IXPs: is De-peering the Right Choice?

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Internet eXchange Points (IXPs) are infrastructures used by ISPs to exchange traffic between their ASes.
BACKGROUND

Lower distances and locality of traffic

Better QoS for the user

(don't) LIE TO ME
Some major ISPs have canceled all peerings (depeering) at the IXPs, justifying such decision in terms of:

- Cost reduction
- Improvement of the quality of service (QoS).
OUR TARGETS

Investigate the impact that IXPs have on the QoS

METRICS USED

Round Trip Time

Hop Count

Packet Loss

Jitter
OUR TARGETS

Investigate the impact that IXPs have on keeping local the local traffic.
A CASE STUDY

The **Italian Internet** and the Italian **main Internet eXchange Points**
DATA SOURCES

Routing Information Service (RIS)

The RIPE NCC collects and stores Internet routing data from several locations around the globe, using the Routing Information Service (RIS), established in 2001. RIS data can be accessed via RIPEstat, our "one-stop shop" for all available information about Internet number resources. RIPEstat uses individual widgets to display routing and other information.

Routing information is visualized using the following widgets:

- The **Routing Status** widget shows if a prefix is routed and, therefore, if the ASN is in use.
- The **Routing History** widget shows the time range(s) when a particular prefix was announced, and by which ASN it was announced.
- The **Announced Prefixes** widget provides a tabular view of prefixes announced by an AS in the last two weeks.
- The **ASN Neighbours** widget provides information about neighbouring ASNs.
- The **ASN Neighbours History** widget provides historical information about neighbouring ASNs.
- The **Related Prefixes** widget shows related networks of the prefix.
- The **BGP Looking Glass** widget allows you to query our route collectors.
- **BGPlay** shows the routing history related to a specific set of resources (prefixes, Autonomous Systems, IPs) by means of an animated and highly interactive graph.
- **RISwhois** searches the latest RIS data for details of an IP address. It is useful when querying RIS using scripts.

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DISTRIBUTION OF THE ATLAS PROBES IN ITALY
EXPERIMENT I

Critical and most visited Internet Services

- Banking
- Insurance
- Law
- Energy
- Public Administration
- News
- Health
- Webmail
- Transport
EXPERIMENT I

Critical and most visited Internet Services

• Measurements

• Targets: 50 critical Internet services and 100 most visited sites
• Duration of the experiment: 4 hours
• 6 pings per hour
• 2 traceroutes per hour
RESULTS

Critical and most visited Internet Services

[Graphs showing cumulative fraction of probes vs. average round trip delay and average hop count, with two lines representing probes not traversing IXPs and probes traversing IXPs.]
RESULTS

Critical and most visited Internet Services

Keeping local the local traffic

Non Italian ASes

Non European ASes
EXPERIMENT II

Selective BGP announcements

Phases
- Upstream
- IXPs
- All

IXP
- NaMeX
- MIX
EXPERIMENT II

Selective BGP announcements

- Measurements
  - Single target in Seeweb/Unidata/Mc-Link datacenter
  - Duration of the experiment: 26 hours
  - 60 pings per hour
  - 6 traceroutes per hour
RESULTS

Selective BGP announcements - Upstream vs IXP
RESULTS

Selective BGP announcements - Specific Upstream vs IXP

- Cumulated fraction of probes vs Average hop count
- Cumulated fraction of probes vs Average round-trip delay
- Probes choosing upstream for Roma vs IXPs for Roma
- Probes choosing upstream for Frosinone vs IXPs for Frosinone
- Probes choosing upstream for Roma vs IXPs for Roma
- Probes choosing upstream for Frosinone vs IXPs for Frosinone

Probes choosing upstream for Roma: Blue
Probes choosing IXPs for Roma: Red
Probes choosing upstream for Frosinone: Orange
Probes choosing IXPs for Frosinone: Green

UP: 3356
IXP: 3356
UP: 174
IXP: 174

Selective BGP announcements - Specific Upstream vs IXP
CONCLUSIONS

Our experiments put in evidence that peerings exploiting IXPs have a positive effect on key performance indicators. Also, they have the effect of reducing the number of foreign ISPs traversed to reach critical Internet services (keep local the local traffic).

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THANK YOU
FOR YOUR ATTENTION

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