The new RIPE Database software

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Outline

• What’s different in the new implementation?
• Project status
  • functionality
  • test servers
• Transition
  • transition plan
  • transition issues
What’s different

• Objects and Attributes
• Querying the Database
• Near Real-Time Mirroring
• Submissions to the Database
• Accounting and Access Control
New objects

- peering-set
- filter-set
- rtr-set
- as-block
New attributes

- **RPSL:**
  - member-of, mbrs-by-ref

- **RPS-auth:**
  - mnt-routes: `<mnt_name> [ rpsl list of prefixes | ANY]`
  - referral-by: `<mnt_name>`
  - auth-override: YYYYMMDD
Modifications to all objects

- Line continuation
- Attribute order is relevant
- Support for end of line comments
- Handling of empty attributes
- Legend:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>[optional]</th>
<th>[multiple]</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>holes</td>
<td></td>
<td></td>
<td>automatically translated</td>
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<tr>
<td>member-of</td>
<td>[optional]</td>
<td>[multiple]</td>
<td>new</td>
</tr>
<tr>
<td>cross-nfy</td>
<td>[optional]</td>
<td>[multiple]</td>
<td>preserved</td>
</tr>
<tr>
<td>community</td>
<td>[optional]</td>
<td>[multiple]</td>
<td>deprecated</td>
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</tbody>
</table>
Modified objects

- mntner object

mntner: [mandatory] [single] [primary/look-up key]
descr: [mandatory] [multiple] [ ]
admin-c: [mandatory] [multiple] [inverse key]
techn-c: [optional] [multiple] [inverse key]
upd-to: [mandatory] [multiple] [inverse key]
mnt-nfy: [optional] [multiple] [inverse key]
auth: [mandatory] [multiple] [ ]
remarks: [optional] [multiple] [ ]
notify: [optional] [multiple] [inverse key]
mnt-by: [mandatory] [multiple] [inverse key]
auth-override: [optional] [single] [ ] *** RPS auth ***
referral-by: [mandatory] [single] [inverse key] *** RPS auth ***
changed: [mandatory] [multiple] [ ]
source: [mandatory] [single] [ ]
Modified objects

• route object

route: [mandatory] [single] [primary/look-up key]
descr: [mandatory] [multiple] [ ]
origin: [mandatory] [single] [primary/inverse key]
holes: [optional] [multiple] [ ] *** hole in RIPE 181 ***
withdrawn: [optional] [single] [ ]
comm-list: [optional] [multiple] [ ]
advisory: [optional] [multiple] [ ]
member-of: [optional] [multiple] [inverse key] *** RPSL ***
inject: [optional] [multiple] [ ] *** RPSL ***
aggr-mtd: [optional] [single] [ ] *** RPSL ***
aggr-bndry: [optional] [single] [ ] *** RPSL ***
export-comps: [optional] [single] [ ] *** RPSL ***
components: [optional] [single] [ ] *** RPSL ***
cross-nfy: [optional] [multiple] [inverse key]
community: [optional] [multiple] [ ]
mnt-lower: [optional] [multiple] [inverse key] *** RPS auth ***
mnt-routes: [optional] [multiple] [inverse key] *** RPS auth ***
mnt-by: [mandatory] [multiple] [inverse key]
changed: [mandatory] [multiple] [ ]
source: [mandatory] [single] [ ]
Modified objects

• autnum object

aut-num: [mandatory] [single] [primary/look-up key]
as-name: [mandatory] [single]
descr: [mandatory] [multiple]
as-in: [optional] [multiple] [ ]
as-out: [optional] [multiple] [ ]
interas-in: [optional] [multiple] [ ]
interas-out: [optional] [multiple] [ ]
as-exclude: [optional] [multiple] [ ]
member-of: [optional] [multiple] [inverse key] *** New in RPSL ***
import: [optional] [multiple] *** as-in in RIPE 181 ***
export: [optional] [multiple] *** as-out in RIPE 181 ***
default: [optional] [multiple]
remarks: [optional] [multiple]
admin-c: [mandatory] [multiple] [inverse key]
techn-c: [mandatory] [multiple] [inverse key]
cross-mnt: [optional] [multiple] [inverse key]
cross-nfy: [optional] [multiple] [inverse key]
notify: [optional] [multiple] [inverse key]
mnt-lower: [optional] [multiple] [inverse key] *** RPS auth ***
mnt-routes: [optional] [multiple] [inverse key] *** RPS auth ***
mnt-by: [mandatory] [multiple] [inverse key]
changed: [mandatory] [multiple]
source: [mandatory] [single]
### Modified objects

- **as-set (previously as-macro)**

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<thead>
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<th>Type</th>
<th>Description</th>
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</tr>
<tr>
<td>descr</td>
<td>mandatory</td>
<td>[multiple]</td>
</tr>
<tr>
<td>members</td>
<td>optional</td>
<td>[multiple] *** as-list in RIPE 181 ***</td>
</tr>
<tr>
<td>mbrs-by-ref</td>
<td>optional</td>
<td>[multiple] [inverse key] *** New in RPSL ***</td>
</tr>
<tr>
<td>remarks</td>
<td>optional</td>
<td>[multiple]</td>
</tr>
<tr>
<td>tech-c</td>
<td>mandatory</td>
<td>[multiple] [inverse key]</td>
</tr>
<tr>
<td>admin-c</td>
<td>mandatory</td>
<td>[multiple] [inverse key]</td>
</tr>
<tr>
<td>notify</td>
<td>optional</td>
<td>[multiple] [inverse key]</td>
</tr>
<tr>
<td>mnt-by</td>
<td>mandatory</td>
<td>[multiple] [inverse key]</td>
</tr>
<tr>
<td>changed</td>
<td>mandatory</td>
<td>[multiple]</td>
</tr>
<tr>
<td>source</td>
<td>mandatory</td>
<td>[single]</td>
</tr>
</tbody>
</table>
Modified objects

- route-set (previously community)

  route-set: [mandatory] [single] [primary/look-up key] *** community in RIPE 181 ***
  descr: [mandatory] [multiple]
  members: [optional] [multiple] *** New in RPSL ***
  mbrs-by-ref: [optional] [multiple] [inverse key] *** New in RPSL ***
  remarks: [optional] [multiple]
  tech-c: [mandatory] [multiple] [inverse key]
  admin-c: [mandatory] [multiple] [inverse key]
  notify: [optional] [multiple] [inverse key]
  mnt-by: [mandatory] [multiple] [inverse key]
  changed: [mandatory] [multiple]
  source: [mandatory] [single]
Modified objects

- **inet-rtr**

  - `inet-rtr: [mandatory] [single] [primary/look-up key]`
  - `descr: [mandatory] [multiple]`
  - `alias: [optional] [multiple] *** New in RPSL ***`
  - `local-as: [mandatory] [single] [inverse key] *** localas in RIPE 181 ***`
  - `ifaddr: [mandatory] [multiple] [look-up key]`
  - `peer: [optional] [multiple]`
  - `member-of: [optional] [multiple] [inverse key] *** New in RPSL ***`
  - `remarks: [optional] [multiple]`
  - `admin-c: [mandatory] [multiple] [inverse key]`
  - `tech-c: [mandatory] [multiple] [inverse key]`
  - `notify: [optional] [multiple] [inverse key]`
  - `mnt-by: [mandatory] [multiple] [inverse key]`
  - `changed: [mandatory] [multiple] [inverse key]`
  - `source: [mandatory] [single]`
Modified objects

- inetnum

<table>
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<th>single</th>
<th>multiple</th>
<th>inverse key</th>
<th>look-up key</th>
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<tbody>
<tr>
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<td></td>
<td>[primary/look-up key]</td>
</tr>
<tr>
<td>netname</td>
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<td></td>
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<td></td>
<td>[lookup key]</td>
</tr>
<tr>
<td>descr</td>
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<td>country</td>
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<td>admin-c</td>
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<td></td>
<td></td>
<td></td>
<td>[inverse key]</td>
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<td>[inverse key]</td>
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<td>[inverse key]</td>
</tr>
<tr>
<td>status</td>
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</tr>
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<td>remarks</td>
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<td></td>
</tr>
<tr>
<td>notify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[inverse key]</td>
</tr>
<tr>
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<td>[inverse key]</td>
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<td>mnt-lower</td>
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</tr>
<tr>
<td>mnt-routes</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>changed</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>source</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*** RPS auth ***
Queries

- New queries
  - `-l <ip range>`
  - `-x <ip range>`
  - `-K`
  - `-d`
  - `-q sources [<source>]`
  - `-q version`

- Inverse queries
- Other differences
-l <ip range>

- One level less specific
- Does not return the exact match
- Returns the smallest IP range that is bigger than the supplied range and that fully contains it

- `whois -r -Tin 193.0.0.0/23`
- `whois -r -Tin -l 193.0.0.0/23`
- `whois -r -Tin -L 193.0.0.0/23`
-x <ip range>

- Exact match
- If no matching object is found nothing is returned

- `whois -r -Tin 193.0.2.0/24`
- `whois -r -Tin -x 193.0.2.0/24`
-K

• Only primary keys are returned
• Exception is a set object, where the members attribute is also returned
• Does not apply to person and role objects
• `whois -Trt -K -M 193.0.0.0/16`
• `whois -K -imo RS-HEPNET`
• `whois -K AS-WORLD`
-d
(proposed)

- Triggers inclusion of in-addr.arpa and ip6.int domain objects in the result of IP lookup
- More/less specific lookups are possible
  - `whois -r -d 193.0.2.0`
  - `whois -d -Tdn -K -M 193.0.0.0/20`
-q sources [<source>]

(proposed)

- Lists all databases (sources) available from the server
- Additional information regarding mirroring
  - `<source>`:<`NRTM_proto_ver>`:<`mirroring>`:<`first`>:<`last`>
  - `<mirroring>`: Y|N|X : can mirror| cannot | n/a
- `whois -q sources`
-q version

• Displays version number of the server software

• `whois -q version`
Inverse queries

- \(-i \text{ admin}_c \)  <nic_hdl | name>
- \(-i \text{ tech}_c \)  <nic_hdl | name>
- \(-i \text{ zone}_c \)  <nic_hdl | name>
- \(-i \text{ author} \)  <nic_hdl | name>
- \(-i \text{ cross}_nfy \)  <nic_hdl | name>
- \(-i \text{ person} \)  <nic_hdl | name>
  
  - (= \(-i \text{ ac,tc,zc,ah,cn}\))

- \(-i \text{ notify} \)  <e-mail>
- \(-i \text{ upd-to} \)  <e-mail>
- \(-i \text{ mnt-nfy} \)  <e-mail>
Inverse queries (2)

- `-i mnt-by <maintainer name>`
- `-i mnt-lower <maintainer name>`
- `-i mbrs-by-ref <maintainer name>`
- `-i mnt-routes <maintainer name>`
- `-i cross-mnt <maintainer name>`
- `-i referral-by <maintainer name>`
- `-i origin <AS key>`
- `-i local-as <AS key>`
- `-i member-of <set name>`
- `-i rev-srv <hostname | IP address>`
- `-i ns-server <hostname | IP address>`
- `-i sub-dom <domain name>`
Other differences

- `-i role` is not supported \textit{(proposed)}
- inverse queries do not follow referral \textit{(proposed)}
- `-k` is also accepted without an argument (next empty `-k` will close the connection)
NRTM

• NRTM server listens on a separate port
• No selective mirroring is possible (do we need it?)
• Queries
  • -q sources
  • -g <source>:<NRTM_proto_ver>:<from>-<to>
• Errors
  • %ERROR:1: Syntax error
  • %ERROR:2: Invalid range: Not within <first>-<last>
  • %ERROR:3: You are not authorized to mirror the database
  • %ERROR:4: Unknown source
Submissions to the Database

• MIME support
  • text/plain, application/pgp-signature, application/pgp
  • multipart/mixed, multipart/alternative,
  • multipart/signed, message/rfc822
  • each MIME part is treated as a separate submission

• PGP support
  • GnuPG
  • multipart/signed MIME encapsulation
Accounting and Access Control

• Access to “public” and “contact” data is accounted differently

• Contact data:
  - limit = \( f(max\_limit1, \text{objects\_received}, \text{query\_rate}) \)
  - when limit is hit - the query is aborted
  - # of times the limit may be hit before permanent denial

• Public data:
  - limit = \( max\_limit2 \)

• Trusted proxies: accounting is based on client’s IP
Project Status

- Version 0.5β was released last week
  - 20/146 downloads
- External functionality is complete
- Our beta testers (Thanks for your input!)
  - Harald Michl
  - Marc Roger
Project Status (2)

• What’s missing:
  • Server infrastructure (backup, cleanup, logging, etc.)

• What needs further development:
  • MIME support
  • Server configuration/administration
  • Software portability
Prototype servers

- Near real-time mirror of the RIPE Database
  - `whois -h rpsl.ripe.net`
  - contains live RIPE Database in RPSL format
- Test server for submissions
  - mail <auto-rip@ripe.net>
  - `whois -h rpsl.ripe.net -p 4343`
Contact information

- Mailing list
  - <db-beta@ripe.net>

- RIPE NCC development team
  - <dbrip@ripe.net>

- Web page:
  - http://www.ripe.net/ripencc/pub-services/db/reimp/
Transition plan

• Phase I: started in February
  • New server mirrors live database and translates IRR objects to RPSL.
• Phase II: End June 2000
  • NRTM of the RIPE Database (RPSL format)
  • New server processes updates on a test database
  • Extensive testing
Transition Plan (2)

• Phase III: 2000. Dependant on confidence and consensus
  • New server becomes the authoritative RIPE Database.
  • DB files at ftp.ripe.net are in RPSL format
  • RPSL submissions at <auto-rpsl@ripe.net>
  • RIPE-181 submissions at <auto-dbm@ripe.net>
    • are translated into RPSL
    • only creations and modifications (NOT deletions!)

• Phase IV
  • RPSL submissions at <auto-dbm@ripe.net>
  • RIPE-181 submissions at <auto-181@ripe.net>

• Phase V
  • Only RPSL submissions at <auto-dbm@ripe.net>
Transition issues

• Sets
  • as-macro: <macro_name> => as-set: <macro_name>
  • community: <comm_name> => route-set: RS-<comm_name>

• Reserved prefixes (RP)
  • AS-, RS-, RTRS-, FLTR-, PRNG-
  • mntner: <RP><mt_name> => mntner: MNT-<RP><mt_name>

• Mandatory attribute: mnt-by (except dn, pn, ro)
  • no mnt-by => mnt-by: RIPE-NCC-NONE-MNT

• New attribute: referral-by
  • => referral-by: RIPE-DBM-MNT
Questions?
New object: peering-set

• Peering-set

peering-set:  [mandatory]  [single]  [primary/look-up key]
descr:        [mandatory]  [multiple]
peering:      [mandatory]  [multiple]
remarks:      [optional]   [multiple]
tech-c:       [mandatory]  [multiple]  [inverse key]
admin-c:      [mandatory]  [multiple]  [inverse key]
notify:       [optional]   [multiple]  [inverse key]
mnt-by:       [mandatory]  [multiple]  [inverse key]
changed:      [mandatory]  [multiple]
source:       [mandatory]  [single]
New object: filter-set

- defines a set of routes that are matched by its filter

filter-set: [mandatory] [single] [primary/look-up key]
descr: [mandatory] [multiple]
filter: [mandatory] [single]
remarks: [optional] [multiple]
tech-c: [mandatory] [multiple] [inverse key]
admin-c: [mandatory] [multiple] [inverse key]
notify: [optional] [multiple] [inverse key]
mnt-by: [mandatory] [multiple] [inverse key]
changed: [mandatory] [multiple]
source: [mandatory] [single]
New object: rtr-set

- defines a set of routers specified by inet-rtr names, ipv4_addresses or other rtr-set names

<table>
<thead>
<tr>
<th>Field</th>
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<th>Type</th>
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</tr>
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<td>primary/look-up key</td>
</tr>
<tr>
<td>descr</td>
<td>mandatory</td>
<td>multiple</td>
<td></td>
</tr>
<tr>
<td>members</td>
<td>optional</td>
<td>multiple</td>
<td></td>
</tr>
<tr>
<td>mbrs-by-ref</td>
<td>optional</td>
<td>multiple</td>
<td></td>
</tr>
<tr>
<td>remarks</td>
<td>optional</td>
<td>multiple</td>
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</tr>
<tr>
<td>tech-c</td>
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<td>multiple</td>
<td>inverse key</td>
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<tr>
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<td>inverse key</td>
</tr>
<tr>
<td>notify</td>
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<td>inverse key</td>
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<tr>
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</table>
New object: as-block

- Defines a range of AS numbers delegated to a given repository

<table>
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<tr>
<th>Field</th>
<th>Type</th>
<th>Key</th>
<th>Description</th>
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<td>[single]</td>
<td>[primary/look-up key]</td>
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<td>descr</td>
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## Membership of set objects

<table>
<thead>
<tr>
<th>Object</th>
<th>Details</th>
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<tbody>
<tr>
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<td>RS-FOO</td>
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<td>mbrs-by-ref:</td>
<td>MNT-FOOBAR</td>
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<td>...</td>
<td>...</td>
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<tr>
<td>route:</td>
<td>193.0.0.0/22</td>
</tr>
<tr>
<td>origin:</td>
<td>AS3333</td>
</tr>
<tr>
<td>member-of:</td>
<td>RS-FOO</td>
</tr>
<tr>
<td>mnt-by:</td>
<td>MNT-FOOBAR</td>
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<td>...</td>
<td>...</td>
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<td>route:</td>
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<tr>
<td>origin:</td>
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<tr>
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