

IP Addressing and the IPv6 Challenge

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CTU's ICTs Roadshow

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Overview

CANN and its structure

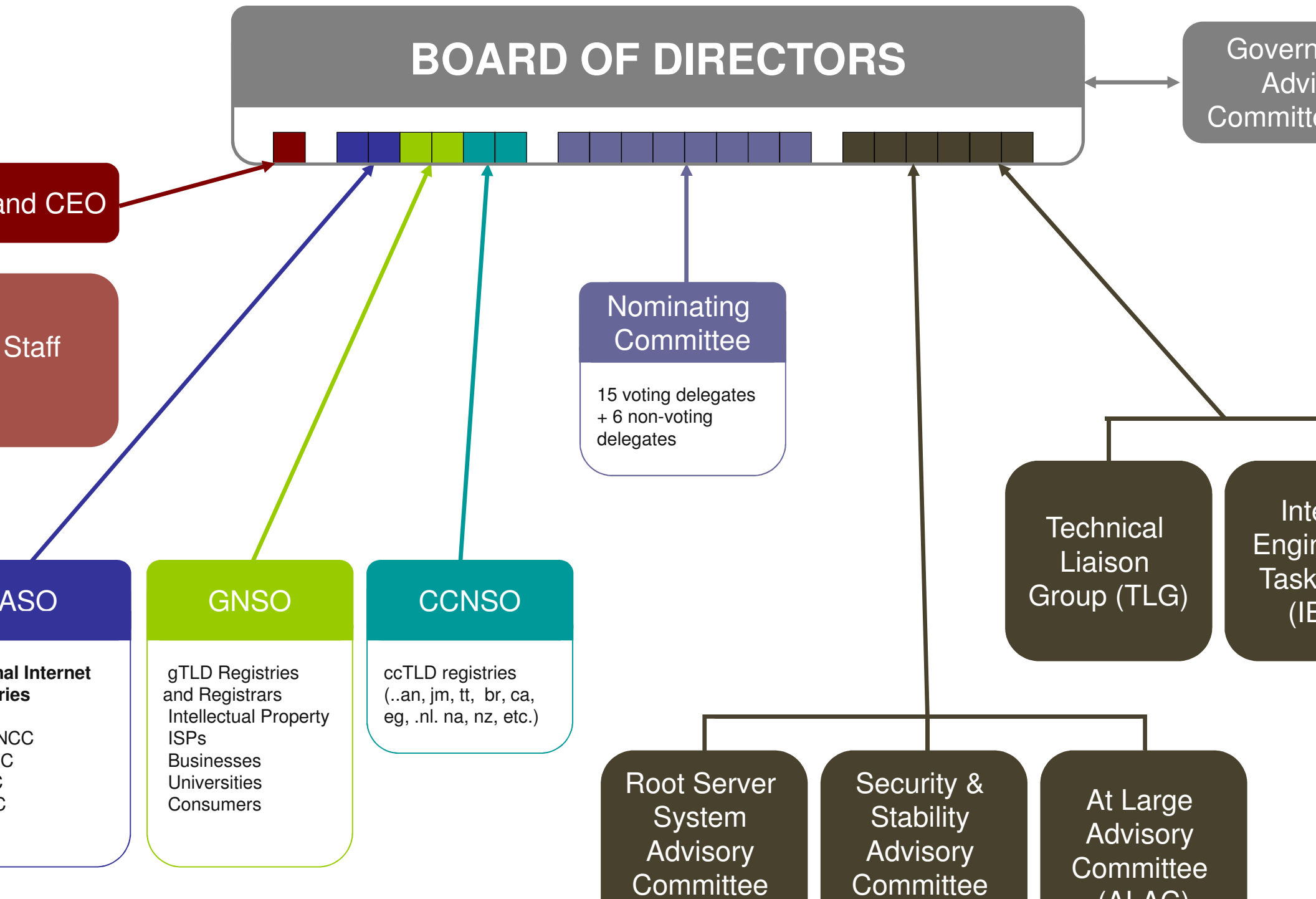
What is IP addressing

- Defining IPv4 & IPv6
- IPv4 & IPv6 size
- IPv4 & IPv6 distribution

Explaining policy

- Allocating to RIRs
- Allocating to ISPs
- How much is already out there?

ICANN's Community



Explaining IPv4 Addressing

IP addresses are the numeric identifiers used by computers in the different networks when they talk to each other.

We use names but the DNS converts these into IP addresses and the computers use the numeric addresses to connect to each other

`www.example.com`

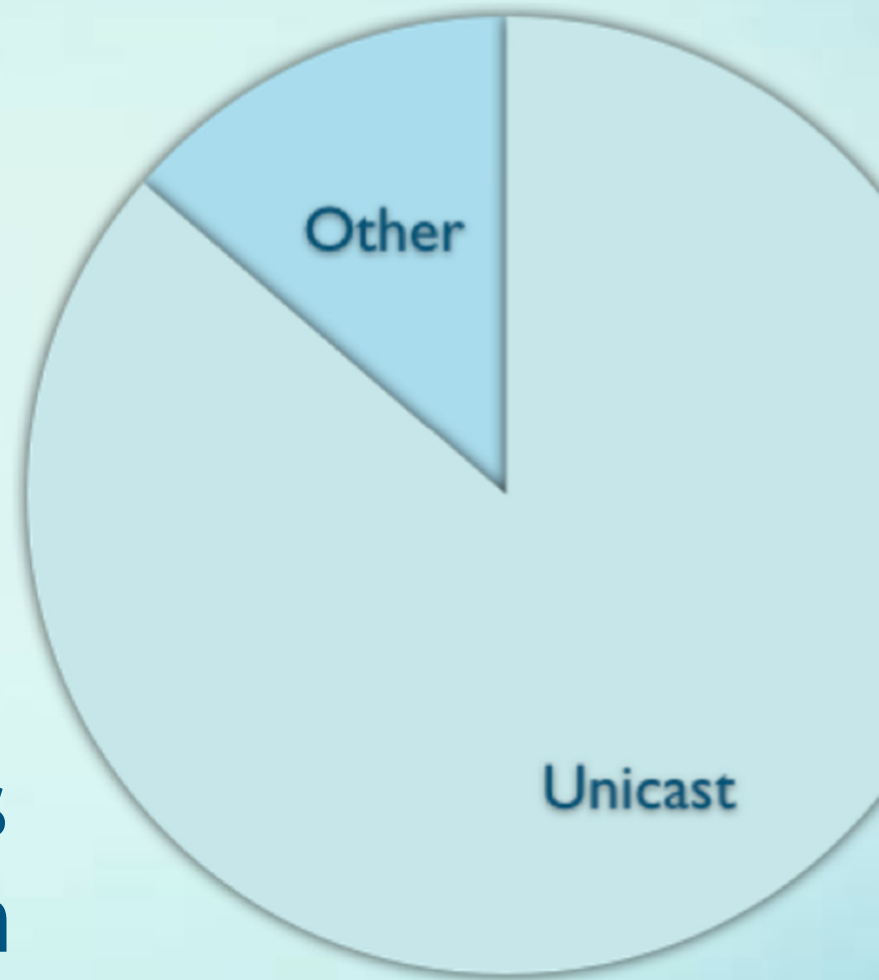


`198.51.100.80`

How big is IPv4?

IPv4 is a 32-bit address space

- 2^{32} addresses is 4,294,967,296
- 3,707,764,736 (86%) can be used on normal computers
- The rest are used for multicast, private address space, loopback and so on



How is IPv4 distributed?

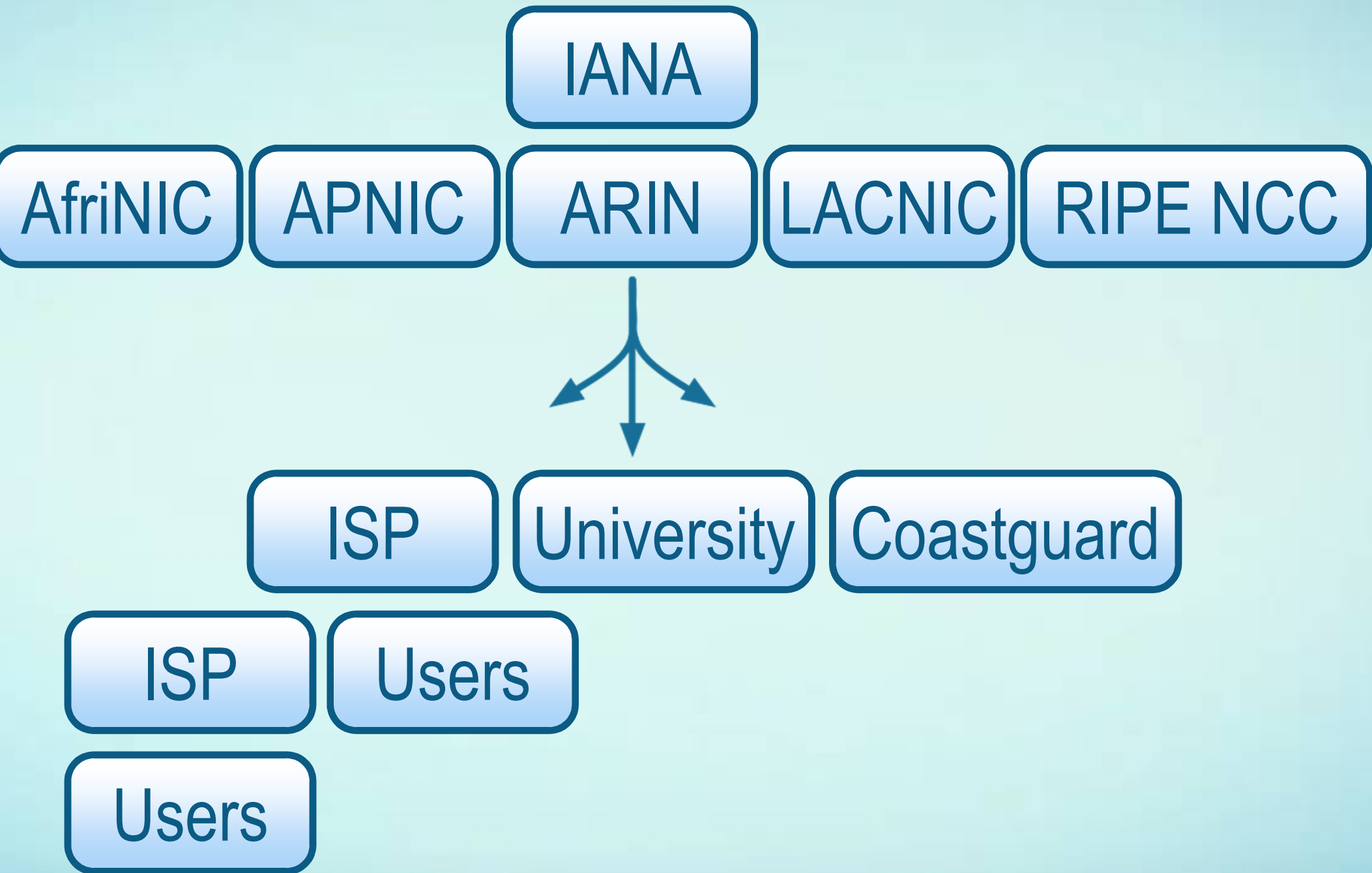
Allocation policy is bottom up

- Policy is developed in RIR open policy forums
- No membership required - just access to e-mail
- Policies for how ICANN should allocate addresses have to be approved in all five regions before being ratified by the ICANN board

Addresses are distributed in a top down hierarchy

- ICANN allocates addresses to the RIRs
- RIRs allocate addresses to ISPs and other networks

How is IPv4 distributed?



What is IPv6?

IPv6 is the “Next Generation” Internet Protocol
It was designed to let the Internet continue to grow
when IPv4 is fully allocated

2001:db8:abc::123

How big is IPv6?



- IPv6 is a 128-bit address space
 - 2^{128} addresses is 340 trillion, trillion, trillion
 - The IETF has only defined one eighth for use by normal computers so far

How policies are set

Policies are developed in a bottom-up way.

Everyone is welcome to participate in the RIR open policy forums where policy is set

No membership fees necessary

Just need access to e-mail

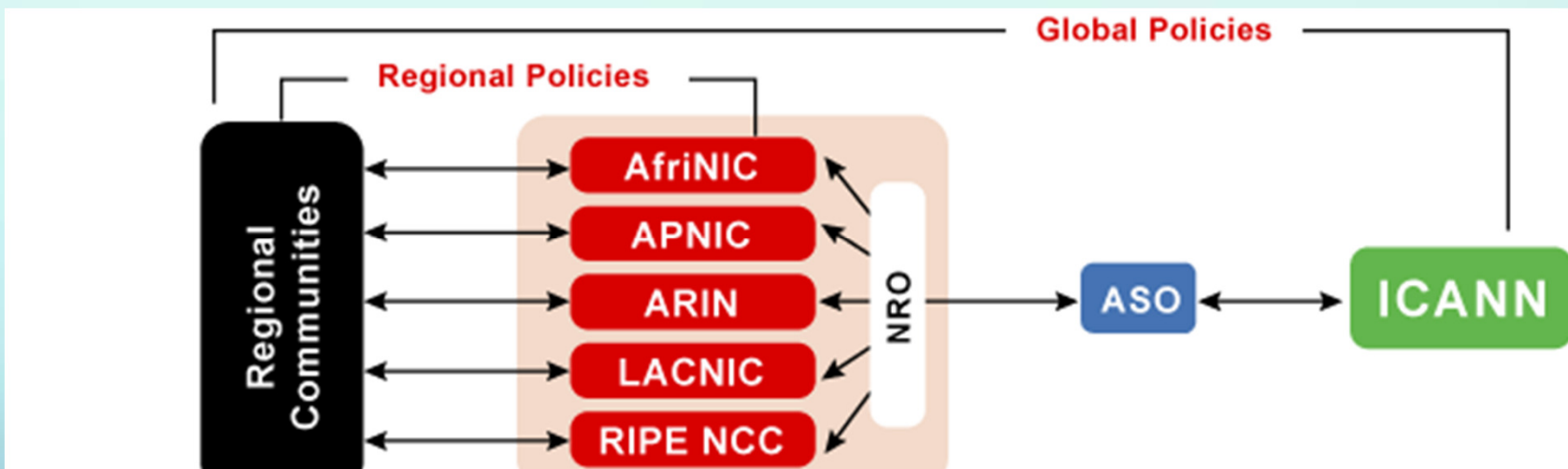
RIRs provide Fellowships to help people from LDC attend open policy meetings

Global policy framework

When the open policy forums in all five RIR regions agree on a policy for how ICANN should allocate addresses it can be ratified by the ICANN board

There are global policies for

- IPv4
- IPv6
- AS Numbers



IPv4 global policy & practice

RIRs get IPv4 in /8 blocks (about 16m addresses)

They qualify by either having

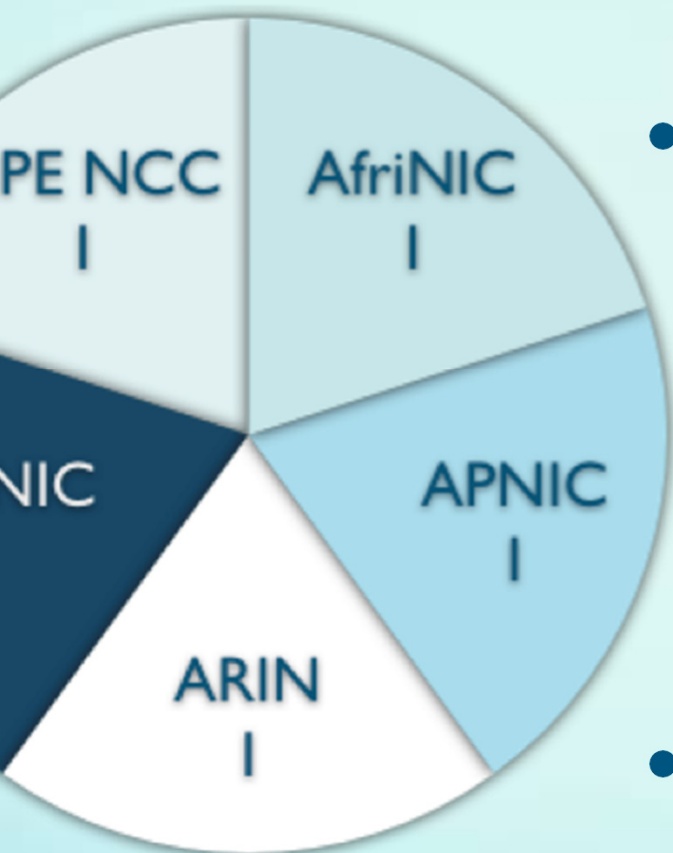
- less than half a block left - or
- less than necessary for the next 9 months

The RIRs have stated they will not request more than 2 /8s at a time, even if they qualify for more

They have also said they won't request more addresses until they have less than 2 /8s left, even if that is less than they need for 9 months

IPv6 global policy & practice

IPv6 /12s per RIR



- RIRs get IPv6 in /12 blocks (enough for about 500k ISPs)
- They qualify for more by either having
 - less than half a block left - or
 - less than necessary for the next 9 months
- We don't expect to see an RIR requesting more space for at least several years

RIR IPv4 policy

ISPs can get an IPv4 /22 (1,024 addresses) when they need to use at least half of it over the next 3 months

- This is a special policy for Caribbean and North Atlantic islands

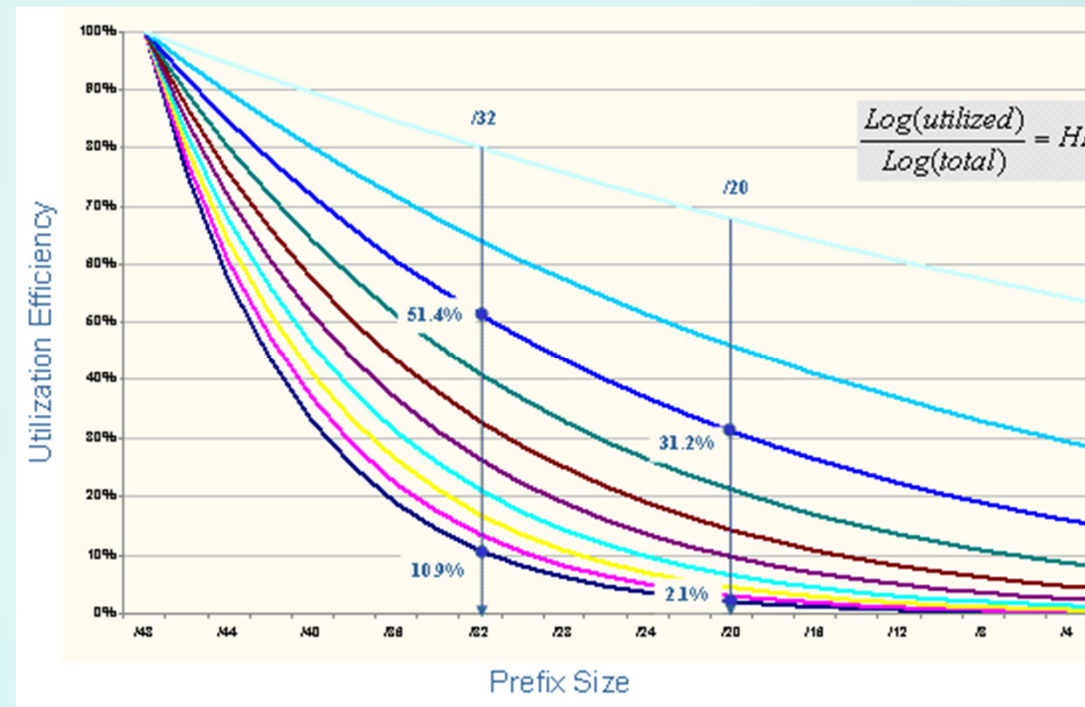
More space available when 80% is used

IR IPv6 policy (ISPs)

ISPs can get an IPv6 allocation when they have a plan to assign IPv6 addresses to customers over the next five years

Can also qualify by already having an IPv4 allocation

More IPv6 space available when 36% is



How much is IPv6 used?

Karin Perset's OECD paper on IPv6 deployment has a wealth of measurements

Internet addressing: measurement of IPv6 deployment (DSTI/ICCP/CISP(2009)10/REV1)

Thank you!

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