Please Follow Our **Safety Measures**

- **Do a self-test**
  Enter the room only if you have a negative result

- **Wear a mask**
  Except when speaking or eating

- **Sanitise your hands**
  Particularly when entering and leaving rooms

- **Respect each other's space**
  Red bracelet: Please keep 1.5 m distance
  Green bracelet: You can stand closer
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00 - 09:30</td>
<td>Coffee, Tea</td>
</tr>
<tr>
<td>11:00 - 11:15</td>
<td>Break</td>
</tr>
<tr>
<td>13:00 - 14:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>15:30 - 15:45</td>
<td>Break</td>
</tr>
<tr>
<td>17:30</td>
<td>End</td>
</tr>
</tbody>
</table>
Introductions

• Name

• Experience with:
  - Being an LIR
  - The RIPE Database

• Goals
Overview

• What is the RIPE Database?
• How does it work?
• How to update it?
• Delegating address space to others
• RIPE Routing Registry
• Reverse DNS
• More RIPE Database
• Play Time!
• The RESTful API
Prepare Yourself!

• Get your laptop up and running

• Make sure you have an Internet connection
  - and a RIPE NCC Access account!

• Go to the TEST Database: https://apps-test.db.ripe.net
  - Open several tabs in the browser, if you want
Make sure you are in the **TEST** Database!
• Take out the exercise booklet
• When you see the green square, there is an activity for you to do!

= Activity time!

• Get ready to type a lot!
• Don’t forget to take notes in the notebook ;-)}
The Story

• Your colleague Jean Blue opened an LIR account

• Jean Blue already did some things in the Database

• You were requested to take over some tasks

• You decided to come to this training course!
The RIPE Database
What is it?
Your LIR Account Was Activated

1. Read the email

   - from the RIPE NCC Member Services department

2. Go to https://apps-test.db.ripe.net

3. Search for the person object from the email
What Do You See?

- What do you get as a result?
- Which lines are not easy to understand?
What You Are Seeing

A *person* object has data that can be used to contact a real person.

This is how you can contact me.
The RIPE Database

Public Internet resource and routing registry database
Purpose of the RIPE Database

- Registry of **WHO** holds IPs and ASNs
- Keep **contact** information
  - For troubleshooting, notifying of outages, etc.
- Publishing **routing** policies
- Provisioning **reverse DNS**
RIPE Database Objects

IPs and ASNs
- inetnum
- inet6num
- aut-num

Routing
- route
- route6
- as-set

Contact Information
- organisation
- person
- role

Reverse DNS
- domain

Object Protection
- mntner
Looking Up Object Templates

1. Go to http://apps-test.db.ripe.net

2. Search for the following:

   -t person

• Alternatively, check the manual:

   https://www.ripe.net/manage-ips-and-asns/db/support/documentation/ripe-database-documentation/
What Do You See?

• What do you get as a result?
• What is not easy to understand?
# Anatomy of an Object

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>person:</td>
<td>Jean Blue</td>
</tr>
<tr>
<td>address:</td>
<td>Long Street 123</td>
</tr>
<tr>
<td>address:</td>
<td>76543 Big City</td>
</tr>
<tr>
<td>e-mail:</td>
<td><a href="mailto:j.blue@example.com">j.blue@example.com</a></td>
</tr>
<tr>
<td>nic-hdl:</td>
<td>JB0123-RIPE</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>SECURITY-MNT</td>
</tr>
<tr>
<td>created:</td>
<td>(date &amp; time)</td>
</tr>
<tr>
<td>last-modified:</td>
<td>(date &amp; time)</td>
</tr>
<tr>
<td>source:</td>
<td>RIPE</td>
</tr>
</tbody>
</table>
## Object Templates

<table>
<thead>
<tr>
<th>Field</th>
<th>Requirement</th>
<th>Multiplicity</th>
<th>Key Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>person</td>
<td>mandatory</td>
<td>single</td>
<td>lookup key</td>
</tr>
<tr>
<td>address</td>
<td>mandatory</td>
<td>multiple</td>
<td></td>
</tr>
<tr>
<td>phone</td>
<td>mandatory</td>
<td>multiple</td>
<td></td>
</tr>
<tr>
<td>fax-no</td>
<td>optional</td>
<td>multiple</td>
<td></td>
</tr>
<tr>
<td>e-mail</td>
<td>optional</td>
<td>multiple</td>
<td>lookup key</td>
</tr>
<tr>
<td>org</td>
<td>optional</td>
<td>multiple</td>
<td>inverse key</td>
</tr>
<tr>
<td>nic-hdl</td>
<td>mandatory</td>
<td>single</td>
<td>primary/lookup key</td>
</tr>
<tr>
<td>remarks</td>
<td>optional</td>
<td>multiple</td>
<td></td>
</tr>
<tr>
<td>notify</td>
<td>optional</td>
<td>multiple</td>
<td>inverse key</td>
</tr>
<tr>
<td>mnt-by</td>
<td>mandatory</td>
<td>multiple</td>
<td>inverse key</td>
</tr>
<tr>
<td>created</td>
<td>generated</td>
<td>single</td>
<td></td>
</tr>
<tr>
<td>last-modified</td>
<td>generated</td>
<td>single</td>
<td></td>
</tr>
<tr>
<td>source</td>
<td>mandatory</td>
<td>single</td>
<td></td>
</tr>
</tbody>
</table>
Primary Key

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

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>person:</td>
<td>Jean Blue</td>
</tr>
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<td>Long Street 123</td>
</tr>
<tr>
<td>address:</td>
<td>76543 Big City</td>
</tr>
<tr>
<td>e-mail:</td>
<td><a href="mailto:j.blue@example.com">j.blue@example.com</a></td>
</tr>
<tr>
<td>nic-hdl:</td>
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</tr>
<tr>
<td>mnt-by:</td>
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</tr>
<tr>
<td>created:</td>
<td>(date &amp; time)</td>
</tr>
<tr>
<td>last-modified:</td>
<td>(date &amp; time)</td>
</tr>
<tr>
<td>source:</td>
<td>RIPE</td>
</tr>
</tbody>
</table>
Search For Your Organisation

1. Read the email 1 again

2. Go to https://apps-test.db.ripe.net

3. Search for the organisation object
What Do You See?

- What does the organisation object represent?
- Notice the “admin-c:” and “tech-c:” attributes
- What are their values?
What You Are Seeing

An 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.
Objects Are Linked To Each Other
admin-c

• Appears in most types of objects

• Name of administrative contact person(s)

• This is someone who will be contacted about administrative questions such as network registration, etc.
tech-c

- Appears in most types of objects
- Name of *technical* contact person(s)
- This is someone to be contacted for technical problems such as routing, (mis)behavior of hosts on the net, etc.
Search For Your Role Object

1. Read the email 1 again

2. Go to https://apps-test.db.ripe.net

3. Search for the role object
What Do You See?

• Notice the “admin-c:” and “tech-c:” attributes

• What are their values?

• Do you see any attribute that catches the eye?
Two Functions for the Role Object

Group of Persons

Abuse Contact

role

admin-c:
tech-c:
abuse-mailbox:
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
Role Object: Group of Persons

**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
- **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

**IP Block**
- **Admin-c:** LA789-RIPE
- **Tech-c:** LA789-RIPE
- **Mnt-by:** LIR-MNT

**IP Block**
- **Admin-c:** LA789-RIPE
- **Tech-c:** LA789-RIPE
- **Mnt-by:** LIR-MNT
Role Object: Group of Persons

**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
- **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

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**IP block**
- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE
Role Object: Group of Persons

**Role Object Details**

- **Role:** LIR Admin
- **nic-hdl:** LA789-RIPE
- **admin-c:** BW531-RIPE
- **tech-c:** BW531-RIPE
- **mnt-by:** LIR-MNT

**IP Block Details**

- **admin-c:** LA789-RIPE
- **tech-c:** LA789-RIPE

**Person Details**

- **Person:** Betty White
- **nic-hdl:** BW531-RIPE
- **address:** Long Street 5
- **phone:** +31 20 555 0101
- **email:** betty@example.net
- **mnt-by:** LIR-MNT
Questions
How Does It Work?
Looking for data in the Database
Search For Your Allocations

1. Read emails 2 and 3
   - from the Registry Services department

2. Go to http://apps-test.db.ripe.net

3. Search for the **inetnum** and **inet6num** objects
   - Open two tabs or windows if needed!
   - Use the text in the “inetnum:” and “inet6num:” lines
     - i.e. 10.XX.0.0 - 10.XX.3.255
     - i.e. 2002:ffXX::/32
What Do You See?

- Look at the first object in the results
- What do you see?
- How many objects did you get?
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

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>inetnum</td>
<td>IPv4 RANGE</td>
</tr>
<tr>
<td>inet6num</td>
<td>IPv6 PREFIX</td>
</tr>
<tr>
<td>netname</td>
<td>NETWORK-NAME</td>
</tr>
<tr>
<td>country</td>
<td>ZZ</td>
</tr>
<tr>
<td>org</td>
<td>ORG-ZZ123-RIPE</td>
</tr>
<tr>
<td>admin-c</td>
<td>AD321-RIPE</td>
</tr>
<tr>
<td>tech-c</td>
<td>TE123-RIPE</td>
</tr>
<tr>
<td>status</td>
<td>ALLOC-ASSIGN</td>
</tr>
<tr>
<td>mnt-by</td>
<td>RIPE-NCC-HM-MNT</td>
</tr>
<tr>
<td>mnt-by</td>
<td>DEFAULT-LIR-MNT</td>
</tr>
<tr>
<td>source</td>
<td>RIPE</td>
</tr>
</tbody>
</table>
Hierarchical Distribution

IANA → RIR → LIR → End User

- Allocation
- PA Assignment
- PI Assignment

Sponsoring LIR
Object Status Hierarchy

IPv4

- **RIR**
  - **ALLOCATED UNSPECIFIED**
- **LIR**
  - **ALLOCATED PA**
  - **ASSIGNED PA**
  - **SUB-ALLOCATED PA**
  - **ASSIGNED PA**
- **End User**
  - **ASSIGNED PI**

IPv6

- **RIR**
  - **ALLOCATED-BY-RIR**
- **LIR**
  - **ALLOCATED-BY-RIR**
  - **ASSIGNED**
  - **AGGREGATED-BY-LIR**
  - **ALLOCATED-BY-LIR**
- **End User**
  - **ASSIGNED PI**
  - **ASSIGNED**
  - **AGGREGATED-BY-LIR**
Default Query Results

• When you query for an **IP address** or **prefix**…
Default Query Results

- When you query for simple text...
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

<table>
<thead>
<tr>
<th>person:</th>
<th>Jean Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>nic-hdl:</td>
<td>JB123-RIPE</td>
</tr>
<tr>
<td>address:</td>
<td>Long Street 5</td>
</tr>
<tr>
<td>phone:</td>
<td>+31 20 555 0101</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>LIR-MNT</td>
</tr>
<tr>
<td>source:</td>
<td>RIPE # Filtered</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>mntner:</th>
<th>LIR-MNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin-c:</td>
<td>JB123-RIPE</td>
</tr>
<tr>
<td>auth:</td>
<td>MD5-PW # Filtered</td>
</tr>
<tr>
<td>auth:</td>
<td>SSO # Filtered</td>
</tr>
<tr>
<td>auth:</td>
<td>PGP-KEY-54321</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>LIR-MNT</td>
</tr>
<tr>
<td>source:</td>
<td>RIPE # Filtered</td>
</tr>
</tbody>
</table>
Results Without Related Objects

Search term:  -r 193.0.24.1
Results Without Related Objects

Search term:  -r 193.0.24.1

inetnum: 193.0.24.0 - 193.0.30.255

admin-c:  BRD-RIPE

tech-c:   OPS4-RIPE
Results Without Related Objects

Search term: -r 193.0.24.1

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
Results With Related Objects

Search term: 193.0.24.1

inetnum: 193.0.24.0 - 193.0.30.255

admin-c: BRD-RIPE

tech-c: OPS4-RIPE
Results With Related Objects

Search term: 193.0.24.1

**inetnum:** 193.0.24.0 - 193.0.30.255

**admin-c:** BRD-RIPE

**tech-c:** OPS4-RIPE

**role:** RIPE NCC Operations

- **admin-c:** JDR-RIPE
- **admin-c:** BRD-RIPE
- **tech-c:** GL7321-RIPE
- **tech-c:** MENN1-RIPE
- **tech-c:** RCO-RIPE
- **tech-c:** CNAG-RIPE
- **nic-hdl:** OPS4-RIPE
Search term: 193.0.24.1

**Results With Related Objects**

**inetnum:** 193.0.24.0 - 193.0.30.255

**admin-c:** BRD-RIPE

**tech-c:** OPS4-RIPE

**role:** RIPE NCC Operations

**person:** Brian Riddle

**address:** Stationsplein 11
**address:** 1012 AB Amsterdam
**phone:** +31 20 535 4444
**e-mail:** brian@ripe.net
**nic-hdl:** BRD-RIPE

**nic-hdl:** OPS4-RIPE
Results With Related Objects

Search term: 193.0.24.1

- **inetnum:** 193.0.24.0 - 193.0.30.255
- **admin-c:** BRD-RIPE
- **tech-c:** 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
Making Better Queries

• Reduce the amount of objects returned
• Use options and flags to optimise the results
• Avoid getting blocked!
Selecting Object Types

• Choose the types of objects you want to see
• This results in fewer objects to process

- Using a flag: -T inetnum
Search For Your Allocations Again

1. In the previous query windows, turn off “Do not retrieve related objects”

2. Search again for the inetnum and inet6num objects
What Do You See?

- Look at all the objects in the results
- How many objects did you get now?
- Which objects are now in the results?
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 in the “Hierarchy Flags” tab
More Specific inetnums:  -m

- m 193.0.24.0/21
More Specific inetnums:  -M

- M 193.0.24.0/21
Less Specific inetnums:  -l

-1 193.0.24.0/21

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
Search For Your Allocations Again

1. In the previous query windows, add “-m” to the search text
   - i.e. -m 10.XX.0.0 - 10.XX.3.255
   - i.e. -m 2002:ffXX::/32

2. Search again for the **inetnum** and **inet6num** objects
What Do You See?

- Look at the objects in the results
- How many objects did you get now?
- Different from what you got before?
  - Notice the “status:” attribute
What You Are Seeing

IPv4

<table>
<thead>
<tr>
<th>LIR</th>
<th>ALLOCATED PA</th>
<th>/22</th>
</tr>
</thead>
<tbody>
<tr>
<td>End User</td>
<td>ASSIGNED PA</td>
<td>/25</td>
</tr>
</tbody>
</table>

IPv6

<table>
<thead>
<tr>
<th>LIR</th>
<th>ALLOCATED-BY-RIR</th>
<th>/32</th>
</tr>
</thead>
<tbody>
<tr>
<td>End User</td>
<td>ASSIGNED</td>
<td>/40</td>
</tr>
</tbody>
</table>
Questions
How To Update It?
Updating the RIPE Database
Part 1
Updating: What You Need

• To **update** the RIPE Database you must have:
  - a RIPE NCC **Access** account
  - a **maintainer** object
  - the **need** to create, update or delete an object!
Search for LIR Maintainer Object

1. Read the email 5
   - from your colleague Jean Blue
2. Go to http://apps-test.db.ripe.net
3. Search for the maintainer object
   - i.e. SMXX-MNT
What Do You See?

• Look at the “mnt-by:” attribute
• What is the value?
• Look at the “auth:” attribute
• What is the value?
## Maintainers: Protecting Objects

### Person: Jean Blue

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>My Street 9876</td>
</tr>
<tr>
<td>Address</td>
<td>Office 123</td>
</tr>
<tr>
<td>Phone</td>
<td>+31 20 876 5432</td>
</tr>
<tr>
<td>E-mail</td>
<td><a href="mailto:jean@example.net">jean@example.net</a></td>
</tr>
<tr>
<td>NIC-HDL</td>
<td>JB123-RIPE</td>
</tr>
<tr>
<td>MNT-By</td>
<td>LIR-MNT</td>
</tr>
</tbody>
</table>

### MNTNER: LIR-MNT

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin-C</td>
<td>JB123-RIPE</td>
</tr>
<tr>
<td>Notify</td>
<td><a href="mailto:noc@example.org">noc@example.org</a></td>
</tr>
<tr>
<td>Upd-To</td>
<td><a href="mailto:noc@example.org">noc@example.org</a></td>
</tr>
<tr>
<td>Auth</td>
<td>MD5-PW $1$crypto-stuff</td>
</tr>
<tr>
<td>Auth</td>
<td>SSO <a href="mailto:email@domain.com">email@domain.com</a></td>
</tr>
<tr>
<td>Auth</td>
<td>PGP-KEY-&lt;key ID&gt;</td>
</tr>
<tr>
<td>MNT-By</td>
<td>LIR-MNT</td>
</tr>
</tbody>
</table>
# Maintainers: Protecting Objects

<table>
<thead>
<tr>
<th>person:</th>
<th>Jean Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>address:</td>
<td>My Street 9876</td>
</tr>
<tr>
<td>address:</td>
<td>Office 123</td>
</tr>
<tr>
<td>phone:</td>
<td>+31 20 876 5432</td>
</tr>
<tr>
<td>e-mail:</td>
<td><a href="mailto:jean@example.net">jean@example.net</a></td>
</tr>
<tr>
<td>nic-hdl:</td>
<td>JB123-RIPE</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>LIR-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>mntner:</th>
<th>LIR-MNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin-c:</td>
<td>JB123-RIPE</td>
</tr>
<tr>
<td>notify:</td>
<td><a href="mailto:noc@example.org">noc@example.org</a></td>
</tr>
<tr>
<td>upd-to:</td>
<td><a href="mailto:noc@example.org">noc@example.org</a></td>
</tr>
<tr>
<td>auth:</td>
<td>MD5-PW $1$crypto-stuff</td>
</tr>
<tr>
<td>auth:</td>
<td>SSO <a href="mailto:email@domain.com">email@domain.com</a></td>
</tr>
<tr>
<td>auth:</td>
<td>PGP-KEY-&lt;key ID&gt;</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>LIR-MNT</td>
</tr>
</tbody>
</table>
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

**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

**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
Maintainers: Authentication

• **SSO**
  - default authentication mechanism
  - uses RIPE NCC Access account
  - to authenticate: login on RIPE NCC website

• **PGP**
  - uses PGP key pair
  - to authenticate: sign updates with private PGP key

• **MD5-PW**
  - uses a MD5 hashed password
  - to authenticate: provide clear text password
Maintainers: Associating an Account

- Your LIR maintainer has a MD5 password
- You want to add your Access as an “auth:” line

<table>
<thead>
<tr>
<th>mntner:</th>
<th>SMXX-MNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin-c:</td>
<td>JBXX-TEST</td>
</tr>
<tr>
<td>tech-c:</td>
<td>JBXX-TEST</td>
</tr>
<tr>
<td>upd-to:</td>
<td><a href="mailto:j.blue@example.com">j.blue@example.com</a></td>
</tr>
<tr>
<td>mnt-by:</td>
<td>SMXX-MNT</td>
</tr>
<tr>
<td>auth:</td>
<td>MD5-PW $1$crypto-stuff</td>
</tr>
</tbody>
</table>
Maintainers: Associating an Account

- Your LIR maintainer has a MD5 password
- You want to add your Access as an “auth:” line

```
mntner:        SMXX-MNT
  admin-c:     JBXX-TEST
  tech-c:      JBXX-TEST
  upd-to:      j.blue@example.com
  mnt-by:      SMXX-MNT
  auth:        MD5-PW $1$crypto-stuff
  auth:        SSO email@domain.com
```

Your Access account is now associated!
Maintainers: Associating an Account

You can easily associate your Access account
- if the maintainer is using MD5-PW authentication

1. Try to update the maintainer object
   - Log in to your Access account!

2. You will be asked to provide the password

3. Authorise your RIPE NCC Access account for this maintainer
Multiple Maintainers

mntner: ONE-MNT
admin-c: LA789-RIPE
tech-c: LA789-RIPE
mnt-by: ONE-MNT
auth: SSO email@domain.com
auth: PGPKEY-AE6FBTI7

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
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

**mntner:** DEFAULT-LIR-MNT

- auth: MD5-PW $1$abC789#1
- auth: SSO lir-admin@email.net
- mnt-by: DEFAULT-LIR-MNT

**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
**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

### User Accounts

- **Jack Sparrow**
  - jack@example.org

- **Jill Fernet**
  - jill@example.org

- **Went Down**
  - thehill@example.org

### mntner: DEFAULT-LIR-MNT

- **admin-c:** JB123-RIPE
- **notify:** noc@example.org
- **upd-to:** noc@example.org
- **auth:**
  - SSO jack@example.org
  - SSO jill@example.org
  - SSO thehill@example.org
- **mnt-by:** LIR-MNT
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
Maintainer and Person

**person:** John Doe

- **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
Creating Your Person/Mntner Pair

1. Read again the email 5
   - from your colleague Jean Blue
2. Go to http://apps-test.db.ripe.net
3. On the left side, click on “Create an object”
4. Choose ”role and maintainer pair”
5. Switch to “person”
6. Click on [Create]
What Do You See?

- Which attributes do you see in the empty template?
- Which lines are not easy to understand?

- Fill in the template and click on [Submit]
- Write down the nic-hdl and the mntner
What You Are Seeing

• Congratulations! You just created your first objects in the RIPE (TEST) Database!

• You now have your own **person** object and your own personal **maintainer**
Creating a Role Object

It’s a good habit to use a role for the admin-c and tech-c attributes of LIR objects

1. Go to http://apps-test.db.ripe.net
2. On the left side, click on “Create an object”
3. Choose ”role” and click on [Create]
3. Choose which maintainer will protect the new object

4. Click on the X to remove a maintainer

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

LIR-MNT★  X  PERSONAL-MNT★  X

☆ = Associated with your Access account
3. Choose which maintainer will protect the new object

4. Click on the X to remove a maintainer

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

LIR-MNT★ X

☆ = Associated with your Access account
5. Fill in the template with data

- Use your LIR maintainer (SMXX-MNT)
- Use role: Tech Team
- Leave nic-hdl as it is: AUTO-1
6. Click on the [ + ] button next to “email”
   - Choose “admin-c” from the drop-down list
   - Click on [ Add ]
   - You now have an empty “admin-c:” attribute

7. Do the same steps in 6) and add a “tech-c:”
8. Fill in the admin-c and tech-c with data
   - admin-c: JBXX-TEST
   - tech-c: YOUR PERSON OBJECT

9. Click on the [Submit] button

- If all was correctly filled in, you have a role object!
- Write down the nic-hdl of the object
What You Just Did

<table>
<thead>
<tr>
<th>role:</th>
<th>Tech Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>nic-hdl:</td>
<td>TT123-TEST</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>SMXX-MNT</td>
</tr>
</tbody>
</table>
What You Just Did

**person:** Jean Blue

- **address:** My Street 9876
- **phone:** +31 20 876 5432
- **e-mail:** jean@example.net
- **nic-hdl:** JBXX-TEST
- **mnt-by:** SMXX-MNT

**role:** Tech Team

- **nic-hdl:** TT123-TEST
- **admin-c:** JBXX-TEST
- **mnt-by:** SMXX-MNT
What You Just Did

person: Jean Blue

<table>
<thead>
<tr>
<th>address</th>
<th>My Street 9876</th>
</tr>
</thead>
<tbody>
<tr>
<td>phone</td>
<td>+31 20 876 5432</td>
</tr>
<tr>
<td>e-mail</td>
<td><a href="mailto:jean@example.net">jean@example.net</a></td>
</tr>
<tr>
<td>nic-hdl</td>
<td>JBXX-TEST</td>
</tr>
<tr>
<td>mnt-by</td>
<td>SMXX-MNT</td>
</tr>
</tbody>
</table>

person: Your Name

<table>
<thead>
<tr>
<th>address</th>
<th>Your Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>phone</td>
<td>Your phone number</td>
</tr>
<tr>
<td>e-mail</td>
<td>Your email address</td>
</tr>
<tr>
<td>nic-hdl</td>
<td>YOUR NIC-HDL</td>
</tr>
<tr>
<td>mnt-by</td>
<td>YOUR-PERSONAL-MNT</td>
</tr>
</tbody>
</table>

role: Tech Team

<table>
<thead>
<tr>
<th>nic-hdl</th>
<th>TT123-TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin-c</td>
<td>JBXX-TEST</td>
</tr>
<tr>
<td>tech-c</td>
<td>YOUR NIC-HDL</td>
</tr>
<tr>
<td>mnt-by</td>
<td>SMXX-MNT</td>
</tr>
</tbody>
</table>
Questions
How To Update It?

Updating the RIPE Database
Part 2
Registering IPv4 and IPv6

1. Let’s go back to the email 5
   - from your colleague Jean Blue
2. Go to http://apps-test.db.ripe.net
3. On the left side, click on “Create an object”
4. Choose ”inetnum” or “inet6num”
5. Click on [Create]
What Do You See?

- Which attributes do you see in the template?
- Notice the first line (**mnt-by:**)
- How many maintainers appear here?
- Which lines are not easy to understand?
Registering Assignments

inetnum: 10.XX.0.0 - 10.XX.3.255
mnt-by: TEST-NCC-HM-MNT
mnt-by: SMXX-MNT
status: ALLOCATED PA

inetnum: 10.XX.2.0 - 10.XX.2.255
mnt-by: SMXX-MNT
status: ASSIGNED PA

inet6num: 2002:ffXX::/32
mnt-by: RIPE-NCC-HM-MNT
mnt-by: SMXX-MNT
status: ALLOCATED-BY-RIR

inet6num: 2002:ffXX:1001::/48
mnt-by: SMXX-MNT
status: ASSIGNED
Registering Assignments

- To create an assignment, you must have authorisation from the allocation.
- Here, "mnt-by:" has control over the allocation object and the space under the object.

![IP Address Allocation Diagram]

```
mnt-by: RIPE-NCC-HM-MNT
mnt-by: DEFAULT-LIR-MNT
mnt-by: DEFAULT-LIR-MNT
status: ASSIGNMENT
status: ASSIGNMENT
status: ASSIGNMENT
```
Registering Assignments

• If “mnt-lower:” is present, then it has permission to create objects in the space under the object - but it cannot update the allocation! (mnt-by:)

IP Address Allocation

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

ASSIGNMENT
mnt-by: ANOTHER-MNT
status: ASSIGNMENT

ASSIGNMENT
mnt-by: ANOTHER-MNT
status: ASSIGNMENT

ASSIGNMENT
mnt-by: ANOTHER-MNT
status: ASSIGNMENT
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

LIR-MNT ★ X | PERSONAL-MNT ★ X

☆ = Associated with your Access account
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

LIR-MNT★ X

☆ = Associated with your Access account
Filling In The Template

Same object structure for IPv4 and IPv6

Address space and
Network name

Country and
Contact information

Type of address space

inetnum: IPv4 RANGE
inet6num: IPv6 PREFIX
netname: NETWORK-NNAME

country: ZZ
admin-c: AD321-RIPE
techn-c: TE123-RIPE

status: ASSIGNMENT

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:** 10.30.2.0 - 10.30.2.255
- netname: LAIKA-NET-01
- country: ZZ
- admin-c: MB54321-TEST
- tech-c: ROLE-NIC-HDL
- status: ASSIGNED PA
- mnt-by: SMXX-MNT

**inet6num:** 2002:ff30:1001::/48
- netname: LAIKA-NET-01
- country: ZZ
- admin-c: MB54321-TEST
- tech-c: ROLE-NIC-HDL
- status: ASSIGNED
- mnt-by: SMXX-MNT
Deleting Objects

1. Let’s go back to the email 5
   - from your colleague Jean Blue

2. Go to http://apps-test.db.ripe.net

3. Search for all the assignments:
   - i.e. -m 10.XX.0.0 - 10.XX.3.255
   - i.e. -m 2002:ffXX::/32
4. You should see Jean Blue’s assignments and your newly registered assignments

5. Look for the wrong objects in the results

6. Click on [Update object]

7. Click on the [Delete this object] button

8. Provide a “reason” and click on [Confirm delete]
LIR Keeps Control

• LIR Default Maintainer has control over the whole address space

• Use “Force Delete” to remove lost objects
LIR Keeps Control

- LIR Default Maintainer has control over the whole address space
- Use "Force Delete" to remove lost objects
When You Cannot Delete

• If an object is referenced in another object, you must first remove the reference

This object cannot be deleted

You can only delete unreferenced objects. Please remove the references from these objects first:

• mntner - SM30-MNT
• inetnum - 10.30.0.0 - 10.30.3.255
• inet6num - 2002:ff30::/32
• organisation - ORG-IC30-TEST
• aut-num - AS65530

Return to object
Summary

• You have now updated the RIPE Database:
  - Associated your Access with the LIR maintainer
  - Created your own person/maintainer pair
  - Created a role object for the LIR
  - Registered assignments by creating inet(6)num objects
  - Deleted the wrong inet(6)num objects
Questions
Delegating To Others
Giving control to someone else
Register a IPv6 Sub-Allocation

1. Go to http://apps-test.db.ripe.net

2. On the left side, click on “Create an object”

3. Choose “inet6num” and click on [Create]
4. Fill in the template:

- inet6num: 2002:ffXX:a000::/36

- netname: SUBALLOCATION

- country: your neighbor’s country

- Use your **person** object as “admin-c:”

- Use your neighbor’s **person** object as “tech-c:”
5. Add a “mnt-lower:” attribute
   - Use your neighbor’s maintainer as value

6. Choose the status **ALLOCATED-BY-LIR**

7. Click on **[Submit]**
Sub-Allocations

- Block for a downstream customer
- Branch office or department
Delegating Control

- "mnt-lower:" attribute 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:** 2002:ff00: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
Create an Assignment

1. Go to http://apps-test.db.ripe.net

2. On the left side, click on “Create an object”

3. Choose “inet6num” and click on [Create]

4. Fill in the template:
   - inet6num: 2002:ffzz:a000::/48
   - zz = number of your neighbor
   - status: ASSIGNED

5. You know how to do the rest! ;-)
## What You Just Did

<table>
<thead>
<tr>
<th>Allocation:</th>
<th>2002:ff30::/32</th>
</tr>
</thead>
<tbody>
<tr>
<td>mnt-by:</td>
<td>TEST-NCC-HM-MNT</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>SM30-MNT</td>
</tr>
</tbody>
</table>
What You Just Did

Allocation: 2002:ff30::/32

mnt-by: TEST-NCC-HM-MNT
mnt-by: SM30-MNT
What You Just Did

Allocation: 2002:ff30::/32

mnt-by: TEST-NCC-HM-MNT
mnt-by: SM30-MNT

Sub-Allocation: 2002:ff30:a000::/36

mnt-by: SM30-MNT
mnt-lower: SM15-MNT
What You Just Did

Allocation: 2002:ff30::/32

mnt-by: TEST-NCC-HM-MNT
mnt-by: SM30-MNT

Sub-Allocation: 2002:ff30:a000::/36

mnt-by: SM30-MNT
mnt-lower: SM15-MNT
What You Just Did

Allocation: 2002:ff30::/32

- mnt-by: TEST-NCC-HM-MNT
- mnt-by: SM30-MNT

Sub-Allocation: 2002:ff30:a000::/36

- mnt-by: SM30-MNT
- mnt-lower: SM15-MNT

Assignment

- mnt-by: SM15-MNT
Questions
RIPE Routing Registry
aut-num, route and route6 objects
Search For Your aut-num Object

1. Read the email 6

2. Go to http://apps-test.db.ripe.net

3. Search for AS655XX
What Do You See?

- What does this object represent?
- Which attributes call your attention?
Autonomous System Number Objects

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

<table>
<thead>
<tr>
<th>aut-num:</th>
<th>AS12345</th>
</tr>
</thead>
<tbody>
<tr>
<td>as-name:</td>
<td>YOUR-AS-NAME</td>
</tr>
<tr>
<td>org:</td>
<td>ORG-EE2-RIPE</td>
</tr>
<tr>
<td>import:</td>
<td>from AS1010 accept ANY</td>
</tr>
<tr>
<td>export:</td>
<td>to AS1010 announce AS12345</td>
</tr>
<tr>
<td>import:</td>
<td>from AS987 accept ANY</td>
</tr>
<tr>
<td>export:</td>
<td>to AS987 announce AS12345</td>
</tr>
<tr>
<td>admin-c:</td>
<td>DV789-RIPE</td>
</tr>
<tr>
<td>tech-c:</td>
<td>JS123-RIPE</td>
</tr>
<tr>
<td>status:</td>
<td>ASSIGNED</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>RIPE-NCC-END-MNT</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>DEFAULT-LIR-MNT</td>
</tr>
<tr>
<td>source:</td>
<td>RIPE</td>
</tr>
</tbody>
</table>
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

AS1

AS2

AS3

AS4

INTERNET

YOU

PEER

CUSTOMER

TRANSIT
Building An aut-num Object

aut-num: AS2

aut-num: AS1

aut-num: AS3
Building An aut-num Object

INTERNET

AS1

aut-num: AS2

aut-num: AS1

aut-num: AS3
Building An aut-num Object

aut-num: AS2

aut-num: AS1

aut-num: AS3
Building An aut-num Object

aut-num: AS2
import: from AS1 accept AS1

aut-num: AS1
export: to AS2 announce AS1

aut-num: AS3
Building An aut-num Object

aut-num: AS2
import: from AS1 accept AS1
export: to AS1 announce AS2

aut-num: AS1
export: to AS2 announce AS1
import: from AS2 accept AS2

aut-num: AS3
Building An aut-num Object

**aut-num: AS2**
- **import:** from AS1 accept AS1
- **export:** to AS1 announce AS2

**aut-num: AS1**
- **export:** to AS2 announce AS1
- **import:** from AS2 accept AS2

**aut-num: AS3**
Building An aut-num Object

aut-num: AS2
import: from AS1 accept AS1
export: to AS1 announce AS2

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

aut-num: AS3
export: to AS1 announce ANY
Building An aut-num Object

- aut-num: AS2
  import: from AS1 accept AS1
  export: to AS1 announce AS2

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

- aut-num: AS3
  export: to AS1 announce ANY
  import: from AS1 accept AS1
Search For route(6) Objects

1. Read the email 6

2. Go to http://apps-test.db.ripe.net

3. Search for the route(6) objects
   - Use the “-T” flag to show the route(6) objects
   - i.e. -T route 10.xx.0.0/22
   - i.e. -T route6 2002:ffxx::/32
What Do You See?

- Did you get any objects in the results?

- No? Then there are no route(6) objects yet!
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
How To Create route(6) Objects

• You need permission from:
  1. inetnum or inet6num
  2. route or route6

```
<table>
<thead>
<tr>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>mnt-by:</td>
</tr>
<tr>
<td>mnt-by:</td>
</tr>
<tr>
<td>mnt-routes:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>route(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>origin:</td>
</tr>
<tr>
<td>mnt-by:</td>
</tr>
</tbody>
</table>
```

* mnt-routes delegates the creation of route(6) objects
Registering IPv4 Routes

inetnum: 10.30.0.0 - 10.30.3.255

mnt-by: TEST-NCC-HM-MNT

mnt-by: SM30-MNT

route: 10.30.0.0/22

origin: AS65530

mnt-by: SM30-MNT
Registering IPv6 Routes

**inet6num:** 2002:ff30::/32
- **mnt-by:** TEST-NCC-HM-MNT
- **mnt-by:** SM30-MNT

**route6:** 2002:ff30::/32
- **origin:** AS65530
- **mnt-by:** SM30-MNT
AS-Sets

```
AS-set: AS3333:AS-EXAMPLE
  members: AS65530
  members: AS65535
  members: AS65552
```

- **route**: 10.30.0.0/22
  - **origin**: AS65530

- **route**: 192.168.0.0/22
  - **origin**: AS65535

- **route**: 169.254.0.0/16
  - **origin**: AS65552
AS-Sets

- **as-set**: AS3333:AS-EXAMPLE
  - **members**: AS65530
  - **members**: AS-CUST1

- **route**: 10.30.0.0/22
  - **origin**: AS65530

- **as-set**: AS-CUST1
  - **members**: AS23456

- **route**: 192.168.0.0/21
  - **origin**: AS23456

- **route**: 192.0.0.0/24
  - **origin**: AS23456
Create route(6) Objects

1. Go to http://apps-test.db.ripe.net

2. On the left side, click on “Create an object”

3. Choose “route” or “route6” and click on [Create]

4. Fill in the template:
   - route: 10.XX.0.0/22
   - route6: 2002:ffXX::/32
   - origin: AS655XX
Questions
Reverse DNS
Setting up reverse delegation
Looking For Domain Objects

1. Read the email
2. Go to http://apps-test.db.ripe.net
3. Search for your IPv4 allocation
4. Use the flags “-r -m -d” in the query
   - “-d” flag includes domain objects in results
   - i.e. -r -m -d 10.XX.0.0/22

You can try this with your own real allocation!
What Do You See?

• Do you see any **domain** objects in the results?

• No? Then Reverse Delegation is not set up yet!
DNS Tree Structure

- At the top is the root (.)
- Then the ccTLDs and gTLDs
- Each domain/sub-domain is stored in a DNS zone
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?

Which host is pointing to 193.0.6.139?

etc…
Reverse Delegation Basics

IPv4
- in-addr.arpa zone
- /24 or /16 blocks

IPv6
- ip6.arpa zone
- Multiple of 4 bits
- /28, /32, /36, /40, /44, /48
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
Domain Objects

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

For this zone, go to these DNS servers:

- nserver1
- nserver2
Creating Domain Objects

Which maintainers are on the address space?

<table>
<thead>
<tr>
<th>Address Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>mnt-by:</td>
</tr>
<tr>
<td>mnt-lower:</td>
</tr>
<tr>
<td>mnt-domains:</td>
</tr>
</tbody>
</table>

**mnt-domains** allows to delegate creation of domain objects to another maintainer
Reverse DNS for IPv4

192.33.28.0

/24  ➔  28.33.192.in-addr.arpa

/16  ➔  33.192.in-addr.arpa

/8   ➔  192.in-addr.arpa
IPv4 and Domain Objects

IPv4 prefix: 192.33.28.0/24

Domain object:

| 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 |
Reverse DNS for IPv6

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

/48 → e.3.0.0.8.b.d.0.1.0.0.2.ip6.arpa
/44 → 3.0.0.8.b.d.0.1.0.0.2.ip6.arpa
/40 → 0.0.8.b.d.0.1.0.0.2.ip6.arpa
/36 → 0.8.b.d.0.1.0.0.2.ip6.arpa
/32 → 8.b.d.0.1.0.0.2.ip6.arpa
/28 → b.d.0.1.0.0.2.ip6.arpa
IPv6 and Domain Objects

IPv6 prefix: 2001:db8::/32

Domain object:

- **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
Create "domain" objects

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

prefix
Prefix looks OK
10.155.16.0/22

nserver
Server looks OK
tinne.arin.net

nserver
Server looks OK
sec3.apnic.net
Create Domain Objects Wizard
Create "domain" objects

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>prefix</td>
<td>10.155.16.0/22</td>
<td>Prefix looks OK</td>
</tr>
<tr>
<td>nserver</td>
<td>tinnie.arin.net</td>
<td>Server looks OK</td>
</tr>
<tr>
<td>nserver</td>
<td>sec3.apnic.net</td>
<td>Server looks OK</td>
</tr>
</tbody>
</table>
Create Domain Objects Wizard

Create "domain" objects

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

EXAMPLE-MNT

Prefix looks OK

Prefix

10.155.16.0/22

Server looks OK

nserver

tinnie.arin.net

Server looks OK

nserver

sec3.apnic.net
Create Domain Objects Wizard

Create "domain" objects

<table>
<thead>
<tr>
<th>Prefix</th>
<th>10.155.16.0/22</th>
<th>Prefix looks OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>nservers</td>
<td>tinnie.arin.net</td>
<td>Server looks OK</td>
</tr>
<tr>
<td></td>
<td>sec3.apnic.net</td>
<td>Server looks OK</td>
</tr>
</tbody>
</table>

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

EXAMPLE-MNT
Create Domain Objects Wizard

Create "domain" objects

<table>
<thead>
<tr>
<th>prefix</th>
<th>Prefix looks OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.155.16.0/22</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>nserver</th>
<th>Server looks OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>tinnie.arin.net</td>
<td></td>
</tr>
<tr>
<td>sec3.apnic.net</td>
<td></td>
</tr>
</tbody>
</table>
Create Domain Objects Wizard

Create "domain" objects

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

EXAMPLE-MNT

prefix
10.155.16.0/22

Prefix looks OK

nservers

tinnie.arin.net

Server looks OK

sec3.apnic.net

Server looks OK

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
## Create Domain Objects Wizard

Create "domain" objects

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

<table>
<thead>
<tr>
<th>domain</th>
<th>mnt-by</th>
<th>nserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.155.10.in-addr.arpa</td>
<td>EXAMPLE-MNT</td>
<td>tinnie.arin.net</td>
</tr>
<tr>
<td>17.155.10.in-addr.arpa</td>
<td></td>
<td>sec3.apnic.net</td>
</tr>
<tr>
<td>18.155.10.in-addr.arpa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.155.10.in-addr.arpa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prefix: 10.155.16.0/22

nserver: tinnie.arin.net

nserver: 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:
Exercise

How many domain objects?
Calculate How Many Objects

You have the following address space:

- 192.12.32.0/22
- 2a00:38::/29

How many domain objects do you have to create?

- Use the largest block size possible

What are the first and last domain objects for each?
And For The Customer?

What are the two domain objects for Marc Bromski’s address space?

IPv4: 10.xx.2.0 – 10.xx.2.255

How to query for IPv6?

Which query would you use to find the /32 domain object for the IPv6 allocation 2001:db8::/32?

a) -Md 2001:db8::/32
b) -md 2001:db8::/32
c) -xd 2001:db8::/32
More RIPE Database

Inverse Lookups, Free Text Search, Notifications, RIPE Database WG
Looking For References

You want to replace the reference to Jean Blue’s person object in all the LIR objects with your new LIR role object

1. Go to http://apps-test.db.ripe.net

2. Search for “-i person JBXX-TEST”
What Do You See?

• Which objects are in the query results?
• Where do you see JBXX-TEST?
Inverse Lookups

Finding all objects in which an object is referenced
Inverse Lookups

Finding all objects in which an object is referenced
Inverse Lookups

Finding all objects in which an object is referenced

PERSON

ALLOCATION

ASSIGNMENT

ORGANISATION

MAINTAINER
## Inverse Lookup: admin-c

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>inet6num:</strong></td>
<td>2001:db8::/32</td>
</tr>
<tr>
<td><strong>org:</strong></td>
<td>ORG-BB2-RIPE</td>
</tr>
<tr>
<td><strong>admin-c:</strong></td>
<td>BW280-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong></td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong></td>
<td>RIPE-NCC-HM-MNT</td>
</tr>
<tr>
<td><strong>mnt-by:</strong></td>
<td>DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

### AS64551

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>org:</strong></td>
<td>ORG-BB2-RIPE</td>
</tr>
<tr>
<td><strong>admin-c:</strong></td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong></td>
<td>TT789-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong></td>
<td>RIPE-NCC-END-MNT</td>
</tr>
<tr>
<td><strong>mnt-by:</strong></td>
<td>DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

### DEFAULT-LIR-MNT

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>admin-c:</strong></td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong></td>
<td>TT789-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong></td>
<td>DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

### Tech Team

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>nic-hdl:</strong></td>
<td>TT789-RIPE</td>
</tr>
<tr>
<td><strong>admin-c:</strong></td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong></td>
<td>KH404-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong></td>
<td>DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

### person: Jean Blue

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>address:</strong></td>
<td>Big Street 45</td>
</tr>
<tr>
<td><strong>phone:</strong></td>
<td>+31 20 345 6854</td>
</tr>
<tr>
<td><strong>e-mail:</strong></td>
<td><a href="mailto:jean.blue@example.net">jean.blue@example.net</a></td>
</tr>
<tr>
<td><strong>nic-hdl:</strong></td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong></td>
<td>BLUE-MNT</td>
</tr>
</tbody>
</table>
**Inverse Lookup: person JB1-RIPE**

<table>
<thead>
<tr>
<th><strong>inet6num:</strong> 2001:db8::/32</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>org:</strong>                   ORG-BB2-RIPE</td>
</tr>
<tr>
<td><strong>admin-c:</strong>               BW280-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong>                JB1-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong>                RIPE-NCC-HM-MNT</td>
</tr>
<tr>
<td><strong>mnt-by:</strong>                DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>aut-num:</strong> AS64551</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>org:</strong>            ORG-BB2-RIPE</td>
</tr>
<tr>
<td><strong>admin-c:</strong>        JB1-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong>         TT789-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong>         RIPE-NCC-END-MNT</td>
</tr>
<tr>
<td><strong>mnt-by:</strong>         DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>mntner:</strong> DEFAULT-LIR-MNT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>admin-c:</strong>                JB1-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong>                 TT789-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong>                 DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>role:</strong> Tech Team</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>nic-hdl:</strong>        TT789-RIPE</td>
</tr>
<tr>
<td><strong>admin-c:</strong>        JB1-RIPE</td>
</tr>
<tr>
<td><strong>tech-c:</strong>         KH404-RIPE</td>
</tr>
<tr>
<td><strong>mnt-by:</strong>         DEFAULT-LIR-MNT</td>
</tr>
</tbody>
</table>

**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

- **organisation:** ORG-BB2-RIPE
  - **org-name:** Internet Company
  - **admin-c:** BW280-RIPE
  - **tech-c:** JB1-RIPE
  - **mnt-by:** DEFAULT-LIR-MNT

**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
Inverse Lookup : mnt-by

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>inet6num:</td>
<td>2001:db8::/32</td>
</tr>
<tr>
<td>org:</td>
<td>ORG-BB2-RIPE</td>
</tr>
<tr>
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<td>BW280-RIPE</td>
</tr>
<tr>
<td>tech-c:</td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>RIPE-NCC-HM-MNT</td>
</tr>
<tr>
<td>mnt-lower:</td>
<td>ANOTHER-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>aut-num:</td>
<td>AS64551</td>
</tr>
<tr>
<td>org:</td>
<td>ORG-BB2-RIPE</td>
</tr>
<tr>
<td>admin-c:</td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td>tech-c:</td>
<td>TT789-RIPE</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>RIPE-NCC-END-MNT</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>ANOTHER-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>person:</td>
<td>Jean Blue</td>
</tr>
<tr>
<td>nic-hdl:</td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td>phone:</td>
<td>+31 20 543 9640</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>ANOTHER-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>role:</td>
<td>Other Group</td>
</tr>
<tr>
<td>nic-hdl:</td>
<td>OG10-RIPE</td>
</tr>
<tr>
<td>admin-c:</td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td>tech-c:</td>
<td>SZ72-RIPE</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>ANOTHER-MNT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>mntner:</td>
<td>ANOTHER-MNT</td>
</tr>
<tr>
<td>admin-c:</td>
<td>JB1-RIPE</td>
</tr>
<tr>
<td>auth:</td>
<td>MD5-PW</td>
</tr>
<tr>
<td>auth:</td>
<td>SSO</td>
</tr>
<tr>
<td>upd-to:</td>
<td><a href="mailto:jean.blue@example.net">jean.blue@example.net</a></td>
</tr>
<tr>
<td>mnt-by:</td>
<td>ANOTHER-MNT</td>
</tr>
</tbody>
</table>
Search For A Word

You want to look for every object that has the word “uplink” in any of the attributes

1. Go to https://apps.db.ripe.net/search/full-text.html
2. Click on the left menu on “Full Text Search”
3. Search for “uplink”
What Do You See?

- Do you get any objects in the results?
- How many objects do you get?
- Can you see the whole object?
Full Text Search

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.

Search results

<table>
<thead>
<tr>
<th>Number of results - all object types</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>key-cert</td>
<td>6</td>
</tr>
<tr>
<td>person</td>
<td>3</td>
</tr>
<tr>
<td>domain</td>
<td>2</td>
</tr>
<tr>
<td>mntner</td>
<td>2</td>
</tr>
<tr>
<td>inet6num</td>
<td>1</td>
</tr>
<tr>
<td>inetnum</td>
<td>1</td>
</tr>
</tbody>
</table>

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
Full Text Search - Advanced

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
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?
Notifications: “notify:”

The RIPE Database has several ways to trigger notifications about updates

- “notify:” attribute
  - Can be used on any object
  - An email is sent when the object is updated

<table>
<thead>
<tr>
<th>Person</th>
<th>IP Address Block</th>
<th>LIR Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>notify: <a href="mailto:email@example.com">email@example.com</a></td>
<td>notify: <a href="mailto:noc-team@example.com">noc-team@example.com</a></td>
<td>notify: <a href="mailto:admin@example.com">admin@example.com</a></td>
</tr>
</tbody>
</table>
Notifications: Maintainers

Maintainers have special attributes

- **“upd-to:”**
  - For **failed** attempts to update objects

- **“mnt-nfy:”**
  - For **successful** attempts to update objects

<table>
<thead>
<tr>
<th>mntner:</th>
<th>LIR-MNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>upd-to:</td>
<td><a href="mailto:db-alerts@example.com">db-alerts@example.com</a></td>
</tr>
<tr>
<td>mnt-nfy:</td>
<td><a href="mailto:db-success@example.com">db-success@example.com</a></td>
</tr>
</tbody>
</table>
RIPE Database Working Group

• Influence the development of the RIPE Database software and operations

• Participate in the Database WG discussions!

• https://www.ripe.net/participate/ripe/wg/db
More RIPE Database Resources

• The RIPE Database page on ripe.net
  - https://www.ripe.net/manage-ips-and-asns/db

• Other RIPE Database query methods
Questions
Play Time!
Practice What You Learned
Choose Your Own Adventure

- From the **Play Time!** list of tasks, choose what you would like to practice
- Review the course slides and your own notes
- Ask the trainers or other participants to assist, if you need help
Beyond The Database

The RESTful API
Problem Statement

- Your company has a provisioning software that assigns address blocks to customers from a pool.
- The RIPE policies require you to register these blocks with contact data in the RIPE Database.
- Can you save time by letting the software create the required objects in the RIPE Database?
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
RIPE Database RESTful API

URI for each Database Object

URI Format:
https://rest.db.ripe.net/{source}/{objecttype}/{key}

Supported Methods
POST: create
GET: lookup
PUT: update
DELETE: delete

HTTP/1.1 Content Negotiation
Accept: application/xml .xml
Accept: application/json .json
URI Format:
https://rest.db.ripe.net/{source}/{objecttype}/{key}

- **{source}**
  - **ripe**: RIPE database
  - **test**: TEST database

- **{objecttype}**
  - person, role, organisation
  - inet(6)num, aut-num
  - route(6), domain, mntner, etc.

- **{key}**
  - Primary key of the object
  - unfiltered, unformatted
# HTTP Status Codes

<table>
<thead>
<tr>
<th>Status Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad Request (400)</td>
<td>The service is unable to understand and process the request.</td>
</tr>
<tr>
<td>Forbidden (403)</td>
<td>Query limit exceeded.</td>
</tr>
<tr>
<td>Not Found (404)</td>
<td>No results were found (on a search request), or object specified in URI does not exist.</td>
</tr>
<tr>
<td>Conflict (409)</td>
<td>Integrity constraint was violated (e.g. when creating, object already exists).</td>
</tr>
<tr>
<td>Internal Server Error (500)</td>
<td>The server encountered an unexpected condition which prevented it from fulfilling the request.</td>
</tr>
</tbody>
</table>
Method: GET

http(s)://rest.db.ripe.net/{source}/{objectType}/{key}

200  Object found
400  Bad request
404  No valid object
Examples

curl 'http://rest.db.ripe.net/ripe/mntner/RIPE-DBM-MNT'

curl -H 'Accept: application/json' 'http://rest.db.ripe.net/ripe/mntner/RIPE-DBM-MNT'

curl 'http://rest-test.db.ripe.net/test/person/AA1-TEST?unfiltered'

curl 'http://rest.db.ripe.net/ripe/inetnum/193.0.0.0%20-%20193.0.7.255.json'
Method: PUT

https://rest.db.ripe.net/{source}/{objectType}/{key}?password={password}…

200  Successful update
400  Bad request: incorrect object type or key
401  Incorrect password
404  Object not found
Examples

curl -X PUT -H 'Content-Type: application/xml' --data @form.txt 'https://rest.db.ripe.net/ripe/person/PP1-RIPE?password=...'

curl -X PUT -H 'Content-Type: application/json' -H 'Accept:application/json' --data @form.txt 'https://rest.db.ripe.net/ripe/person/PP1-RIPE?password=...'

curl -X PUT --data @form.txt 'https://rest.db.ripe.net/ripe/person/TP1-RIPE?dry-run&password=...''
Method: POST

https://rest.db.ripe.net/{source}/{objectType}?password={password}…

POST

200   Success (object created)
400   Bad request
401   Incorrect password
409   Object already exists
Examples

curl -X POST -H 'Content-Type: application/xml' --data @form.txt 'https://rest.db.ripe.net/ripe/person?password=...'

curl -X POST -H 'Content-Type: application/json' -H 'Accept: application/json' --data @form.txt 'https://rest.db.ripe.net/ripe/person?password=...'

curl -X POST --data @form.txt 'https://rest.db.ripe.net/ripe/person?dry-run&password=...'
Method: DELETE

https://rest.db.ripe.net/{source}/{objectType}/{key}?password={password}...&reason={reason}

200 Successful delete
400 Bad request: invalid object type or key
401 Incorrect password
404 Object not found
curl -X DELETE 'https://rest.db.ripe.net/ripe/person/pp1-ripe?password=123'

curl -X PUT --data @form.txt 'https://rest.db.ripe.net/ripe/person/TP1-RIPE?dry-run&password=...'
## Additional Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Search</strong></td>
<td>RIPE database whois search service</td>
</tr>
</tbody>
</table>
| **Metadata**     | List available sources  
Object type template                                                  |
| **Geolocation**  | Geolocation and language attributes for IPv4/IPv6 Address              |
| **Abuse Contact**| Lookup abuse contact for Internet Resource                             |
Examples


curl http://rest.db.ripe.net/metadata/templates/person.xml

curl http://rest.db.ripe.net/abuse-contact/AS3333
References

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

- GitHub WHOIS REST API WhoisResources:
  https://github.com/RIPE-NCC/whois/wiki/WHOIS-REST-API-WhoisResources
Doing it for real!

Demo
Create an inet6num object

| TEST Database | Location: rest-test.db.ripe.net  
| Source: test |
| Object Type | Type: inet6num (ASSIGNED) |
| Key | Key: 2001:ff29:1234::/48 |
| Format | XML |
Query and Fail

curl 'http://rest-test.db.ripe.net/test/inet6num/2001:ff29:1234::/48'

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<whois-resources xmlns:xlink="http://www.w3.org/1999/xlink">
  <errormessages>
    <errormessage severity="Error" text="ERROR:101: no entries found\xA;\xA;No entries found in source %s.\xA;">
      <args value="TEST"/>
    </errormessage>
  </errormessages>
  <terms-and-conditions xlink:type="locator" xlink:href="http://www.ripe.net/db/support/db-terms-conditions.pdf"/>
</whois-resources>
```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<whois-resources>
    <objects>
        <object type="inet6num">
            <source id="ripe"/>
            <attributes>
                <attribute name="inet6num" value="2001:ff29:1234::/48"/>
                <attribute name="netname" value="MyNewNET"/>
                <attribute name="country" value="NL"/>
                <attribute name="admin-c" value="TP29-TEST"/>
                <attribute name="tech-c" value="TP29-TEST"/>
                <attribute name="status" value="ASSIGNED"/>
                <attribute name="mnt-by" value="CM29-MNT"/>
                <attribute name="source" value="TEST"/>
            </attributes>
        </object>
    </objects>
</whois-resources>
Create inet6num Object

curl -X POST -H 'Content-Type: application/xml' --data @form-create.txt 'https://rest-test.db.ripe.net/test/inet6num?password=secret29'

```xml
<?xml version="1.0" encoding="UTF-8"?>
<whois-resources xmlns:xlink="http://www.w3.org/1999/xlink">
  <link xlink:type="locator" xlink:href="http://rest-test.db.ripe.net/test/inet6num"/>
  <objects>
    <object type="inet6num">
      <source id="test"/>
      <primary-key>
        <attribute name="inet6num" value="2001:ff29:1234::/48"/>
      </primary-key>
      <attributes>
        <attribute name="inet6num" value="2001:ff29:1234::/48"/>
        <attribute name="netname" value="MyNewNET"/>
        <attribute name="country" value="NL"/>
        <attribute name="admin-c" value="TP29-TEST" referenced-type="person">
          <link xlink:type="locator" xlink:href="http://rest-test.db.ripe.net/test/person/TP29-TEST"/>
        </attribute>
        <attribute name="tech-c" value="TP29-TEST" referenced-type="person">
          <link xlink:type="locator" xlink:href="http://rest-test.db.ripe.net/test/person/TP29-TEST"/>
        </attribute>
        <attribute name="status" value="ASSIGNED"/>
        <attribute name="mnt-by" value="CM29-MNT" referenced-type="mntner">
          <link xlink:type="locator" xlink:href="http://rest-test.db.ripe.net/test/mntner/CM29-MNT"/>
        </attribute>
        <attribute name="created" value="2019-02-08T11:16:16Z"/>
        <attribute name="last-modified" value="2019-02-08T11:16:16Z"/>
        <attribute name="source" value="TEST"/>
      </attributes>
    </object>
  </objects>
  <terms-and-conditions xlink:type="locator" xlink:href="http://www.ripe.net/db/support/db-terms-conditions.pdf"/>
</whois-resources>
```
Query and Succeed!

curl 'http://rest-test.db.ripe.net/test/inet6num/2001:ff29:1234::/48'

<?xml version="1.0" encoding="UTF-8"?>
<whois-resources xmlns:xlink="http://www.w3.org/1999/xlink">
<objects>
<object type="inet6num">
  <source id="test"/>
  <primary-key>
    <attribute name="inet6num" value="2001:ff29:1234::/48"/>
  </primary-key>
  <attributes>
    <attribute name="inet6num" value="2001:ff29:1234::/48"/>
    <attribute name="netname" value="MyNewNET"/>
    <attribute name="country" value="NL"/>
    <attribute name="admin-c" value="TP29-TEST" referenced-type="person">
      <link xlink:type="locator" xlink:href="http://rest-test.db.ripe.net/test/person/TP29-TEST"/>
    </attribute>
    <attribute name="tech-c" value="TP29-TEST" referenced-type="person">
      <link xlink:type="locator" xlink:href="http://rest-test.db.ripe.net/test/person/TP29-TEST"/>
    </attribute>
    <attribute name="status" value="ASSIGNED"/>
    <attribute name="mnt-by" value="CM29-MNT" referenced-type="mntner">
      <link xlink:type="locator" xlink:href="http://rest-test.db.ripe.net/test/mntner/CM29-MNT"/>
    </attribute>
    <attribute name="created" value="2019-02-08T11:16:16Z"/>
    <attribute name="last-modified" value="2019-02-08T11:16:16Z"/>
    <attribute name="source" value="TEST"/>
  </attributes>
</object>
</objects>
<terms-and-conditions xlink:type="locator" xlink:href="http://www.ripe.net/db/support/db-terms-conditions.pdf"/>
</whois-resources>
Questions
We want your feedback!

What did you think about this session?

Take our survey at:

https://www.ripe.net/training/rdb/survey
Learn something new today!

academy.ripe.net
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IPv6 Security Expert

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The End!