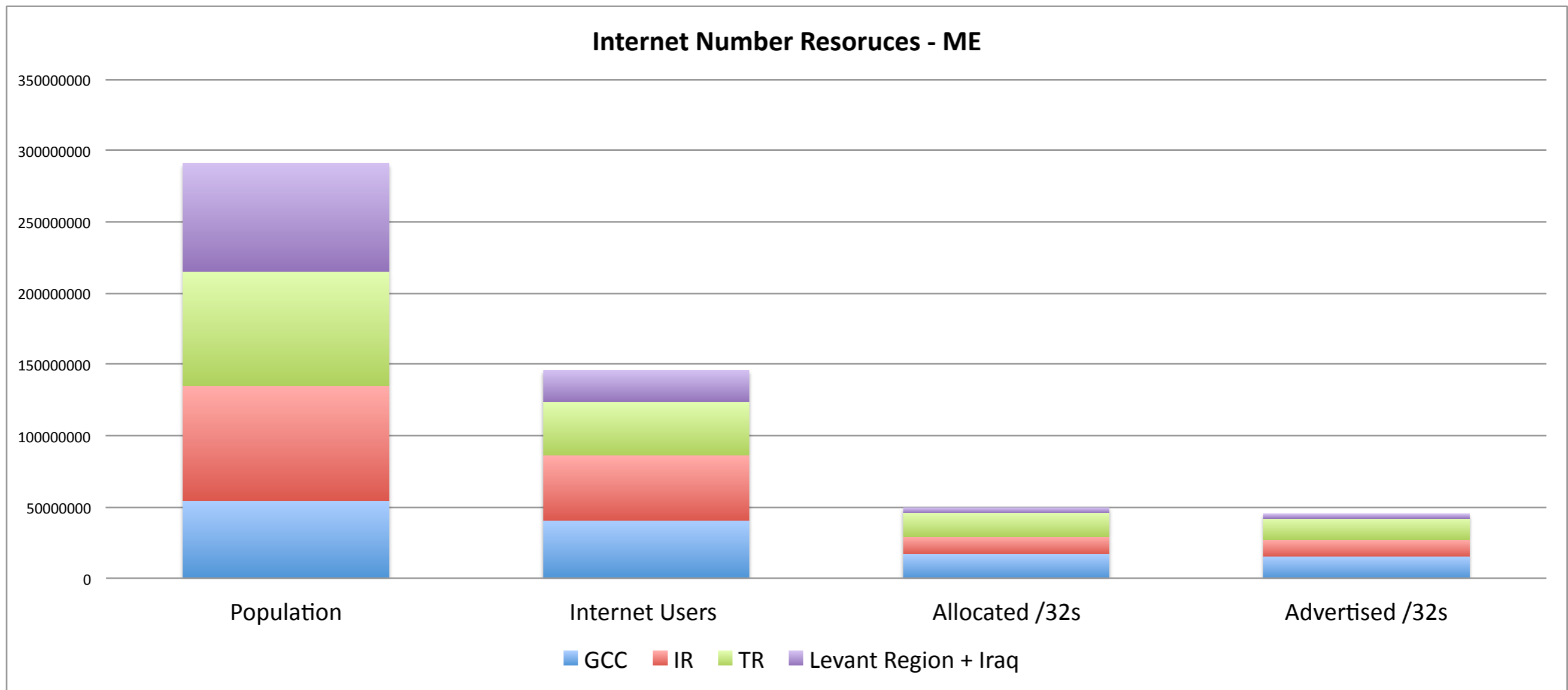
Post IPv4 Depletion



- On 14 September 2012, the RIPE NCC began to allocate IPv4 address space from the last /8 of IPv4 address space it holds.
- RIPE NCC members can request a one time /22 allocation (1,024 IPv4 addresses).

<https://www.ripe.net/publications/ipv6-info-centre/about-ipv6/ipv4-exhaustion>

Internet Number Resources - ME (GCC + Levant + TR + IR)



RIPE NCC membership = 1414
Advertised IPv4 addresses per capita = 0.16
Advertised IPv4 addresses per Internet user = 0.31

Post IPv4 Depletion

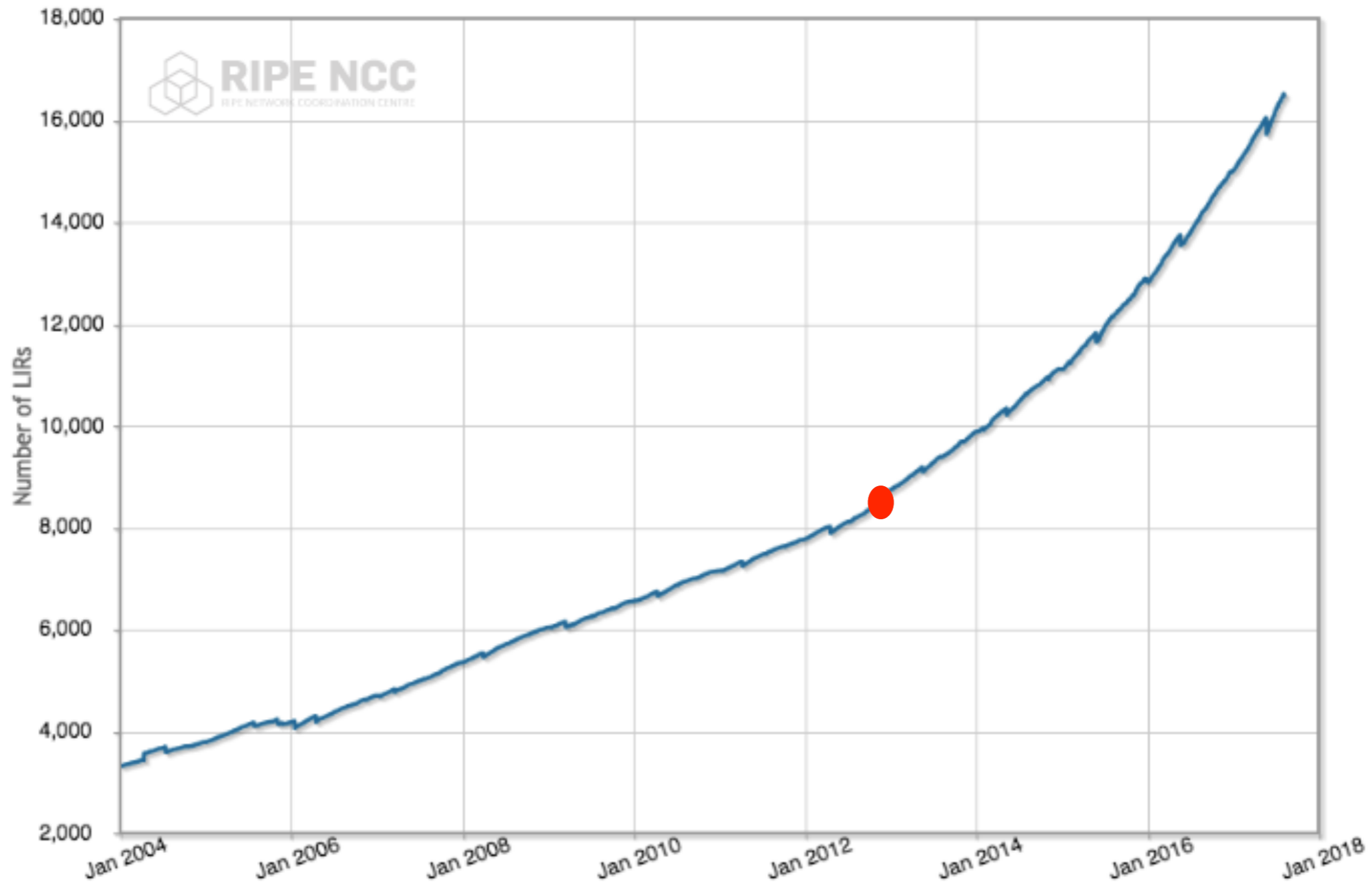


- Become a member of the RIPE NCC
- IPv4 Transfers & Brokers
- Carrier Grade Nat (CGN)
- IPv6

Becoming a RIPE NCC member



Total Number of LIRs

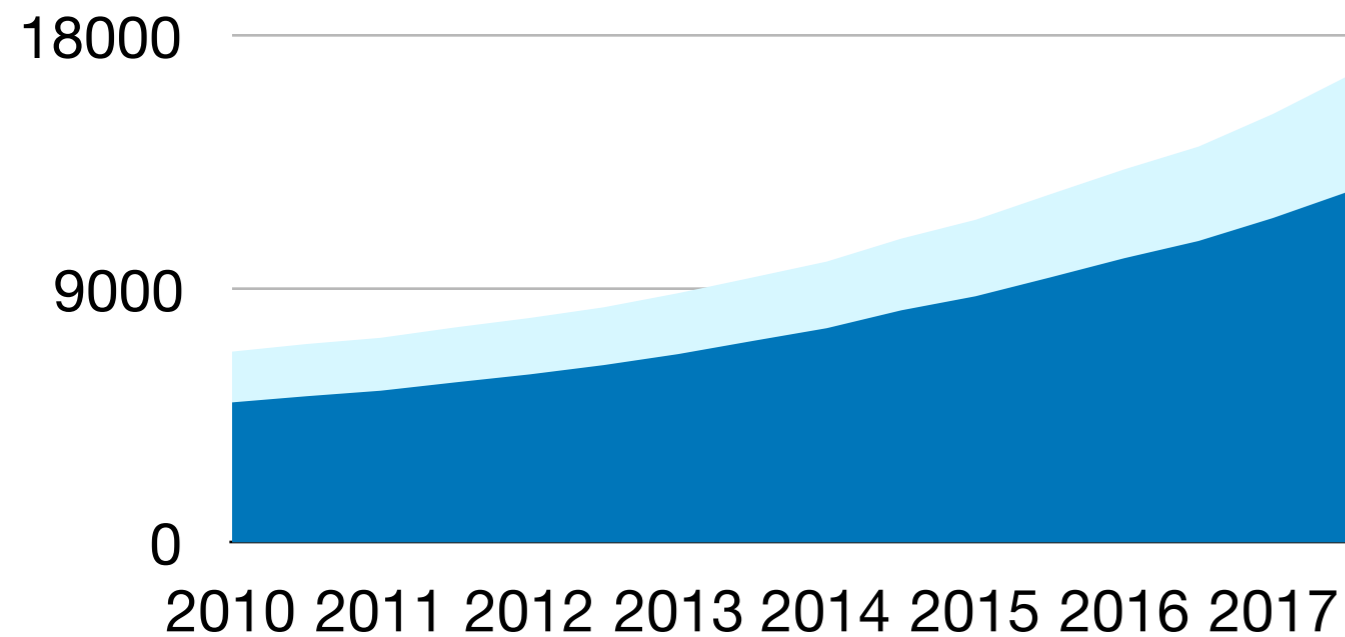


Currently, there are over 16,000 members in more than 75 countries who rely on us for registration and coordination services.

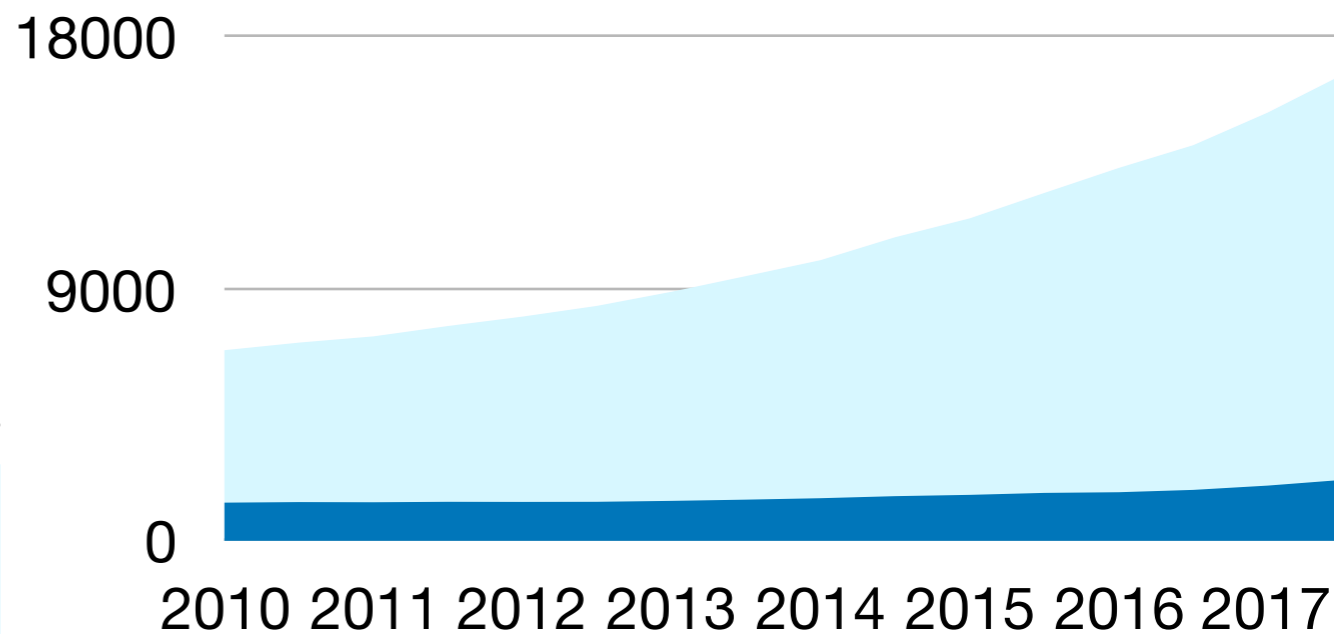
RIPE Policy Development - 2017



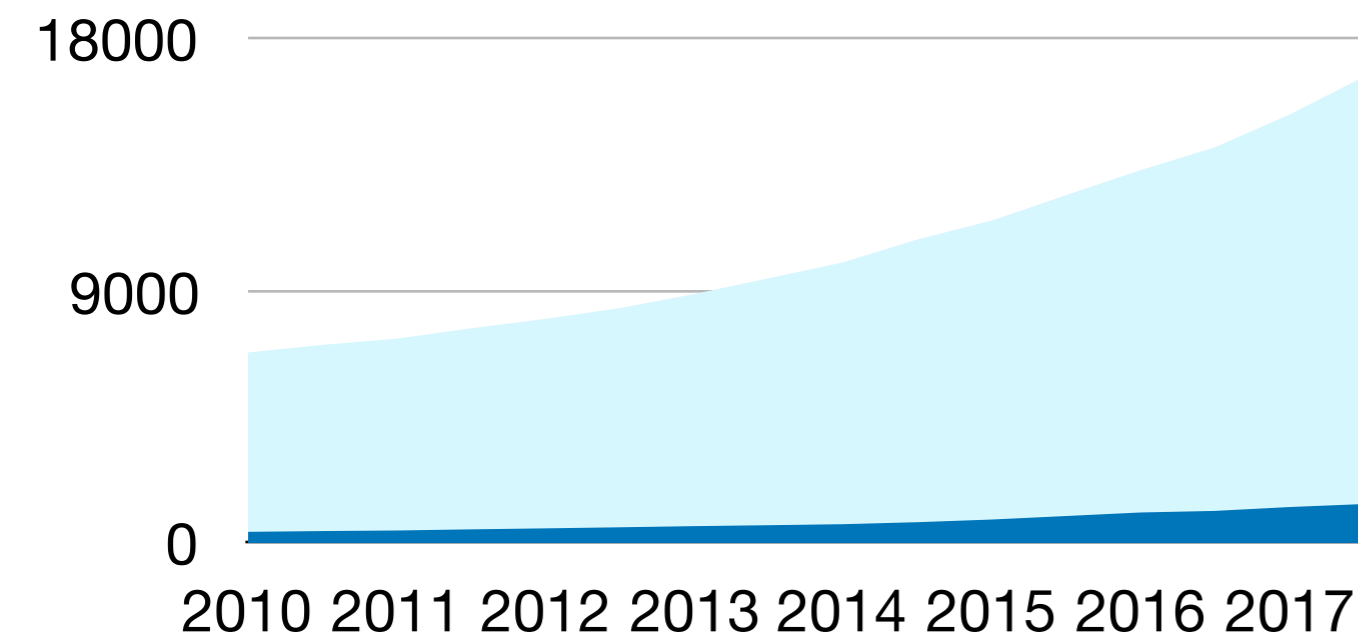
Western Europe & SEE



CIS, Central Asia & Caucasus



Middle East



IPv4 Transfers & Brokers



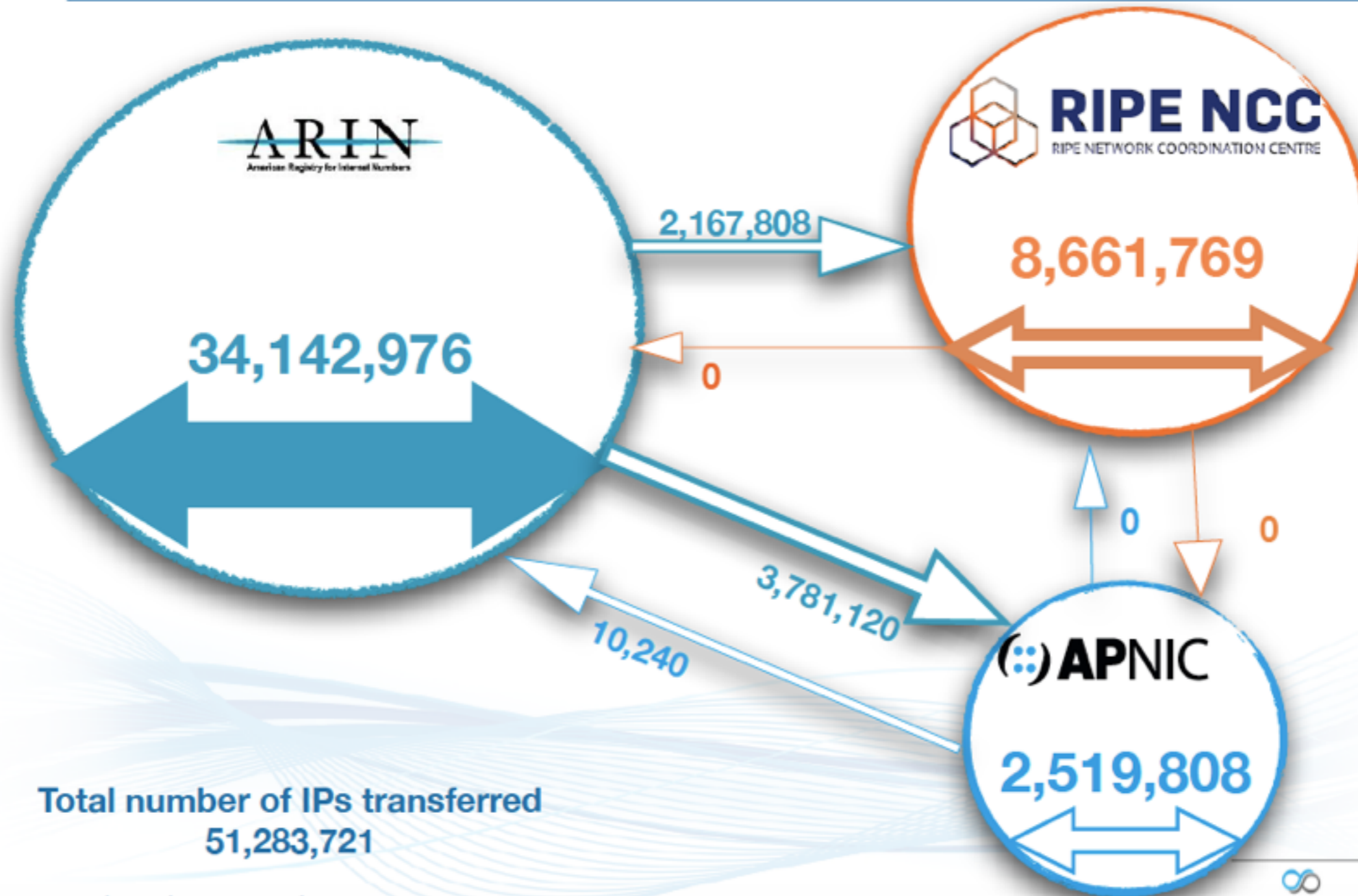
- Some members may decide to use a broker to find an organisation offering or seeking address space and to help facilitate the process by advising on the processes and policies that need to be followed.
- It is up to members to find and organise a transfer of IPv4 address space.
- The RIPE NCC will not be involved in the process of reaching an agreement between the parties involved in the transfer of IPv4 address space.

<https://www.ripe.net/manage-ips-and-asns/resource-transfers-and-mergers/transfers/brokers/brokers>

IPv4 Transfers & Brokers



Transfer Statistics 2015



Total number of IPs transferred
51,283,721

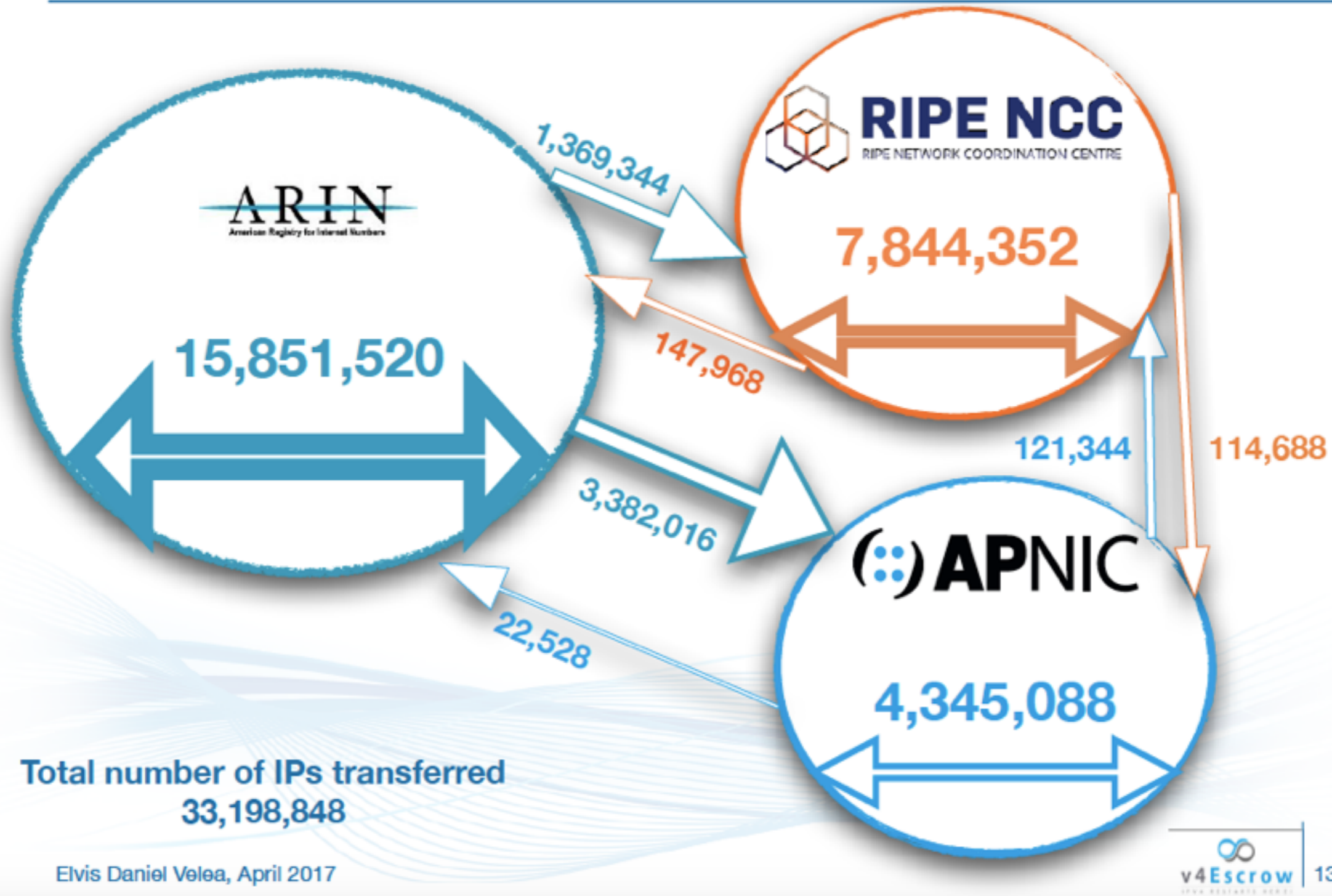
Elvis Daniel Velea, April 2017



IPv4 Transfers & Brokers



Transfer Statistics 2016



Carrier Grade Nat (CGN)



- Carrier Grade NAT (CGN/CGNAT), also known as Large Scale NAT (LSN)
- CGN enables organisations to deliver IPv4 connectivity while oversubscribing their limited global IPv4 addresses.
- Carriers can assign local (private) IPv4 addresses in their access network, and use a centralised device to manage the address translation to the global (public) Internet.
- Some operators in the region NAT up to 4K users behind a single public IPv4 address.

Carrier Grade Nat (CGN)



**Brussels, 16 January 2017
(OR. en)**

5127/17

LIMITE

**CYBER 7
COPEN 9
JAI 33
COSI 8
ENFOPOL 33**

NOTE

From:	EUROPOL/EC3
To:	Delegations
Subject:	Carrier-Grade Network Address Translation (CGN) and the Going Dark Problem - initial debate

<http://www.statewatch.org/news/2017/jan/eu-europol-cgn-tech-going-dark-data-retention-note-5127-17.pdf>

Internet Protocol version 6 (IPv6)



2001:db8:0:0:0:0:0:2

```
0010 0000 0000 0001
0000 1101 1011 1000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0010
```



```
0010 0000 0000 0001
0000 1101 1011 1000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0001
```

2001:db8:0:0:0:0:0:1

Internet Number Resources



There are two types of IP addresses in active use:

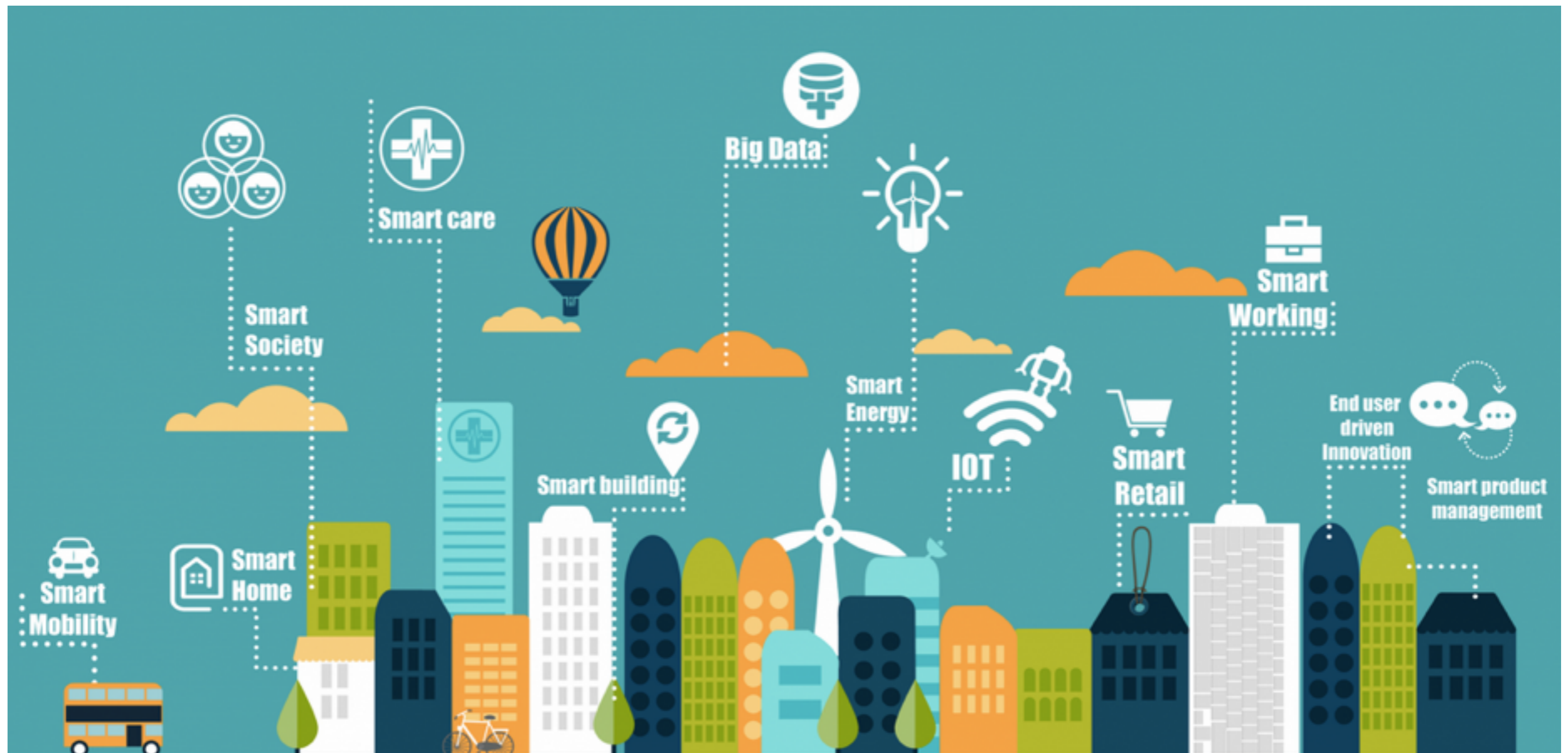
IP version 4 (IPv4)

- Initially deployed: 1 January 1983.
- IPv4 addresses are 32-bit numbers. (4.2 Billion)
- Example: 192.0.2.53
- Still the most commonly used version.

IP version 6 (IPv6)

- Published by the IETF in 1998.
- IPv6 addresses are 128-bit numbers. (340 Trillion Trillion Trillion)

Internet of Things (IoT)

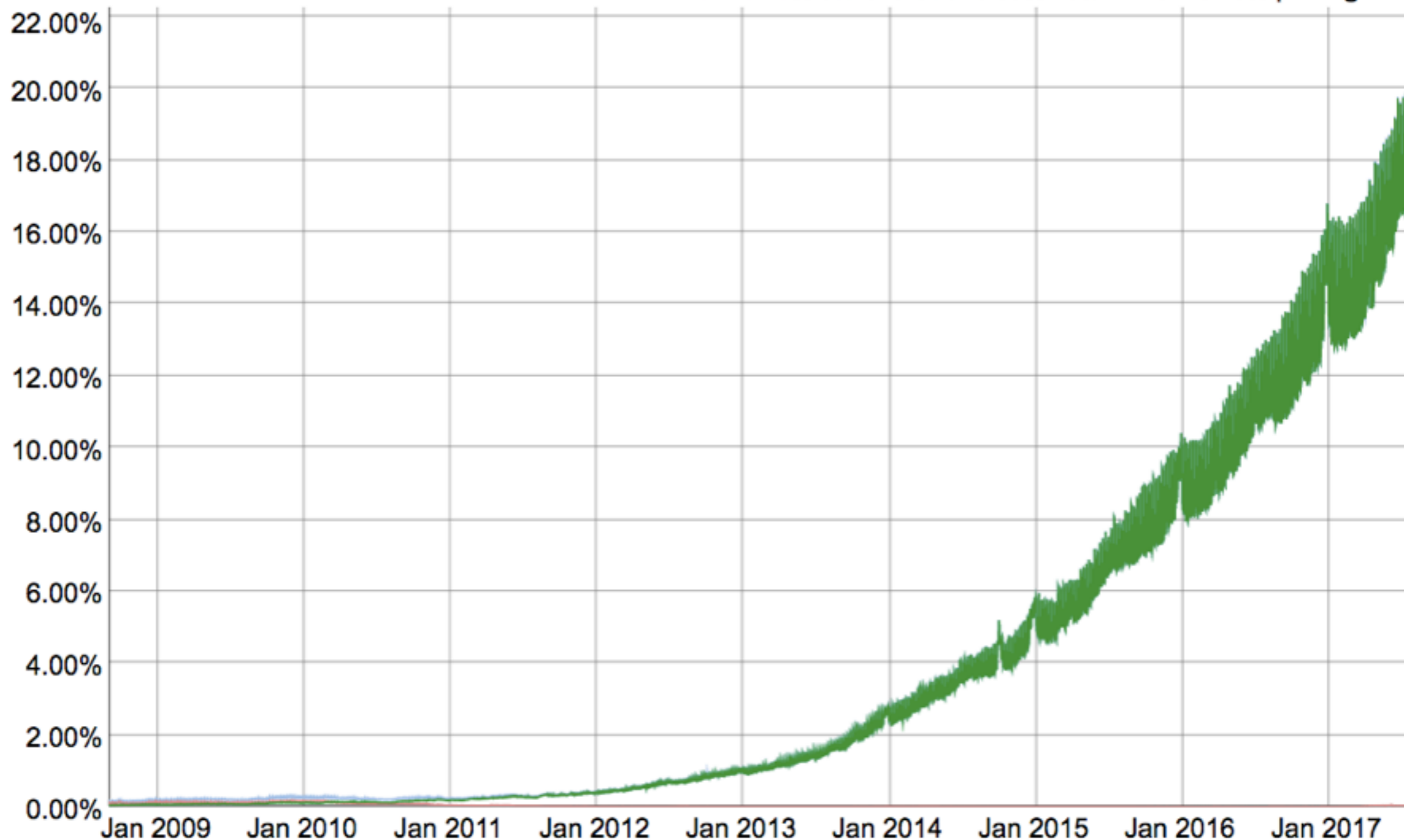


The only way to build a scalable and interoperable future with IoT is IPv6

IPv6 Statistics - Google



Native: 18.15% 6to4/Teredo: 0.03% Total IPv6: 18.18% | 4 Aug 2017



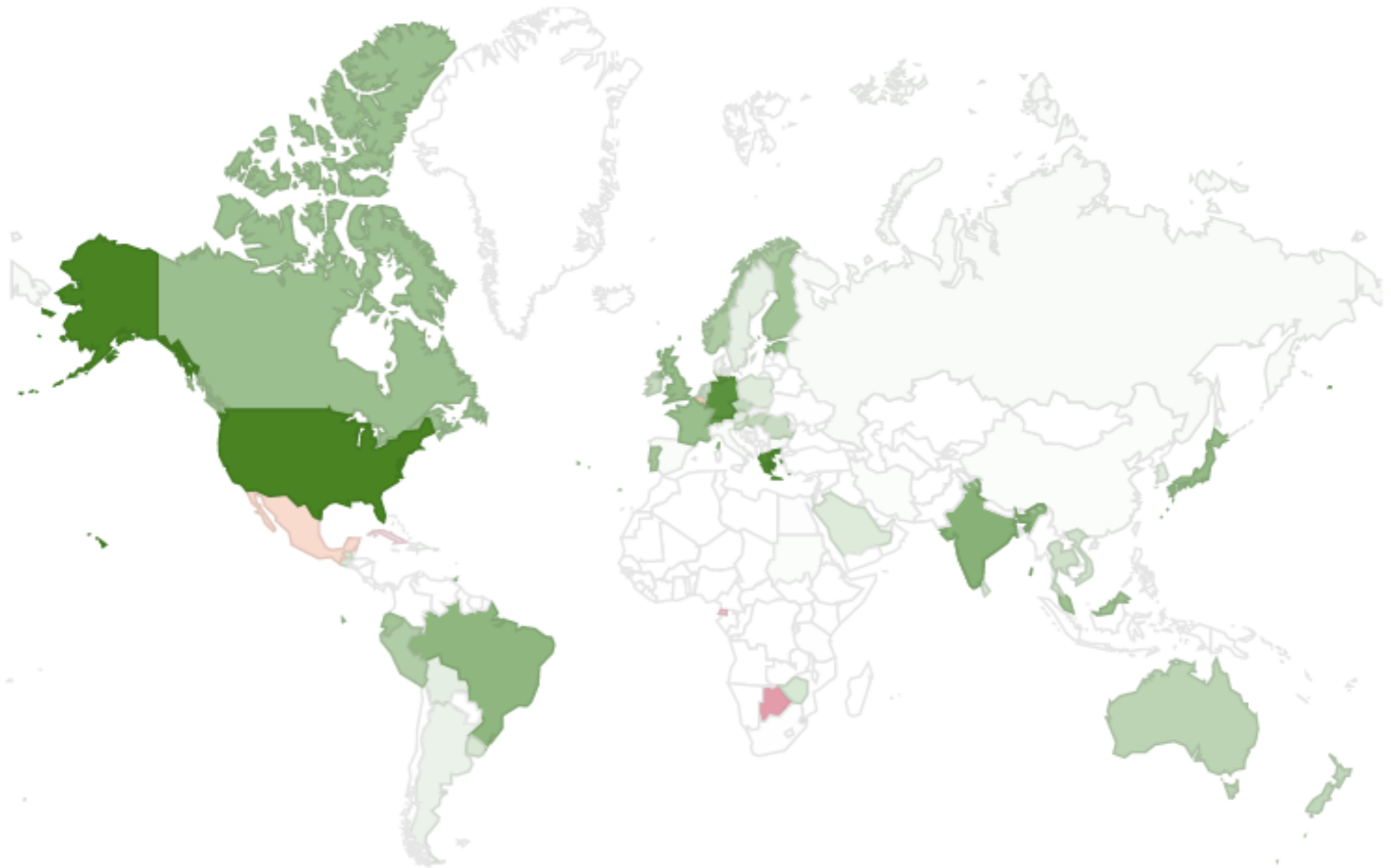
Percentage of IPv6 users that access Google over IPv6

<https://www.google.com/intl/en/ipv6/statistics.html#tab=ipv6-adoption&tab=ipv6-adoption>

IPv6 Statistics - Google



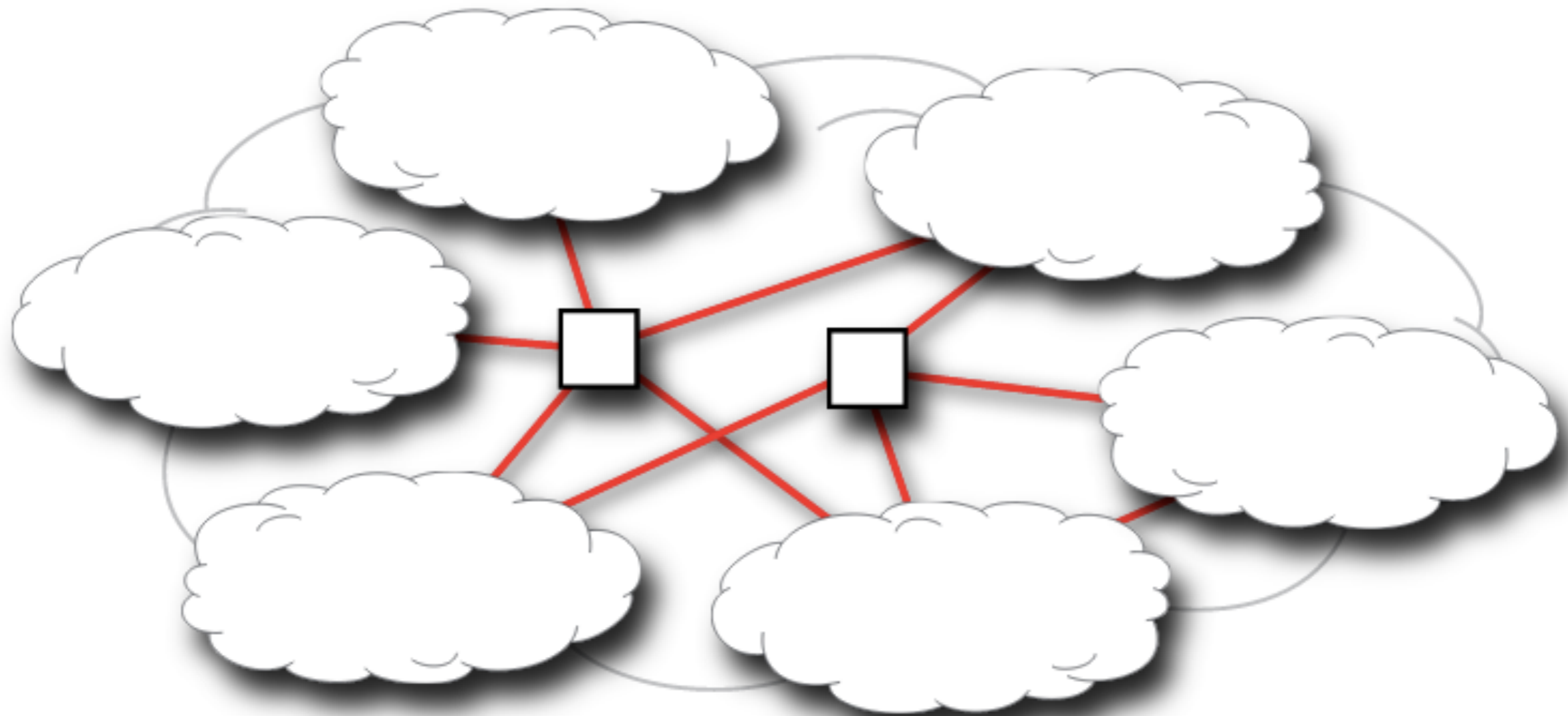
Per-Country IPv6 adoption



Percentage of IPv6 users that access Google over IPv6

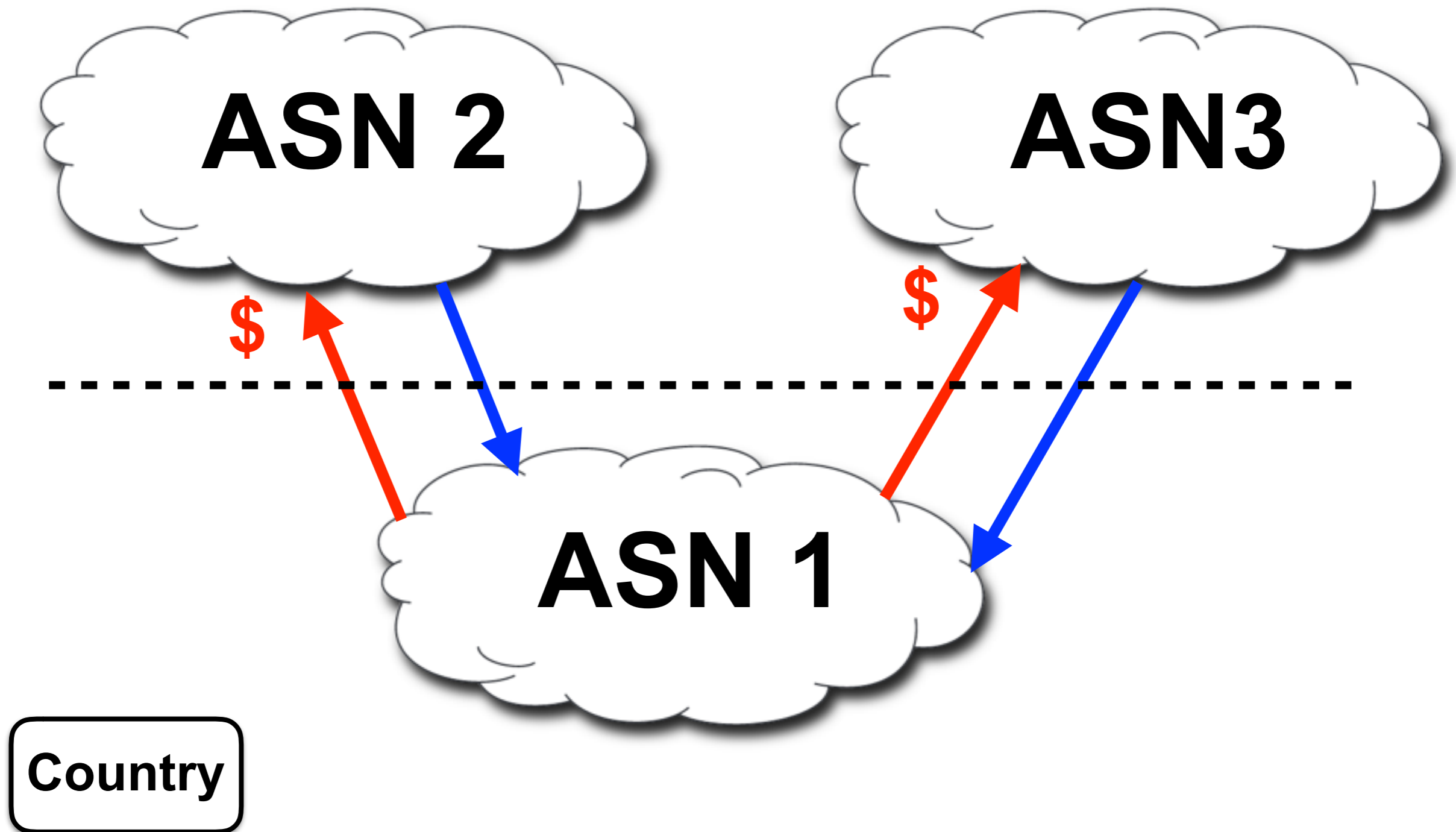
<https://www.google.com/intl/en/ipv6/statistics.html#tab=ipv6-adoption&tab=ipv6-adoption>

Autonomous System Numbers

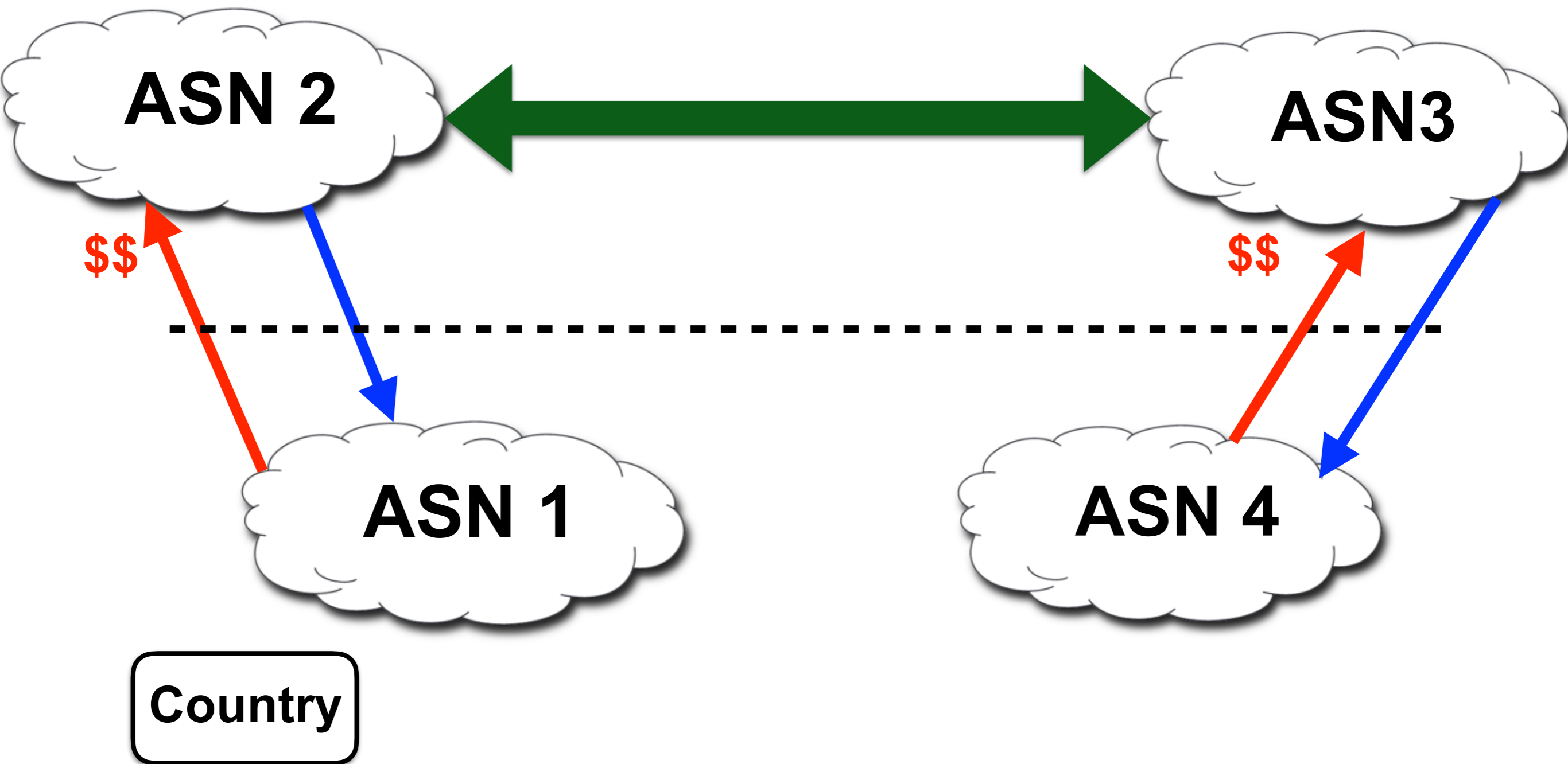


A public AS has a globally unique number, an AS Number, associated with it. This number is used as an identifier of the AS itself.

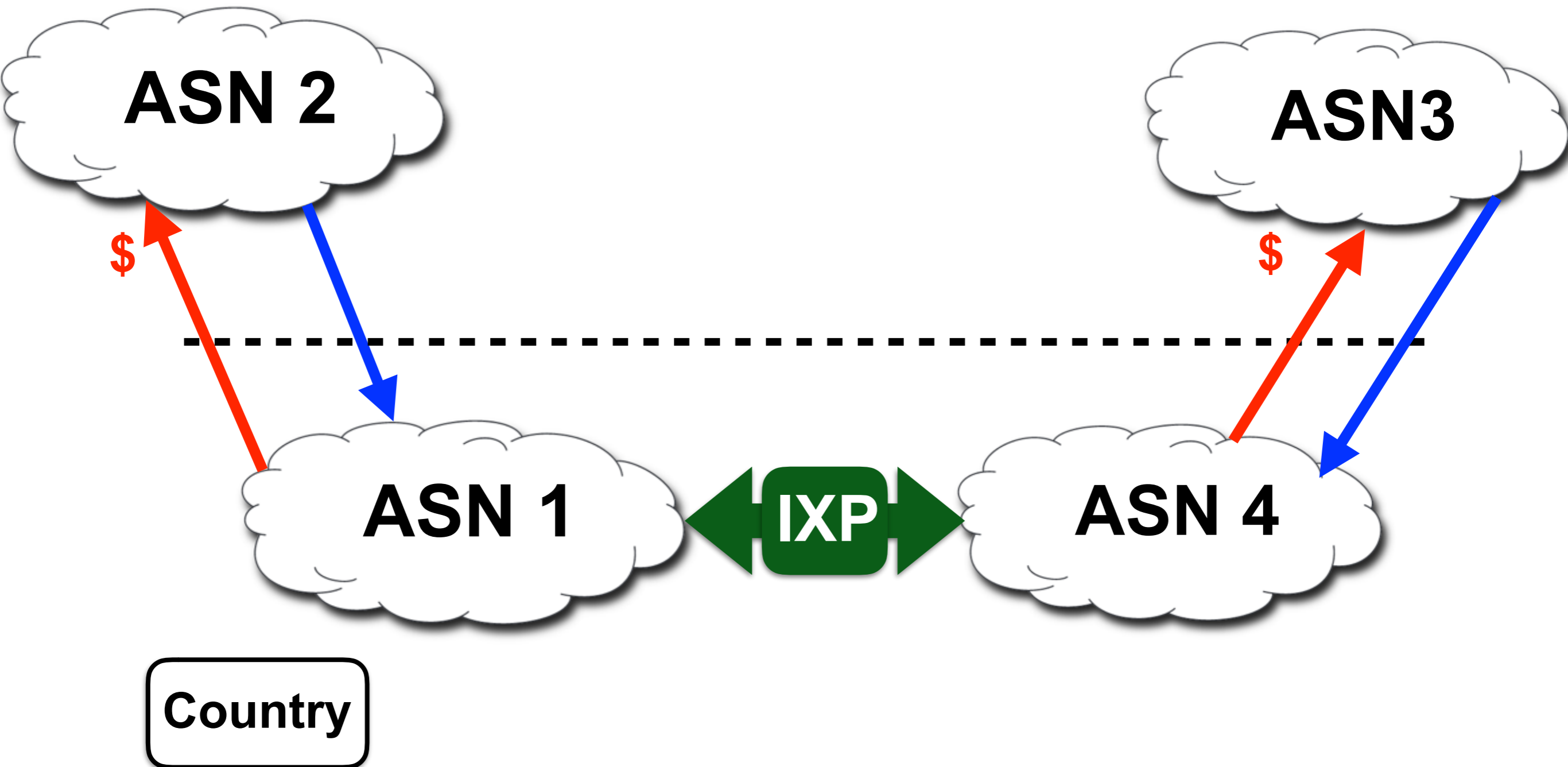
Connecting to the Internet



Domestic Traffic Tromboning



Internet Exchange Points (IXPs)



Middle East Network Operator Group



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The Middle East Network Operators Group (MENOG) is exclusively dedicated to supporting the annual regional meeting and the national Roadshows, offering a platform for key Internet builders in the region to learn from their peers and other leaders in the Internet community from around the world.

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<https://www.menog.org/>

Middle East Network Operator Group



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The MENOG Roadshows were established in 2011 to meet a demand in the community for more capacity building in the area of IPv6 adoption, particularly hands-on training for network operators in how to deploy IPv6.

In 2016, the MENOG Program Committee decided to broaden the scope of the MENOG Roadshows by introducing new tracks relevant to the sustainable growth of Internet.

IPv6 Roadshows

DNS Roadshows

Routing & Peering Roadshows

Host a Roadshow

The IPv6 Roadshows are a joint initiative from the Middle East Network Operators Group (MENOG) and the RIPE NCC, offering three-day training events targeted at the technical staff of Internet Service Providers, government and enterprise network operators. A half-day meeting for decision makers usually follows the IPv6 Roadshow.

Middle East Network Operator Group

Ten Years of MENOG: What Have We Learned?

Hisham Ibrahim — 01 May 2017

We have just concluded MENOG 17 in Muscat, Oman, which coincided with MENOG's ten-year anniversary. It is no secret that MENOG has seen several ups and downs during the ten years since it came into existence. This journey has resulted in the accumulation of a tremendous amount of experience that has been vital in enabling us to organise one of our most successful events to date.



Although there's no obvious objective way to measure the success of a regional event like MENOG, it is safe to say that MENOG 17 ticked all the boxes we could have hoped it to. Hundreds of attendees showed up and stayed on till the very end, with everyone making an obvious effort to engage with the discussions and presentations. Of those present, 43% were Omani locals and 72% were Middle Eastern, with representatives from all fourteen countries in the Middle East. This in itself was a huge accomplishment!

https://labs.ripe.net/Members/hisham_ibrahim/ten-years-of-menog-what-have-we-learned



Questions



HMI@RIPE.NET