



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

RIPE Database Basics And Applications

Webinar for the Ukrainian Community

RIPE NCC Learning & Development



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being recorded**

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Agenda



The RIPE Database

Purpose of the Database

RIPE Database Objects

Contact Objects

Network Objects

Query the RIPE Database

Available interfaces

Default query results

Using flags and options

Inverse Lookups

Full Text Search

Create and update objects

Maintainer Objects

Authentication Mechanisms

Best practices

Updating objects



The RIPE Database

Purpose and Objects



RIPE Database

- Public Internet resource and routing registry database
 - Registry of **WHO** holds IPs and ASNs
 - Keep **contact information**
 - For troubleshooting, notifying of outages
 - Publishing **routing policies**
 - Provisioning **reverse DNS**





Try it out!

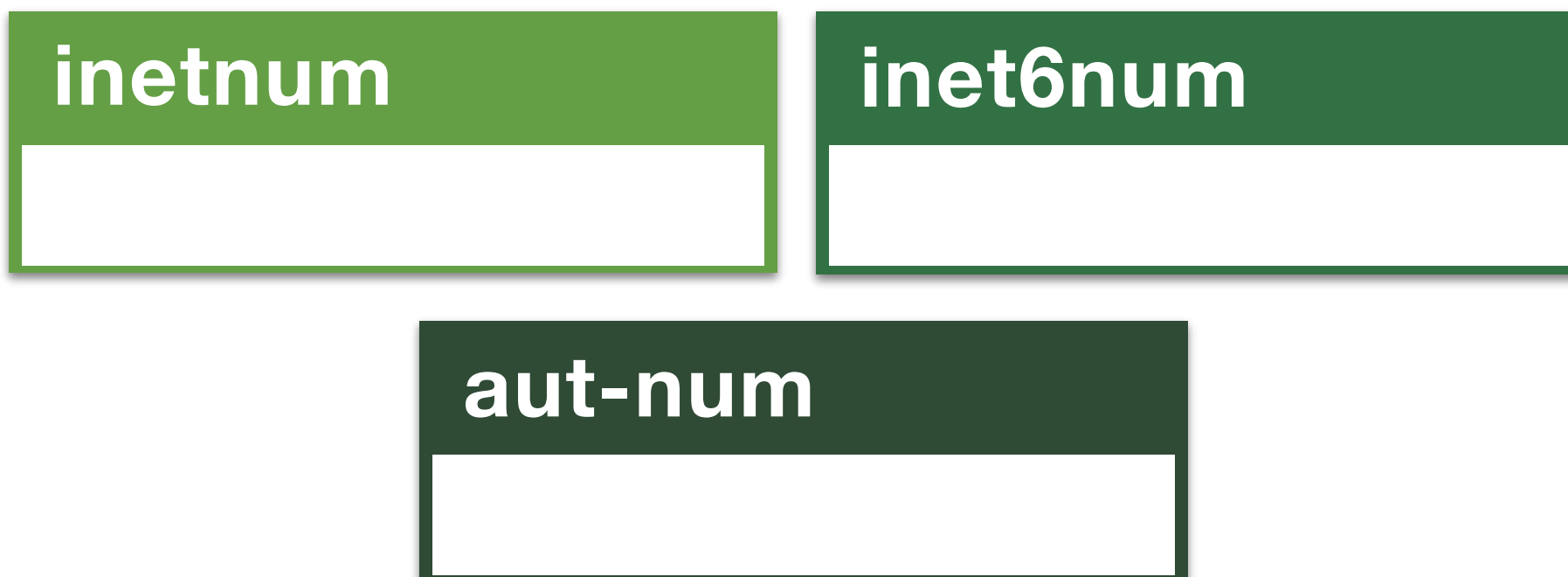
Go to apps.db.ripe.net

Search for **193.0.24.10**

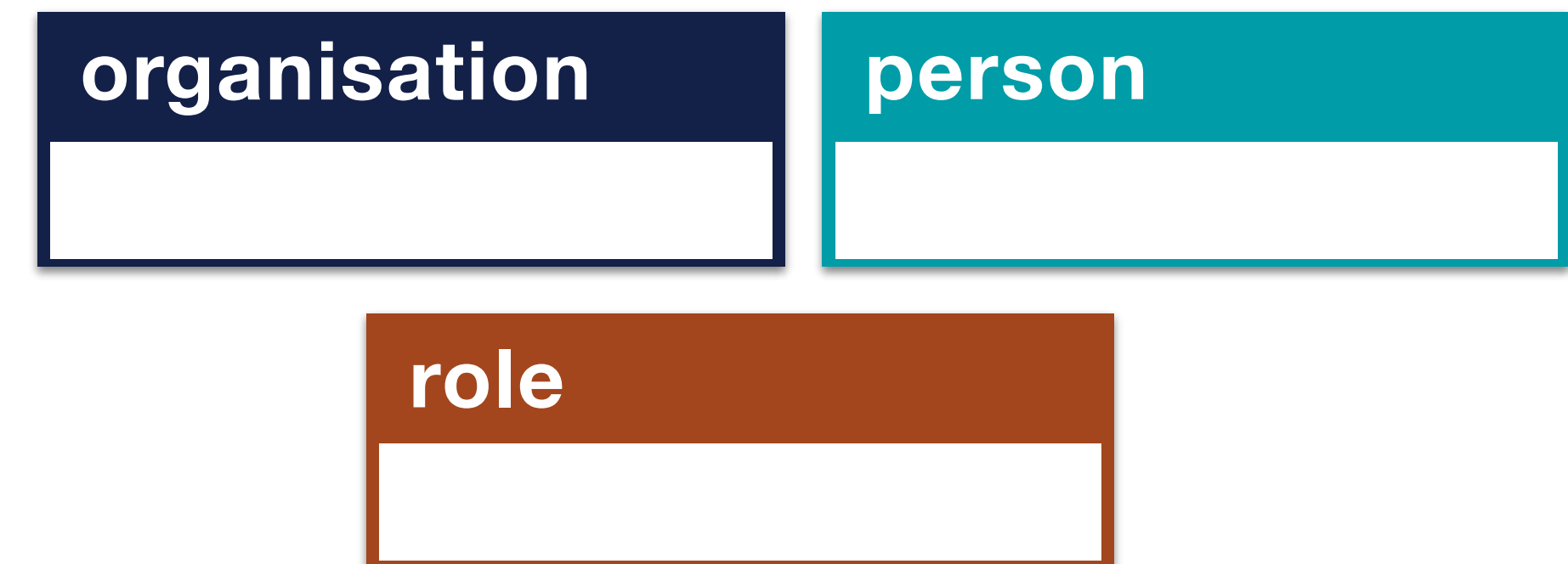
What did you find in the RIPE Database?



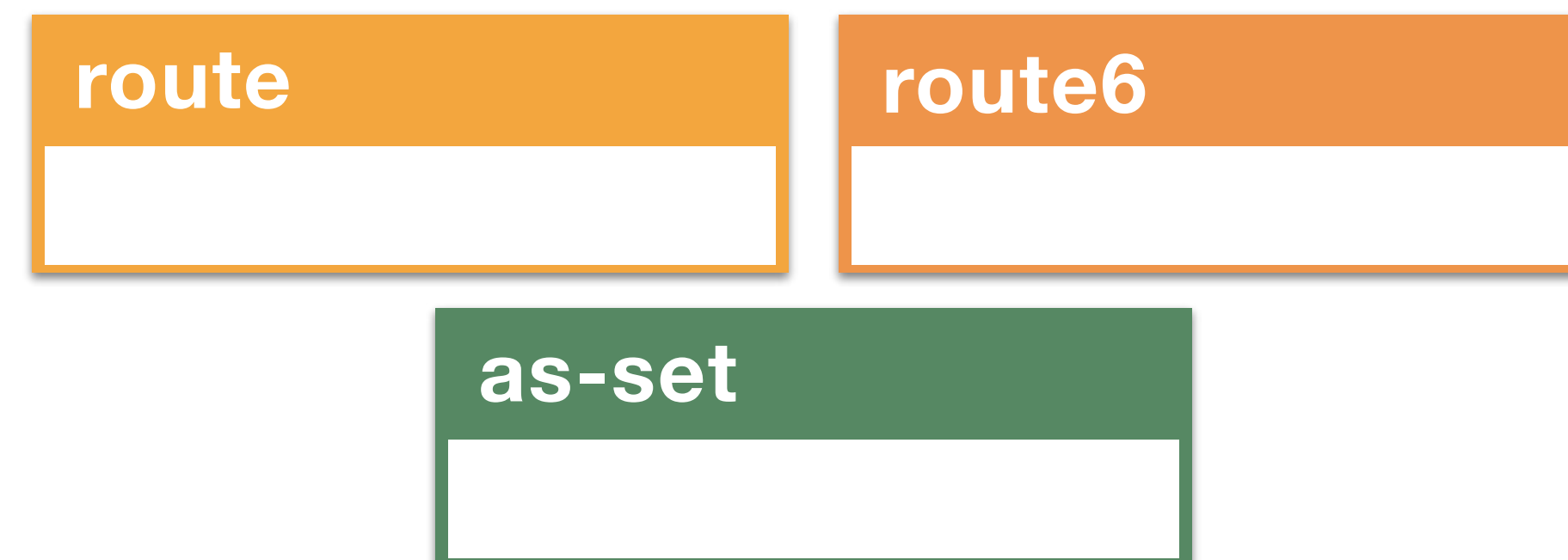
IPs and ASNs



Contact Information



Routing



Reverse DNS



Object Protection



Anatomy of an Object



Attributes

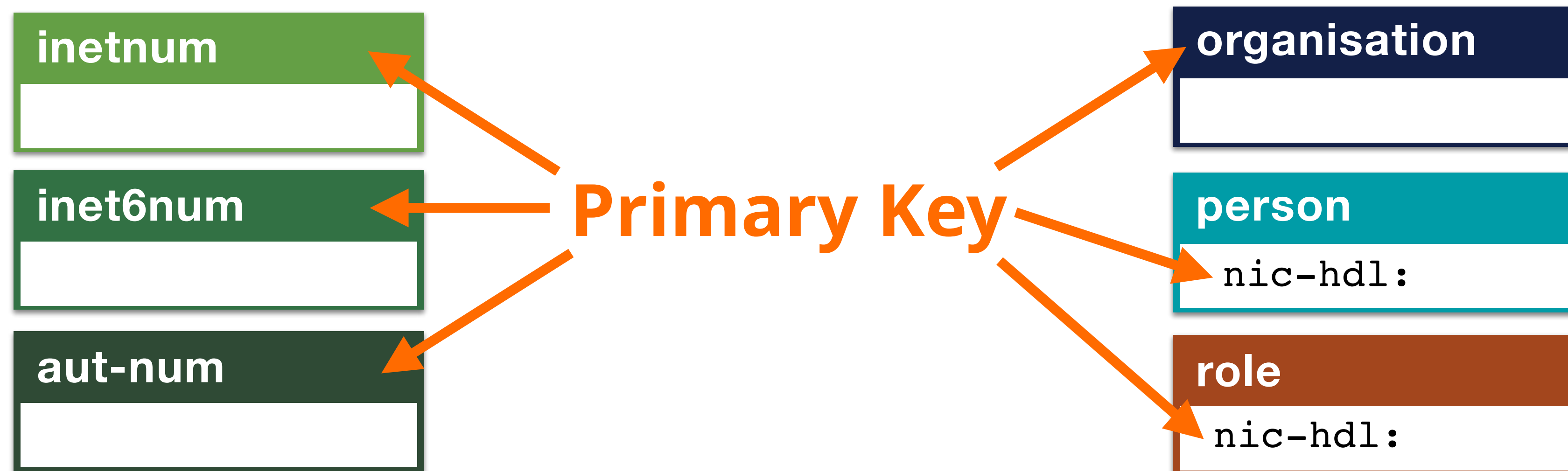
person:	Jean Blue
address:	Long Street 123
address:	76543 Big City
e-mail:	j.blue@example.com
nic-hdl:	JB0123-RIPE
mnt-by:	SECURITY-MNT
created:	(date & time)
last-modified:	(date & time)
source:	RIPE

Values



Primary Key

- Every object has one Primary Key
- It makes the object unique
 - Different from other objects of the same type



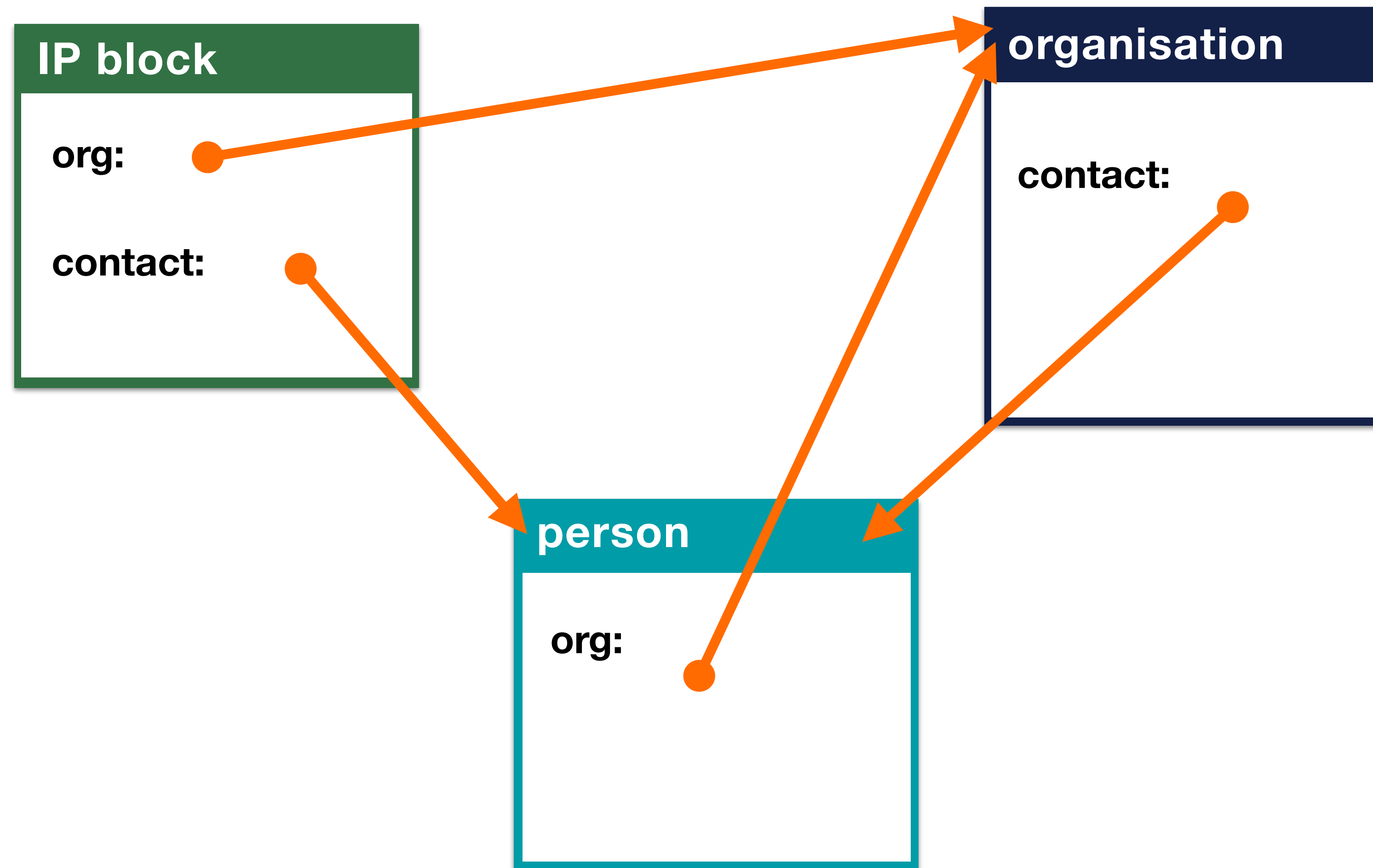
Lookup Keys



person:	Jean Blue
address:	Long Street 123
address:	76543 Big City
e-mail:	j.blue@example.com
nic-hdl:	JB0123-RIPE
mnt-by:	SECURITY-MNT
created:	(date & time)
last-modified:	(date & time)
source:	RIPE



Objects are Linked to Each Other





Questions





Contact Objects

How contact data is registered



organisation object

Has data about a company, institution or any other kind of organisation that has IP addresses and AS Numbers.



organisation

This is how you
can contact ORG
and who is
responsible



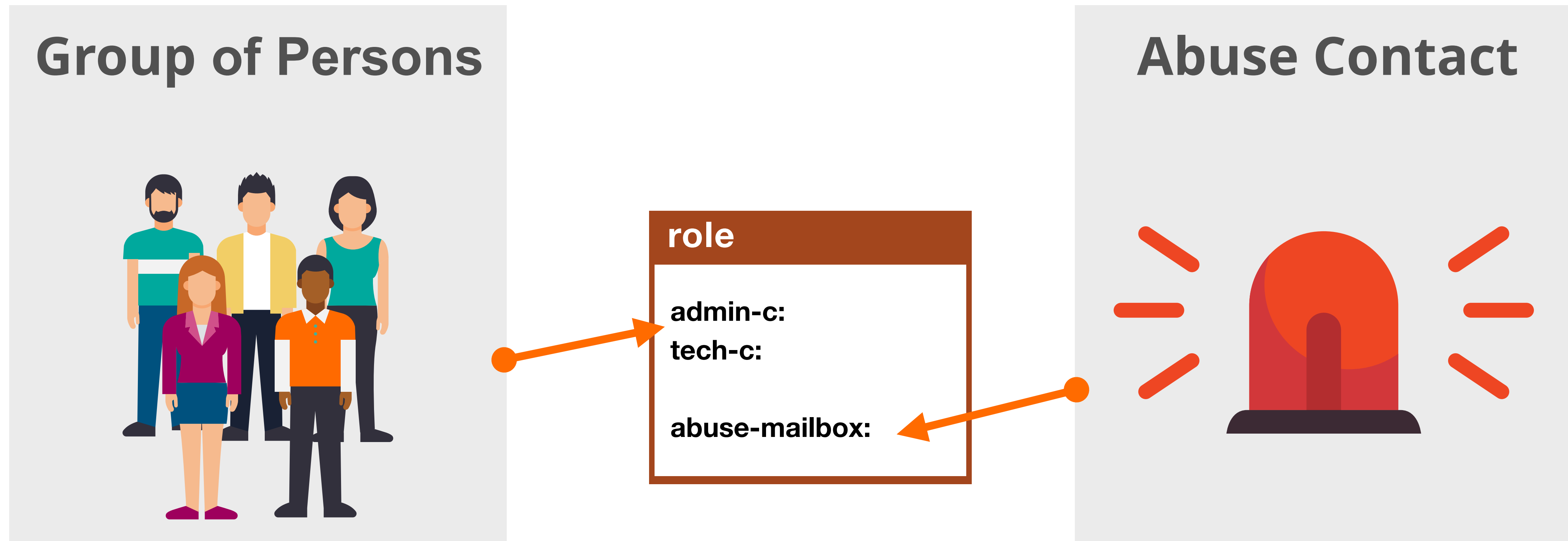
person object

Has data that can be used to contact a real person.



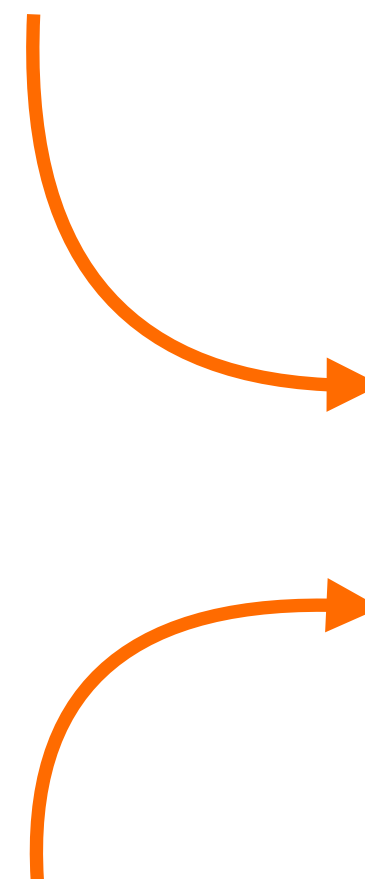
person
This is how you can contact me

role object



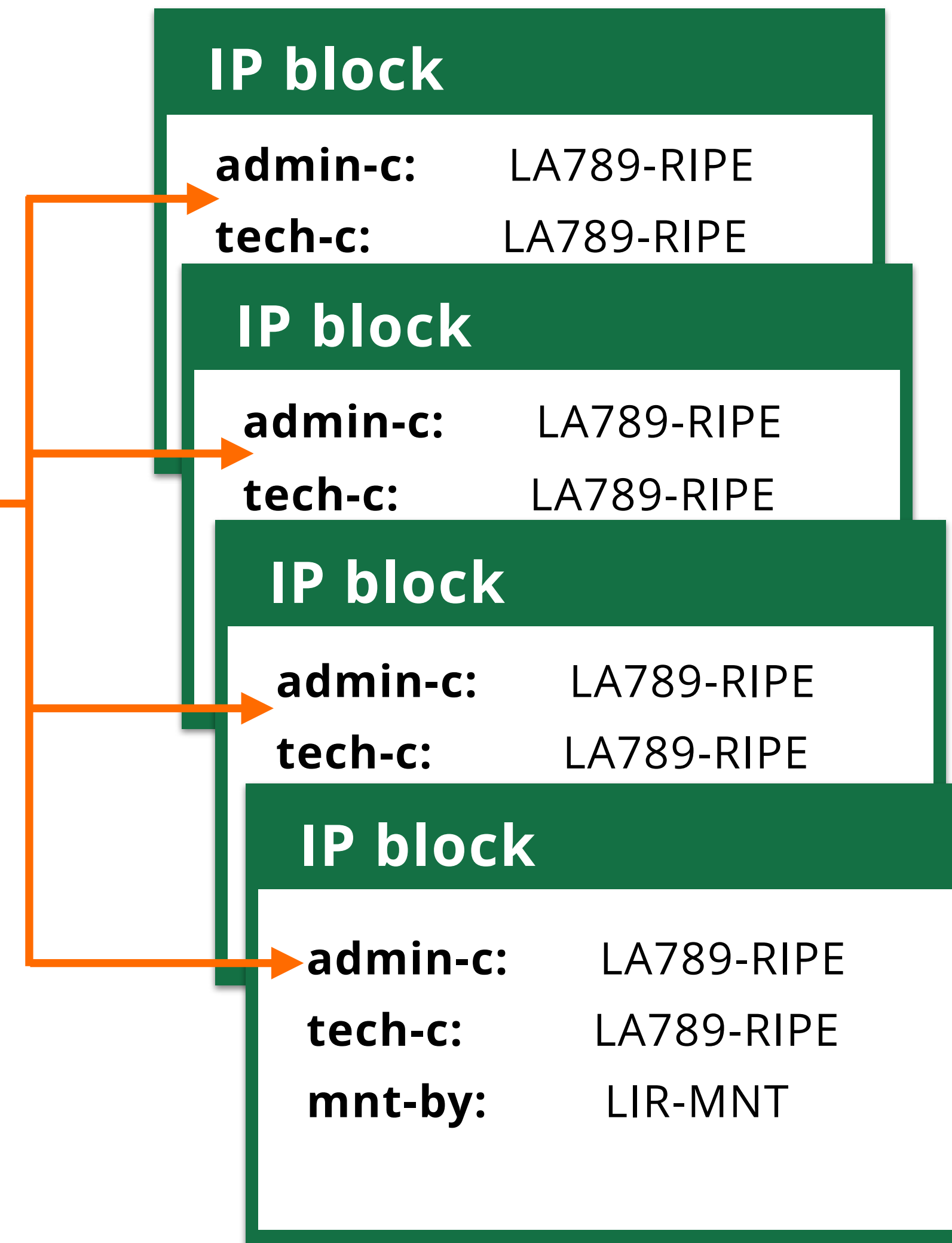


person: Jean Blue
nic-hdl: JB123-RIPE
address: Long Street 5
phone: +31 20 555 0101
email: jean@example.net
mnt-by: LIR-MNT



role: LIR Admin
nic-hdl: LA789-RIPE
admin-c: JB123-RIPE
tech-c: JB123-RIPE
admin-c: BW531-RIPE
tech-c: BW531-RIPE
mnt-by: LIR-MNT

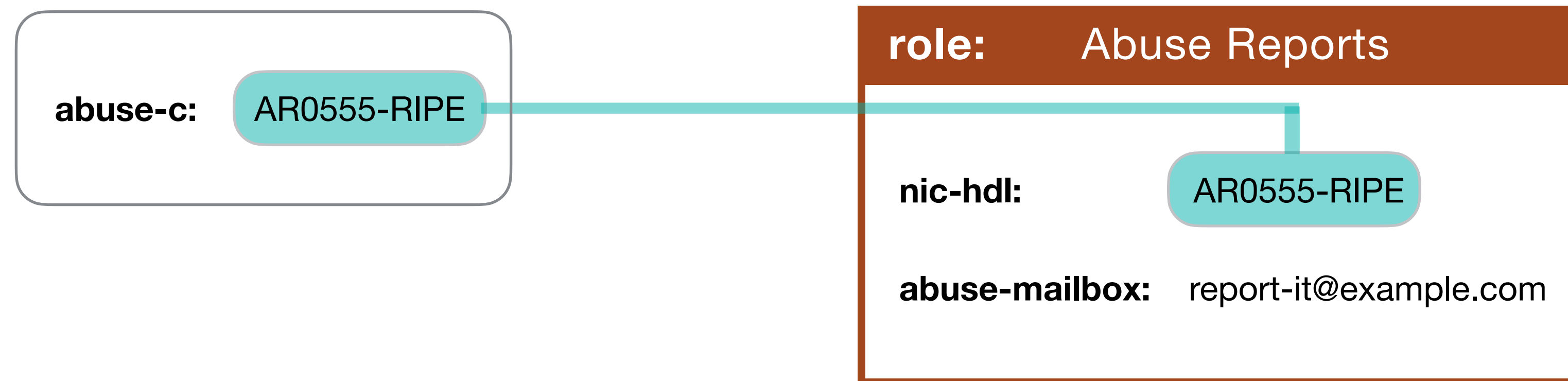
person: Betty White
nic-hdl: BW531-RIPE
address: Long Street 5
phone: +31 20 555 0101
email: betty@example.net
mnt-by: LIR-MNT





role object: Abuse Contact

- The **role** object contains the “abuse-mailbox:”
- Objects reference the **role** in “abuse-c:”
- RIPE Database shows the abuse contact in WHOIS query results





Network objects

How networks are registered



Network objects

IPv4 = inetnum

inetnum: 192.30.0.0 - 192.30.3.255

netname: NL-NETWORK-20170101
country: NL
org: ORG-EE2-RIPE
admin-c: DV789-RIPE
tech-c: JS123-RIPE
status: ALLOCATED PA
mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT
source: RIPE

IPv6 = inet6num

inet6num: 2001:db8::/32

netname: NL-NETWORK-20170101
country: NL
org: ORG-EE2-RIPE
admin-c: DV789-RIPE
tech-c: JS123-RIPE
status: ALLOCATED-BY-RIR
mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT
source: RIPE

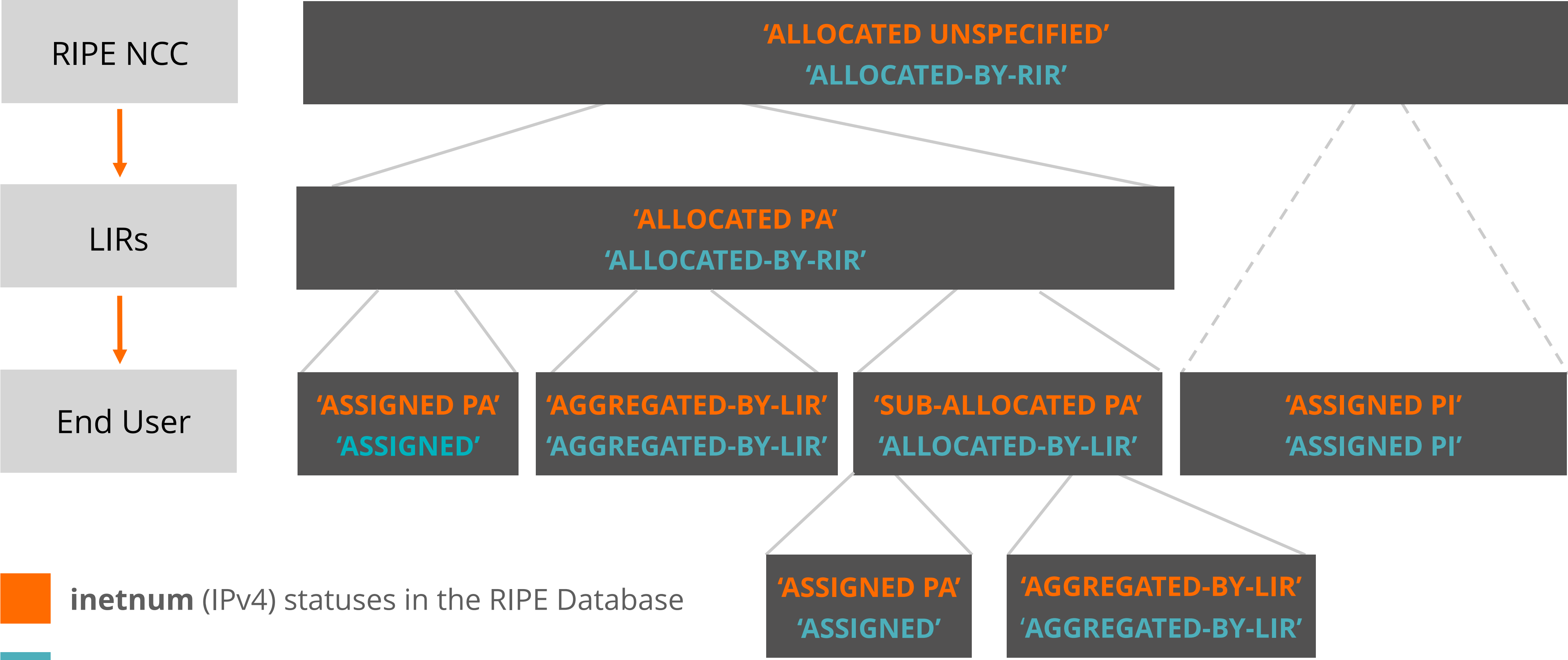


Same object structure for IPv4 and IPv6

Network	inetnum: IPv4 RANGE
	inet6num: IPv6 PREFIX
	netname: NETWORK-NAME
	country: ZZ
Contact information	org: ORG-ZZ123-RIPE
	admin-c: AD321-RIPE
	tech-c: TE123-RIPE
Type of address space	status: ALLOC-ASSIGN
Protection of object	mnt-by: RIPE-NCC-HM-MNT
	mnt-by: DEFAULT-LIR-MNT
	source: RIPE



Object Status Hierarchy



 **inetnum** (IPv4) statuses in the RIPE Database

 **inet6num** (IPv6) statuses in the RIPE Database



Questions





Querying

Default results, flags and options



Querying the RIPE Database

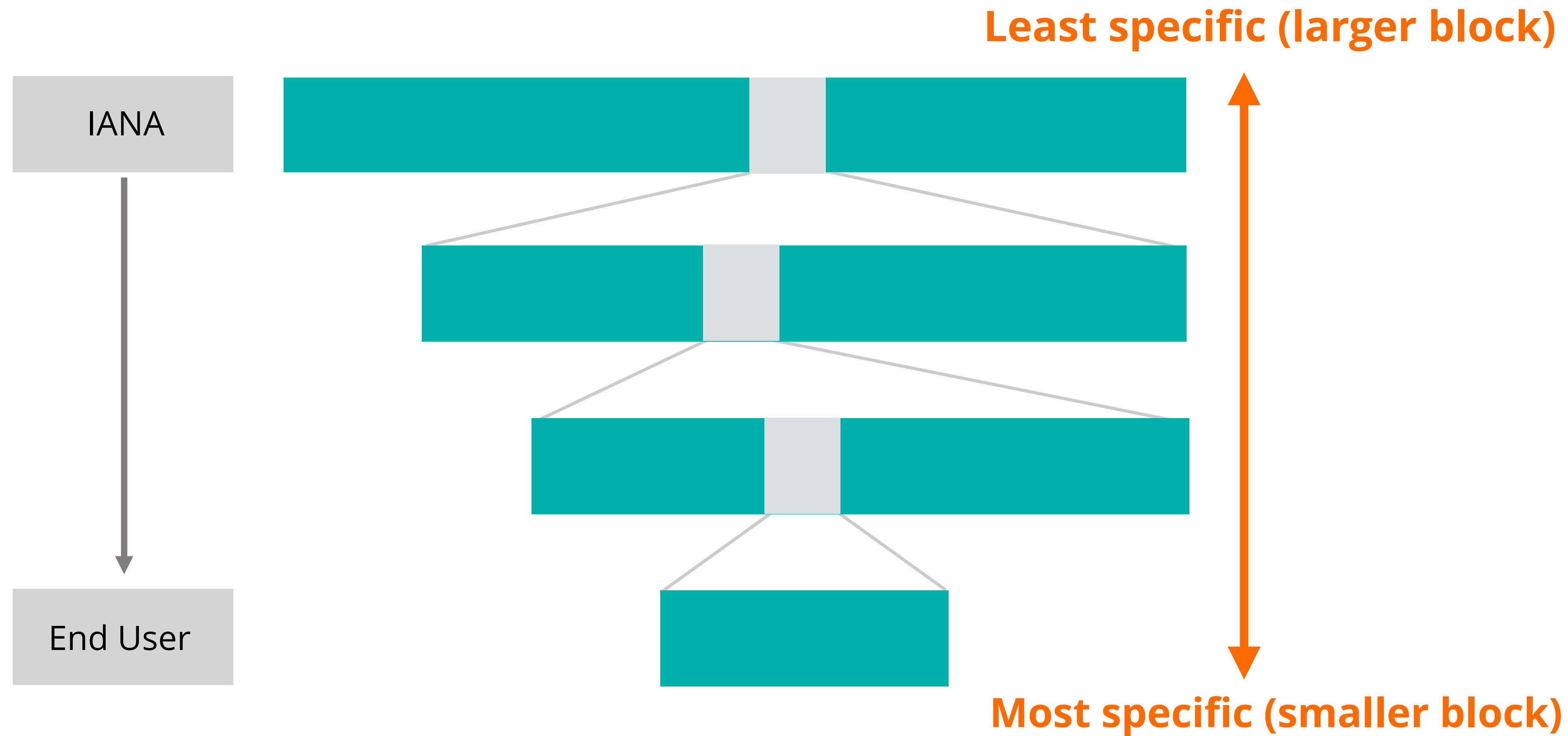
- Web interface
- Command line
- Full Text Search
- RESTful API
- RIPEstat





Default Query Results

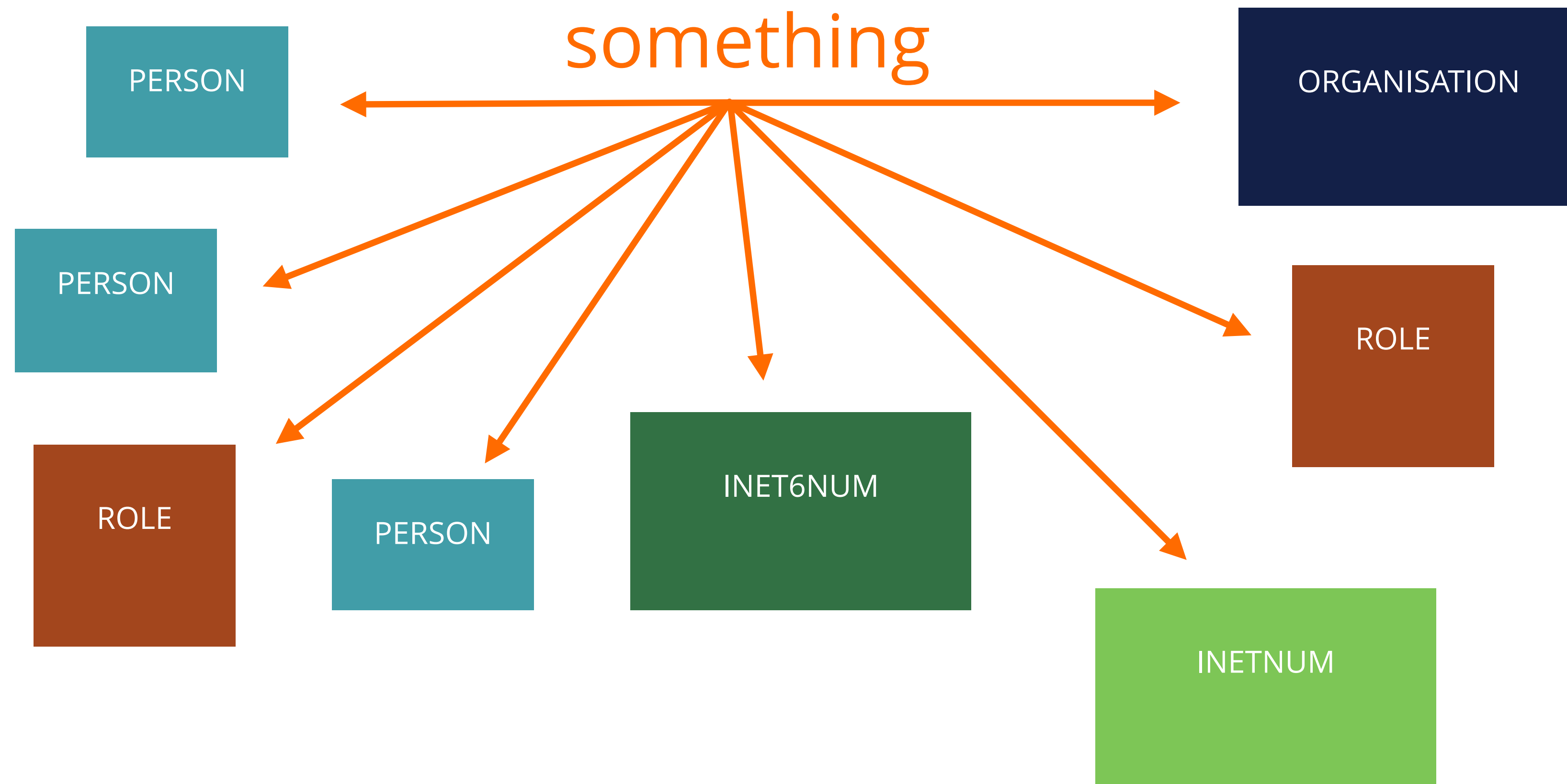
When you query for an **IP address** or **prefix**...





Default Query Results

When you query for simple **text**...





Making Better Queries

- Reduce the amount of objects returned
- Use options and flags to optimise the results.
- Avoid getting blocked!





Making Better Queries

- Reduce the amount of objects returned
- Use options and flags to optimise the results.
- Avoid getting blocked!

Query service:

- Number of queries from an IP address – Unlimited
- Number of queries passed by a proxy – Unlimited
- Number of personal data sets returned in queries from an IP address – 1,000 per 24 hours
- Number of personal data sets returned in queries from a proxy IP address – 20,000 per 24 hours

Update service:

- Number of update e-mails sent to auto-dbm@ripe.net – Unlimited
- Number of updates submitted through the syncupdates interface – Unlimited
- Number of updates submitted through the webupdates interface – Unlimited
- Number of objects contained in a single update message – 5,000
- Size of a single update message – 500Kb
- Number of queued e-mail update messages from any one e-mail address – 100





Filtered Query Results

- All email addresses **are filtered**
- Show them with **-B** flag in query
 - Or turn on “Show full object details”
- “auth:” attribute values are always filtered

person:	Jean Blue
nic-hdl:	JB123-RIPE
address:	Long Street 5
phone:	+31 20 555 0101
mnt-by:	LIR-MNT
source:	RIPE # Filtered

mntner:	LIR-MNT
admin-c:	JB123-RIPE
auth:	MD5-PW # Filtered
auth:	SSO # Filtered
auth:	PGP-KEY-54321
mnt-by:	LIR-MNT
source:	RIPE # Filtered



Results Without Related Objects

Search term:

Search 

inetnum: 193.0.24.0 - 193.0.30.255

admin-c: BRD-RIPE

tech-c: OPS4-RIPE

route: 193.0.24.0/21

origin: AS2121



Results With Related Objects

Search term:

193.0.24.1



Search

inetnum: 193.0.24.0 - 193.0.30.255

admin-c: BRD-RIPE

tech-c: OPS4-RIPE

role: RIPE NCC Operations

admin-c:

admin-c:

tech-c:

tech-c:

tech-c:

tech-c:

nic-hdl: OPS4-RIPE

person: Brian Riddle

address: Stationsplein 11

address: 1012 AB Amsterdam

phone: +31 20 535 4444

e-mail: brian@ripe.net

nic-hdl: BRD-RIPE

route: 193.0.24.0/21

origin: AS2121

Selecting Object Types



<input type="checkbox"/>	as-block	<input type="checkbox"/>	inet-rtr	<input type="checkbox"/>	poem
<input type="checkbox"/>	as-set	<input type="checkbox"/>	irt	<input type="checkbox"/>	poetic-form
<input type="checkbox"/>	aut-num	<input type="checkbox"/>	key-cert	<input type="checkbox"/>	role
<input type="checkbox"/>	domain	<input type="checkbox"/>	mntner	<input type="checkbox"/>	route
<input type="checkbox"/>	filter-set	<input type="checkbox"/>	organisation	<input type="checkbox"/>	route6
<input checked="" type="checkbox"/>	inet6num	<input type="checkbox"/>	peering-set	<input type="checkbox"/>	route-set
<input checked="" type="checkbox"/>	inetnum	<input type="checkbox"/>	person	<input type="checkbox"/>	rtr-set

- Choose the types of objects you want to see
- This results in fewer objects to process
- Using a flag: **-T {object type}**
 - i.e. -T inetnum 192.168.0.0/21

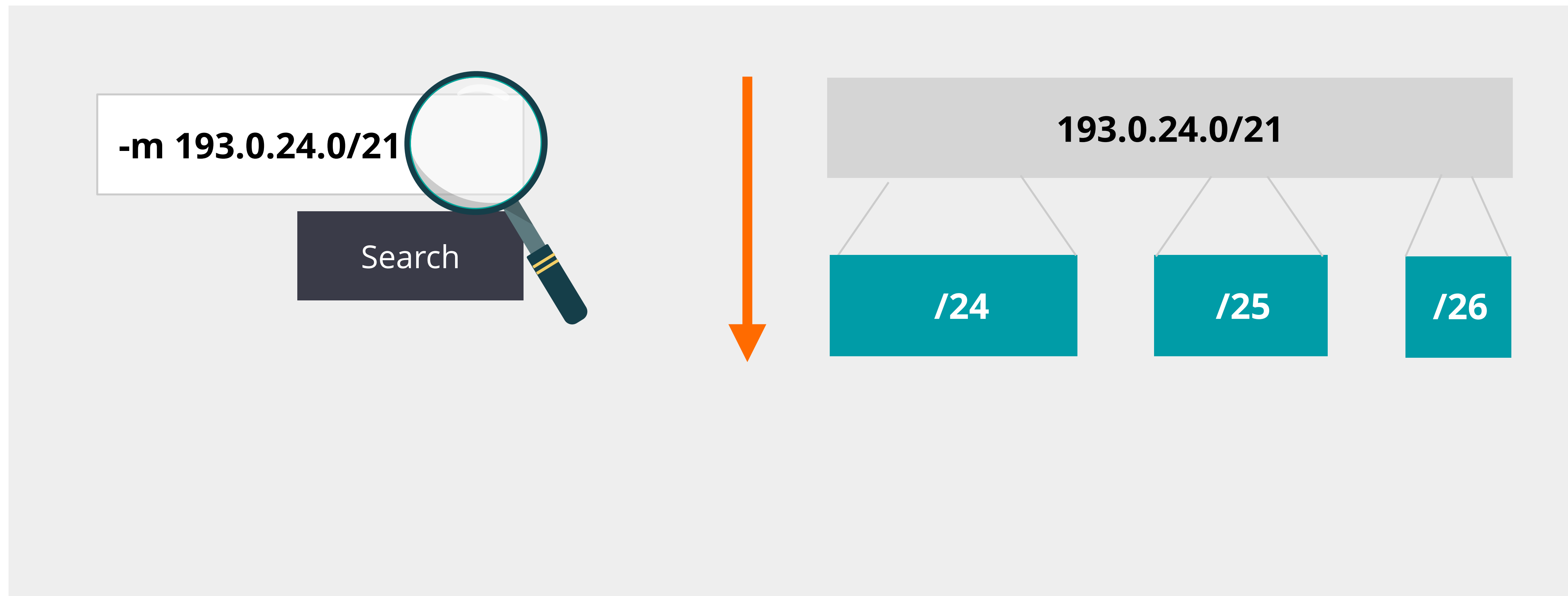


Navigating the Hierarchy

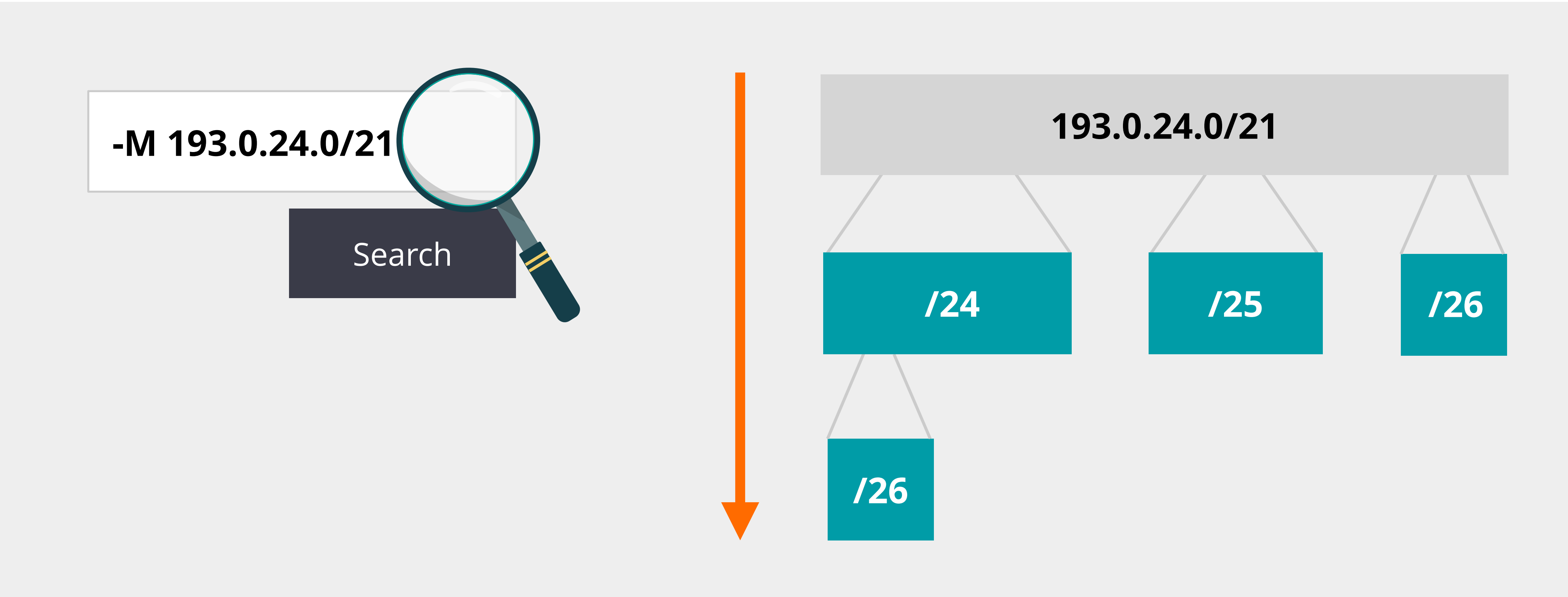
- Using flags, you can find what is under or above an inet(6)num object
 - Under = More Specific
 - Above = Less Specific
- The flags: -m, -M, -l, -L
- Also found in the “Hierarchy Flags” tab



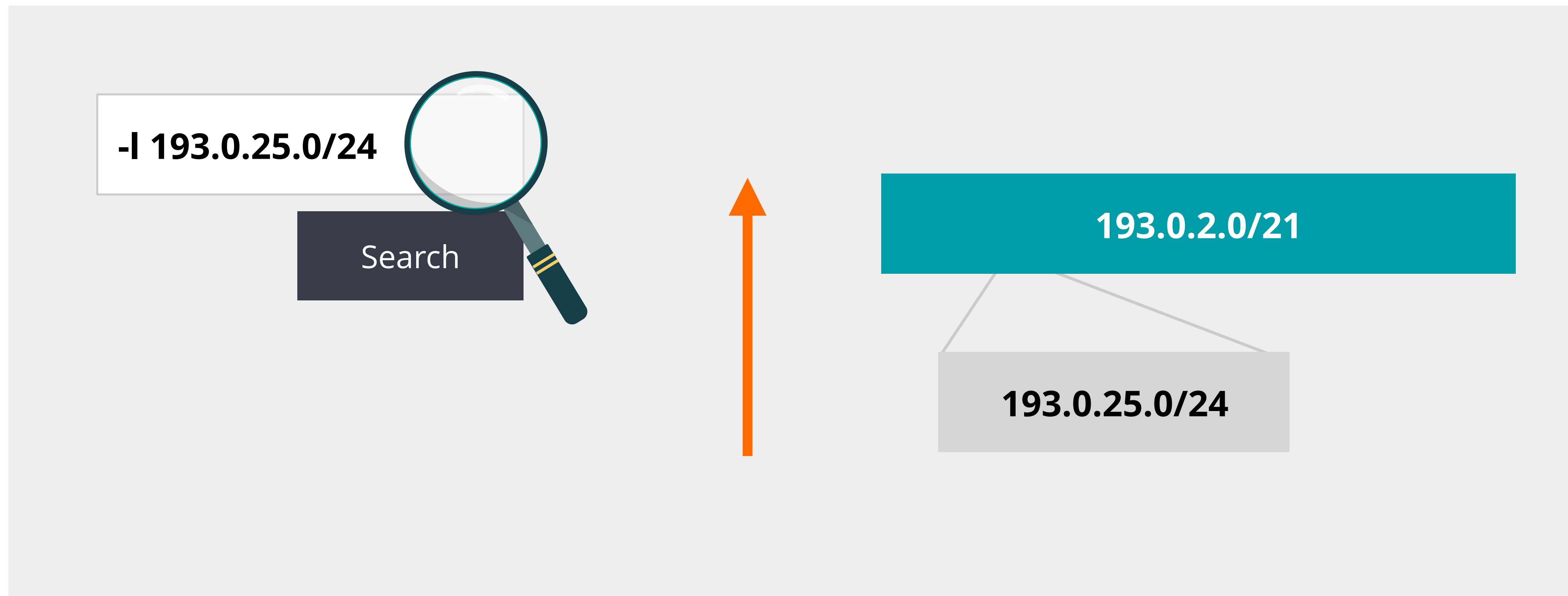
More Specific inetnums: -m



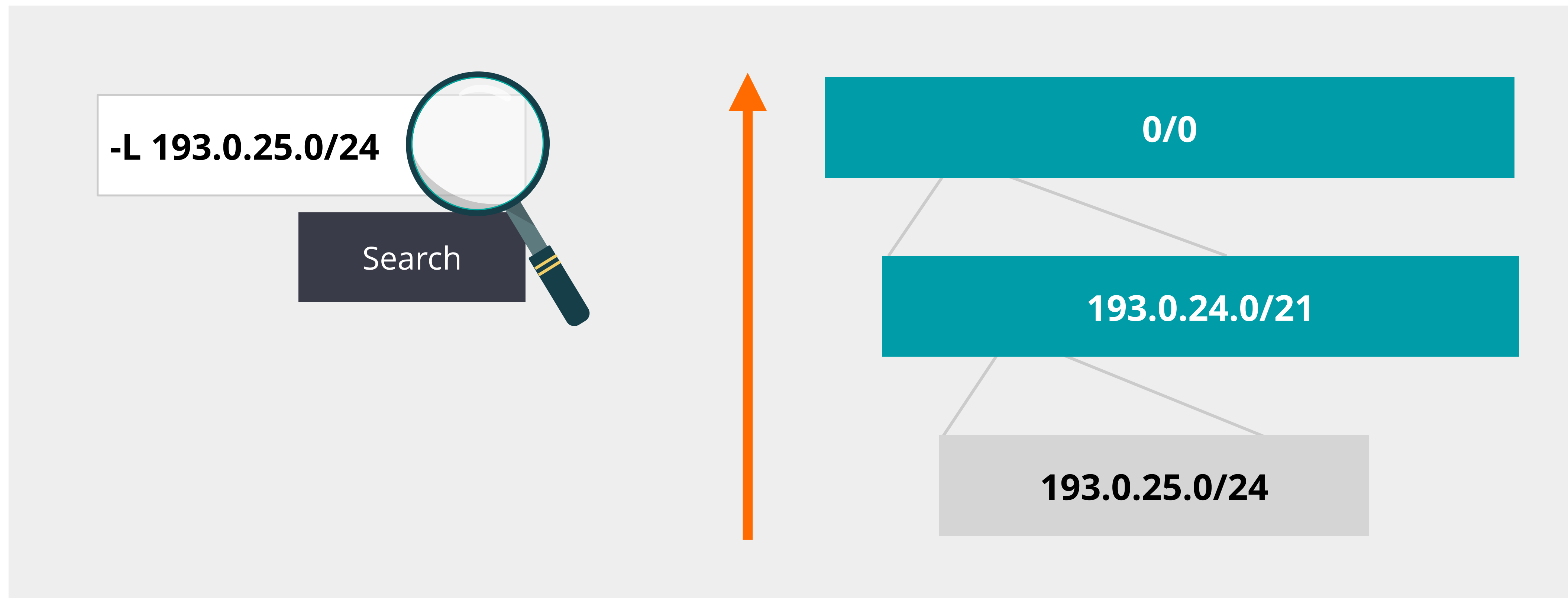
More Specific inetnums: -M



Less Specific inetnums: -l



Less Specific inetnums: -L





Let's practice! (1)

Which **flag** would give you this object as a result?

person:	Jean Blue
nic-hdl:	JB123-RIPE
address:	Long Street 5
phone:	+31 20 555 0101
e-mail:	j.blue@example.net
mnt-by:	LIR-MNT
source:	RIPE



Let's practice! (2)

Which **flag** would give you these objects as a result?

193.0.24.0/21

/24

/26



Let's practice! (3)

Which **flag** would give you this object as a result?

```
route6: 2001:db8::/32
```

```
origin: AS65530
```



Questions



Welcome back!



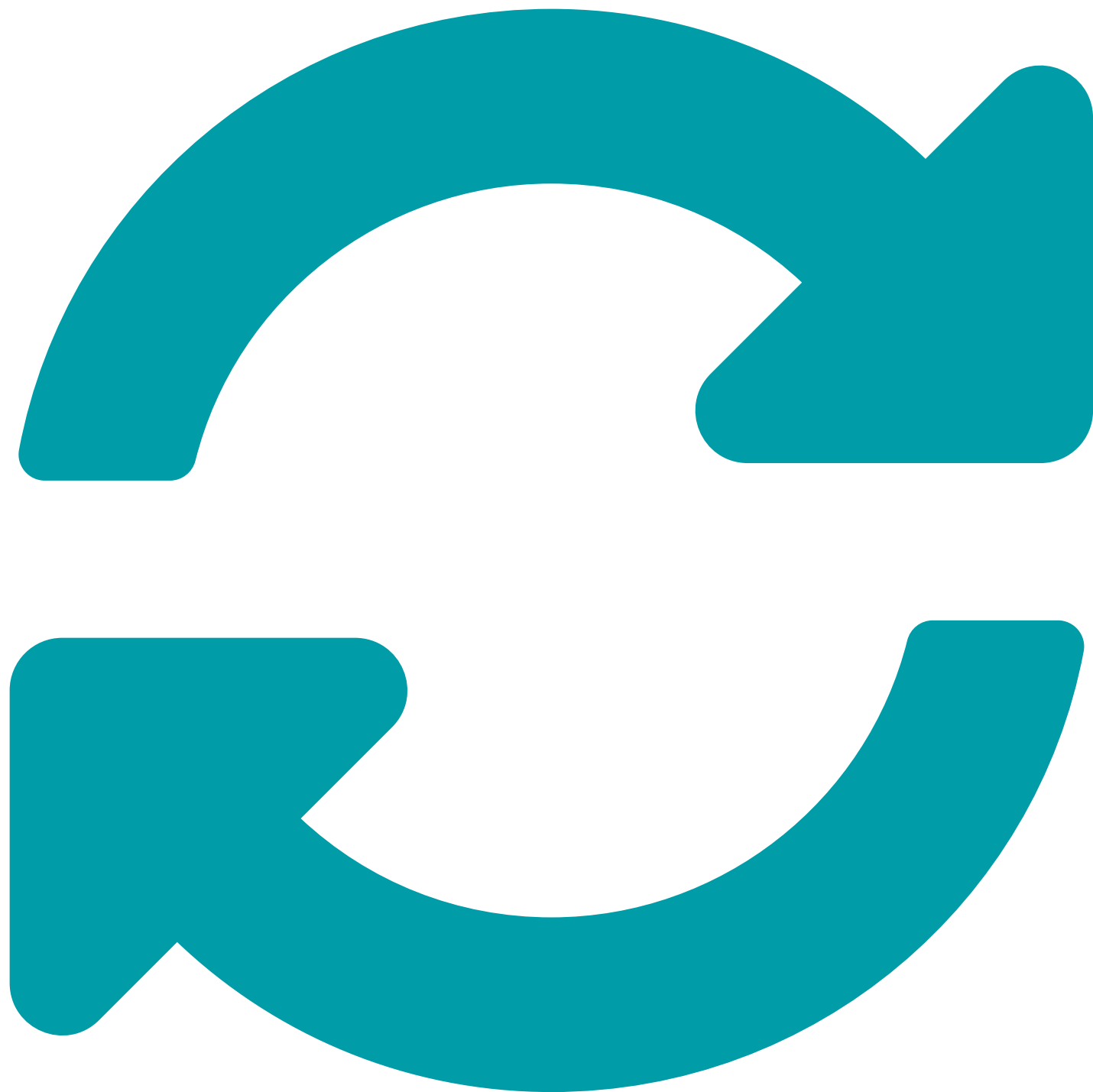


Inverse Lookups

Searching for references



Inverse Lookup



Finding all other objects in which your object is **referenced**.

Inverse Lookup: admin-c



inet6num: 2001:db8::/32

org: ORG-BB2-RIPE
admin-c: BW280-RIPE
tech-c: JB1-RIPE
mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT

aut-num: AS64551

org: ORG-BB2-RIPE
admin-c: **JB1-RIPE**
tech-c: TT789-RIPE
mnt-by: RIPE-NCC-END-MNT
mnt-by: DEFAULT-LIR-MNT

mntner: DEFAULT-LIR-MNT

admin-c: **JB1-RIPE**
tech-c: TT789-RIPE
mnt-by: DEFAULT-LIR-MNT

role: Tech Team

nic-hdl: TT789-RIPE
admin-c: **JB1-RIPE**
tech-c: KH404-RIPE
mnt-by: DEFAULT-LIR-MNT

-i admin-c JB1-RIPE

person: Jean Blue

address: Big Street 45
phone: +31 20 345 6854
e-mail: jean.blue@example.net
nic-hdl: JB1-RIPE
mnt-by: BLUE-MNT

Inverse Lookup: admin-c



inet6num: 2001:db8::/32

org: ORG-BB2-RIPE
admin-c: BW280-RIPE
tech-c: JB1-RIPE
mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT

aut-num: AS64551

org: ORG-BB2-RIPE
admin-c: **JB1-RIPE**
tech-c: TT789-RIPE

-i admin-c JB1-RIPE

person: Jean Blue

address: Big Street 45
phone: +31 20 345 6854
e-mail: jean.blue@example.net

```
% whois -- '-B -r -i admin-c BRD-RIPE'
```

mnt-by: DEFAULT-LIR-MNT

admin-c: **JB1-RIPE**
tech-c: TT789-RIPE
mnt-by: DEFAULT-LIR-MNT

role: Tech Team

nic-hdl: TT789-RIPE
admin-c: **JB1-RIPE**
tech-c: KH404-RIPE
mnt-by: DEFAULT-LIR-MNT

Inverse Lookup: admin-c



inet6num: 2001:db8::/32

org: ORG-BB2-RIPE
admin-c: BW280-RIPE
tech-c: JB1-RIPE
mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT

-i admin-c JB1-RIPE

aut-num: AS64551

org: ORG-BB2-RIPE
admin-c: **JB1-RIPE**
tech-c: TT789-RIPE

person: Jean Blue

address: Big Street 45
phone: +31 20 345 6854
e-mail: jean.blue@example.net

```
% whois -- '-B -r -i admin-c BRD-RIPE'
```

```
% whois3 -B -r -i admin-c BRD-RIPE
```

role: Tech Team

nic-hdl: TT789-RIPE
admin-c: **JB1-RIPE**
tech-c: KH404-RIPE
mnt-by: DEFAULT-LIR-MNT

Inverse Lookup: person



inet6num: 2001:db8::/32
org: ORG-BB2-RIPE
admin-c: BW280-RIPE
tech-c: JB1-RIPE ←
mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT

aut-num: AS64551
org: ORG-BB2-RIPE
admin-c: JB1-RIPE ←
tech-c: TT789-RIPE
mnt-by: RIPE-NCC-END-MNT
mnt-by: DEFAULT-LIR-MNT

mntner: DEFAULT-LIR-MNT
admin-c: JB1-RIPE ←
tech-c: TT789-RIPE
mnt-by: DEFAULT-LIR-MNT

role: Tech Team
nic-hdl: TT789-RIPE
admin-c: JB1-RIPE ←
tech-c: KH404-RIPE
mnt-by: DEFAULT-LIR-MNT

-i person JB1-RIPE

person: Jean Blue
address: Big Street 45
phone: +31 20 345 6854
e-mail: jean.blue@example.net
nic-hdl: JB1-RIPE
mnt-by: BLUE-MNT

Inverse Lookup: organisation



inet6num: 2001:db8::/32

descr: My IPv6 allocation
org: **ORG-BB2-RIPE**
admin-c: BW280-RIPE
tech-c: JB1-RIPE

inetnum: 188.23.16.0/21

descr: My IPv4 allocation
org: **ORG-BB2-RIPE**
admin-c: BW280-RIPE
tech-c: JB1-RIPE

inetnum: 37.4.128.0/22

descr: My Other IPv4 alloc.
org: **ORG-BB2-RIPE**
admin-c: BW280-RIPE
tech-c: JB1-RIPE

aut-num: AS64551

descr: My Other IPv4 alloc.
org: **ORG-BB2-RIPE**
admin-c: BW280-RIPE
tech-c: JB1-RIPE

-i org ORG-BB2-RIPE

organisation: ORG-BB2-RIPE

org-name: Internet Company
admin-c: BW280-RIPE
tech-c: JB1-RIPE
abuse-c: ac56-RIPE
mnt-by: DEFAULT-LIR-MNT

Inverse Lookup: mnt-by



```
inet6num: 2001:db8::/32
org: ORG-BB2-RIPE
admin-c: BW280-RIPE
tech-c: JB1-RIPE
mnt-by: RIPE-NCC-HM-MNT
mnt-lower: ANOTHER-MNT
```

```
aut-num: AS64551
org: ORG-BB2-RIPE
admin-c: JB1-RIPE
tech-c: TT789-RIPE
mnt-by: RIPE-NCC-END-MNT
mnt-by: ANOTHER-MNT
```

```
person: Jean Blue
nic-hdl: JB1-RIPE
phone: +31 20 543 9640
mnt-by: ANOTHER-MNT
```

```
role: Other Group
nic-hdl: OG10-RIPE
admin-c: JB1-RIPE
tech-c: SZ72-RIPE
mnt-by: ANOTHER-MNT
```

-i mnt-by ANOTHER-MNT

```
mntner: ANOTHER-MNT
admin-c: JB1-RIPE
auth: MD5-PW
auth: SSO
upd-to: jean.blue@example.net
mnt-by: ANOTHER-MNT
```



Full Text Search

Looking for text everywhere



RIPE Database Text Search

This service allows searches over the full text of the RIPE Database object data.

The search is done on object text without regard for any relationships. Multiple search terms should be separated with a space.

+ [Advanced Search](#)

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

Search



Search results

This is the RIPE Database full text search service.
The RIPE Database is subject to [Terms and Conditions](#).

Number of results - all object types	15
key-cert	6
person	3
domain	2
mntner	2
inet6num	1
inetnum	1

« 1 2 »

domain: 201.156.178.IN-ADDR.ARPA
descr=BLUELIGHT , mnt-by=RO-BLUELIGHT

domain: 200.156.178.IN-ADDR.ARPA
descr=BLUELIGHT , mnt-by=RO-BLUELIGHT

inet6num: 2a01:4f8:201:31ea::/64
netname=BLUE-LIGHT



Search term

+ Basic Search

All
 Any
 Exact Match

Search only within the following objects:

- as-block
- as-set
- aut-num
- domain
- filter-set
- inet-rtr
- inet6num
- inetnum**
- irt
- key-cert
- mntner
- organisation
- peering-set
- person
- poem
- poetic-form
- role
- route
- route-set
- route6
- rtr-set

Search within the following fields: ?

- admin-c
- changed
- country
- created
- descr
- geoloc
- inetnum
- language
- last-modified
- mnt-by
- mnt-domains
- mnt-irt
- mnt-lower
- mnt-routes
- netname
- notify
- org
- remarks
- source
- sponsoring-org
- status
- tech-c

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

Search

Advanced search



Questions





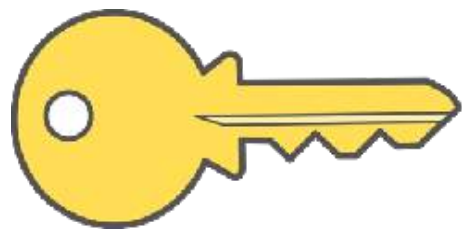
Creating Objects

How to put data in the RIPE Database



Maintainers: 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

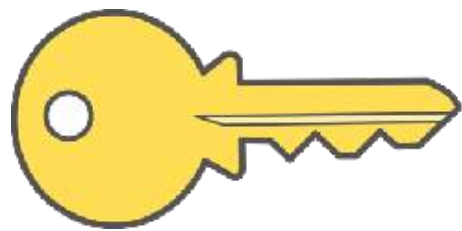


mntner:	LIR-MNT
admin-c:	JB123-RIPE
notify:	noc@example.org
upd-to:	noc@example.org
auth:	MD5-PW \$1\$crypto-stuff
auth:	SSO email@domain.com
auth:	PGP-KEY-<key ID>
mnt-by:	LIR-MNT



Maintainers: 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
<u>mnt-by:</u>	<u>LIR-MNT</u>



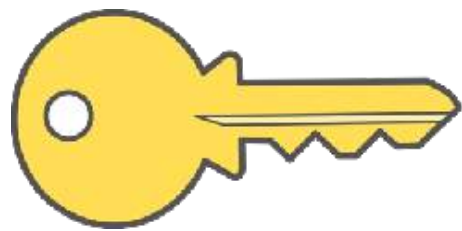
mntner:	LIR-MNT
admin-c:	JB123-RIPE
notify:	noc@example.org
upd-to:	noc@example.org
auth:	MD5-PW \$1\$crypto-stuff
auth:	SSO email@domain.com
auth:	PGP-KEY-<key ID>
mnt-by:	LIR-MNT



Maintainers: 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

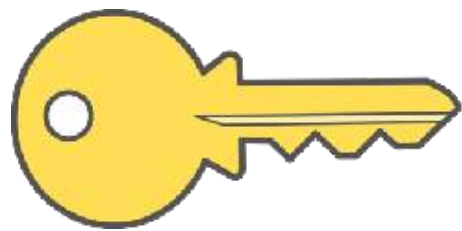
admin-c: JB123-RIPE
notify: noc@example.org
upd-to: noc@example.org
auth: MD5-PW \$1\$crypto-stuff
auth: SSO email@domain.com
auth: PGP-KEY-<key ID>
mnt-by: LIR-MNT



Maintainers: 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 \$1\$crypto-stuff
auth: SSO email@domain.com
auth: PGP-KEY-<key ID>
mnt-by: LIR-MNT



Authentication

- RIPE NCC Access (Single Sign-On)
- Password (MD5-PW)
- Private key/public key





auth: SSO

```
mntner: NCCTS-MNT

admin-c: JB123-RIPE
upd-to: noc@example.org
auth: SSO email@domain.com
mnt-by: NCCTS-MNT
```

Maintainer with SSO

Sign in using your RIPE NCC
Access account

Your email address*

Your password*

SIGN IN

[Forgot password?](#) [Create an account](#)

Sign in to Access

Create object!

Create "person" object

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

NCCTS-MNT ★ ✕

person
Specifies the full name of a contact, e.g. John Smith.

address
Specifies the full postal address of a contact.

phone
Phone number with country code, e.g. +44 161 715 1234.



auth: MD5-PW

```
mntner: NCCTS-MNT  
  
admin-c: JB123-RIPE  
upd-to: noc@example.org  
auth: MD5-PW $1$crypto-stuff  
mnt-by: NCCTS-MNT
```

Maintainer with MD5

Password authentication

Select a maintainer to authenticate the update operation.

NCCTS-MNT

Provide the password for the selected maintainer [Forgotten MNTNER password?](#)

Also authorise my RIPE NCC Access account for this maintainer. [Learn more.](#)

Submit

Provide password

Create object!

Create "person" object

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

NCCTS-MNT ★ ×

person
Specifies the full name of a contact, e.g. John Smith.

address
Specifies the full postal address of a contact.

phone
Phone number with country code, e.g. +44 161 715 1234.



auth: PGPKEY

```
mntner: SPIDERMAN-MNT

admin-c: JB123-RIPE
upd-to: noc@example.org
auth: PGP-KEY-<key ID>
mnt-by: LIR-MNT
```

Maintainer with PGPKEY

```
key-cert: PGP-KEY-<keyID>

method: PGP
owner: Some Body <somebody@domain.email>
fingerpr: B8C7 456D 66DD 4A26 D976 9987 79D2 7CC1
certif: -----BEGIN PGP PUBLIC KEY BLOCK-----
certif: Version: PGP Desktop 10.1.1 (Build 10)
certif:
certif: mQENBE800ZIBCAC07Dj4BJ1NwWpiCOzA
certif: aGpzuMVJB0QO6HzGvC9t8F4uBJdderTtCd
certif: wWe2foVxMgF2upPpGmpfq6TxuEekM/5XB
certif: jfETr4J77VsSW9Q581HyRDdVaAT9wdL8jZa
certif: bxQbO3XZrROjmf5PPq+5/XNv7tQs1AtglEu
```

key-cert object holds the public key

auth: PGPKEY



New message

To:

Subject:

person: Peter Parker
address: Some Long Street 123
phone: +99876543210
nic-hdl: PP999-RIPE
mnt-by: SPIDERMAN-MNT
source: RIPE

- - - BEGIN PGP SIGNATURE - - -
Version: PGP Desktop 10.1.1 (Build 10)

mQGIBDuWQtARBACA88T3KzHTmirNtTQ3zo7l6KhZIZCJ9+i5yJaDIaPTGmT7/LuO
VXaM011iLqjIzRb+EZbV48979UcYNHu7HpBiaRX9wLXVxb2OQANGME5mkhDtFsNP
tA0k0SaEzXUBH4l2k8UuMT8Ph779q/kvO2S5kno7WLnOsHYXKvyGIn2QDwCght3g

Send A [emojis] [image] [trash] [menu]

Send update in email

Signed with private key

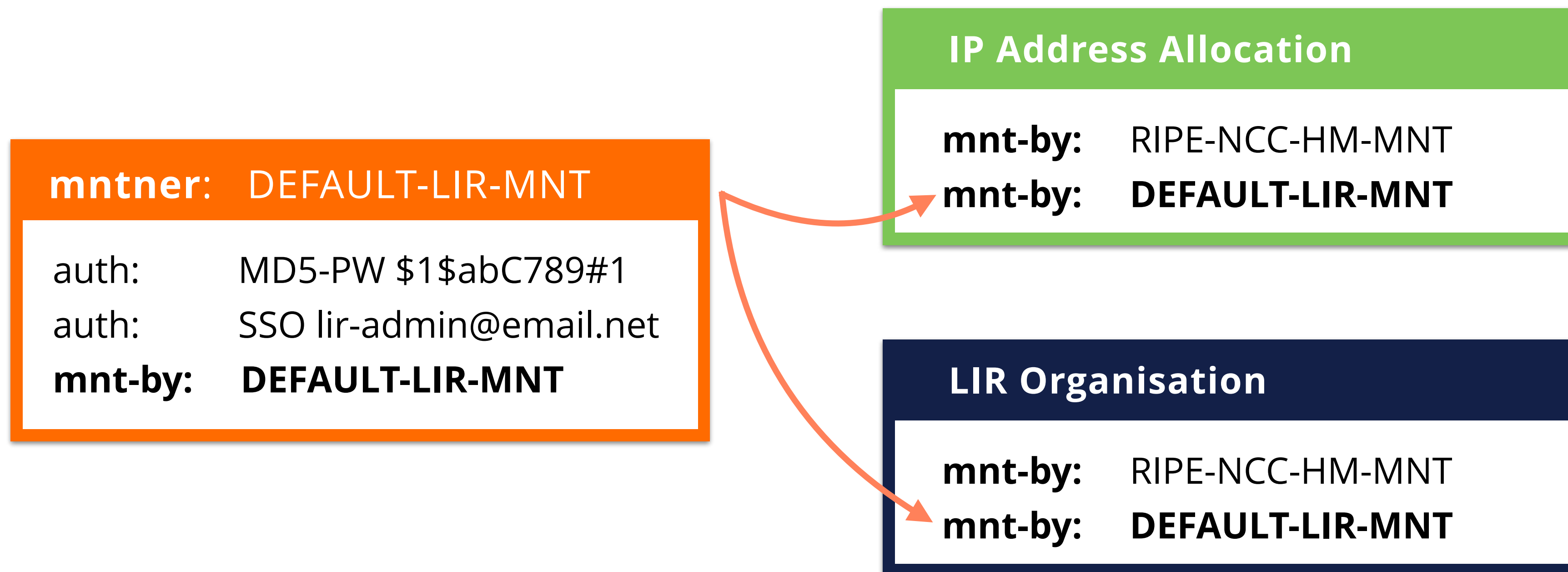
Create object!

```
person: Peter Parker
address: Some Long Street 123
phone: +99876543210
nic-hdl: PP999-RIPE
mnt-by: SPIDERMAN-MNT
created: 2019-04-03T11:44:58Z
last-modified: 2019-04-03T11:44:58Z
source: RIPE
```



Default Maintainer for LIRs

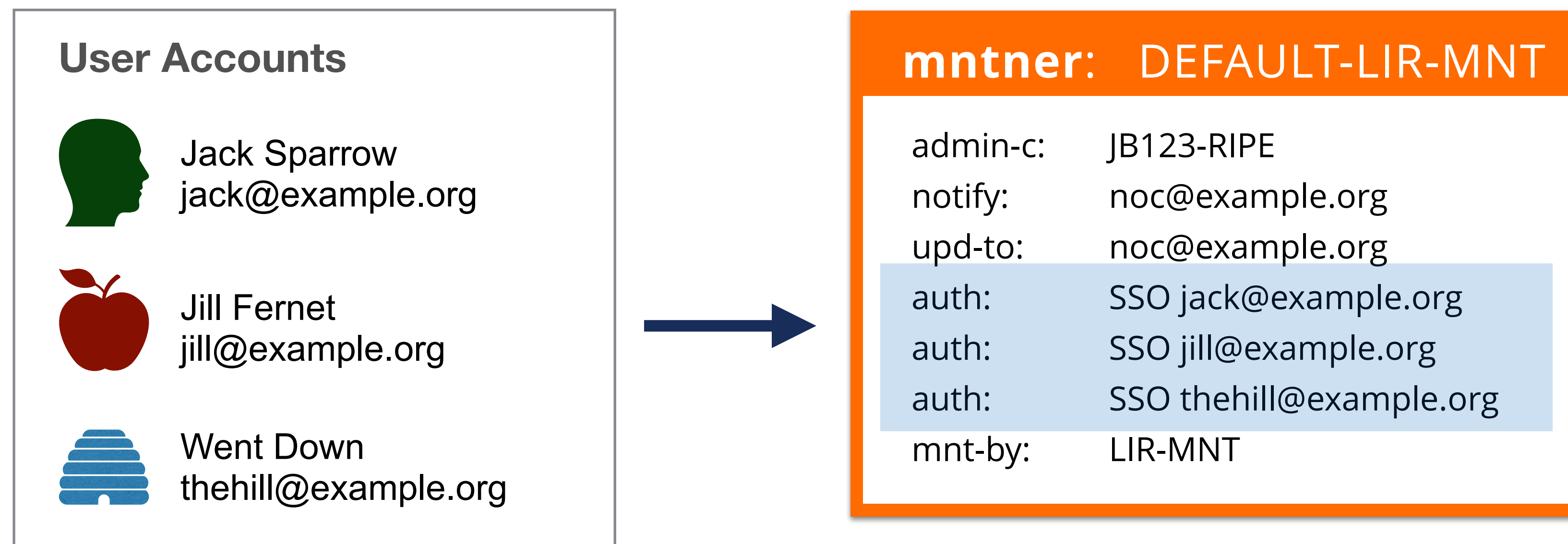
- Allows partial control over Allocation and ORG
- Can be selected in the LIR Account Details
- Automatically reflected in the RIPE Database





Synch With LIR Portal

- Default LIR Maintainer can be synchronised with LIR Portal
- Users added as SSO to the maintainer
- Previous “auth:” lines are removed





Take the poll!

Which maintainer would **you** use to protect **your own person object**?





Personal vs Shared

LIR objects, shared maintainer

```
mntner: DEFAULT-LIR-MNT  
  
auth: MD5-PW $1$abC789#1  
auth: SSO johndoe@email.net  
auth: SSO clara@network.com
```

```
IP Address Allocation  
  
mnt-by: RIPE-NCC-HM-MNT  
mnt-by: DEFAULT-LIR-MNT
```

```
LIR Organisation  
  
mnt-by: RIPE-NCC-HM-MNT  
mnt-by: DEFAULT-LIR-MNT
```

Your person, your maintainer

```
mntner: PERSONAL-MNT  
  
auth: SSO johndoe@email.net
```

```
Person  
  
mnt-by: PERSONAL-MNT
```

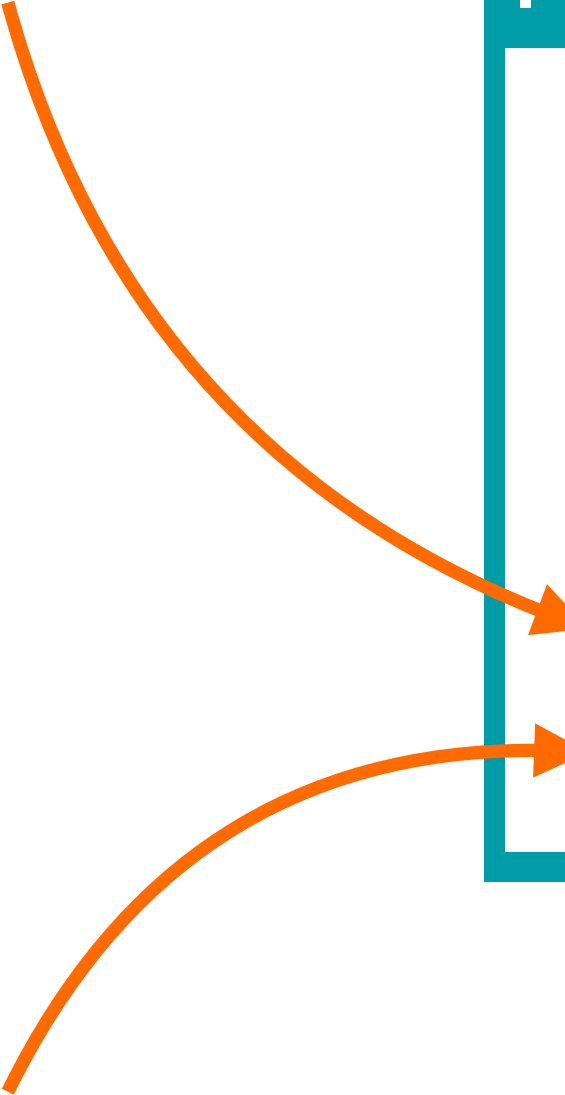



Multiple Maintainers

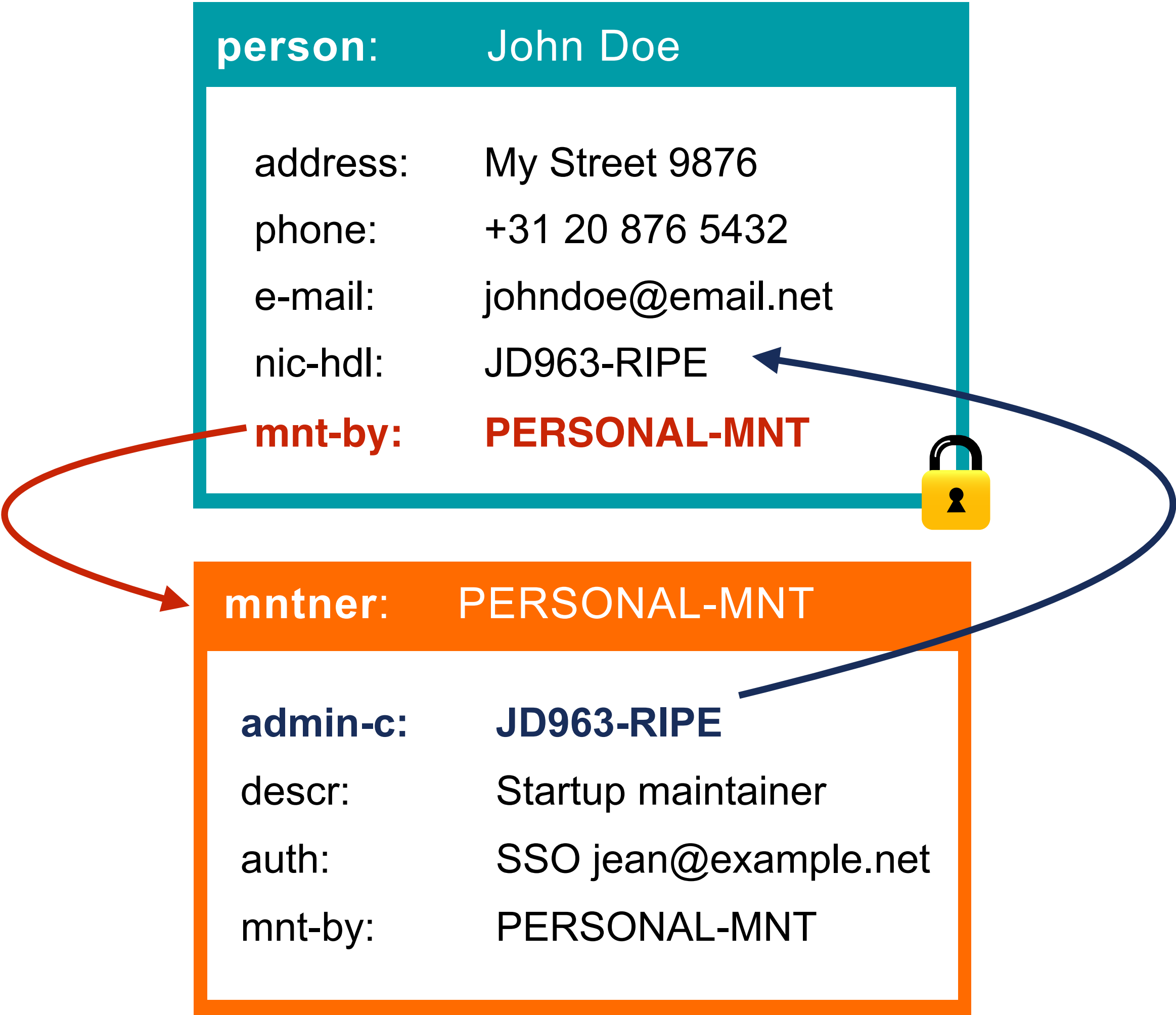
```
mntner: ONE-MNT  
  
admin-c: LA789-RIPE  
tech-c: LA789-RIPE  
mnt-by: ONE-MNT  
auth: SSO email@domain.com  
auth: PGPKEY-AE6FBT17
```

```
mntner: TWO-MNT  
  
admin-c: XY456-RIPE  
tech-c: XY456-RIPE  
mnt-by: TWO-MNT  
auth: MD5-PW $1$crypto-stuff
```

```
person: Jean Blue  
  
address: My Street 9876  
phone: +31 20 876 5432  
e-mail: jean@example.net  
nic-hdl: JB123-RIPE  
mnt-by: ONE-MNT  
mnt-by: TWO-MNT
```



Maintainer and Person





Questions





Updating Objects

The easy way

Sign in to Access



Sign in using your RIPE NCC
Access account

Your email address*

Your password*



SIGN IN

[Forgot password?](#)

[Create an account](#)

You **always** need to be signed in to your RIPE NCC Access account to create and update objects.

Go to Webupdates



**RIPE Database**



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



Search for the object

Search results

[PERMA](#) [XML](#) [JSON](#)

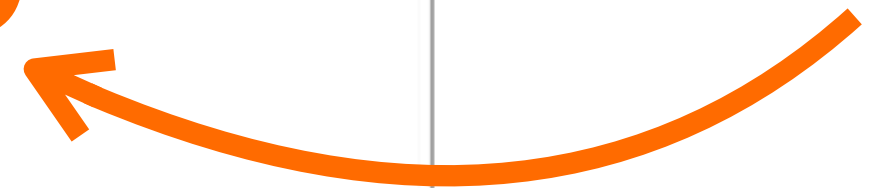
This is the RIPE Database search service. The objects are in RPSL format.
The RIPE Database is subject to [Terms and Conditions](#).

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:	LARGE-NETWORK
country:	NL
admin-c:	BRD-RIPE
tech-c:	GAV
status:	ASSIGNED PA
mnt-by:	RIPE-NCC-MNT
created:	2020-03-26T14:07:53Z
last-modified:	2020-03-26T14:07:53Z
source:	RIPE

[Update object](#) [RIPEstat](#)

Click here!



Update object



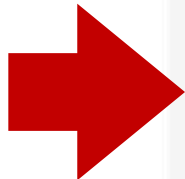
Modify "inetnum" object

Edit in text area

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

RIPE-NCC-MNT ★

Some attributes **cannot** be updated



inetnum	193.0.24.0 - 193.0.30.255	<input type="button" value="+"/>	<input type="button" value="?"/>	
netname	LARGE-NETWORK	<input type="button" value="+"/>	<input type="button" value="?"/>	
country	NL	<input type="button" value="↓"/>	<input type="button" value="+"/>	<input type="button" value="?"/>
admin-c	BRD-RIPE	<input type="button" value="↓"/>	<input type="button" value="+"/>	<input type="button" value="?"/>
tech-c	GAV	<input type="button" value="↓"/>	<input type="button" value="+"/>	<input type="button" value="?"/>
status	ASSIGNED PA	<input type="button" value="+"/>	<input type="button" value="?"/>	
source	RIPE	<input type="button" value="+"/>	<input type="button" value="?"/>	

This one **can** be updated!



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

Delete this object

Cancel Submit

Submit the changes



Your object has been successfully modified

inetnum "193.0.24.0 - 193.0.30.255"

inetnum:	193.0.24.0 - 193.0.30.255
netname:	LARGE-NETWORK
country:	NL
admin-c:	BRD-RIPE
- tech-c:	GAV
+ tech-c:	OPS-RIPE
status:	ASSIGNED PA
mnt-by:	RIPE-NCC-MNT
created:	2020-03-26T14:07:53Z
- last-modified:	2020-03-26T14:07:53Z
+ last-modified:	2020-03-26T14:16:28Z
source:	RIPE

Modify

Back to Create object





Questions





**We will continue in
5 minutes!**



Agenda



Registering PA assignments

What is registration?

Filling in the inet(6)num template

Registering sub-allocations

What is a sub-allocation?

Using "mnt-lower:"

RIPE Routing Registry

aut-num objects

route(6) objects

as-set objects

Reverse Delegation

What is reverse DNS?

domain objects

Notifications

"notify:"

"upd-to:" and "mnt-nfy:"

The RESTful API

What is it?

How can I use it?

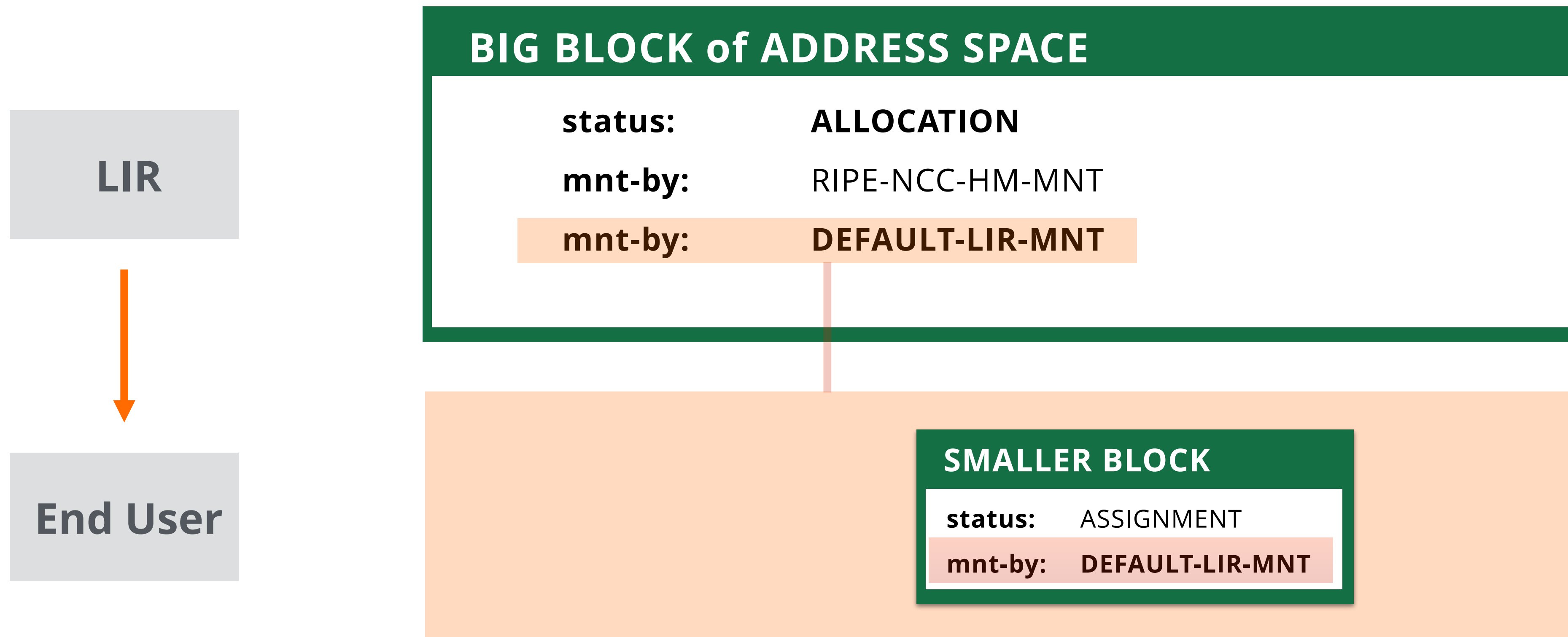


PA Assignments

How to register them



Registering PA Assignments





inetnum: 10.1.0.0 - 10.1.3.255

mnt-by: RIPE-NCC-HM-MNT
mnt-by: **DEFAULT-LIR-MNT**
status: ALLOCATED PA

inetnum: 10.1.2.0 - 10.1.2.255

mnt-by: **DEFAULT-LIR-MNT**
status: ASSIGNED PA

inet6num: 2001:db8::/32

mnt-by: RIPE-NCC-HM-MNT
mnt-by: **DEFAULT-LIR-MNT**
status: ALLOCATED-BY-RIR

inet6num: 2001:db8:1001::/48

mnt-by: **DEFAULT-LIR-MNT**
status: ASSIGNED



- You can group multiple assignments in one single object
- Use “**status: AGGREGATED-BY-LIR**”
- “**assignment-size:**” attribute is
 - optional in IPv4
 - mandatory in IPv6

```
inetnum: 10.XX.0.0 - 10.XX.0.128
```

```
mnt-by: SMXX-MNT  
status: AGGREGATED-BY-LIR  
assignment-size: 30
```

```
inet6num: 2002:ffXX:1000::/36
```

```
mnt-by: SMXX-MNT  
status: AGGREGATED-BY-LIR  
assignment-size: 56
```



Filling in the Template

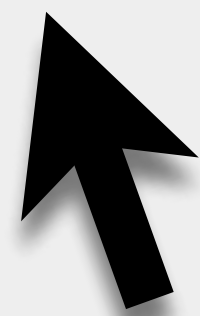
- Choose which maintainer will protect the new object
- Click on the **X** to remove a maintainer

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

DEFAULT-LIR-MNT ★ | X

OTHER-MNT ★ | X

★ = Associated with your Access account





Same object structure for IPv4 and IPv6

Network	inetnum: IPv4 RANGE
	inet6num: IPv6 PREFIX
	netname: NETWORK-NAME
	country: ZZ
Contact information	org: ORG-ZZ123-RIPE
	admin-c: AD321-RIPE
	tech-c: TE123-RIPE
Type of address space	status: ALLOC-ASSIGN
Protection of object	mnt-by: RIPE-NCC-HM-MNT
	mnt-by: DEFAULT-LIR-MNT
	source: RIPE



Object Creation Success

If the **values** in the object template are **correct**, then the RIPE Database will **create** the object.

inetnum: 10.1.3.0 - 10.1.3.255

netname: LAIKA-NET-01
country: ZZ
admin-c: MB54321-TEST
tech-c: TP1-TEST
status: ASSIGNED PA
mnt-by: SM1-MNT



inet6num: 2002:ff01:1001::/48

netname: LAIKA-NET-01
country: ZZ
admin-c: MB54321-TEST
tech-c: TP1-TEST
status: ASSIGNED
mnt-by: SM1-MNT





status: **ALLOCATED-ASSIGNED PA**

- Registers a whole assignment for small IPv4 allocations
- LIR changes status in the RIPE Database
- It is seen **both** as **ALLOCATED PA** and **ASSIGNED PA**

```
inetnum: 192.30.0.0 - 192.30.0.255
netname: NL-NETWORK-20240101
country: NL
org:     ORG-ZX99-RIPE
admin-c: DV789-RIPE
tech-c:  JS123-RIPE
status:  ALLOCATED PA
mnt-by:  RIPE-NCC-HM-MNT
mnt-by:  DEFAULT-LIR-MNT
source:  RIPE
```



```
inetnum: 192.30.0.0 - 192.30.0.255
netname: NL-NETWORK-20240101
country: NL
org:     ORG-ZX99-RIPE
admin-c: DV789-RIPE
tech-c:  JS123-RIPE
status:  ALLOCATED-ASSIGNED PA
mnt-by:  RIPE-NCC-HM-MNT
mnt-by:  DEFAULT-LIR-MNT
source:  RIPE
```



Questions





Sub-Allocations

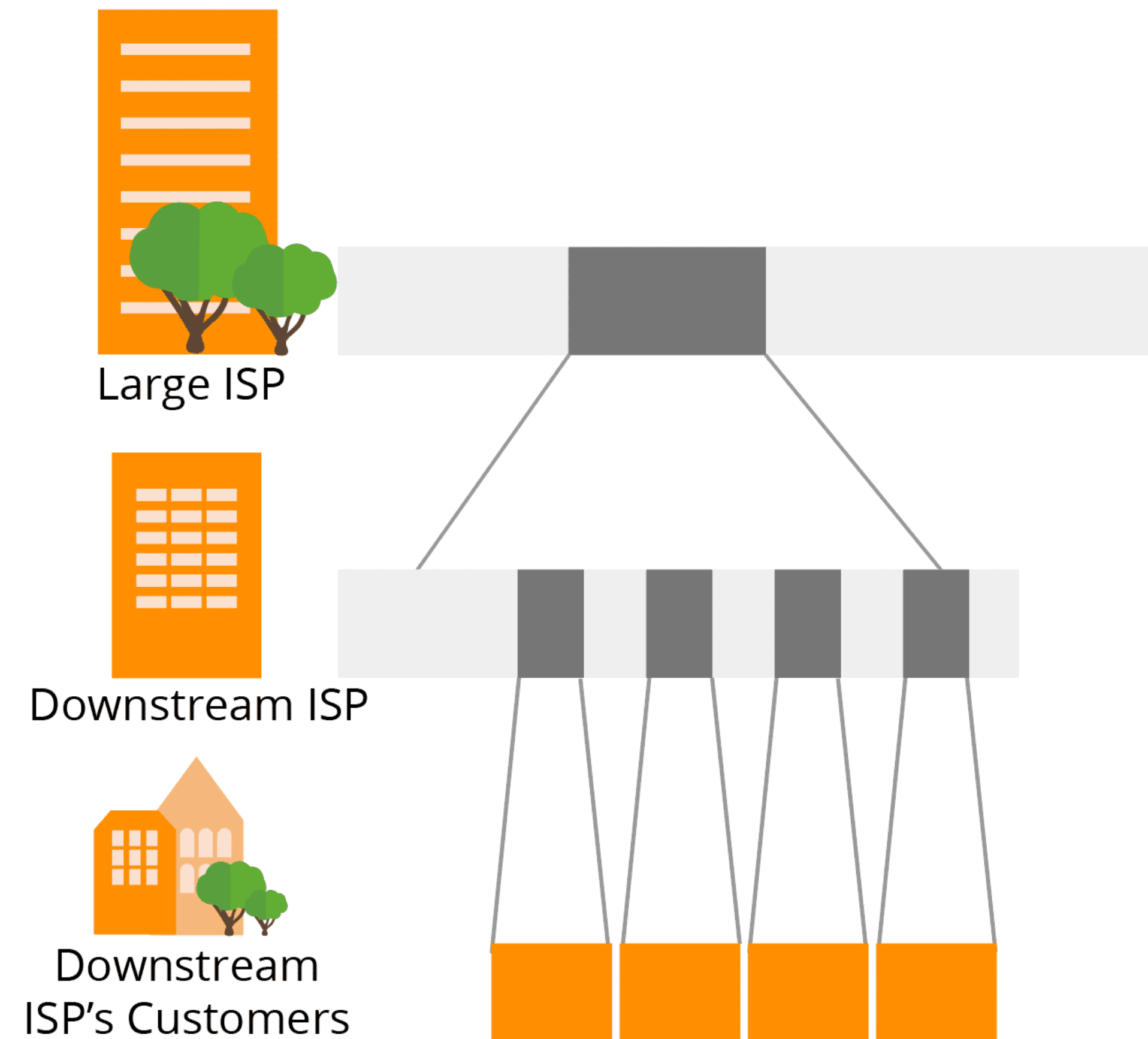
Delegating to someone else



Sub-Allocations

Block for a downstream ISP

- ISP can register the assignments to its customers.
- Allows them to create their own route(6) and domain objects

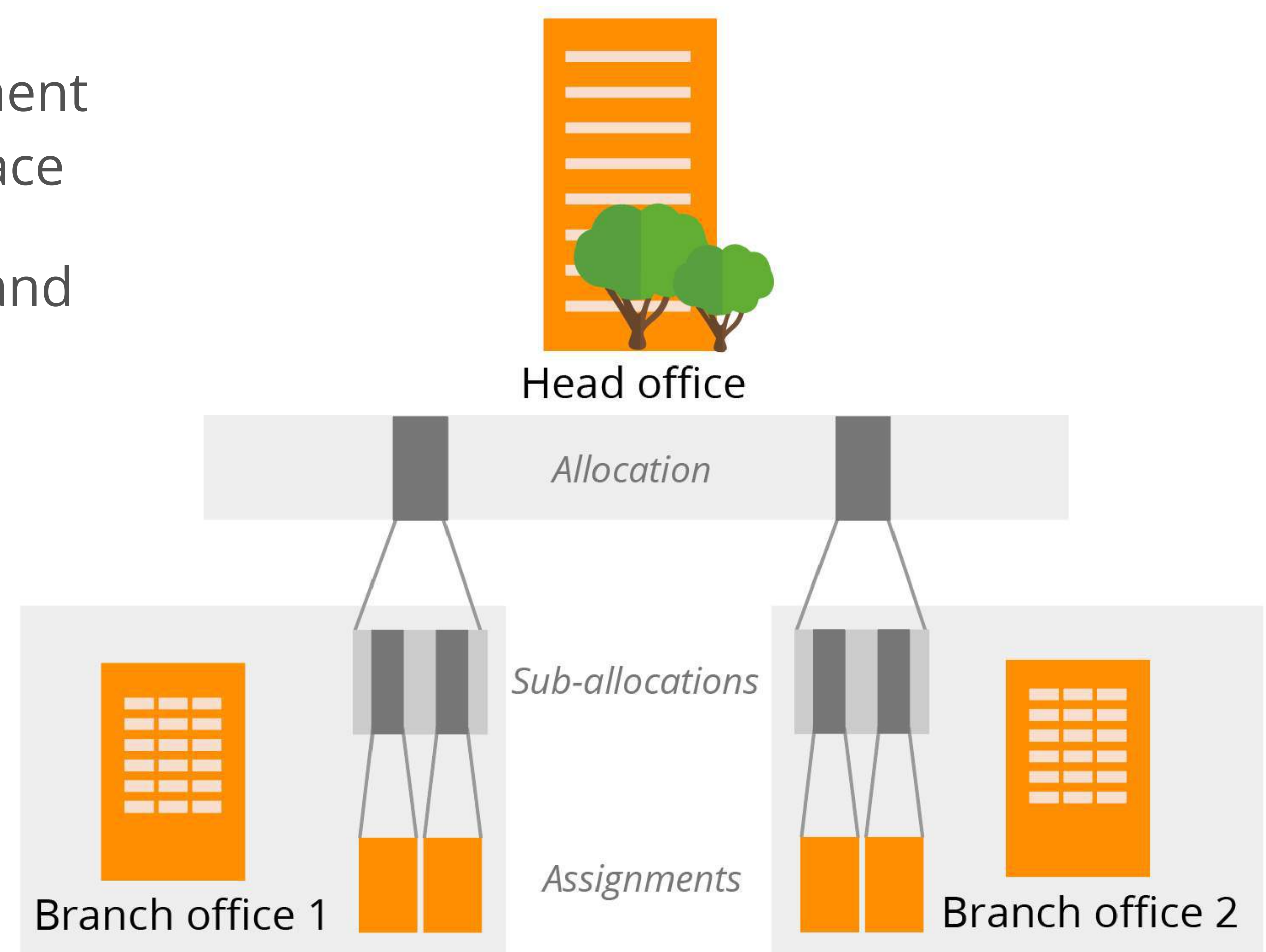




Sub-Allocations

Branch office or department

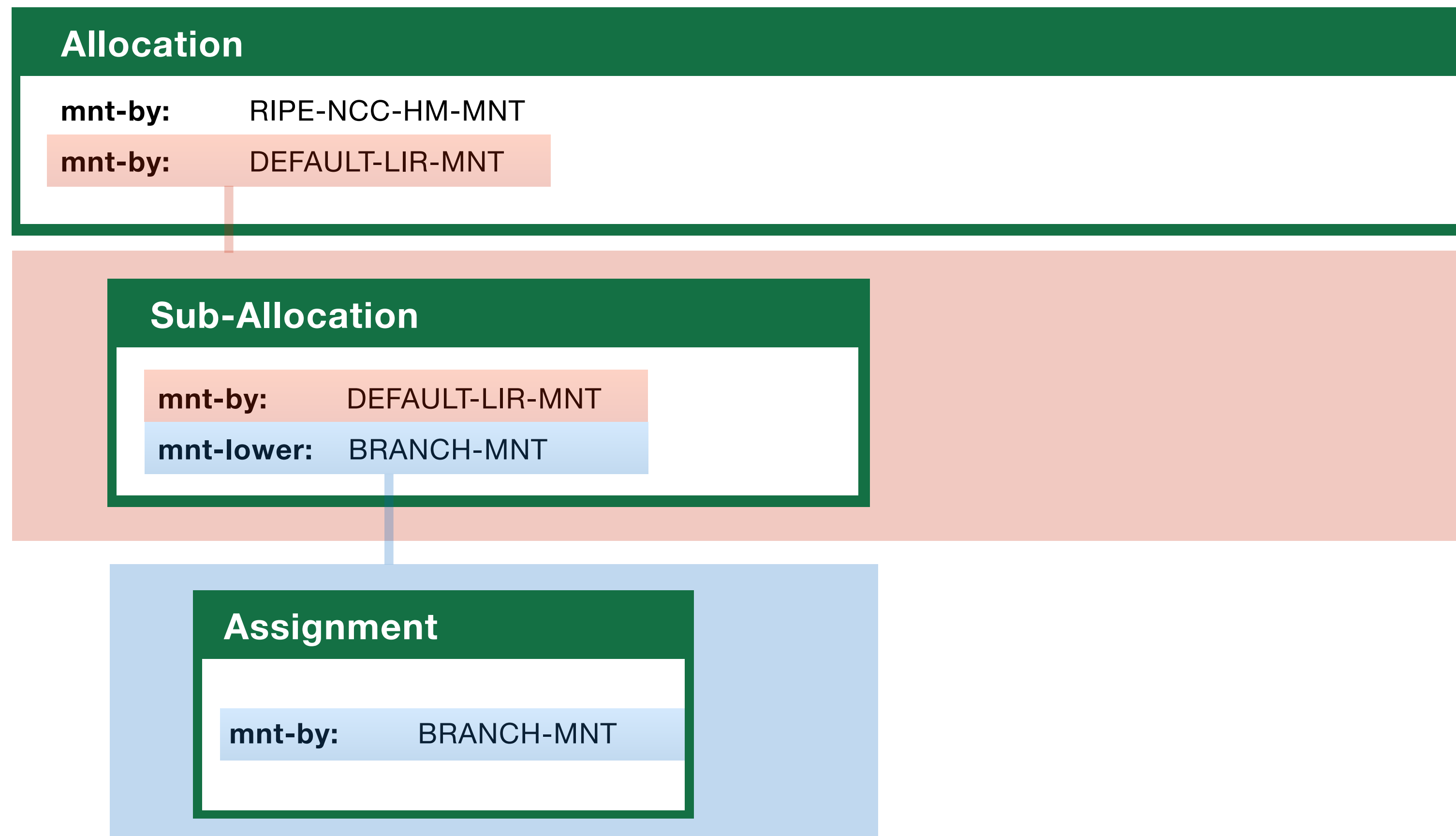
- Allows the branch office or department to control their block of address space
- They can create their own route(6) and domain objects





Delegating Control

“mnt-lower:” gives permission to create more specific objects.





Registering Sub-Allocations

Use the appropriate “**status:**”

IPv4 = SUB-ALLOCATED PA

IPv6 = ALLOCATED-BY-LIR

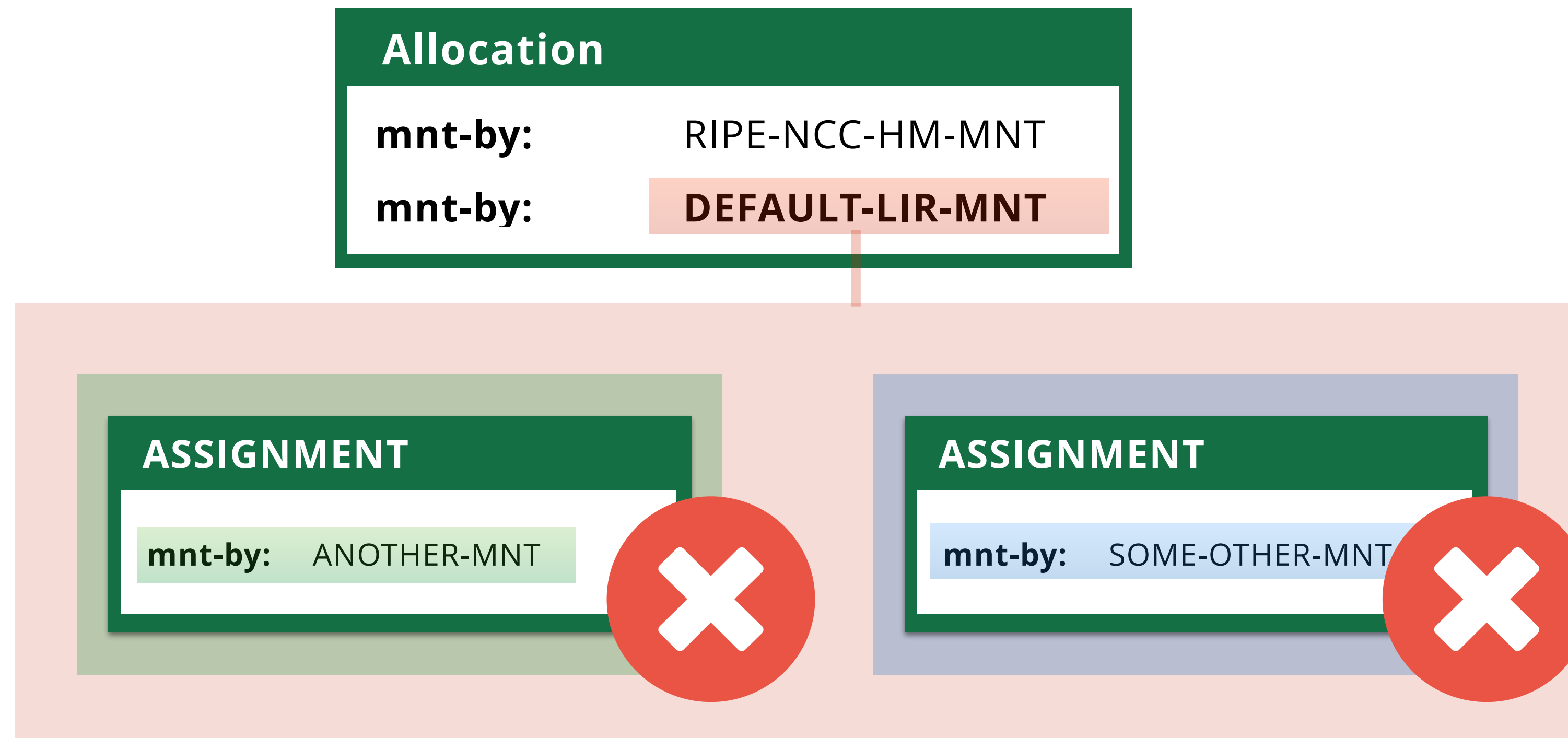
inetnum:	10.0.1.0 - 10.0.2.255
netname:	Branch-office-1
country:	NL
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	SUB-ALLOCATED PA
mnt-by:	LIR-MNT
mnt-lower:	BRANCH-MNT

inet6num:	2001:db8:a000::/36
netname:	Branch-office-1
country:	NL
admin-c:	LA789-RIPE
tech-c:	LA789-RIPE
status:	ALLOCATED-BY-LIR
mnt-by:	LIR-MNT
mnt-lower:	BRANCH-MNT



LIR Keeps Control

- LIR Default Maintainer has control over the whole address space
- Use **“Force Delete”** to remove lost objects





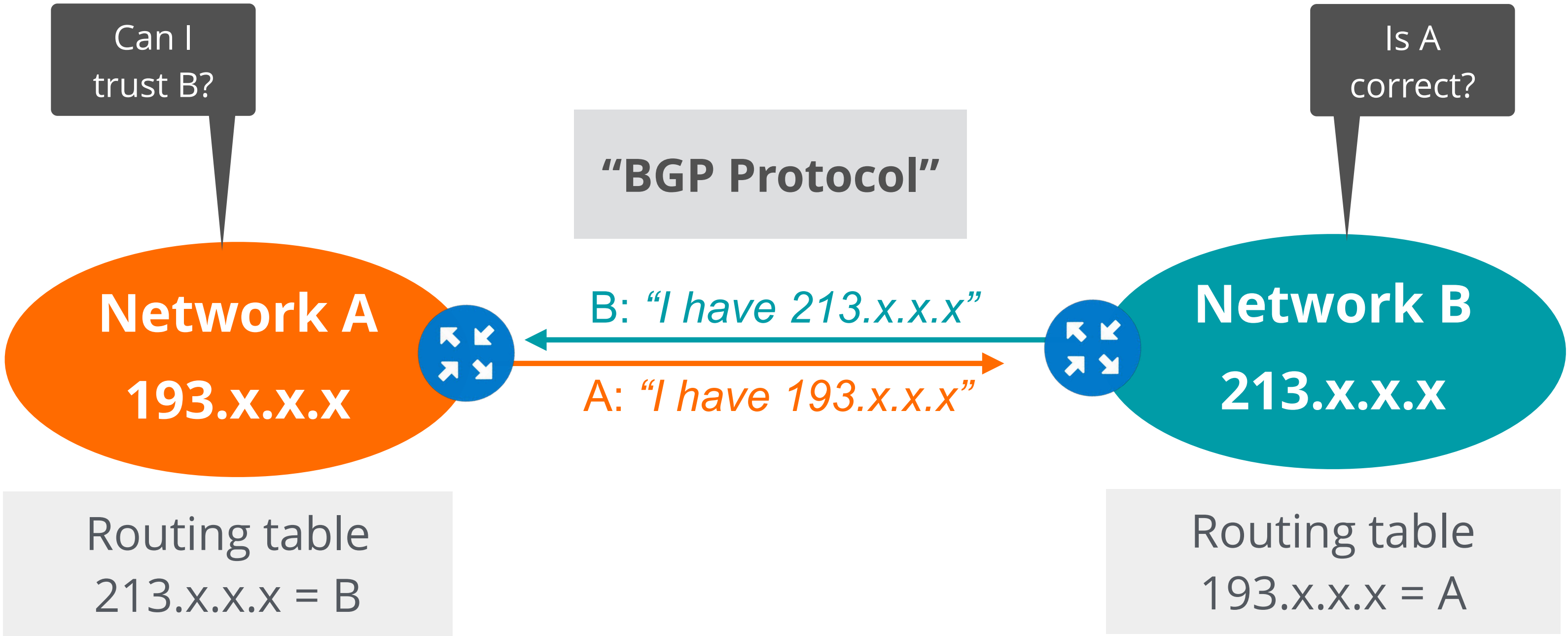
Routing Registry

Making routing safer

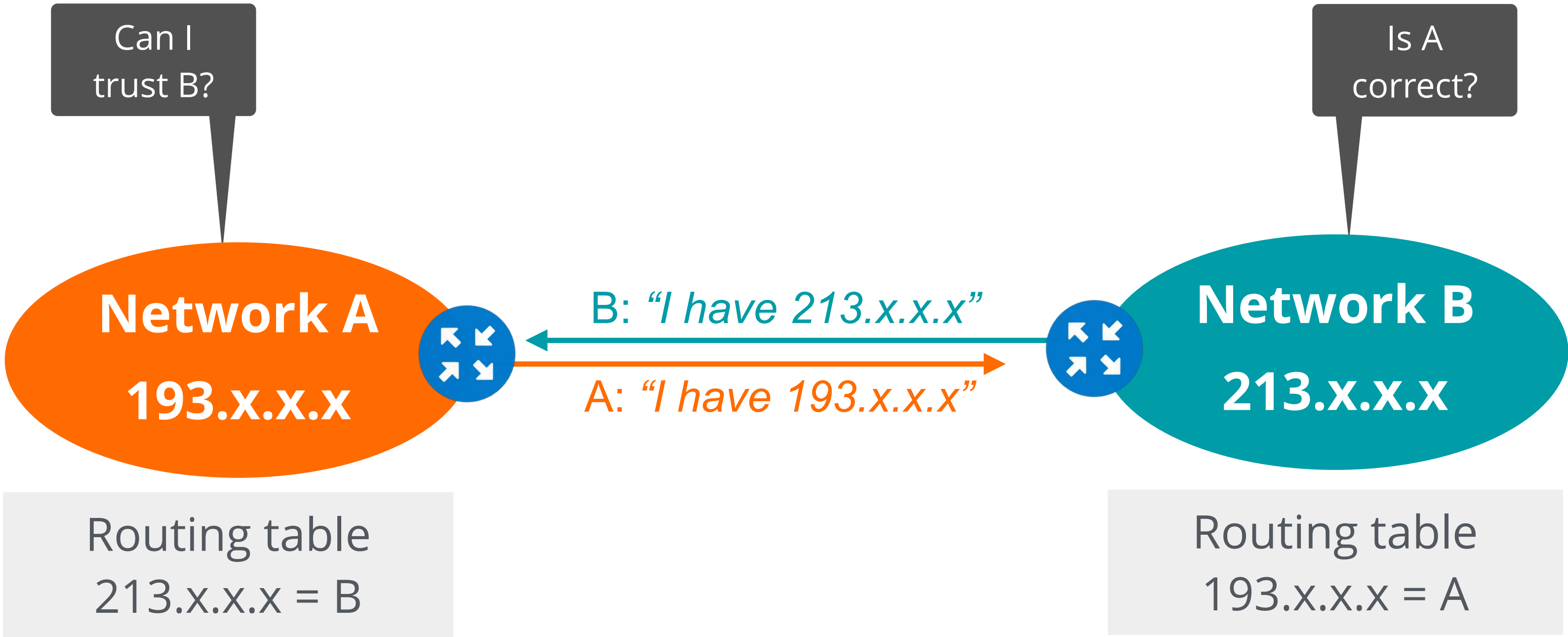
Routing on the Internet



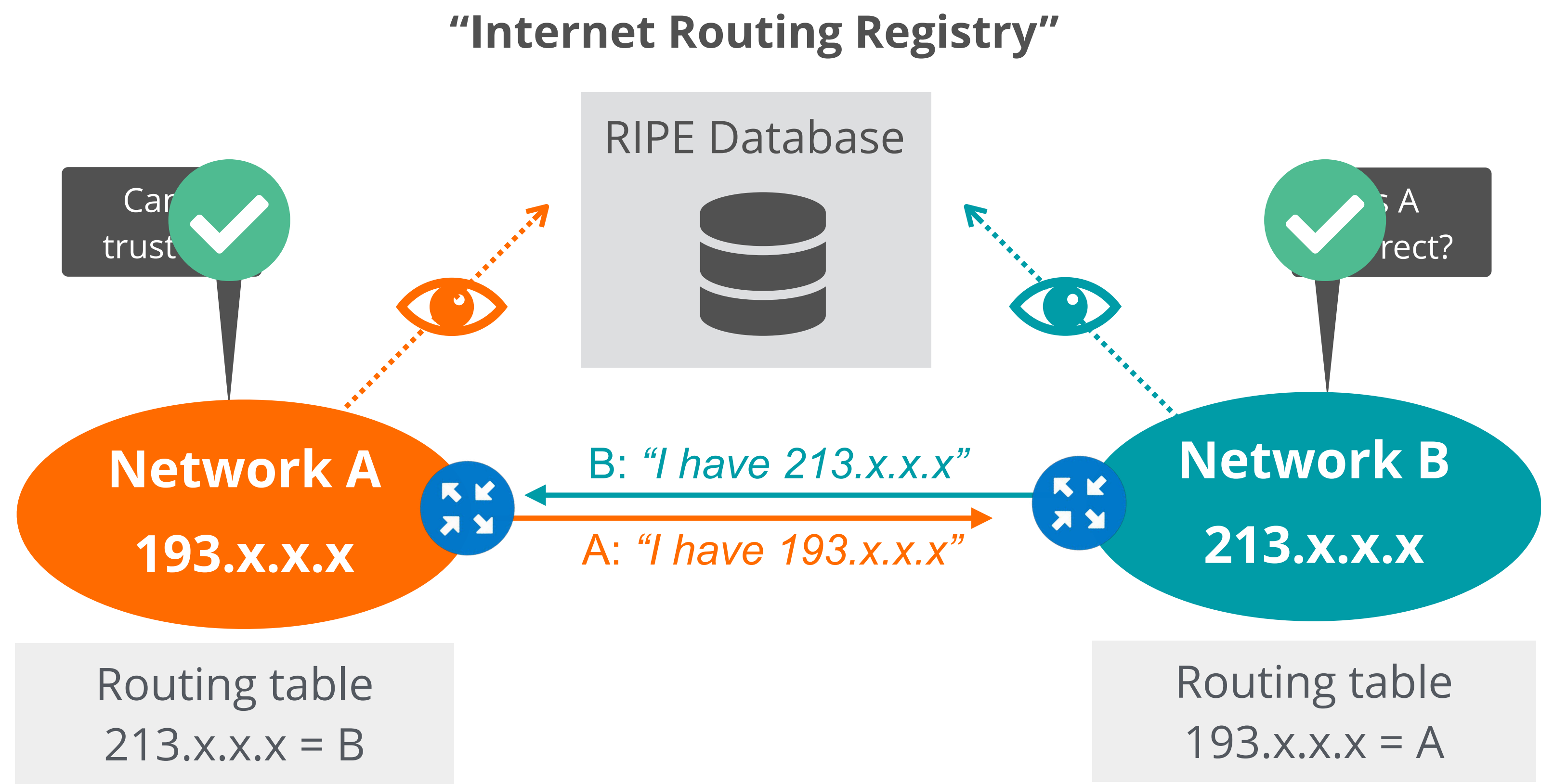
Routing on the Internet



Routing on the Internet



How to Secure Routing?



Autonomous Number Objects

- Known as **aut-num** objects
- Register **who** holds an AS Number
- Shows the routing policy for that AS

```
aut-num: AS12345
as-name: YOUR-AS-NAME
org: ORG-EE2-RIPE
import: from AS1010 accept ANY
export: to AS1010 announce AS12345
import: from AS987 accept ANY
export: to AS987 announce AS12345
admin-c: DV789-RIPE
tech-c: JS123-RIPE
status: ASSIGNED
mnt-by: RIPE-NCC-END-MNT
mnt-by: DEFAULT-LIR-MNT
source: RIPE
```

Autonomous Number Objects

- Known as **aut-num** objects
- Register **who** holds an AS Number
- Shows the routing policy for that AS

```
interas-in: from AS2 L1 R1 (pref=100) accept AS100
interas-in: from AS2 L2 R2 (pref=100) accept AS100
interas-in: from AS2 L3 R3 (pref=100) accept AS100 OR {10.0.0.0/8} MNT
```

```
aut-num: AS12345
```

```
as-name: YOUR-AS-NAME
```

```
org: ORG-EE2-RIPE
```

```
import: from AS1010 accept ANY
```

```
export: to AS1010 announce AS12345
```

```
import: from AS987 accept ANY
```

```
export: to AS987 announce AS12345
```

```
admin-c: DV789-RIPE
```

```
mnt-by: DEFAULT-LIR-MNT
```

```
source: RIPE
```

Autonomous Number Objects

- Known as **aut-num** objects
- Register **who** holds an AS Number
- Shows the routing policy for that AS

```
interas-out:ntoiAS1104p192.87.45.254/32t192.87.45.80/32 ANY
interas-out: to AS1104m192.87.45.254/32n192.87.45.80/32 AS12345
interas-out: to AS1103 192.87.45.254/325192.87.45.80/32
in (metric-out=IGP) announce ANY
interas-in: from AS2 L2 R2 (pref=100) accept AS100
interas-in: from AS2 L3 R3 (pref=100) accept AS100 OR {10.0.0.0/8} MNT
```

aut-num: AS12345

as-name: YOUR-AS-NAME

org: ORG-EE2-RIPE

import: from AS1010 accept ANY

export: to AS1010 announce AS12345

mnt-by: DEFAULT-LIR-MNT

source: RIPE

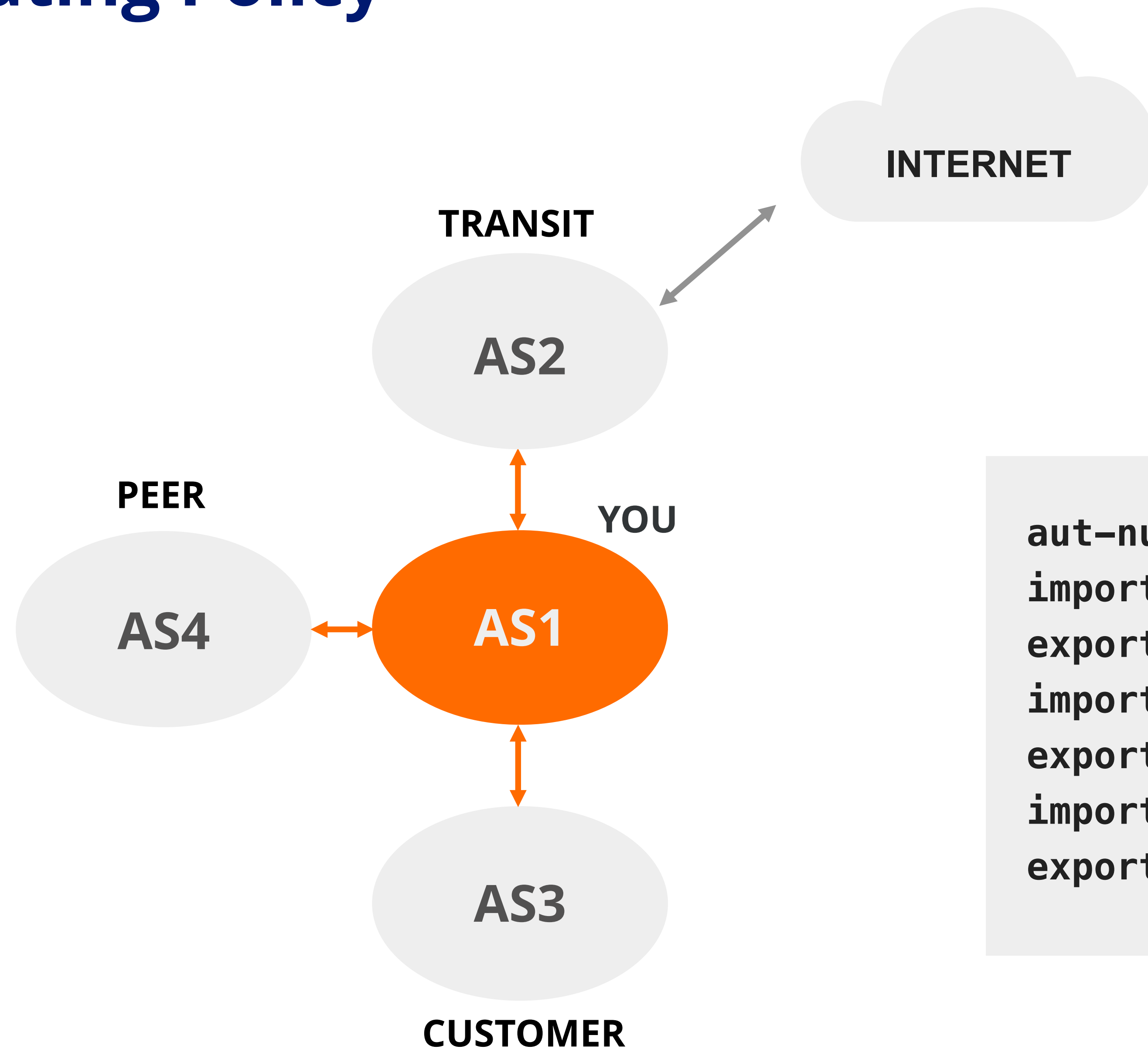
Autonomous Number Objects

- Known as **aut-num** objects
- Register **who** holds an AS Number
- Shows the routing policy for that AS

```

aut-num: AS12345
as-name: YOUR-AS-NAME
org: ORG-EE2-RIPE
import: from AS1010 accept ANY
export: to AS1010 announce AS12345
interas-out: ntoiAS1104p192.87.45.254/32t192.87.45.80/32 ANY
interas-out: to AS1104m192.87.45.254/32n192.87.45.80/32 AS12345
interas-out: to AS1103 192.87.45.254/325192.87.45.80/32
in (metric-out=IGP) announce ANY
interas-in: from AS2 L2 R2 (pref=100) accept AS100
interas-in: from AS2 L3 R3 (pref=100) accept AS100 OR {10 0 0 0/8} MNT
interas-in: from AS1104 192.(pref=10)/accept.AS786.AS987
interas-in: from AS1104 192.87.45.(pref=20)2accept.AS987 -LIR-MNT
interas-in: from AS1103 192.87.45.2(pref=MED)8accept2ANY
  
```

Routing Policy

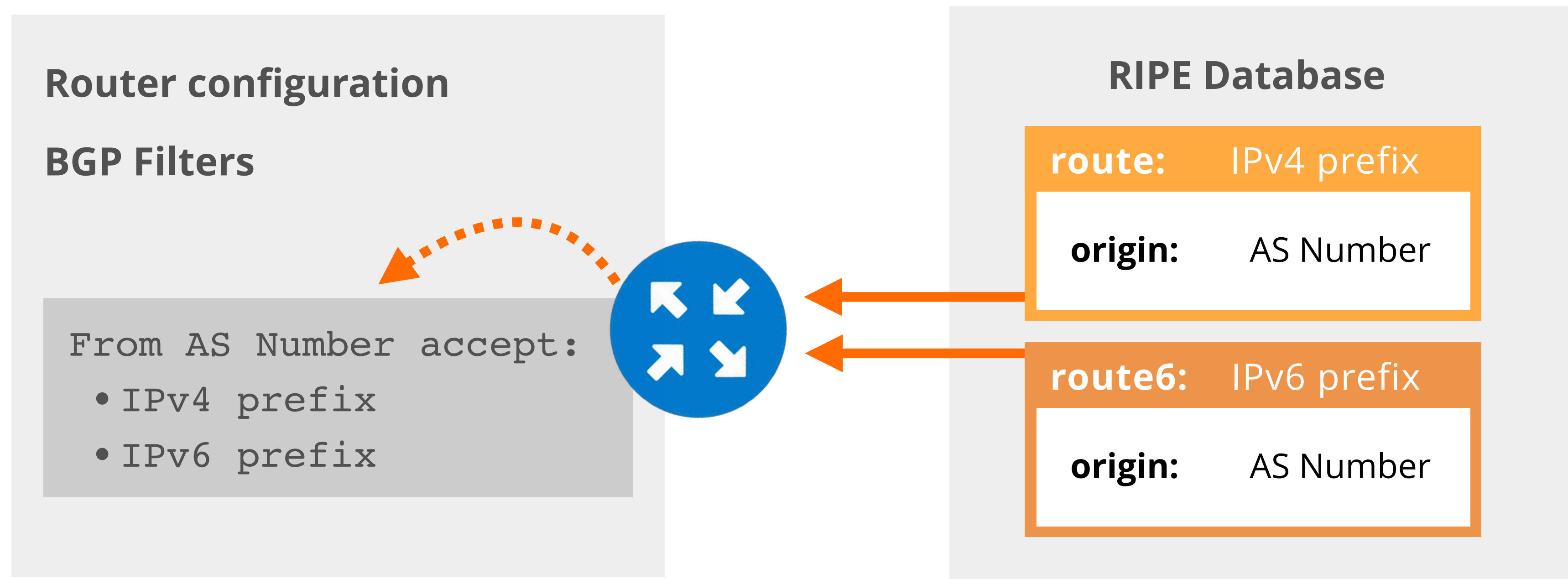


```
aut-num: AS1
import: from AS2 accept ANY
export: to AS2 announce AS1 AS3
import: from AS3 accept AS3
export: to AS3 announce ANY
import: from AS4 accept AS4
export: to AS4 announce AS1 AS3
```



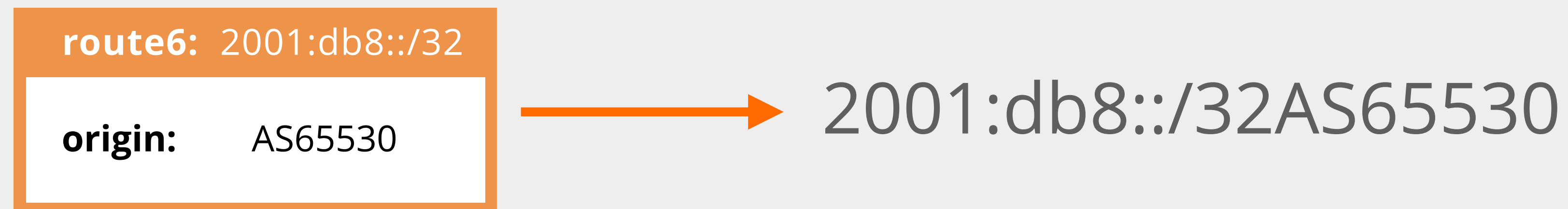
What Are route(6) Objects?

- **route(6)** objects register which IPv4/IPv6 prefix will be announced by which AS number
- Used for creating BGP filters





Primary key of route(6) objects





How To Create route(6) Objects

You need permission from:

1. **inetnum** or **inet6num**
2. **route** or **route6**

①

Allocation

mnt-by:	RIPE-NCC-HM-MNT
mnt-by:	DEFAULT-LIR-MNT
mnt-routes:	ANOTHER-MNT

②

route(6)

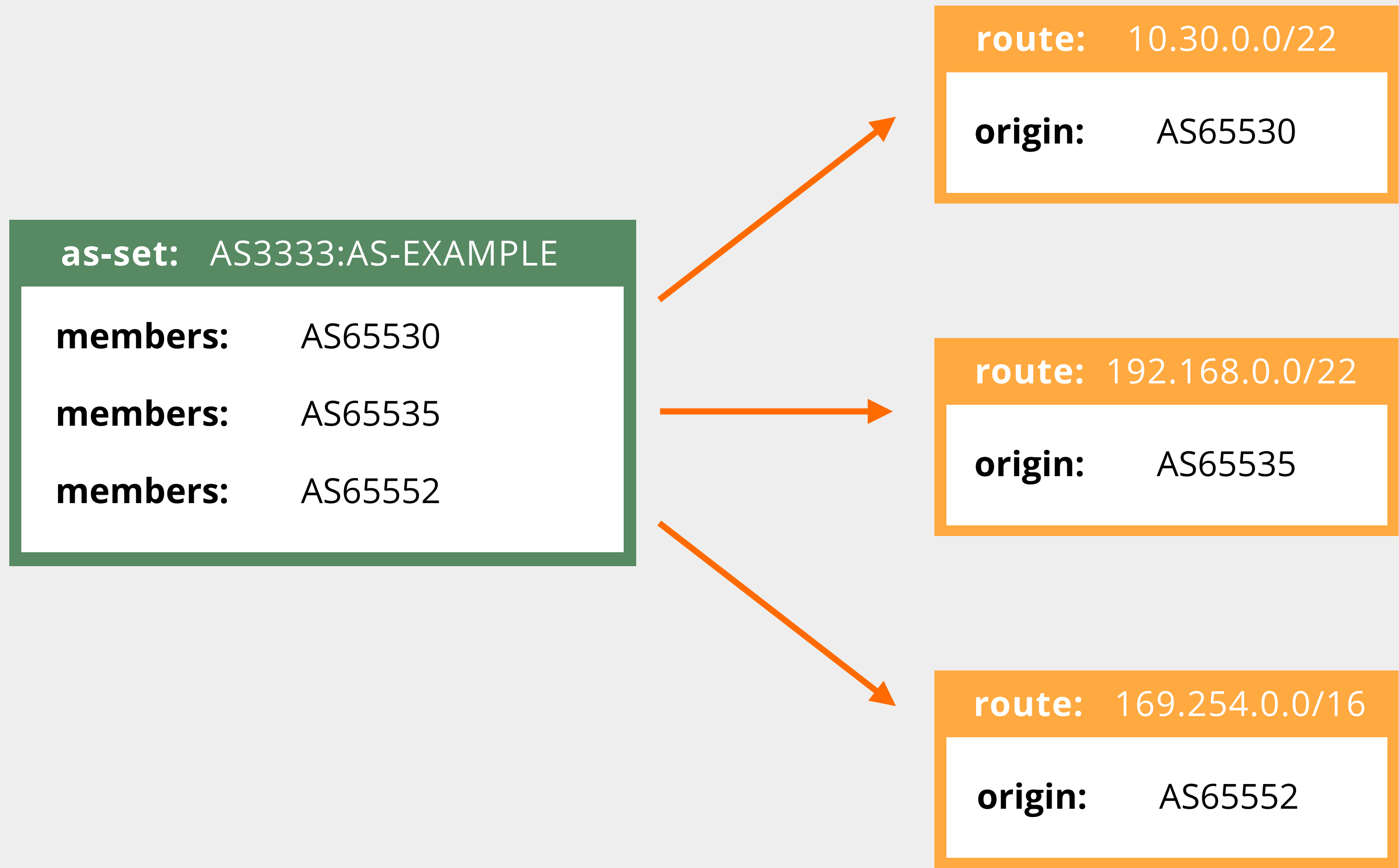
origin:	AS12345
mnt-by:	ANOTHER-MNT

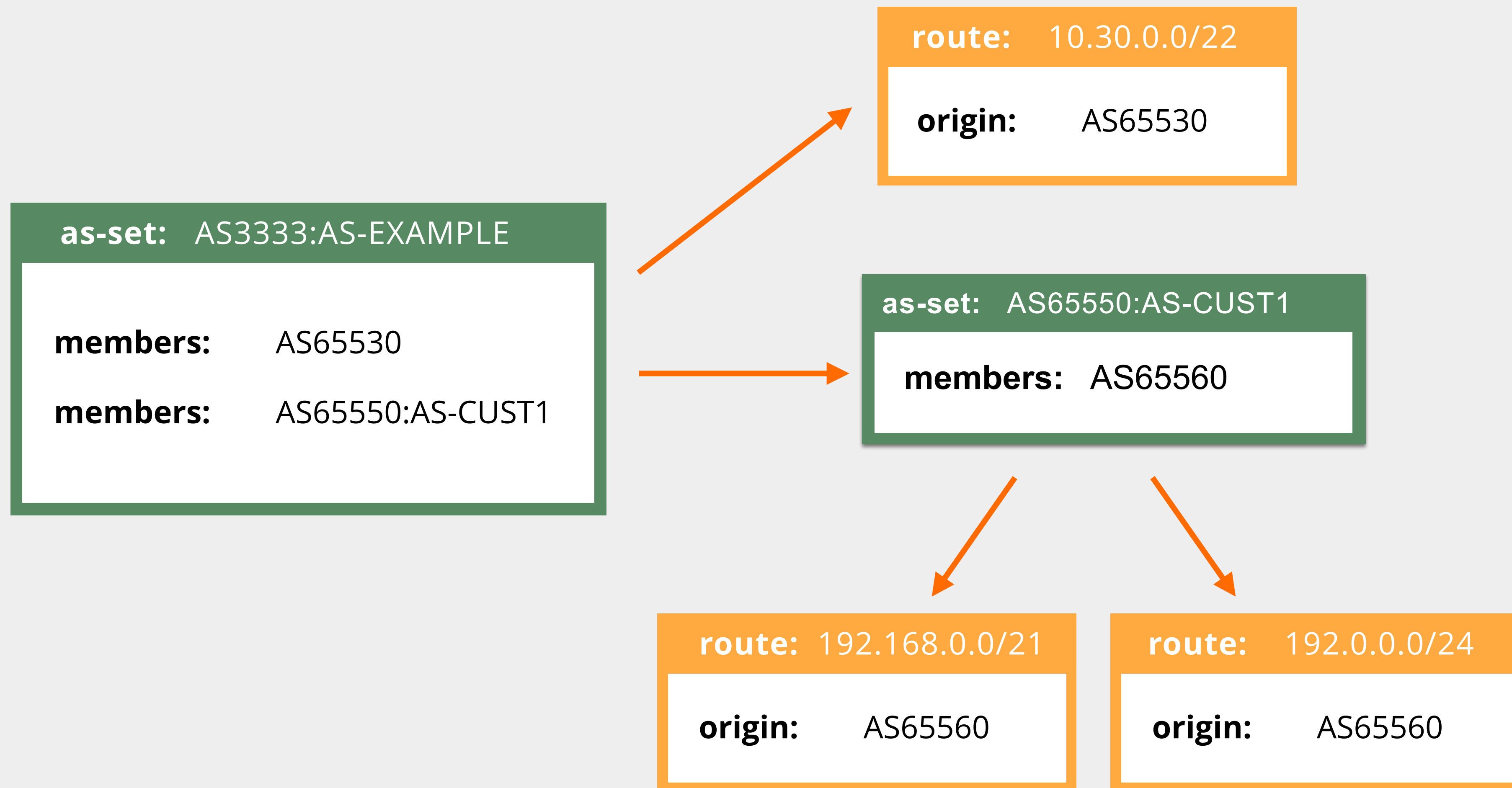
Take the poll!

What would happen if your **route(6)** objects were deleted?



as-sets







Questions





Reverse DNS

How to request reverse
delegation



What is Reverse DNS ?

Mapping of IP addresses to host names

193.2.6.139

2001:67c:2e8:22::c100:68b



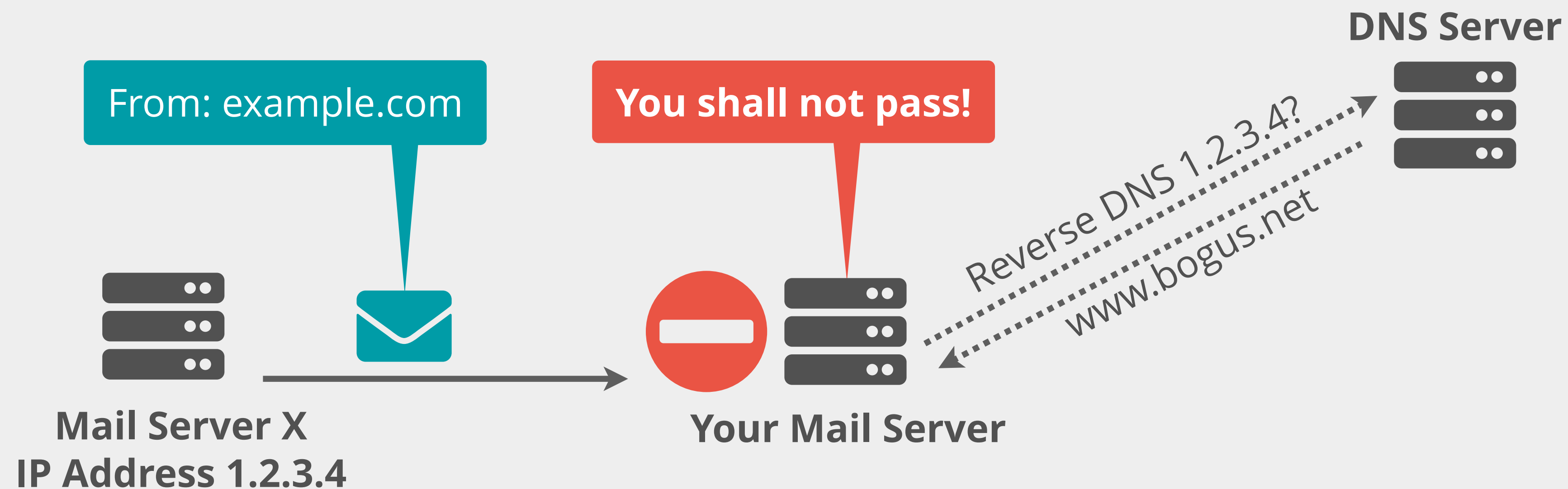
www.ripe.net



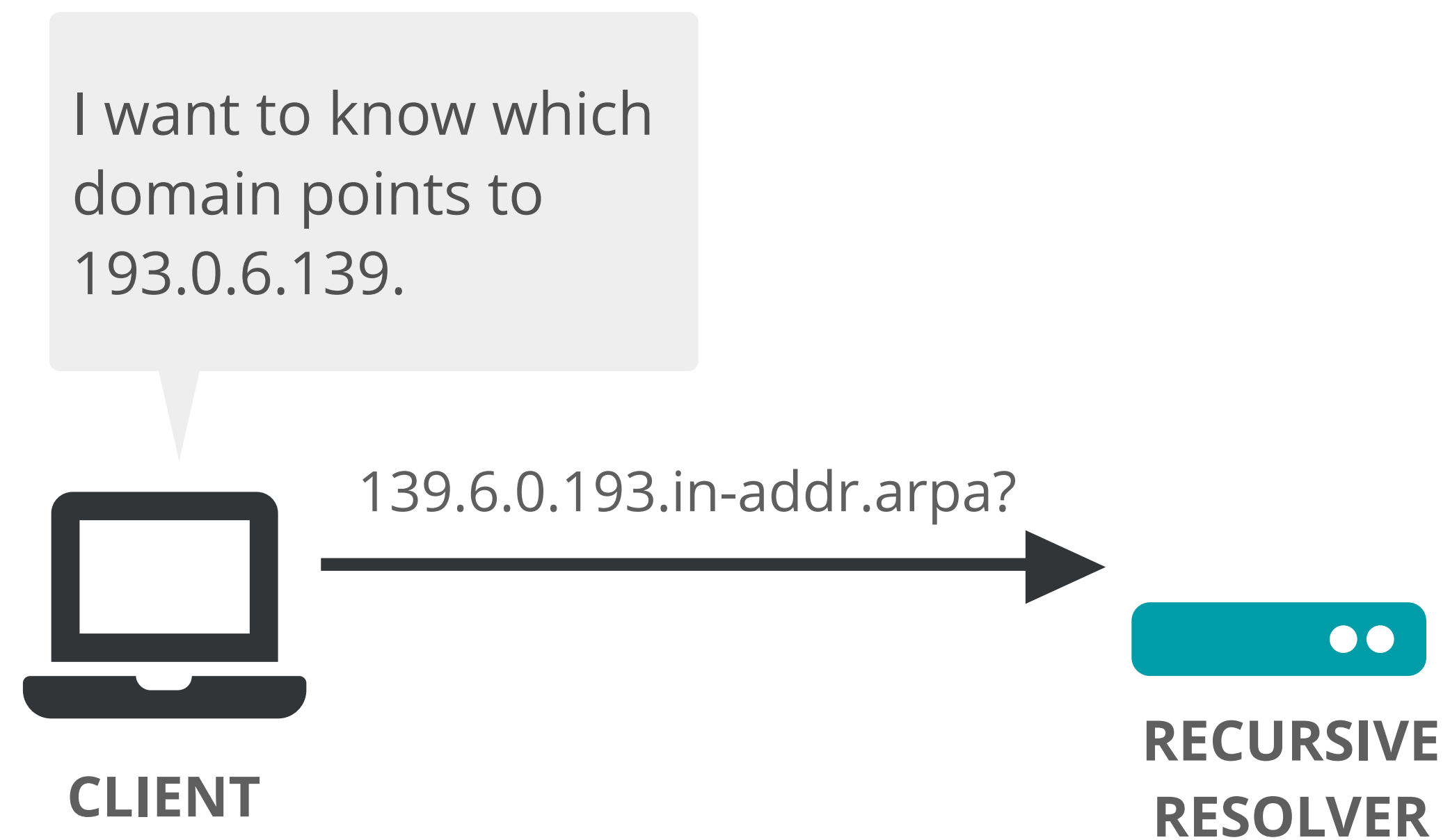
Purpose of Reverse DNS

Reverse DNS is used for:

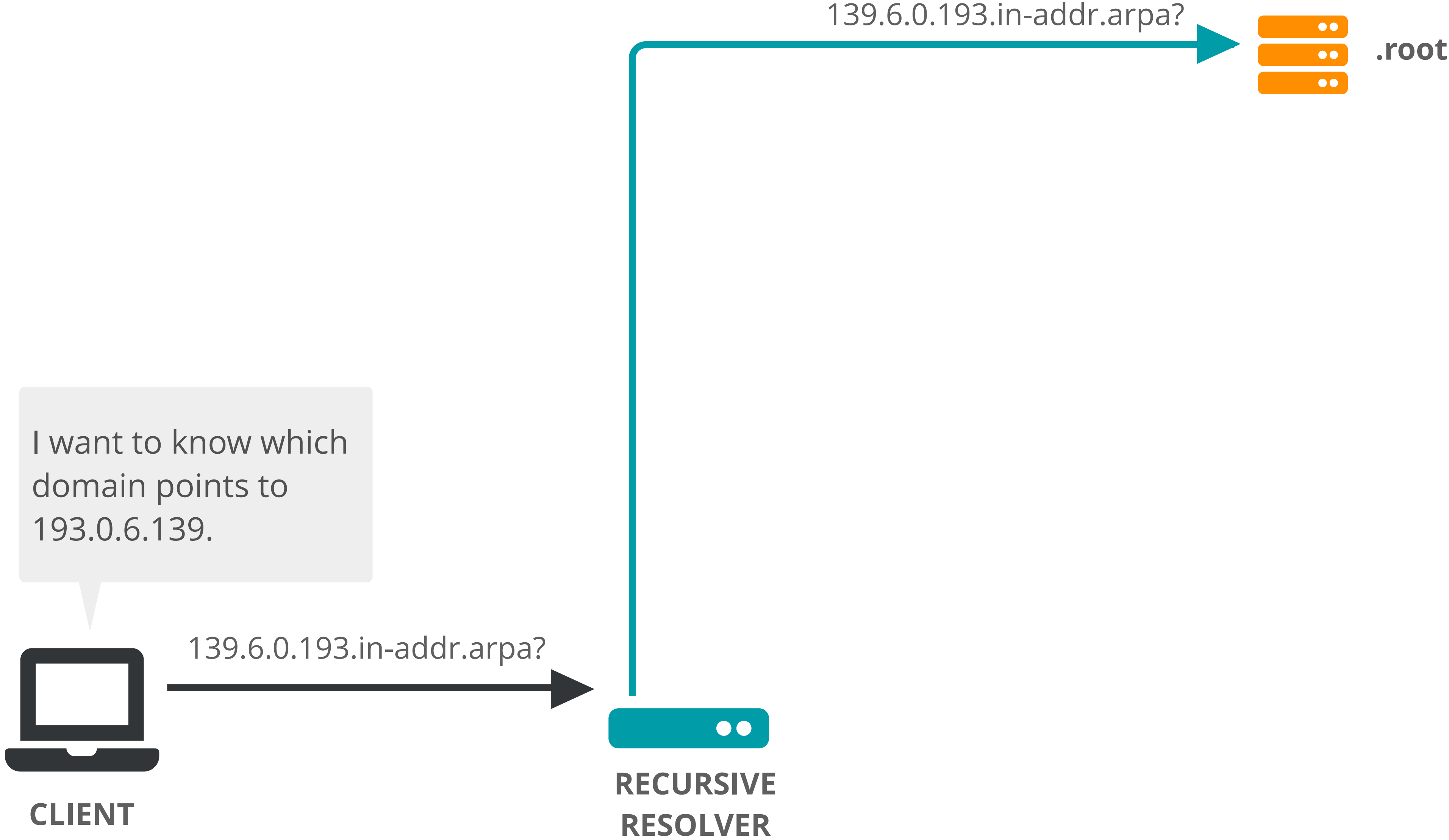
- Identifying Spam
- Network Diagnostics
- Controlling Access to a Network



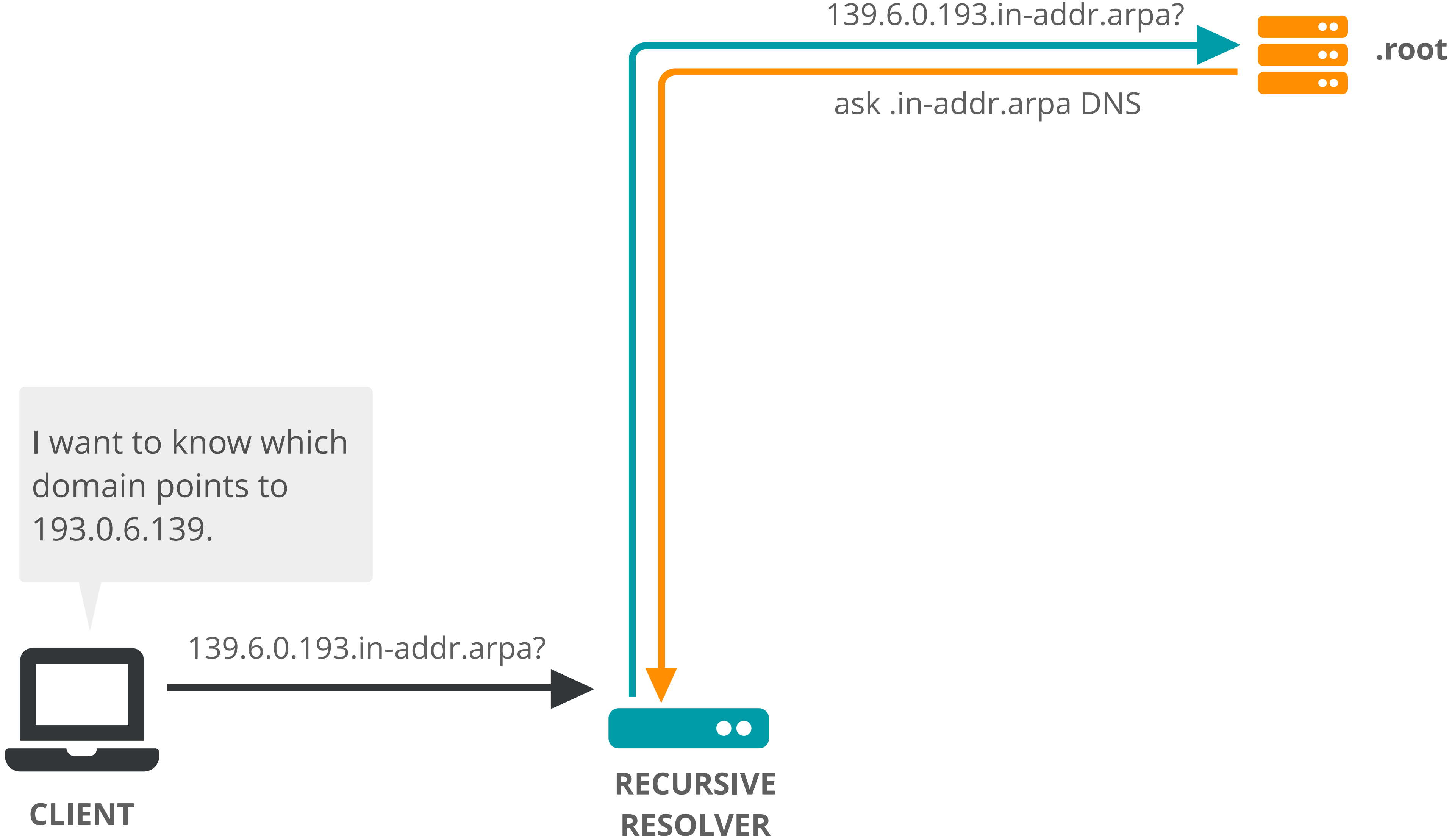
How does Reverse DNS Work?



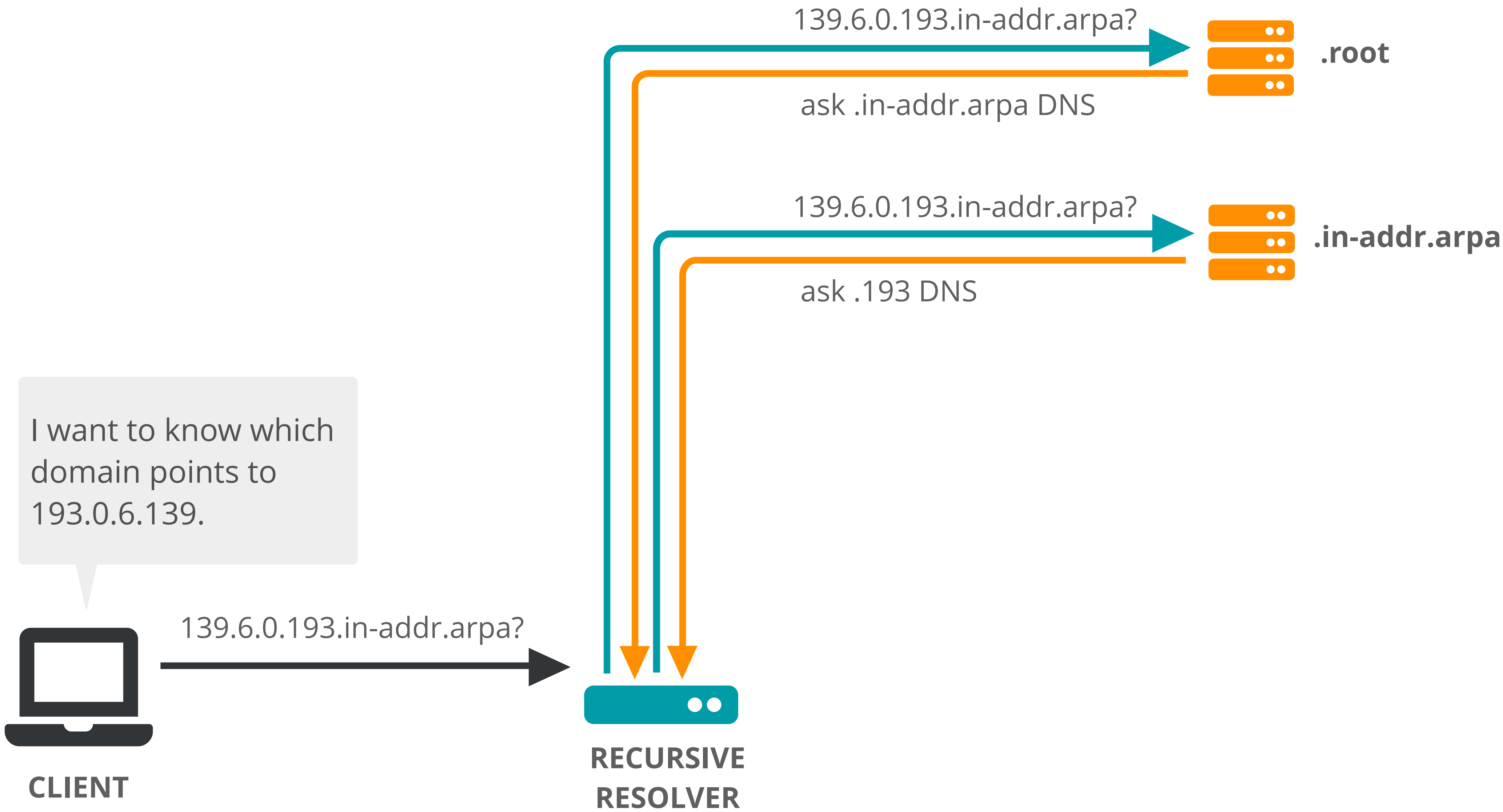
How does Reverse DNS Work?



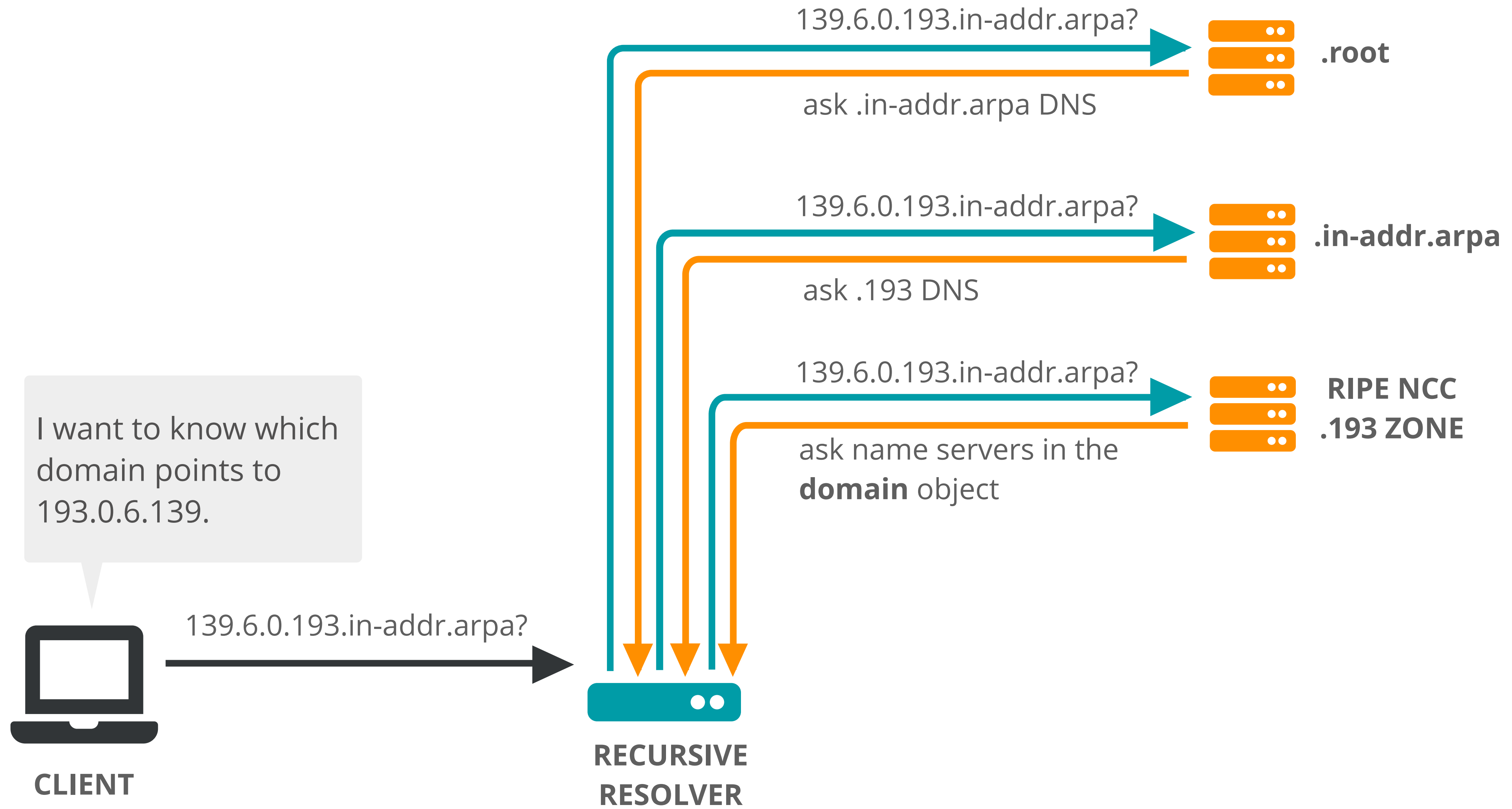
How does Reverse DNS Work?



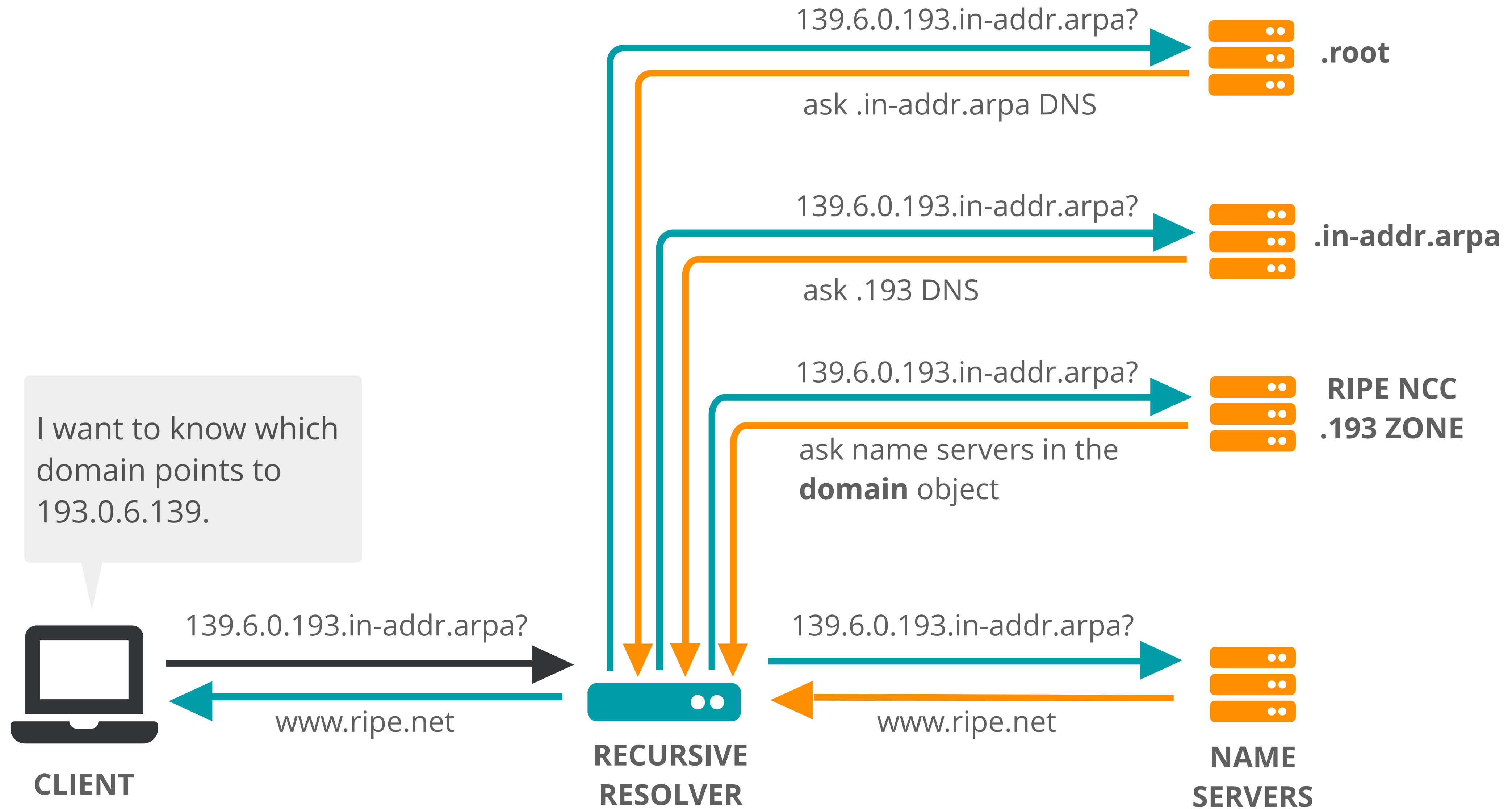
How does Reverse DNS Work?



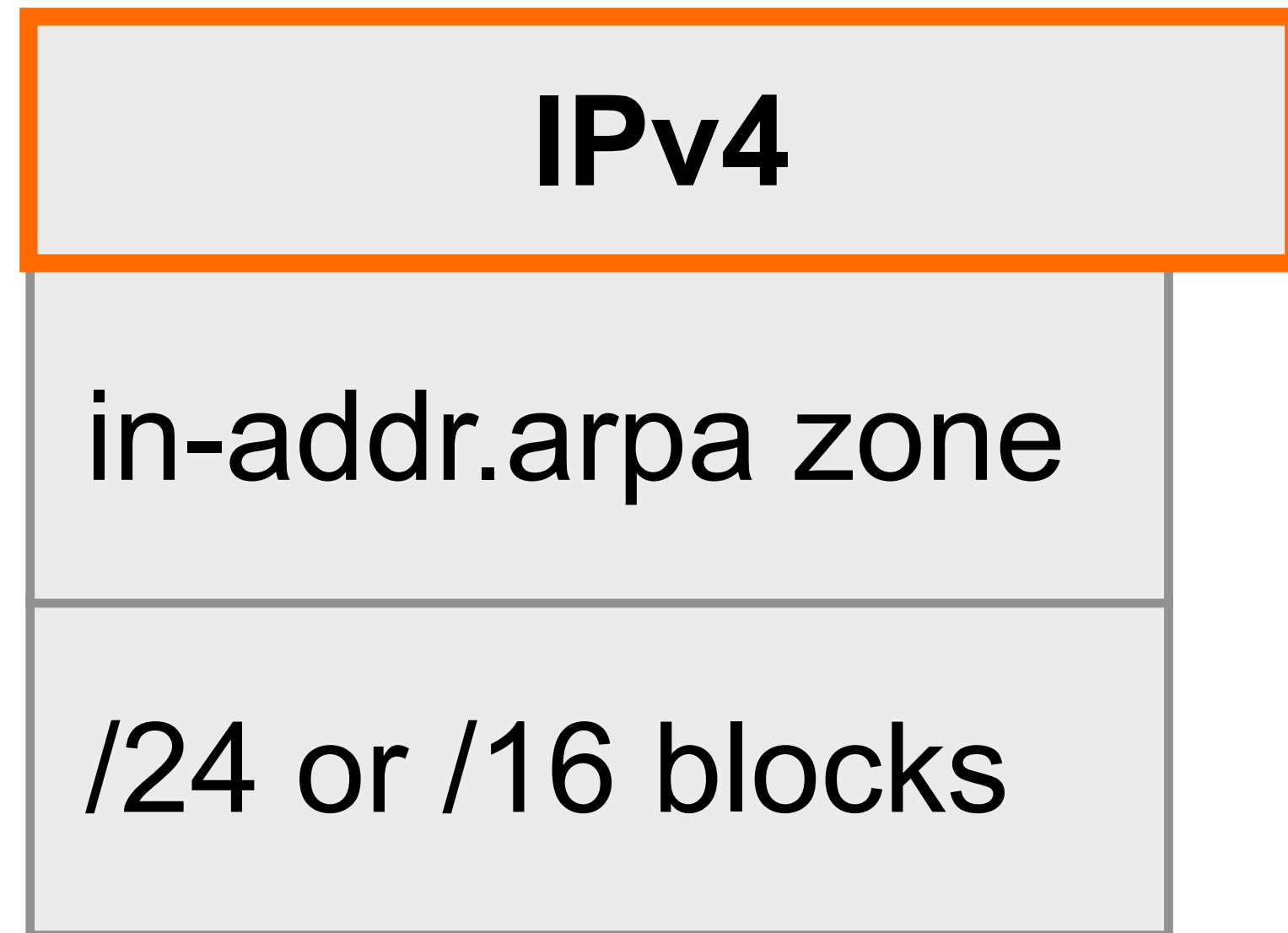
How does Reverse DNS Work?



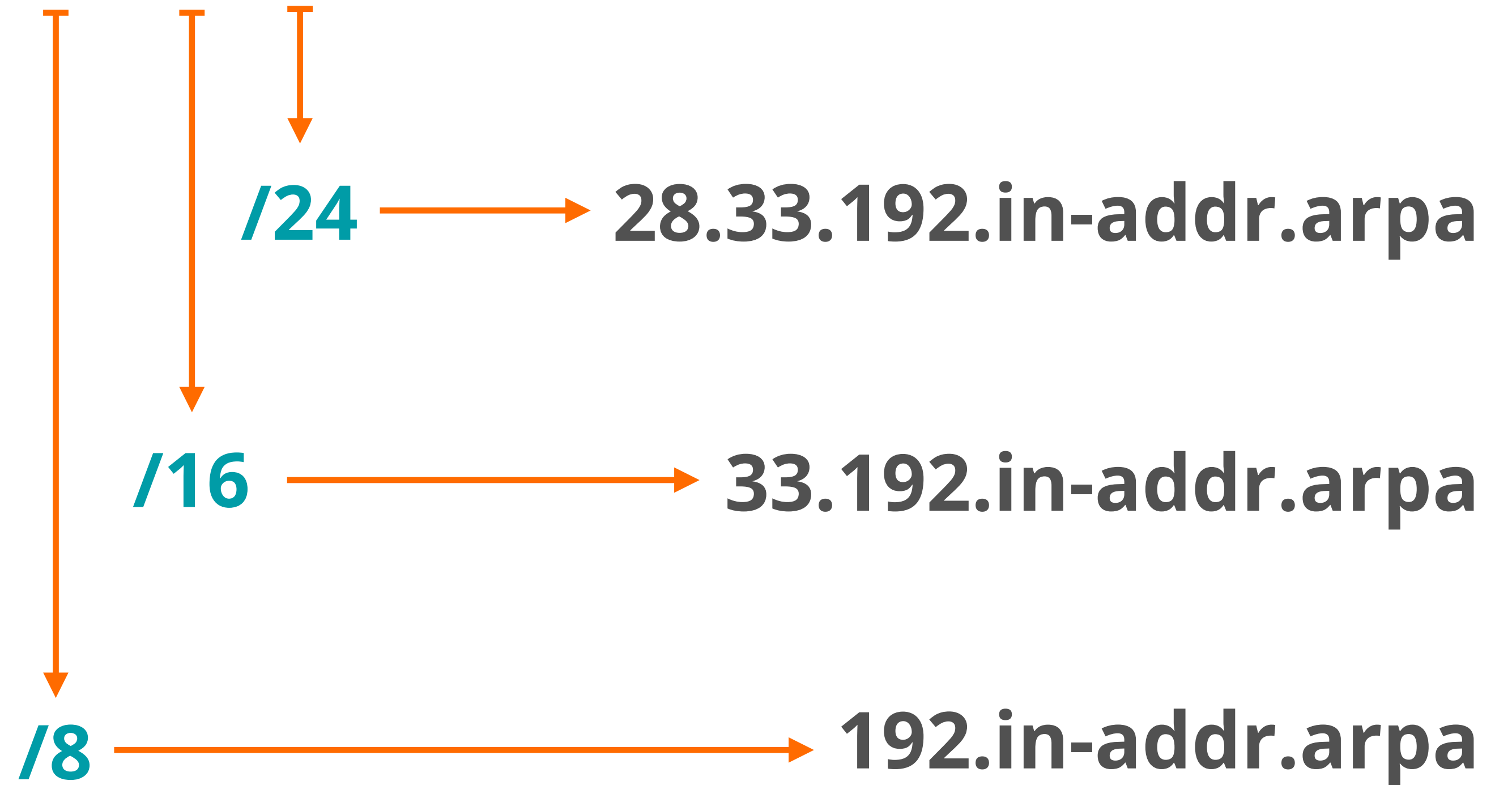
How does Reverse DNS Work?



Reverse Delegation Basics



192.33.28.0



Take the poll!

How many domain objects
need to be created for
192.168.8.0/21?

 2 min.



Reverse Delegation Basics



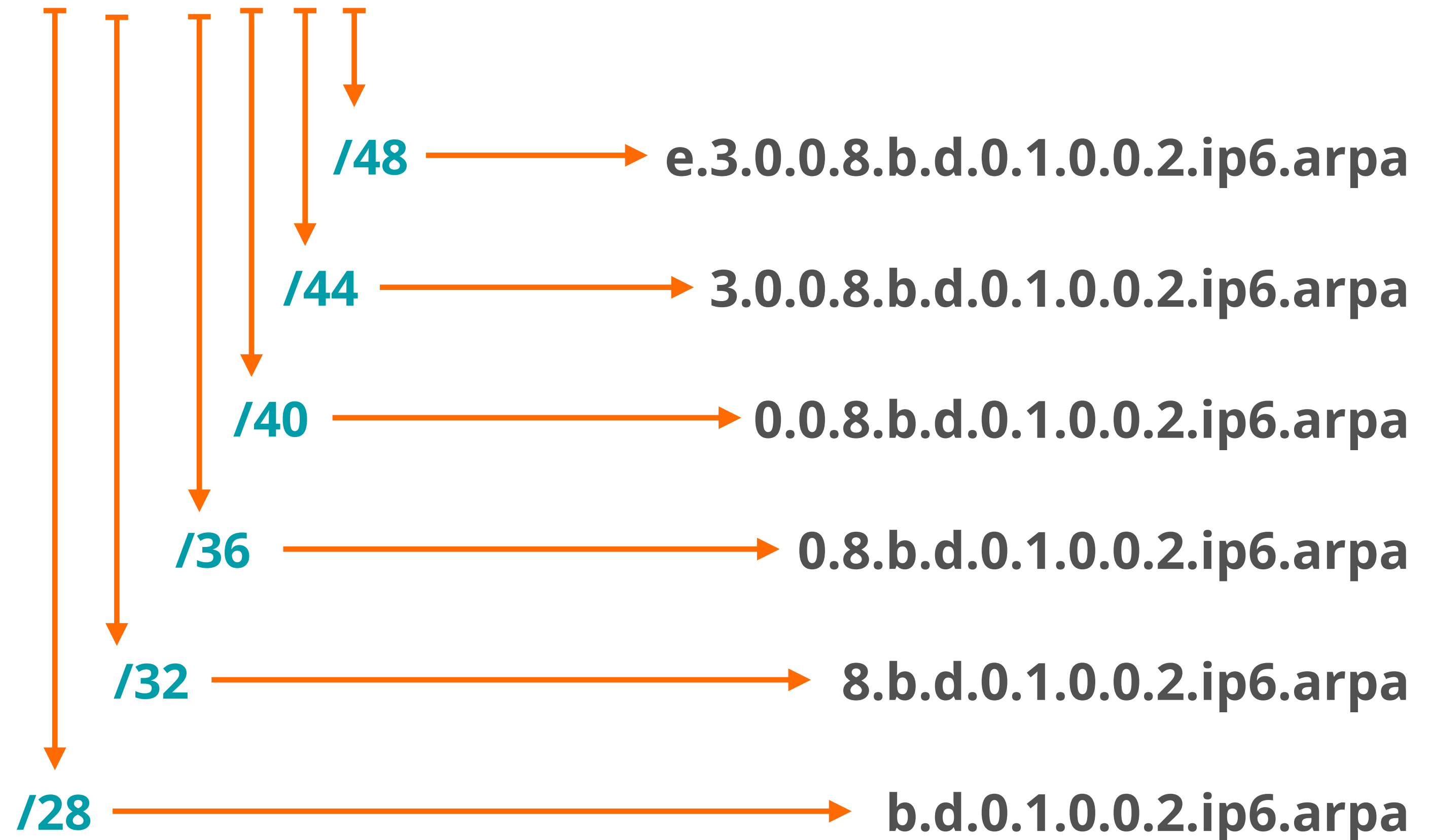
IPv6

ip6.arpa zone

Multiple of 4 bits

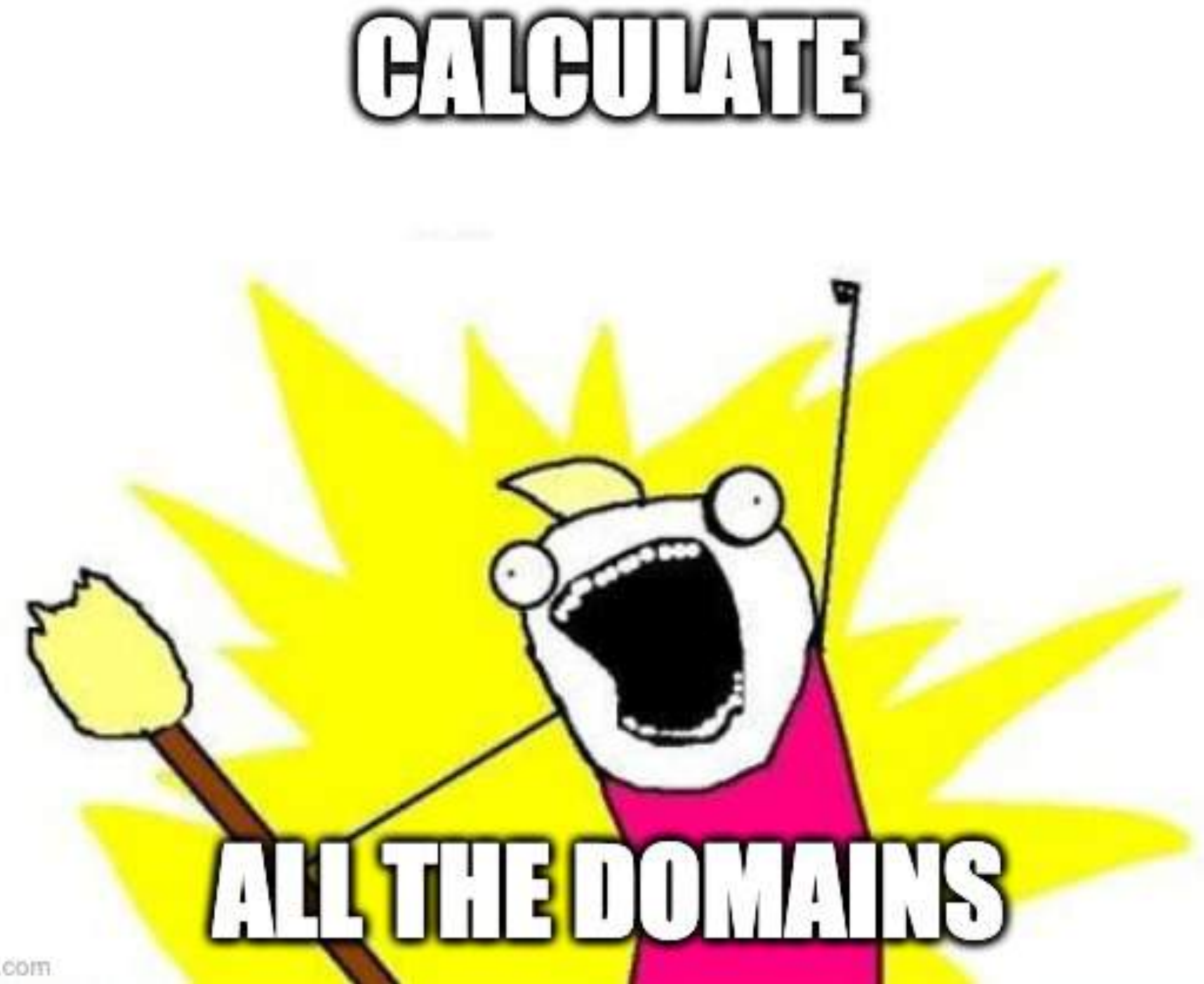
*/28, /32, /36, /40,
/44, /48, /52, /56...*

2001:0db8:003e:ef11:0000:0000:c100:004d



Take the poll!

How many domain objects need to be created for **2001:db8::/29**?





Setting up Reverse Delegation

- Configure your DNS servers
 - at least two name servers in different subnets
 - create a zone file on each for each chunk
- Check your zones: <http://dnscheck.ripe.net>

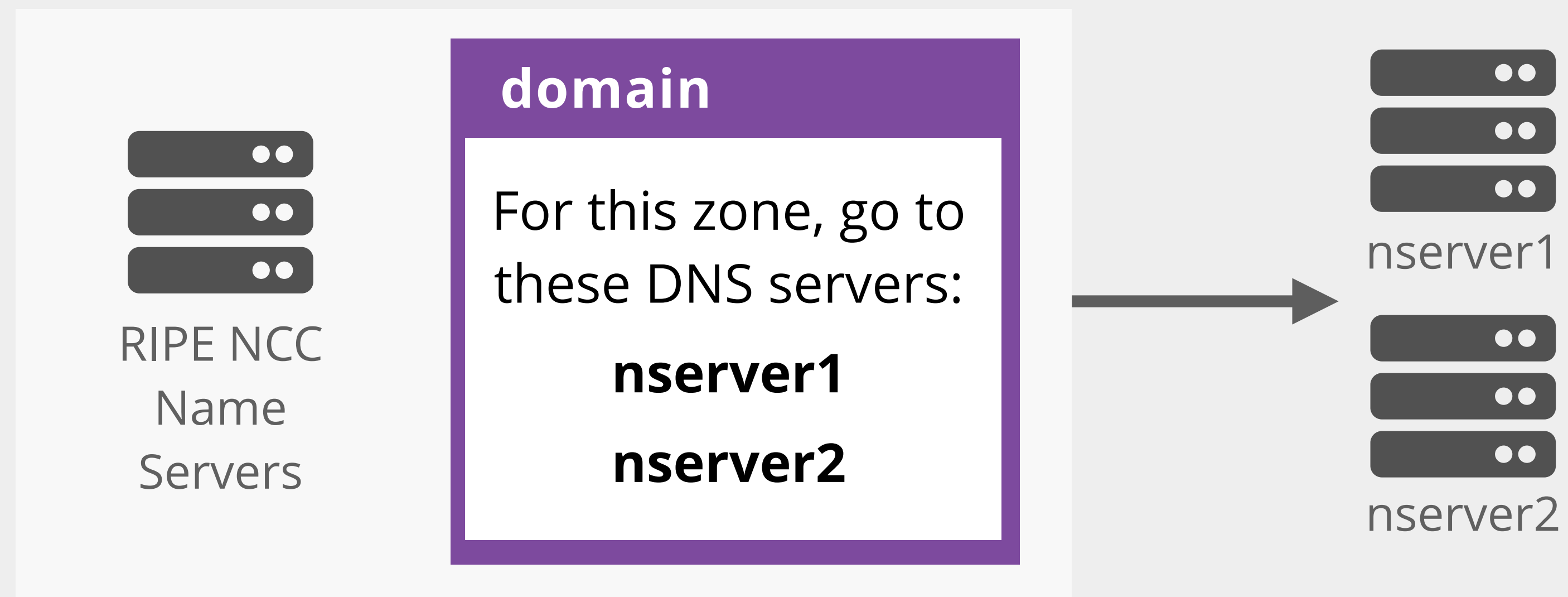
The screenshot shows a web form for checking DNS zones. It has the following sections:

- Domain name:** A text input field with a play button icon to its right.
- Nameservers:** A section with a plus sign icon to its right. It contains two input fields: one labeled "NS" and one labeled "IP", with a minus sign icon to the right of the "IP" field.
- Digests:** A section with a plus sign icon to its right.
- Fetch data from parent zone:** A button.
- Advanced options:** A checkbox that is currently unchecked.



domain objects

- Create records on RIPE NCC DNS servers
- They point to name servers that will be authoritative for the zone





IPv4 and domain objects

domain object for prefix: **192.33.28.0/24**

domain:	28.33.192.in-addr.arpa
descr:	rDNS for my IPv4 network
admin-c:	NOC12-RIPE
tech-c:	NOC12-RIPE
zone-c:	NOC12-RIPE
nserver:	pri.example.net
nserver:	sns.company.org
ds-rdata:	45062 8 2 275d9acbf3d3fec11b6d6...
mnt-by:	EXAMPLE-LIR—MNT
created:	2015-01-21T13:52:29Z
last-modified:	2016-02-07T15:09:46Z
source:	RIPE



IPv6 and domain objects

domain object for prefix: **2001:db8::/32**

domain:	8.b.d.0.1.0.0.2.ip6.arpa
descr:	rDNS for my IPv6 network
admin-c:	NOC12-RIPE
tech-c:	NOC12-RIPE
zone-c:	NOC12-RIPE
nserver:	pri.example.net
nserver:	sns.company.org
ds-rdata:	45062 8 2 275d9acbf3d3fec11b6d6...
mnt-by:	EXAMPLE-LIR—MNT
created:	2015-01-21T13:52:29Z
last-modified:	2016-02-07T15:09:46Z
source:	RIPE



Create Domain Objects Wizard

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

EXAMPLE-MNT x

prefix Prefix looks OK
10.155.16.0/22 ?

nserver Server looks OK
tinnie.arin.net ↓ ?

nserver Server looks OK
sec3.apnic.net ↓ ?

Reverse zones

16.155.10.in-addr.arpa

17.155.10.in-addr.arpa

18.155.10.in-addr.arpa

19.155.10.in-addr.arpa

admin-c
EX9999-RIPE ↓ ?

tech-c

Provide the **maintainer** that will protect the domain objects.



Create Domain Objects Wizard

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

EXAMPLE-MNT x

prefix Prefix looks OK

10.155.16.0/22 ?

nserver Server looks OK

tinnie.arin.net ↓ ?

nserver Server looks OK

sec3.apnic.net ↓ ?

Reverse zones

16.155.10.in-addr.arpa

17.155.10.in-addr.arpa

18.155.10.in-addr.arpa

19.155.10.in-addr.arpa

admin-c

EX9999-RIPE ↓ ?

tech-c

Order in which the RIPE Database checks for authorisation from the address space:

- mnt-domains:
- mnt-lower:
- mnt-by:



Create Domain Objects Wizard

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

EXAMPLE-MNT x

prefix Prefix looks OK
10.155.16.0/22 ?

nserver Server looks OK
tinnie.arin.net ↓ ?

nserver Server looks OK
sec3.apnic.net ↓ ?

Reverse zones

16.155.10.in-addr.arpa
17.155.10.in-addr.arpa
18.155.10.in-addr.arpa
19.155.10.in-addr.arpa

admin-c
EX9999-RIPE ↓ ?

tech-c

Provide at least **two** different name servers in **two** different subnets.

They must be **reachable!**



Create Domain Objects Wizard

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

EXAMPLE-MNT x

prefix Prefix looks OK
10.155.16.0/22 ?

nserver Server looks OK
tinnie.arin.net ↓ ?

nserver Server looks OK
sec3.apnic.net ↓ ?

Reverse zones

- 16.155.10.in-addr.arpa
- 17.155.10.in-addr.arpa
- 18.155.10.in-addr.arpa
- 19.155.10.in-addr.arpa

admin-c
EX9999-RIPE ↓ ?

tech-c

- domain:** 16.155.10.in-addr.arpa
mnt-by: EXAMPLE-MNT
- domain:** 17.155.10.in-addr.arpa
mnt-by: EXAMPLE-MNT
nserver: tinnie.arin.net
- domain:** 18.155.10.in-addr.arpa
mnt-by: EXAMPLE-MNT
nserver: tinnie.arin.net
- domain:** 19.155.10.in-addr.arpa
mnt-by: EXAMPLE-MNT
nserver: tinnie.arin.net
nserver: sec3.apnic.net



Questions



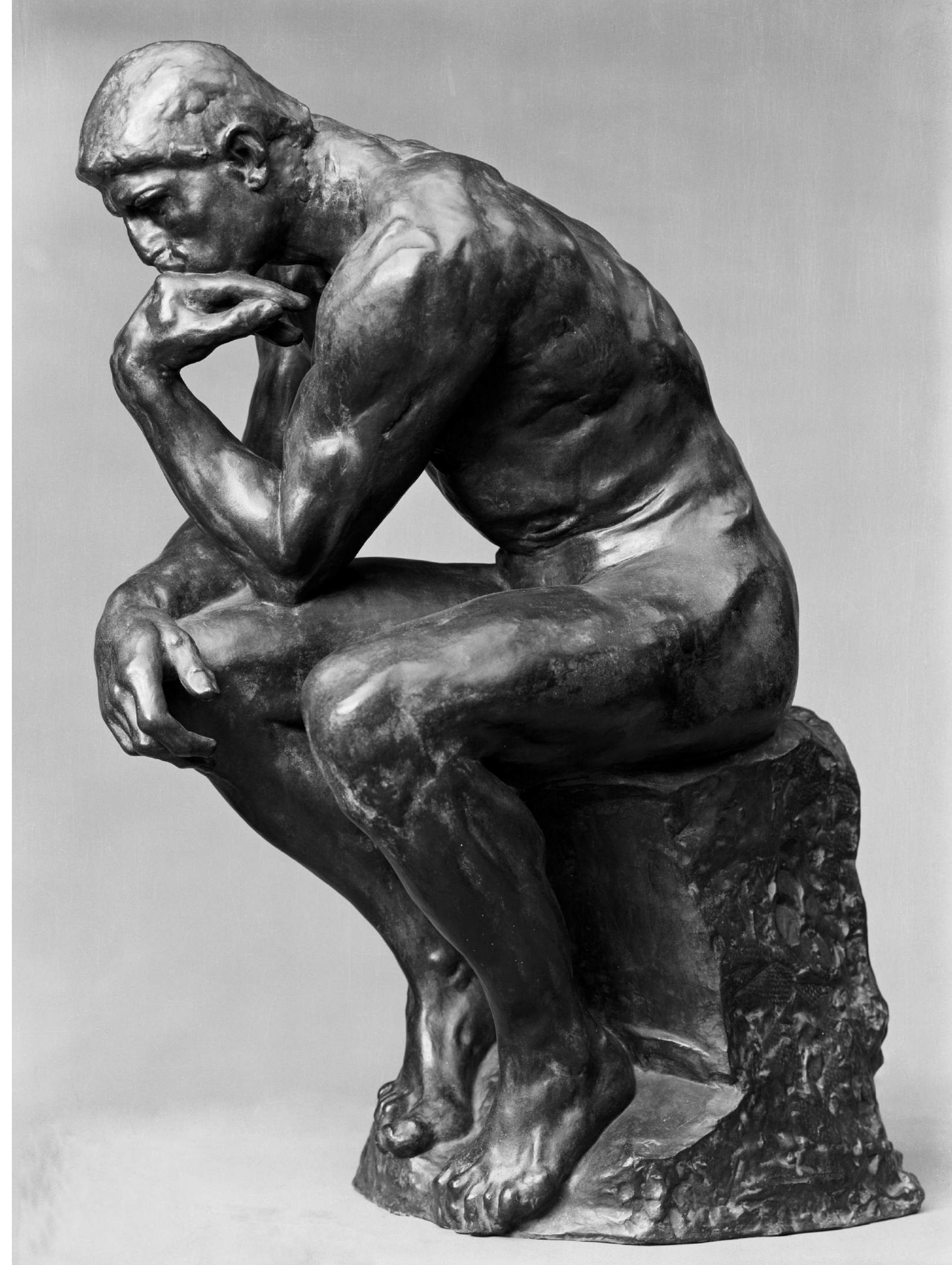


Notifications

How to know if your objects change?

Think about this...

- The RIPE Database is a **public** database
- **Anybody** can search in the database
- **Who** can make updates?
- How can you **know** if somebody updates your objects?





“notify:”

The “**notify:**” attribute is optional

- Can be used on any object
- An email is sent when the object is updated

Person

notify: email@example.com

IP Address Block

notify: noc-team@example.com

LIR Organisation

notify: admin@example.com



“upd-to:”

For **failed** attempts to update objects.



mntner: LIR-MNT

upd-to: db-alerts@example.com

IP Address Block

mnt-by: LIR-MNT



“mnt-nfy:”

For **successful** attempts to update objects.

mntner: LIR-MNT

mnt-nfy: db-success@example.com



IP Address Block

mnt-by: LIR-MNT





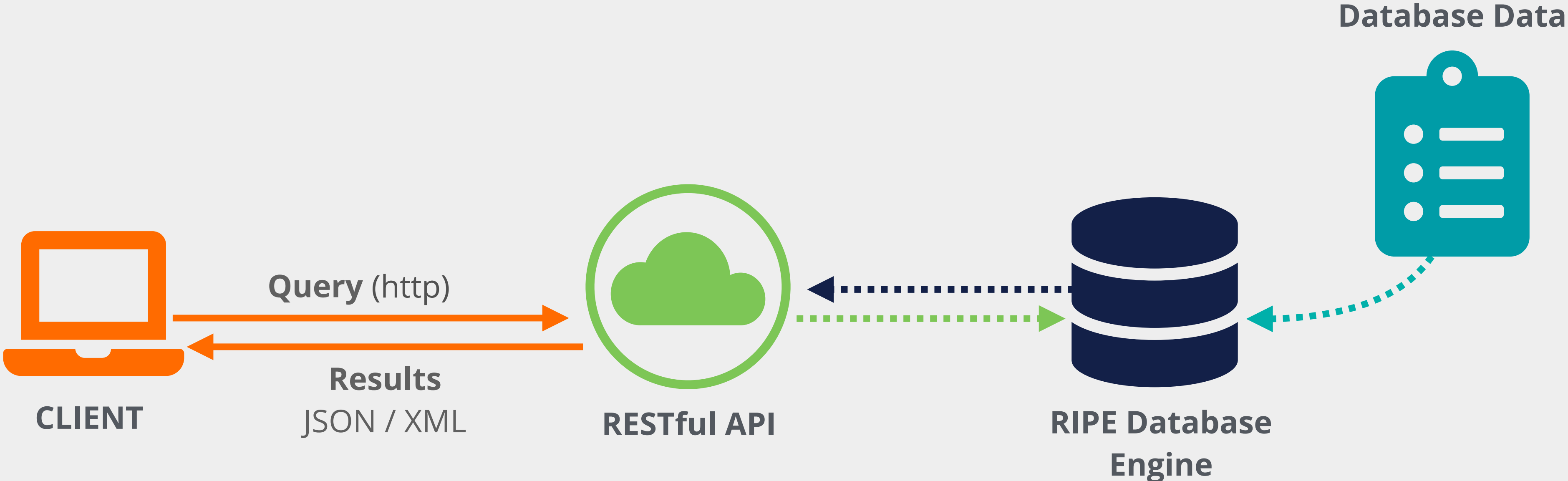
Beyond The Database

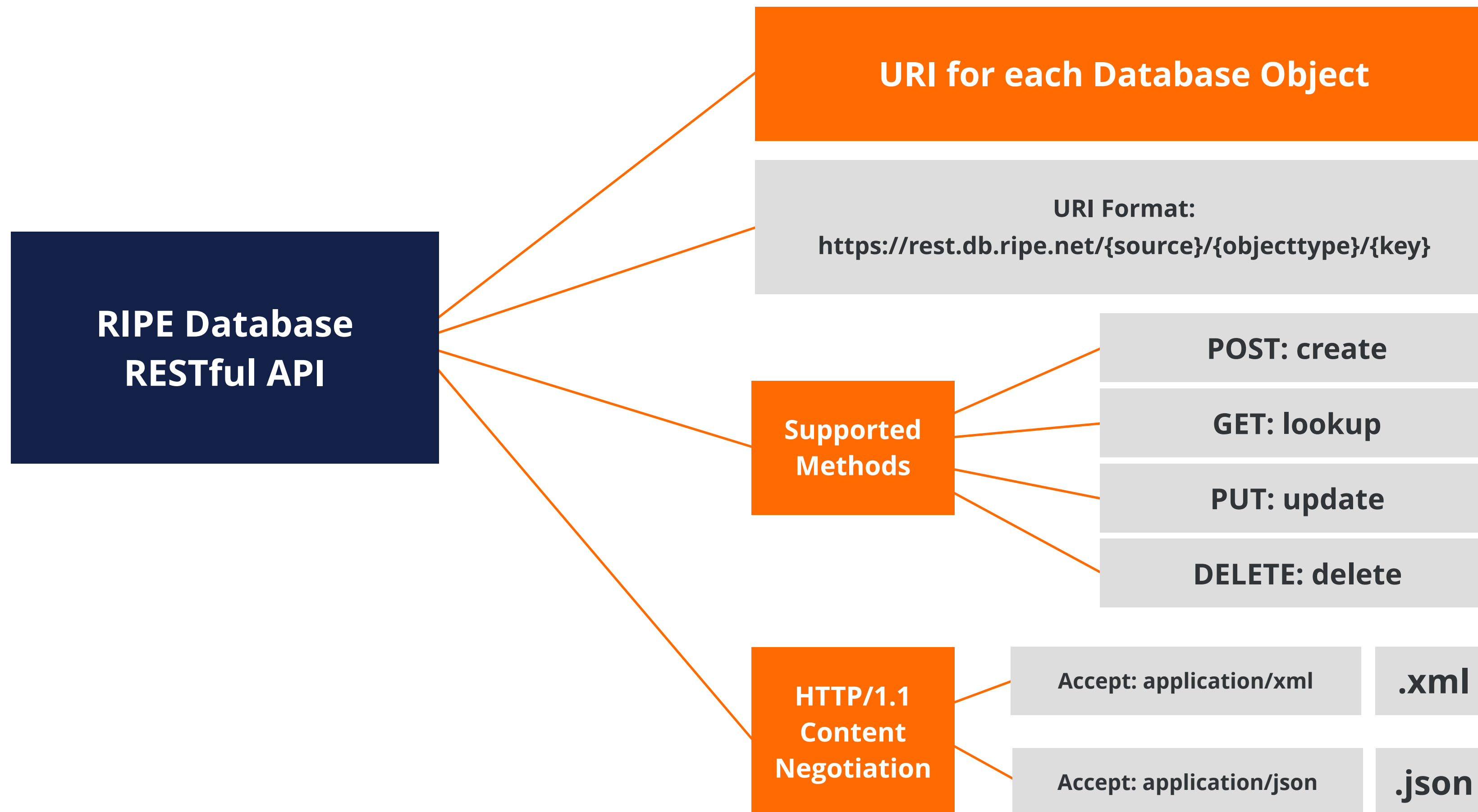
The RESTful API



RIPE Database RESTful API

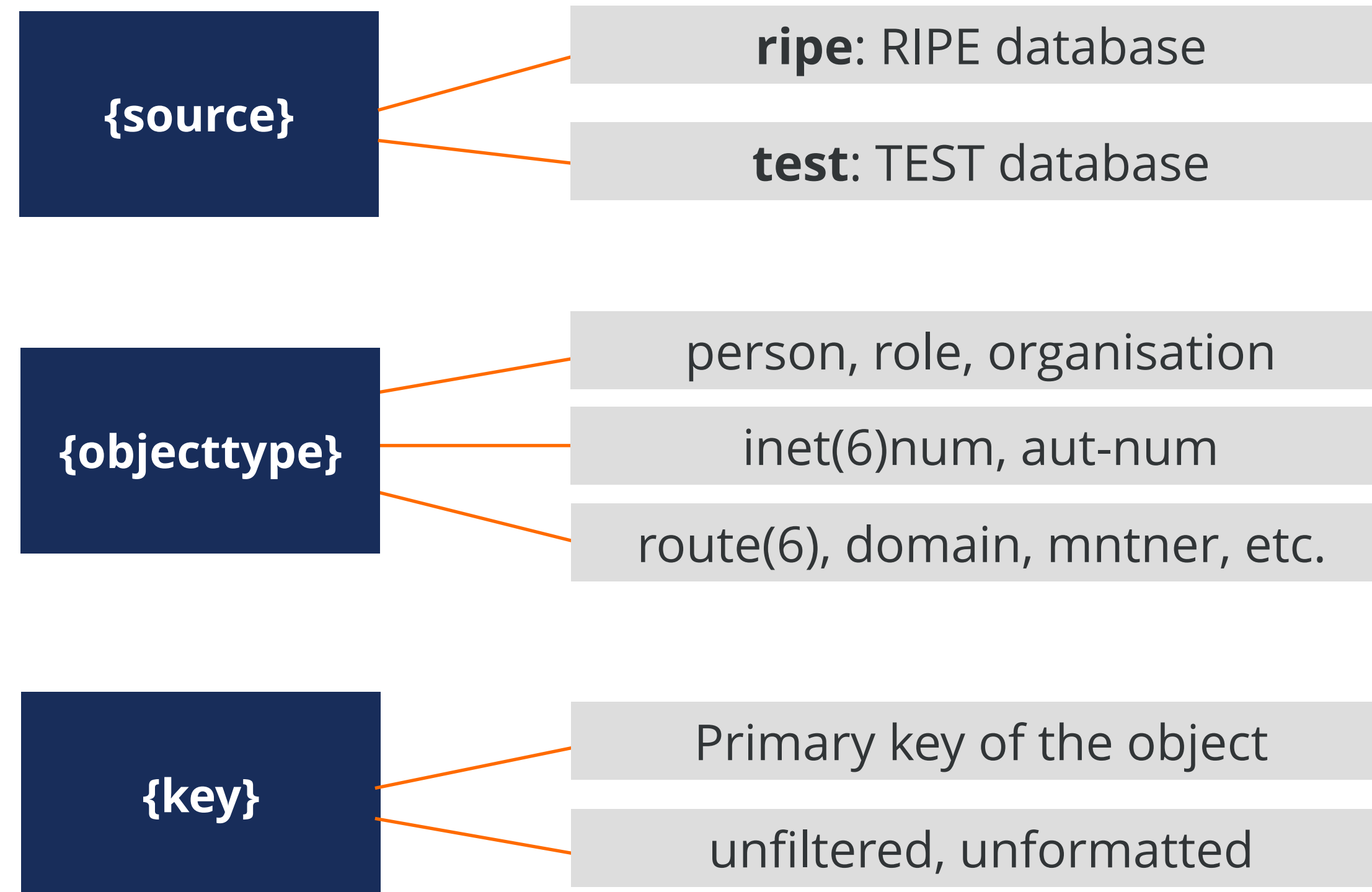
- Allows **REST-compliant** systems to access the RIPE Database
- Data is exchanged in **XML** or **JSON** format
- Standard **query limits** apply







Uniform Resource Identifier (URI) Format: `https://rest.db.ripe.net/{source}/{objecttype}/{key}`





Examples of URIs

Maintainer object RIPE-DBM-MNT (XML)

<https://rest.db.ripe.net/ripe/mntner/RIPE-DBM-MNT>

inetnum object for 193.0.0.0 - 193.0.7.255 (json)

<https://rest.db.ripe.net/ripe/inetnum/193.0.0.0%20-%20193.0.7.255.json>

Person object PP1-RIPE

<https://rest.db.ripe.net/ripe/person/pp1-ripe>

Additional Services



Search

RIPE Database whois search service

Metadata

List available sources
Object type template

Geolocation

Geolocation and language attributes for IPv4/IPv6 Address

Abuse Contact

Lookup abuse contact for Internet Resource



More Examples of URIs

Search for 'tp19-ripe' in the RIPE Database

<https://rest.db.ripe.net/search?source=ripe&query-string=tp19-ripe>

Show the template for the person object type

<https://rest.db.ripe.net/metadata/templates/person.xml>

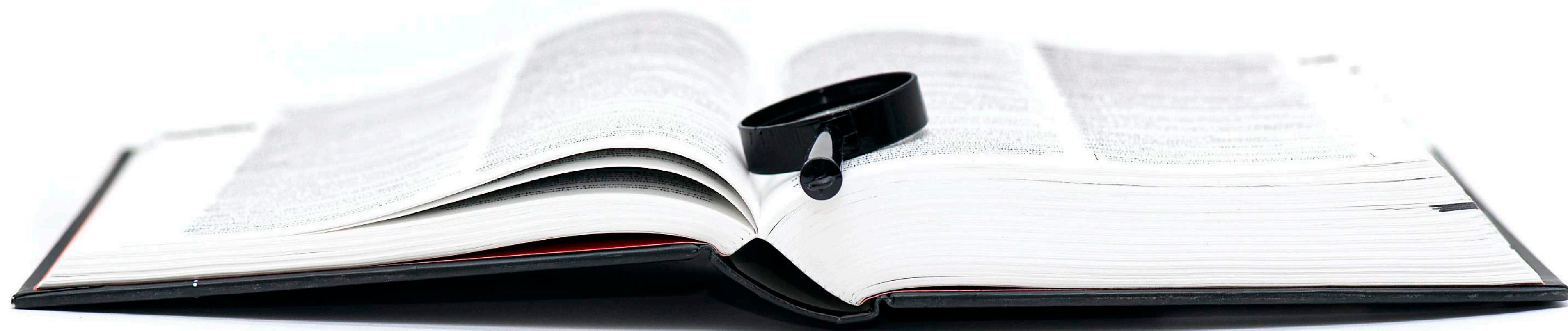
Show the abuse contact email address for AS3333

<https://rest-test.db.ripe.net/abuse-contact/AS3333>

RESTful API Documentation



Get the documentation!



Link to documentation:

<https://github.com/RIPE-NCC/whois/wiki/WHOIS-REST-API>



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.

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- ❖ RIPE Database (8.5 hrs)



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- ❖ RIPE Database (16 hrs)

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Examinations

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- ❖ RIPE Database Associate

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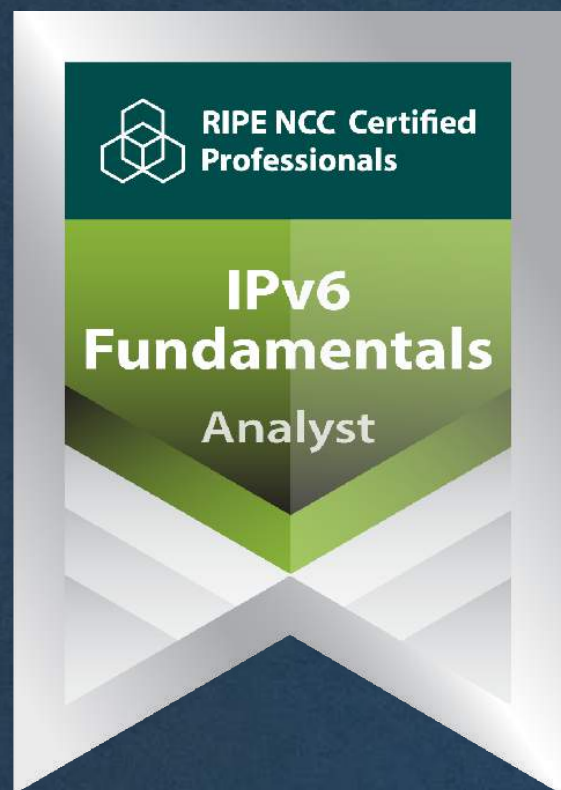


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<https://getcertified.ripe.net/>

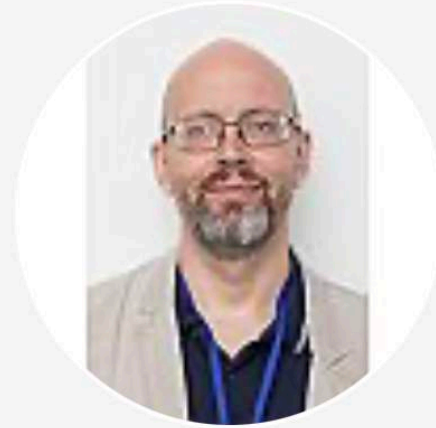
Do not hesitate to contact me!



RIPE Labs



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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.



BGP & Routing Security

Is BGP secure?

Ěnn	Соңы	An Críoch	پایان	Ende	Y Diwedd	
Vége	Endir	Finvezh	վերջ	Кінець	Koniec	
Son	დასასრული	הסוף	Tmíem	Liđugt	Finis	
Lõpp	Amaia	Loppu	Slutt	Кraj		
Kraj	Sfârşit	النهاية	Конец	Koniec	Fund	
Fine	Fin	Einde	Fí	Край	Beigas	Τέλος
Fim	Slut				Pabaiga	

