PRIDE

RIPE-81++

or

“Representation of IP Routing Policies in the RIPE Routing Registry”

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Introduction

- Givens
  - Understanding of RIPE-81
  - Will not discuss routing policy itself
- New things
  - Allocation v Routing information
  - New object (“route”)
  - Classless
  - Updated Syntax for objects
  - Additional attribute in aut-num
  - Transition issues
- Overview ONLY

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Allocation v Routing

- Need to Split
  - Often maintained by different people
  - Other registries have this split
  - Classless changes semantic of objects
- Split into two objects
  - Allocation - modified “**inetnum**” object
  - Routing - new “**route**” object

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Modified “inetnum”

- Obsoleted attributes
  - connect
  - routpr-l
  - bdrygw-l
  - nsf-in, nsf-out
  - gateway
- Moved to “route” object
  - aut-sys → origin
  - ias-int → encoded in component
  - comm-list

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Route Object

- Represents a single route in the Internet routing table
- Classless and aggregation
- Contains NO allocation information
- Linked to ASes (“aut-num”) and communities (“community”)
- Multiple originating ASes per route possible (i.e. proxy aggregation)

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Route Object

- Current

```
inetnum: 192.87.45.0
netname: RIPE-NCC
descr: RIPE Network Coordination Centre
descr: Amsterdam, Netherlands
country: NL
admin-c: Daniel Karrenberg
tech-c: Marten Terpstra
connect: RIPE NSF WCW
aut-sys: AS3333
ias-int: 192.87.45.80 AS1104
ias-int: 192.87.45.6 AS2122
ias-int: 192.87.45.254 AS2600
rev-srv: ns.ripe.net
rev-srv: ns.eu.net
notify: ops@ripe.net
changed: tony@ripe.net 940110
source: RIPE
```


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Route Object

- Allocation

```
inetnum: 192.87.45.0
netname: RIPE-NCC
descr: RIPE Network Coordination Centre
descr: Amsterdam, Netherlands
country: NL
admin-c: Daniel Karrenberg
tech-c: Marten Terpstra
rev-srv: ns.ripe.net
rev-srv: ns.eu.net
notify: ops@ripe.net
changed: tony@ripe.net 940110
source: RIPE
```


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Route Object

- Routing

```
route: 192.87.45.0/24
descr: RIPE NCC
origin: AS3333
comm-list: SURFNET
component: 192.87.45.80/32 AS1104
component: 192.87.45.6/32 AS2122
component: 192.87.45.254/32 AS2600
changed: dfk@ripe.net 940427
source: RIPE
```

Route Object Attributes

- route:
  - classless address (prefix length format)
- origin:
  - AS originating this route
  - Multiple originating ASes is represented by multiple route objects
  - route/origin combination is always unique
- comm-list:
  - List of communities this route is party of

Route Object Attributes

- component:
  - Describes the components of a route/aggregate which do not have the same origin or community values

Component Attribute

Example:

```
route: 193.0.8.0/24
descr: Enterprise 1
origin: AS1
 ...

route: 193.0.9.0/24
descr: Enterprise 1
origin: AS1
 ...
```

Can be aggregated as:

```
route: 193.0.8.0/23
descr: Enterprise 1
origin: AS1
 ...
```


Component Attribute

Example 2:

```
route: 193.0.8.0/24
descr: Enterprise 1
origin: AS1
 ...
route: 193.0.9.0/24
descr: Enterprise 1
origin: AS1
comm-list: SPECIAL
 ...
```

Can be aggregated as:

```
route: 193.0.8.0/23
descr: Enterprise 1
origin: AS1
component: 193.0.9.0/24 AS1 SPECIAL
 ...
```

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Component Attribute

Example 3:

```
route: 193.0.0.0/20
descr: All routes known by AS1
origin: AS1
component: 193.0.0.0/24 HOLE
component: 193.0.2.0/23 HOLE
component: 193.0.4.0/22 HOLE
component: 193.0.8.0/24 AS1
component: 193.0.9.0/24 AS1 SPECIAL
component: 193.0.10.0/23 HOLE
component: 193.0.12.0/22 HOLE
 ...
```

- ❍ HOLE is used to indicate aggregation with holes.
- ❍ HOLE is not a community

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Component Attribute

Example 4:

```
route: 193.0.9.0/24
descr: Enterprise 1
origin: AS1
 ...

route: 193.0.9.0/24
descr: Enterprise 1
origin: AS2
 ...
```

- ❍ Route origination by more than more AS
- ❍ Valid in routing registry
- ❍ Used for proxy-aggregation
- ❍ Caution !!!

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aut-num object

- ❍ No major changes in as-in / as-out
- ❍ Clarifications on syntax
  - ❍ Communities allowed in as-in and as-out
  - ❍ AS-macros allowed in as-in and as-out
  - ❍ Implicit “OR” in routing policy expressions
  - ❍ Clarifications on wrapping of rules over long lines

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aut-num Object

- ❍ **as-reject** attribute
  - ❍ Advisory attribute which can be used to indicate exclusion of routes based on a **transit** AS
- ❍ Syntax allows:
  - ❍ as-reject: AS690 AS1104
  - ❍ as-reject: AS1800 HEPNET
  - ❍ as-reject: AS1103 AS-EUNET
  - ❍ as-reject: AS1888 ANY

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Transition Issues

- Implement Classless and new object definitions
- Make common tools understand new schema and prefer new data
- Encourage maintainers to use new objects and convert existing data (automatic where possible) - Summer, 94
- Flag day will be needed to remove all remaining routing information from “inetnum” objects - Fall, 94

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Open Issues

- PRIDE tool transition
- Inter-working with other registries