Local Internet Registry

Training Course

January 2025

09:00 - 09:30	**Coffee, Tea**
11:00 - 11:15	**Break**
13:00 - 14:00	**Lunch**
15:30 - 15:45	**Break**
17:30	**End**

Introductions

- **Name**

- **Experience** with the RIPE NCC

- **Goals** for today

Overview

- The Internet Registry System

- Participating

- Being an LIR

  - Activity: Create an Access Account

- The RIPE Database

  - Activity: Querying the RIPE DB

- Getting Resources

- Transfers

- Distributing Resources

  - Activity: Making Assignments

  - Activity: Registering Assignments

- Managing Resources

  - Activity: Being an LIR Contact

- Tips and Tools

RIPE NCC Training Material

Please find your training material at the following link

https://www.ripe.net/training-material

The Internet Registry System

Section 1

The Internet Registry System

Distribution Hierarchy

IANA — The Internet Assigned Numbers Authority

RIR — Regional Internet Registry (RIR): **the RIPE NCC**

LIR — Local Internet Registries

Optional

ISP — Internet Service Providers

Users

8
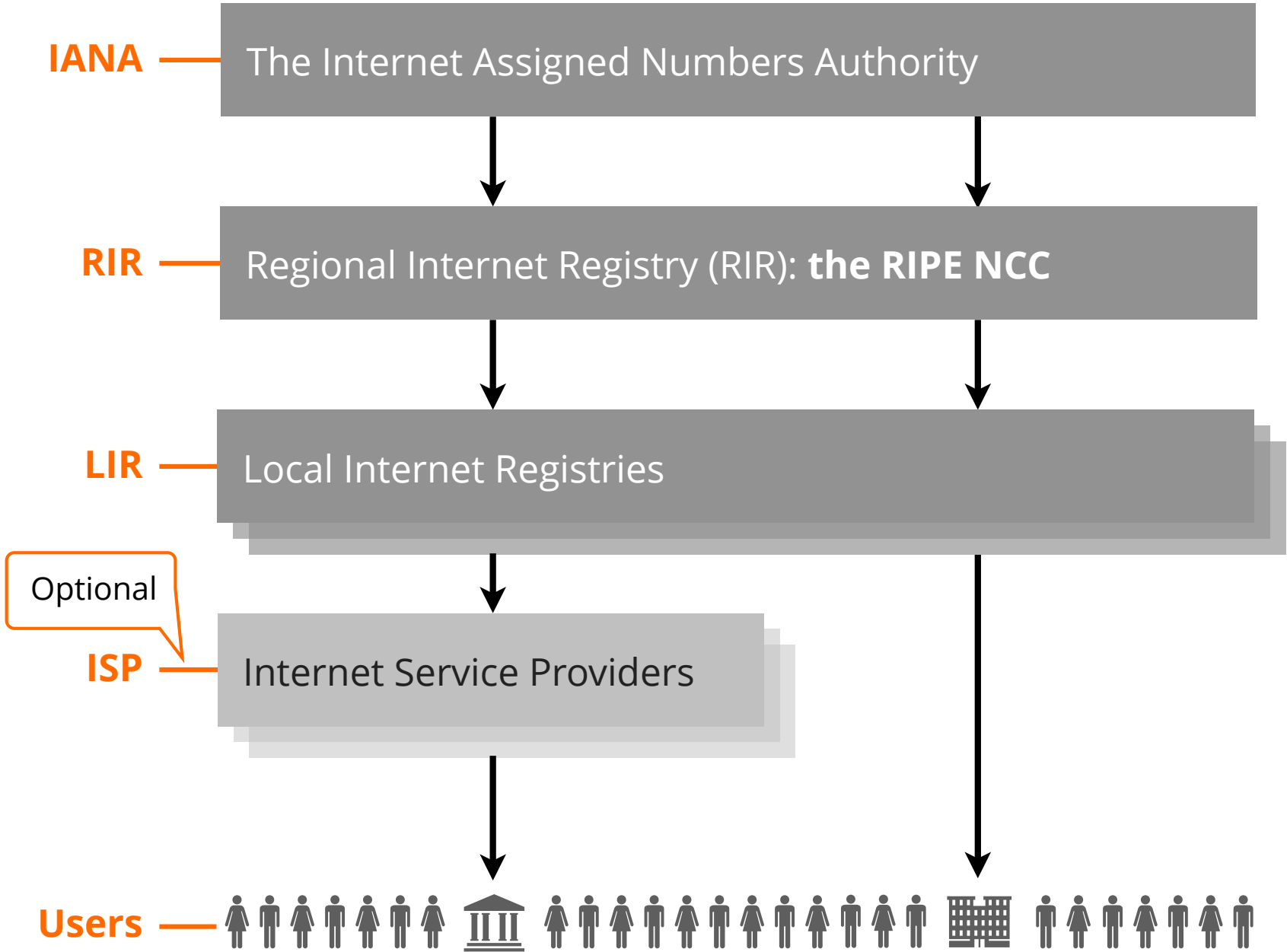
Regional Internet Registries

- Five RIRs worldwide

  - Not-for-profit organisations

  - Funded by membership fees

  - Policies decided by regional communities

  - Neutral, Impartial, Open, Transparent

- RIRs Goals: Registration, Aggregation, Conservation

Goals: Registration

- **Why?**

  - Ensure uniqueness of Internet number resources

  - Provide contact information

- **How?**

  - RIR whois databases

- **Results:**

  - IP address space used only by one organisation

  - Information available on users of Internet number resources

Goals: Aggregation

- **Why?**

  - Routing tables growing too fast

  - Provide scalable routing solution for Internet

- **How?**

  - Encourage announcement of whole allocations

  - Introduction of Classless Inter Domain Routing (CIDR)

- **Result:**

  - Growth of routing tables has slowed a bit

Goals: Conservation

- **Why?**

  - IP addresses and AS Numbers are limited resources

  - These resources were not used efficiently in the past

- **How?**

  - Introduction of CIDR

  - Policies to ensure fair usage

- **Results:**

  - Growth in IP address space usage slowed down

  - Resources were distributed based on need

RIPE NCC

- Began operating in **1992**

- Not-for-profit **membership** organisation

- 21,000+ Local Internet Registries (LIRs)

- Neutral, Impartial, Open, Transparent

- Provides administrative support to **RIPE**

RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Réseaux IP Européens (RIPE) Community

- Since **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**

- **RIPE meetings** twice a year

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
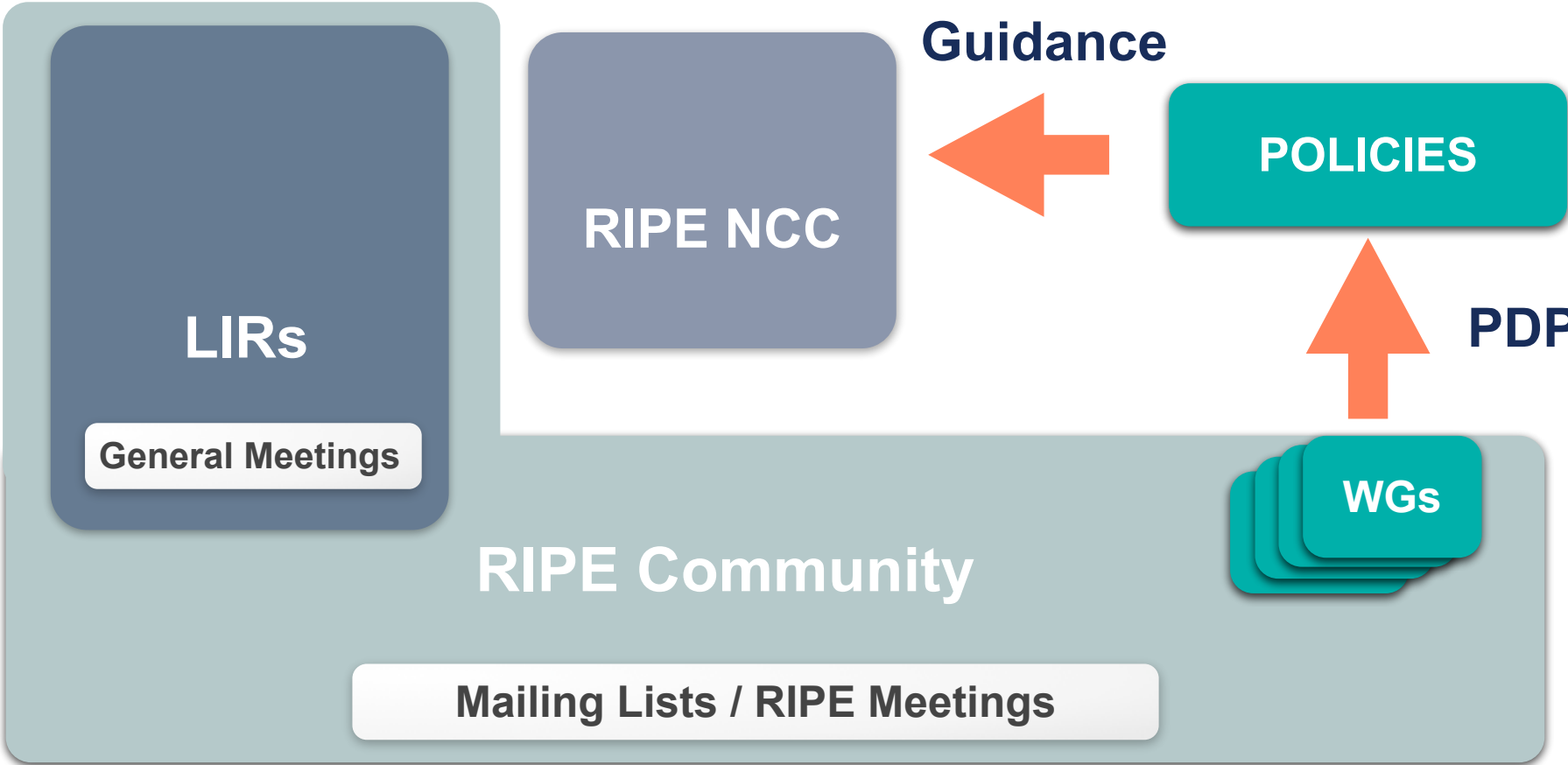- Offices in Amsterdam and Dubai

Participating

Section 2

RIR Bottom-up Model

Guidance

RIPE NCC

POLICIES

PDP

LIRs

General Meetings

RIPE Community

WGs

Mailing Lists / RIPE Meetings

Working Groups

- Address Policy

- Routing

- Database

- Security

- Cooperation

- DNS

- IPv6

- RIPE NCC Services

- Connect

- Open Source

- Measurement, Analysis and Tools

- IoT

Policy Development Process

- Open

  - Anyone can participate

  - On mailing lists and at meetings

- Transparent

  - List discussions archived publicly

  - Meetings transcribed

- Developed bottom-up

  - **YOU** make the policies

  - The RIPE NCC implements them

Participating in the PDP

- Sign up for the **Policy Development Process Announcements** mailing list

  - Join in discussions about policy proposals

  - Stay up-to-date with new policies

  - Propose a new policy

https://www.ripe.net/participate/policies/participation-ripe-pdp

When to Start a Policy Proposal?

- When something is **missing**, **outdated** or can be **improved** in the policies

- When **not** to do it?

  - Disagreement with RIPE NCCs request evaluation
    First: Revision/Escalation

  - Changes to the RIPE NCC membership (charging, rules)
    Solution: RIPE NCC General Meeting

21

RIPE NCC General Meeting

- During RIPE Meetings

- RIPE NCC members (LIRs) participate

- Discuss the RIPE NCC operations and activities

- Give feedback on the Budget and Activity Plan

- Vote on:
    - Charging Scheme, Resolutions
    - Executive Board membership
    - Financial Report

Who Does What ?

- **The RIPE community**

  - Creates & discuss proposals

  - Seeks consensus

- **Working Group (WG) chairs**

  - Accept proposals

  - Chair the discussions

  - Decide if consensus has been reached

- **The RIPE NCC**

  - Acts as the secretariat to support the process

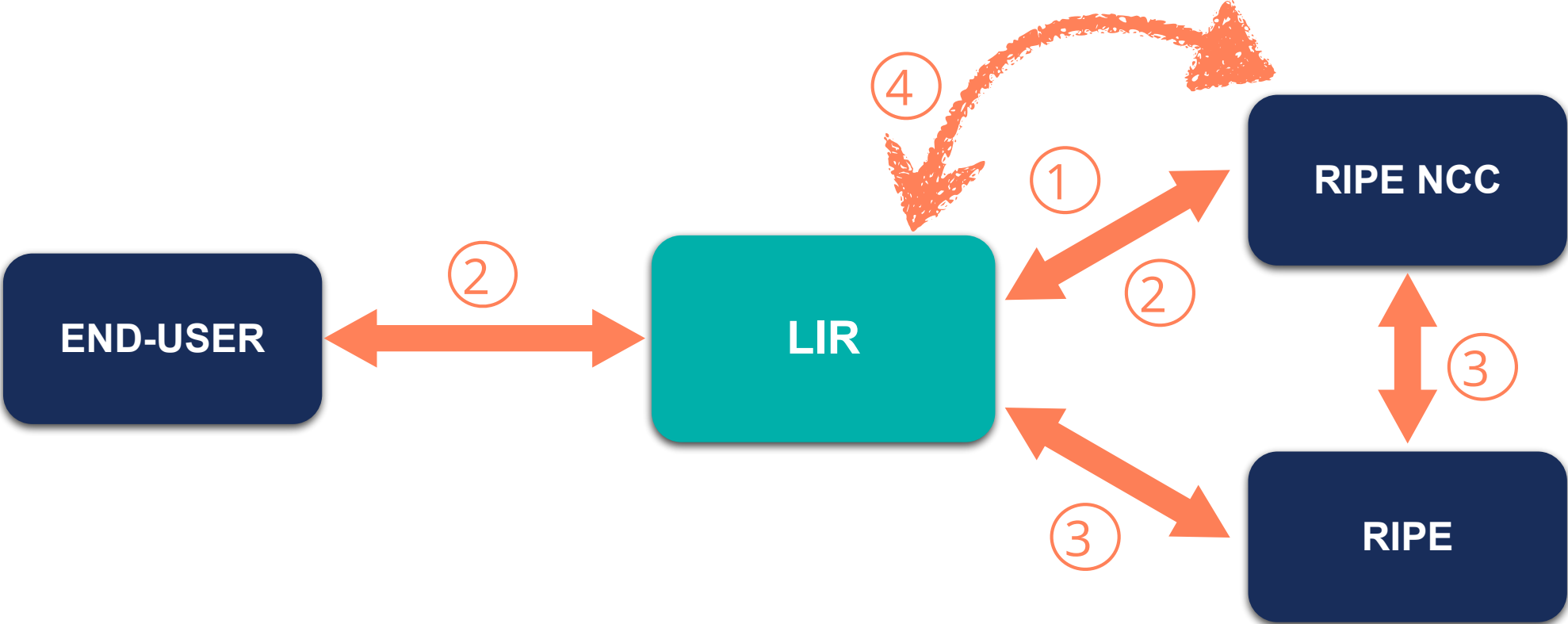 - Publishes policies documents and implement them

Questions

Being an LIR

Section 3

Being an LIR

END-USER ②→ LIR

LIR ① RIPE NCC
LIR ② RIPE NCC
LIR ③ RIPE
RIPE NCC ③ RIPE
④ RIPE NCC Services / Tools

① Register (fee)
  Updated LIR Info

② IPs and ASNs Management
  Update DB

③ PDP

④ RIPE NCC Services / Tools

What is in the Local Internet Registry?

Name of the organisation
or person operating the LIR

Contact Information

- Postal address
- Phone numbers
- Email addresses

User Accounts

Billing details

- Allocations
- PI assignments

IPv4 & IPv6

- Allocations
- PI assignments

AS Numbers

Preferences

What Should the RIPE NCC Know?

- If any of these change:

  - **Company name**

  - **VAT number**

- Company acquisitions and mergers

- Bankruptcy

- Transfer of resources to another organisation

Closing LIRs

- The RIPE NCC may close an LIR if:

  - The LIR cannot be contacted by the RIPE NCC
    for a significant period of time

  - The LIR consistently violates RIPE community's policies

  - The LIR does not pay its fee

  - The LIR does not cooperate with RIPE NCC audits (ARC)

- The RIPE NCC takes on responsibility for address space held by closing LIRs

RIPE NCC Access Account

- For RIPE NCC **services**

- **Free** to create

- Can be **associated** with one or more LIRs

Create an Access Account

Activity 1

LIR Portal

Demonstration

Demo: LIR Portal Overview

- Account details

- Resources details

- Communicating with the RIPE NCC:

    - Request resources

    - Create tickets

    - Sign up for a training or webinar

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

The RIPE Database

Section 4

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**

RIPE Database Objects

IPs and ASNs

inetnum

inet6num

aut-num

Contact Information

organisation

person

role

Routing

route

route6

as-set

Reverse DNS

domain
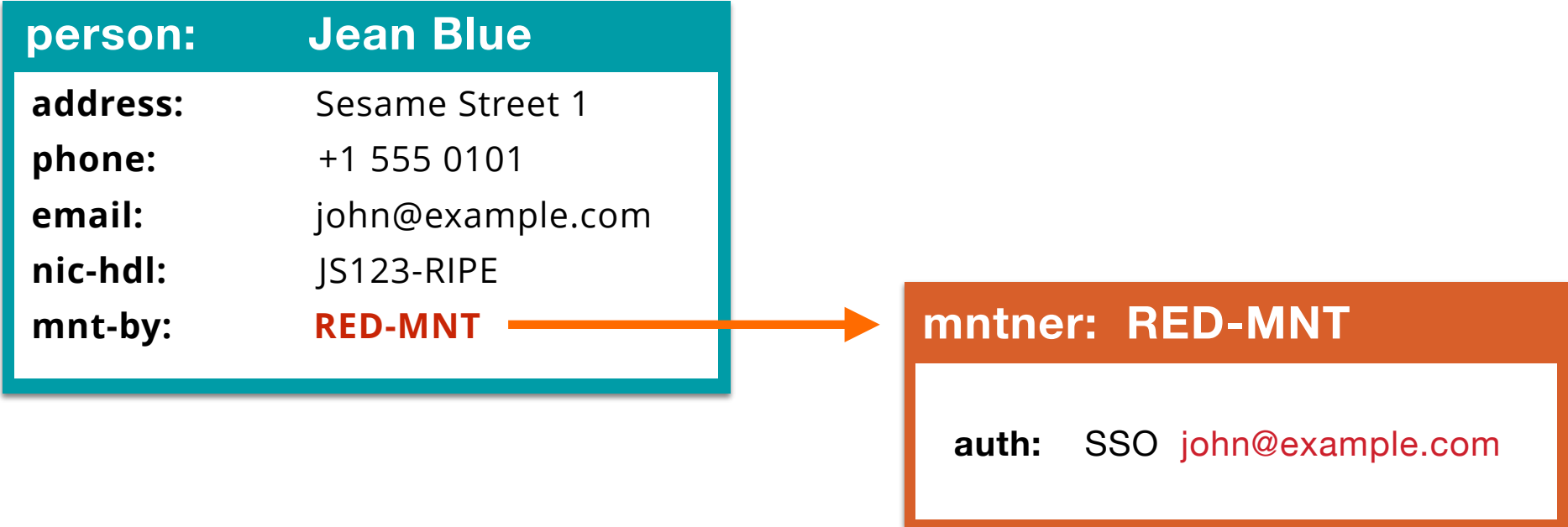
Object Protection

mntner

RIPE Database Attributes

- Information in Objects is stored in pairs:

Attribute-name : Attribute-value

person:	Jean Blue
address:	Sesame Street 1
phone:	+1 555 0101
email:	john@example.com
nic-hdl:	JS123-RIPE
mnt-by:	**RED-MNT**

mntner:	RED-MNT
auth:	SSO john@example.com

Querying the RIPE Database

Querying the RIPE Database

- Web interface
- Command line

- Full Text Search
- Restful API (XML/JSON)

39

Querying with Flags

- For finding additional information

  - Insert flag in front of the query:

  -m 193.0.16.0/21

  - Or check appropriate box in a tab

  Example, "Hierarchy Flags":

More Specific inetnums: -m
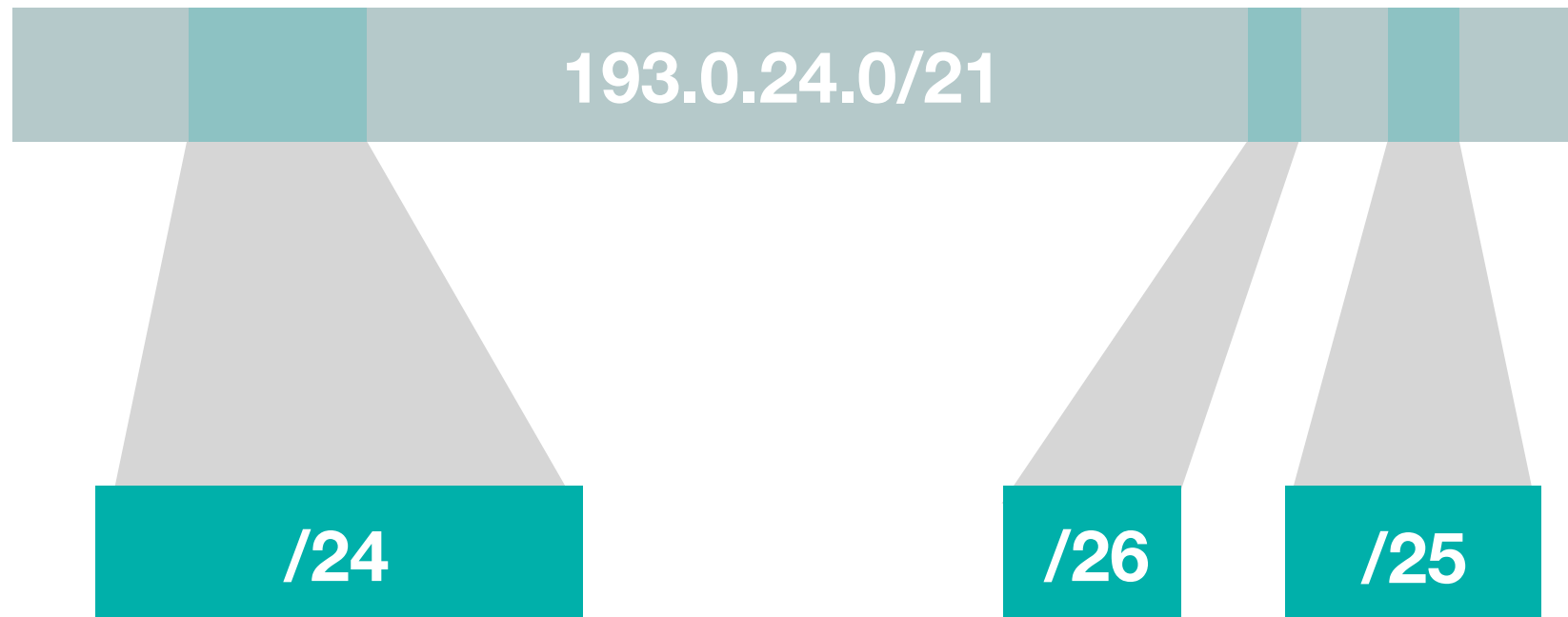
-m 193.0.24.0/21

More Specific inetnums: -M

-M 193.0.24.0/21
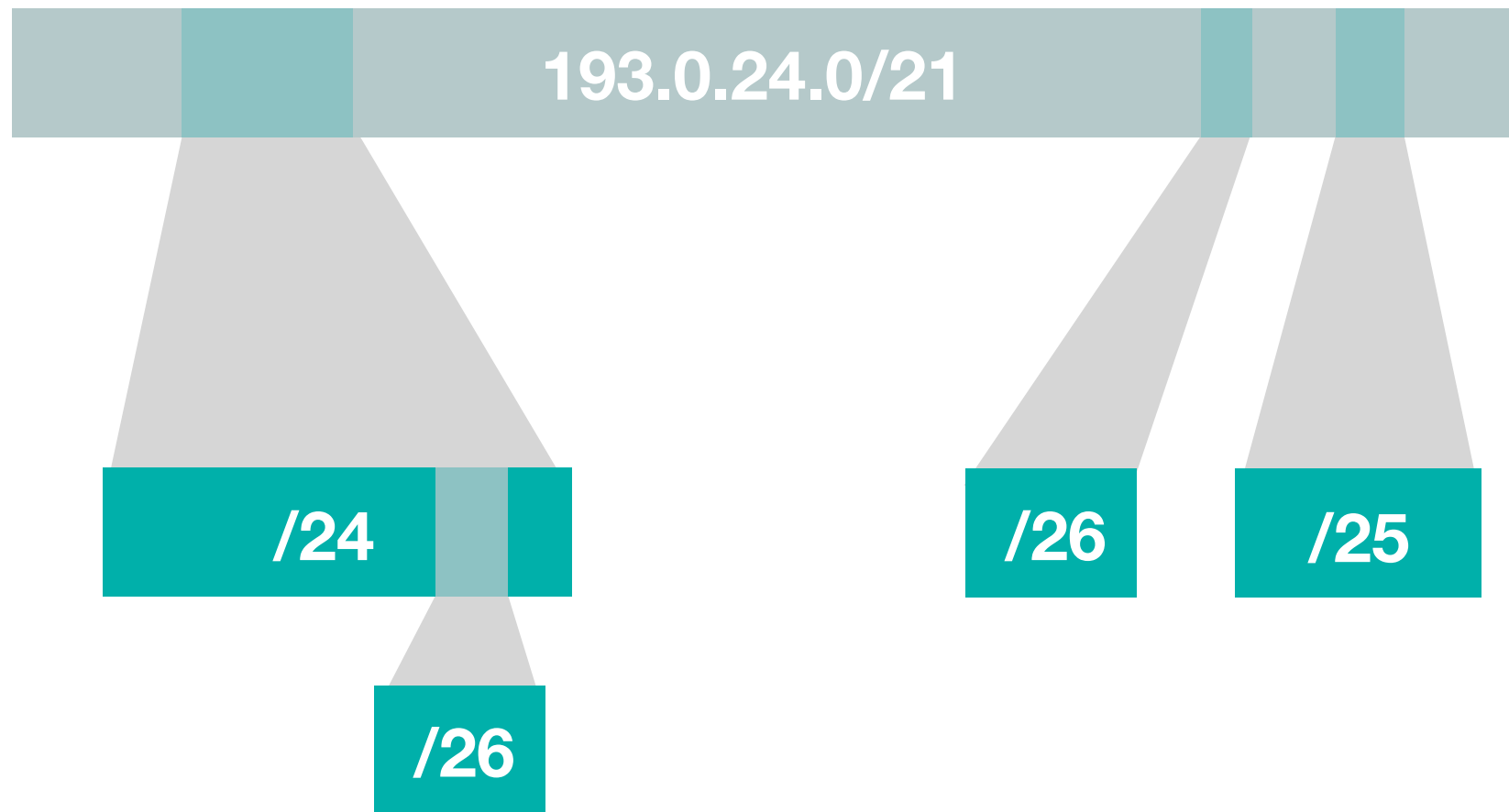
Less Specific inetnums: -l

-l 193.0.25.0/24

Less Specific inetnums: -L

-L 193.0.25.0/24

0/0

193.0.24.0/21
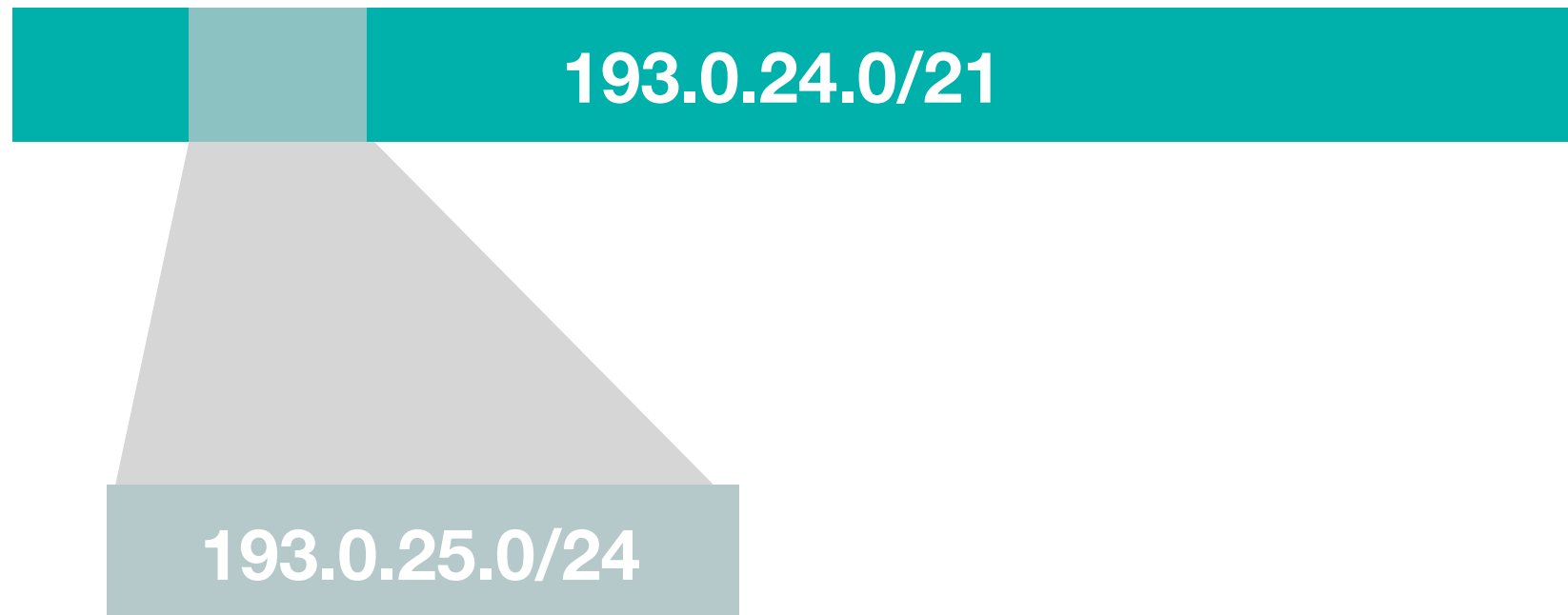
193.0.25.0/24
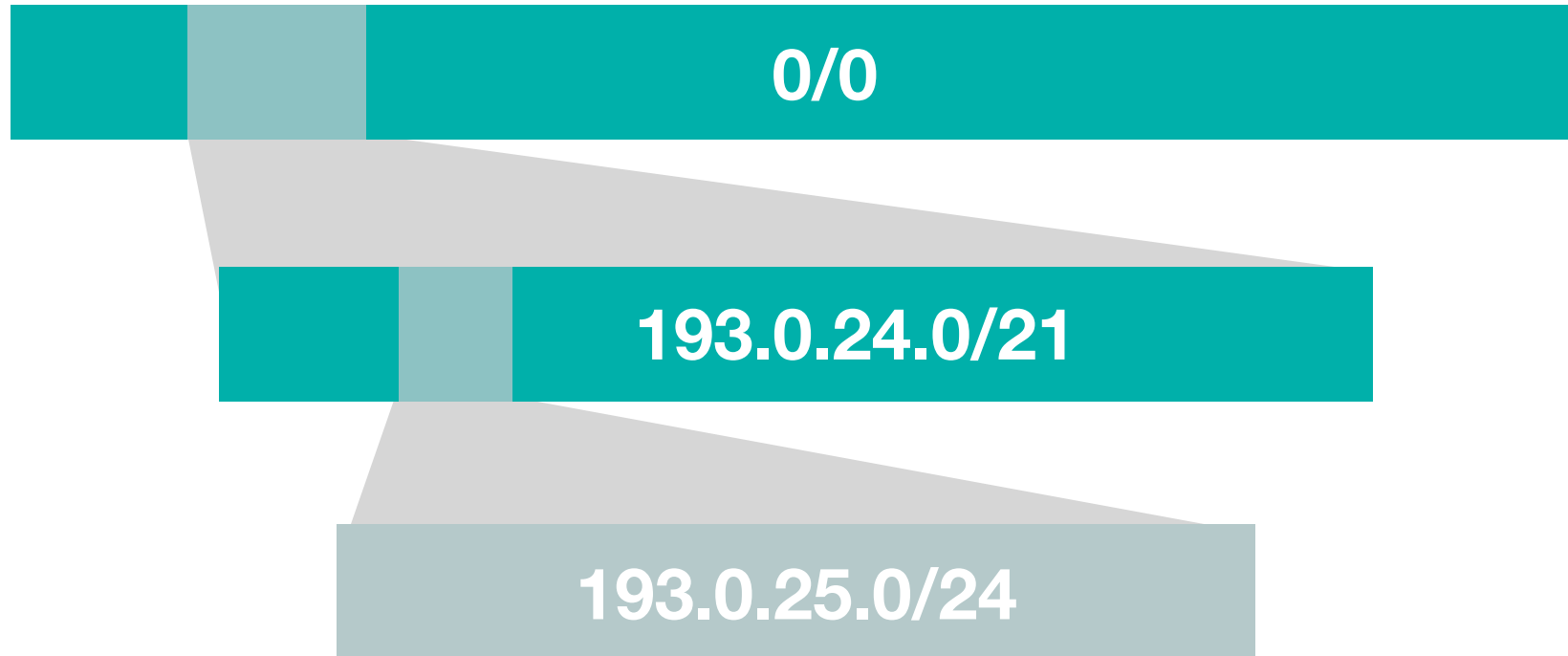
Querying the RIPE Database

Activity 2

Activity: Querying the RIPE Database

- **Time**

  - 15 minutes

- **Goal**

  - Learn to use the web interface to find information in RIPE DB

- **Tasks**

  - Find contact information about an IP address

  - Look for the IP address space of an LIR

Updating the RIPE Database

Protecting Objects

person: Jean Blue

address: My Street 9876

address: Office 123

phone: +31 20 876 5432

e-mail: jean@example.net

nic-hdl: JB123-RIPE

mnt-by: LIR-MNT
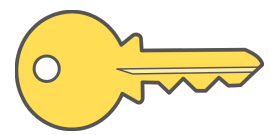
mntner: LIR-MNT

admin-c: JB123-RIPE

notify: noc@example.org

upd-to: noc@example.org

auth: MD5-PW 1crypto-stuff

auth: SSO email@domain.com

auth: PGP-KEY-<key ID>

mnt-by: LIR-MNT

Update after a Query Result

Responsible organisation: Reseaux IP Europeens Network Coordination Centre (RIPE NCC)
Abuse contact info: abuse@ripe.net

```
inetnum:        193.0.24.0 - 193.0.30.255
netname:        RIPENCC-MEETING-PUBLIC
descr:          Reseaux IP Europeens Network Coordination Centre (RIPE NCC)
remarks:        RIPE NCC Training Services & RIPE Meetings
remarks:        This space is used as public space during RIPE meetings
country:        NL
admin-c:        BRD-RIPE
tech-c:         OPS4-RIPE
status:         ASSIGNED PA
mnt-by:         RIPE-NCC-MNT
mnt-routes:     RIPE-NCC-MNT
mnt-domains:    RIPE-NCC-MNT
created:        2013-10-09T14:42:14Z
last-modified:  2017-12-04T14:40:12Z
source:         RIPE
```

Update object   RIPEstat

Modify "inetnum" object   Edit in text area

Please enter the maintainers you would like to use as mnt-by
RIPE-NCC-MNT

inetnum
193.0.24.0 -193.0.30.255

netname
RIPENCC-MEETING-PUBLIC

descr
Reseaux IP Europeens Network Coordination Centre (RIPE NCC)

remarks
RIPE NCC Training Services & RIPE Meetings

remarks
This space is used as public space during RIPE meetings

country
NL

admin-c
BRD-RIPE

tech-c
OPS4-RIPE

Duplicate the attribute   Add a new attribute   Delete the attribute   Info about the attribute

Creating Objects

Maintainer and Person/Role

role: Technical Team
address: My Street 9876
phone: +31 20 876 5432
e-mail: johndoe@email.net
nic-hdl: JD963-RIPE
mnt-by: **PERSONAL-MNT**

mntner: PERSONAL-MNT
admin-c: **JD963-RIPE**
descr: Startup maintainer
auth: SSO jean@example.net
mnt-by: PERSONAL-MNT
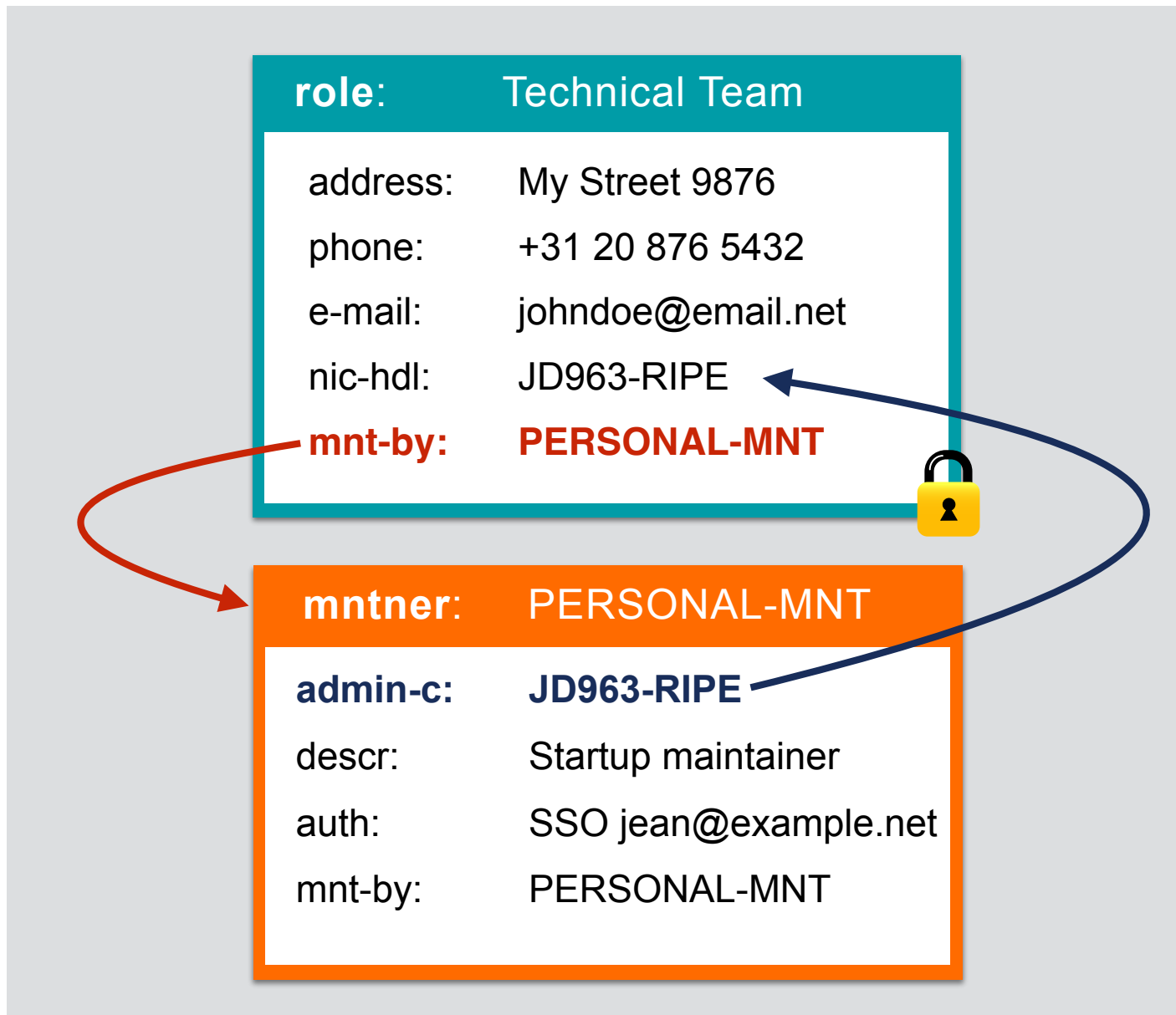
Create role and maintainer pair (1)

Select object type you would like to create

Object type

role and maintainer pair ⇕

Create

Create role and maintainer pair (2)

Create role and maintainer pair

mntner

| AA320-MNT | ? |

role   Switch to **person**

| ABC Admins | ? |

address

| Singel 258, 1016 AB Amsterdam | ? |

e-mail

| abd-admins@abc-company-email.com | ? |

By submitting this form you explicitly express your agreement with the RIPE Database Terms and Conditions

Cancel   Submit

- Instead of a **role,** you can create a **person** object

Create role and maintainer pair (3)

> Your objects have been successfully created

role with primary key "AA3-TEST"

```
role:            ABC Admins

address:         Singel 258, 1016 AB, Amsterdam

e-mail:          abc-admins@abc-company-email.com

nic-hdl:         AA3-TEST

mnt-by:          AA320-MNT

created:         2019-10-16T11:52:09Z

last-modified:   2019-10-16T11:52:09Z

source:          TEST
```

mntner with primary key "AA320-MNT"

```
mntner:          AA320-MNT

admin-c:         AA3-TEST

upd-to:          john.smith@abc-company-email.com

auth:            SSO john.smith@abc-company-email.com

mnt-by:          AA320-MNT

created:         2019-10-16T11:52:09Z

last-modified:   2019-10-16T11:52:09Z

source:          TEST
```

Creating an object (1)

- Webupdates
- Syncupdates

- Email updates
- Restful API (XML/JSON)

You are editing [Reseaux IP Europeens Network C... ▼]

Select object type you would like to create

Object type

✓ role and maintainer pair
as-set
aut-num
domain
filter-set
inet-rtr
inet6num
inetnum
irt
key-cert
mntner
organisation
peering-set
person
role
route
route-set
route6
rtr-set

vice

Creating an object (2)

- Choose a **mntner** to protect the new object

Create "inetnum" object

Please enter the maintainers you would like to use as mnt-by

Type maintainer name   🔍   ?

- Or choose a **person** object for admin-c (only mntners)

Create "mntner" object

Please select your administrative contact before creating the shared maintainer object

🔍   ?

Don't have an administrative contact? Create maintainer and person pair

Creating an object (3)

Create "inetnum" object

[✎ Create in text area]

Please enter the maintainers you would like to use as mnt-by

`EXAMPLE-LIR-MNT ★ ✕`

inetnum

Specifies the range of IPv4 addresses in dash or CIDR notation.

netname

The name of the range of IP address space.

country

Identifies the country as a two-letter ISO 3166 code, e.g. NL

admin-c

Nic-handle of an administrative contact.

tech-c

Nic-handle of a technical contact.

status

Specifies the kind of resource.

source

RIPE

By submitting this form you explicitly express your agreement with the RIPE Database Terms and Conditions

Cancel   Submit

Creating an object (4)

Your object has been successfully created

inetnum with primary key "193.0.30.0 - 193.0.30.255"

```
inetnum:          193.0.30.0 - 193.0.30.255
netname:          CUSTOMER-NETWORK-001
descr:            The IPv4 network of customer 001
country:          NL
admin-c:          GV5919-RIPE
tech-c:           GV5919-RIPE
status:           ASSIGNED PA
mnt-by:           EXAMPLE-LIR-MNT
created:          2015-12-24T10:02:59Z
last-modified:    2015-12-24T10:02:59Z
source:           RIPE
```

Questions ?

Getting Resources

Section 5

Terminology

- **Allocation**

  - Block of IP addresses reserved for future use

- **Assignment**

  - A chunk of addresses from an allocation that is used:

  - in your own infrastructure

  - in an End User network

Types of Address Space

- **PA = Provider Aggregatable**

  - Blocks given to LIRs

  - Distributed further to other users

  - When customers change ISP, the IPs go back to LIR

- **PI = Provider Independent**

  - Blocks given directly to a user for their own network

  - User takes IPs with them if they change ISP

PA versus PI

Internet

Provider Aggregatable

Provider Independent

ISP 1

ISP 2

ISP 1

ISP 2

PA Alloc. 1

PA Alloc. 2

PA Assign

PA Assign

PI
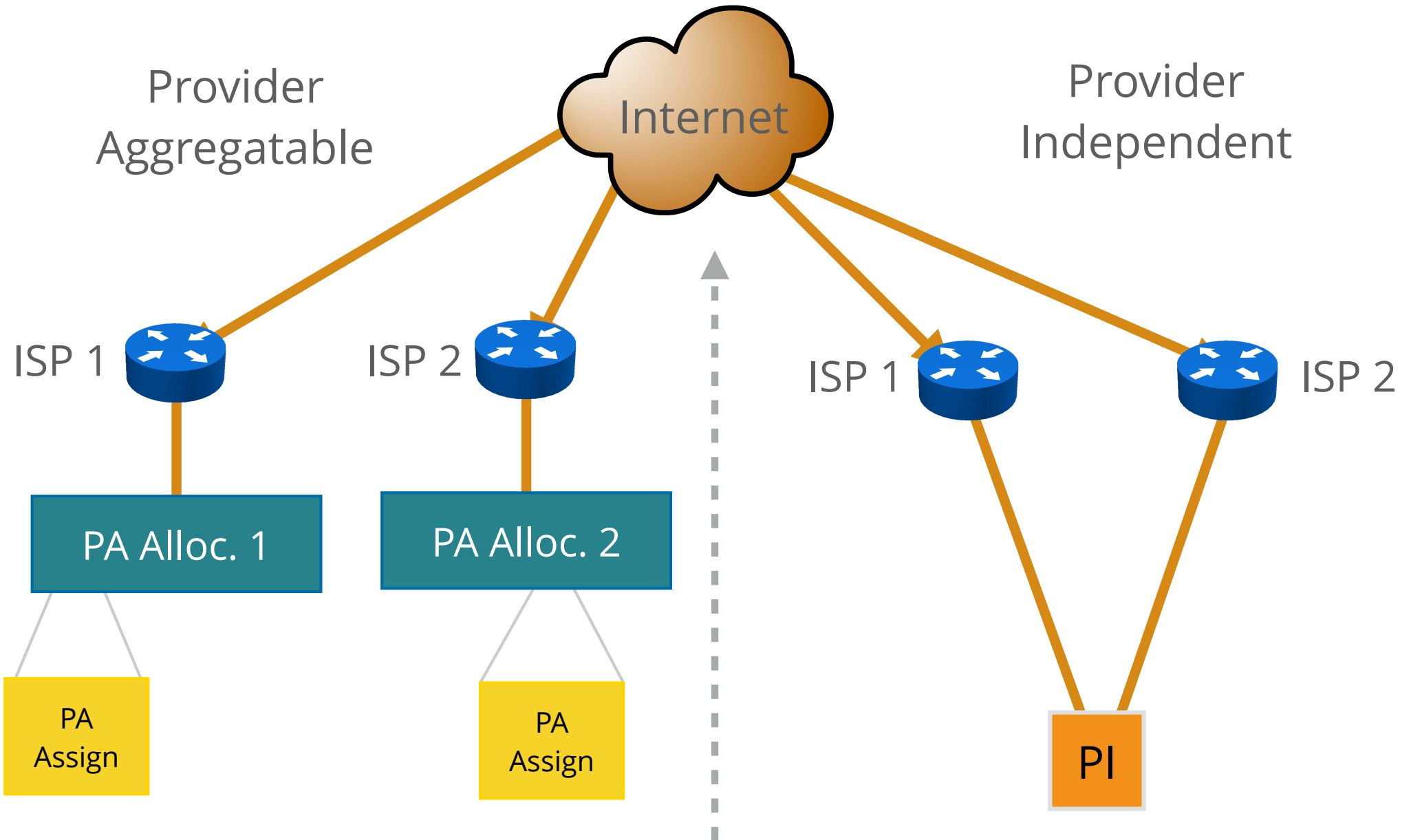
IPv4: **How it used to be**

/**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 —

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

How it works for IPv6

IANA — IANA distributes **2000::/3**

RIR — **The RIPE NCC** receives **ALLOCATIONs → /12s**

LIR — **LIRs** receive **ALLOCATIONs → /32, /29...**

ISP — **SUB-ALLOCATIONs**

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

Sub-allocations

IANA: Global Internet Numbers Pools

RIR: Reserved for future use: **Allocations**

LIR: Reserved for future use: **Allocations**

ISP: Reserved or partitioned: **Sub-allocations**

Users: In use:

First IPv6 Allocation

- Have **mntner**, **person** and **role** objects ready

- Submit the First IPv6 Allocation Request form

  - Have a plan for making assignments within two years

- Minimum allocation size is /32

  - Up to a /29 without additional justification

  - More if justified by customer numbers and the extent of the infrastructure

  - Additional bits based on hierarchical and geographical structure, planned longevity and security levels

Requesting an IPv6 PI Assignment

- PI Assignment for End-Users need a Sponsoring LIR

- Needs **organisation**, **person, role** and **mntner** objects

- Minimum size = /48

- You must provide:

    - PI Assignment Request Form

    - End User Assignment Agreement

    - Company registration document or picture ID (for a private individual)

IPv6 PI Assignments

- Cannot be further sub-assigned to other organisations

- Allowed to give separate addresses (not prefixes) to:

    - Visitors, server or appliance, point-to-point link to 3rd party

inet6num:	2001:db8:1234::/48
descr:	Some PI Assignment
status:	ASSIGNED PI
mnt-by:	RIPE-NCC-END-MNT
mnt-by:	ENDUSER-MNT
mnt-routes:	ENDUSER-MNT
mnt-domains:	ENDUSER-MNT

- Yearly charges for PI Assignments

    - See the RIPE NCC Charging Scheme

IPv4 Allocation: The Waiting List

- Submit the IPv4 Allocation Request form

  - Use the same **mntner**, **person**/**role** objects from the IPv6 allocation

- Each LIR is put on the first-come-first-served waiting list to get **one /24** block

  - = 256 IPv4 addresses

- Cannot be transferred for **24 months** after receiving it

IPv4 PI Assignments

- Since IPv4 exhaustion, **no new PI assignments**

- No sub-assigning allowed

- Yearly charges for PI Assignments

  - See the RIPE NCC Charging Scheme

- **Convert** LIR PI assignments into PA allocations

Autonomous System Numbers

- **Assignment requirements**

  - Address space

  - Multihoming

  - One AS Number per network

- For LIR itself

- For End User

  - Sponsoring LIR requests it for End User

- **32-bit is the default**

PI / ASN and Sponsoring LIR

- Options for End Users without sponsoring LIR holding PI / ASN:

    - Sign End User Agreement with an LIR

    - Become an LIR themselves

    - Return the resources

- Sponsoring LIR is published in the RIPE Database

    - "sponsoring-org:" attribute

Getting IPs and ASNs

Demonstration

Transfers

Section 6

Types of Transfers

PA allocations
between RIPE NCC members

PI assignments
between End Users

AS numbers
between End Users

Merger or Acquisition

From Legacy Space

Inter-RIR

AS Number Transfers

TEMPORARY   PERMANENT
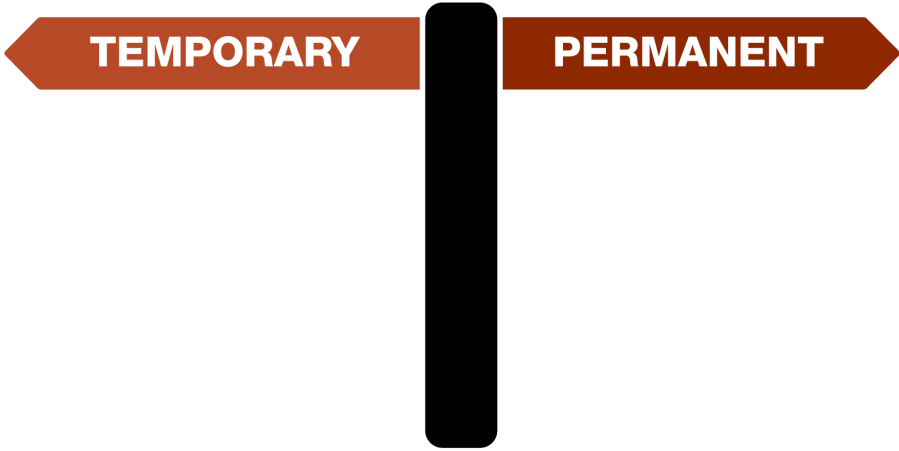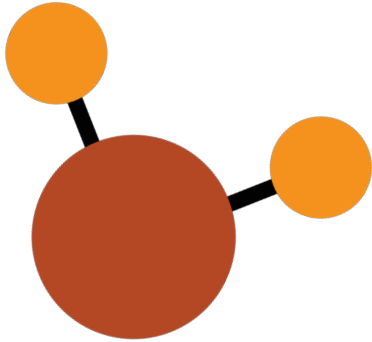
SPONSORED BY
YOUR LIR

IPv4 Allocation Transfers

LIR ➡ **LIR**

SIZE LIMIT /22

TEMPORARY | PERMANENT

KEEP CALM

No transfer within 24 months

IPv4 PI Assignment Transfers

SIZE LIMIT /24

KEEP CALM

No transfer within 24 months

TEMPORARY | PERMANENT
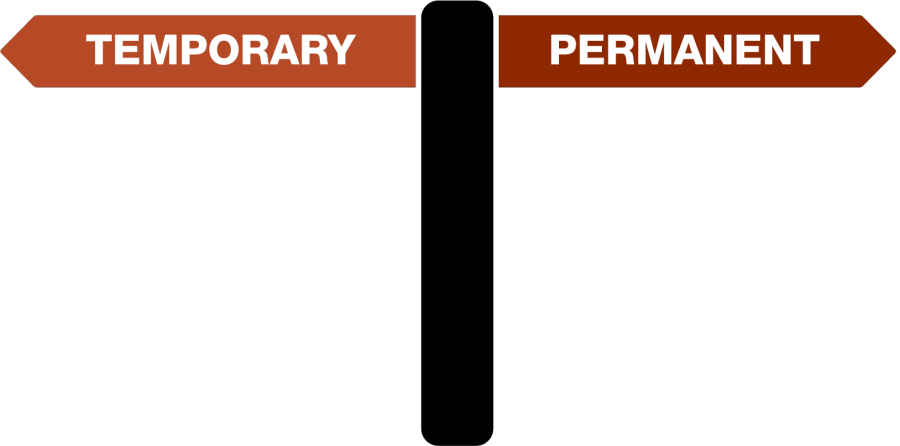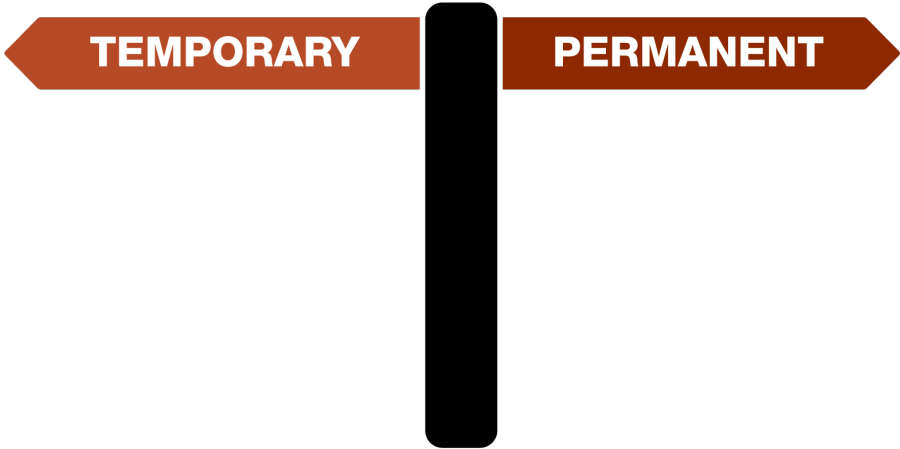
SPONSORED BY
YOUR LIR

Transfers Restrictions

IPv4 or 16-bits ASN

Received from RIPE NCC

<24 MONTHS → **Transfer to another LIR?** → **NO**

MERGER

<24 MONTHS → **Transfer to another LIR?** → **NO**

<24 MONTHS → **Merge/ Acquisition with another LIR with resources?** → **YES**
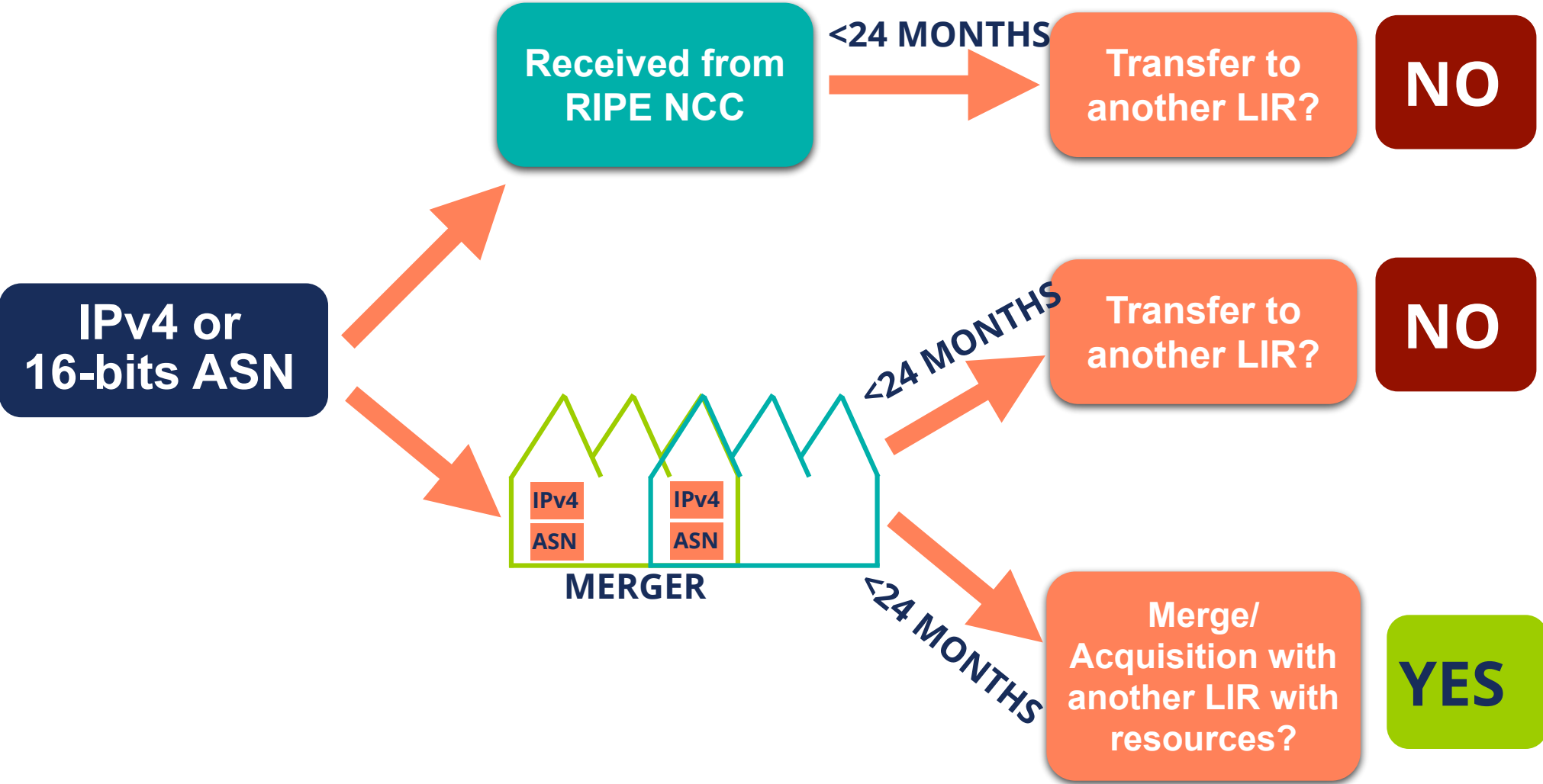
IPv6 Allocation Transfers

LIR ➡ **LIR**

MIN
SIZE
/32

TEMPORARY | PERMANENT
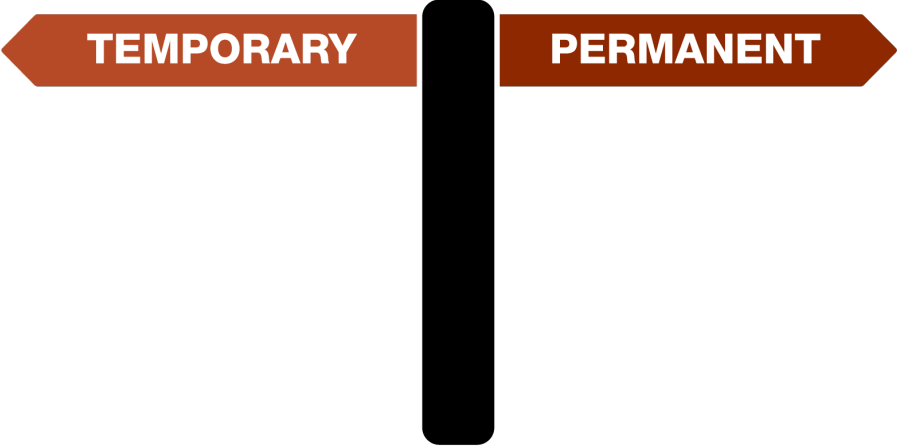
IPv6 PI Assignment Transfers

MIN SIZE /48

TEMPORARY | PERMANENT
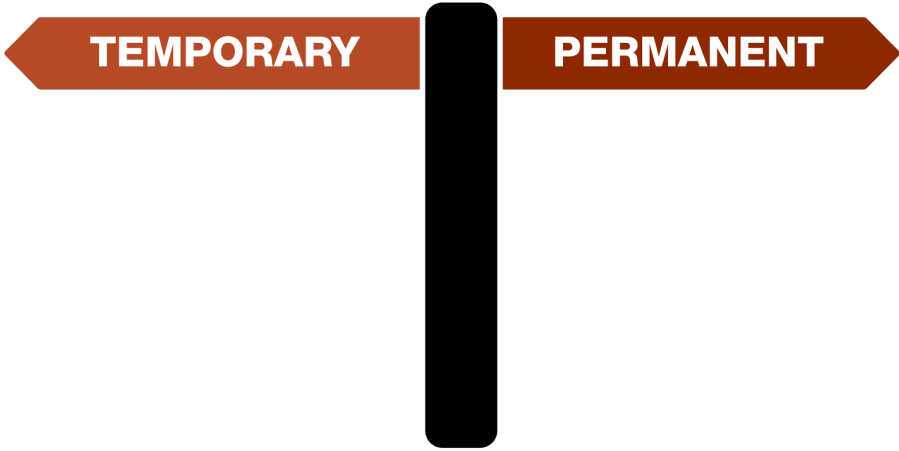
SPONSORED BY
YOUR LIR

Transfers: How to Request

- Use the "**Request Transfer**" wizard

- Include the following information & documents:

  - IPv4 / IPv6 / ASN being transferred

  - company names and contact details

  - company registration papers

  - Transfer Agreement

  - information why it needs to be transferred

  - **For PI transfers, sponsoring LIR agreement is needed too**

Inter-RIR Transfers
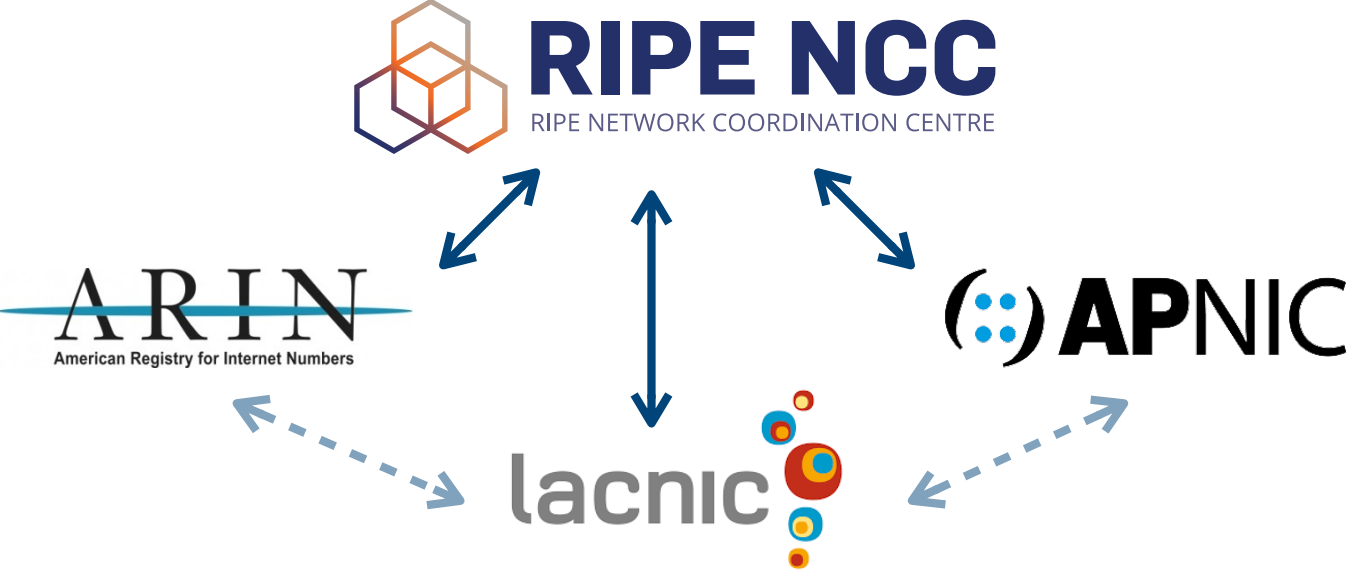
- Between RIRs with compatible policies (ARIN, APNIC, LACNIC)

- IPv4 addresses and AS Numbers (including legacy)

- Send your request to inter-rir@ripe.net

Questions ?

Distributing Resources

Section 7

How Much Address Space?

- Think about how the network will be split up

- Subnets are used to group hosts
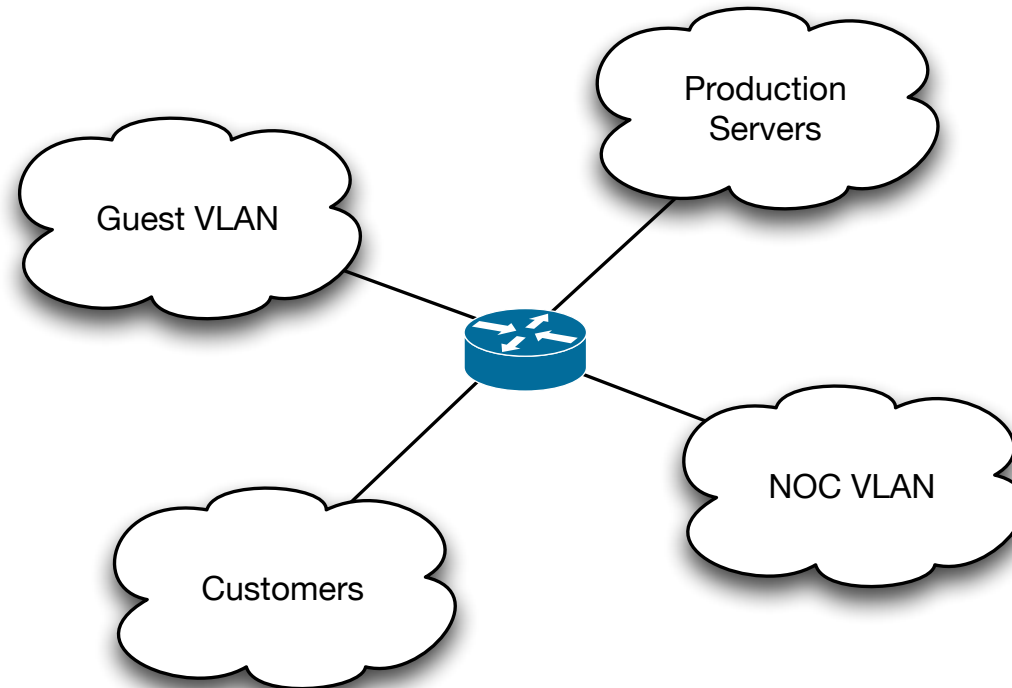
- Calculate how much address space you will need!

IPv4 Subnets

- 3 IPs required for each subnet

  - network

  - broadcast

  - gateway

- Usable IPs = [subnet size] - 3 IPs

  - /24 = 256 IPs = 256 - 3 = 253 usable IPs

IPv6 Subnets

/64 = 1 subnet = 18,446,744,073,709,551,616 IPs

...

/60 = 16 subnets

...

/56 = 256 subnets

...

/52 = 4096 subnets

...

/48 = 65536 subnets
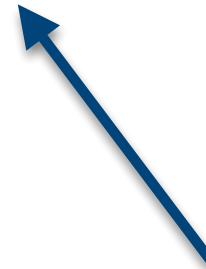
*In **IPv6**,
amount of hosts
in a subnet is
irrelevant!*

IPv6 Assignments

- Default IPv6 subnet = **/64**

- Every "end site" can be assigned between /64 and larger without prior approval of the RIPE NCC

  - Keep assignment documentation in case of audit!

- Assignments for your own infrastructure

  - /48 per Point of Presence

  - Additional /48 for the core network

Making Assignments

Activity 3

Activity: Making assignments

- **Time**

    - 30 minutes

- **Goal**

    - Understand and practice the Assignment Process

- **Task**

    - Ask the End User for more information, if needed

    - Decide the assignment sizes

    - How would you document the assignments?

Making assignments - Solution

- IPv4

Service	Now	1 Year	2 Years	IPv4 Prefix
Shared Webhosting	(150/10) + 3 = 18 IPs	(300/10) + 3 = 33 IPs	(600 / 10) + 3 = 63 IPs	**/26**
SSL Webhosting	7 + 3 = 10 IPs	14 + 3 = 17 IPs	28 + 3 = 31 IPs	**/27**
Infrastructure	10 + 3 = 13 IPs			**/28**

- IPv6

- A prefix with at least 3 /64s. Make it easy, use a **/48**

IPv6 Registration in the Database

- All assignments and sub-allocations must be registered to make them valid!

Assignment

inet6num:	2001:db8:aaaa::/48
descr:	Customer 321
country:	EU
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	**ASSIGNED**
mnt-by:	LIR-MNT

Sub-allocation

inet6num:	2001:db8:f000::/36
descr:	Branch office #1
country:	EU
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	**ALLOCATED-BY-LIR**
mnt-by:	LIR-MNT

Grouping Customer Assignments

inet6num: 2001:db8::/36

descr: DSL customers
admin-c: LA789-RIPE
tech-c: LA789-RIPE
status: **AGGREGATED-BY-LIR**
assignment-size: **48**
mnt-by: LIR-MNT

inet6num: 2001:db8:103::/48

inet6num: 2001:db8:102::/48

inet6num: 2001:db8:101::/48

inet6num: 2001:db8:100::/48

descr: Customer 321
country: EU
admin-c: LA789-RIPE
tech-c: LA789-RIPE
status: ASSIGNED
mnt-by: LIR-MNT
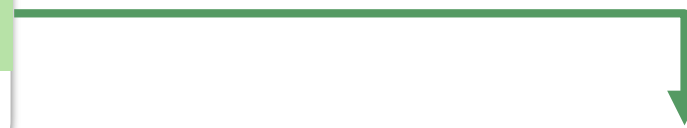
IPv4 Resources

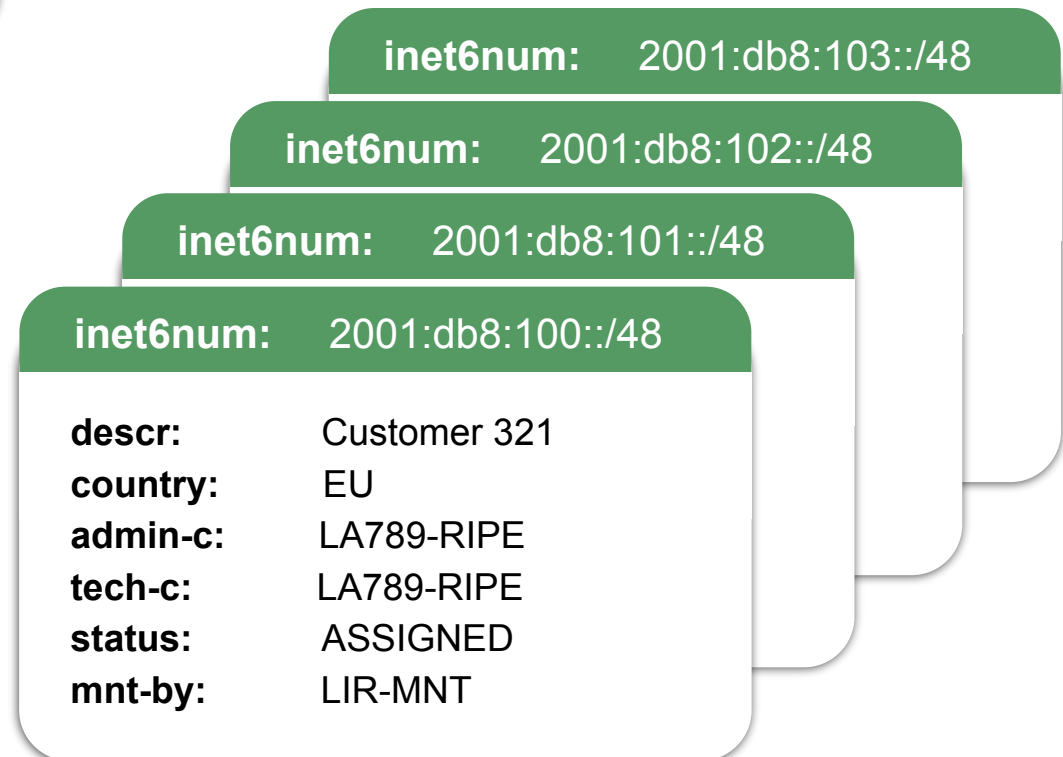- LIRs are allocated only one /24

  - More IPv4 space through transfers

  - Assignment size is limited to total of IPv4 space an LIR holds

- All assignments must be registered correctly in the RIPE Database

http://www.ripe.net/ripe/docs/ipv4-policies.html

IPv4 Registration in the Database

- All assignments and sub-allocations must be registered to make them valid!

Assignment

inetnum:	10.0.3.0 - 10.0.3.255
descr:	Customer 321
country:	EU
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	**ASSIGNED PA**
mnt-by:	LIR-MNT

Sub-allocation

inetnum:	10.0.1.0 - 10.0.2.255
descr:	Branch office #1
country:	EU
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	**SUB-ALLOCATED PA**
mnt-by:	LIR-MNT

Grouping Customer Assignments

inetnum:	10.5.0.0 - 10..5.7.255
descr:	DSL customers
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	**AGGREGATED-BY-LIR**
assignment-size:	**29**
mnt-by:	LIR-MNT
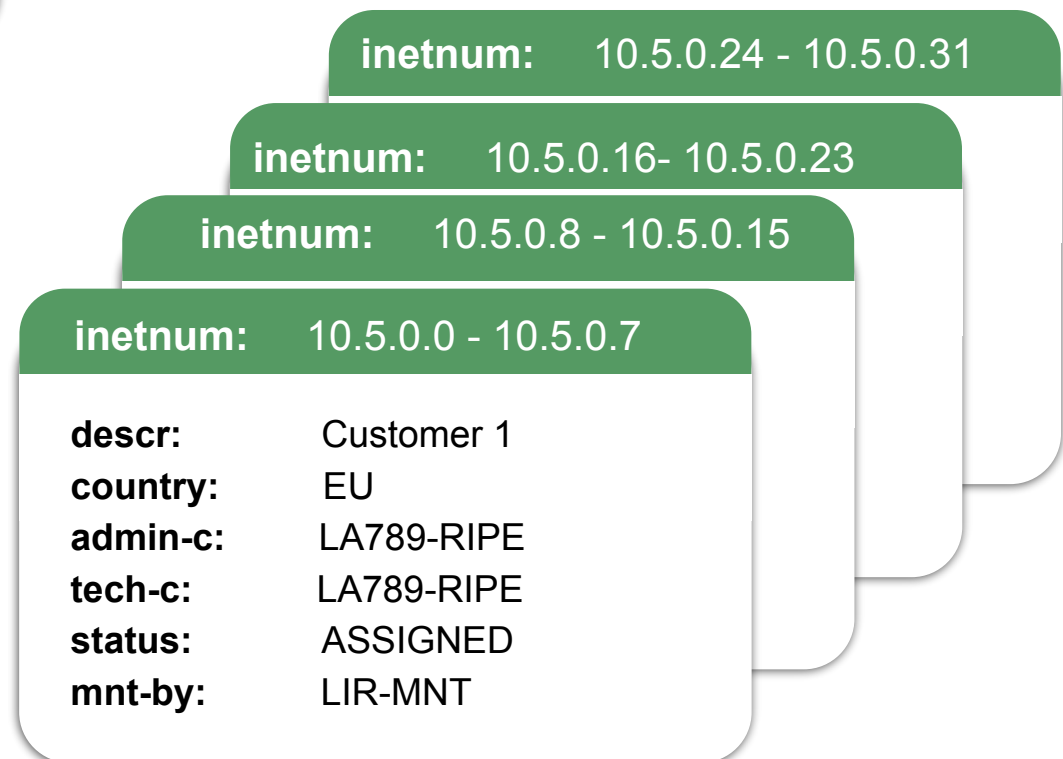
inetnum:	10.5.0.24 - 10.5.0.31

inetnum:	10.5.0.16- 10.5.0.23

inetnum:	10.5.0.8 - 10.5.0.15

inetnum:	10.5.0.0 - 10.5.0.7
descr:	Customer 1
country:	EU
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	ASSIGNED
mnt-by:	LIR-MNT

Infrastructure vs. End User

Infrastructure

Blocks for connections to
End Users:

- Point of Presence
- Point-to-Point
- Broadband address pools

(Also LIRs own network)

End User

Their equipment,
their location

- End User networks
- Offices
- Co-located subnets

Infrastructure vs. End User

Infrastructure

Blocks for connections to End Users:

• **Point of Presence**
• **Point-to-Point**
• **Broadband address pools**

(Also LIRs own network)

Grey Area

Co-location
Server housing
Web hosting
Application Services

End User

Their equipment, their location

• **End User networks**
• **Offices**
• **Co-located subnets**

When the End User has a few addresses out of a larger address block

If the End User has a separate subnet

Registering the Assignments

Activity 4

Activity: Registering an Assignment

- **Time**

  - 25 minutes

- **Goal**

  - Practice how to register an assignment

- **Task**

  - Use the assignment from the previous activity

  - Choose the range(s) from your allocation

  - Create the inetnum and inet6num objects in the TEST RIPE Database

Managing Resources

Section 8

Managing IPv6 Address Space

- **Consider your mental health**

  - Use assignments on 4-bit boundary

- **Don't be too conservative**

  - Business customers often get a /48

  - /56 is a popular size for residential customers

- **Use "AGGREGATED-BY-LIR"**

  - to group assignments of the same size

Managing IPv4 Address Space

- LIRs can join the waiting list, and at some point get one /24 allocation (can be done only once)

  - Make **classless** assignments

  - **inetnum** does not have to be CIDR

  - Do not fragment your allocation

- **Need** is not a criteria for obtaining more IPv4 address space

- Keep the **RIPE Database** up to date

ARC

- **Assisted Registry Check**

Registry Consistency	Resource Consistency	Route and rDNS Consistency
Legal Name and Status of LIR	IPv4 Resources	Routing Registry vs BGP Announcements
Postal Address	IPv6 Resources	Lame Reverse Delegations
Telephone and Fax Numbers	Independent Resources	Network Reachability
Registry Contacts		
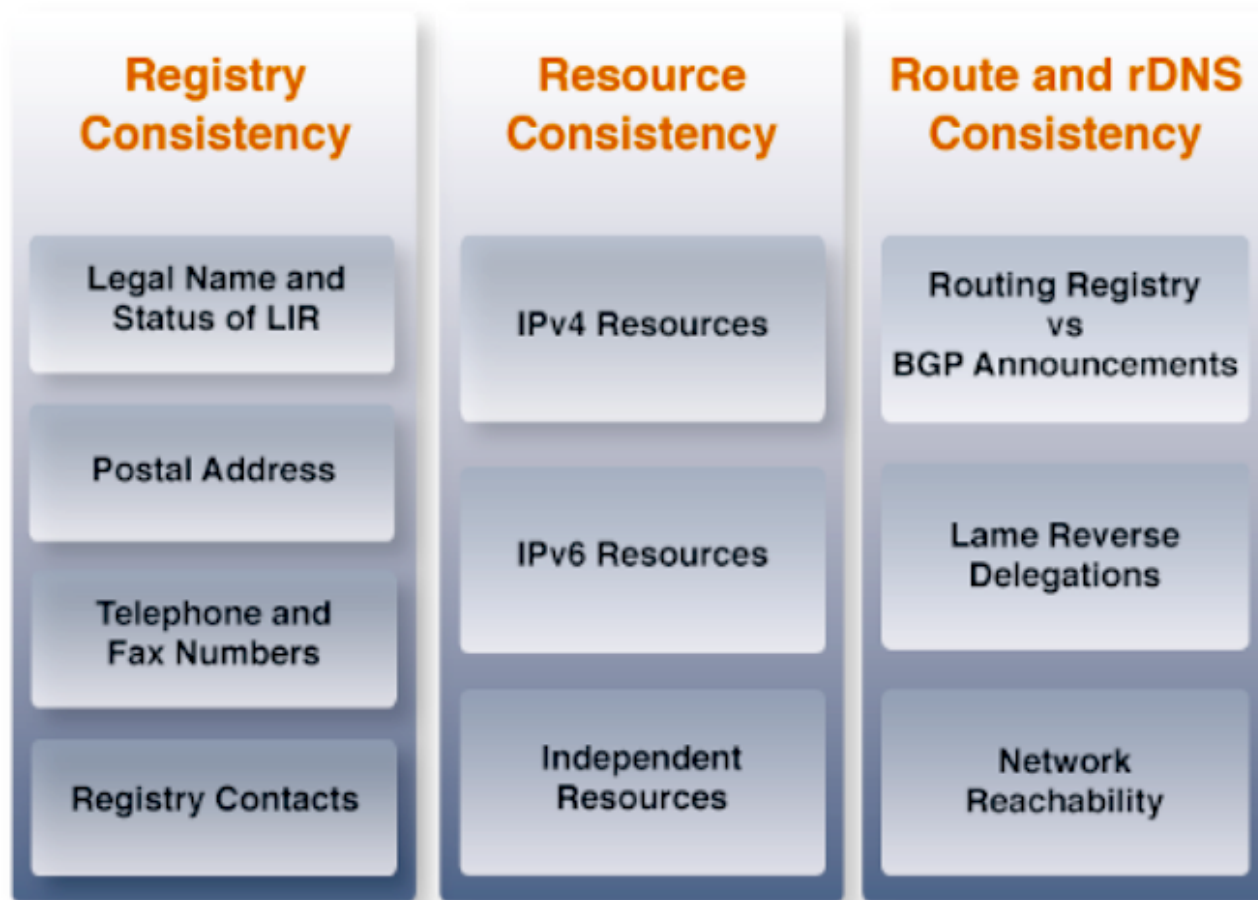
ARC Goals

- Keep registry clean and up to date

- Make you aware of any inconsistencies with the registry data

- Support you with your registration tasks

- Increase LIR account security

- Keep in touch with you!

RPKI Digital Resource Certificates

- Issue digital certificates along with the registration of Internet number resources

- Two main purposes:

  - Make the registry more robust

  - Making Internet routing more secure

- Added value comes with validation

  - The possibility to perform BGP Origin Validation

Using Certificates

- Certification is a free, opt-in service for LIRs

- Your choice to request a certificate

    - Linked to your membership

    - Renewed every 12 months

    - Available in LIR Portal

- Certificate does not list any identity information
    - That information is in the RIPE Database

- Digital proof you are the holder of a resource
    - and you're authorised to announce it

Being an LIR contact

Activity 5

Activity: Being an LIR Contact

- **Time**

  - 25 minutes

- **Goal**

  - Understand the tasks of an LIR contact

- **Scenario**

  - It is your first day as an LIR contact. In which order would you complete these tasks?

Solution: Tasks to be arranged

ID	Groups of Tasks
1)	Get access / rights to the RIPE Database information related with your LIR
2)	Check / Update your registration information (LIR Portal)
3)	Revise / Update your LIR's objects in the RIPE Database
4)	Manage the resources for your LIR (IPs and ASNs)
5)	Get Access to the Management Web Interface

ID	TASKS
a)	Check / update LIR Certificate and certified authorisation for announced prefixes (RPKI Dashboard)
b)	Correct invalid and unused assignments in the RIPE Database
c)	Compare the resources assigned to your LIR with the RIPE Database
d)	Ask the RIPE NCC to update any out-dated LIR information you can't update yourself
e)	Add the object representing you in the DB (person object) to the object representing the LIR in the DB (role object)
f)	Create a RIPE NCC Access account, if you don't have one
g)	Request resources if needed (and possible)
h)	Check the LIR account information
i)	Create an object representing you in the RIPE Database, if you don't have one (person object)
j)	Check the User Accounts list in the LIR Portal (they have access to your LIR Portal)
k)	Make it possible for you to update LIR's objects created in the RIPE Database (Default LIR maintainer password or get your Access account associated with it)
l)	Correct any out-dated LIR information in the LIR Portal (User accounts, LIR Contact Info., etc.)
m)	Get access to the LIR portal (add your Access Account to User Accounts in LIR Portal)
n)	Check what resources your LIR has

Solution

Task Related With…	Group of Tasks	Tasks
LIR Portal, containing registration information of the LIR (Private Information Kept by RIPE NCC)	**5) Get Access to the Management Web Interface**	**f)** Create RIPE NCC Access account
		m) Get access to the LIR Portal
	2) Check / Update your registration information (LIR Portal)	**j)** Check the User Accounts list in Portal
		h) Check the LIR account information
		n) Check what resources your LIR has
		l) Correct out-dated LIR info in Portal
		d) Ask NCC to update out-dated LIR info
	4) Manage the resources for your LIR (IPs and ASNs)	**g)** Request resources if needed
		a) Update LIR Certificate (RPKI)
RIPE Database, containing information about numeric resources of the LIR and related contact information (Public information)	**1) Get access / rights to the RIPE Database information related with your LIR)**	**k)** Make it possible to update RIPE DB
		i) Create your person object in RIPE DB
	3) Revise / Update your LIR's objects in the RIPE Database	**e)** Add your person object to LIR role
		c) Compare LIR resources with RIPE DB
		b) Correct invalid assignm'ts in RIPE DB

Solution

Task Related With…	Group of Tasks	Tasks
LIR Portal, containing registration information of the LIR (Private Information Kept by RIPE NCC)	**5) Get Access to the Management Web Interface**	**f)** Create RIPE NCC Access account
		m) Get access to the LIR Portal
	2) Check / Update your registration information (LIR Portal)	**j)** Check the User Accounts list in Portal
		h) Check the LIR account information
		n) Check what resources your LIR has
		l) Correct out-dated LIR info in Portal
		d) Ask NCC to update out-dated LIR info
	4) Manage the resources for your LIR (IPs and ASNs)	**g)** Request resources if needed
		a) Update LIR Certificate (RPKI)
RIPE Database, containing information about numeric resources of the LIR and related contact information (Public information)	**1) Get access / rights to the RIPE Database information related with your LIR)**	**k)** Make it possible to update RIPE DB
		i) Create your person object in RIPE DB
	3) Revise / Update your LIR's objects in the RIPE Database	**e)** Add your person object to LIR role
		c) Compare LIR resources with RIPE DB
		b) Correct invalid assignm'ts in RIPE DB

Tips and Tools

Section 9

Lost Maintainer Password

- Go to https://apps.db.ripe.net/db-web-ui/fmp

- **Automated process**

  - Recovery link sent to "**upd-to:**" email address

- **Manual process**

  - Send statement & registration papers to us

  - After verification, we will send you an email with the recovery link

  - We will add your Access account to the maintainer

Protect Your Resources

- Maintain your contact info in the RIPE database

- Keep your User Accounts in the LIR Portal up to date

- Know the policies and procedures

- In case of questions, contact

  Registration Services

  lir-help@ripe.net

RIPE NCC Resource Quality Assistance

- Address distribution - no claims about routability

  - Assistance in case of filtering issues:

      - Help to establish a direct communication

      - Provide available contact details

      - Provide information about tools

- To reduce routability problems, the RIPE NCC:

  - Announces pilot prefixes of every newly allocated
    IP address block

  - Quarantines returned IP address space

RIPEstat

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

- Registry data, routing, reverse DNS, measurements & 3rd-party data

- Main interface: web-based widgets

  - also available as: CLI, data API & mobile

  - personalised via RIPE NCC Access

http://stat.ripe.net

RIPE Atlas: Active Measurements

- Next generation Internet measurement network

  - Gives a big picture about Internet traffic

- Currently 10,000+ active probes worldwide

- User Defined Measurements available for LIRs

  - ping, traceroute, DNS, SSL

- Set up IPv6 reachability test

http://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

http://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

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Academy

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RIPE NCC Certified Professionals

RIPE NCC Certified Professionals
IPv6 Fundamentals
Analyst

RIPE NCC Certified Professionals
RIPE Database
Associate

RIPE NCC Certified Professionals
BGP Security
Associate

RIPE NCC Certified Professionals
IPv6 Security
Expert

https://getcertified.ripe.net/
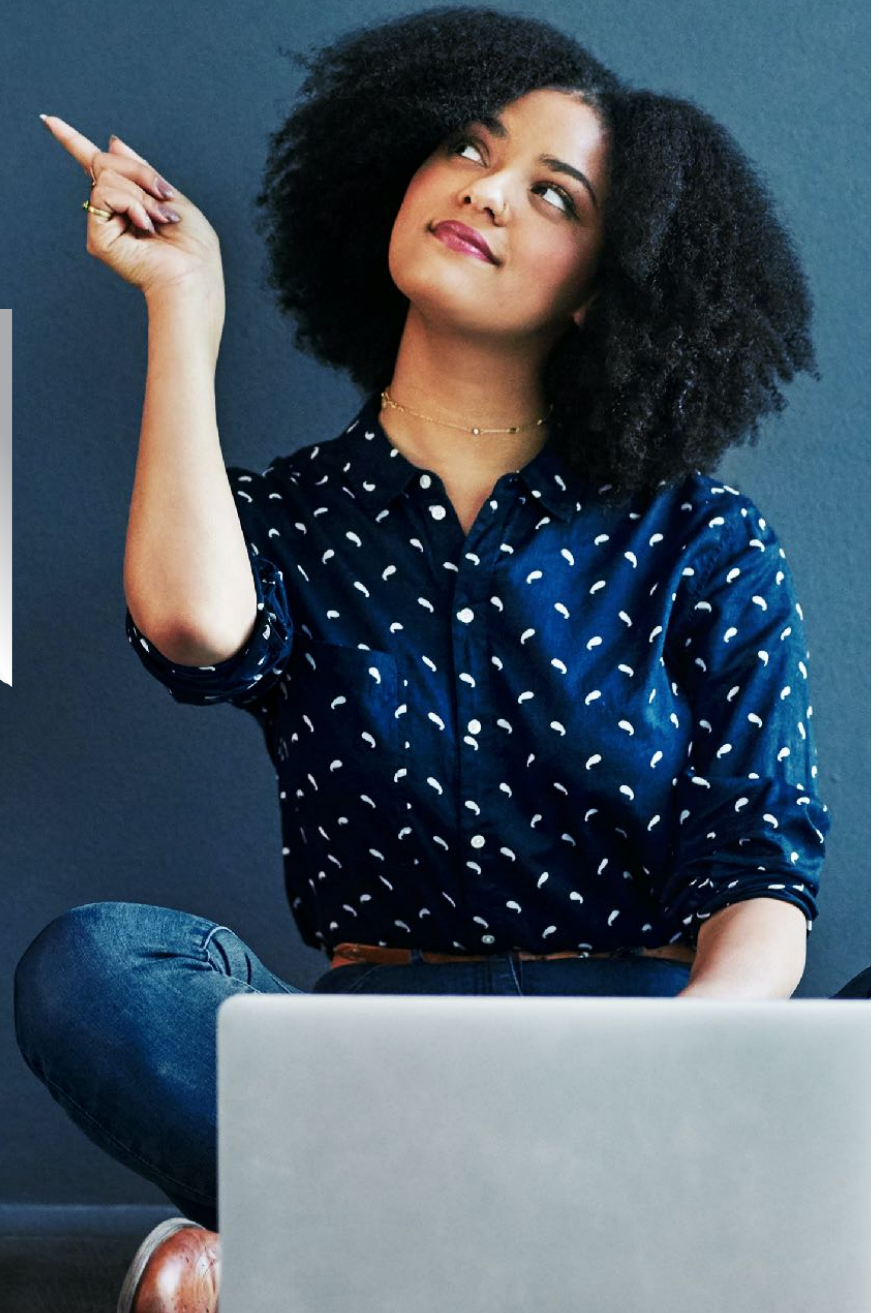
Have more questions? Ask us!

academy@ripe.net

We want your feedback!

What did you think about this session?

Take our survey at:

https://www.ripe.net/feedback/lir/

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