WELCOME
WE ARE
OPEN
PLEASE COME IN

RIPE NCC
RIPE NETWORK COORDINATION CENTRE

# LIRs and the Internet Ecosystem

# LIRs: Managing IP Addresses and AS Numbers

RIPE NCC Learning & Development

**This session is being recorded**

# Agenda

## LIRs and the Internet Ecosystem

1. The Internet Registry System
2. RIPE and the RIPE NCC
3. How to improve the Internet
4. The LIR Portal
5. The RIPE Database

## LIRs: Manage your IP Addresses and AS Numbers

1. Which Internet Numbers does the RIPE NCC distribute?
2. How to get Internet Numbers from the RIPE NCC
3. How to transfer them to/from another LIR
4. Using the Internet Numbers
5. Tips and tricks

# Take the poll!

What does an **LIR** do?

*Please type in your answer*

3 min.

# The Internet Registry System

Section 1 of 5

Internet Assigned Numbers Authority

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ARIN
American Registry for Internet Numbers

APNIC

lacnic

AFRINIC
The Internet Numbers Registry for Africa

# All five RIRs are:

- Not-for-profit organisation
- Funded by membership fees
- Policies developed by regional communities
- Neutral, impartial, open, and transparent

RIR = Regional Internet Registry

# RIRs are responsible for:

- Keeping the registry up to date, correct, and secure
- Using hierarchical allocations
- Maintaining neutrality towards all members

# The RIPE NCC Service Region

Europe, the Middle East, and parts of Central Asia

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**LIRs**: Local Internet Registries

# Who can become an LIR?

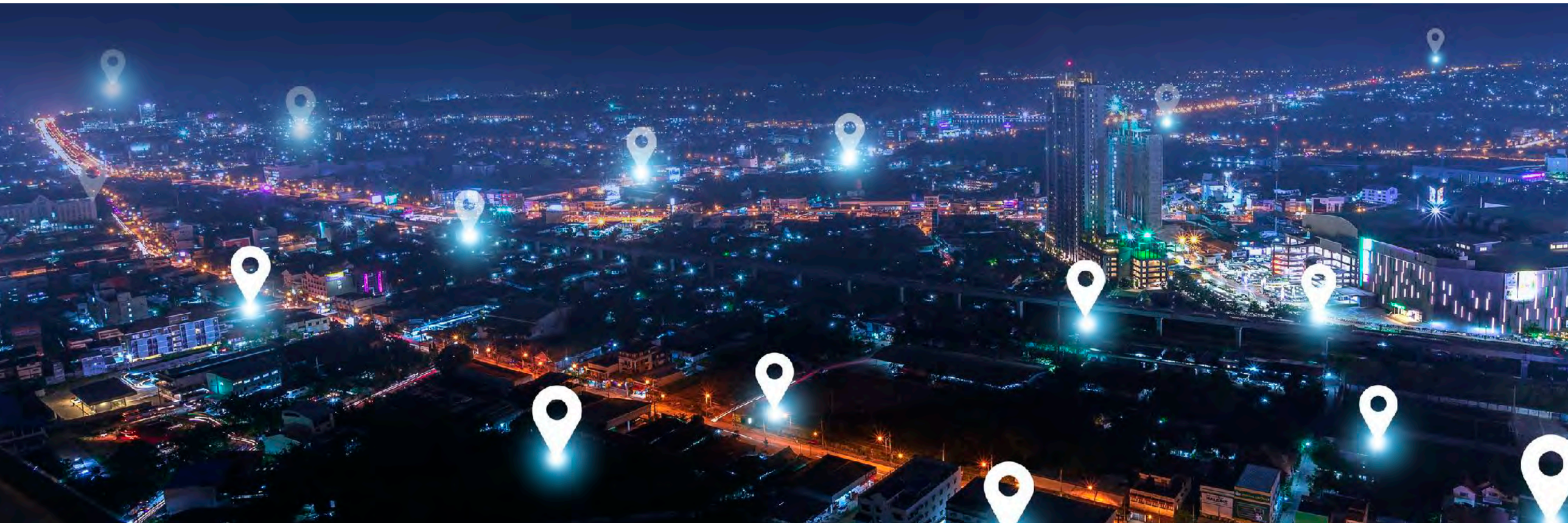
- Organisations:
  - Internet Service Provider (ISP)
  - University
  - Bank
  - …
- A private person

Any **legal entity** or **natural person** can become a member of the RIPE NCC → become a Local Internet Registry (**LIR**)

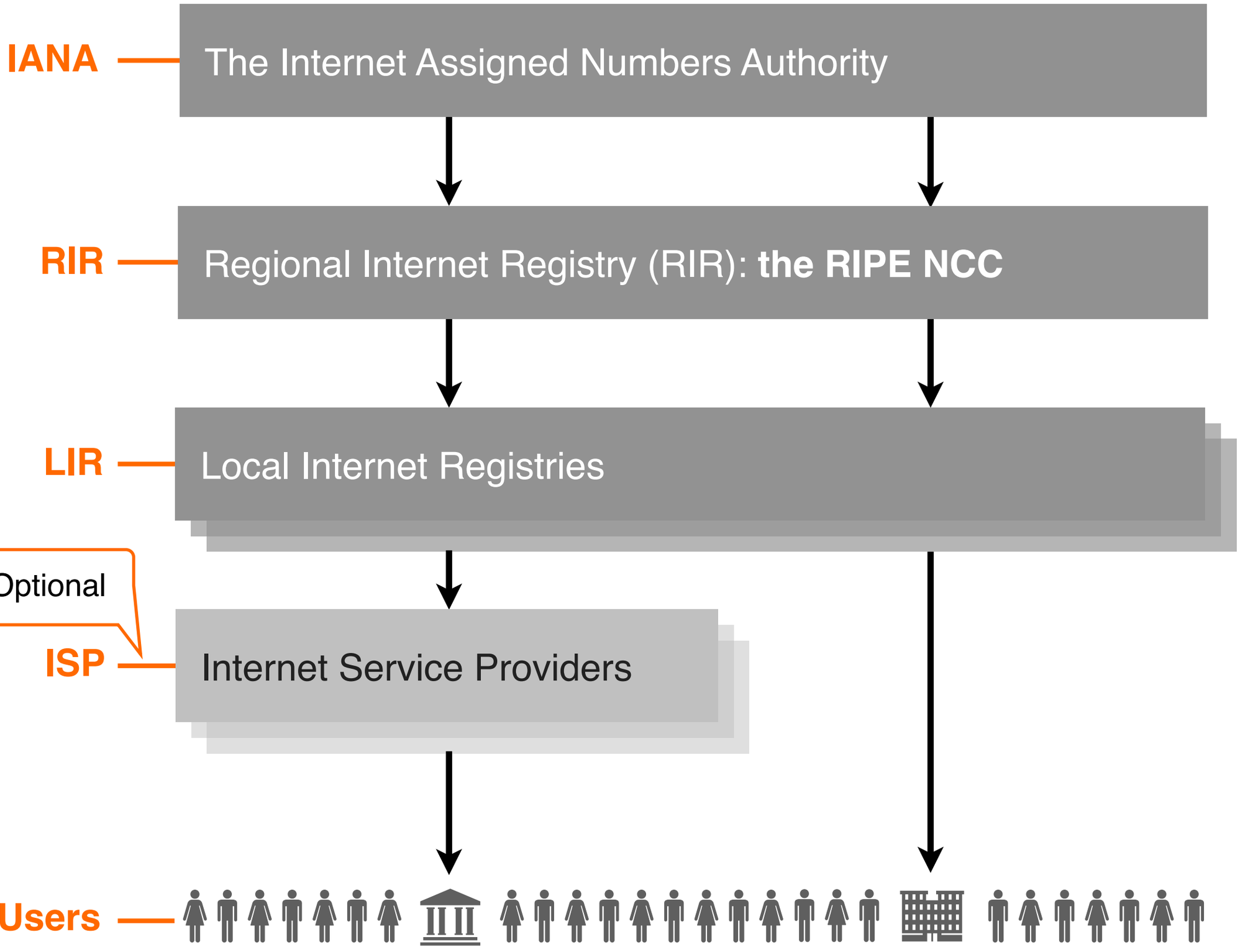
**The RIPE NCC membership landing page:**
https://www.ripe.net/participate/member-support

# What are LIRs responsible for?

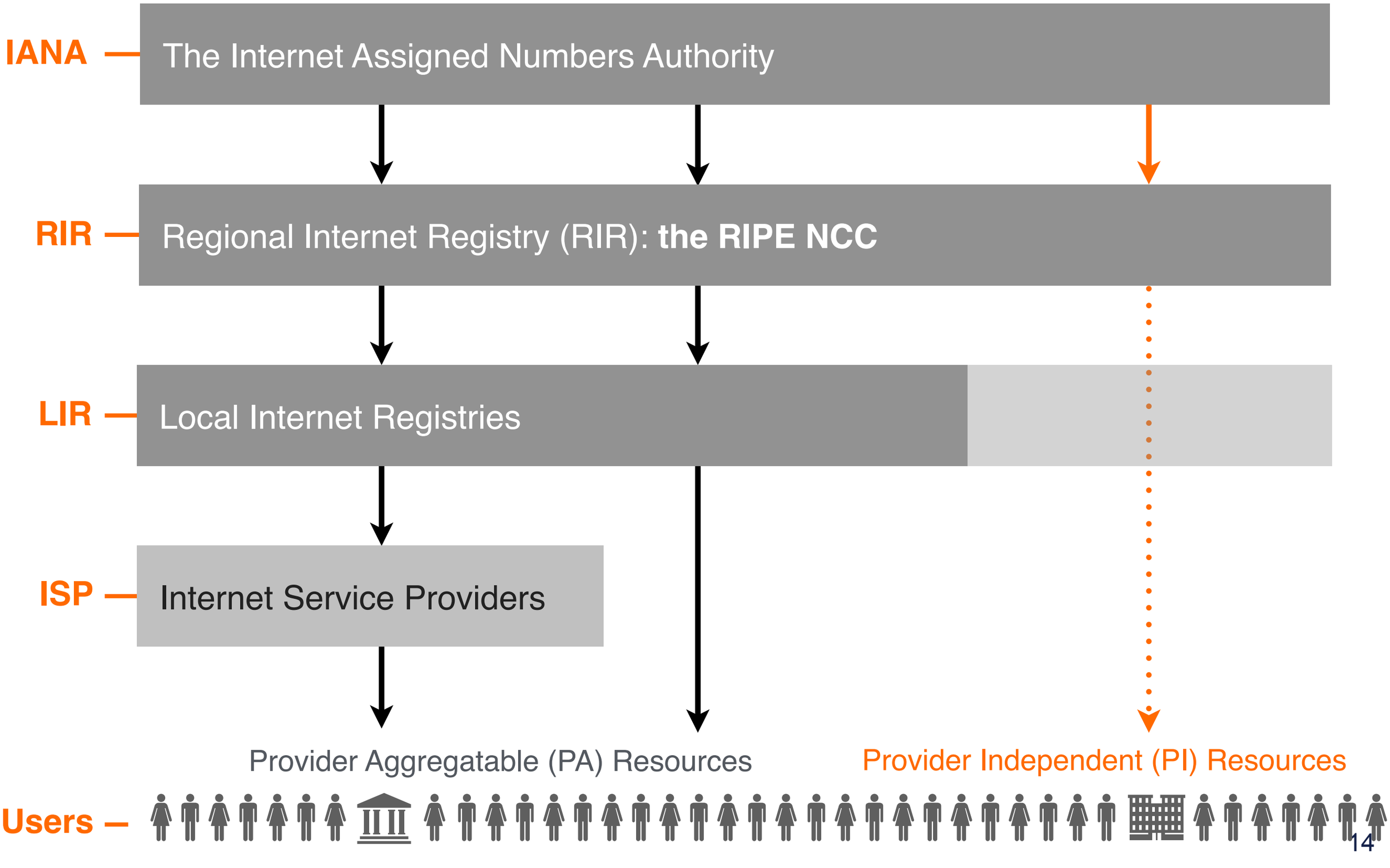
- Distributing Internet Number resources to End Users
- Registering them in the RIPE Database
- Keeping the registry up-to-date
- Can participate in discussions on the future of the RIPE NCC



# There is a Distribution Hierarchy



# PA and PI Resources



# IPv4: How it used to be

**/8** = 16,77 million IPv4 addresses
**/16** = 65536 IPv4 addresses
**/24** = 256 IPv4 addresses

**IANA** — Holds the whole range ⟶ **/0**

**RIR** — **RIRs** get **ALLOCATIONs** ⟶ **/8s**

**LIR** — **LIRs** get an **ALLOCATION** ⟶ **.. /19, /21, /22**

**ISP** — **SUB-ALLOCATIONs**

**Users** — **PA Assignments** | **PA Assignments** | **PI Assignments**

# How it is for IPv4 now

After quarantine

IANA — Holds the whole range → /0

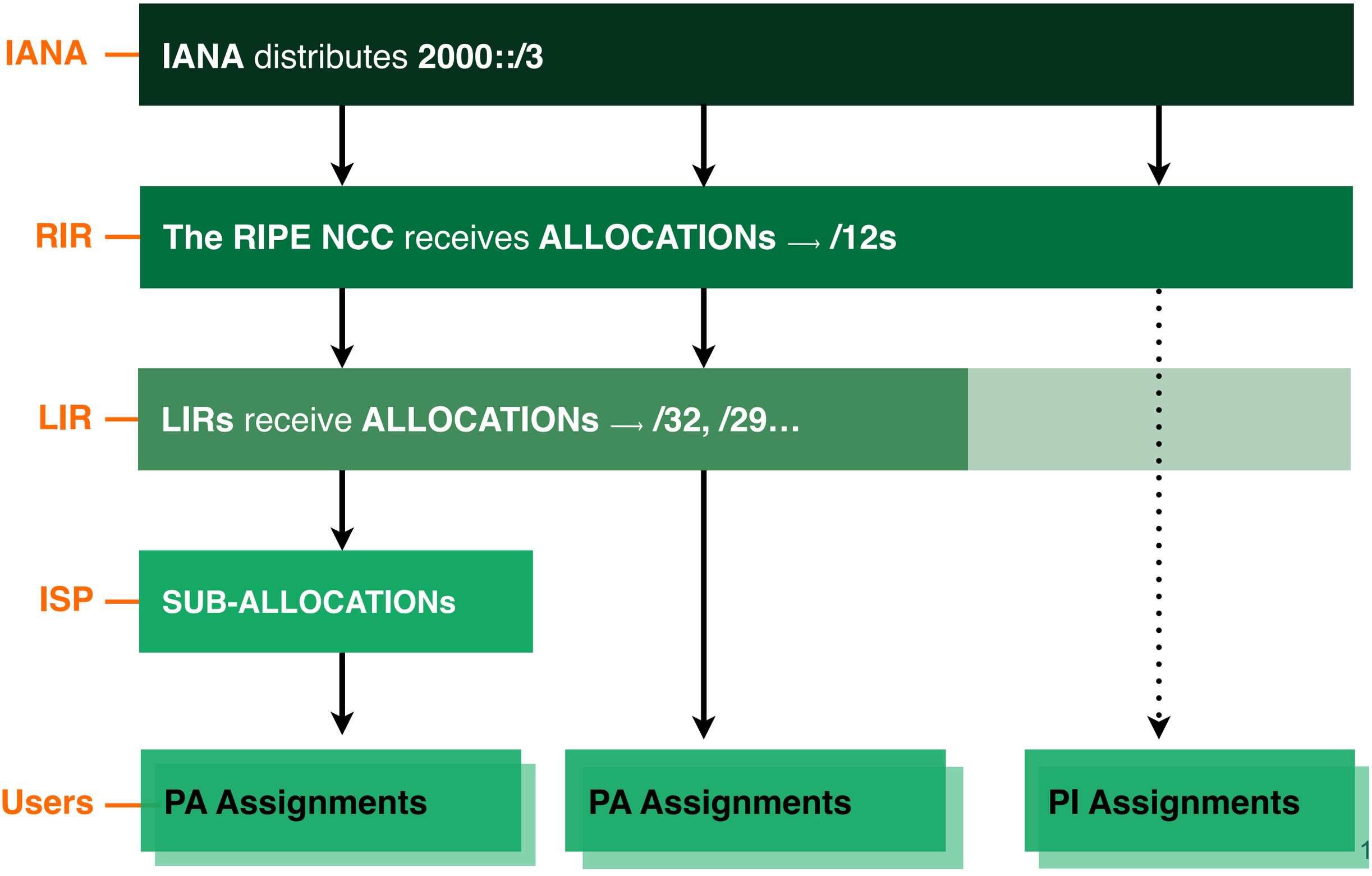
RIR — **The RIPE NCC** gets **ALLOCATIONs** from the **recycled** space

LIR — **LIRs** get an **ALLOCATION** → /24

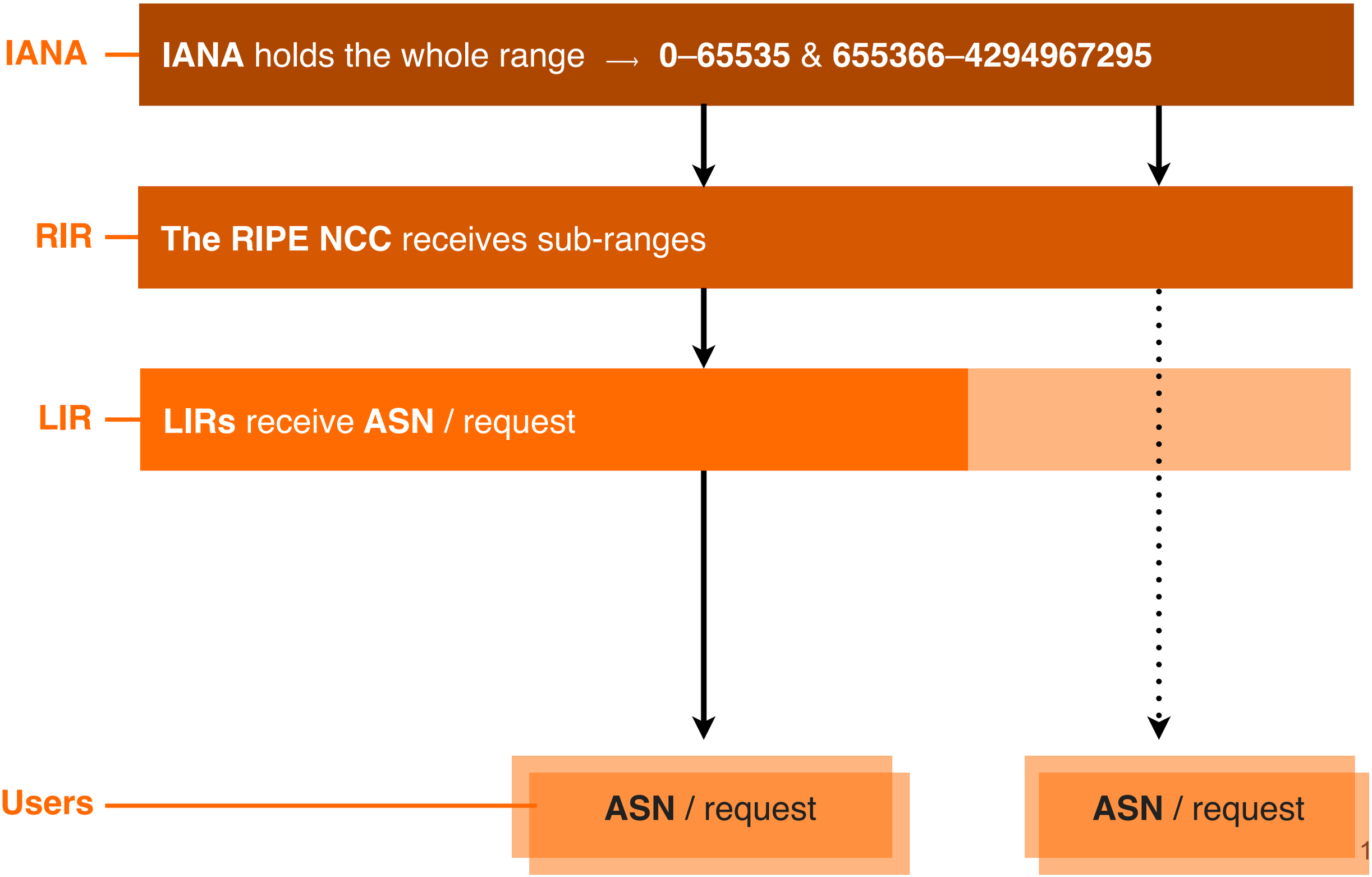
ISP — **SUB-ALLOCATIONs**

Users — **PA Assignments** | **PA Assignments** | **PI Assignments**

# How it works for IPv6



# How it works for ASNs



# Questions

# RIPE and the RIPE NCC

Section 2 of 5

# Réseaux IP Européens (RIPE)

RIPE Discussion forum open to everybody interested

## The RIPE community

## The RIPE Network Coordination Centre

RIPE NCC
RIPE NETWORK COORDINATION CENTRE

- ~160 employees
- Offices in Amsterdam and Dubai

# The RIPE community

- Started in 1989
- Discussion forum **open** to all parties interested
- Not a legal entity and **no formal membership**
- Develops **policies**
- Work done in Working Groups
- Activities are performed on a voluntary basis
- Decisions formed by **consensus**

# The RIPE NCC

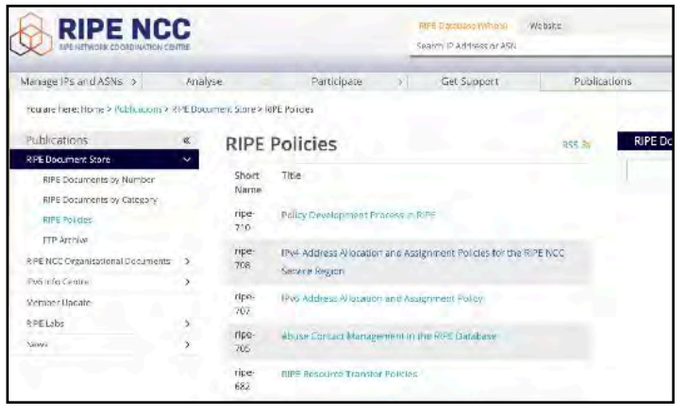
- Distributes IP addresses and ASNs
- Maintains the registry
- Outreach activities with governments and LEAs
- Internet measurements
- Operates the K-root name servers

LEA = Law Enforcement Agency

RIPE

RIPE Working Groups
RIPE Meetings

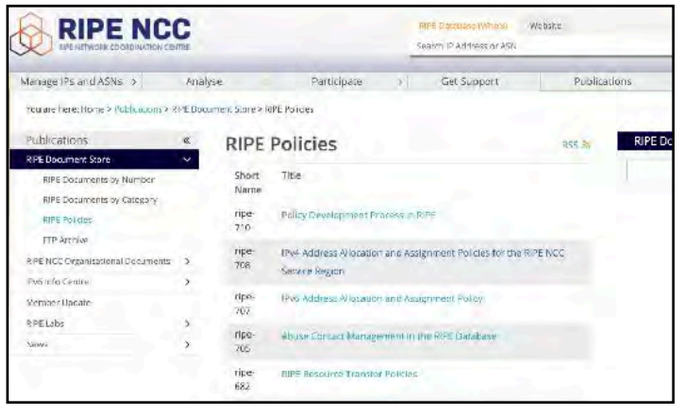
RIPE Policies




RIPE Working Groups

RIPE Meetings

RIPE Policies




RIPE NCC
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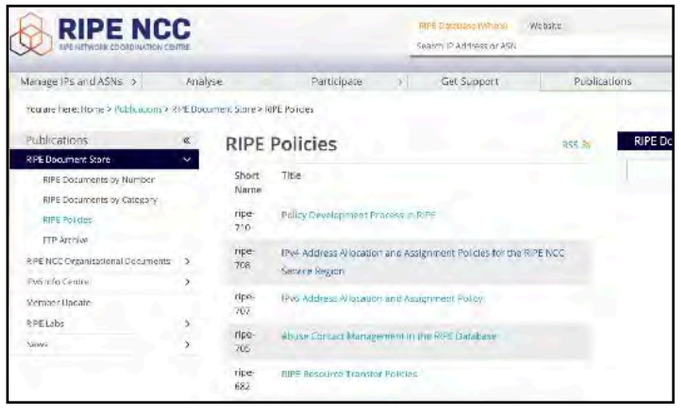
RIPE Working Groups
RIPE Meetings

LIRs

RIPE

RIPE Policies

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CENTRE

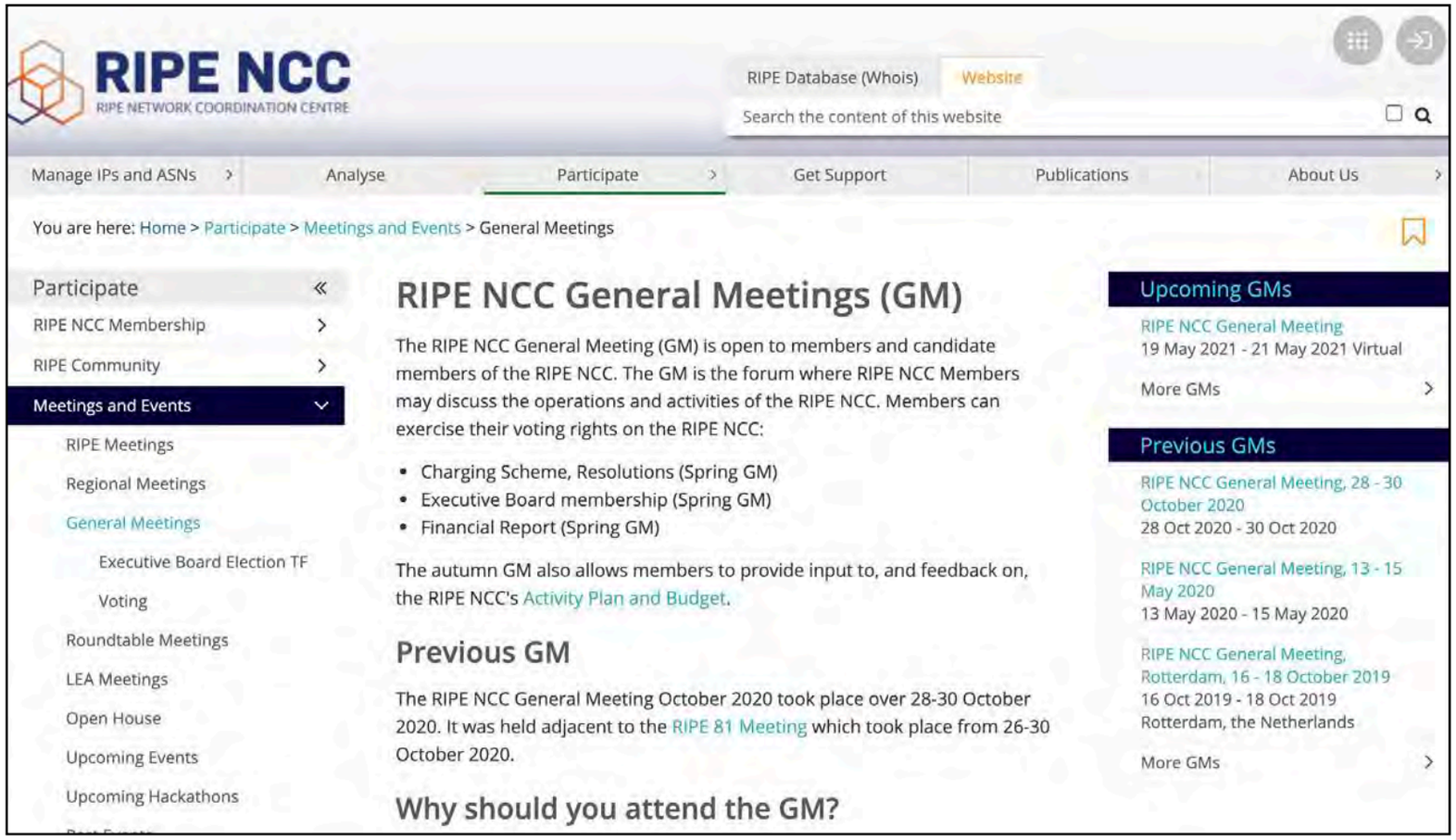
RIPE Working Groups
RIPE Meetings

RIPE NCC
General Meetings

Mailing Lists

LIRs

# Demo: Registering for the GM




Demo

**The General Meeting information page:**
https://www.ripe.net/participate/meetings/gm

# Questions

# How to Improve the Internet

Section 3 of 5

# RIPE Policies:

- How IPv4 addresses are allocated and assigned
- How IPv6 addresses are allocated and assigned
- How abuse contacts are managed

…

# How can you improve the Internet?

1. Check the current policies
2. Suggest an improvement to the Working Group
3. Try to reach consensus
4. Make a RIPE policy 👍

**Current RIPE policies:**
https://www.ripe.net/publications/docs/ripe-policies

# Too difficult? Takes too long?

# Need help from the RIPE NCC?

Angela Dall’Ara
pdo@ripe.net

**YES!** The **Policy Officer** will assist you.

# How can you start?

1. Stay up-to-date with new policies
2. Join in the policy discussions
3. Propose a new policy

**Join WG Mailing Lists:**
https://www.ripe.net/participate/ripe/wg/active-wg

**Join RIPE NCC Membership Announce Mailing List:**
https://www.ripe.net/participate/mail/ripe-ncc-mailing-lists/ncc-announce

**Current Policy Proposals:**
https://www.ripe.net/participate/policies/current-proposals/current-policy-proposals

RIPE

**The RIPE Community**:

- Creates and discusses proposals
- Seeks consensus

**Working Group Chairs**:

- Accept proposals
- Chair discussions
- Decide whether consensus has been reached

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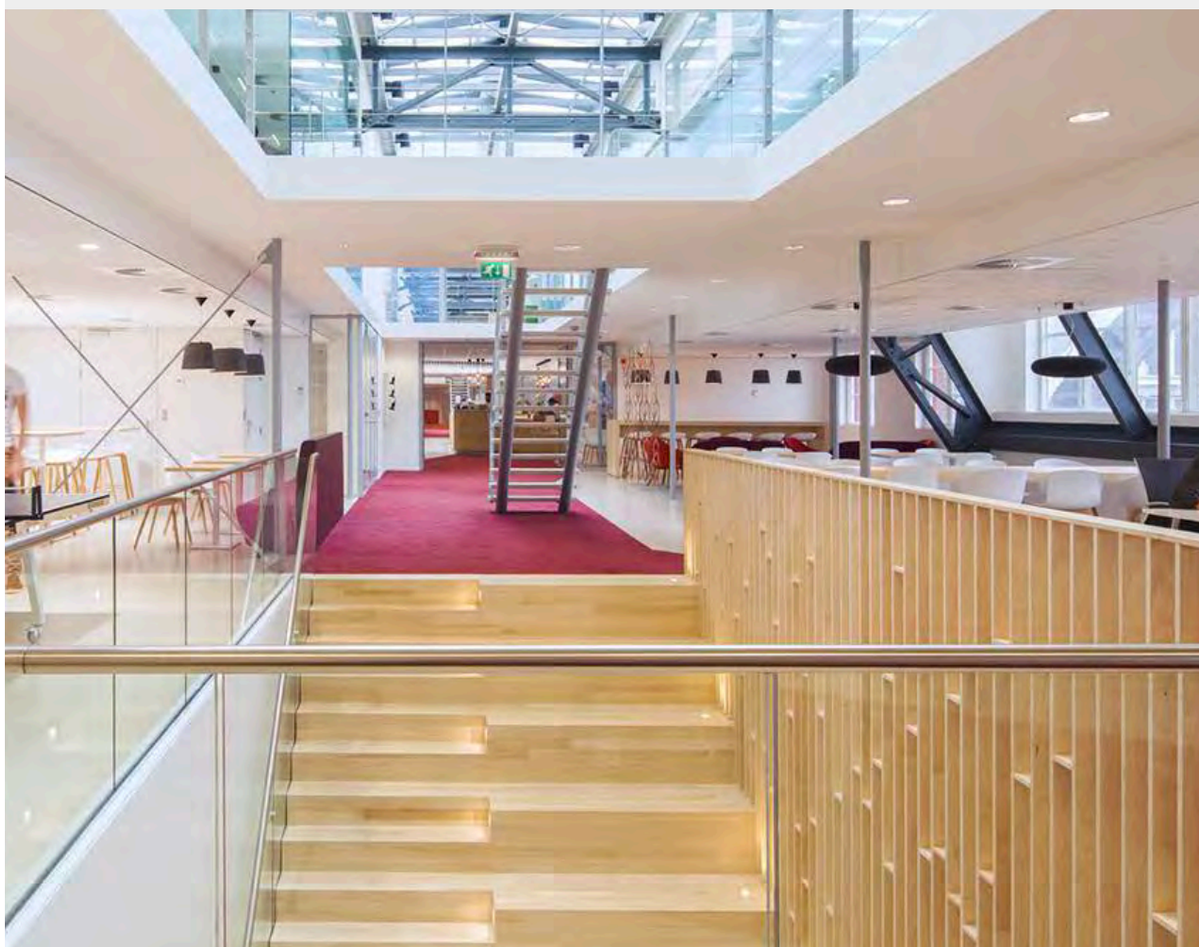
- Supports these activities
- Publishes accepted policies
- Implements and enforces them



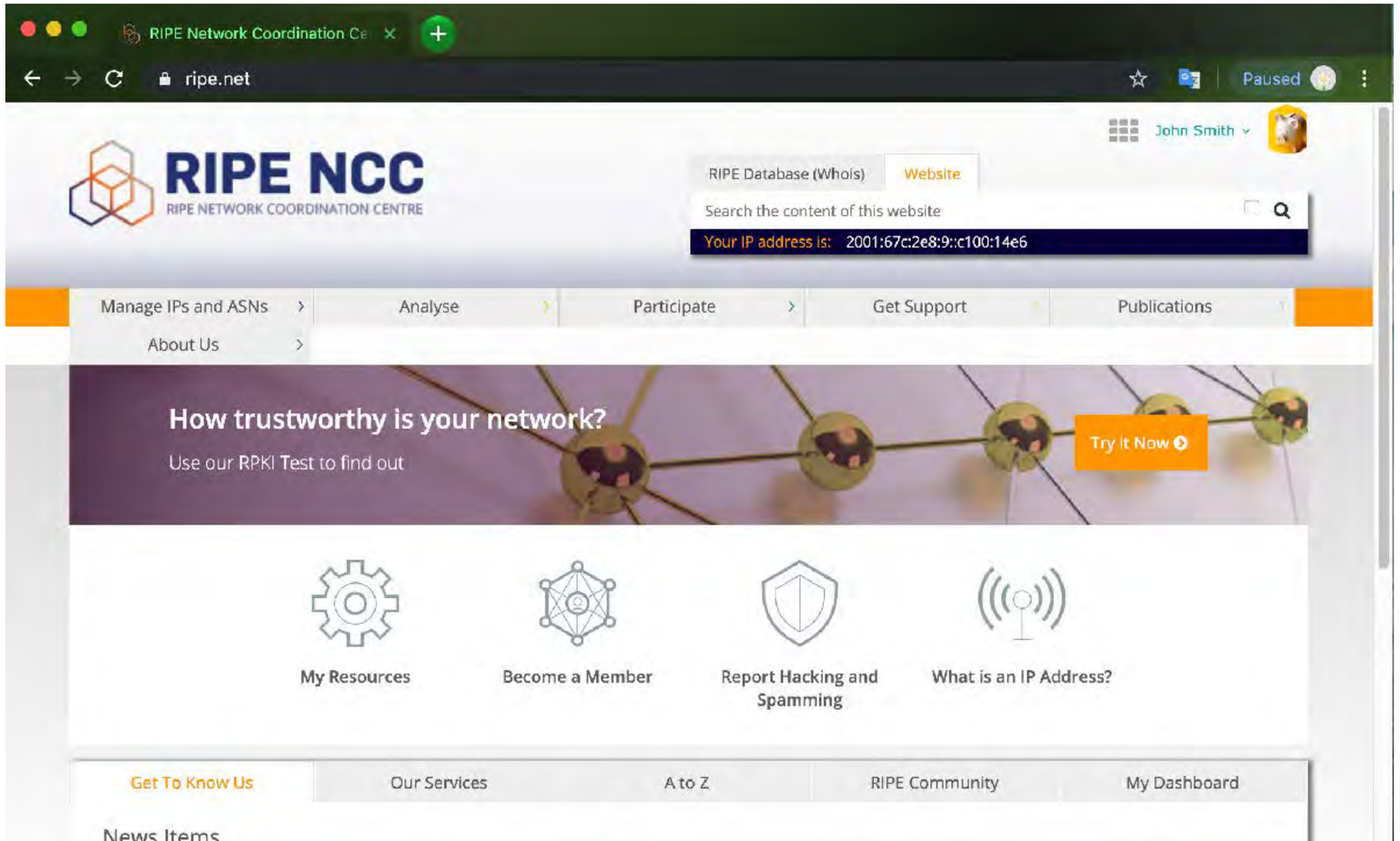
# Questions

# The LIR Portal

Section 4 of 5

# A RIPE NCC Access Account

- For all RIPE NCC services
- Free to create
- Can be associated with one or more LIRs → gets access to the **LIR Portal**



# Demo: LIR Portal Overview

- Account details
- Resources details
- Communicating with the RIPE NCC:
    - Request resources
    - Create tickets
    - Sign up for a training or webinar

**LIR Portal:** https://my.ripe.net

# Questions

# The RIPE Database

Section 5 of 5

# The purpose of the RIPE Database

- Registry of **who** holds IP addresses and ASNs
- Keeps **contact** information
  - For troubleshooting, notifying outages, etc.
- Publishing **routing** policies
- Provisioning **reverse DNS**

# The RIPE Database

Production

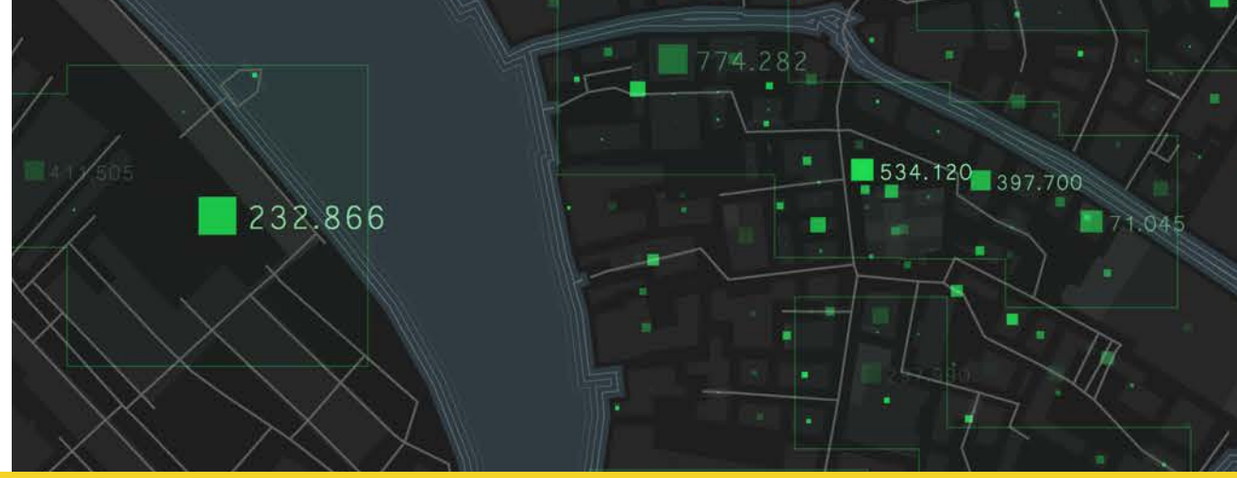
https://apps.db.ripe.net/

# The Test Database

For testing purposes

https://apps**-test**.db.ripe.net/

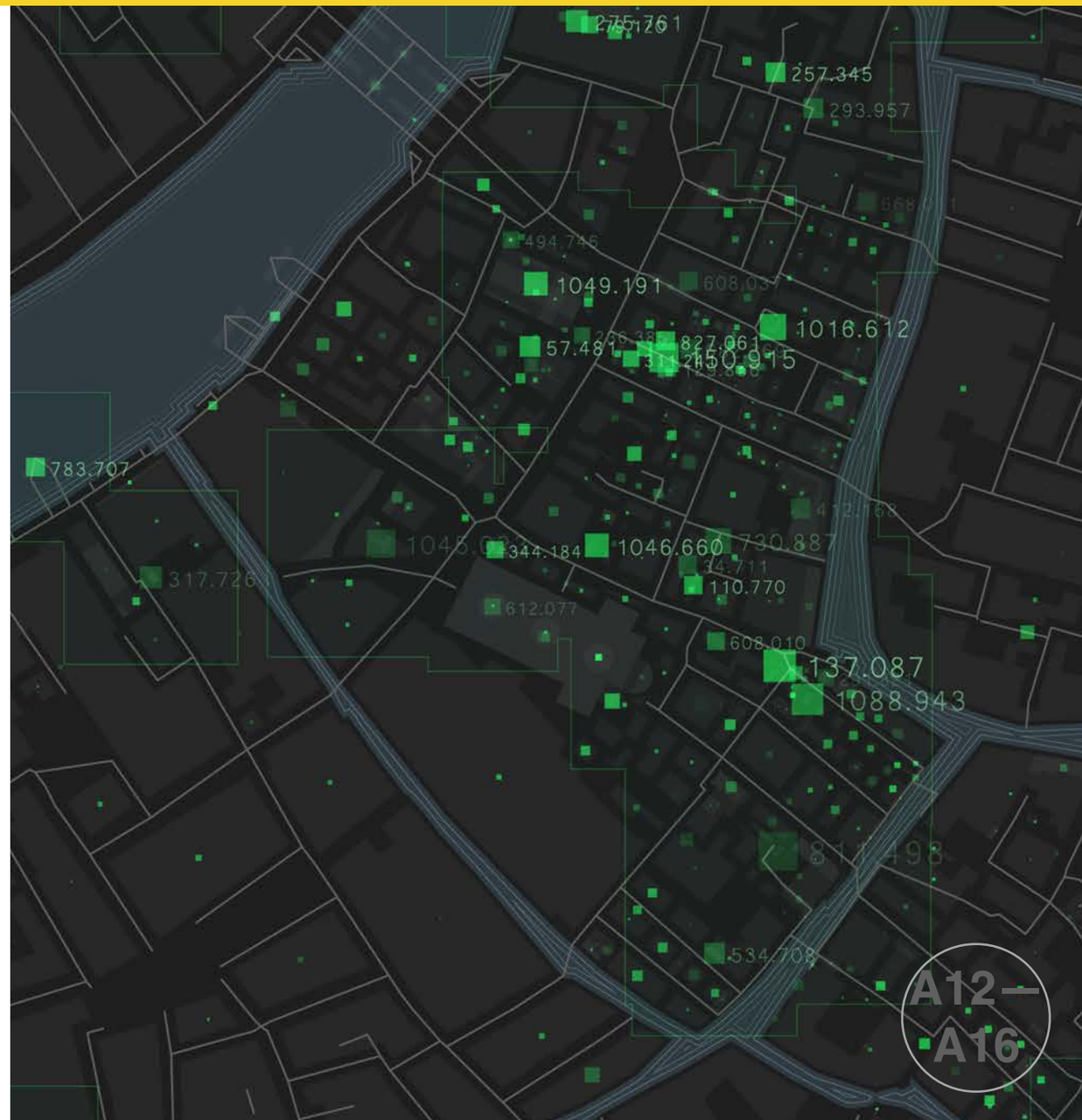
# Lab: Look up a network




We are using the TEST Database: https://apps-test.db.ripe.net/

You want to buy a company which is using **193.0.29.71** for their services.

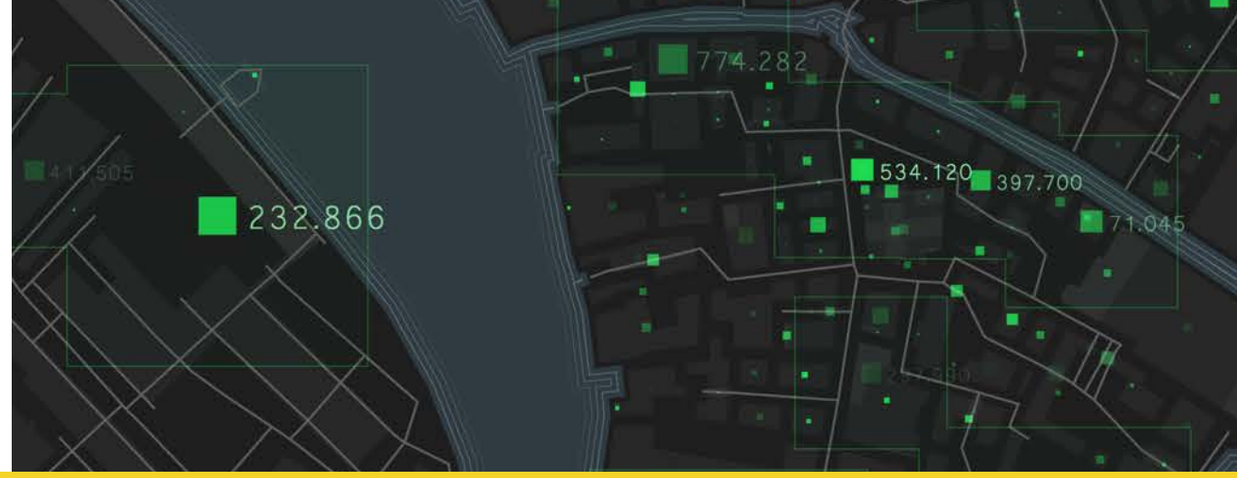
Before signing the contract, you want to investigate this a bit further.




Demo

15 min.

# Lab: Look up a network



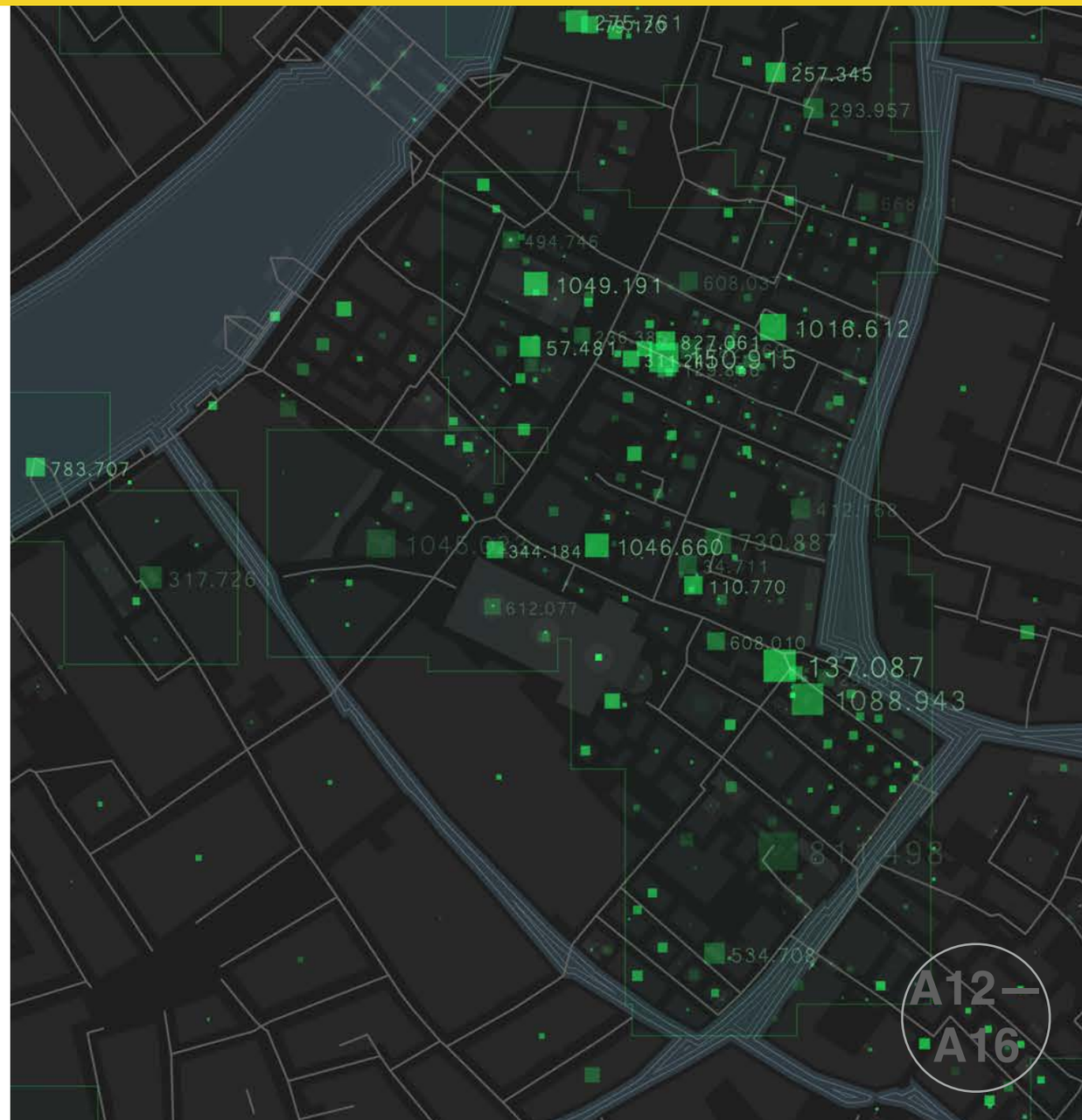

We are using the TEST Database: https://apps-test.db.ripe.net/

You want to buy a company which is using **193.0.29.71** for their services.

- What is the name of the company to which this IP is registered to?
- What is the assignment (the range of addresses or prefix) this IP belongs to?
- Who is the administrative contact of the network?
- Who is providing technical support for the network?
- * How many people in total have a relation to the prefix?
- * Anything suspicious?

Demo

20 min.



# Questions

# What's Next in Internet Registry

## Webinars

**Attend another webinar live wherever you are.**

- LIRs and the Internet Ecosystem (2 hrs)
- LIRs: Managing IP Addresses and ASNs (2 hrs)
- Internet Governance (1 hr)
- Policy Development Process (1 hr)
- Webinar for New LIRs (1 hr)

For more info click the link below

**learning.ripe.net**

## Face-to-face

**Meet us at a location near you for a training session delivered in person.**

- LIR (8.5 hrs)
- RIPE Database (8.5 hrs)

## E-learning

**Learn at your own pace at our online Academy.**

- Internet Governance (3 hrs)
- RIPE Database (16 hrs)

For more info click the link below

**academy.ripe.net**

## Examinations

**Learnt everything you needed? Get certified!**

- RIPE Database Associate

For more info click the link below

**getcertified.ripe.net**

# What's Next

## LIRs and the Internet Ecosystem

1. The Internet Registry System
2. RIPE & RIPE NCC
3. How to improve the Internet
4. LIR Portal
5. The RIPE Database

## LIRs: Manage your IP Addresses and AS Numbers

1. Which Internet Number resources does the RIPE NCC distribute?
2. How to get Internet Number resources from the RIPE NCC
3. How to transfer them to/from another LIR
4. Using the Internet Number resources
5. Tips and tricks

# Let’s take a **5 minute** break!

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# Agenda

## LIRs and the Internet Ecosystem

1. The Internet Registry System
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## LIRs: Manage your IP Addresses and AS Numbers

1. Which Internet number resources does the RIPE NCC distribute?
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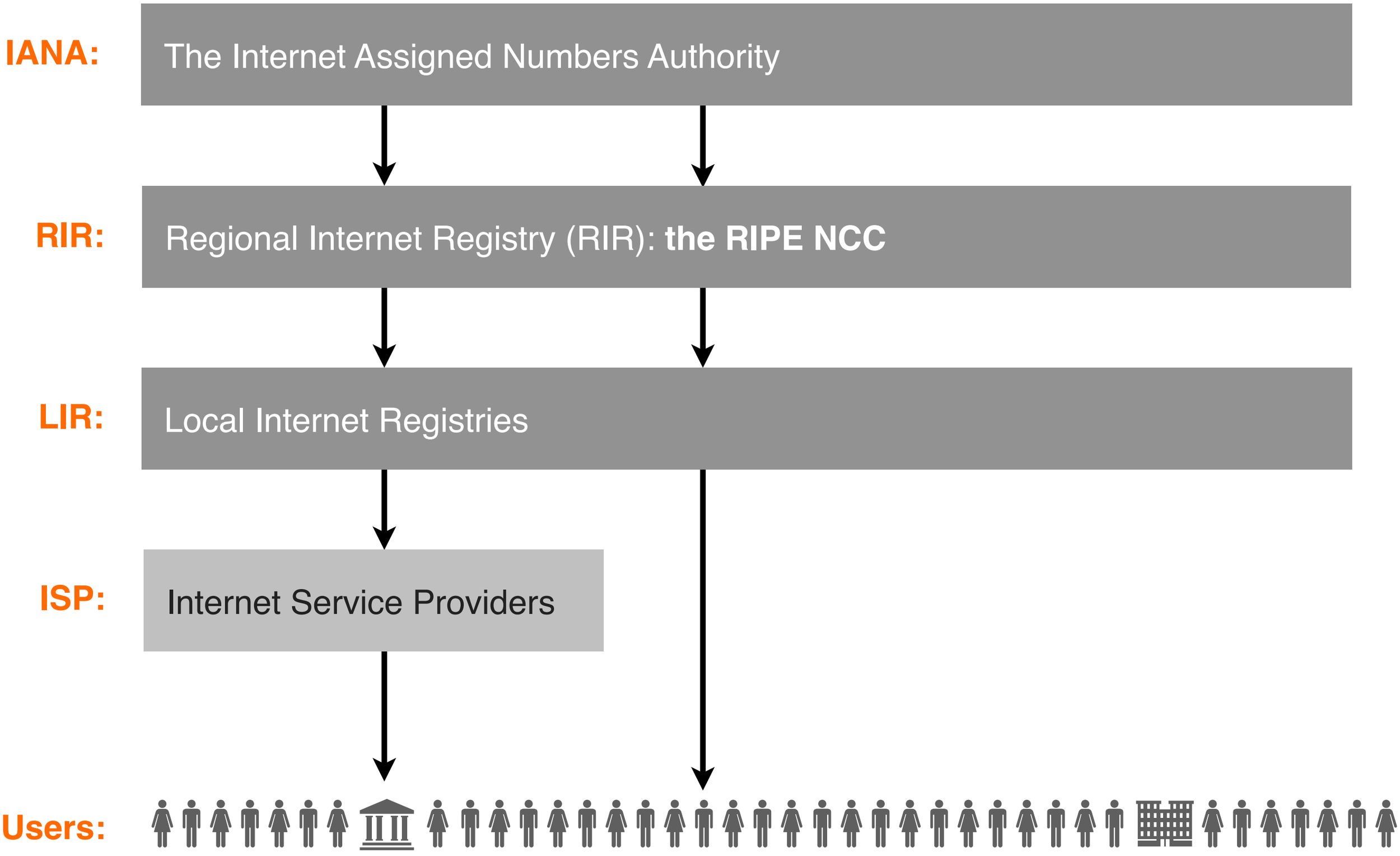
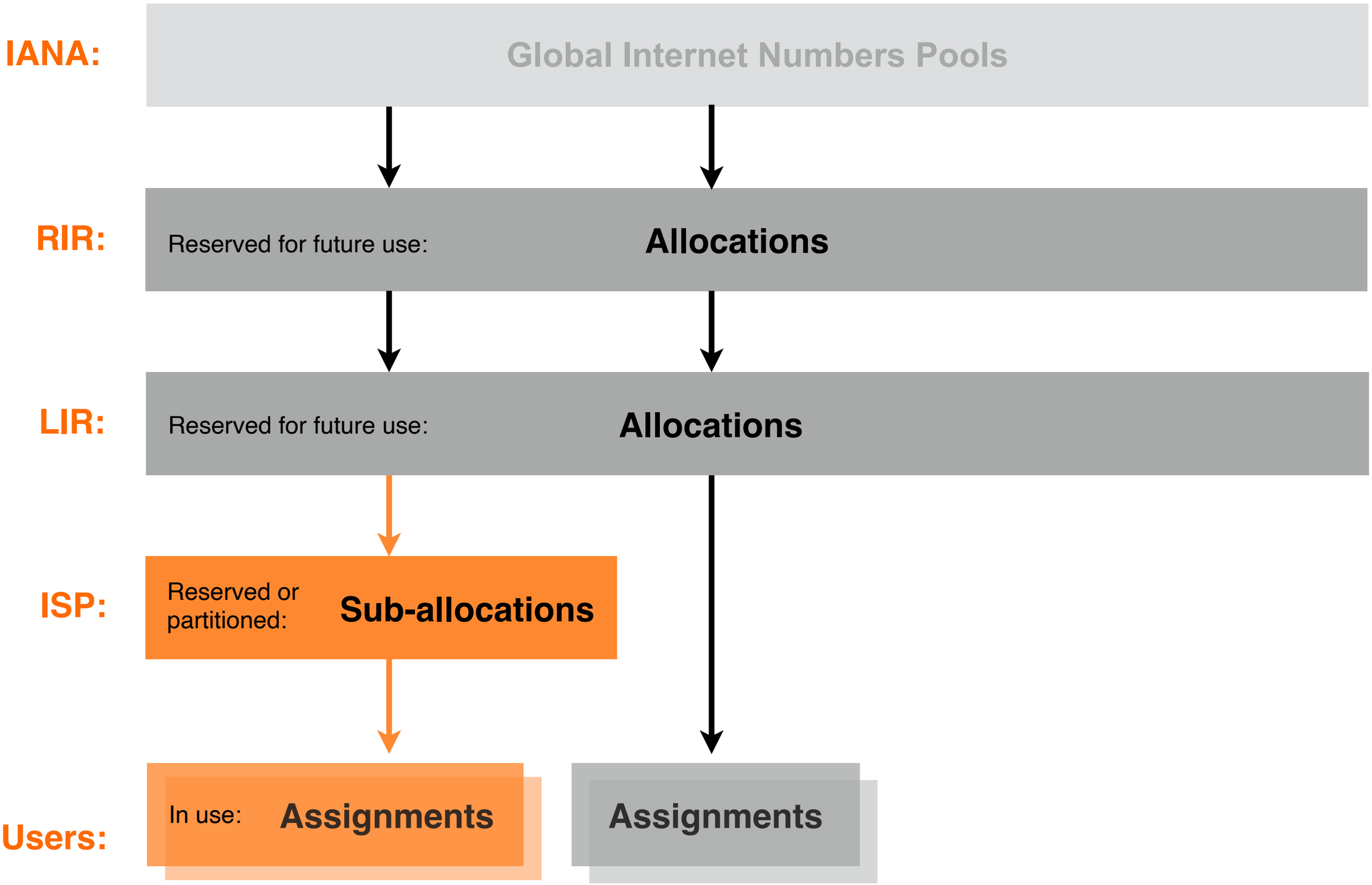
# Which Internet number resources does the RIPE NCC distribute?

Section 1 of 5

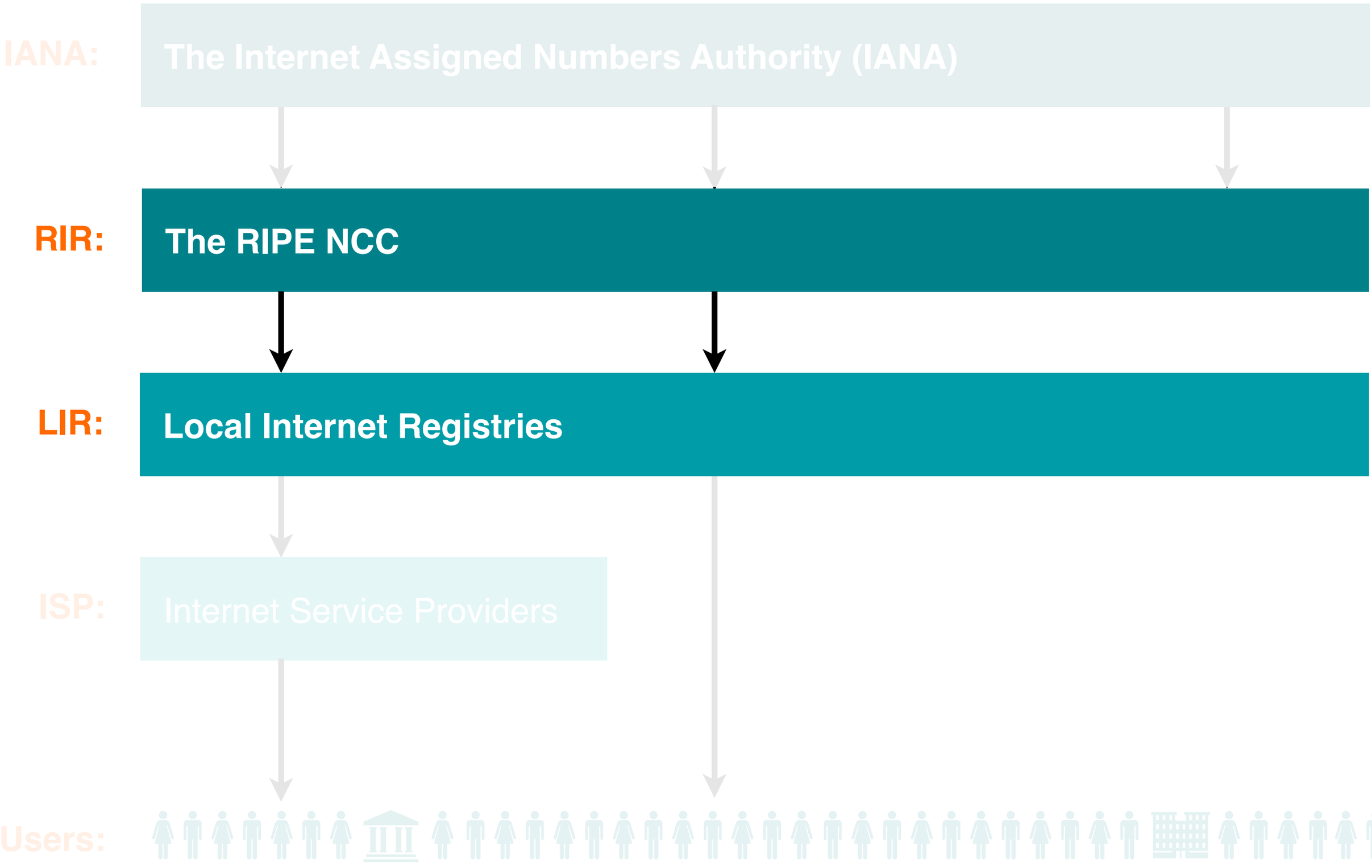
# There is a Distribution Hierarchy:



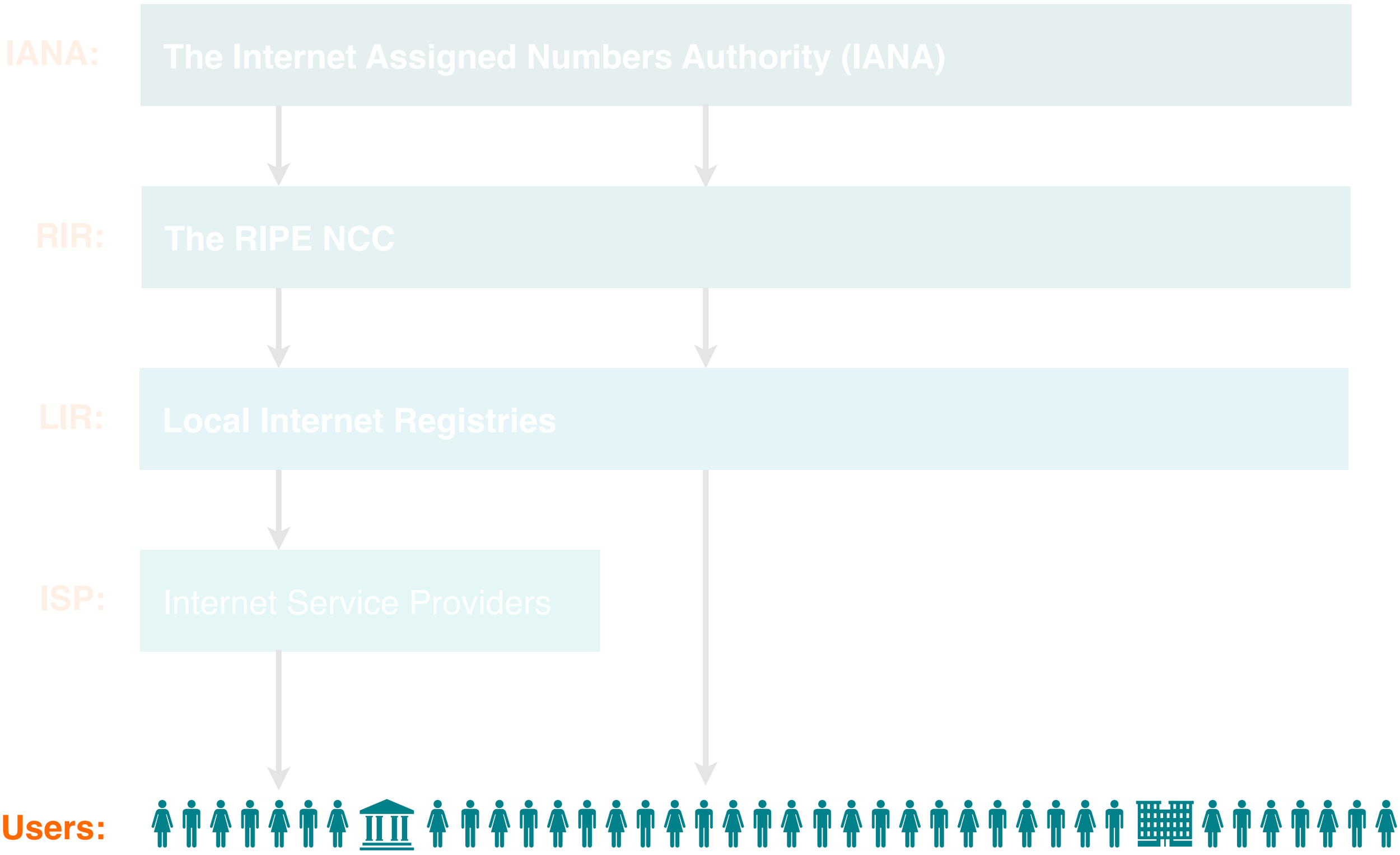
# Behind the scenes:



# Who gets IP address allocations?

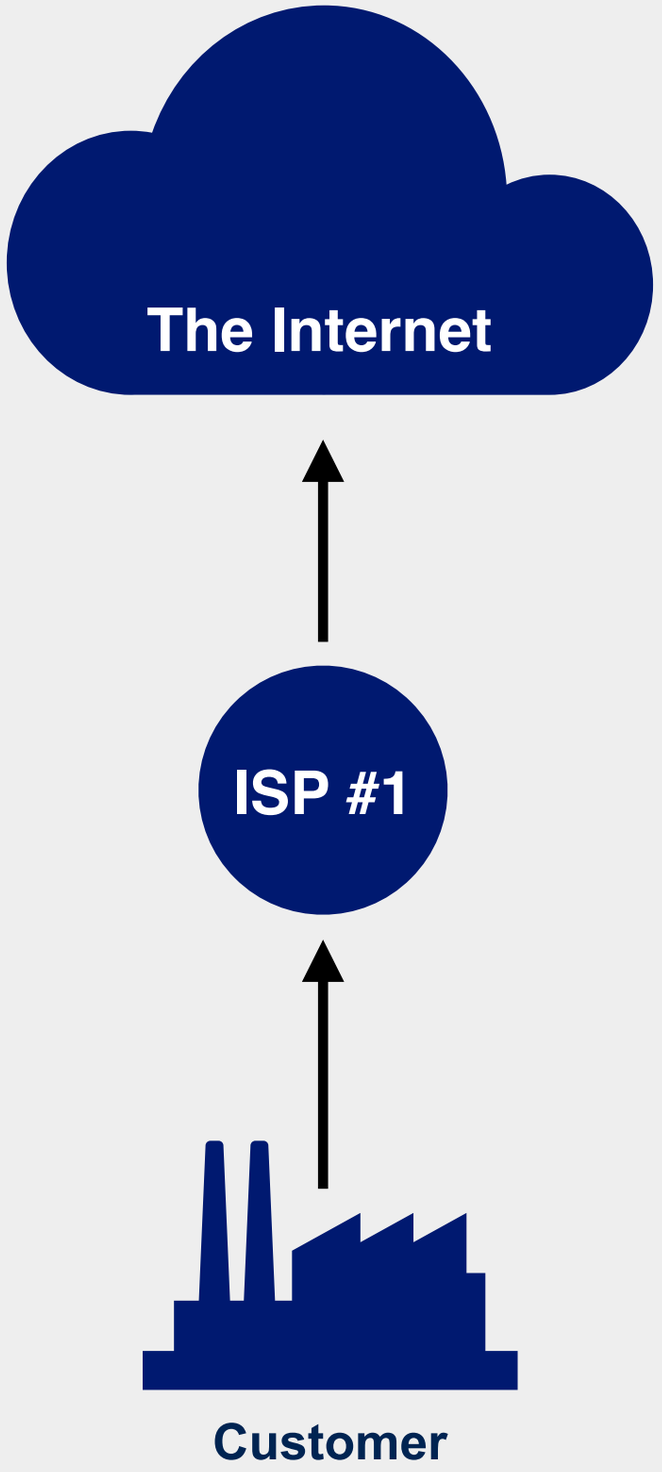


# …. Assignments?

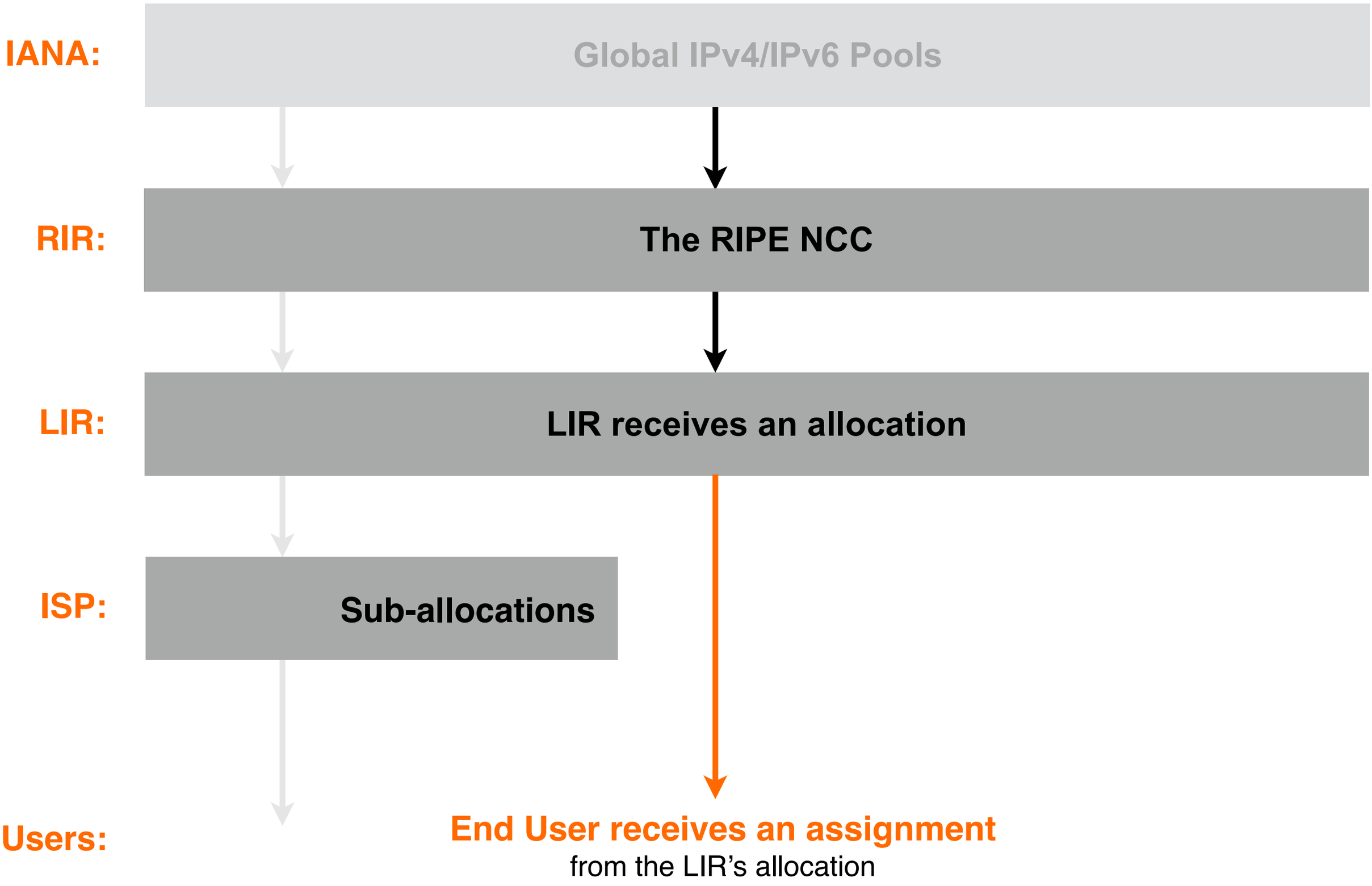


# What should a customer do if they need a public IP?

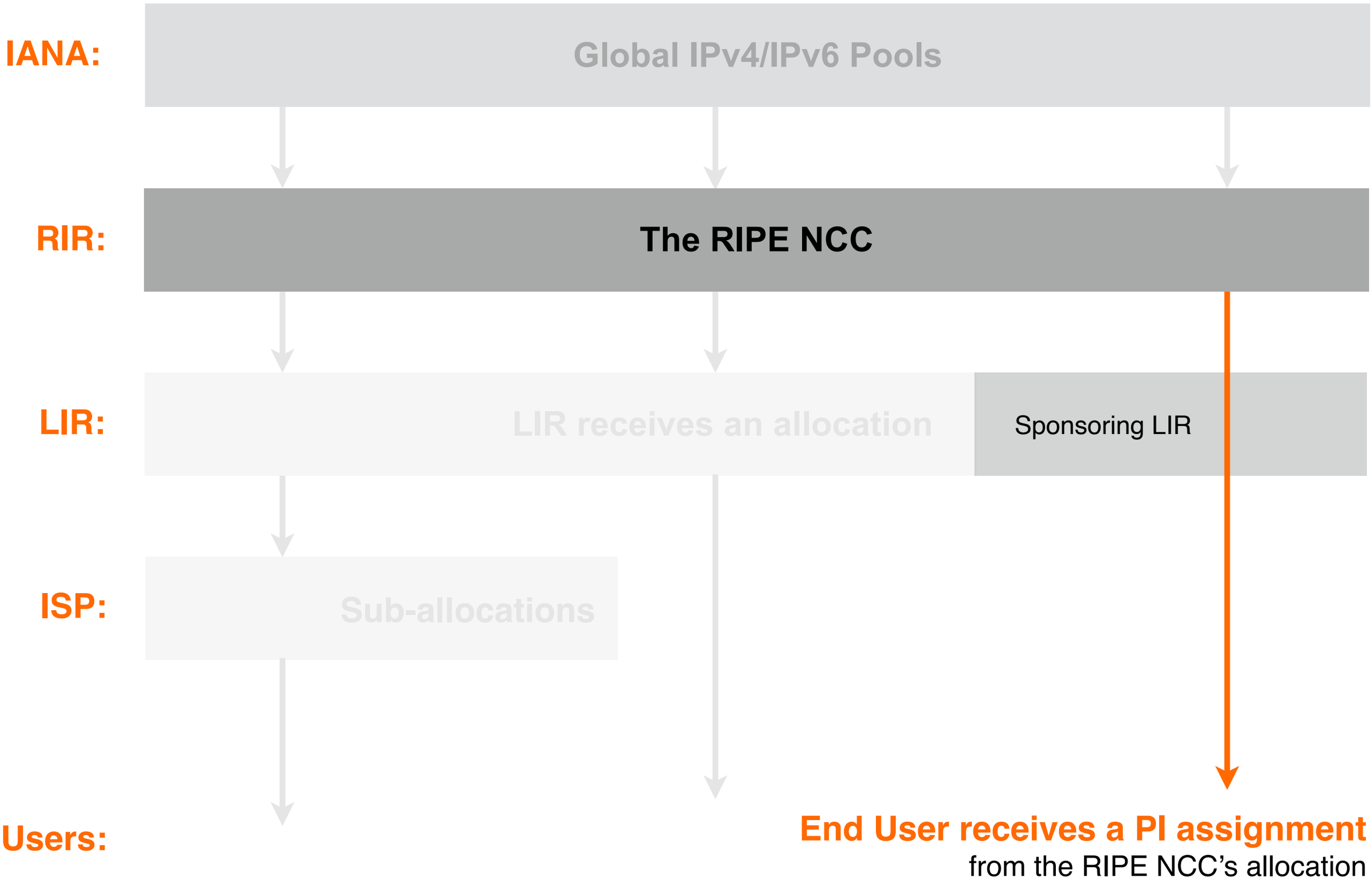
1. Find an ISP which provides public IPs
2. Ask the ISP for a public IP
3. Use it 👍



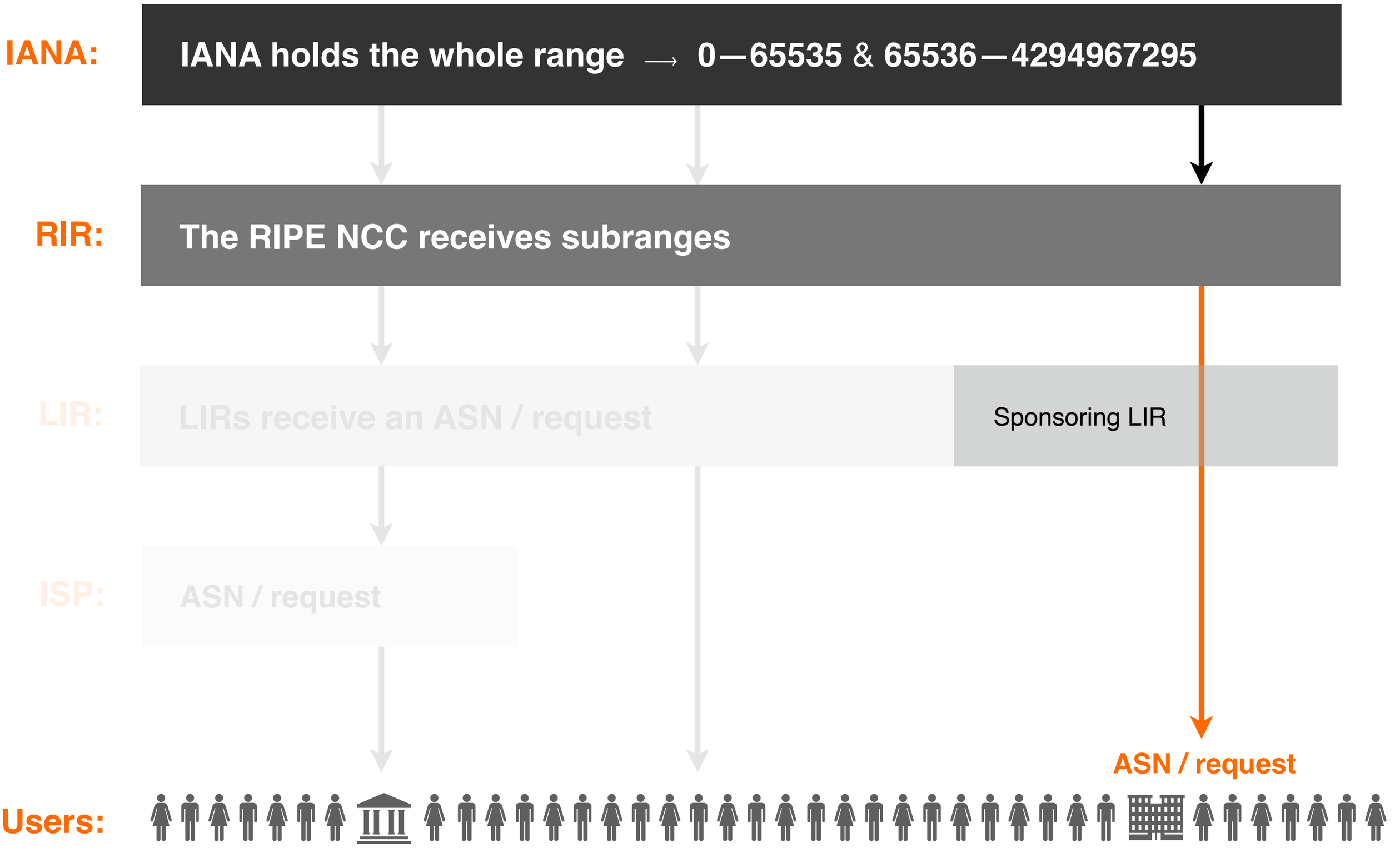
# Behind the scenes…



# Where does PI space come from?



# ASNs: 16-bit and 32-bit

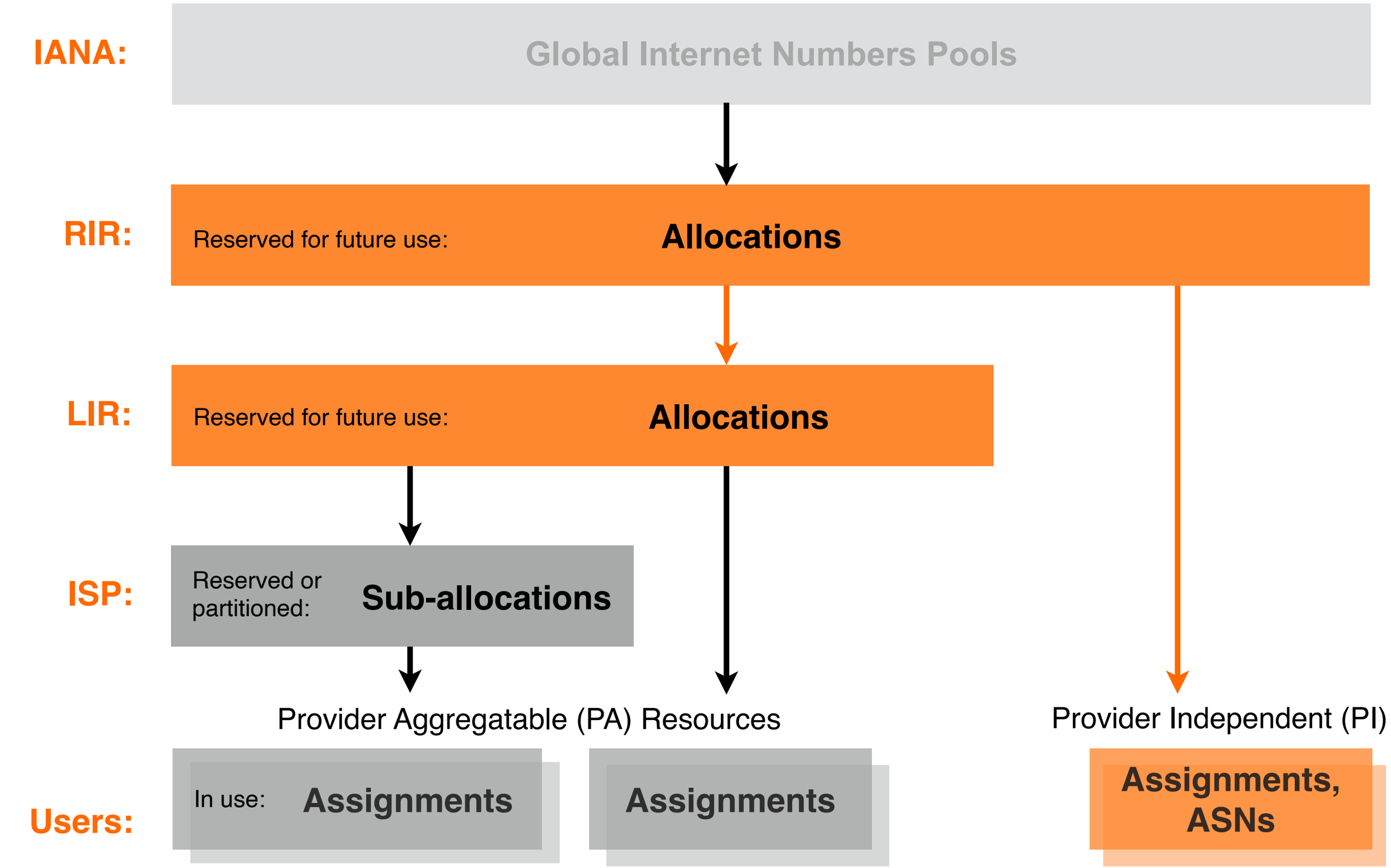


# Questions

# How to get Internet number resources from the RIPE NCC

Section 2 of 5

# The RIPE NCC allocates / assigns:



# The RIPE NCC allocates / assigns:

**To LIR:** **Provider Aggregatable (PA)**:

1. IPv4 allocations
2. IPv6 allocations

**To End Users:** **Provider Independent (PI)**:

4. IPv4 assignments
5. IPv6 assignments
6. ASNs

# The RIPE NCC allocates / assigns:

**To LIR:**

**Provider Aggregatable (PA)**:

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# IPv4 Distribution Timeline

Original policy: **Everybody receives as many addresses as they can justify**

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2011: **IANA allocates the RIPE NCC the last block: 185/8**

# IPv4 Distribution Timeline

Original policy: Everybody receives as many addresses as they can justify

2011: IANA allocates the RIPE NCC the last block: 185/8

2012: **LIRs start receiving allocations from the last new block: 185/8**

New policy: **No more than a single /22 for each new LIR**

# IPv4 Distribution Timeline

| | |
|---|---|
| Original policy: | Everybody receives as many addresses as they can justify |
| 2011: | IANA allocates the RIPE NCC the last block: 185/8 |
| 2012: | LIRs start receiving allocations from the last new block: 185/8 |
| | New policy: No more than a single /22 for each new LIR |
| 2018: | **LIRs start receiving /22 allocations from the recycled space** |
| | Soon continuous /22 are gone; LIRs start receiving /22 allocation equivalents in multiple smaller prefixes (/23—/24) |

# IPv4 Distribution Timeline

| | |
|---|---|
| Original policy: | Everybody receives as many addresses as they can justify |
| 2011: | IANA allocates the RIPE NCC the last block: 185/8 |
| 2012: | LIRs start receiving allocations from the last new block: 185/8 |
| | New policy: No more than a single /22 for each new LIR |
| 2018: | LIRs start receiving /22 allocations from the recycled space |
| November 2019: | An equivalent of /22 can no longer be allocated |
| | New policy: **No more than a single /24 for each new LIR.** |
| | **The waiting list is introduced** |

# Our Reality: The Waiting List

1. Submit the IPv4 allocation request form at the LIR Portal
2. Wait

# Take the poll!

How long do you have to wait for your IPv4 allocation?

2 min.

B5

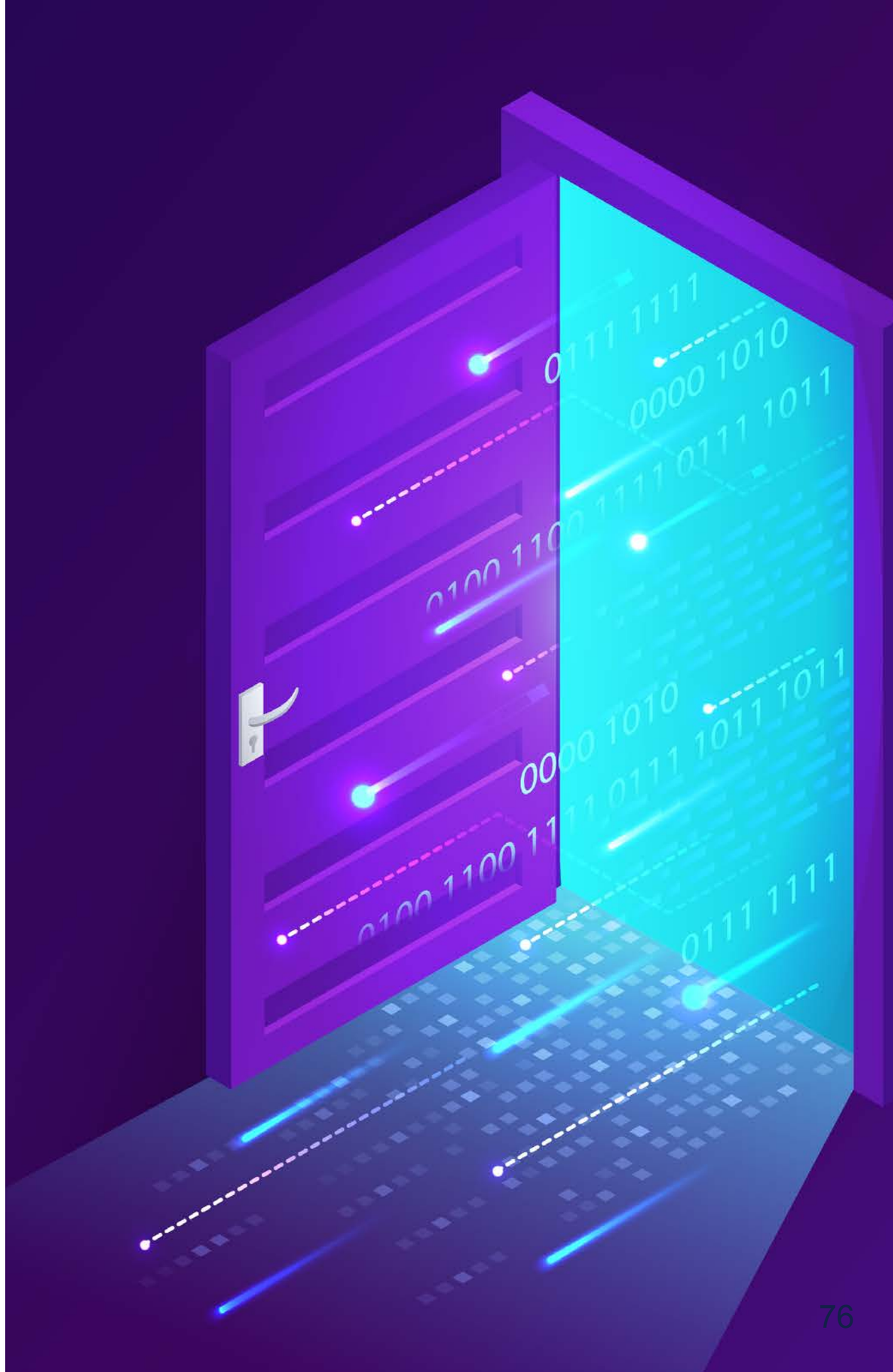
# Our Reality: Limitations

- The waiting list is first-come-first-served
- Each LIR receives only **one /24** block (256 IPv4 addresses)
- IPv4 allocation cannot be transferred for 24 months after receiving it

**The IPv4 waiting list right now:**
https://www.ripe.net/manage-ips-and-asns/ipv4/ipv4-waiting-list

# Let's use IPv6!

- All LIRs can receive as many IPv6 addresses as they can justify
- There are no limitations on the transfer
- There is no waiting list!



# The RIPE NCC allocates / assigns:

**To LIR:**

**Provider Aggregatable (PA)**:

1. IPv4 allocations
2. IPv6 allocations

**To End Users:**

**Provider Independent (PI)**:

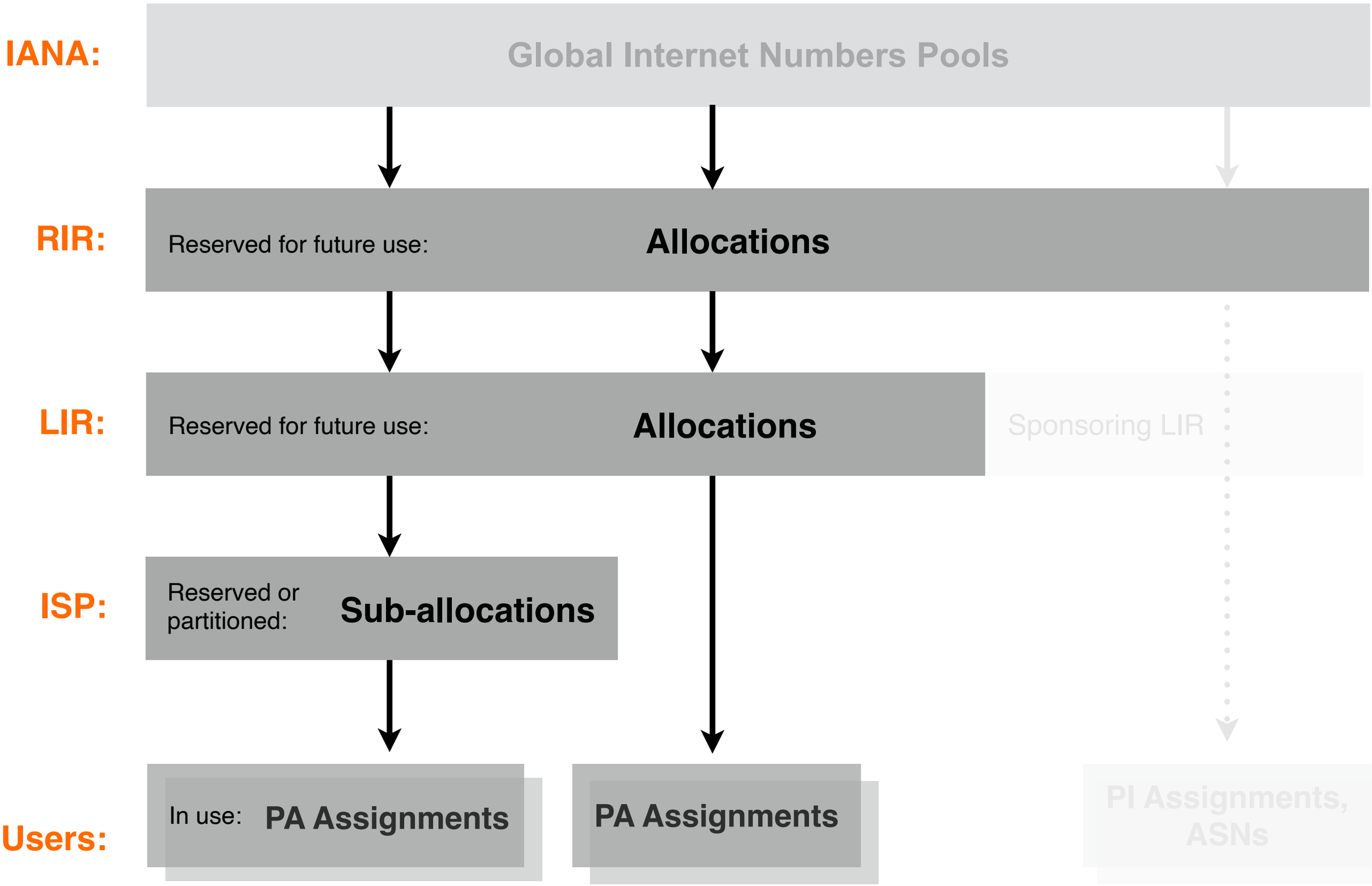
4. IPv4 assignments
5. IPv6 assignments
6. ASNs

# How to request IPv6 addresses..

1. Submit the **IPv6 allocation request form** in the LIR Portal:
    - Have a plan for making assignments within two years
    - Minimum block: /32 (16 millions /56 IPv6 subnets)
    - Maximum block without justification: /29 (134 million /56 IPv6 subnets)
    - But sky’s the limit if the LIR can justify the business need!

2. **Get it approved!**

# Behind the scenes:



# The RIPE NCC allocates / assigns:

**To LIR:**

**Provider Aggregatable (PA):**

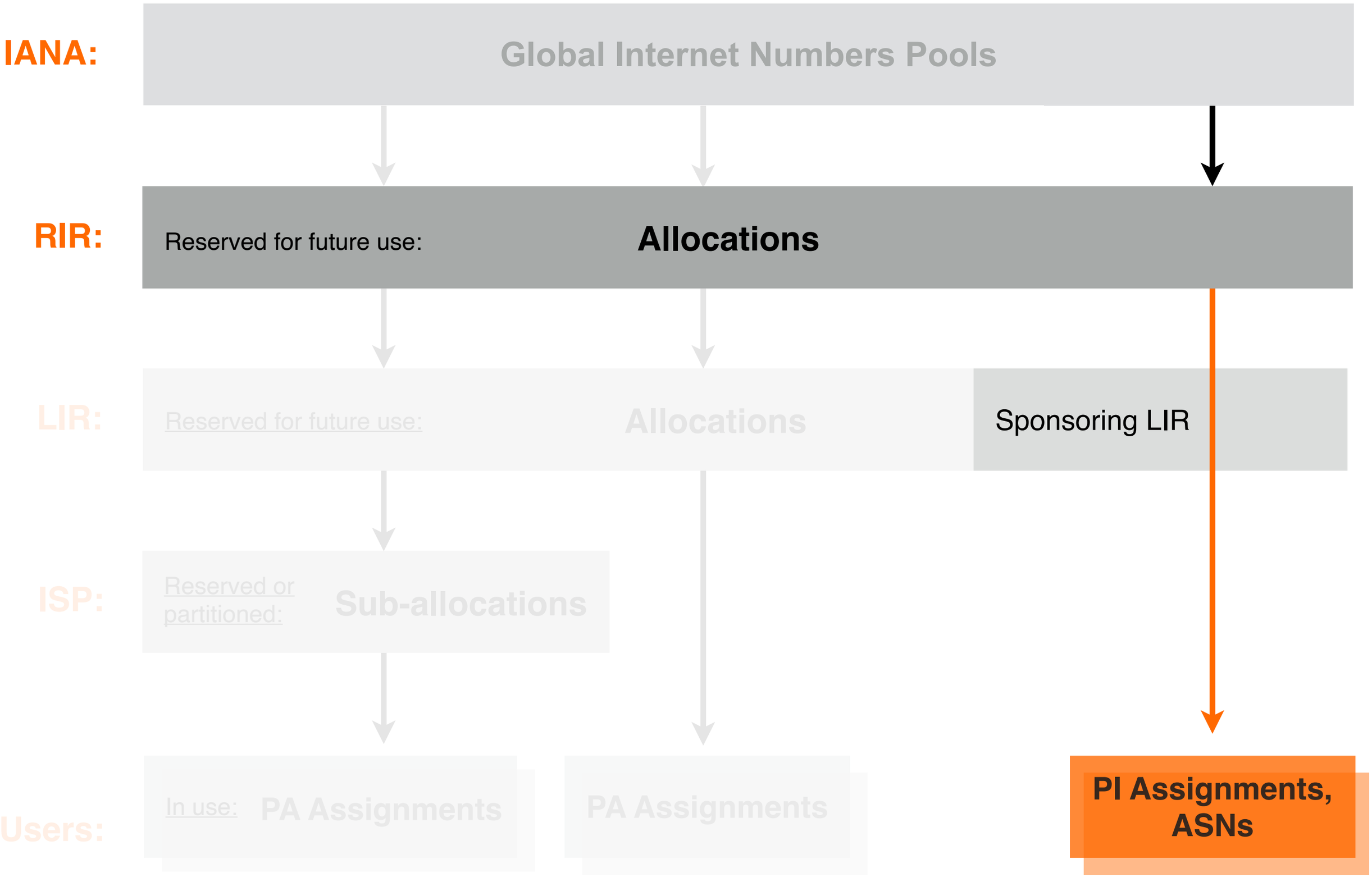
1. IPv4 allocations
2. IPv6 allocations

**To End Users:**

**Provider Independent (PI):**

4. IPv4 assignments
5. IPv6 assignments
6. ASNs

# PI is assigned per User / Network



# 4. IPv4 PI Assignments

## Get it transferred from another resource holder.

# 5. IPv6 PI Assignments

## A sponsoring LIR requests it on behalf of the End User

(min. assignment size: /48)

**How to request PI resources:**
https://www.ripe.net/manage-ips-and-asns/resource-management/number-resources/independent-resources

# 6. ASNs

## A sponsoring LIR requests it on behalf of the End User

(the Network must be multi-homed and have a unique routing policy for each AS)

**ASN Assignment Criteria:**
https://www.ripe.net/publications/docs/ripe-679#AssignmentCriteria

**How to request ASN:**
https://www.ripe.net/manage-ips-and-asns/as-numbers/request-an-as-number

# Questions

# Activity:

RIPE-745 defines the SSA.

https://www.ripe.net/publications/docs/ripe-745

Which article says when the RIPE NCC can close an LIR?

5 min.

B6

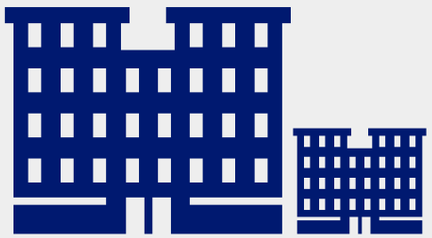
# Let’s take a **5 minute** break!

WELCOME
WE ARE
OPEN
PLEASE COME IN

# How to transfer Internet number resources to/from another LIR

Section 3 of 5

# The General Procedure



The current resource holder

1. Check if the transfer is possible
2. Sign the transfer agreement
3. The current resource holder starts the transfer

The receiving party

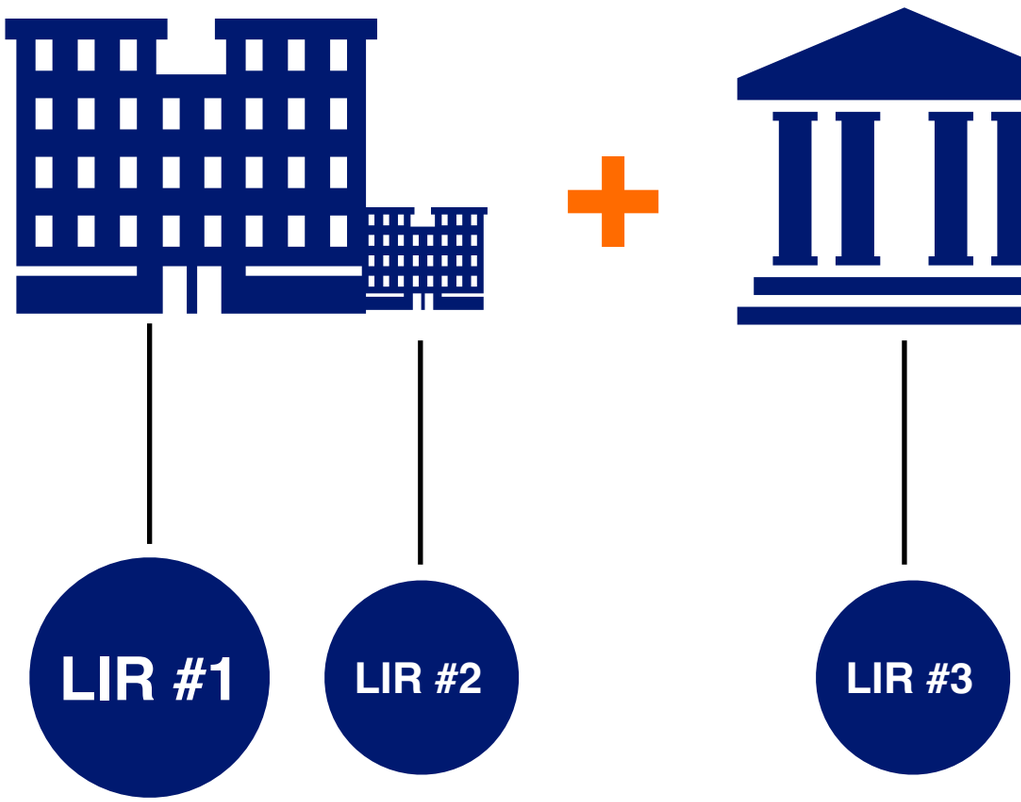
# Take the poll!

In the RIPE NCC region, there is a restriction prohibiting transfers within 24 months since the last transfer/allocation.

**For which resources does this apply?**

2 min.

# Company Mergers/Acquisitions




1. Check the policy if the transfer is possible
2. Transfer the resources to one of the LIRs
3. Close LIRs that you do not need anymore

**How to start a merger/acquisition:**
https://www.ripe.net/manage-ips-and-asns/resource-transfers-and-mergers/mergers-and-acquisitions

# Transfers can be temporary!

- The resource holder can temporary transfer:
  - Allocations / sub-allocations
  - PI assignments & ASNs

- The temporary transfer must have an expiration date

- The restrictions for transfers do not apply upon return

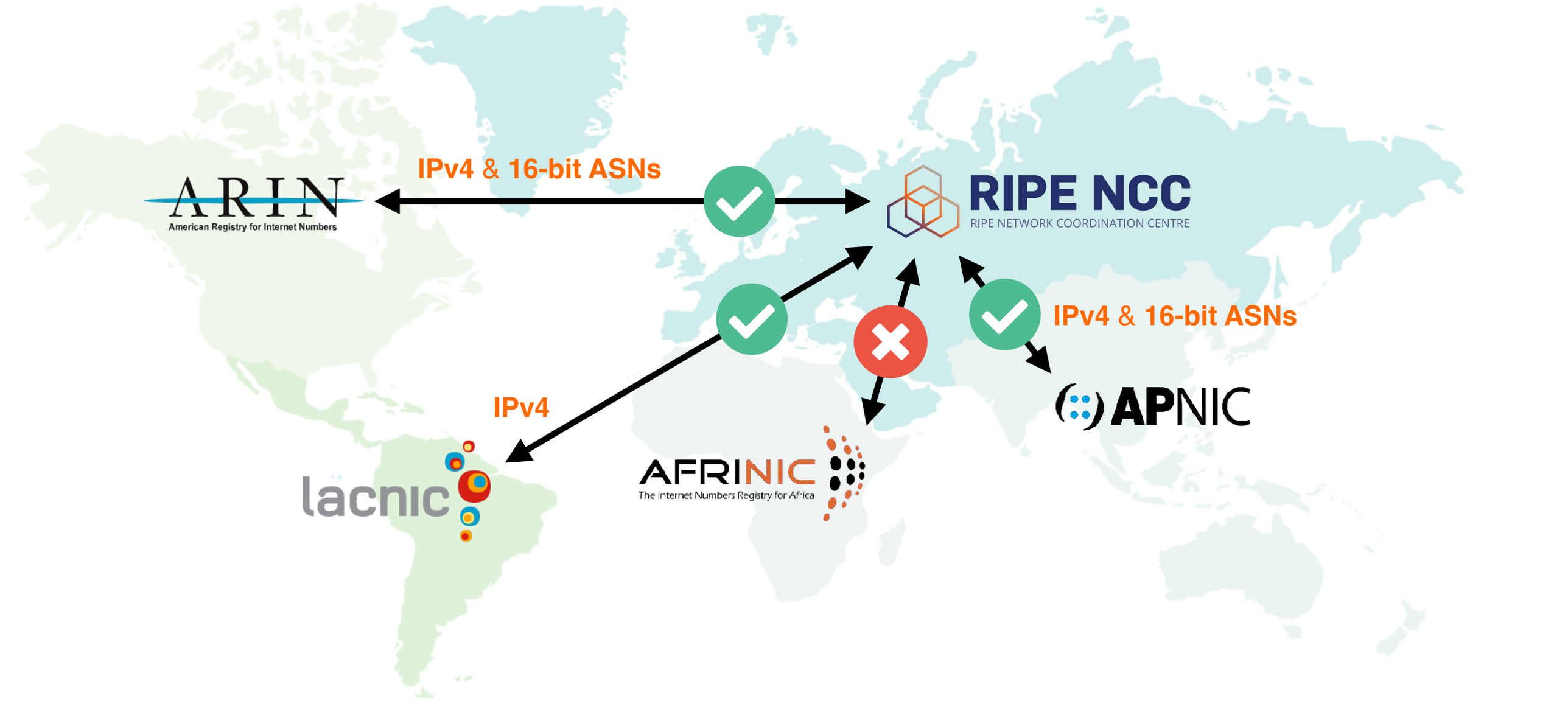
# Can PI resources be transferred?

- The End User name changes → notify the RIPE NCC
- The sponsoring LIR changes → notify the RIPE NCC
- The sponsoring LIR closes → within 20 working days find a new one
- Transfer PI resources to another company/person → submit the transfer request

**The RIPE Policy to check:**
https://www.ripe.net/publications/docs/ripe-757

# Transfers with other RIRs

# Transfers with other RIRs




**Inter-RIR transfers procedure:**
https://www.ripe.net/manage-ips-and-asns/resource-transfers-and-mergers/mergers-and-acquisitions

**To start inter-RIR transfer send request to:** inter-rir@ripe.net

# Questions

# Using the Internet number resources

Section 4 of 5

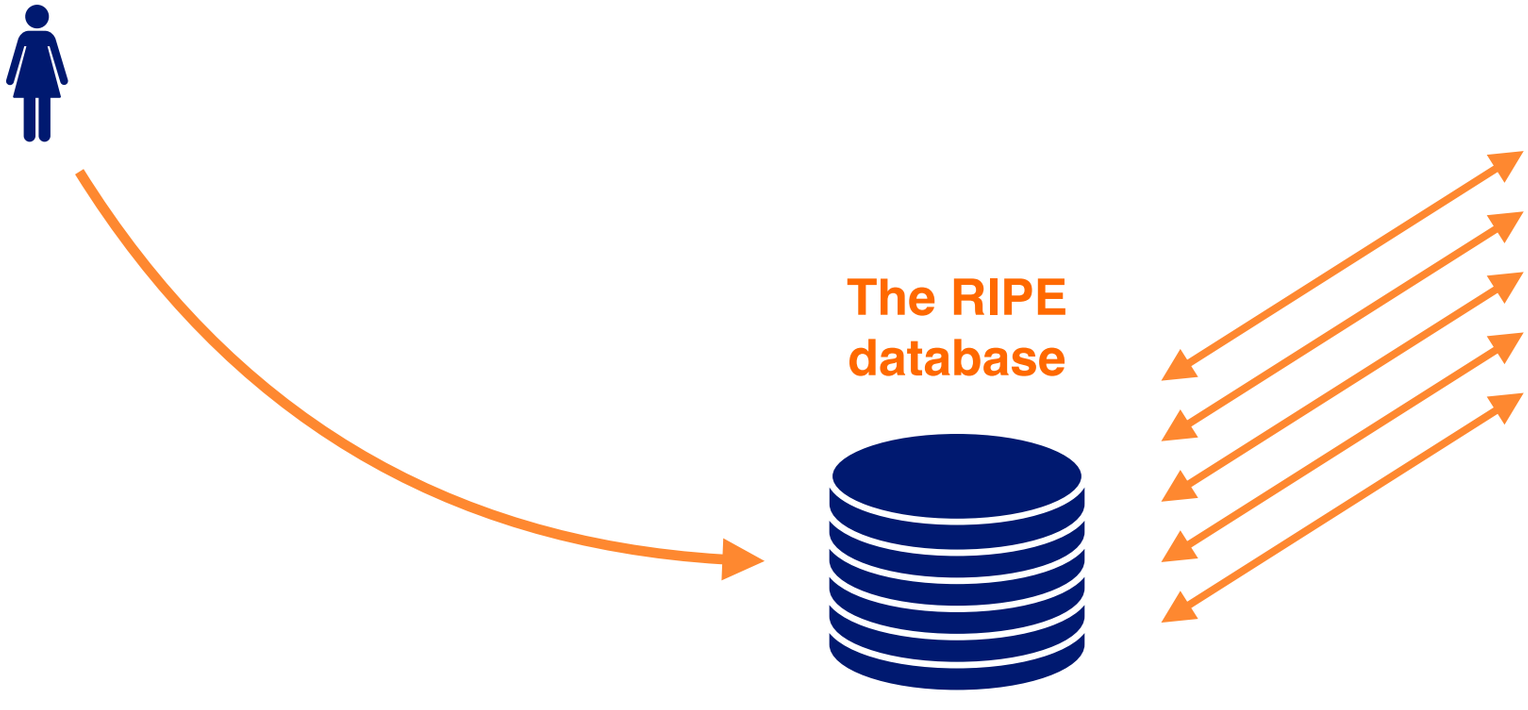
# Must be registered in the RIPE Database!

## Step 1

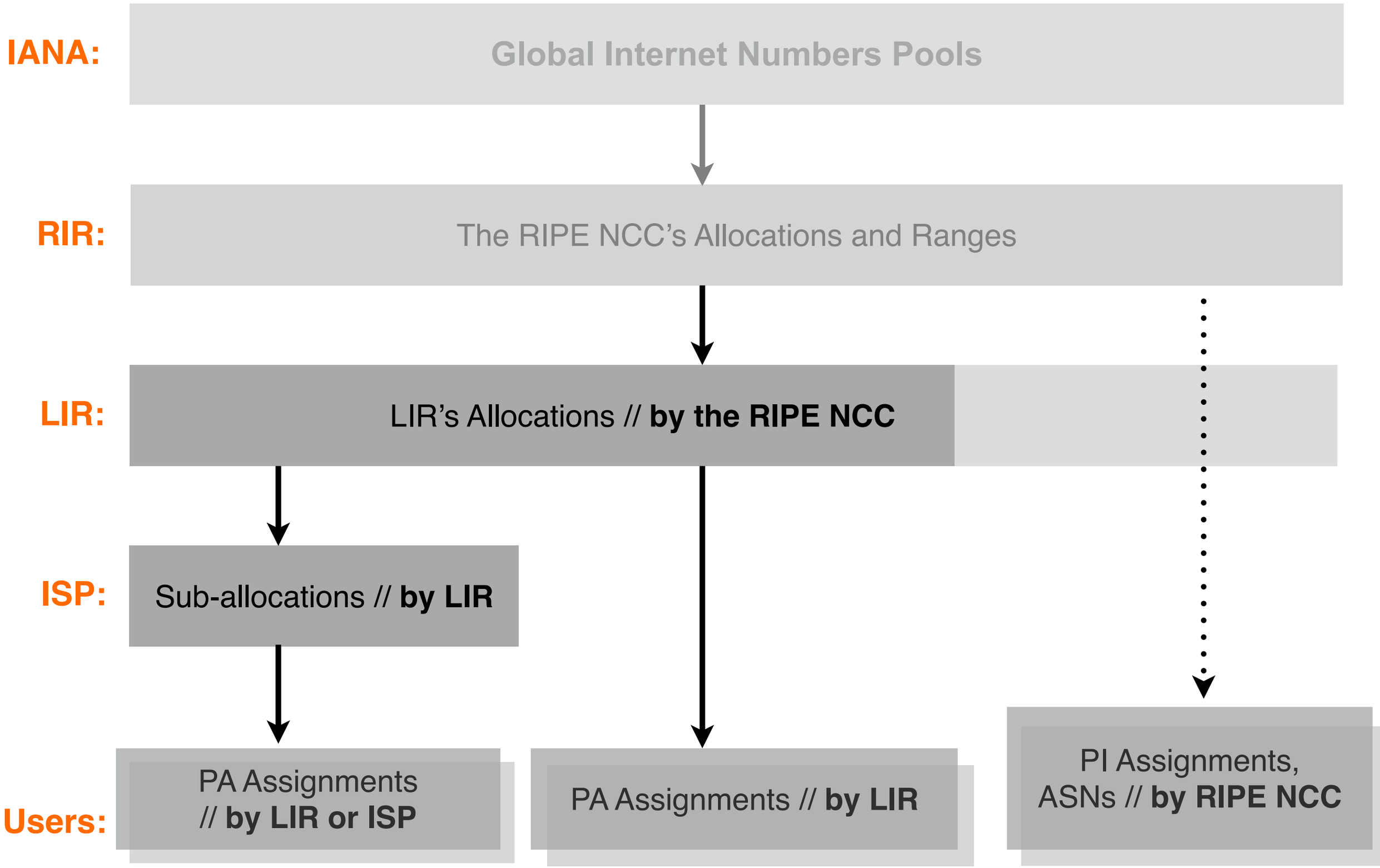
**The legitimate holder** registers all assignments, (sub)-allocations, and ASNs.

## Step 2

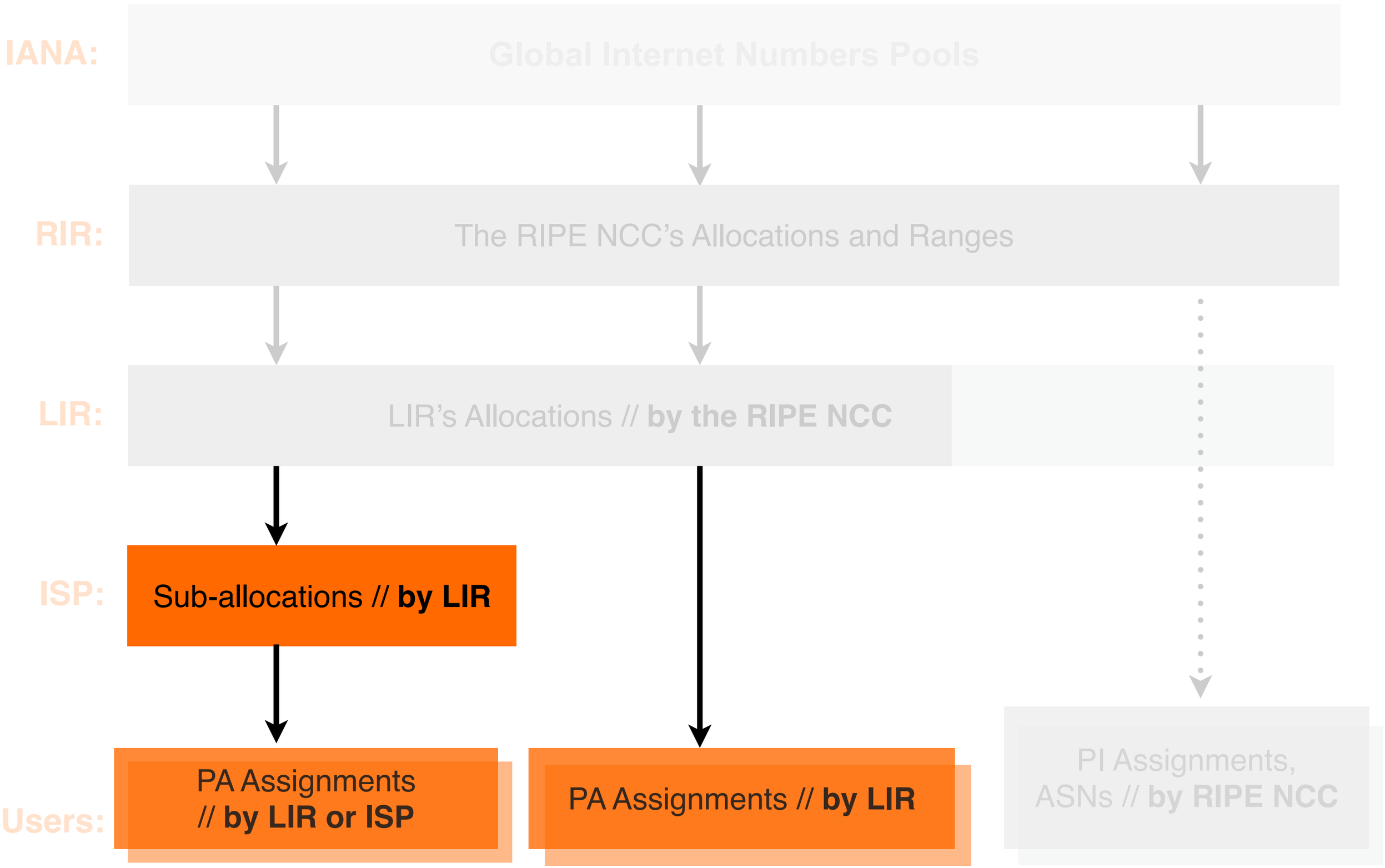
**Other Internet users or ISPs** can query who is the legitimate holder of a resource.



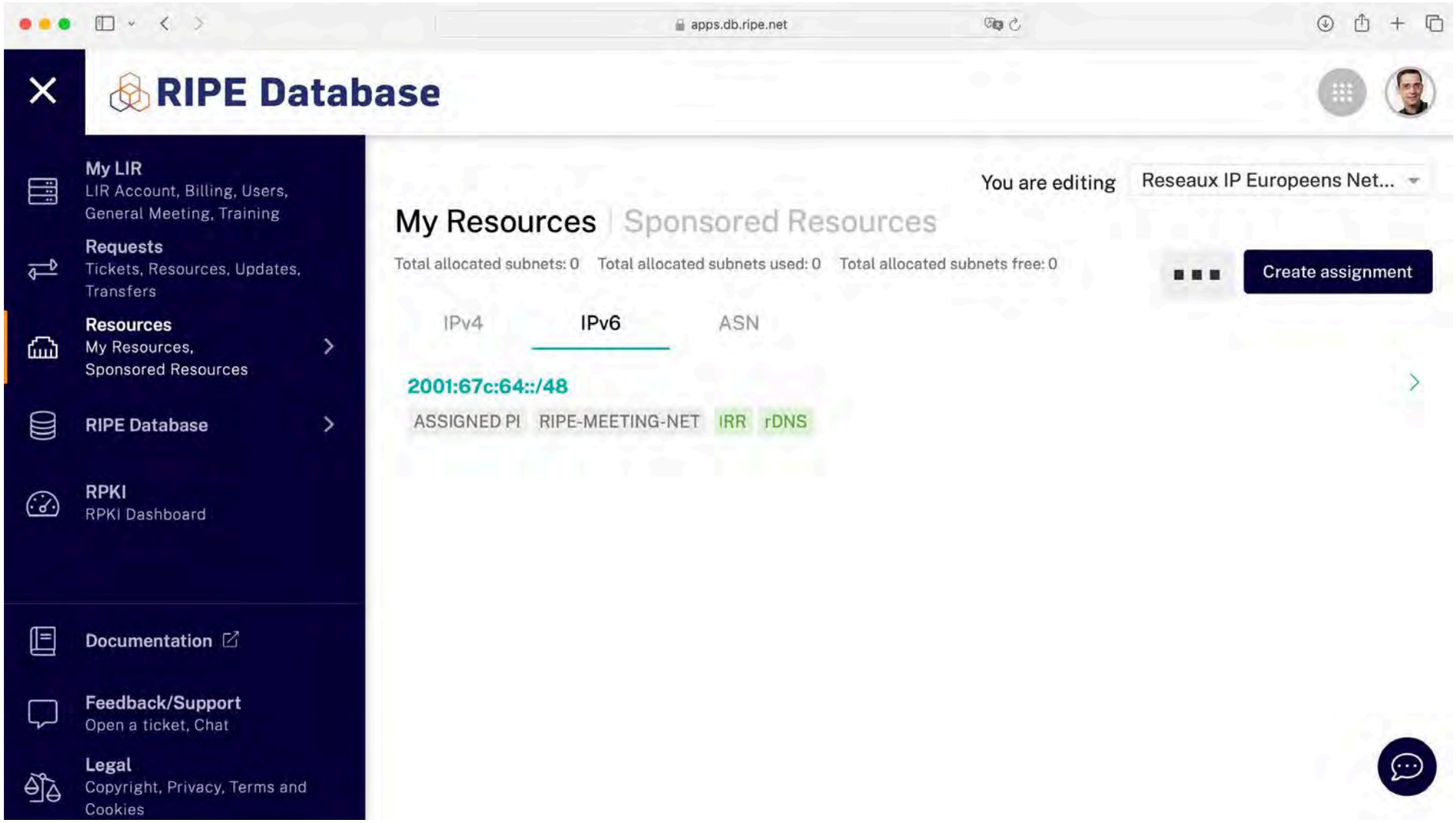
# Who registers what?



# An LIR registers:



# Registering an assignment




*It's in the LIR portal!*

Demo

# Questions

# Tips and Tricks

Section 5 of 5

# It is an Assisted Registry Check!

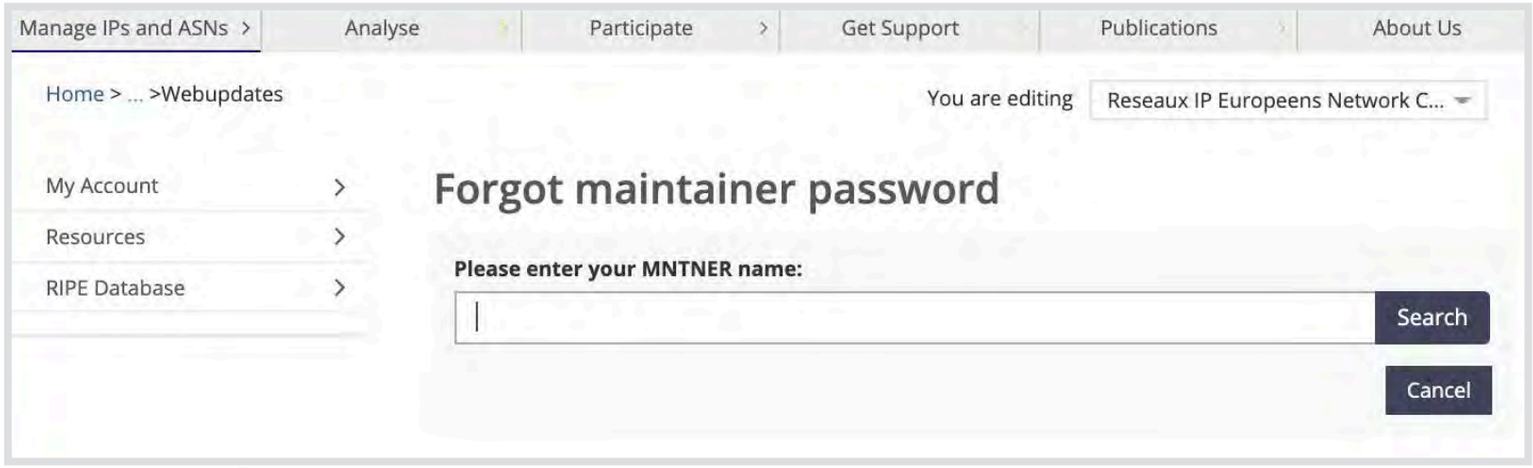
Once in a while, we will reach you to ask how things are and:

1. Remind you that some important information in the LIR portal must be **up-to-date**: legal name, VAT, address, and phone number…

2. Check the allocated resource consistency.

# Lost Maintainer Password

- **Automated recovery**: the link sent to “**upd-to:**” email address

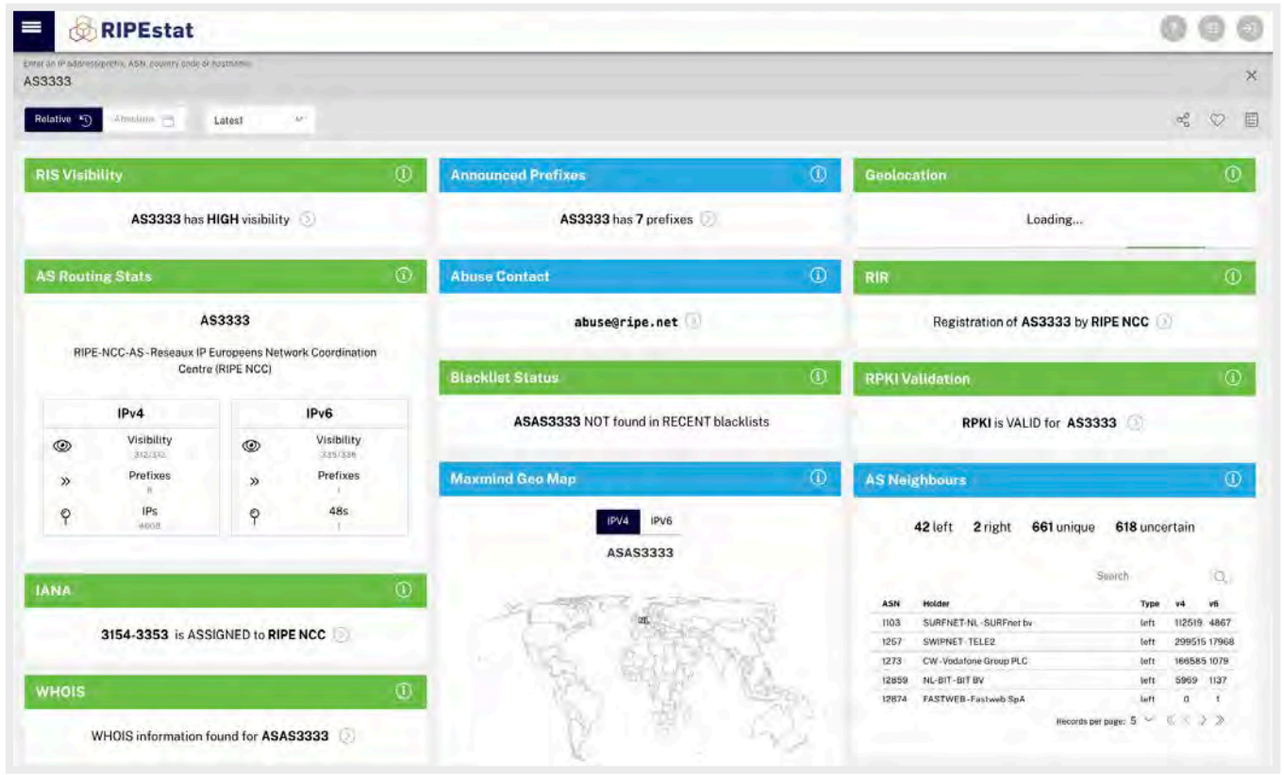



- **Manual recovery:**
  1. Send statement and registration papers to the RIPE NCC
  2. After verification, we will send you an email with the recovery link
  3. We will add your **RIPE NCC Access account** to the maintainer

**To start the password recovery:**
https://apps.db.ripe.net/change-auth/

# RIPEstat

- One-stop-shop for viewing all IP-resource related data from the RIPE NCC




- Registry data, routing, reverse DNS, measurements, and third-party data
- Via web-site widgets, CLI, data API or mobile

**RIPEstat:**

https://stat.ripe.net

# RIPE Atlas: Active Measurements

- Next generation Internet measurement network

  Gives a bigger picture about the Internet traffic

- Currently **12,000+ active probes** worldwide

- User Defined Measurements

  available for LIRs

  ping, traceroute, DNS, SSL

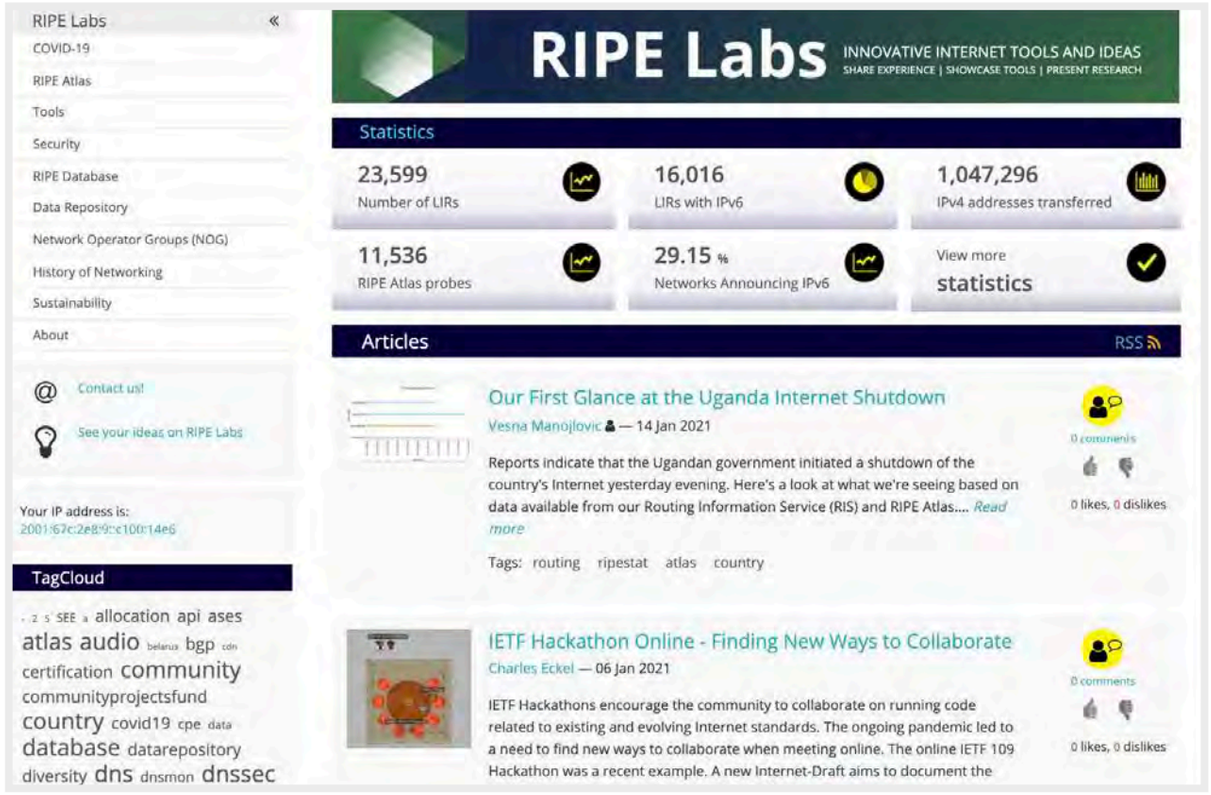
- Set up IPv6 reachability test

Hardware or software

**RIPE Atlas:**
https://atlas.ripe.net

# RIPE Labs

- A place to showcase new and interesting Internet-related developments




- **Anyone** can:
  - Present research
  - Showcase prototype tools
  - Share operational experience
  - Exchange ideas

**RIPE Labs:**

https://labs.ripe.net

# Questions

# What's Next in Internet Registry

## Webinars

**Attend another webinar live wherever you are.**

- LIRs and the Internet Ecosystem (2 hrs)
- LIRs: Managing IP Addresses and ASNs (2 hrs)
- Internet Governance (1 hr)
- Policy Development Process (1 hr)
- Webinar for New LIRs (1 hr)

For more info click the link below

**learning.ripe.net**

## Face-to-face

**Meet us at a location near you for a training session delivered in person.**

- LIR (8.5 hrs)
- RIPE Database (8.5 hrs)

## E-learning

**Learn at your own pace at our online Academy.**

- Internet Governance (3 hrs)
- RIPE Database (16 hrs)

For more info click the link below

**academy.ripe.net**

## Examinations

**Learnt everything you needed? Get certified!**

- RIPE Database Associate

For more info click the link below

**getcertified.ripe.net**

# We want your feedback!

What did you think about this session?

Take our survey at:
https://www.ripe.net/feedback/lir2/

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**https://getcertified.ripe.net/**

# Do not hesitate to contact me!

RIPE Labs

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Articles 3 Newest

## RIPE NCC Engagement with Ukraine During the War

Alex Semenyaka • 19 Oct 2022 • 7 min read

Since the beginning of the war in Ukraine, the RIPE NCC has been carrying out a number of initiatives to help keep the country's Internet stable. In this article, we share information on these activities and what steps might be taken in the future.

ripe events country community 31 0

## RPKI Training for Ukrainian Network Operators

Alex Semenyaka • 7 Jun 2022 • 3 min read

The RIPE NCC held online BGP Security training for Ukrainian telecom operators on 6 April. The training was delivered in English with translation into Ukrainian. In this article, we talk about the motivation for providing this particular kind of training and share the full recording.

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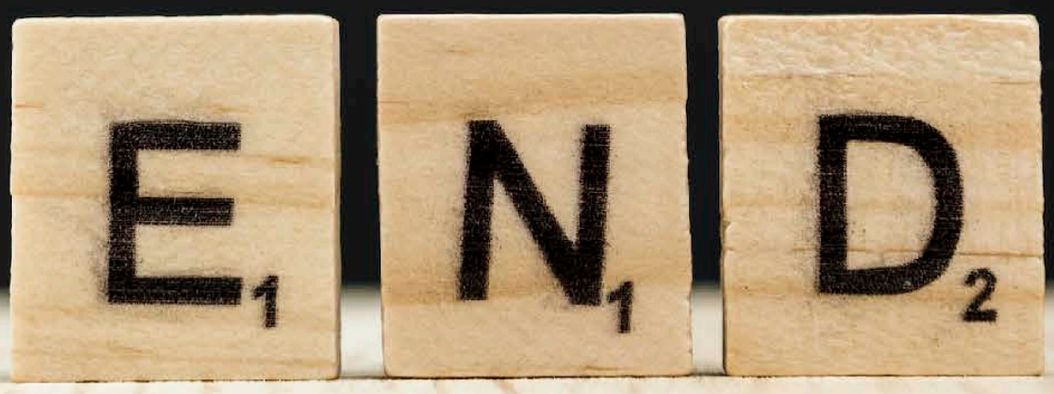

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