The RIPE NCC, Internet Measurements and IXPs

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Overview

• The RIPE NCC and our services

• RIPE Atlas
  - How it works & use cases
  - Measurements in Norway

• RIPE Labs
  - Statistics
  - IPv6 deployment in Norway

• Membership information

• RIPE NCC Survey 2016
RIPE NCC Background

• Established in 1992 by the RIPE community
  - Initially part of academic network association
  - Since 1997 membership association under Dutch law
  - Not-for-profit, independent, neutral, open

• Funded by membership
  - 13,000 members, 76-country service region
  - Initially mostly ISPs and universities
  - Now various industries and sectors

• One of five Regional Internet Registries
RIR Regions
RIPE NCC Services

- **Member Services**
  - Resource distribution (IPv4, IPv6, ASNs)
  - Resource certification
  - Training
  - LIR Portal features
  - Extra features in RIPE Atlas

- **Public Services**
  - RIPE Database
  - Reverse DNS
  - Operating K-root server
  - Operator tools
    - RIPE Atlas, RIPEstat, RIS, RIPE Labs
  - Data sharing
  - Open meetings
RIPE Atlas
Active Measurements Network

• Largest active measurements network
• Thousands of measurement nodes
• Probes run different measurements
  - ping, traceroute, DNS, SSLcert

https://atlas.ripe.net
RIPE Atlas Coverage
RIPE Atlas Infrastructure

• Probe distribution
  - 14,000 RIPE Atlas probes distributed
  - 9,300 RIPE Atlas probes active
  - 120 active RIPE Atlas anchors

• Coverage
  - 176 countries covered
  - Originating ASes covered
    • 3,251 (IPv4), 1,187 (IPv6)
RIPE Atlas Probes & Anchors in NO

One RIPE Atlas Anchor

no-osl-as39029  6002  Redpill Linpro

Connected: 119  Disconnected: 28  Abandoned: 16
RIPE Atlas IXP Country Jedi

• IXP-Country-jedi
  - Are the paths between ASes staying in the country?
  - What is the difference between IPv6 & IPv4?
  - How many paths go via a local IXP?
  - Which peer could you add to improve reachability?

• Experimental tool
  - Feature requests welcome!
  - Depends on probe distribution in a country
**IXP Country Jedi**

- Tool & concept by Emile Aben
  - [https://github.com/emileaben/ixp-country-jedi](https://github.com/emileaben/ixp-country-jedi)
  - [https://labs.ripe.net/Members/emileaben/measuring-ixps-with-ripe-atlas](https://labs.ripe.net/Members/emileaben/measuring-ixps-with-ripe-atlas)

- traceroute mesh between RIPE Atlas probes
  - Identify ASNs in the country using RIPEstat
  - Identify IXPs & IXP LANs using PeeringDB
  - Mesh: from a set of probes in a country to each other
    - Max 2 probes per ASN
    - Only “public” probes with “good” geolocation
    - Hops geolocated using “OpenIPMap” database
Do Paths Stay in the Country?

- Snapshot of the paths that do, or don’t, stay local
Difference between IPv4 & IPv6

• Fewer RIPE Atlas probes support IPv6
How Many Paths Go Via Local IXP?

- IXP IPs: YES, out-of-country IPs: NO
- IXP IPs: NO, out-of-country IPs: NO
- IXP IPs: YES, out-of-country IPs: YES
- IXP IPs: NO, out-of-country IPs: YES
Potential Routing Optimisation

- Interactive diagnosis tool (hover over the cell)
  - http://sg-pub.ripe.net/emile(ixp-country-jedi)latest/JP/ixpcountry

- Red or blue: the path is going out of country
  - If this is a surprise, talk to your upstream(s)

- Yellow: the path is not going via a local IXP
  - If this is undesired, make a new peering agreement
Benefits (1)

• Country: regulators, politicians, cyber-security
  - How many paths stay within the country? Where do they go?

• Operators
  - Routing & traffic optimisation

• IPv6 advocates
  - Comparing IPv4 and IPv6 paths
Benefits (2)

• IXP operators
  - Shows how IXPs help to keep traffic local & regional

• RIPE Atlas community
  - More probes in more networks and ASes = higher-quality measurements data

• Geolocation data community
  - Use case for improving the data quality
Actions

• Use this tool to find possible suboptimal routing
  - Find your ASN in the mesh, find the person from another ASN, have tea :)

• To improve accuracy of this diagnostic tool
  - If your ASN is not on the graph, apply for a RIPE Atlas probe
  - If you move, remember to update your probe’s geolocation

• Re-use & re-write the code: it is free & open source software

• Improve infrastructure geolocation: contribute data to OpenIPMap!
What is RIPE Labs?

• It’s a blog, a community platform for sharing ideas, and a tool to try out new ideas

• You can
  - Test and evaluate new tools and prototypes
  - Contribute new ideas and research results
  - Provide feedback and discuss with others

• Many articles from the RIPE NCC but its for the whole community and we want your input

  https://labs.ripe.net
This Is What It Looks Like
RIPE Labs Content

• Statistics and measurements
  - Routing, IPv4, IPv6, DNS, traffic

• Tools
  - RIPE Atlas, RIPEstat, RIPE DB

• Research and analysis
  - Also many external contributors
RIPE Labs Statistics Dashboard

**Tags**

- allocation
- ases
- atlas
- certification
- country
- database
- ipv4
- ipv6
- k-root
- lirs
- meetings
- ripestat
- routing
- syria
- transfers

**Statistics**

- **12,971**
  - Number of LIRs

- **912,384**
  - Number of IPv4 addresses transferred last month

- **9,857**
  - LIRs with IPv6

View more statistics

**RIPE Database Server - Operational Plots**

Query rate:
The number of RIPE Database queries we serve in total

- **IPv4 Addresses Transferred**
  - 2,500,000

- **Whois Queries (Total) - by day**
  - Avg: 10,080 queries/minute
  - Last update: Wed Jan 27 12:00:10 2016
IPv6 RIPEness

- Rating system to monitor IPv6 deployment among RIPE NCC members

- Stars are awarded for:
  - Obtaining an IPv6 address (allocation)
  - Visibility in global routing table
  - Setting up routing registry entries
  - Setting up reverse DNS

- Per country statistics published daily

http://ipv6ripeness.ripe.net/
IPv6 RIPEness total (12,981 LIRs)

- 0 stars: 24%
- 1 star: 30%
- 2 stars: 15%
- 3 stars: 10%
- 4 stars: 21%
IPv6 RIPEness in NO (271 LIRs)
IPv6 RIPEness - Fifth Star

• Members can qualify for a fifth star
• This measures IPv6 deployment at the edge and looks at:
  - **Content** - 16% of content must be accessible over IPv6; or
  - **Access** - 16% of your customers are IPv6-capable
• The threshold doubles every year
• Get a new 5-star RIPEness t-shirt every year!

http://ipv6ripeness.ripe.net/5star/NO.html
ASes Announcing IPv6 Prefixes
Country Statistics in RIPEstat

- RIPEstat shows statistics on resources and bandwidth
- check out: https://stats.ripe.net
Actual Use of IPv6 in Norway

Map showing the Actual Use of IPv6 in Norway with the following statistics:

- NO: Capable: 10.93%
Capable and Preferred IPv6 Use
RIPE NCC Membership
RIPE NCC Members in Norway

- 271 members in Norway today - a 15% increase over the past year
Last RIPE NCC General Meeting

• Redistribution of 2015 surplus to the membership

• Board resolution after last GM to suspend members’ ability to add additional LIRs
  - Board will ask for members’ opinion on this on members-discuss mailing list soon

• Presented Activity Plan and Budget 2016:
  - Details everything the RIPE NCC will work on this year, outlines all services (incl. benefits for members), and gives the cost of each activity
Next General Meeting - 25 May 2016

- Takes place alongside RIPE 72
- Charging Scheme for 2017 will be voted on
- Annual/Financial reports presented
- There will be an Executive Board election:
  - Two seats available
  - Will be making call for candidates this month
- Members should register for the GM
  - Remote participation and electronic voting available
Voting at the GM

• 16 of 691 registrations from Norway at last GM
RIPE NCC Survey 2016

• Large-scale survey conducted every 3 years
• In 2013, over 3,000 responses that we used to create 48 actions that we implemented
• The 2016 process began here in Oslo at NIX
• Consultations around service region to find out how people think we can improve
• Launches at RIPE 72 - please take part!
RIPE NCC Survey 2016

• If not to help the RIPE NCC provide better services for members, then to win a nice prize…
Meet Us at RIPE 72 in Copenhagen
Questions

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