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"Route Server Project" Overview and Progress Report

RARE

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Overview

- ❍ Update from last time
- ❍ Concepts
- ❍ Goals
- ❍ Route Server
- ❍ Routing Registry
- ❍ Plan
- ❍ Status

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Update from last time

- ❍ November 1992, Washington D.C. IPEG
  - ❍ Implementation plan tabled

"Internet Routing in a Multi Provider, Multi Path Open Environment"

--> "(ripe-82)" <--

by Bates, Karrenberg, Lothberg, Stockman and Terpstra

  - ❍ Consensus on plan and pilot.
- ❍ March 1993, Colombus, Ohio, IEPG
  - ❍ Deployment plan and status report
- ❍ RARE/RIPE project as part of RARE Technical Program being carried out at RIPE NCC funded by SURFnet through RARE

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Concepts

- ❍ Three main components for the project
  - ❍ The physical **"GIX"** itself
  - ❍ The **"Route Server (RS)"**
  - ❍ The **"Routing Registry (RR)"**

Main Goals

- ❍ Establishing a route server on the GIX itself
  - ❍ RS aspects as opposed to transport
- ❍ Making it possible to document European routing policies to make RR viable

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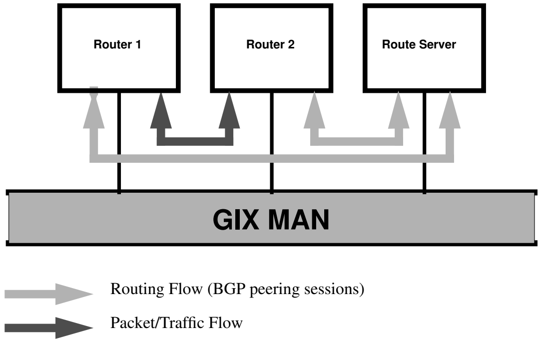
Route Server



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Routing Registry

- Neutral run registry (RIPE NCC)
- Would manage routes for a region or domain (model used -- Geographic)
- Registration of routing policy information
  - Proposal for a format for documenting routing policy

"Representation of IP Routing Policies in the RIPE Database"

(ripe-81)

- Generic guidance document as well as having direct relevance to European Route Server work

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Routing Registry

- Database and objects must be easily derived for use by the route server
- Creation of tools for routing policy
- Information/debugging tools
  - "prcheck" -- consistency checker
  - "prpath" -- extract AS-path information
  - "prconn" -- display connectivity
  - "prtrace" -- policy derived traceroute
- Configuration tools
  - Network-based lists generator
  - Interactive Configurator
- RS/RR interaction tools

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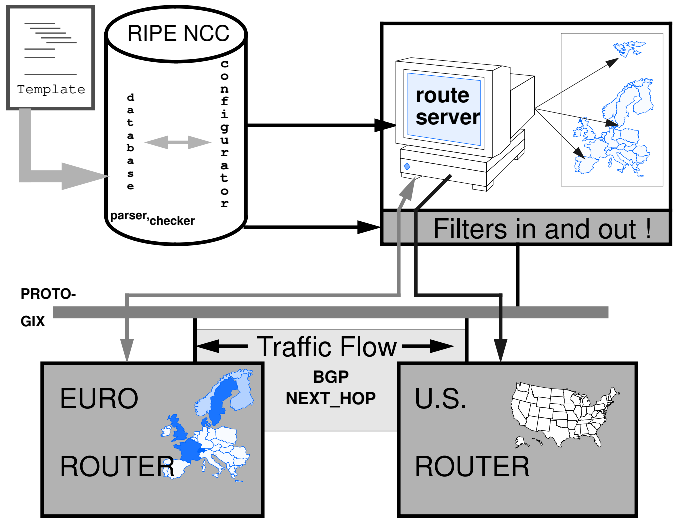


Plan

- 12 point plan produced (work in progress)
- Ongoing plan of course
- Key points (refer to paper for timescales)

-- Routing Registry

-- New database objects in RIPE database

-- Modification of software

-- Impact document for providers

-- Development of database software

-- Development of Tools

-- Development of update and transition procedures

Plan

-- Route Server

-- Install Route-Server on the Proto-GIX itself

-- Test and possibly enhance route server software (keep focus of initial RS ideas of ripe-82)

-- Work in collaboration with the NA route server and any future route servers

-- Clear and smooth transition with the providers at the GIX

-- Use the RS for operational traffic **(ULTIMATE GOAL)**

Status

Routing Registry

- Ripe-81 produced and general consensus seems very good
  - Large effort of data collection underway
  - Positive results so far (some way to go yet)

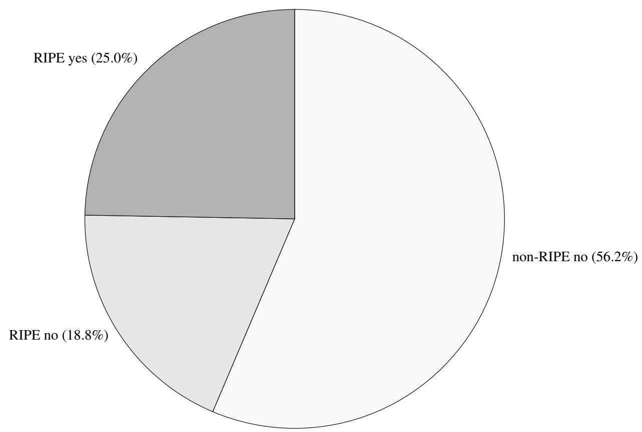
"25 % of ASs have policy information"

  - Daily generated information of current routing policy information as seen "in routing tables" as opposed to the RIPE database

ftp.ripe.net:ripe/as

- Database software enhanced (whois for AS info)
- Prototype configuration tools working for cisco and gated network and as-path based filter lists

Breakdown of AS in Database (taken from network entries)



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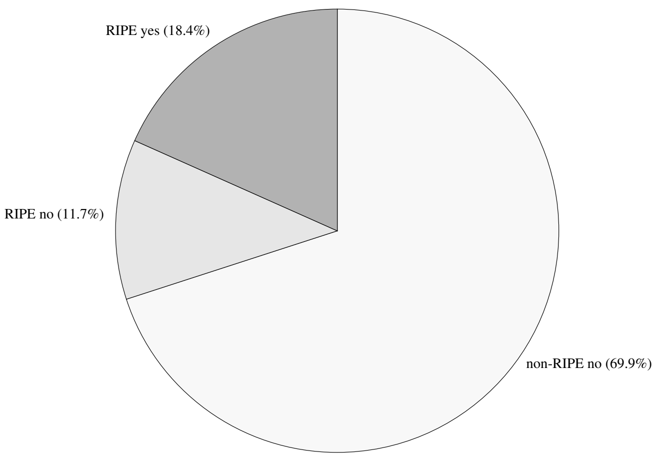
Breakdown of AS in Database (taken from Routing Tables)

Includes some U.S. ASes



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MODIFIED WHOIS

```
[mature-tony-224] whois AS786
aut-num: AS786
descr: The JANET IP Service
descr: UK
as-in: AS60 50 AS60
as-in: AS766 100 AS766
as-in: AS1263 45 DEFAULT
as-in: AS1275 100 AS1275
as-in: AS1290 50 AS1290
as-in: AS1755 102 RIPE-DB AND NOT (LOCAL AS786)
as-in: AS1849 50 AS1849
as-in: AS1930 100 AS1930
as-in: AS2107 100 AS2107
as-in: AS2111 100 AS2111
as-out: AS60 AS786 AS766
as-out: AS766 AS786 AS1755
as-out: AS1263 AS786 AS766 AS1930 AS2107 AS2111
as-out: AS1275 AS786 AS1755
as-out: AS1290 AS786
as-out: AS1755 AS786 AS766 AS1275 AS1930 AS2107 AS2111
as-out: AS1849 AS786 AS1755
as-out: AS1930 AS786 AS1755
as-out: AS2107 AS786 AS1755
as-out: AS2111 AS786 AS1755
default: AS1263 1
guardian: jips-nosc@noc.ulcc.ac.uk
admin-c: Duncan Rogerson
admin-c: Kevin Hoadley
tech-c: Duncan Rogerson
tech-c: Kevin Hoadley
remarks: AS2111 link is not yet active, coming soon.
```


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“Prtrace”

- Still a prototype (Working !!!)

Example

```
% prtrace ns0.ja.net
Policy tracing to ns0.ja.net
 1 AS1104 hef-router.nikhef.nl (192.87.45.80) 11 ms 6 ms 5 ms
 2 AS ??? Amsterdam-EBS2.Ebone.NET (192.87.4.22) 5 ms 3 ms 2 ms
 3 AS1755 Stockholm-EBS2.Ebone.NET (192.121.154.49) 37 ms 63 ms 43 ms
 4 AS1755 Stockholm-EBS1.Ebone.NET (192.121.154.17) 86 ms 110 ms 49 ms
 5 AS1755 London-EBS1.Ebone.NET (192.121.155.17) 690 ms 532 ms 310 ms
 6 AS 786 ns0.ja.net (128.86.1.20) 282 ms (ttl=249!) 401 ms (ttl=249!) 397
ms (ttl=249!)

Path used = 1104 ??? 1755 786
AS1104 = NIKHEF-H
AS ??? =
AS1755 = EBONE-INTERNAL
AS 786 = The JANET IP Service
```


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“Prtrace”

```
% prtrace dfnnoc.gmd.de
Policy tracing to dfnnoc.gmd.de

 1 AS1104 hef-router.nikhef.nl (192.87.45.80) 11 ms 5 ms 6 ms
 2 AS ??? Amsterdam-EBS2.Ebone.NET (192.87.4.22) 5 ms 5 ms 89 ms
 3 AS1755 Stockholm-EBS2.Ebone.NET (192.121.154.49) 32 ms 47 ms 63 ms
 4 AS1755 Stockholm-EBS1.Ebone.NET (192.121.154.17) 49 ms 93 ms 115 ms
 5 AS1755 London-EBS1.Ebone.NET (192.121.155.17) 761 ms 609 ms
 6 AS 786 int-gw.ulcc.ac.uk (128.86.1.2) 664 ms 665 ms 425 ms
 7 AS ??? 192.129.8.33 (192.129.8.33) 539 ms 603 ms 295 ms
 8 AS1274 dfnvmgate_e1.gmd.de (192.76.246.23) 481 ms 188 ms 301 ms
 9 AS1275 dfnnoc.gmd.de (192.88.108.8) 387 ms 303 ms 398 ms

Path used = 1104 ??? 1755 786 ??? 1274 1275
AS1104 = NIKHEF-H
AS ??? =
AS1755 = EBONE-INTERNAL
AS 786 = The JANET IP Service
AS ??? =
AS1274 = GMD-AS
AS1275 = GMD-DFN
```

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Status

Route Server

- Route Server installed at Sprint POP
- Many thanks to **Sprint, SUNET and AlterNET**
- Up and running !!
  - SUN IPC running "gated" alpha
- Initial testing done using some test-networks in Amsterdam and Stockholm
- Currently peering with ENSS and ICM-DC-1 as a test doing third party routing correctly
- Generated European list could be used today

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Status

- Development RS installed in Amsterdam on IBR LAN (Ebone Amsterdam DMZ)
- Test cisco installed **(thanks to SURFnet)**

General

- Good response from Providers at the GIX
- On Schedule with proposed time-scales
- **Going Well !!!!**
- **CIX association will use tools and ripe-81 for their own Route Server on the GIX**