What do we do?

- 2 Forums per year
- Maintaining the Website, database and tools
- Mailing Lists
- Newsletter – Subscribe here: www.euro-ix.net/newsletters
- Working Groups
- Working with IEEE Ethernet Study Group
- Signed MoU with ISOC to support IXPs
- Annual European IXP Report
- Twinning Program
- Benchmarking

Why do we do it? Good of the community!
Association of IXPs

75 affiliated IXPs:

• 52 IXPs in the Euro-IX Region => in 32 Countries, operating over 100 IXPs

• 23 IXPs from the rest of the world

• Newest Members: Angonix (Angola), SOX (Serbia)
11 Patrons

- ADVA Optical Networking
- Alcatel-Lucent
- Brocade
- BTI Systems
- Extreme Networks
- Huawei

- Interxion
- Juniper Networks
- MRV
- Telecity
- Telehouse
Euro-IX projects
Traffic during FIFA World Cup

- Collaboration with RIPE NCC

Traffic at PTT Sao Paulo during the Brazil vs. Germany Game

Traffic at LINX London (Extreme LAN) during the Brazil vs. Germany Game
IXP Database Project

- There are many IXP Databases…
IXP Database

What do we want..

- A single canonical place for IXP data
- IXP data maintained by IXPs ensures greater accuracy
- Useful for the IXP members to see IXP data in context
- We want it to be open and plugable

.. and be able to develop tools against it.
End Goal
IXP Database

IXPDB API server written using Python / Django, which can:

- get / create / update / delete IXP and Organisation objects
- all interaction is JSON
- all non-sensitive information will be publically available
- Members of IXPAs (and others as appropriate) will be able to create, update and delete IXPs from the databases.
IXP Database

- We have a proof of concept client to interact with this database in Python including unit test code at: https://github.com/euro-ix/ixf-client-py

- The PHP version of this with unit tests also available at: https://github.com/euro-ix/ixf-client-php
Twinning is Winning

Euro-IX run’s a twinning program to support IXPs in need, the following are existing twins –

• DE-CIX – NPIX (Nepal) and TIX (Tanzania)
• LINX – ZIXP (Zambia)
• Netnod – KINIX (Congo), KIXP (Kenya) and MOZ-IX (Mozambique)
Other Projects

• IXP BCOPs updated - https://www.euro-ix.net/euro-ix-bcp

• IXP Bogon list Project with Team Cymru - http://www.team-cymru.org/ixp

• Work done by the Data TF is being implemented, thanks to Elisa and Nick - https://www.euro-ix.net/euro-ix-bcp we now have an IXP Member list JSON Scheme
Euro-IX Tools
Euro-IX Tools

- IXP Service Matrix - euro-ix.net/tools/ixp_matrix
- Peering Matrix - euro-ix.net/tools/peering_matrix
- ASN Search euro-ix.net/tools/asn_search
- ASN Filter - euro-ix.net/tools/asn_filter
- Newest ASN entries - euro-ix.net/tools/asn_newest
- Most common ASNs - euro-ix.net/tools/asn_common
## ASN Search Tool

Enter an ASN, IXP or organisation name:

<table>
<thead>
<tr>
<th>IXP</th>
<th>IXP Participants</th>
<th>IPv6 active</th>
<th>Unique ASNs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AF-IX</strong></td>
<td></td>
<td></td>
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<tr>
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<td>275</td>
<td>43</td>
<td>223</td>
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<td><strong>North America</strong></td>
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<tr>
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<td>2161</td>
<td>390</td>
<td>1005</td>
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<tr>
<td><strong>LAC-IX</strong></td>
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<td></td>
<td>1105</td>
<td>490</td>
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<td><strong>APIX</strong></td>
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<td>872</td>
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<tr>
<td><strong>Euro-IX</strong></td>
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<tr>
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<td>7881</td>
<td>4183</td>
<td>4188</td>
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<tr>
<td><strong>Global</strong></td>
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</tr>
<tr>
<td></td>
<td>12891</td>
<td>5455</td>
<td>7394</td>
</tr>
</tbody>
</table>

*Note: The ASN information contained within this database is a combination of both affiliated and non-affiliated IXP content. While the affiliated IXP content is highly accurate, the non-affiliated IXP content is updated on a best effort basis and is nonetheless considered to be quite accurate.*
## ASN Filter

### ASNs that peer at:

<table>
<thead>
<tr>
<th>NAP INCA (Peru)</th>
<th>NAP INCA (Peru)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6NGIX (Korea, Republic of)</td>
<td>6NGIX (Korea, Republic of)</td>
</tr>
<tr>
<td>AAIIX (Austria)</td>
<td>AAIIX (Austria)</td>
</tr>
<tr>
<td>ACT-IX – Canberra (Australia)</td>
<td>ACT-IX – Canberra (Australia)</td>
</tr>
<tr>
<td>ADN-IX (France)</td>
<td>ADN-IX (France)</td>
</tr>
<tr>
<td>AIXP (Tanzania, United Republic of)</td>
<td>AIXP (Tanzania, United Republic of)</td>
</tr>
<tr>
<td>ALB-IX (Albania)</td>
<td>ALB-IX (Albania)</td>
</tr>
<tr>
<td>AlbertaIX (Canada)</td>
<td>AlbertaIX (Canada)</td>
</tr>
<tr>
<td>AMPATH (United States of America)</td>
<td>AMPATH (United States of America)</td>
</tr>
<tr>
<td>AMS-IX (Netherlands)</td>
<td>AMS-IX (Netherlands)</td>
</tr>
<tr>
<td>AMS-IX Caribbean (Netherlands Antilles)</td>
<td>AMS-IX Caribbean (Netherlands Antilles)</td>
</tr>
<tr>
<td>AMS-IX East Africa (Kenya)</td>
<td>AMS-IX East Africa (Kenya)</td>
</tr>
<tr>
<td>AMS-IX Hong Kong (China)</td>
<td>AMS-IX Hong Kong (China)</td>
</tr>
<tr>
<td>AMS-IX New York (United States of America)</td>
<td>AMS-IX New York (United States of America)</td>
</tr>
<tr>
<td>ANG-IXP (Angola)</td>
<td>ANG-IXP (Angola)</td>
</tr>
</tbody>
</table>

- List all
- Only
- And other IXPs
- And at ➞
- But not at ➞
- And other IXPs, but not at ➞
# Peering Matrix

| IXP                  | Total listed ASNs at IXP | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs | ASNs that don’t peer at other IXPs |
|----------------------|--------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| AMS-IX               | 672                      | 114                               | 17                                | 565                               | 83                                | 0                                 | 0                                 | 679                               | 1                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| AMS-RI Caribbean     | 7                        | 2                                 | 29                                | 36                                | 65                                | 0                                 | 0                                 | 26                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| APMX                 | 8                        | 9                                 | 75                                | 21                                | 25                                | 0                                 | 0                                 | 26                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| BEIX - Tokyo         | 8                        | 1                                 | 13                                | 15                                | 87                                | 0                                 | 0                                 | 8                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| BCOX                 | 62                       | 22                                | 36                                | 40                                | 65                                | 0                                 | 0                                 | 26                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| BIX                  | 51                       | 33                                | 65                                | 18                                | 35                                | 0                                 | 0                                 | 15                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| BIX-BG               | 54                       | 25                                | 45                                | 29                                | 54                                | 0                                 | 0                                 | 13                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| FNIX                 | 45                       | 17                                | 38                                | 28                                | 62                                | 0                                 | 0                                 | 20                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| CATNIK               | 29                       | 15                                | 52                                | 14                                | 48                                | 0                                 | 0                                 | 7                                 | 1                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| CIX                  | 29                       | 20                                | 69                                | 9                                 | 31                                | 0                                 | 0                                 | 1                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| CIX-R                 | 37                       | 8                                 | 22                                | 29                                | 78                                | 0                                 | 0                                 | 19                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| CoreSite - Any2 Los Angeles | 147                  | 56                                | 40                                | 56                                | 60                                | 0                                 | 0                                 | 51                                | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
| DE-CIX Frankfurt      | 586                      | 111                               | 19                                | 424                               | 81                                | 0                                 | 0                                 | 305                               | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 | 0                                 |
## IXP Service Matrix

<table>
<thead>
<tr>
<th>IXP</th>
<th>Location</th>
<th>Asn</th>
<th>Rs Asn</th>
<th># Of Customers</th>
<th>% IPv6 Ready</th>
<th>% IPv6 Ready</th>
<th># Of Sites</th>
<th>Last Month Traffic (Gbps)</th>
<th>Public Stats</th>
<th>Non Profit</th>
<th>Priv. Peering</th>
<th>IPv6 Lan Type</th>
<th>IPv6 Registry</th>
<th>Multicast</th>
<th>Vlan Services</th>
<th>Out Of Band Access</th>
<th>24x7 Service</th>
<th>24x7 Access</th>
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<tbody>
<tr>
<td>ADN-IX</td>
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<td>6777</td>
<td>679</td>
<td>538</td>
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<td>Y</td>
<td>Y</td>
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</tr>
</tbody>
</table>

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*europa-ix*
Euro-IX Database
Range of ASNs connected to Members

- 6 - 25 ASNs
  KINIX (Congo), FICIX (Finland)

- 26 - 50 ASNs
  SOX (Serbia), DIX (Denmark)

- 51 - 100 ASNs
  NaMeX (Italy), JPNAP (Japan)

- 101 - 200 ASNs
  UA-IX (Ukraine), TorIX (Canada)

- 201 - 400 ASNs
  PLIX (Poland), MSK-IX (Russia)

- 401 - 704 ASNs
  PTT.br (Brazil), AMS-IX (NL)
Who connect to our Members

=> 91% of our member IXPs had dedicated hosting providers connected to their exchange in 2014
Average Port types usage evolution

=> the 1GigE and 10 GigE ports were the types the most used at member IXPs in 2014
Use of Route Servers

Proportion of Euro-IX Member IXPs using Route Servers:
- Route Servers: 79%
- No Route Servers: 21%

Average proportion of IXP participants that are on Route Servers:
- Participants on route servers: 81%
Switch/Router DB – Vendors used

- Brocade: 27%
- Extreme: 26%
- Cisco: 20%
- Glimmerglass: 8%
- Juniper: 8%
- Force10: 6%
- Alcatel-Lucent: 4%
- Other: 2%
Route Server DB – Daemons used

- Bird: 57%
- Cisco: 19%
- Quagga: 14%
- OpenBGPd: 9%
- Other: 1%
IXPs in Euro-IX Region

- 189 known IXPs
- 48 Countries
- 142 Cities

Check our Map:
www.euro-ix.net/location-of-ixps
Traffic Growth in Euro-IX Region

- Known aggregated traffic over public peering LAN
- From 15,887 Gbps to 20,228 Gbps
- 85 IXPs monitored on average
Internet Exchange Federation
Other IXPAs

NA-IX

EURO-IX

LAC-IX

AF-IX

APIX
Internet Exchange Federation (IX-F)

- MOU signed by APIX, Euro-IX and LAC-IX to form the IX-F in November 2012 – [www.ix-f.net](http://www.ix-f.net)
- Af-IX signed the MoU to join the IX-F
- Idea to have a Global IXP DB
- Global IXP BCPs
- Automate Data Collection from IXPs
- Plans to collaborate with other external Databases
IX-F Board

- **Af-IX**
  Nishal Goburdhan – JINX (South Africa)
  Kyle Spencer – UIXP (Uganda)

- **APIX**
  Raphael Ho - Equinix (Hong Kong)
  Katsuyasu Toyama - JPNAP (Japan)

- **Euro-IX**
  Arnold Nipper - DE-CIX (Germany)
  John Souter - LINX (United Kingdom)

- **LAC-IX**
  Ariel Graizer - NAP CABase (Argentina)
  Milton Kashiwakura - PTT.br (Brazil)
IXPs outside Euro-IX Region
IXPs in APIX Region

89 known IXPs
19 Countries
49 Cities

Check our Map:
www.euro-ix.net/location-of-ixps
Traffic Growth in APIX Region

- Known aggregated traffic over public peering LAN
- From **1,195 Gbps** to **1,563 Gbps**
- 17 IXPs monitored
IXPs in Af-IX Region

- 33 known IXPs
- 25 Countries
- 31 Cities

Check our Map: [www.euro-ix.net/location-of-ixps](http://www.euro-ix.net/location-of-ixps)
Traffic Growth in Af-IX Region

- Known aggregated traffic over public peering LAN
- From **127 Gbps** to **154 Gbps**
- 11 IXPs monitored on average
IXPs in LAC-IX Region

- 56 known IXPs
- 16 Countries
- 49 Cities

Check our Map: [www.euro-ix.net/location-of-ixps](http://www.euro-ix.net/location-of-ixps)
Traffic Growth in LAC-IX Region

- Known aggregated traffic over public peering LAN
- From 428 Gbps to 703 Gbps
- 29 IXPs monitored
IXPs in NA-IX Region

- 102 known IXPs
- 2 Countries
- 57 Cities

Check our Map: [www.euro-ix.net/location-of-ixps](http://www.euro-ix.net/location-of-ixps)
Traffic Growth in NA-IX Region

- Known aggregated traffic over public peering LAN
- From **852 Gbps** to **1,206 Gbps**
- From 13 to 21 IXPs monitored
Twinning is Winning
Now available in English, French, Turkish, Spanish, Romanian, Portuguese, Arabic and German, check out our Youtube channel: https://www.youtube.com/channel/UCFyucVRAAMzxyJIsxnGwsjw

=> more languages to come, if you're interested in translating the video, contact us!
Thank you!

Bijal Sanghani
bijal at euro-ix dot net
Twitter: @euroix