



euro-IX

IXP database and tools

ESNOG/ GORE 19 2017

Barcelona, Spain

➤ What do we do?

- Two fora per year
- Maintain and develop the website, database and tools
- Annual European IXP Report
- Mentor-IX programme
- Fellowship programme
- Benchmarking Club (BMC)

➤ Talk to us and each other

- Mailing lists
- Newsletter – Subscribe here:
 - euro-ix.net/news-and-events/newsletter/
- Working Groups
- Social Media
 - Twitter @euroix
 - Facebook fb.me/maineuroix
 - YouTube youtube.com/channel/UCFyucVRAAMzxyJIsxnGwsjw

➤ Association of IXPs

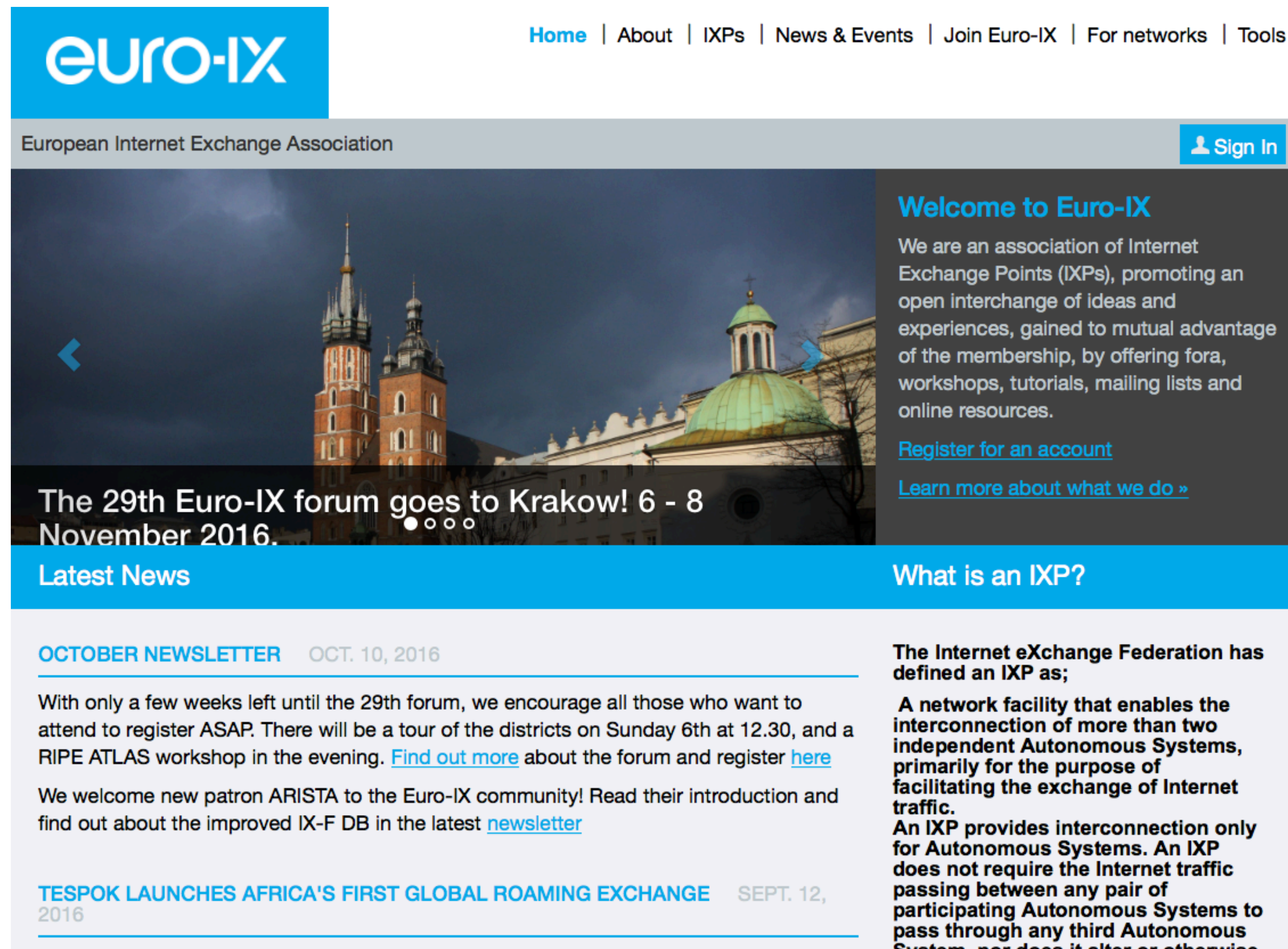
82 affiliated IXPs:

- 56 IXPs in the Euro-IX Region 49 Countries, operating over 100 Peering LANs
- 26 IXPs from the rest of the world
- Newest Members:
 - Global-IX
 - DataIX

Patrons

- **Arista**
- Brocade
- **Ciena**
- **Coriant**
- ECI Telecom
- Equinix | Telecity
- Extreme Networks
- Huawei
- Interxion
- Juniper Networks
- MRV
- Nokia
- Telehouse

Website



The screenshot shows the Euro-IX website homepage. At the top left is the Euro-IX logo. To its right is a navigation menu with links for Home, About, IXPs, News & Events, Join Euro-IX, For networks, and Tools. Below the navigation is a grey bar with the text "European Internet Exchange Association" and a "Sign In" button. The main content area features a large image of a church with a green dome. Overlaid on the image is the text "The 29th Euro-IX forum goes to Krakow! 6 - 8 November 2016." To the right of the image is a "Welcome to Euro-IX" section with a paragraph of text and two links: "Register for an account" and "Learn more about what we do >". Below the image is a blue bar with the text "Latest News" and "What is an IXP?". Under "Latest News" are two news items: "OCTOBER NEWSLETTER OCT. 10, 2016" and "TESPOK LAUNCHES AFRICA'S FIRST GLOBAL ROAMING EXCHANGE SEPT. 12, 2016". Under "What is an IXP?" is a definition of an IXP.

euro-ix

Home | About | IXPs | News & Events | Join Euro-IX | For networks | Tools

European Internet Exchange Association [Sign In](#)

Welcome to Euro-IX

We are an association of Internet Exchange Points (IXPs), promoting an open interchange of ideas and experiences, gained to mutual advantage of the membership, by offering fora, workshops, tutorials, mailing lists and online resources.

[Register for an account](#)

[Learn more about what we do >](#)

The 29th Euro-IX forum goes to Krakow! 6 - 8 November 2016.

Latest News

OCTOBER NEWSLETTER OCT. 10, 2016

With only a few weeks left until the 29th forum, we encourage all those who want to attend to register ASAP. There will be a tour of the districts on Sunday 6th at 12.30, and a RIPE ATLAS workshop in the evening. [Find out more](#) about the forum and register [here](#)

We welcome new patron ARISTA to the Euro-IX community! Read their introduction and find out about the improved IX-F DB in the latest [newsletter](#)

TESPOK LAUNCHES AFRICA'S FIRST GLOBAL ROAMING EXCHANGE SEPT. 12, 2016

What is an IXP?

The Internet eXchange Federation has defined an IXP as;

A network facility that enables the interconnection of more than two independent Autonomous Systems, primarily for the purpose of facilitating the exchange of Internet traffic.

An IXP provides interconnection only for Autonomous Systems. An IXP does not require the Internet traffic passing between any pair of participating Autonomous Systems to pass through any third Autonomous System, nor does it alter or otherwise

➤ Website – Top Improvements!

1. ASN Automation
2. Switch Database
3. Route Server Database
4. Peering matrix, service matrix and ASN
5. Database quality improvements
6. Edit your organisation and team members

IXP Database

Organization Profile

Internet Neutral Exchange Association

General [Introduction](#) [Contacts](#) [IXPs](#) [Users](#)



Location:	Ireland
Established:	1996-09-01
Affiliation:	Member
Board Contact:	
Email:	barry.rhodes@inex.ie
Website:	https://www.inex.ie/

[Edit](#)

Organization Profile

Amsterdam Internet Exchange B.V.

[General](#) [Introduction](#) [Contacts](#) [IXPs](#) [Users](#)

NAME	COUNTRY
AMS-IX Bay Area	United States of America
AMS-IX Caribbean	Netherlands Antilles
AMS-IX Chicago	United States of America
AMS-IX Hong Kong	China
AMS-IX India	India
AMS-IX New York	United States of America
Amsterdam Internet Exchange	Netherlands

IXP Database

IXP Profile

Internet Neutral Exchange Association

[Profile](#) [Network](#) [Switches](#) [Services](#) [Pricing](#) [Tree](#) **ASNs** [Users](#) [Automations](#)

Automation Link <https://www.inex.ie/noncms/php/euro-ix-members.php>

AS #	COMPANY	IPV6
34218	3 Ireland	N
29644	Airspeed Telecom	Y
42227	Airwire	Y
20940	Akamai Technologies	Y
16509	Amazon	Y
61194	Another 9	N
49567	Aptus Broadband	Y
5580	Atrato IP Networks	Y
47680	BBnet	N

Automations

ASN Link

Traffic Link

Traffic

IXP Database

ASN Database			
Stats	Search	Recent	Common
IXP PARTICIPANTS	IPV6	UNIQUE ASNS	
	EURO-IX		
8715	5488	4478	
	APIX		
1513	447	929	
	AF-IX		
335	64	296	
	LAC-IX		
1883	1258	1385	
	NORTH AMERICA		
2195	538	1086	
	GLOBAL		
14641	7795	7755	

IXP Database

ASN Database			
Stats Search Recent Common			
AS#	COMPANY	PRESENT AT	IPV6
6939	HE	80	
20940	Akamai		
15169	Google		
3856	Packet Clearing House		
42	WoodyNet		
8075	Microsoft		
22822	Limelight Networks, Inc.		
10310	Yahoo Inc. (B)		
13335	CloudFlare		
16509	Amazon		
26415	VeriSign Netherlands BV		
15133	Edgecast		

IXPs

- AMS-IX
- AMS-IX Bay Area
- AMS-IX Chicago
- AMS-IX Hong Kong
- AMS-IX New York
- BBIX - Tokyo
- BCIX
- BIX.BG
- BiX
- Big APE
- CATNIX
- CoreSite - Any2 Denver / RMIIX Denver
- CoreSite - Any2 Los Angeles
- DE-CIX Frankfurt
- DE-CIX Hamburg
- DE-CIX Marseille
- DE-CIX Munich
- DE-CIX New York
- DIX - Lyngby
- ECIX Berlin

IXP Database

Peering Matrix

[CSV Download](#)

	Total listed ASNs	ASNs that don't peer at other IXPs	% of ASNs that don't peer at other IXPs	ASNs that peer at other IXPs	% of ASNs that peer at other IXPs	ALB-IX	AMS-IX	AMS-IX Caribbean	ARMIX	Angonix	BBIX - Hong Kong	BBIX - Tokyo	BCIX	BIX.BG	BNIX	BiX	CATNIX	CHN-IX	CIX	CIXP
AMS-IX	79.77	0		796	2	0	0	0	0	0	2	37	22	19	17	11	0	4	19	
AMS-IX Caribbean	30.77	0		2	13	0	0	0	0	0	1	1	1	0	0	1	0	1	0	
ARMIX	0.00	0		0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angonix	50.00	0		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
BBIX - Tokyo	62.50	0		2	1	0	0	0	0	0	8	2	2	0	1	1	0	0	0	0
BCIX	70.89	0		37	1	0	0	0	0	0	2	79	8	3	4	4	0	2	2	
BIX.BG	58.33	0		22	1	0	0	0	0	0	2	8	72	1	4	3	0	3	0	
BNIX	53.33	0		19	0	0	0	0	0	0	0	3	1	45	4	2	0	0	3	
BiX	42.86	0		17	0	0	0	0	0	0	1	4	4	4	49	2	0	1	1	
CATNIX	37.50	0		11	1	0	0	0	0	0	1	4	3	2	2	32	0	3	1	
CIX	37.50	0		4	1	0	0	0	0	0	0	2	3	0	1	3	0	32	0	
CIXP	75.00	0		19	0	0	0	0	0	0	0	2	0	3	1	1	0	0	36	
DE-CIX Frankfurt	72.48	0		385	1	0	0	1	0	0	2	46	26	17	17	8	0	5	15	
DIX - Lyngby	59.09	0		22	1	0	0	0	0	0	2	5	2	4	2	2	0	0	3	
ECIX Berlin	83.67	0		24	1	0	0	0	0	0	2	22	5	1	3	1	0	1	0	
Equinix Paris	83.38	0		131	1	0	0	0	0	0	2	19	10	8	5	6	0	2	7	
Equinix Zurich	98.95	0		69	1	0	0	0	0	0	2	10	7	4	2	3	0	1	2	
FICIX - Helsinki	56.67	0		9	0	0	0	0	0	0	0	2	1	2	2	1	0	1	1	
FVG-IX	75.00	0		3	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	
France-IX Paris	89.80	0		113	1	0	0	0	0	0	2	17	8	12	7	6	0	2	5	

IXP Database

IXP Service Matrix

[CSV Download](#)

IXP	Location	ASN	RS ASN	# of customers	# IPv6 ready	% IPv6 ready	# of Sites
AMS-IX Bay Area	San Francisco			23	17	73.91	0
AMS-IX Caribbean	Willemstad, Curacao	28017		14	6	42.86	1
AMS-IX Chicago	Chicago			21	17	80.95	0
AMS-IX Hong Kong	Hong Kong	58516		32	25	78.12	1
AMS-IX India	Mumbai					0.0	0
AMS-IX New York	New York	62981		18	17	94.44	4
ARMIX	Yerevan	51225		10	8	80.00	1
Angonix	Luanda	327788		2	2	100.00	0
Aracaju (SE)	Aracaju					0.0	0
BBIX - Hong Kong	Hong Kong					0.0	0
BBIX - Tokyo	Tokyo	23640		8	1	12.50	7
BCIX	Berlin	16374		83	72	86.75	6
BIX Bergen	Bergen	0		4	2	50.00	0
BIX.BG	Sofia	15669		77	36	46.75	8
BNIX	Brussels	5406		45	14	31.11	3
Belo Horizonte (MG)	Belo Horizonte			29	13	44.83	0
Belm (BEL)	Belém			15	6	40.00	1
BiX	Budapest	5507		49	37	75.51	3
Brasilia (DF)	Brasilia			32	21	65.62	0
CATNIX	Barcelona	49638		35	22	62.86	3
CHN-IX	Beijing					0.0	0
CIX	Zagreb	51702		32	11	34.38	2
CIXP	Geneva	57859		36	7	19.44	3

IXP Database

« **ASN Database**

[Stats](#) [Search](#) [Recent](#) [Common](#)

Search

Advanced Filters

<input type="text" value="-----"/>	<input type="text" value="Nothing selected"/>
<input type="text" value="-----"/>	<input type="text" value="Nothing selected"/>

[Toggle Advanced Filters](#)

IXP Database

Switch Database

[Browse](#)
[Recent](#)
[For Sale](#)
[My IXP Switches](#)
[Add Switch](#)

NAME	VENDOR	MODEL	IXP	SOFTWARE VERSION	CREATED
Cremat	Arista	7280SE-72	CATNIX	4.15.3F	Sept. 28, 2016
Sucre	Arista	7280SE-72	CATNIX	4.15.3F	Sept. 28, 2016
CIX2	Force10	S4810	CIX	9.10(0.0)	Sept. 23, 2016
mlx-zh4	Brocade	MLXe-16	SwissIX	5.7.0dT163	Aug. 02, 2016
mlx-rue	Brocade	MLXe-16	SwissIX	5.7.0dT163	Aug. 02, 2016

NAME	VENDOR	MODEL	IXP	SOFTWARE VERSION	UPDATED
switch26	Extreme	X480-24x(10G4X)	LINX LON2	15.4.1.3	Oct. 23, 2016

Route Servers

[Browse](#)
[Recent](#)
[My Route Servers](#)
[Add Route Server](#)

IXP	AT IXP	NAME	IN USE	DAEMON	VERSION	OS	CREATED
DE-CIX Frankfurt	Y	rsbh.fra.de-cix.net	Y	BIRD	1.6.3	Debian	Jan. 28, 2017
ECIX Munich	N	rs1.muc.ecix.net	Y	bird		CentOS	Jan. 27, 2017
InterLAN	Y	RS02-INTERLAN	Y	BIRD	1.3.11	CentOS	Nov. 11, 2016
InterLAN	Y	RS01-INTERLAN	Y	BIRD	1.3.11	CentOS	Nov. 11, 2016
SAIX	Y	saix-rs1	Y	BIRD	1.4.5	Debian	Nov. 11, 2016

IXP	AT IXP	NAME	IN USE	DAEMON	VERSION	OS	UPDATED
TOP-IX	Y	rs2.top-ix.org	Y	BIRD	1.6.2	Ubuntu	Feb. 21, 2017
TOP-IX	Y	rs1.top-ix.org	Y	BIRD	1.6.2	Ubuntu	Feb. 21, 2017
DE-CIX Frankfurt	Y	rs2.fra.de-cix.net	Y	BIRD	1.6.3	Debian	Jan. 28, 2017
DE-CIX Frankfurt	Y	rs1.fra.de-cix.net	Y	BIRD	1.5.0	Debian	Jan. 28, 2017
DE-CIX Frankfurt	Y	rsbh.fra.de-cix.net	Y	BIRD	1.6.3	Debian	Jan. 28, 2017

➤ IXP Database – where are we?

- Database schema is in place for IXPs to record their information about themselves and the operators they serve
- IXP API is live - <https://db.ix-f.net/api/ixp>

➤ IXP Database – use case

Thanks to Andy Davidson for the example

“who am I not peering with at LONAP?”

- You have a script which load direct adjacencies into an array
- You need a complete and canonical list of peers to compare differences

➤ IXP Database – use case

Using the IXP API

<https://db.ix-f.net/api/ixp>

➤ IXP Database – use case

```
{
  "ixp_info": {
    "status": "active",
    "updated": "2014-02-17T10:07:51Z",
    "name": "London Network Access Point",
    "created": "2011-08-16T13:26:26Z",
    "shortname": "LONAP",
    "ixp_id": "IX-F#18"
  },
  "timestamp": "2015-09-16T08:17:31.116Z",
  "version": "2014110401",
  "member_list": [
    {
      "asnum": 20915,
      "name": "100 Percent"
    },
    {
      "url": "http://www.2connectbahrain.com/",
      "asnum": 51406,
      "name": "2Connect"
    },
    {
      "url": "http://www.34sp.com",
      "asnum": 41357,
      "name": "34SP.com Ltd"
    },
    {
      "url": "http://4d-dc.com/",
      "asnum": 31463,
      "name": "4D Data Centres"
    },
    {
      "url": "http://www.afilias.info",
      "asnum": 12041,
      "name": "Afilias"
    },
    {
      "url": "http://www.akamai.com",
      "asnum": 20940,
      "name": "Akamai Technologies"
    },
    {
      "url": "http://www.alentus.com",
      "asnum": 21321,
      "name": "Alentus UK Ltd"
    }
  ]
}
```

➤ IXP Database – use case

```
ewP Switc Ports ports impo ports admi Circu circuli VXCn instar db_sc apiwe switc test_
import urllib, json

url = "http://db.ix-f.net/api/ixp/18/member-list"
response = urllib.urlopen(url)

ixpdata = json.loads(response.read())

my_peers = [8916,20940,20915, 51406, 41357, 31463, 12041, 21321, 12536, 16509, 20712, 33920, 4

for member in ixpdata["member_list"]:
    if member["asnum"] not in my_peers:
        print "Get some peering with " + str(member["asnum"]) + " (" + member["name"] + ")"
```

➤ IXP Database – use case

```
enigma:Desktop andy$  
enigma:Desktop andy$ python ixp.py  
Get some peering with 6871 (PlusNet)  
Get some peering with 8689 (PowerGroup (Power Internet Ltd))  
Get some peering with 8676 (PRT Systems)  
Get some peering with 28792 (Public Internet Limited)  
Get some peering with 31402 (Rank Interactive (Blue Square Limited))  
Get some peering with 35662 (Redstation)  
Get some peering with 5552 (Redstone Communications Ltd)  
Get some peering with 5503 (RM Education Plc)  
Get some peering with 51409 (SectorSix)  
Get some peering with 50056 (Advantage Interactive Ltd)  
Get some peering with 29550 (Simply Transit Ltd.)  
Get some peering with 48961 (Warwicknet Ltd)  
Get some peering with 20738 (Webfusion)  
Get some peering with 44444 (Websense Hosted R&D Ltd. (UK))  
Get some peering with 49158 (Wifinity)  
Get some peering with 13037 (Zen Internet)  
enigma:Desktop andy$
```

➤ IXP Database – What's next?

- Extend and internationalise the admin interface for all IXPs (APIX, LAC-IX and AF-IX)
- Create bespoke maintained APIs
- Future revisions to the database schema to capture more data

➤ IXP Database – IXP JSON Schema

- Contains both IXP data & IXP participant data
 - ASN (member list), locations, switch, RS, etc etc
- Open, consistent & an atomic design
- Currently 24 IXP independent implementations
(API includes data from euro-ix portal entered manually or via .csv)
- Open source implementation in IXP Manager
- Source available on GitHub;

<https://github.com/euro-ix/json-schemas>

➤ IXP Database – use case

Why not just use the IXPs own data?

- This gives you a single API for many IXPs
- Get the same format for all IXPs, its standard – wohoo!
- Data is fed from the IXP – IXPs have accurate data, they own it.
- Portable, supportable and scaleable!

IXP Database

In search of accurate information

- Peering networks can go to two sources of data to guarantee accuracy
- Tools and portal available on the Euro-IX website, future development for APIX, LAC-IX and AF-IX
- IXPAAs have regional reach to local IXPs
- The data is complementary to database services that the RIR/ NIRs & PeeringDB provide



Questions?



Thank You!

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