

**Hello and welcome!**

You will need a **RIPE NCC Access** account for the exercises in today's course.

If you don't have one, go to <https://access.ripe.net/registration>





**RIPE NCC**

RIPE NETWORK COORDINATION CENTRE

# Local Internet Registry Fundamentals

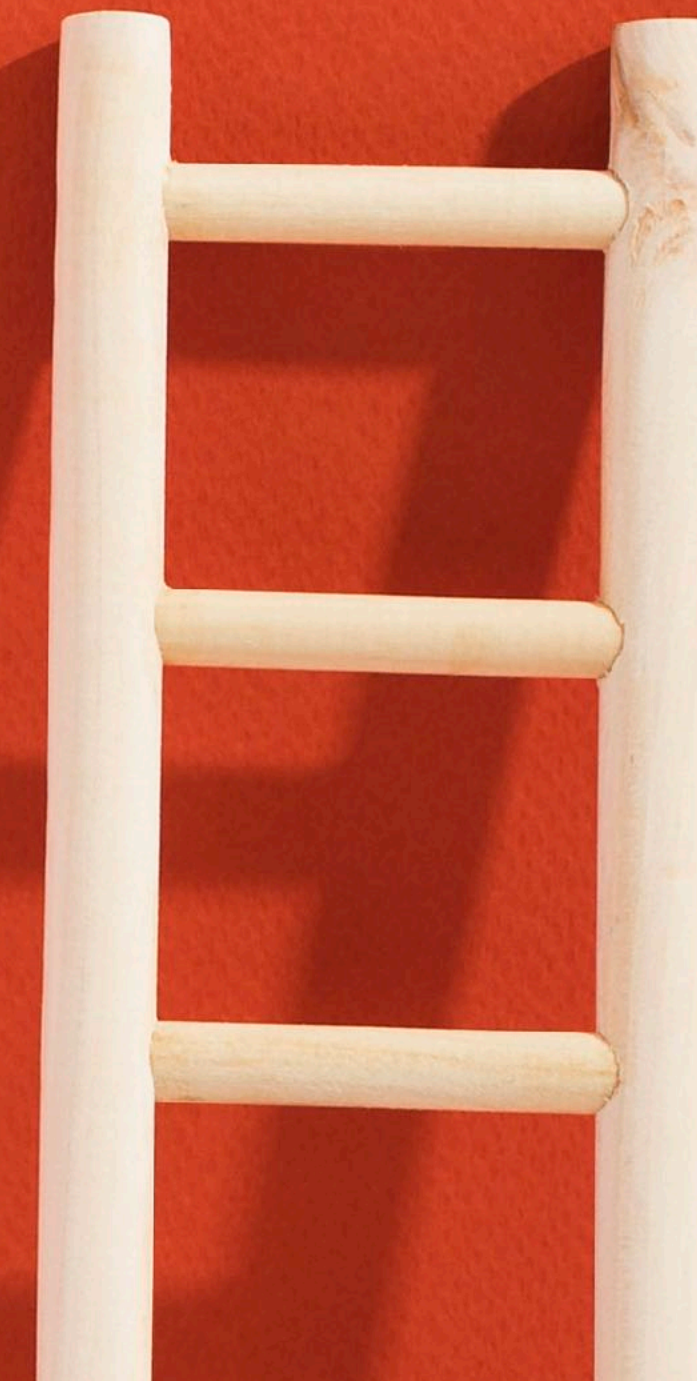
**In-person training**

**RIPE NCC Learning & Development**

Version 2026-01-04

# Goals

- **Explain** how the Internet Registry system works to coordinate the distribution of Internet number resources
- **Perform** the main roles and responsibilities of LIRs
- **Identify** the ways LIRs can participate in the RIPE community



# Agenda

## Understanding the Internet Ecosystem

- Distribution Hierarchy
- RIPE NCC and RIPE
- RIPE Policies
- RIPE NCC Access, LIR Portal and RIPE Database

## All About Internet Number Resources

- Types of Resources
- Requesting for Resources for Your Type of Needs
- Making and Registering Assignments in the RIPE Database
- Sponsoring Resources
- Transferring Resources
- Maintaining and Updating Information

## Finding Help and Support

- Developing Policies
- Assisted Registry Checks (ARC)
- Meetings
- Tools and Services

# Agenda

0900 - 0930

Coffee & Tea

**0930 - 1100**

**Understanding the Internet Ecosystem**

1100 - 1130

Break

**1130 - 1300**

**All About Resources: Part 1**

1300 - 1400

Lunch

**1400 - 1530**

**All About Resources: Part 2**

1530 - 1600

Break

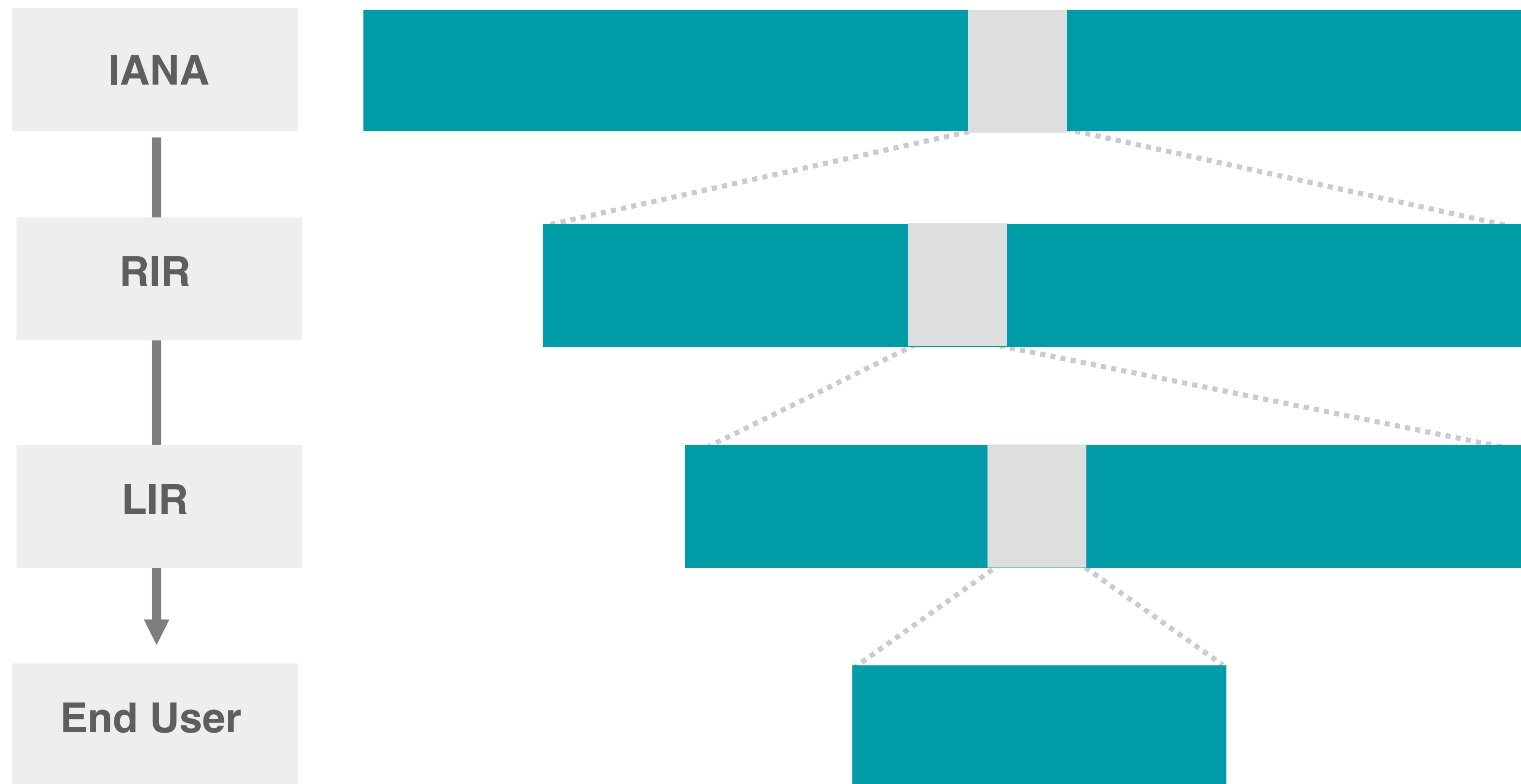
**1600 - 1730**

**Finding Help and Support**



# Understanding the Internet Ecosystem

The Distribution Hierarchy





**ARIN**

**LACNIC**

**AFRINIC**

**RIPE NCC**

**APNIC**



**What do RIRs across the world share?**



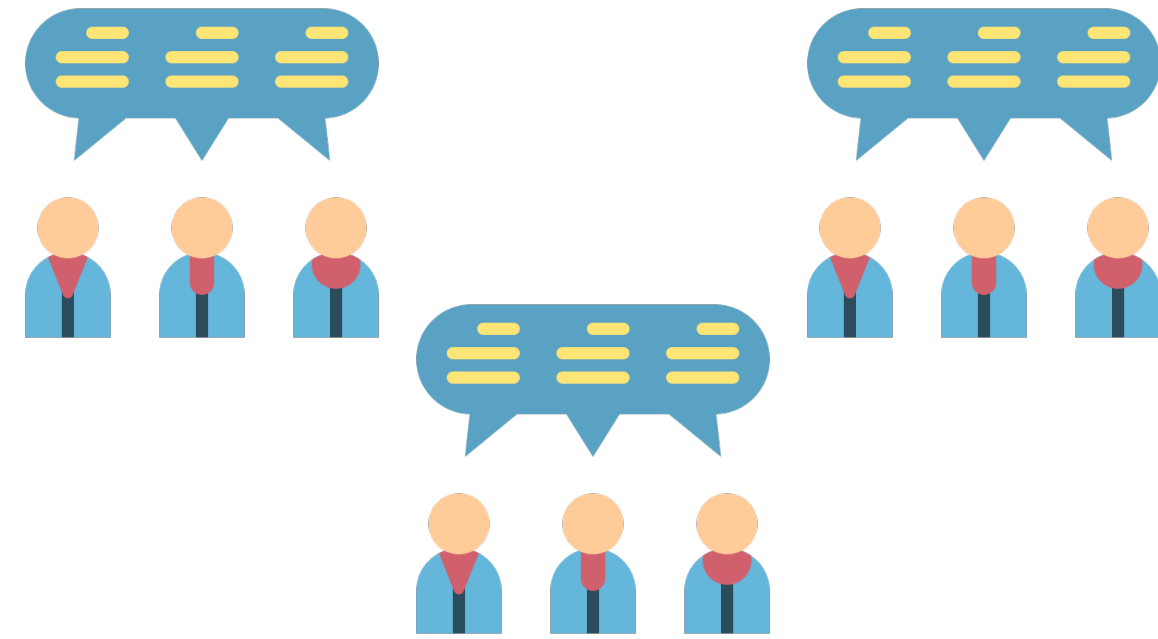
**RIRs are:**

- Not-for-profit
- Funded by membership fees
- Operating based on policies decided by their Internet community
- Neutral, Impartial, Open and Transparent



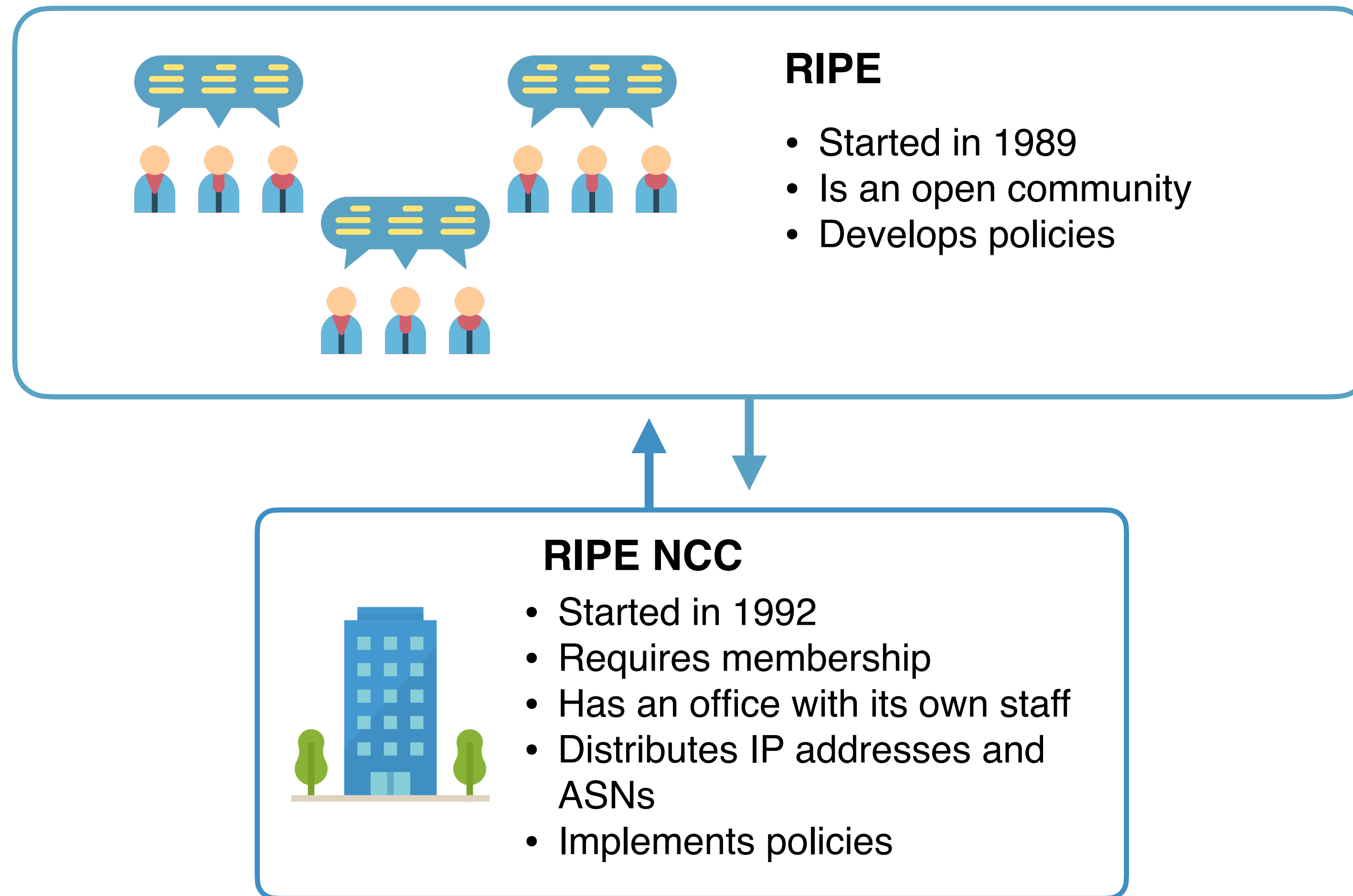
# Understanding the Internet Ecosystem

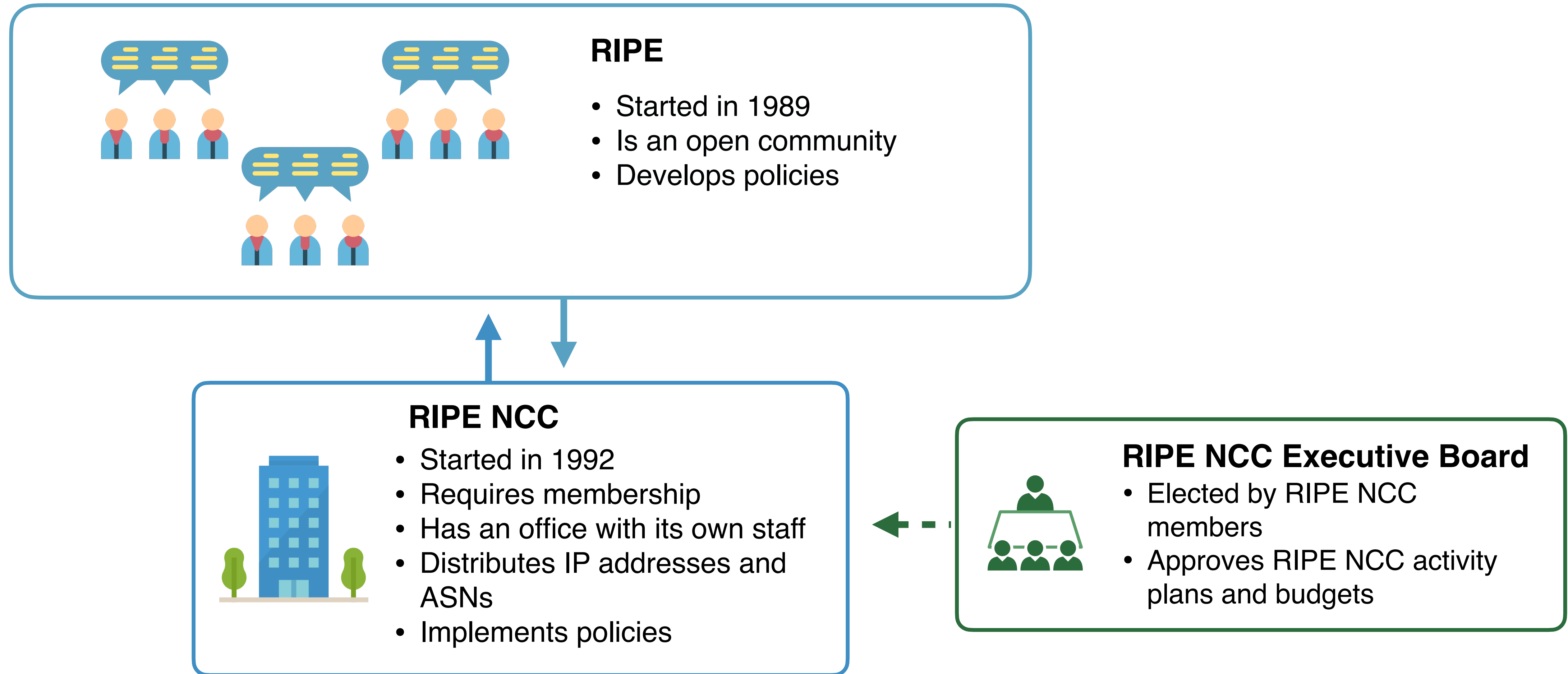
RIPE and the RIPE NCC



### **RIPE**

- Started in 1989
- Is an open community
- Develops policies







## Quiz

### How does RIPE differ from RIPE NCC?

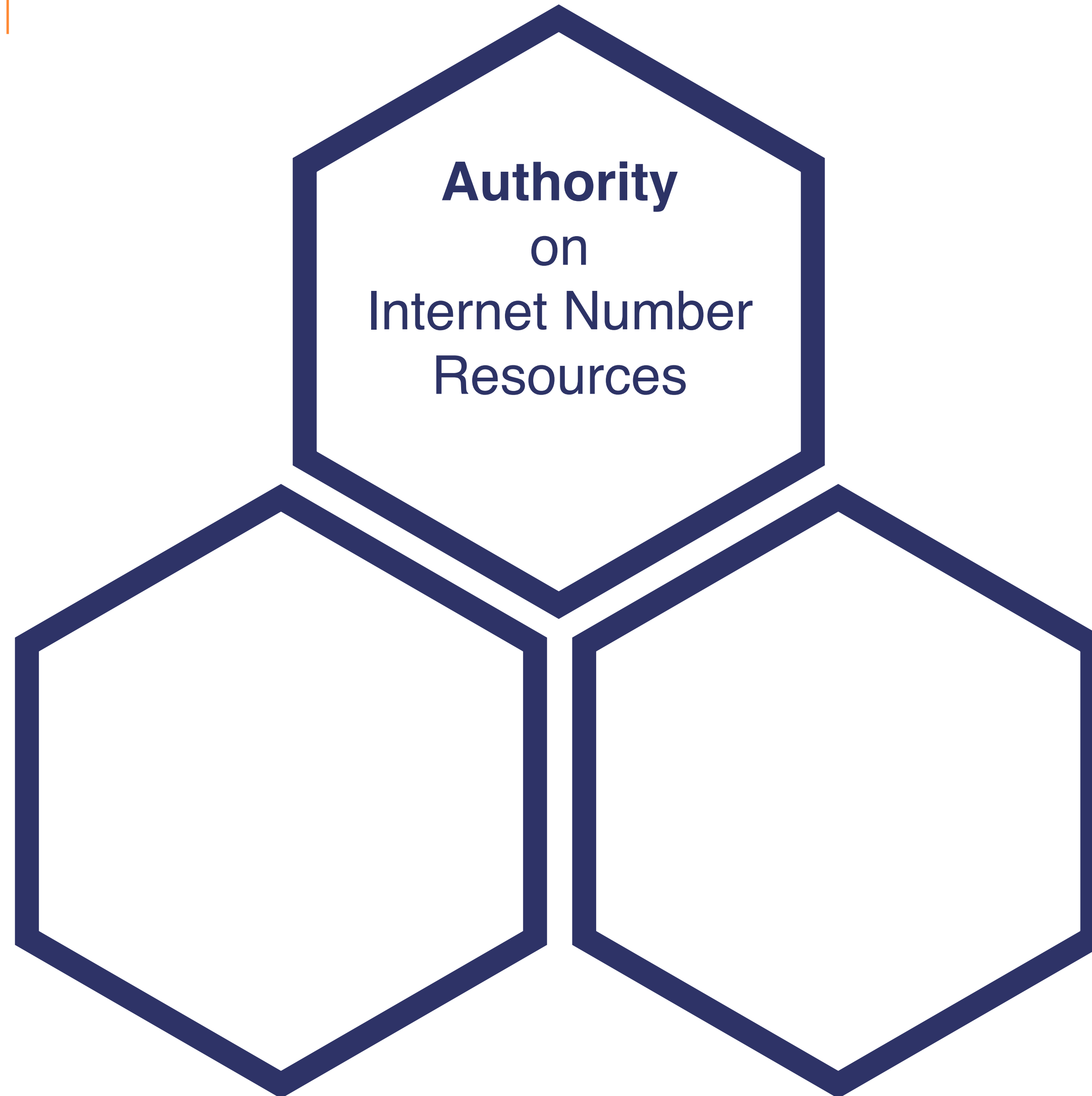
- A) RIPE is responsible for allocating IP addresses and ASNs to LIRs.
- B) RIPE NCC is an open forum for network operators, while RIPE is a Regional Internet Registry (RIR).
- C) RIPE is a community that develops policies, while RIPE NCC implements and enforces these policies.
- D) RIPE is an organisation with full-time staff, whereas RIPE NCC is a community open to all interested parties.



## Quiz

### How does RIPE differ from RIPE NCC?

- A) RIPE is responsible for allocating IP addresses and ASNs to LIRs.
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- C) RIPE is a community that develops policies, while RIPE NCC implements and enforces these policies.**
- D) RIPE is an organisation with full-time staff, whereas RIPE NCC is a community open to all interested parties.









# Understanding the Internet Ecosystem

RIPE Policies

## What are policies?

RIPE Policies decide the rules which LIRs and their End Users have to follow.



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### Why do policies exist?

Policies reflect how the community wants to govern the Internet.



### What are policies?

RIPE Policies decide the rules which LIRs and their End Users have to follow.

### Why do policies exist?

Policies reflect how the community wants to govern the Internet.

### Where can I find these policies?

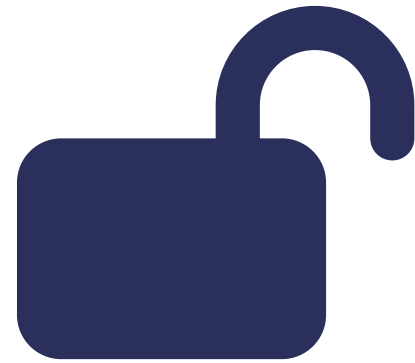
You can find all current implemented policies at our [website](#).





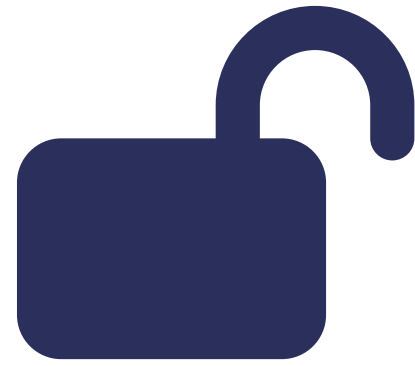
# Understanding the Internet Ecosystem

RIPE NCC Access, LIR Portal and RIPE Database



## **RIPE NCC Access**

Single-Sign-On (SSO)  
account you use to  
access the LIR Portal,  
and the RIPE Database



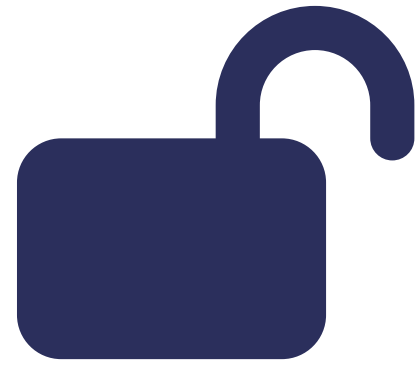
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## LIR Portal

a centralised portal where  
you can manage everything  
to do with your LIR



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## LIR Portal

a centralised portal where  
you can manage everything  
to do with your LIR



## RIPE Database

a registry containing  
information about Internet  
resources and how they  
are used



LIR Portal

**Admin**

Can do all possible actions in the LIR portal. There should be at least one admin user in each LIR account.



LIR Portal

**Admin**

Can do all possible actions in the LIR portal. There should be at least one admin user in each LIR account.

**Regular**

Can do all possible actions in the LIR portal except managing user accounts and creating API keys.



LIR Portal

**Admin**

Can do all possible actions in the LIR portal. There should be at least one admin user in each LIR account.

**Regular**

Can do all possible actions in the LIR portal except managing user accounts and creating API keys.

**Billing**

A billing user can only see and update the billing section of the LIR portal. We recommend creating a billing user so you can provide access to the billing information to the finance department, for example.



LIR Portal

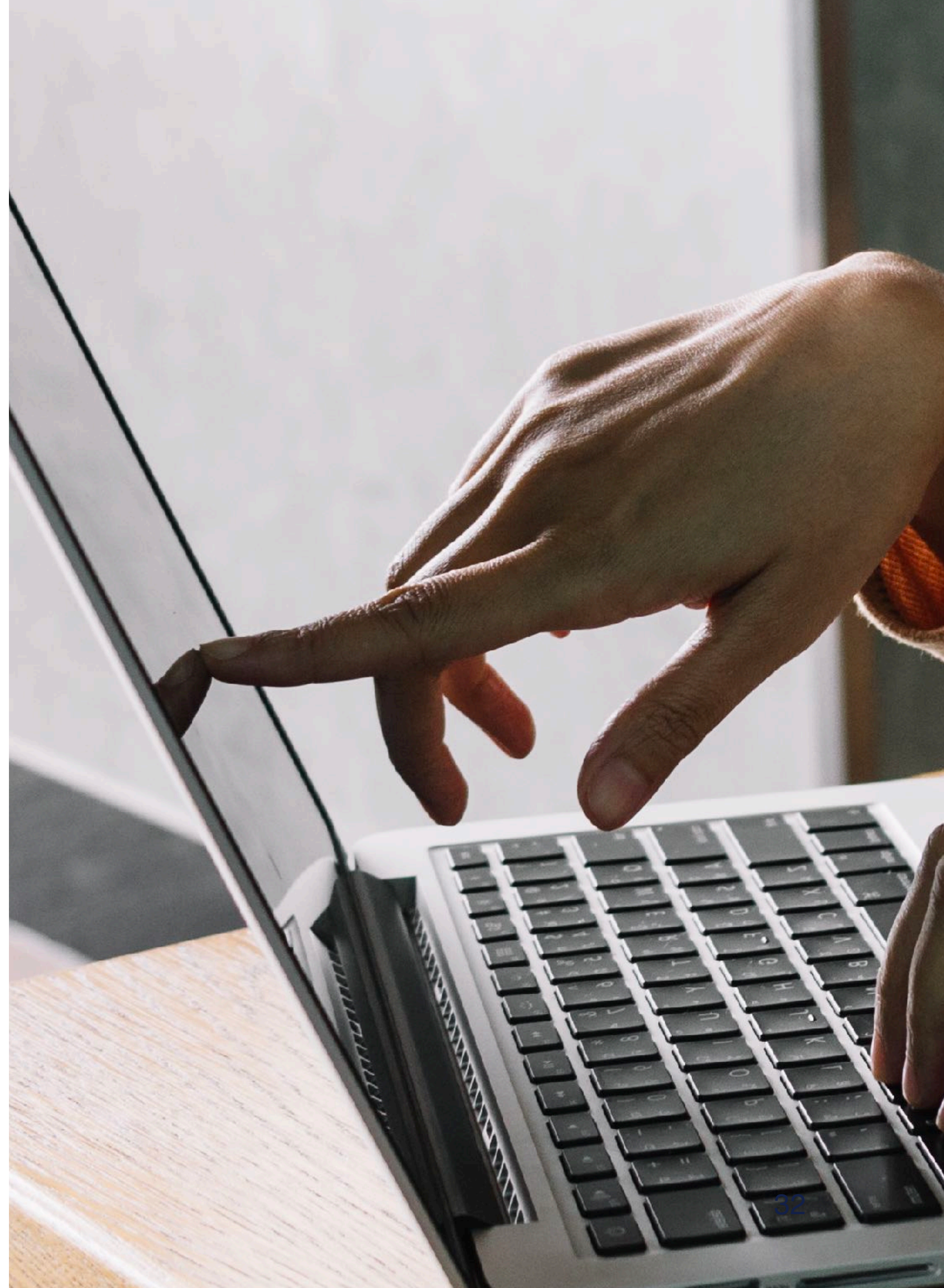
<b>Admin</b>	Can do all possible actions in the LIR portal. There should be at least one admin user in each LIR account.
<b>Regular</b>	Can do all possible actions in the LIR portal except managing user accounts and creating API keys.
<b>Billing</b>	A billing user can only see and update the billing section of the LIR portal. We recommend creating a billing user so you can provide access to the billing information to the finance department, for example.



Decreasing rights

# Demo

Let's take a look at the **LIR Portal**.





## RIPE Database

- What is the RIPE Database?
- Why do we have the RIPE Database?
- What **information** can I find there?
- What do I need to do before I can **add or edit** information in there?



## **What is the RIPE Database?**

A registry containing information about Internet resources and how they are used



## **Why do we have the RIPE Database?**

It tells people who is responsible for an IP address, domain or network

**Contact Information**

**Resources**

**Routing**

**Reverse Delegation**

**Security**

**Contact Information**

**organisation**

**person**

**role**

Resources

Routing

Reverse Delegation

Security

Contact Information

**Resources**

Routing

Reverse Delegation

Security

inetnum

inet6num

aut-num

Contact Information

Resources

**Routing**

Reverse Delegation

Security

route

route6

as-set



Contact Information

Resources

Routing

**Reverse Delegation**

Security

domain



Contact Information

Resources

Routing

Reverse Delegation

**Security**

**mntner**



**Contact Information**

**organisation** ★

**person**

**role** ★

**Resources**

**inetnum**

**inet6num**

**aut-num**

**Routing**

**route**

**route6**

**as-set**

**Reverse Delegation**

**domain**

**Security**

**mntner** ★



## Activity 0

Associating your SSO to your maintainer

# Demo

Let's take a look at the **Test RIPE Database**.



**RIPE Database** | LIR Portal | Resources | **RIPE Database** | RPKI | RIPEstat | RIPE Atlas | More services

Test Database

Query Database  
Full Text Search  
Syncupdates  
Create an Object  
API Keys  
Test Database

**Welcome to the TEST Environment of the RIPE Database.**  
You can use this environment to learn and experiment with RIPE Database. It uses a TEST source and all changes are reverted each night.

You are editing: Reseaux IP Europeens Network

### TEST Database Query

Enter a search term

By submitting this form you explicitly express your agreement with the [RIPE Database Terms and Conditions](#)

#### Querying the TEST Database

You can query the RIPE Database via the web interface, the RESTful API or a command line tool. Learn more about each option by clicking the link below.

[Go to documentation](#)

#### RESTful API

The RESTful API can only process one object at a time. If you want to process several objects simultaneously, you need to write a script on the client side to handle the list of objects and feed them.

[Go to documentation](#)

#### RIPE Database

TEST environment is to learn and experiment with RIPE Database and all changes are reverted in the night. Switch to RIPE Database for live action.

[Go to RIPE Database](#)

#### Does your CV show your RIPE Database expertise?

Do you use the RIPE Database regularly as a researching and data registration tool? You can earn a verifiable digital badge that certifies your skills and expertise in using RIPE Database. RIPE NCC members can use exam vouchers to schedule an exam and get certified!

[Find out more](#)

Documentation  
Legal  
Feedback/Support

**RIPE Database** | LIR Portal | Resources | **RIPE Database** | RPKI | RIPEstat | RIPE Atlas | More services

Test Database

Query Database | Full Text Search | Syncupdates | Create an Object | API Keys | Test Database

Documentation | Legal | Feedback/Support

**Welcome to the TEST Environment of the RIPE Database.**  
You can use this environment to learn and experiment with RIPE Database. It uses a TEST source and all changes are reverted each night.

You are editing **Reseaux IP Europeens Network**

### TEST Database Query

jean blue

Types | Hierarchy flags | Inverse lookup | Advanced filter (1)

By submitting this form you explicitly express your agreement with the [RIPE Database Terms and Conditions](#)

### Search results

This is the RIPE Database search service. The objects are in RPSL format. The RIPE Database is subject to [Terms and Conditions](#).

```
person:      Jean Blue
address:     Long Street 123
address:     76543 Big City
phone:       +99 10 876 5432
nic-hdl:     JB1-TEST
mnt-by:      SM1-MNT
created:     2002-04-08T12:43:46Z
last-modified: 2022-06-01T13:15:13Z
source:      TEST# Filtered
```

Attributes	Values
person:	Jean Blue
address:	Long Street 123
address:	76543 Big City
e-mail:	j.blue@sandbox.inc
contact:	<a href="https://wa/319876542">https://wa/319876542</a>
nic-hdl:	JB0123-RIPE
mnt-by:	SECURITY-MNT
created:	2019-08-13T07:45:21Z
last-modified:	2019-08-13T11:39:11Z
source:	RIPE



## Activity 1

Look up an object template on the (Test) RIPE Database



## Activity 2

Look up information in the (Test) RIPE Database

# Agenda

## Understanding the Internet Ecosystem

- Distribution Hierarchy
- RIPE NCC and RIPE
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## All About Internet Number Resources

- Types of Resources You Can Request for
- Making Assignments to End Users: Considerations
- Registering Assignments in the RIPE Database
- Sponsoring Resources
- Transferring Resources
- Maintaining and Updating Information

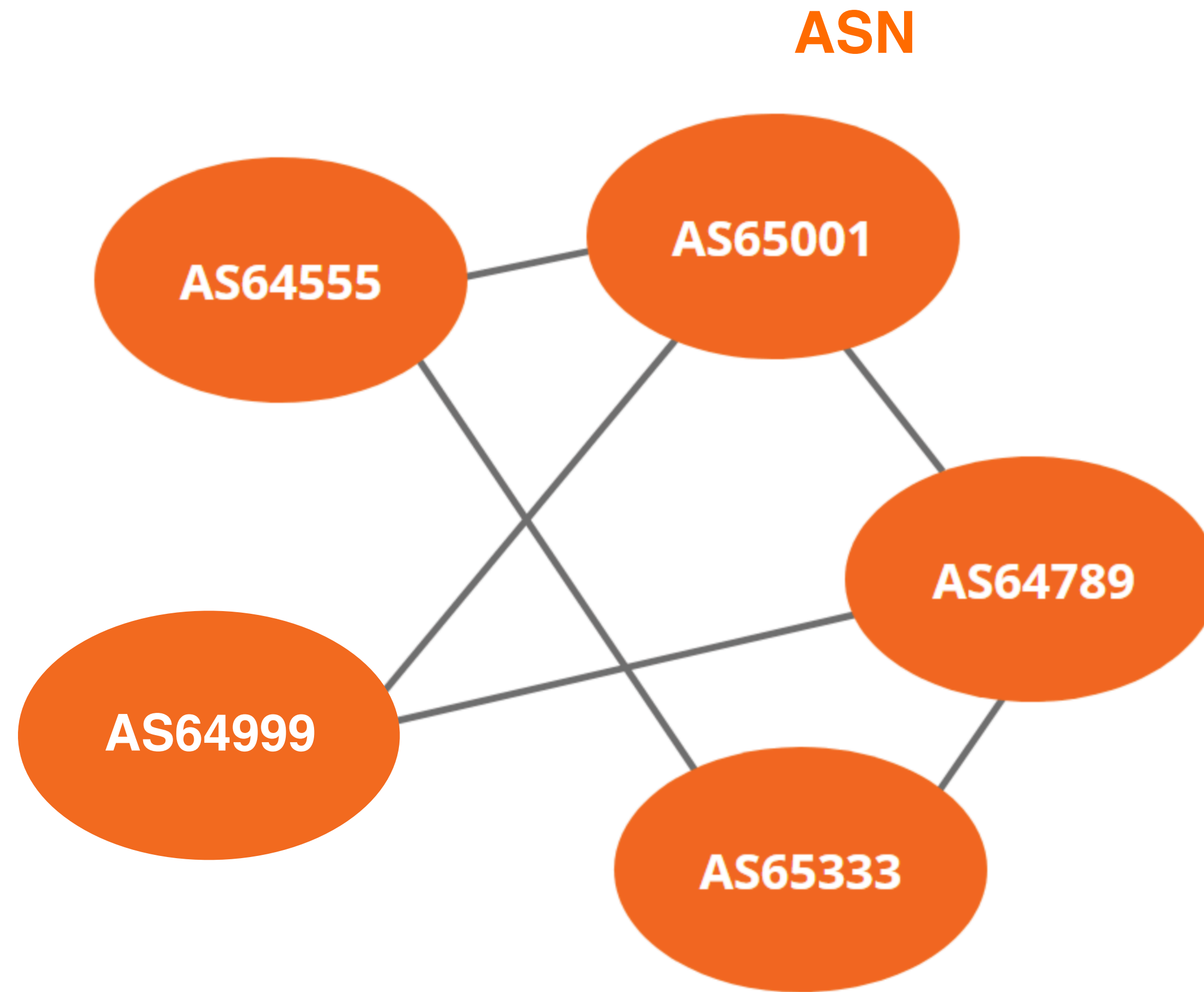
## Finding Help and Support

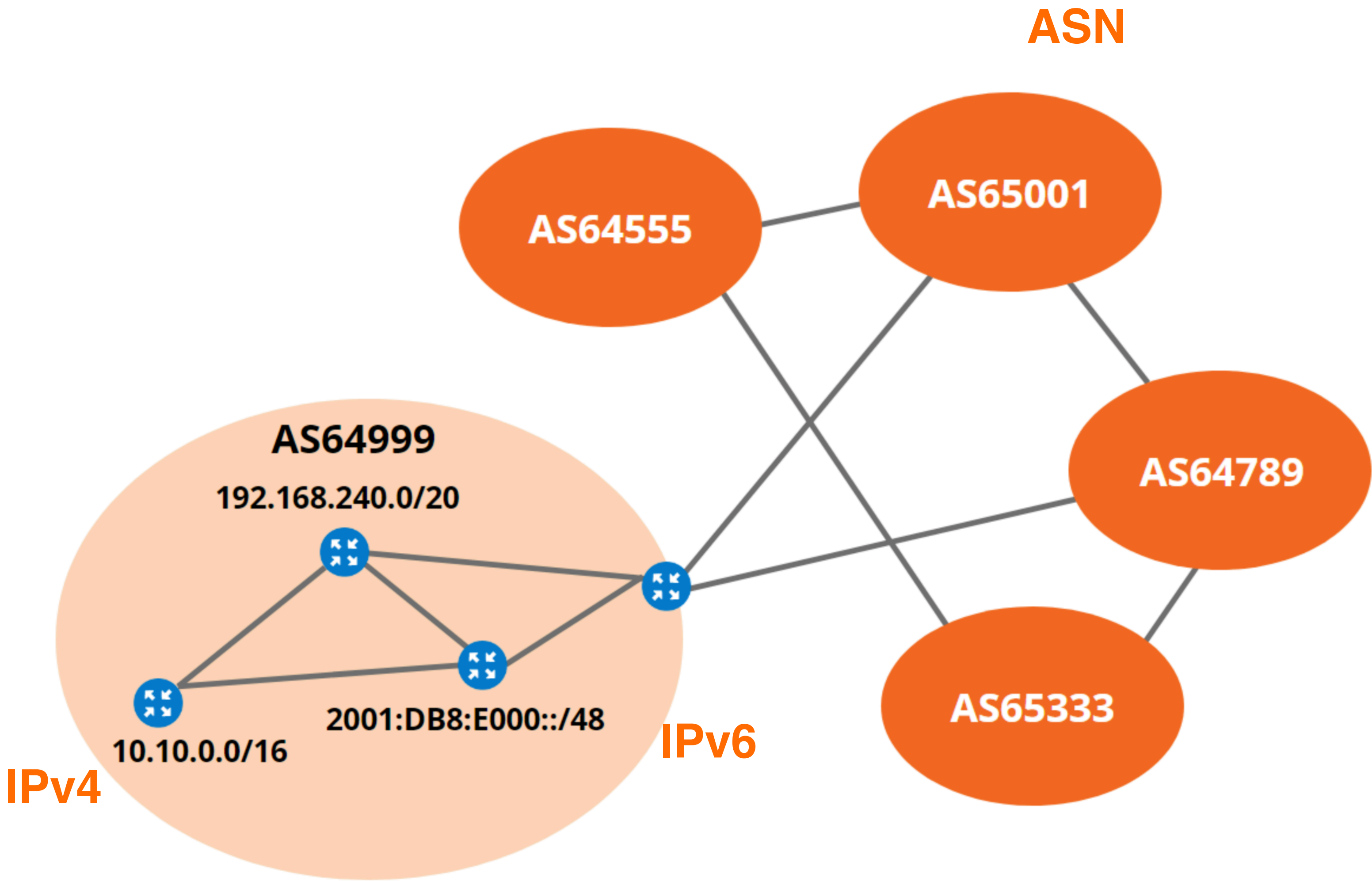
- Policy Development
- Assisted Registry Checks (ARC)
- Meetings
- Tools and Services



# All About Resources

Types of Resources You Can Request For





**PA: Provider Aggregatable**

**PI: Provider Independent**

**PA: Provider Aggregatable**

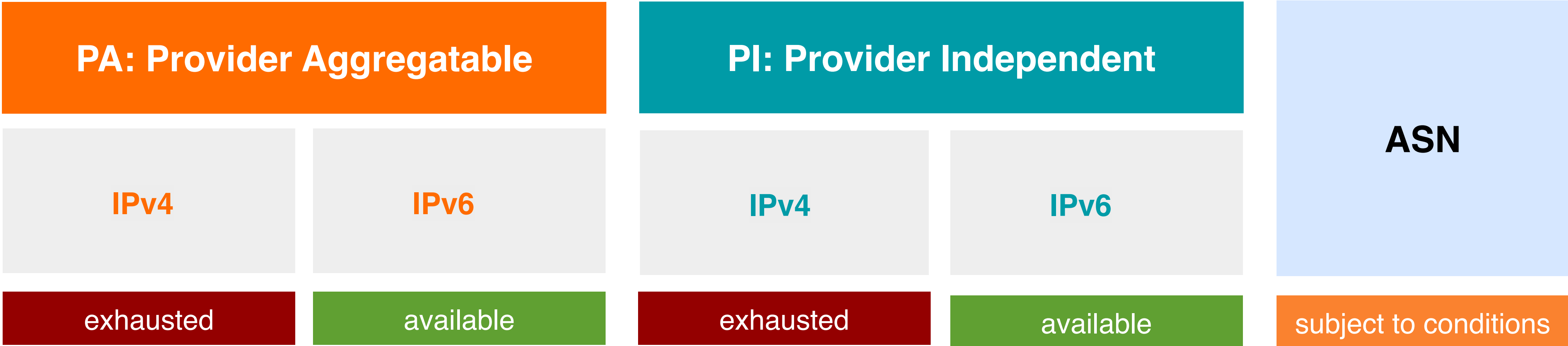
**IPv4**

exhausted

**PI: Provider Independent**

**IPv4**

exhausted





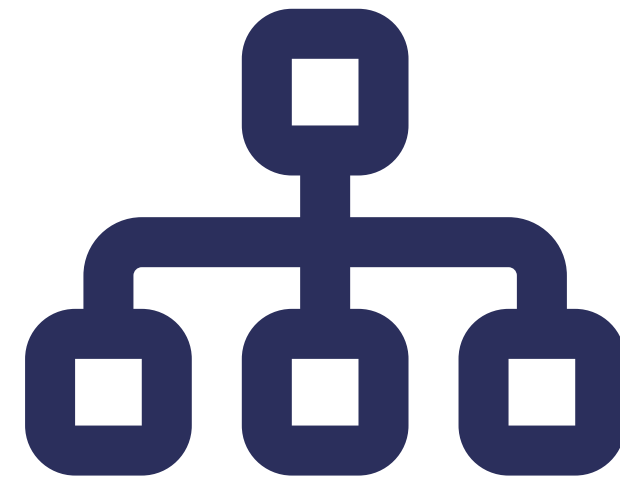
# All About Resources

Making Assignments: Considerations

- Do you need **IPv4**, **IPv6** or both?
- How **many** devices, end sites or customers will you be assigning addresses to?
- Do any of your customers need to **retain** their address space independently of your LIR relationship?
- Will you be **announcing your own prefixes** via BGP?
- Have you used your **existing** address space efficiently?
- Can you **document** your justification?



**Conservation**



**Aggregation**

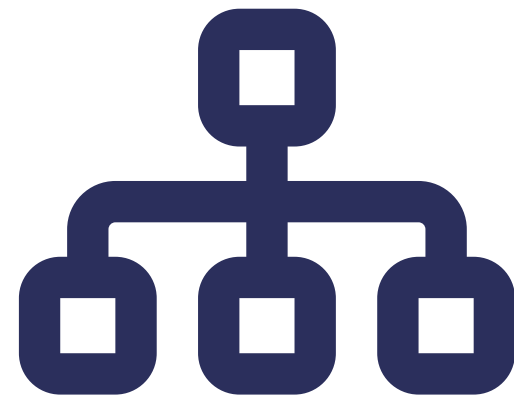


**Registration**



## Conservation

- Avoid unnecessarily wasteful **practices**.
- Ask for **appropriate** documentation when you receive a request
- Avoid stockpiling of unused addresses



## Aggregation

- Distribute address space in a hierarchical manner, whenever possible
- Permits the aggregation of routing information by **ISPs**
- Limits the **expansion** of Internet routing tables



## Registration

- Register Internet address assignments
- Ensure the uniqueness of each Internet address
- Provide reference information for Internet troubleshooting.



## Activity 3

Calculate how much address space to assign



# All About Resources

Registering Assignments



## Activity 4

Register the assignment in the (Test) RIPE Database



# All About Resources

Sponsoring Resources

## **Sponsoring resources for End Users?**

Managing PI resource requests and registration on behalf of End Users.

## Sponsoring resources for End Users?

Managing PI resource requests and registration on behalf of End Users.

## Responsibilities of Sponsoring LIRs

Requesting PI resources from the RIPE NCC

Keeping resource records accurate in the Registry and Database

Ensuring End Users comply with RIPE policies

Communicating with the RIPE NCC on behalf of the End User

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Ensuring End Users comply with RIPE policies

Communicating with the RIPE NCC on behalf of the End User



How do I make sure the End Users I am sponsoring are *compliant*?

Draw up a **contractual agreement** with them!





## Quiz

**NetServe is the sponsoring LIR for an End User's Provider-Independent (PI) resources. During a routine check, the RIPE NCC discovers that the End User moved to a new office six months ago. Not surprisingly, the RIPE Database still shows the End User's old address.**

**Which specific sponsorship function did NetServe fail to perform?**

- A) Applying for new IP addresses or AS Numbers on behalf of the End User.
- B) Ensuring that the End User's registration details remain accurate.
- C) Reviewing the End User's network plan to ensure it meets RIPE community standards.
- D) Acting as the primary contact for billing and contractual disputes with the RIPE NCC.



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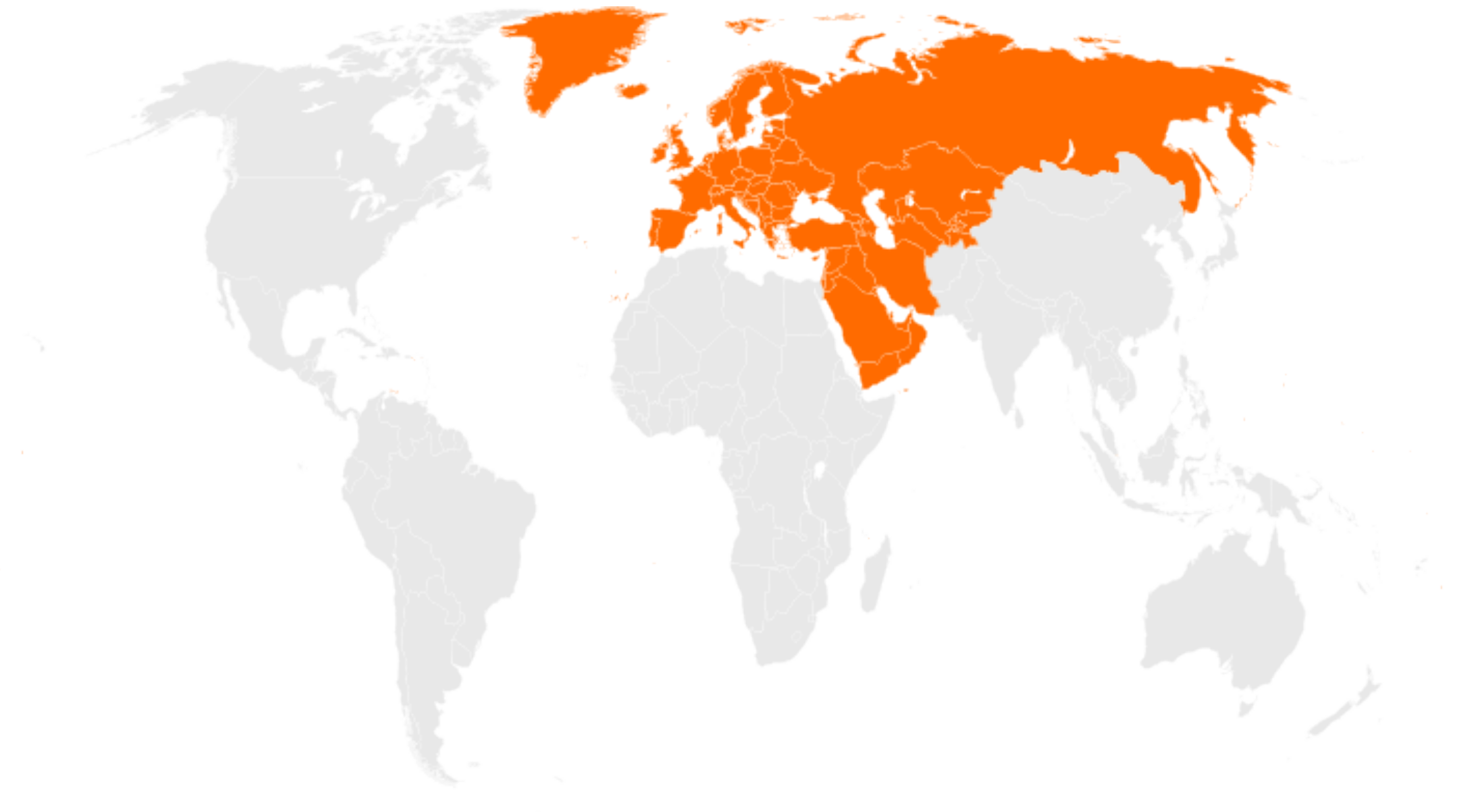


# All About Resources

Transferring

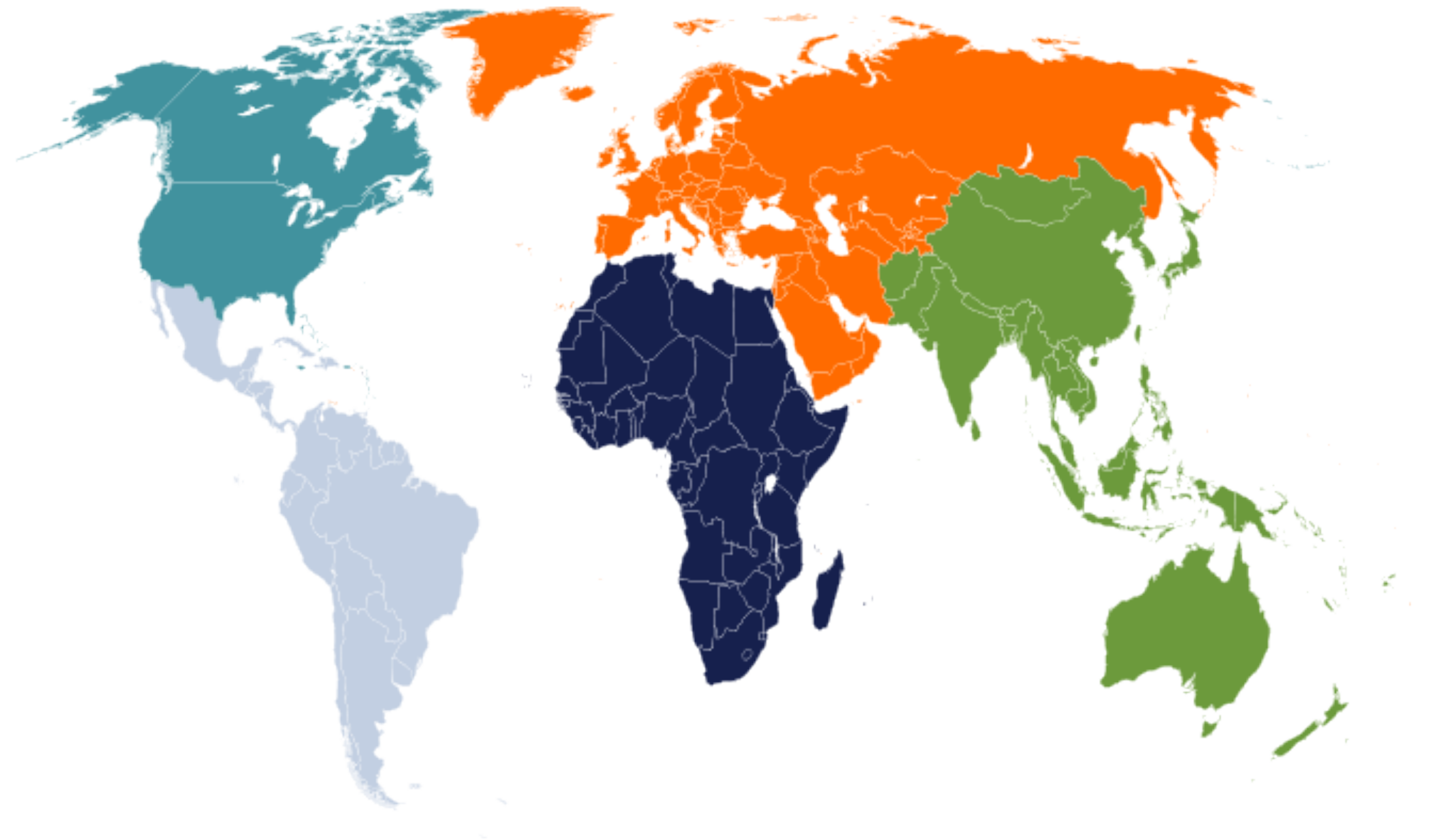
## Within the RIR Service Region

1. LIR to LIR
2. End User to End User
3. LIR to End User and vice versa



## Between Two Different RIR Service Regions

- Each RIR has its own unique policy framework
- Different requirements can apply
- Inter-RIR transfers must first be approved by both the RIPE NCC and the other RIR before they can be processed





# All About Resources

Maintaining and Updating Registrations



**When do you need to update registrations of your resources?**

**Organisation**

**Contact Information**

**Communication/Address**

**Resource Management**

**End-User Relationship**

**Your colleague is leaving**

**Your LIR's e-mail domain is changing**

**Your End User is leaving for another provider**



## Your colleague is leaving

Which of the following actions do you take as a responsible LIR contact?

- a) remove him as a user in the LIR Portal
- b) remove his SSO from the relevant maintainers
- c) remove his name and e-mail address from all objects in the RIPE Database



## Your LIR's e-mail domain is changing

Below are actions you take as a responsible LIR contact. Can you think of two other actions you should take?

- a) create new RIPE NCC Access accounts for every user of the LIR Portal
- b) add the users registered with the new domains on the LIR Portal
- c) do a full text search on the RIPE Database of the old email domain and replace with the new email domain



## Your End User is leaving for another provider

One of your customers holding an IPv4 PA assignment is leaving for another provider. What should you do?

- a) inform the RIPE NCC immediately
- b) remove the PA assignment and related objects in the RIPE Database



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- Developing Policies
- Assisted Registry Checks (ARC)
- Meetings
- Tools and Services



# **Finding Help and Support**

Developing Policies

What

RIPE policies exist to make sure that the Internet remains **stable** and **accessible** for everyone.

Who

Where

How



What

**Who**

Where

How

Who develops the policies that govern the internet?

What

Who

Where

How

The RIPE community develops and adopts policies through:

- an **open, bottom-up** process of discussion
- **consensus-based** decision-making

**Everyone** is welcome to take part in RIPE Meetings and RIPE Working Group mailing lists, not just members of the RIPE NCC.



What

Who

Where

How

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

RIPE Working Groups are composed of community members working together to discuss specific topics.

Some examples of the groups are:

- Address Policy
- Routing
- Database



What

Who

Where

How

- follow **active proposals** on the RIPE NCC website
- join the relevant Working Group mailing lists
- attend RIPE Meetings to engage with the community in person
- submit your own proposal





## Quiz

**Only members of the RIPE NCC can take part in policy development.**

**True or false?**

A) True

B) False



## Quiz

**Only members of the RIPE NCC can take part in policy development.**

**True or false?**

A) True

**B) False**



# Finding Help and Support

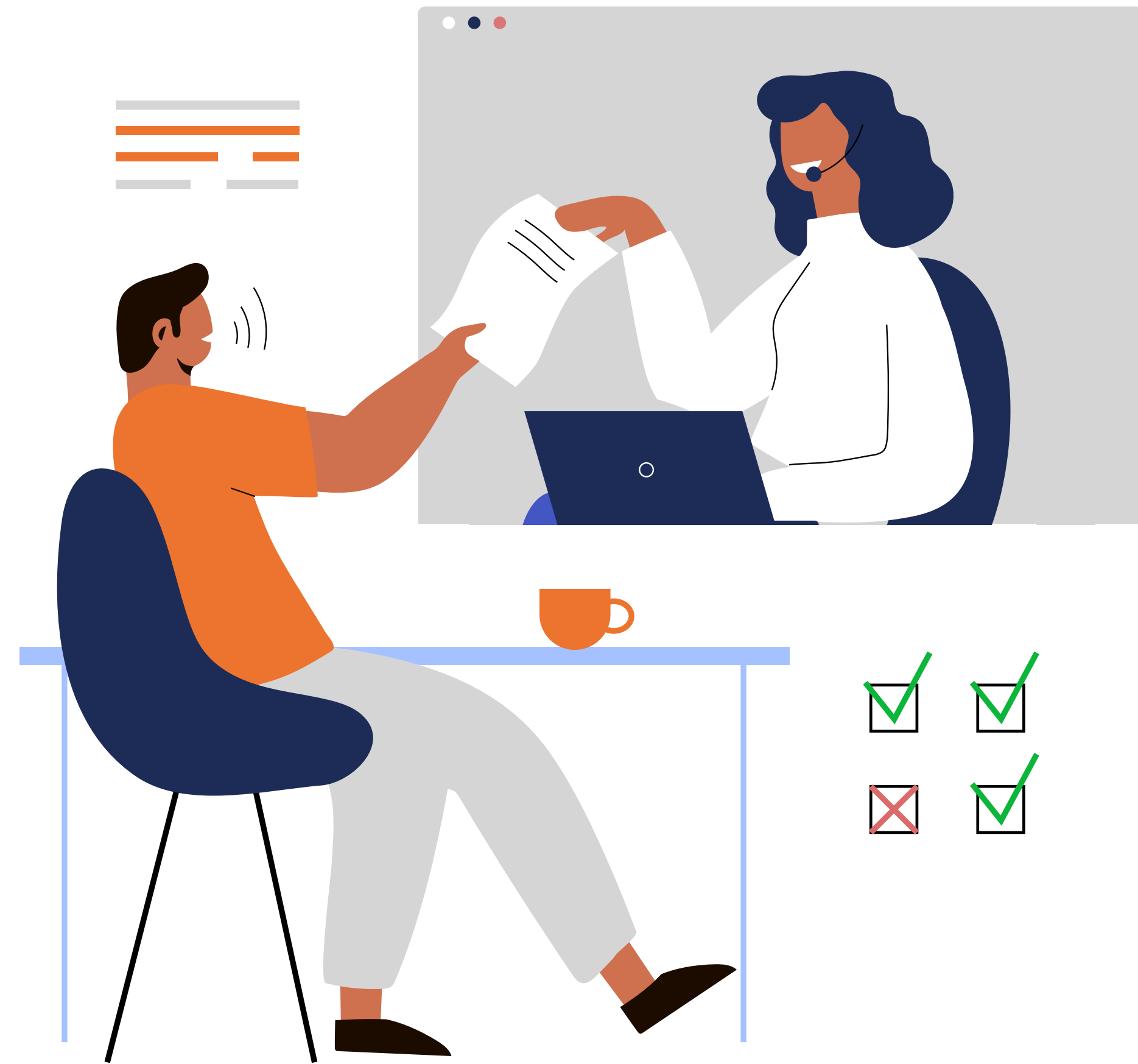
ARCs

# ARC

What is an ARC?

What is being checked?

Where does it happen?



## What is an ARC?

What is being checked?

Where does it happen?

The **Assisted Registry Check (ARC)** is a **mandatory audit** for all LIRs. It:

- checks your registry data
- helps you make any necessary improvements.



What is an ARC?

What is being checked?

Where does it happen?

- **Registry Consistency:**
- **Resource Consistency:**
- **Routing and Reverse DNS Consistency:**

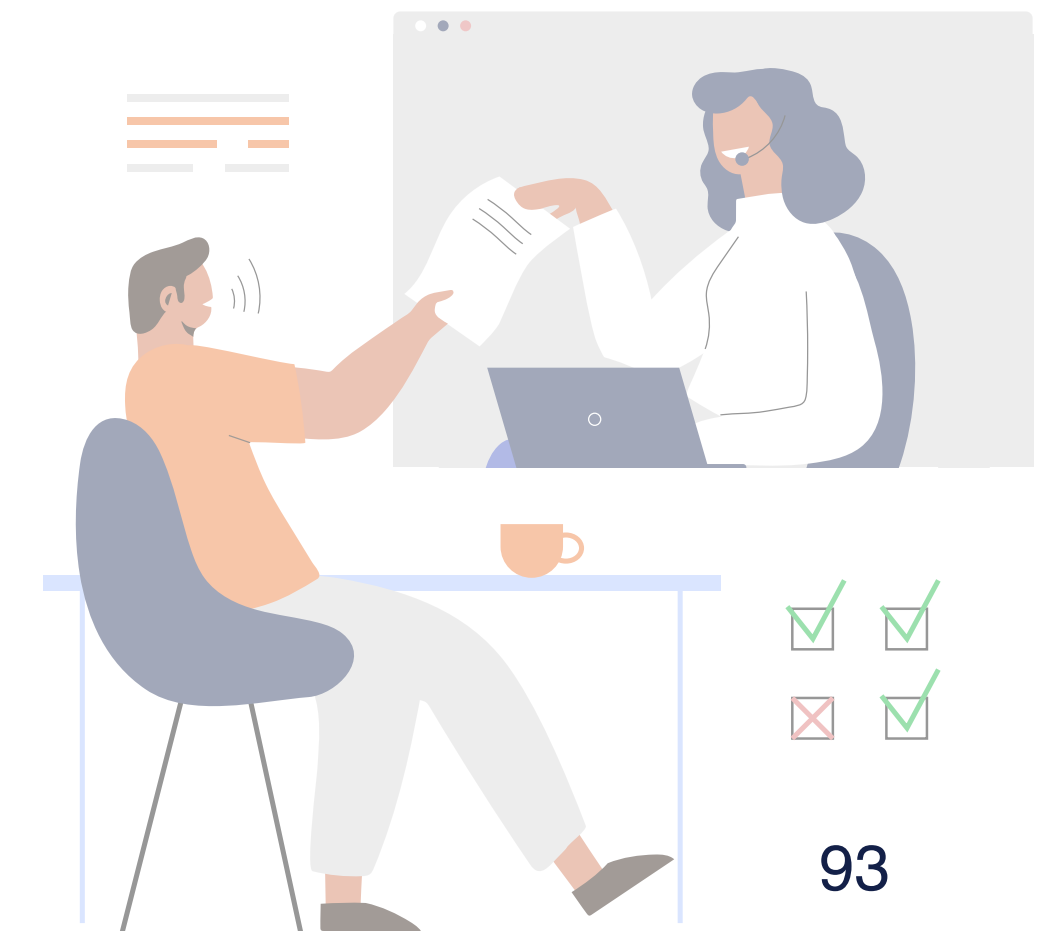


What is an ARC?

What is being checked?

Where does it happen?

- **Requested** by yourself at any time
- **Selected** by RIPE NCC
- **Conducted** at RIPE Meetings







# Finding Help and Support

Tools and Services

RIPEstat

- 35+ datasets — **all in one place**
- Look up **any** IP address or ASN
- Visualisations, routing history, geolocation
- **Free-to-use** - no account required

RIPE Atlas

RIPE Labs

RIPE NCC  
Academy



RIPEstat

RIPE Atlas

RIPE Labs

RIPE NCC  
Academy

- **Thousands** of probes and anchors worldwide
- Measures pings, traceroute, DNS, TLS
- Maps, streaming visualisations and API access
- Run **custom** measurements on your own network



RIPEstat

RIPE Atlas

RIPE Labs

RIPE NCC  
Academy

- **Expert** articles on the state of the Internet
- New tools, prototypes and experiments
- Published by RIPE NCC staff and community
- **Trusted reference** for network operators



## Finding Help and Support

## Tools and Services

RIPEstat

RIPE Atlas

RIPE Labs

RIPE NCC  
Academy

- **Free** for all
- Learn at your **own pace**
- BGP, IPv6, Internet Governance, etc.



# Demo

Let's take a look at the **RIPE NCC website**.





## Quiz

**Cyber Inc. needs to look into how a recent BGP routing incident affected Internet traffic in different parts of the world. They also want to explore measurement data and visual reports about routing and address space usage. Which RIPE NCC service should they use?**

- A) RIPE NCC Academy
- B) RIPE Labs
- C) RIPE Atlas
- D) RIPEstat



## Quiz

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- A) RIPE NCC Academy
- B) RIPE Labs
- C) RIPE Atlas
- D) RIPEstat**



## Quiz

**Cyber Inc. wants to check whether their network is reachable and performing well from different locations around the world, not just from their own infrastructure. They also want to train their network engineers to understand these measurements. Which combination of RIPE NCC services would best meet their needs?**

- A) RIPE Labs and RIPE NCC Academy
- B) RIPE Atlas and RIPE NCC Academy
- C) RIPEstat and RIPE Labs
- D) RIPE Atlas and RIPEstat



## Quiz

**Cyber Inc. wants to check whether their network is reachable and performing well from different locations around the world, not just from their own infrastructure. They also want to train their network engineers to understand these measurements. Which combination of RIPE NCC services would best meet their needs?**

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- C) RIPEstat and RIPE Labs
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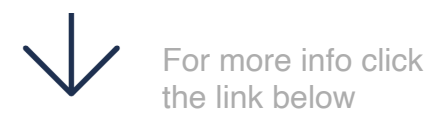
# What's Next in Internet Registry



## Webinars

Attend another webinar live wherever you are.

- ❖ Welcome to the RIPE NCC (1 hr)
- ❖ Internet Governance (1 hr)
- ❖ RIPE Policy Development Process (1 hr)
- ❖ RIPE Database Basics (2 hrs)
- ❖ RIPE Database Applications (2 hrs)



[learning.ripe.net](https://learning.ripe.net)



## Face-to-face

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

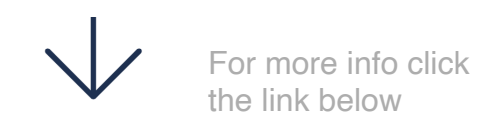
- ❖ Local Internet Registry (8.5 hrs)
- ❖ RIPE Database (8.5 hrs)



## E-learning

Learn at your own pace at our online Academy.

- ❖ Internet Governance (3 hrs)
- ❖ RIPE Database (16 hrs)
- ❖ LIR Fundamentals (3 hrs)



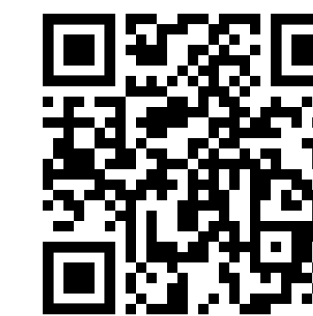
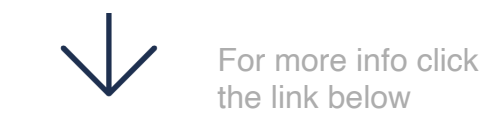
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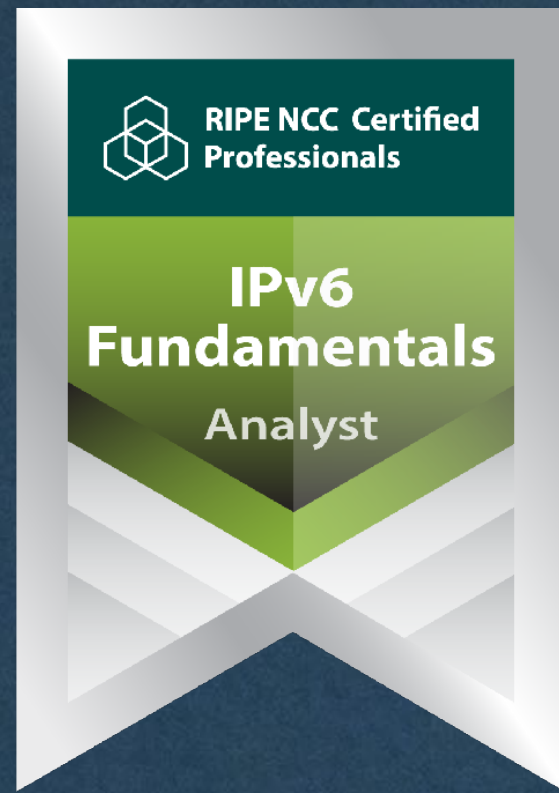


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