



euro-IX

IXP Scene Around the World

October 2014

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Twitter: @euroix

Introduction

Euro-IX is an association of Internet Exchanges Points, promoting an open interchange of ideas and experiences, gained to mutual advantage of the membership, by offering fora, meetings, mailing lists and on-line resources.

Euro-IX also gathers information on regulatory issues affecting member exchanges within the region and where appropriate from other jurisdictions that could potentially impact on the membership.

➤ 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 and Task Forces
- Close relationship 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

78 affiliated IXPs:

- 53 IXPs in the Euro-IX Region
=> in 32 Countries, operating over 100 IXPs
- 25 IXPs from the rest of the world
- Newest Members:
Angonix (Angola), NetIX (Bulgaria), SOX (Serbia),
ARMIX (Armenia), KOSIX (Kosovo), TPIX (Poland)

12 Patrons

- ADVA Optical Networking
- Alcatel-Lucent
- Brocade
- BTI Systems
- Cisco
- Extreme Networks
- Huawei
- Interxion
- Juniper Networks
- MRV
- Telecity
- Telehouse

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

ANS Search Tool

Enter an ASN, IXP or organisation name:

Query

Search

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.

AF-IX		
IXP Participants	IPv6 active	Unique ASNs
275	43	223
North America		
IXP Participants	IPv6 active	Unique ASNs
2161	390	1005
LAC-IX		
IXP Participants	IPv6 active	Unique ASNs
1105	490	763
APIX		
IXP Participants	IPv6 active	Unique ASNs
1469	350	872
Euro-IX		
IXP Participants	IPv6 active	Unique ASNs
7881	4183	4188
Global		
IXP Participants	IPv6 active	Unique ASNs
12891	5456	7394

ASN Filter

ASNs that peer at:

NAP INCA (Peru)
6NGIX (Korea, Republic of)
AAIX (Austria)
ACT-IX - Canberra (Australia)
ADN-IX (France)
AIXP (Tanzania, United Republic of)
ALB-IX (Albania)
AlbertalX (Canada)
AMPATH (United States of America)
AMS-IX (Netherlands)
AMS-IX Caribbean (Netherlands Antilles)
AMS-IX East Africa (Kenya)
AMS-IX Hong Kong (China)
AMS-IX New York (United States of America)
ANG-IXP (Angola)

- List all
- Only
- And other IXPs
- And at ⇒
- But not at ⇒
- And other IXPs, but not at ⇒

NAP INCA (Peru)
6NGIX (Korea, Republic of)
AAIX (Austria)
ACT-IX - Canberra (Australia)
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AMS-IX East Africa (Kenya)
AMS-IX Hong Kong (China)
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Filter

Peering Matrix

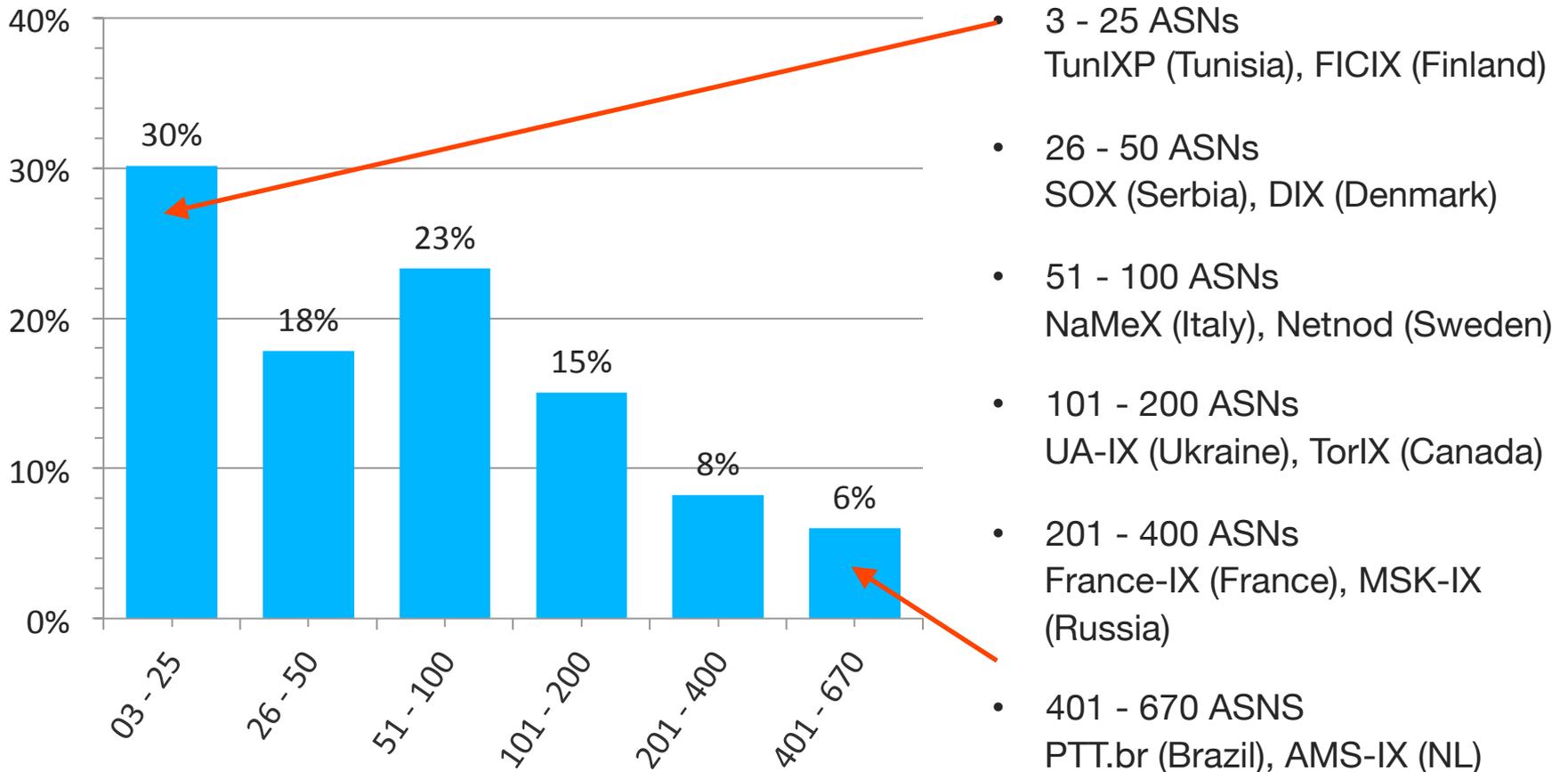
IXP	Total listed ASNs at IXP	ASNs that don't peer at other IXPs	% of ASNs that don't peer at other IXPs	ASNs that peer at other IXPs	% of ASNs that peer at other IXP	ADN-IX	ALB-IX	AMS-IX	AMS-IX Caribbean	AMS-IX East Africa	AMS-IX Hong Kong	AMS-IX New York	ANGONIX	ARMIX	BBIX - Fukuoka	BBIX - Nagoya	BBIX - Okinawa	BBIX - Osaka	BBIX - Tokyo	BBIX - Tokyo	BCIX	BIX	BIX	BIX.BG	BNIX	CATNIX	CIX	CIXP	CoreSite - Any Los	CyruSOne	DE-CIX Frankfurt	DE-CIX Hamburg	DE-CIX Munich	DE-CIX New York	DIX - Balearic	DIX - Skanderborg	
AMS-IX	679	114	17	565	83	0	0	679	1	0	0	0	0	0	0	0	0	0	2	0	26	15	0	13	20	7	0	19	31	0	305	12	7	1	0	0	
AMS-IX Caribbean	7	2	29	5	71	0	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
ARMIX	8	6	75	2	25	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
BBIX - Tokyo	8	1	13	7	87	0	0	2	0	0	0	0	0	0	0	0	0	0	8	0	2	1	0	2	0	0	0	0	3	0	2	1	2	1	0	0	
BCIX	62	22	35	40	65	0	0	26	0	0	0	0	0	0	0	0	0	0	2	0	62	3	0	5	3	1	0	1	8	0	31	8	7	1	0	0	
BIX	51	33	65	18	35	0	0	15	0	0	0	0	0	0	0	0	0	0	1	0	3	51	0	2	4	0	0	3	4	0	16	1	2	1	0	0	
BIX.BG	54	25	46	29	54	0	0	13	0	0	0	0	0	0	0	0	0	0	2	0	5	2	0	54	0	0	0	5	0	16	2	3	1	0	0		
BNIX	45	17	38	28	62	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	0	45	2	0	3	3	0	17	0	0	0	0		
CATNIX	29	15	52	14	48	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	29	1	0	1	0	4	0	0	0	0		
CIX	29	20	69	9	31	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	29	0	0	0	3	0	0	0	0		
CIXP	37	8	22	29	78	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	3	0	0	37	1	0	13	1	0	0	0		
CoreSite - Any2 Los Angeles	147	59	40	88	60	0	0	31	0	0	0	0	0	0	0	0	0	0	3	0	8	4	0	5	3	1	0	1	147	0	28	2	3	1	0	0	
DE-CIX Frankfurt	585	111	19	474	81	0	0	305	0	0	0	0	0	1	0	0	0	0	2	0	31	16	0	16	17	4	3	13	28	0	585	19	16	1	0	0	

IXP Service Matrix

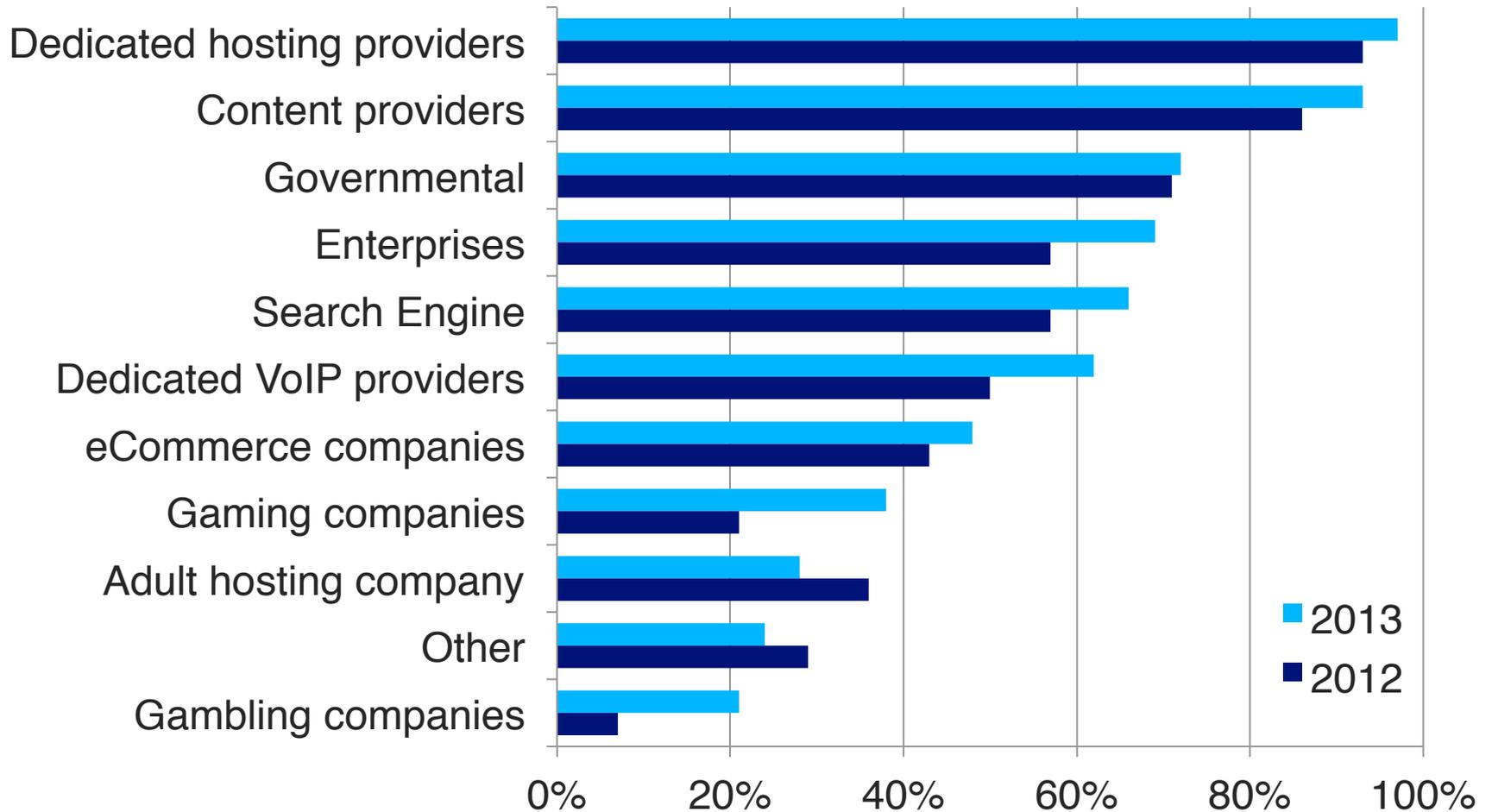
IXP	↑ Location	Asn	Rs Asn	# Of Customers	# I Pv6 Ready	% I Pv6 Ready	# Of Sites	Last Month Traffic (Gb/S)	Public Stats	Non Profit	Priv. Peering	Ipv6 Lan Type	Ipv6 Registry	Multicast	Vlan Services	Out Of Band Access	24x7 Service	24x7 Access
ADN-IX	Valence		N/A	0	0	0	0	0	-	-	-				-	-	-	-
ALB-IX	Tirana		N/A	0	0	0	0	0	-	-	-				-	-	Y	-
AMS-IX Traffic	Amsterdam	1200	6777	679	539	79.4	12	2927	Y	Y	Y	ISP Peering LAN	RIPE	No	Y	-	Y	Y
AMS-IX Caribbean Traffic	Willemstad, Curacao	28017	N/A	7	0	0.0	1	0	Y	Y	Y				Y	-	Y	Y
AMS-IX East Africa Traffic	Mombasa	327740	N/A	0	0	0	1	0	Y	Y	Y				Y	-	Y	Y
AMS-IX Hong Kong Traffic	Hong Kong	58516	N/A	0	0	0	1	0	Y	Y	Y				Y	-	Y	Y
AMS-IX New York Traffic	New York	62981	N/A	0	0	0	4	0	Y	Y	Y				Y	-	Y	Y
ANGONIX	Luanda		N/A	0	0	0	0	0	-	-	-				-	-	-	-
ARMIX	Yerevan	51225	N/A	8	8	100.0	1	0	-	Y	-				-	-	Y	Y
BBIX - Fukuoka	Fukuoka		N/A	0	0	0	0	0	-	-	-				-	-	-	-

Euro-IX Database

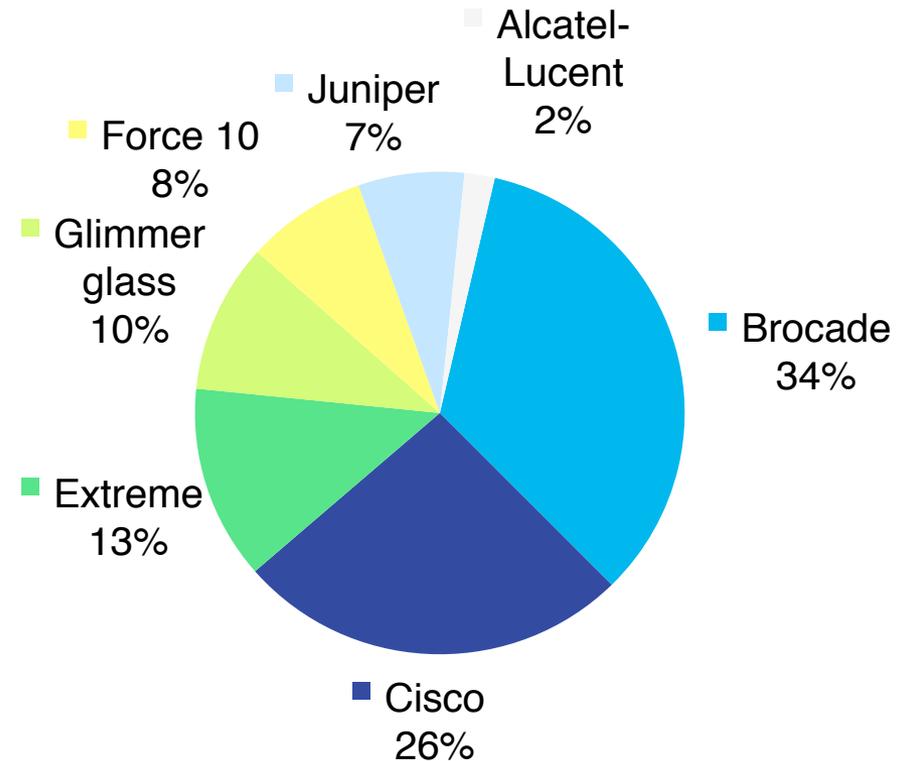
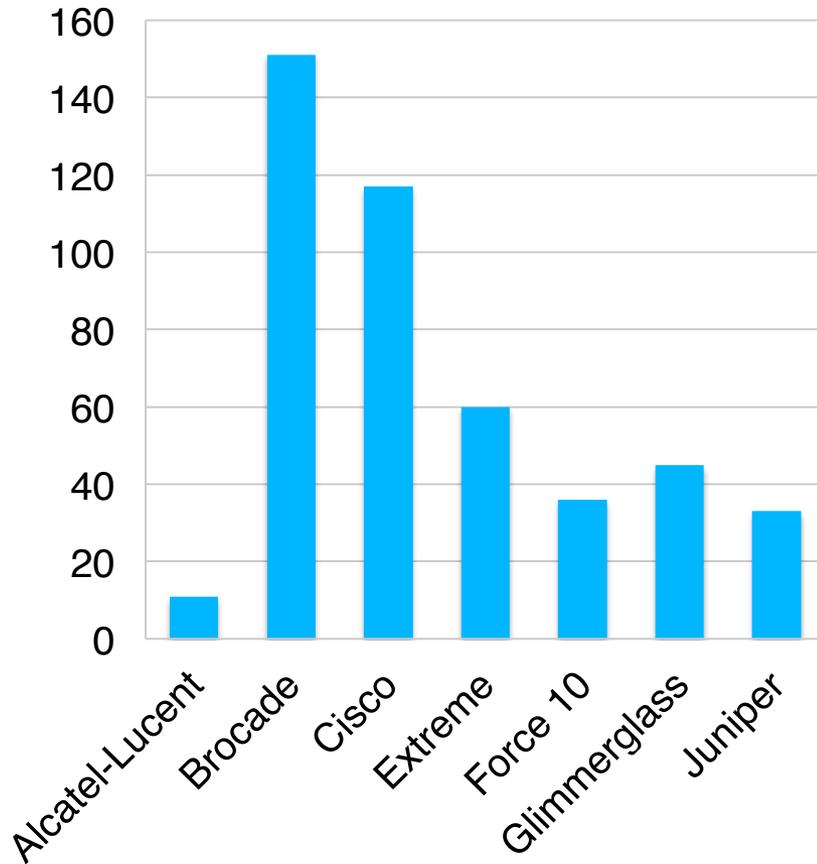
Range of ASNs connected to Members



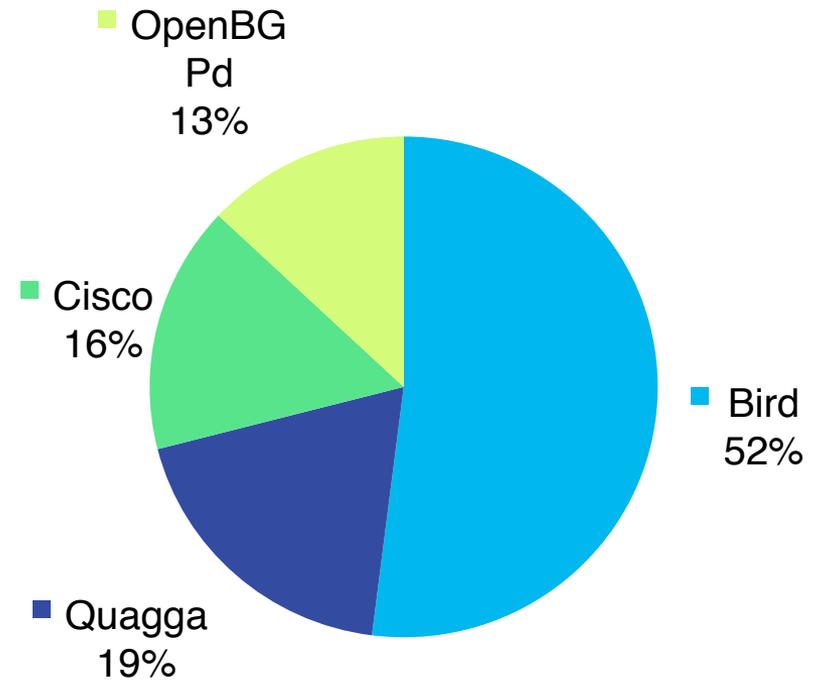
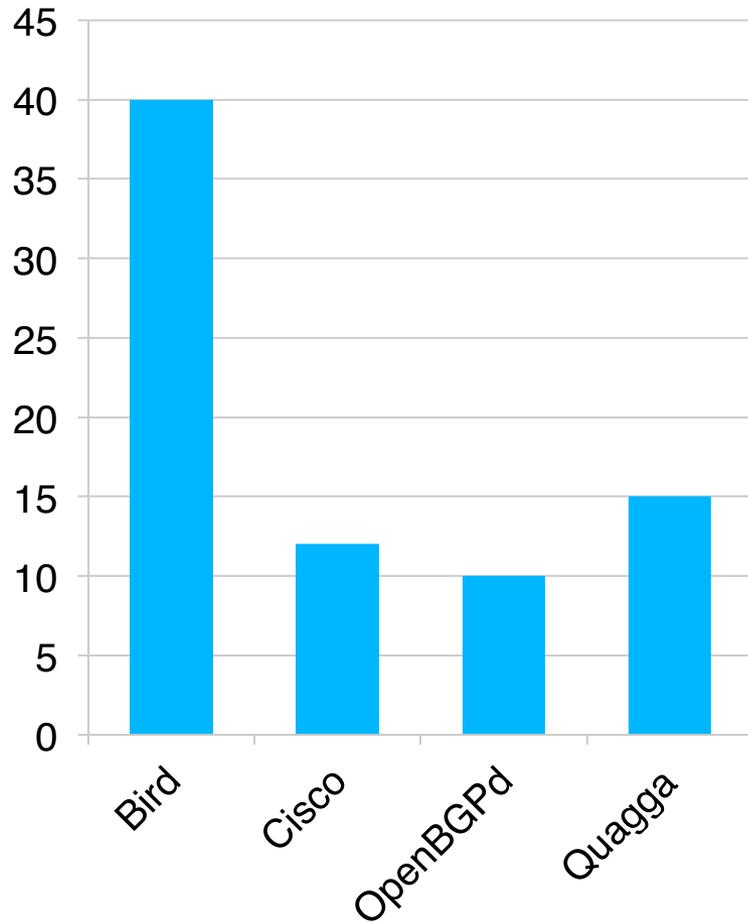
Who connects to IXPs



Switch/Router DB – Vendors used



Route Server DB – Deamons used



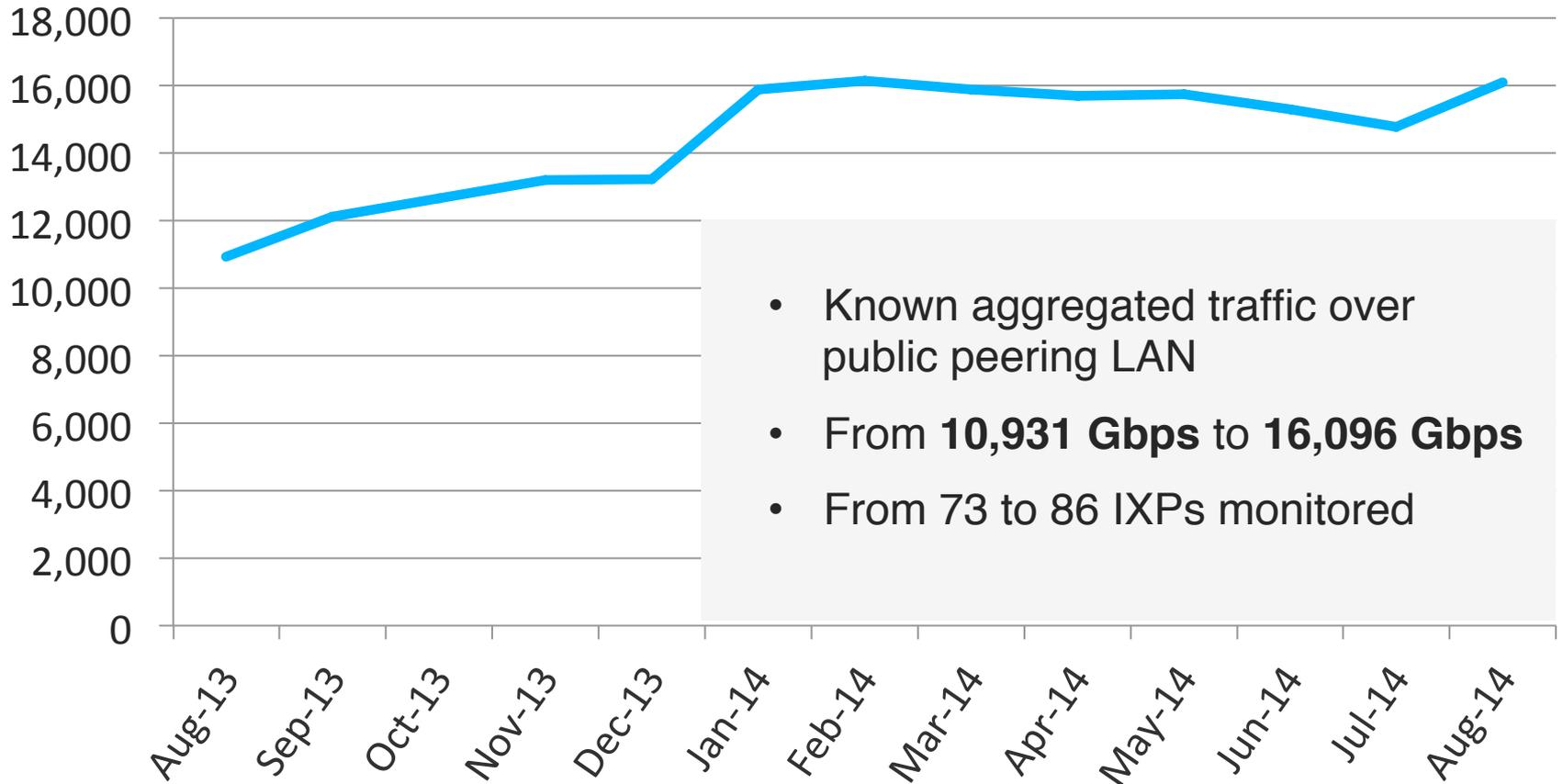
IXPs in Euro-IX Region



193 known IXPs
48 Countries
146 Cities

Check our Map:
www.euro-ix.net/location-of-ixps

Traffic Growth in Euro-IX Region



Internet Exchange Federation

➤ Other IXPA's



➤ 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
- Af-IX will sign during the NANOG meeting Baltimore
- Idea to have a Global IXP DB
- IXP standards and BCPs
- Automate Data Collection from IXPs
- Plans to collaborate with other external Databases

IX-F Board

- **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

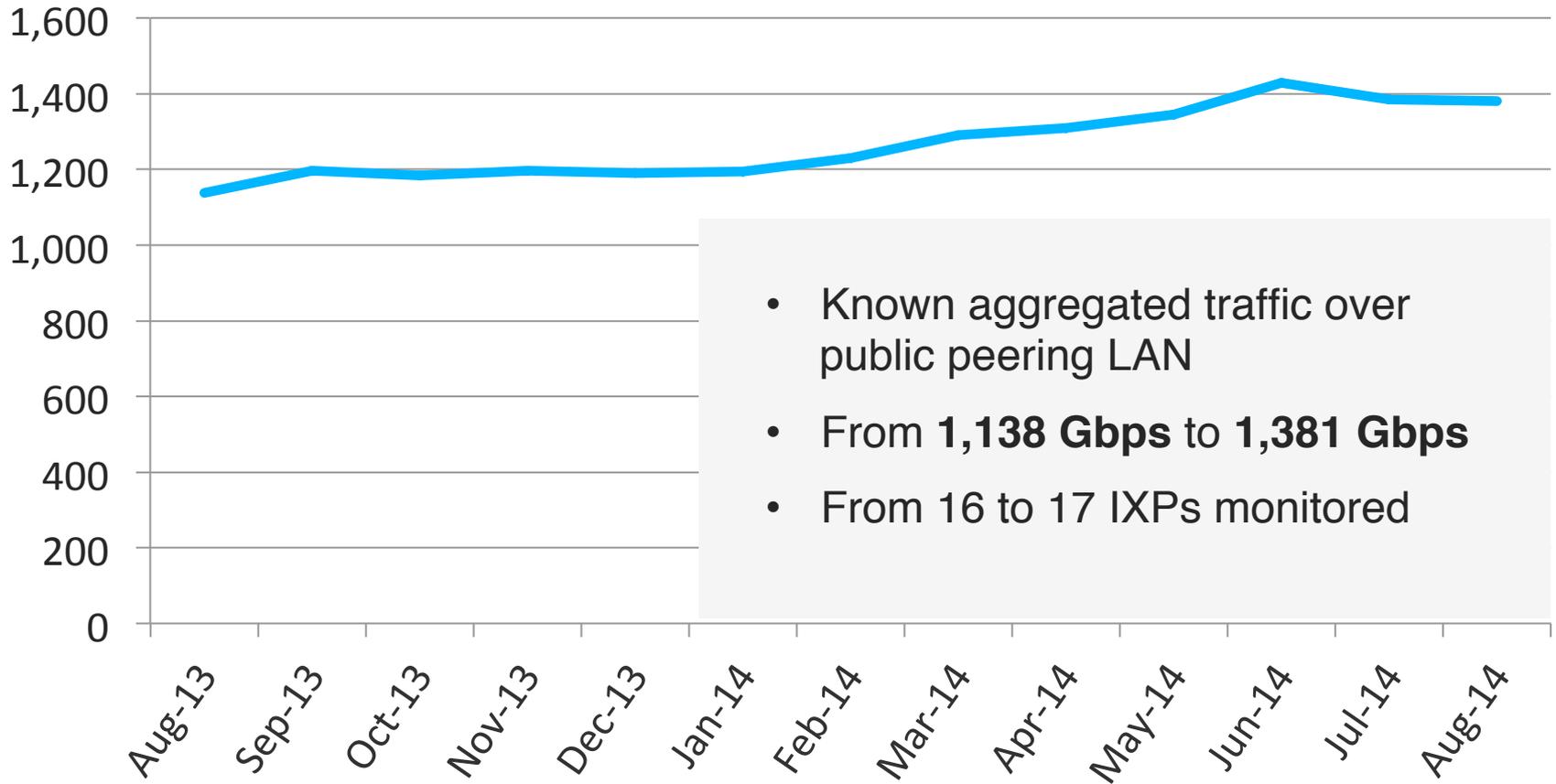
IXPs in APIX Region



89 known IXPs
19 Countries
49 Cities

Check our Map:
www.euro-ix.net/location-of-ixps

Traffic Growth in APIX Region



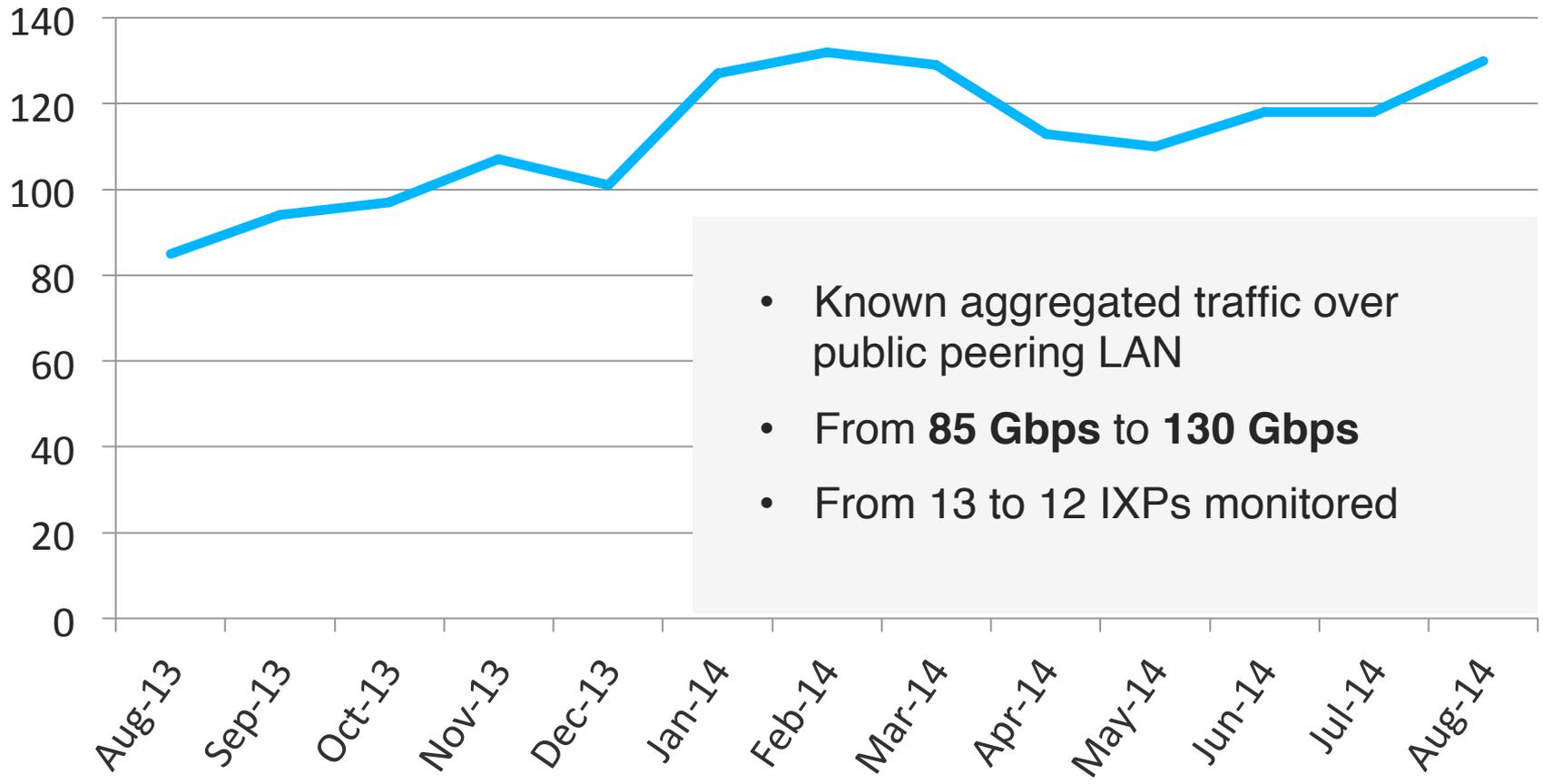
IXPs in Af-IX Region



30 known IXPs
23 Countries
28 Cities

Check our Map:
www.euro-ix.net/location-of-ixps

Traffic Growth in Af-IX Region



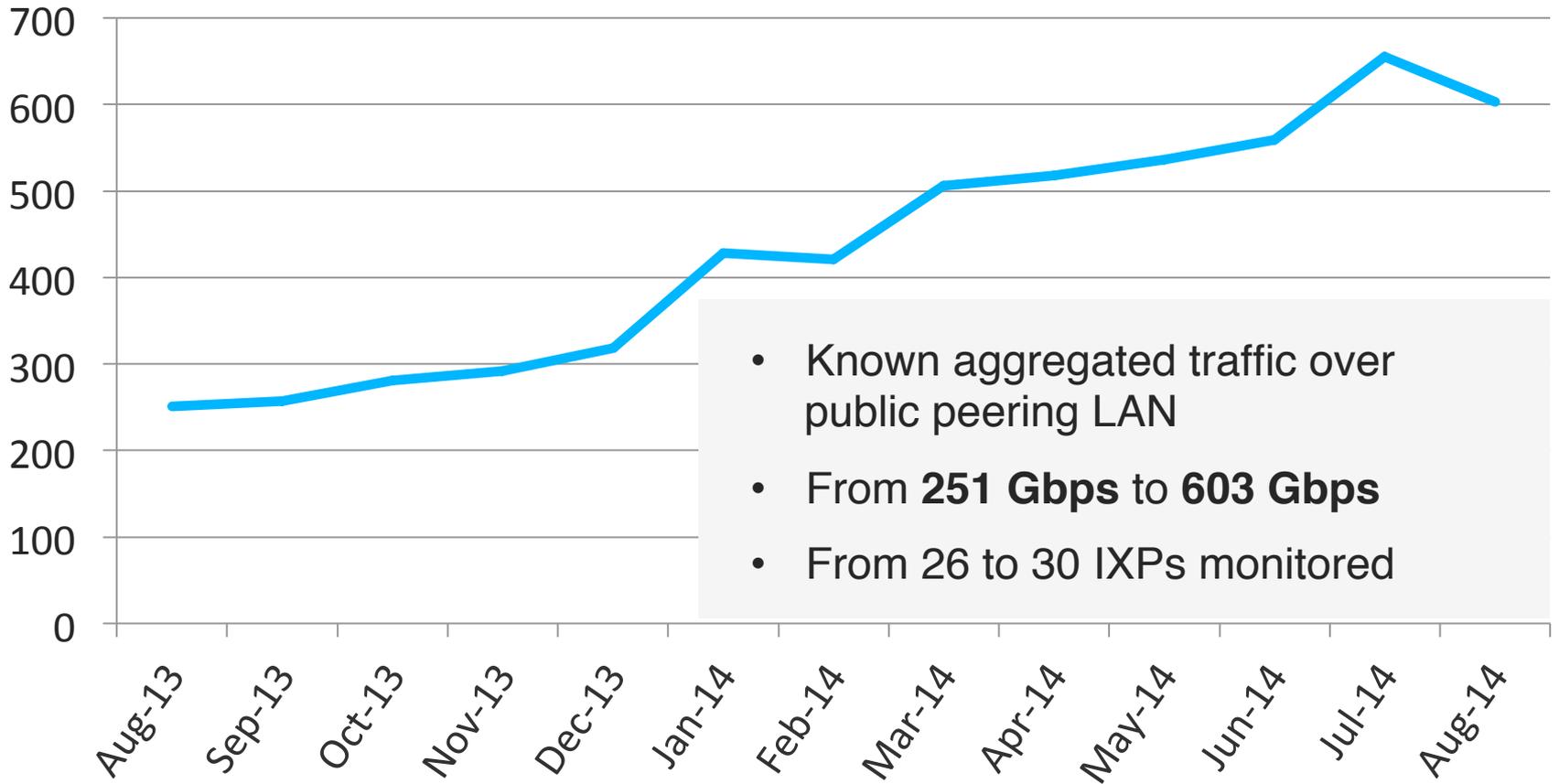
IXPs in LAC-IX Region



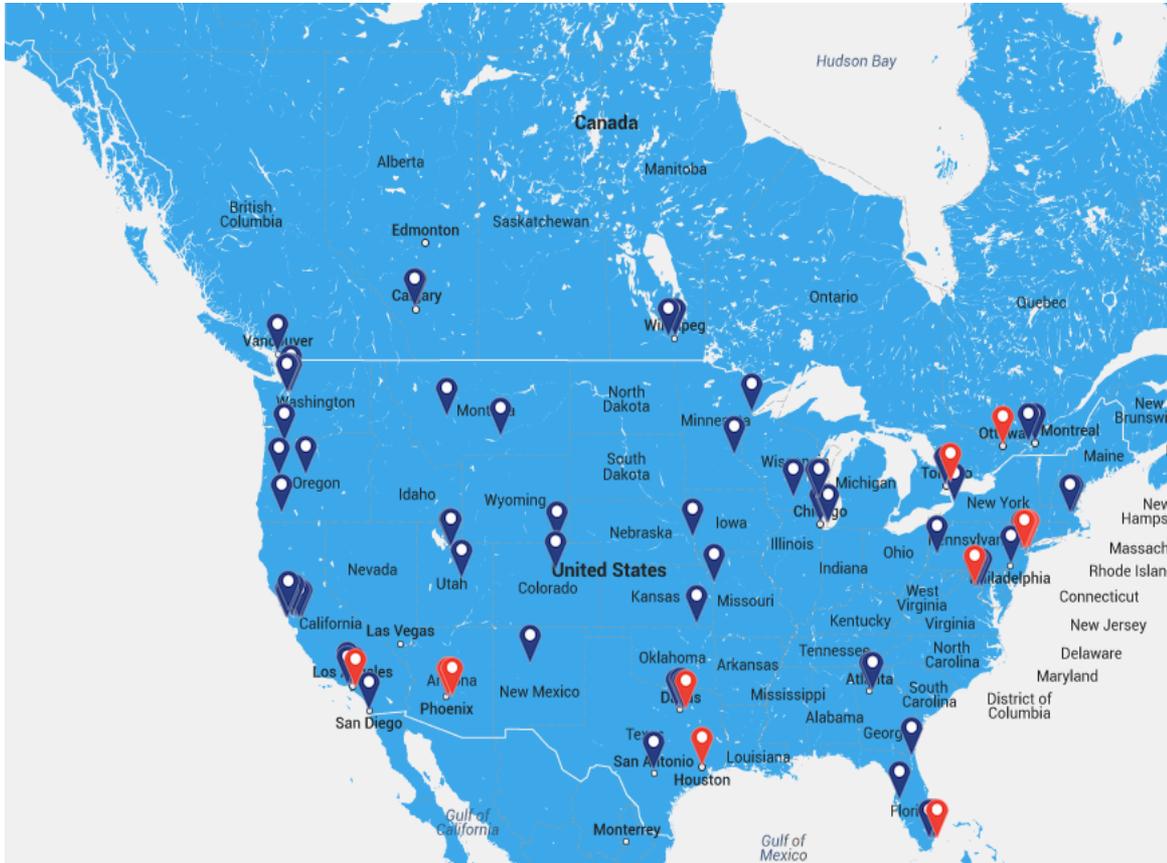
51 known IXPs
11 Countries
45 Cities

Check our Map:
www.euro-ix.net/location-of-ixps

Traffic Growth in LAC-IX Region



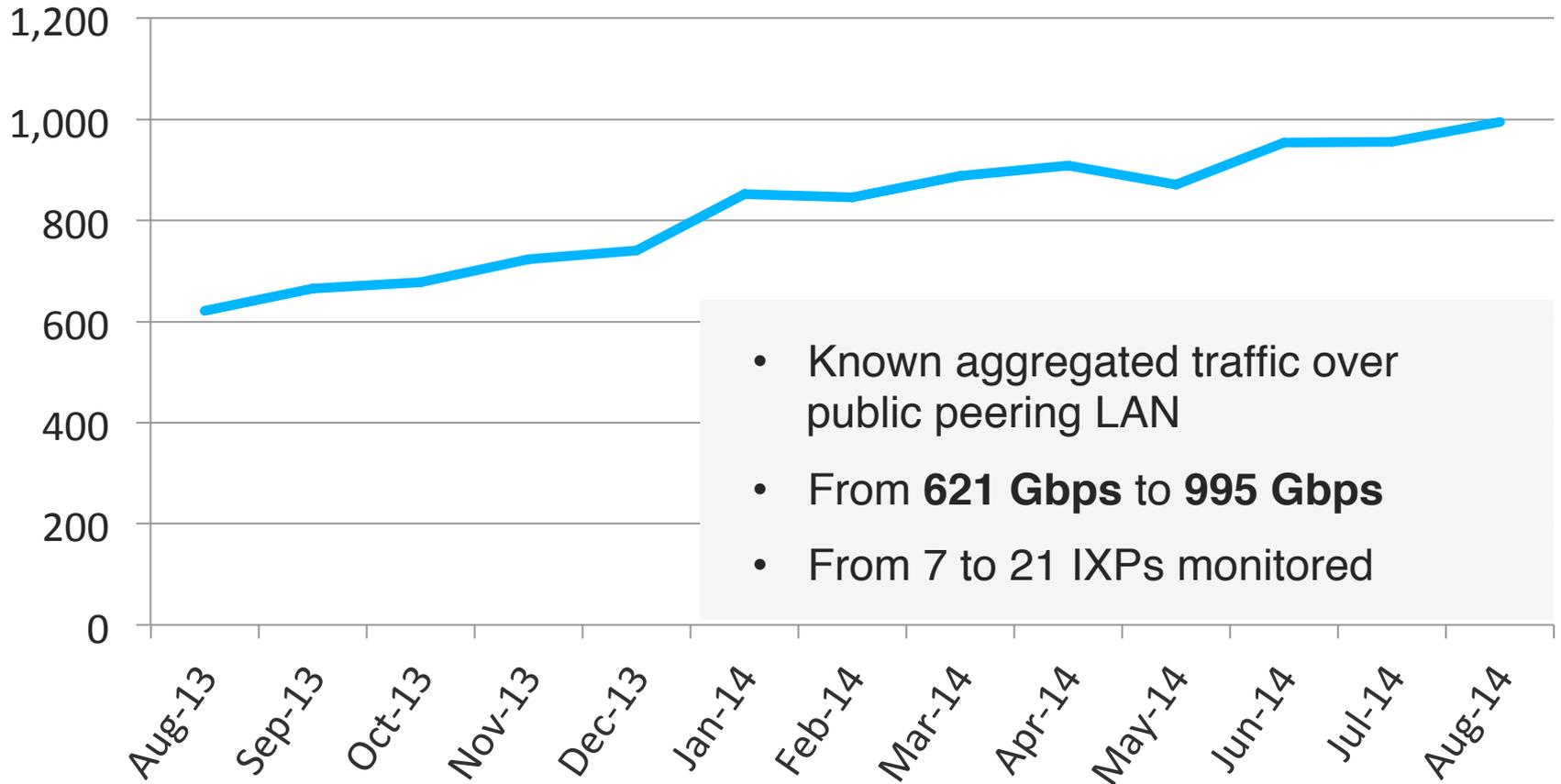
IXPs in North America



97 known IXPs
2 Countries
56 Cities

Check our Map:
www.euro-ix.net/location-of-ixps

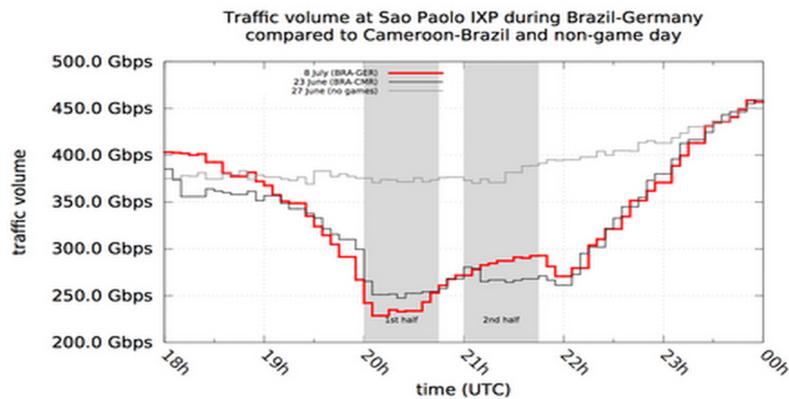
Traffic Growth in North America



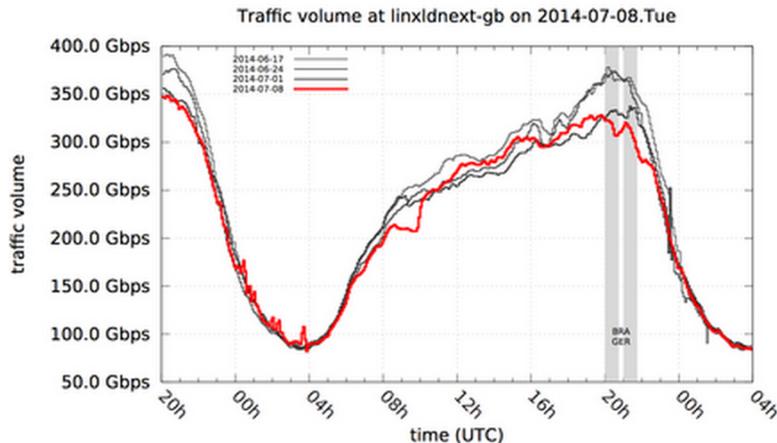
Euro-IX projects

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

IX-F Database Project

- There are many IXP Databases...

Navigation: Home Page, Logout, Your Records, Peering Record, User Account

Search Public Exchange Points

Exchange Name: City:

IP Block: Country:

Media Type: Continental Region:

Search

Search Records

List of Public Exchange Points

Exchange Name	Long Name	City/Region	Country	Continental Region	Media Type	Participants
ASIX	Alpes Adria Internet eIXchange	Klagenfurt	AT	Europe	Ethernet	4
ACTIX	ACT Internet Exchange	Canberra	ACT AU	Australia	Ethernet	11
ADN-IX		Valence	FR	Europe	Ethernet	0
AlbertaIX	AlbertaIX	Calgary	CA	North America	Ethernet	4
AMPATH	AMPATH - Florida International University/CISRA	Miami	US	North America	Multiple	0
AMS-IX	Amsterdam Internet Exchange	Amsterdam	NL	Europe	Ethernet	1229
AMS-IX Caribbean	Amsterdam Internet Exchange Caribbean	Curacao	CW	South America	Ethernet	11
AMS-IX Hong Kong	Amsterdam Internet Exchange Hong Kong	Hong Kong	HK	Asia Pacific	Ethernet	27
AMS-IX NY	AMS-IX New York	New York	US	North America	Ethernet	14
Angola-IXP / ANG-IXP	Angola Internet Exchange point	Luanda	AO	Africa	Ethernet	3
ASX	Auckland Peering Exchange	Auckland	NZ	Asia Pacific	Ethernet	56
ArmitX	Armenian Internet Exchange	Yerevan	AM	Europe	Ethernet	0
ASIX6	Academia Sinica Internet Exchange 6	Taipei	TW	Asia Pacific	Multiple	1
ASSOCIO	mpls ASSOCIO	Tokyo, Nation wide	jp	Asia Pacific	Multiple	0
AZIX	Arizona Internet Exchange	Phoenix, Arizona	US	North America	Ethernet	10
B-IX	Balkan Internet Exchange	Sofia	BG	Europe	Ethernet	13

www.datacentermap.com/ixps.html

Map Database Search Request quote Research About Login / Signup

Internet Exchange Points
IXPs

On the map below you can see an overview of internet exchange points (IXPs) around the world. Zoom in and click on a city marker to see the internet exchange points available in the city.

Map Satellite

TRUSTED SERVER HOSTING SINCE 1994

Managed Hosting Hybrid Hosting

How to Safely Avoid Overcooling Your Data Center and Save Money Today

Peering Research Related Reports & White Papers

- Multi-Tenant Datacenter: North American Providers - 2013
- To Build or Not To Build - Part I: Should Service Providers Build Or Lease Their Datacenters?

Related News

- Alcatel first connected customer at DE-CX New York
- DE-CX New York signs on Akamai as its first customer
- Microsoft Adds Private Azure Links at 37 European Data Centers
- Akamai becomes First DE-CX New York Customer
- TeletyGroup adds Microsoft Azure to Cloud-IX ecosystem

Latest Facilities

- Caronet XB, Charlotte

www.telegeography.com/research-services/internet-exchange-points-directory/

TeleGeography AUTHORITY IN TELECOM DATA

RESEARCH SERVICES CUSTOM RESEARCH TELECOM MAPS TELECOM RESOURCES

HOME > RESEARCH SERVICES > Internet Exchange Points Directory

Internet Exchange Points Directory

The data provided in our Internet Exchange Points Directory is now accessible via our free interactive Internet Exchange Map. The map provides information for active Internet exchanges and buildings. Select an Internet exchange from the list provided to view the buildings in which that exchange is present. Or, select a building from the map projection to access data about the building, including its street address and a list of Internet exchanges present there.

The Internet Exchange Map is based on data compiled by TeleGeography, and is updated regularly to ensure that it is as accurate and as up-to-date as possible. Click here for more information about the map, or try it out at www.internetexchangemap.com.

Related Services

Interactive Internet Exch
An interactive, regularly updated directory of internet exchanges worldwide.

Colocation Database
Commonsense online.

www.prefix.pch.net/applications/ixpdir/

PCH Packet Clearing House

Log In search pch.net

Home About Purpose Technology Resources Calendar Sponsors Contact

EDUCATION RESEARCH POLICY

Help

- Show inactive IXPs
- Hide inactive IXPs
- Show summary views
- Submit a change
- Featurebug report

Region	Country	City	Internet Exchange Name	Participants	Traffic	Prefixes	Established	URL
Asia/Pacific	Albania	Katun	National Internet Exchange of Afghanistan				May 2011	
Africa	Algeria	Algiers	Algeria Internet Exchange				2013	
	Angola	Luanda	Angola Internet Exchange	10	13M		2008	
		Luanda	Foro de Interconexão Internet Angola					
Latin America	Argentina (10)	Buenos Aires	NAP CABA SE Buenos Aires	12	100M		2010	
		Buenos Aires	NAP CABA SE Buenos Aires	78	7.04G	100	Aug 2006	
		Cordoba	NAP CABA SE Cordoba	9	100M		Aug 2012	

IX-F IXP Database

- A single canonical place for IXP data
- Development of current Euro-IX database
- Only source that IXPs own and maintain data in
- IXP data maintained by IXPs ensures greater accuracy
- Useful for the IXP members to see IX data in context
- We want it to be open and pluggable

The plan

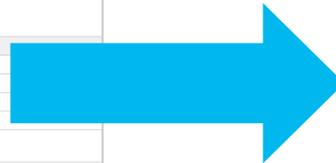
- Others will be able to mirror IX-F Data

https://www.euro-ix.net/resources-list-of-ixps

List of 399 known IXPS around the globe

Region	# of IXPs
Europe	159
North America	89
Asia / Pacific	81
Latin America	35
Africa	27
Middle East	8
TOTAL	399

IXP	City	Country	Traffic stats
NAP-INGA	San Juan de lima	Peru	
RNGIX	Seoul	Korea, Republic of	
AIX	Klagenfurt	Austria	
ACTIX-Canberra	Canberra	Australia	
AIXP	Arusha	Tanzania, United Republic of	
ALB-IX	Tirana	Albania	
AMS-IX	Amsterdam	Netherlands	
AMS-IX Caribbean	Willemstad, Curacao	Netherlands Antilles	
Transferring data from monitor.gld.ix.asn.au...	Hong Kong	China	



https://www.peeringdb.com/private/exchange_list.php

Navigation: Search Public Exchange Points

Home Page: Exchange Name City

Logout: IP Block Country

Your Records: Media Type Select Value Continental Region Select Value

Peering Record: User Account Search

Search Records: List of Public Exchange Points

Networks	Exchange Name	Long Name	City/Region	Country	Continental Region	Media Type	Participants
Exchange Points	AAIX	Alpes Adria Internet exchange	Klagenfurt	AT	Europe	Ethernet	4
Facilities	ACTIX	ACT Internet Exchange	Canberra, ACT	AU	Australia	Ethernet	11
Common Points	ADN-IX		Valencia	FR	Europe	Ethernet	0
Suggestions	AlbertaIX		Calgary	CA	North America	Ethernet	4
Comments	AMPATH	AMPATH - Florida International University/CASA	Miami	US	North America	Multiple	0
New Exchange	AMS-IX	Amsterdam Internet Exchange	Amsterdam	NL	Europe	Ethernet	1229
New Facility	AMS-IX Caribbean	Amsterdam Internet Exchange Caribbean	Curacao	CW	South America	Ethernet	11

www.datacentermap.com/ixps.html

Map Database Search Request quote Research About Login / Signup

Internet Exchange Points

309

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Related News

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PCH Prefix Clearing House

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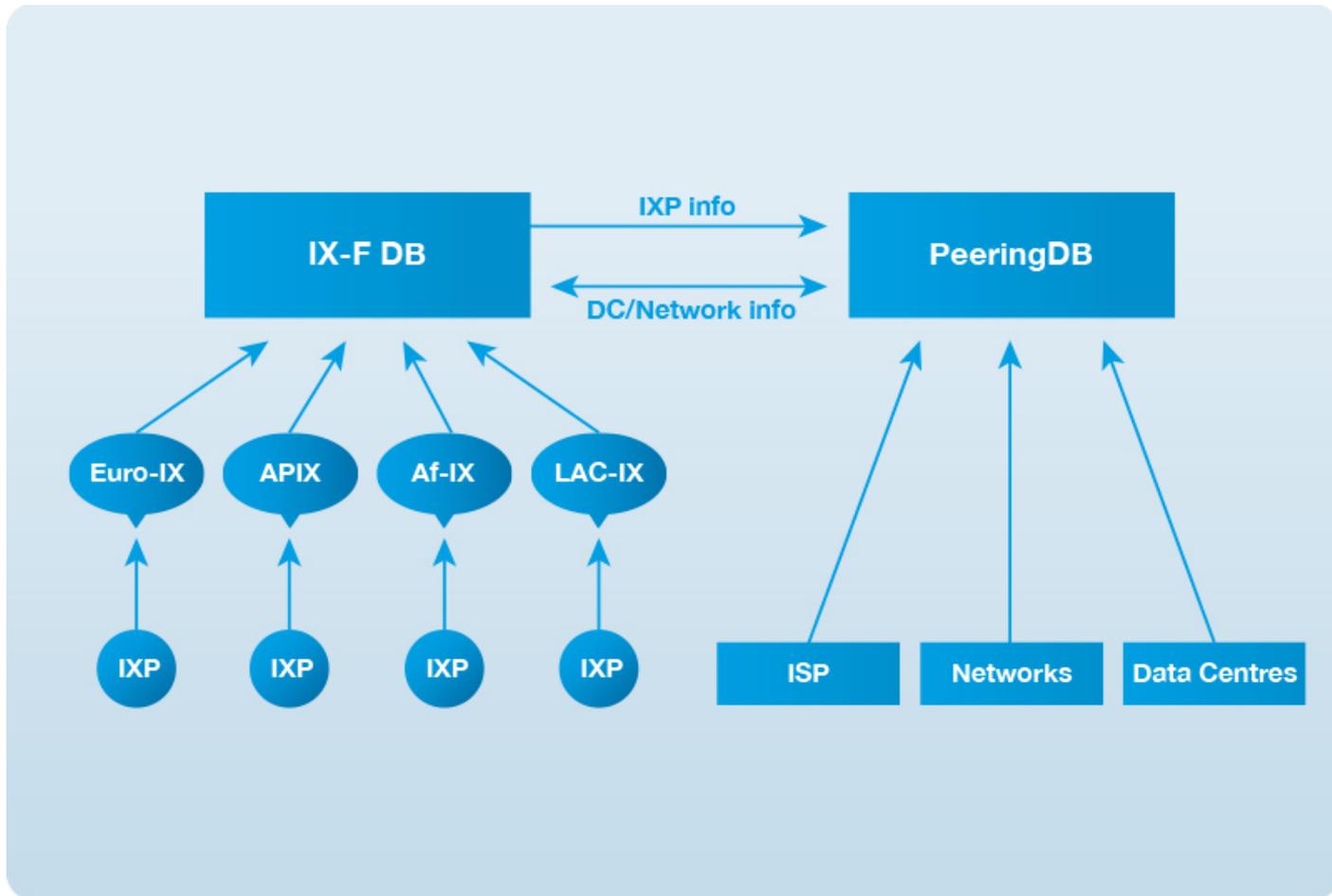
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Asia-Pacific	Afghanistan	Kabul	National Internet Exchange of Afghanistan	x	x	x	May 2011	
Africa	Algeria	Algiers	Algeria Internet Exchange	x	x	x	2013	
Angola	Luanda	Luanda	Angola Internet Exchange	10	13M	x	2008	
	Luanda	Luanda	Ponto de Interconexão Internet Angola	x	x	x	x	
Latin America	Argentina (10)	Bahía Blanca	NAP-CABASE Bahía Blanca	12	180M	x	2013	
	Buenos Aires	NAP-CABASE Buenos Aires		79	7,040	100	Aug 2009	
	Cordoba	NAP-CABASE Cordoba		x	100M	x	Aug 2012	

➤ End Goal



IX-F Database

IX-F DB 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 IXPA's (and others as appropriate) will be able to create, update and delete IXPs from the databases.

➤ IX-F 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>

➤ IX-F Database

It is work in progress... therefore:

- We have migration scripts to migrate / keep IX-F DB in sync from euro-ix for the next few months while the Euro-IX database remains as the primary database.

These are at:

<https://github.com/euro-ix/euroix-ixf-sync>

- All code is available on the Euro-IX GitHub repository

<https://github.com/Euro-IX>

➤ **Twinning is Winning**

- IXPs can help facilitate and increase peering
- Increased interconnects will benefit the internet ecosystem (especially in regions where there is not much peering)
- We want IXPs to succeed
- Startups and growing IXPs can learn from successful IXPs willing to share experiences
- Working with partners such as ISOC on the AXIS project

➤ **Twinning is Winning**

Benefits:

- Expose engineering to problems they may not find in their own environment
- Marketing and commercial kudos
- Use of standard documentation and training material
- Encourage IXPs to follow IX-F BCPs
- Make the internet faster and reliable in twins market
- Feel good factor, helping out because you can!

➤ **Twinning is Winning**

- DE-CIX, twins with 2 IXPs – NPIX and TIX
- LINX, twins with 1 IXP – ZIXP
- Netnod, twins with 3 IXPs – KINIX, KIXP and MOZ-IX
 - Provides support and training to other IXPs around the world
- INEX with support from ISOC - The Gambia IXP, first stages of help:
 - Obtain IP addresses and ASN
 - IXP and BGP training
- France-IX and LyonIX working with ISOC on AXIS project, provide training in Francophone countries

Questions?

Thank you!

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