

Introduction to IP Numbering & ccTLD Management

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CTU's ICTs Roadshow

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Overview

CANN and its structure

What is IP addressing

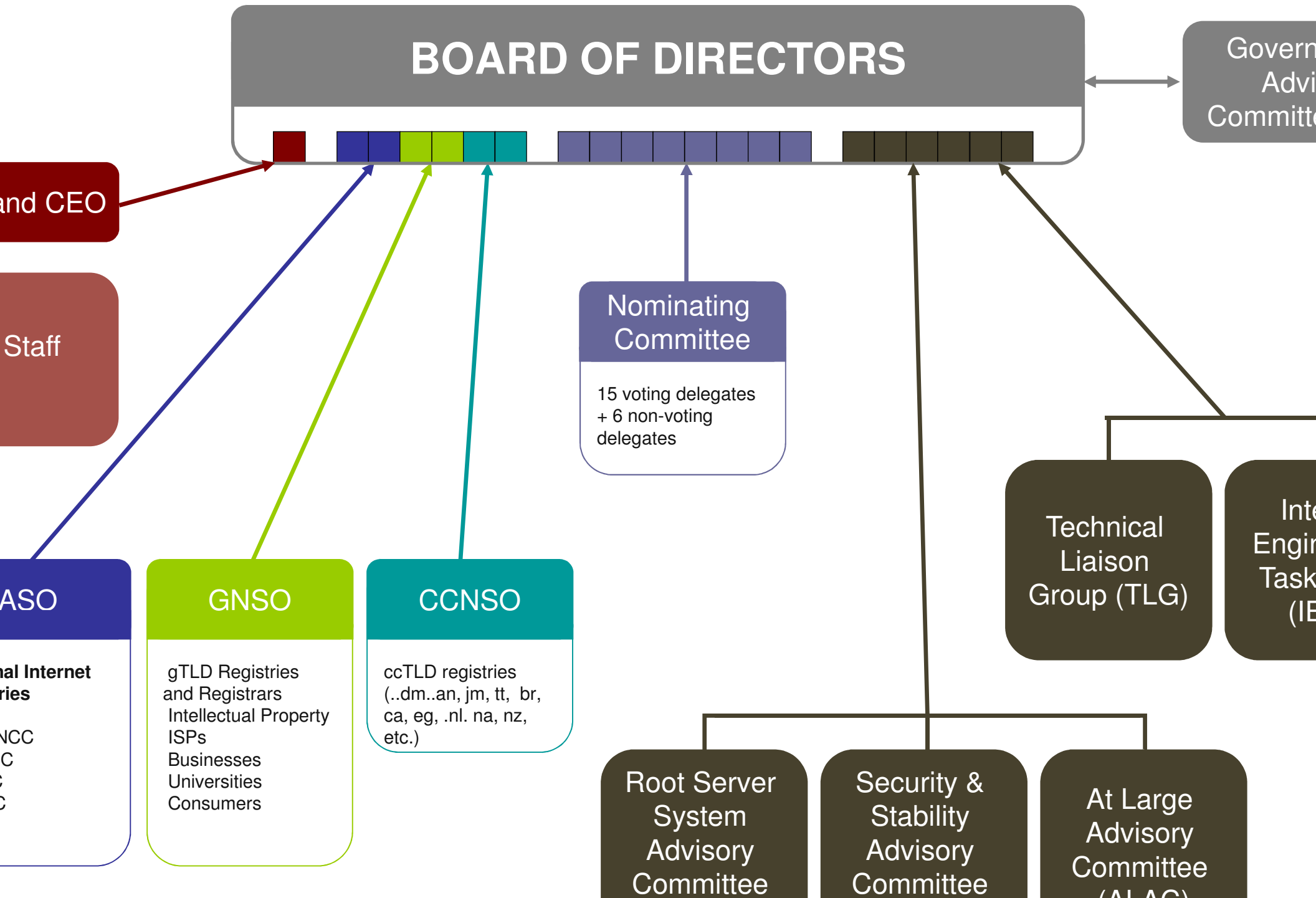
- Defining IPv4 & IPv6
- IPv4 & IPv6 size
- IPv4 & IPv6 distribution

Explaining policy

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

ccTLD management

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`

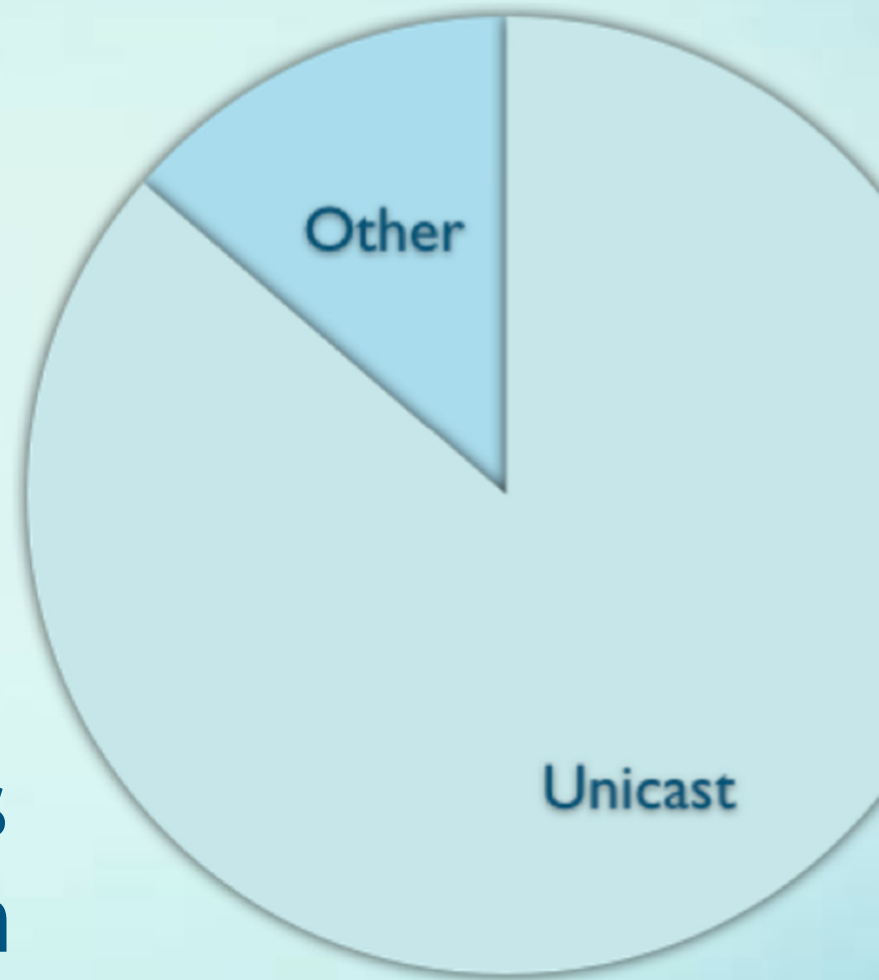


`198.51.100.80`

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?

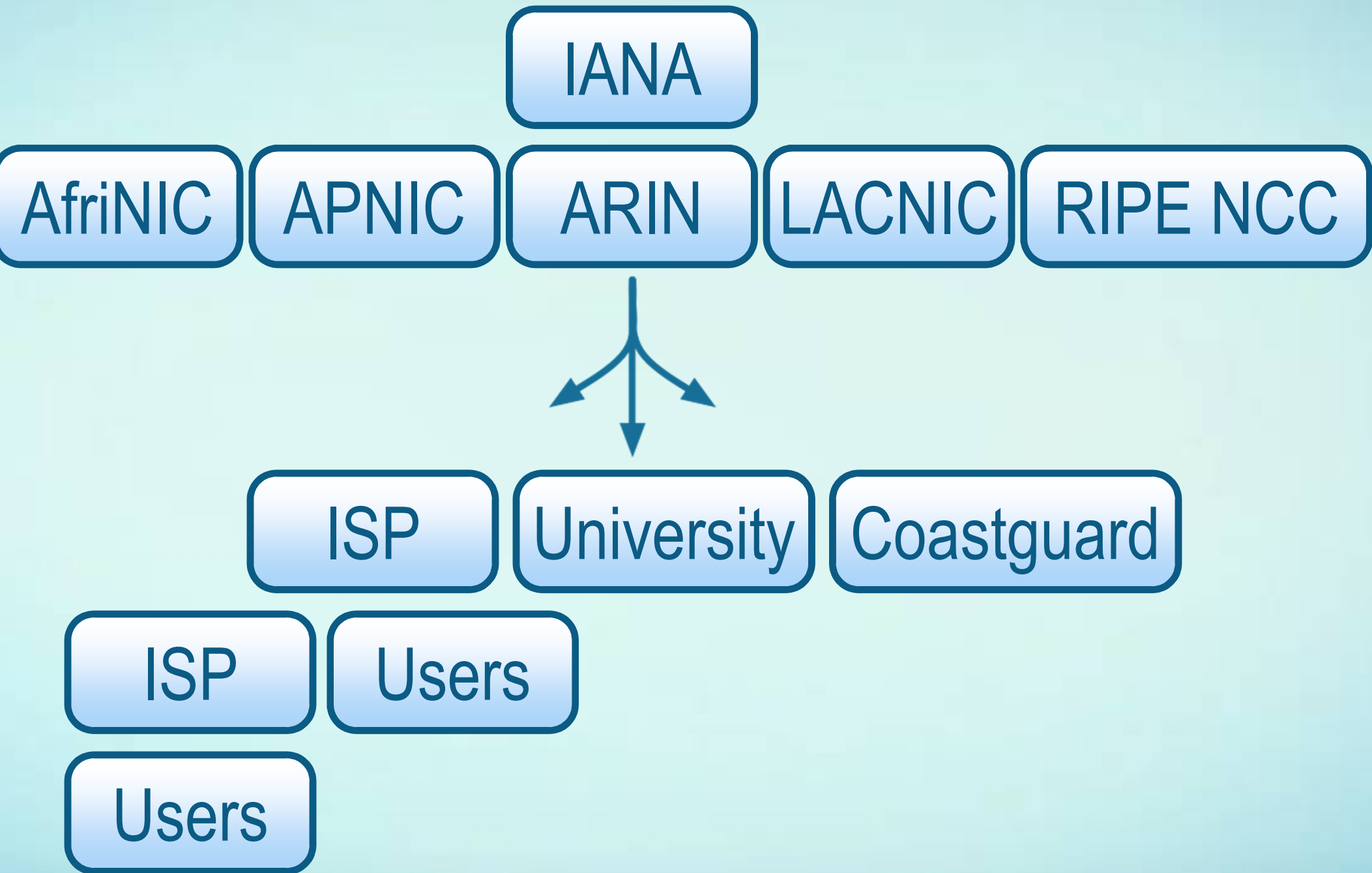
Allocation policy is bottom up

- 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

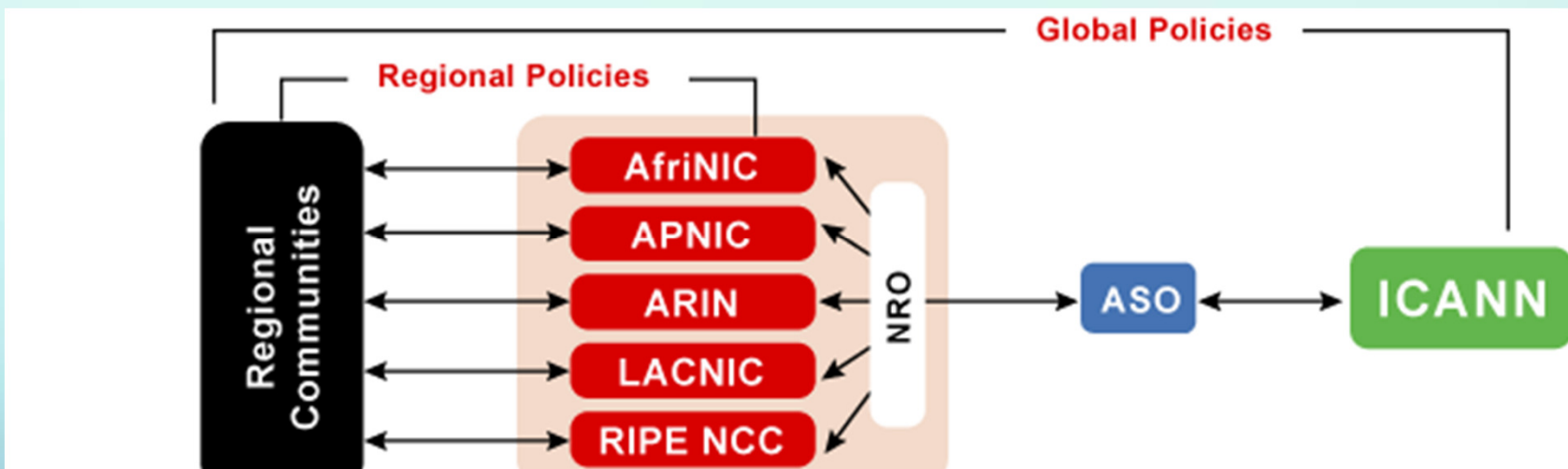
RIRs provide Fellowships to help people from LDC attend open policy meetings

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

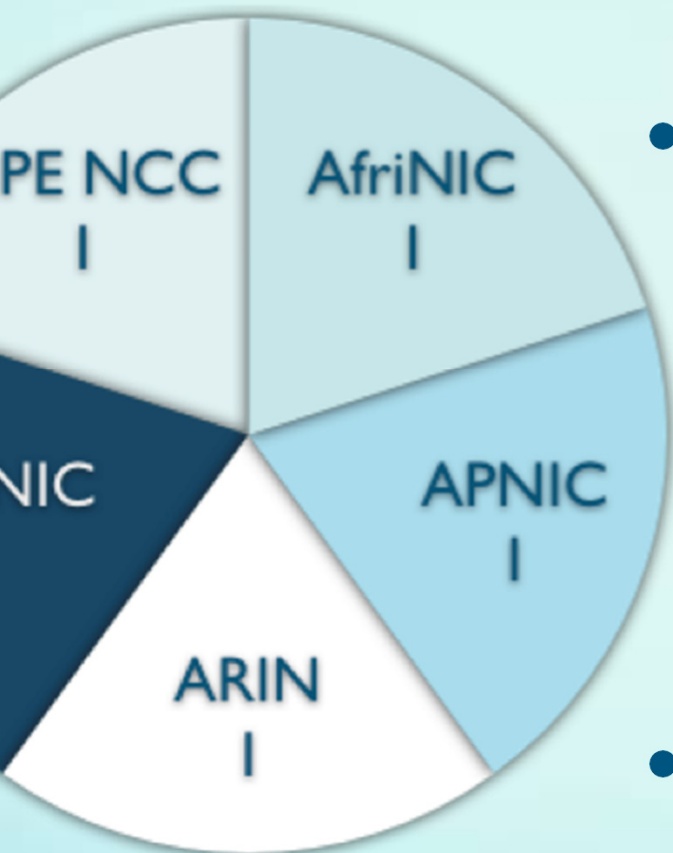
- less than half a block left - or
- less than necessary for the next 9 months

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

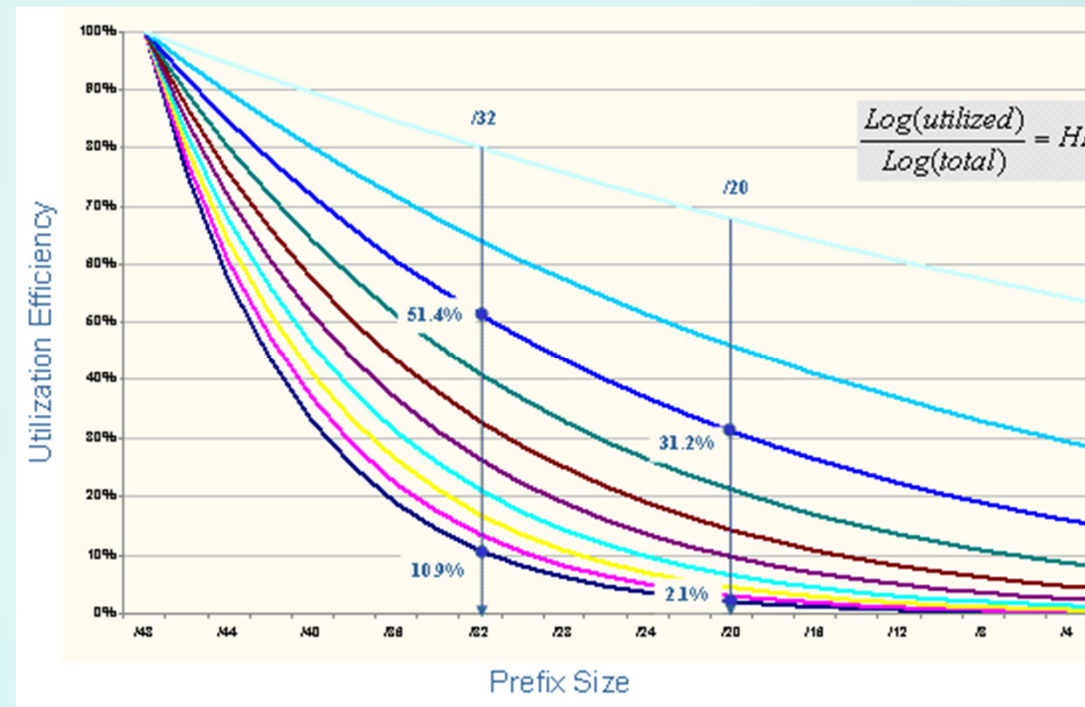
More space available when 80% is used

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)

On ccTLDs

gTLDs (.com, .org, .int, etc.)

gIDNs (non-latin scripts)

ccTLDs (.dm, .tt, .jm, etc)

ccTLD as a public trust

ccTLDs are designated to operators who will operate them in the best interests of the local communities they serve.

Operators should strive to tailor operations to best serve the users:

- Ensure minimum technical standards are met

- Strive for best practice

- Operate with policy that suits local requirements

Things to consider

How a ccTLD operator can be structured

Best Current Practices

Interacting with ICANN

Some options

Government?

Not for profit?

Outsource?

Most common:

Not for profit private organization

Appropriate membership from the community

Chartered for limited scope

Some kind of liaison with the government

Often light regulatory oversight

Sales model

Direct registration

No middle man - easier to control most aspects of registration

Registry-registrar model

Requires an interface between registry and registrar

Offloads end-user interface from registry

Both

Scope

Local or Global sales?

Decide what best serves local community

For global, consider legal aspects

Technical operations

RFC 2870 - Root Server Name Operational Requirements (security, operations, communications)

RFC 2182 - Selection and Operation of Secondary DNS Servers

ccTLD Best Current Practice document

<http://www.nsrc.org/netadmin/cctld-bcp.html>

Administrative Point of Contact

Responsible for making clear rules for domain policy and operation.

Should represent the local Internet community and ensure ccTLD run for benefit of country and its citizens.

Technical Point of Contact

Maintains the zone and makes sure systems run

Programmers and Technical Staff

DNS experts, UNIX administrators should be in the team

Finance and Billing

If you are charging fees...

Lawyers

A reality if you trade globally

Technical Requirements for Registry

Secondary Servers

Networks (redundant)

Physical and Electronic Security

Quality of Service (24/ 7 availability!)

DNS software (BIND, NSD, etc.)

Registry software

Diagnostic tools (ping, traceroute, zonecheck, dig)

Registry Registrar Protocol

Other considerations

Structure of the TLD sub TLDs? (.xy.dm or .dm)

Dispute Resolution

Local law prevails

Alternate Dispute Resolution (ADR) designed to be more lightweight

UDRP is often used as a model

<http://www.icann.org/udrp/udrp.htm>

Regional Organisations

APTLD (www.aptd.org)

CENTR (www.cent.org) - Your local group

LACTLD (www.lactld.org)

AfTLD (www.aftld.org)

Country Code Network Operators Group

www.ccnog.org

Thank you!

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