



BNIX 20 Years Anniversary

September 2015

Bijal Sanghani

bijal at euro-ix dot net

Twitter: @euroix

➤ What do we do?

- 2 Forums per year
- Maintaining the Website, database and tools
- Mailing Lists
- Newsletter – Subscribe here: <https://www.euro-ix.net/news-and-events/newsletter/>
- Working Groups
- Working with IEEE Ethernet Study Group
- 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:
TOUIX (France), STHIX (Sweden)

13 Patrons

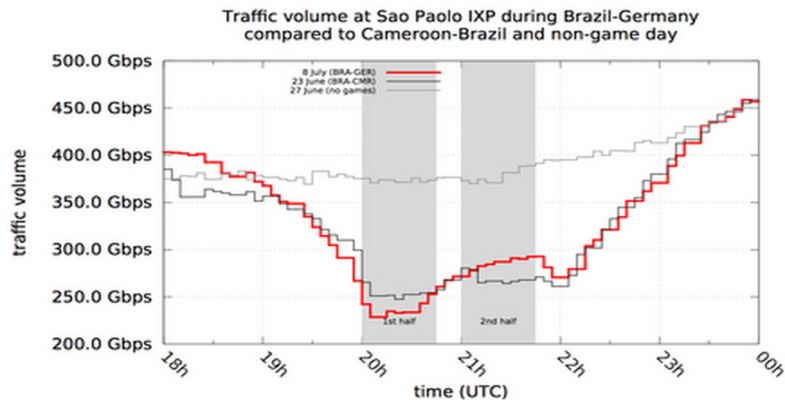
- ADVA Optical Networking
- Alcatel-Lucent
- Brocade
- BTI Systems
- ECI Telecom
- Extreme Networks
- Flexoptix
- Huawei
- Interxion
- Juniper Networks
- MRV
- Telecity
- Telehouse



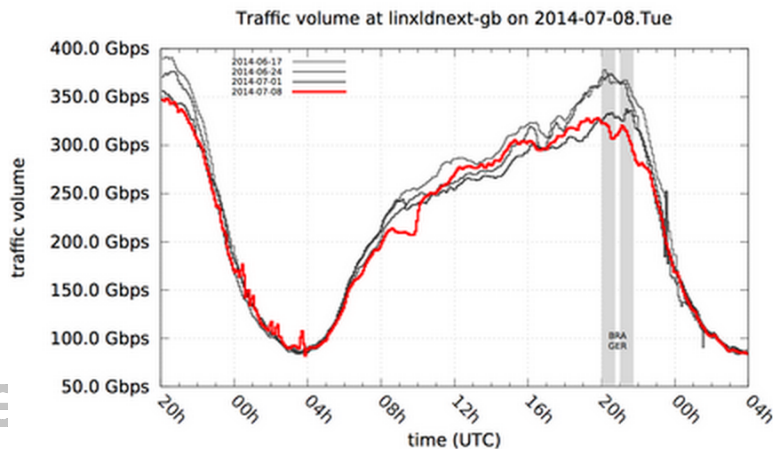
Euro-IX projects

➤ Traffic during FIFA World Cup

- Collaboration with RIPE NCC
 - <https://labs.ripe.net/Members/emileaben/internet-traffic-during-the-world-cup-2014>



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...

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

List of Public Exchange Points

Exchange Name	Long Name	City/Region	Country	Continental Region	Media Type	Participants
ASIX	Alpes Adria Internet Exchange	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/CABA	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
APX	Auckland Peering Exchange	Auckland	NZ	Asia Pacific	Ethernet	56
ArmIX	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

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

Download Now

Peering Research
Related Reports & White Papers

- Multi-Tenant Datacenter: North American Providers - 2013
- To Build or Not To Build - Part 2: Should Service Providers Build Or Lease Their Datacenters?

Related News

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

Latest Facilities

- Caronet XB, Charlotte

TRUSTED SERVER HOSTING SINCE 1994

Managed Hosting Hybrid Hosting

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

TeleGeography
AUTHORITATIVE 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 providing 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.interneteixmap.com](#).

Related Services

Interactive Internet Exch
An interactive, regularly exchanges worldwide.

Colocation Database
Comprehensive online

https://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

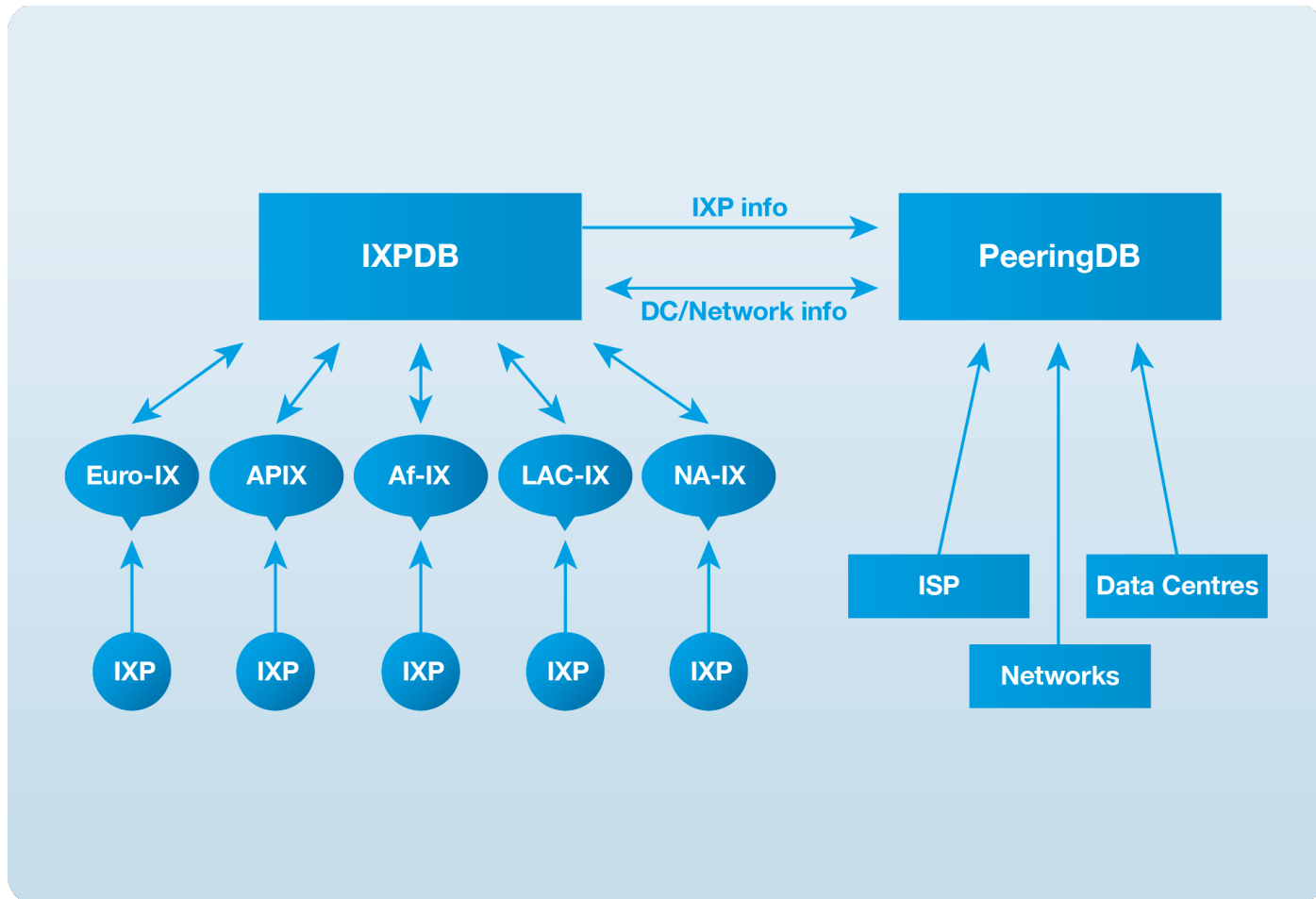
World map showing Internet Exchange Points (IXPs) with PCH logo.

Region	Country	City	Internet Exchange Name	Participants	Traffic	Prefixes	Established	URL
Africa	Algeria	Algiers	National Internet Exchange of Algeria				May 2011	
Africa	Algeria	Algiers	Algeria Internet Exchange	9			2013	
	Angola	Luanda	Angola Internet Exchange	10	13M		2008	
	Angola	Luanda	Foro de Interconexão Internet Angola	5				
Latin America	Argentina (10)	Buenos Aires	NAP CABA	12	100M		2013	
	Buenos Aires	Buenos Aires	NAP CABA	79	7.045	100	Aug 2006	
	Cordoba	Cordoba	NAP CABA	9	100M		Aug 2012	

➤ Existing database issues

- No single trusted data source
- Poor quality & no or very little APIs / automation
- “We’ll only peer with you, if you’re in PeeringDB”
- Databases are updated manually
- We’re moving into a world of automation
- ...IXPs hold accurate information but lack automation

➤ End Goal



IX-F Database

IX-F DB API server written using Python / Django, which can:

- get / create / update / delete IXP, organisation, IP addressing and network information
- all interaction is JSON
- all non-sensitive information will be publicly available

➤ 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>
- <https://db.ix-f.net/api/ixp>



Euro-IX Tools

➤ Euro-IX Tools

- IXP Service Matrix - <https://www.euro-ix.net/tools/ixp-service-matrix/>
- Peering Matrix - <https://www.euro-ix.net/tools/peering-matrix/>
- ASN Search - <https://www.euro-ix.net/tools/asn-database/>
- Newest ASN entries - <https://www.euro-ix.net/tools/asn-database/?tool=recent>
- Most common ASNs - <https://www.euro-ix.net/tools/asn-database/?tool=common>

> ASN 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)
ADN-IX (France)
AIXP (Tanzania, United Republic of)
ALB-IX (Albania)
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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)

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 - Baileup	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
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	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	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	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	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	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	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

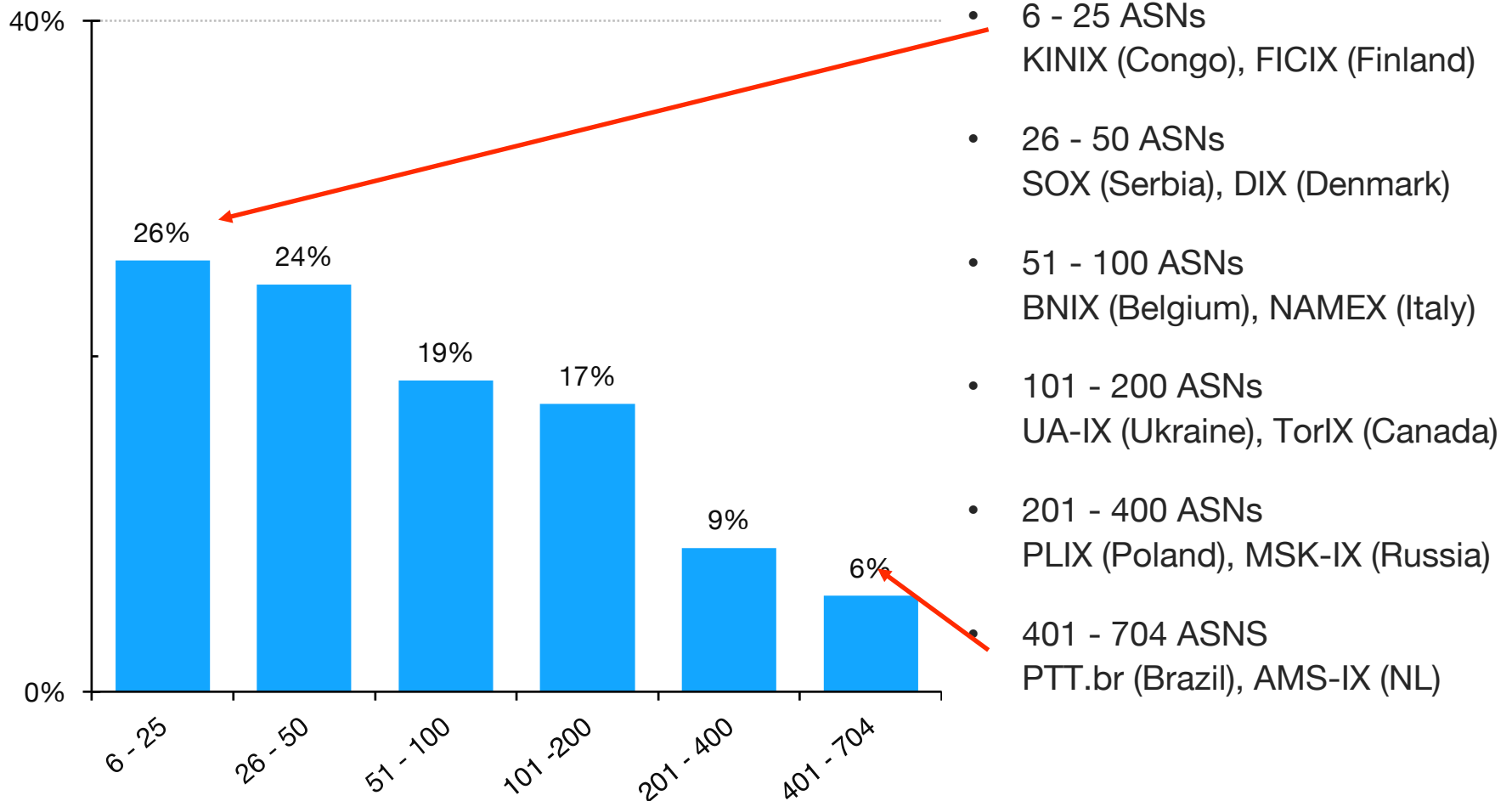
IXP Service Matrix

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	-	-	-				-	-	-	-
ALB-IX	Tirana		N/A	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	-	-	-				-	-	-	-
ARMIX	Yerevan	51225	N/A	8	8	100.0	1	0	-	Y	-				-	-	Y	Y
BBIX - Fukuoka	Fukuoka		N/A	0	0	0		0	-	-	-				-	-	-	-



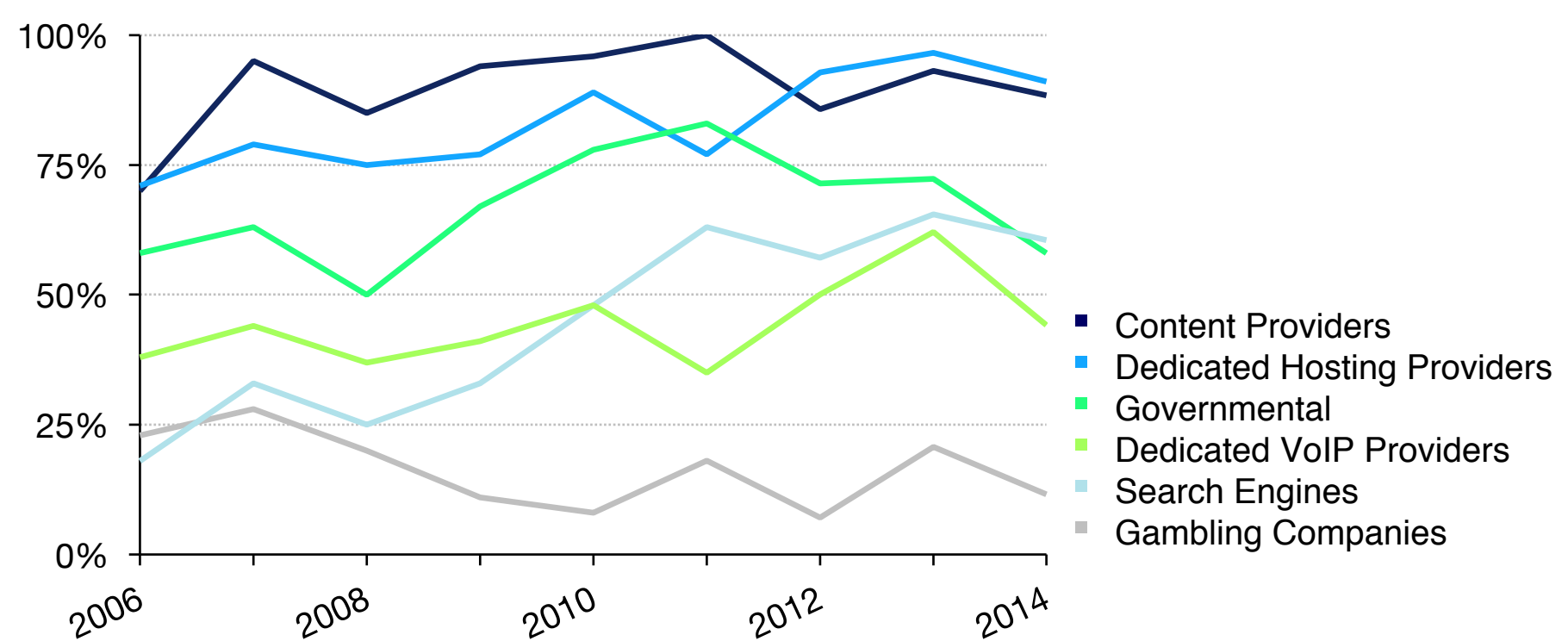
Euro-IX Database

> Range of ASNs connected to Members



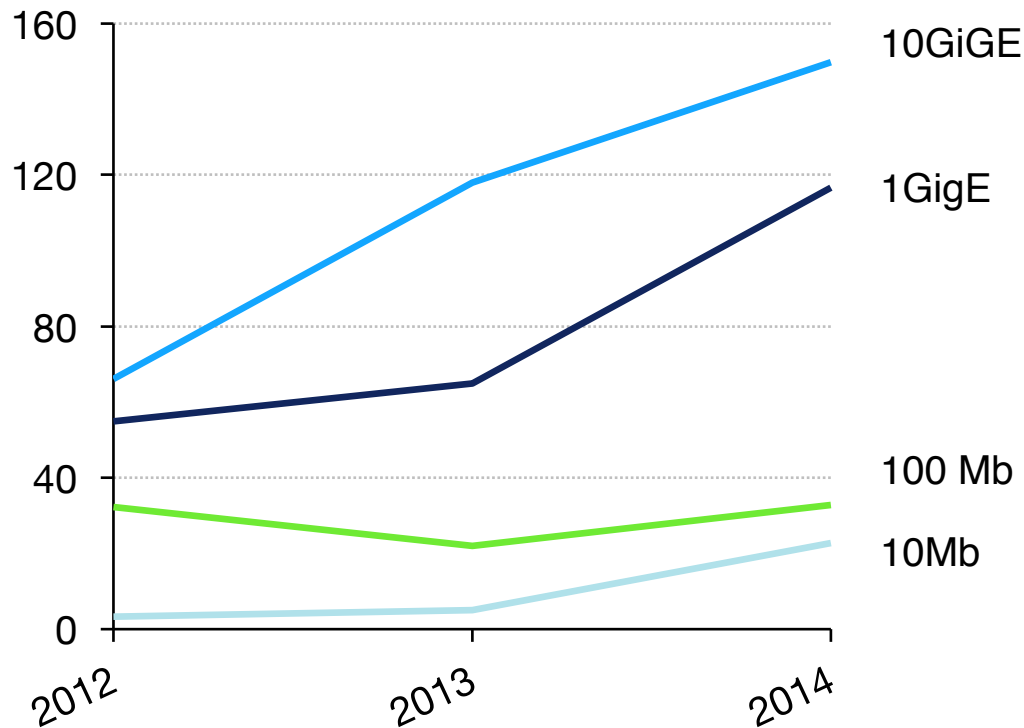
Who connect to our Members

=> 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



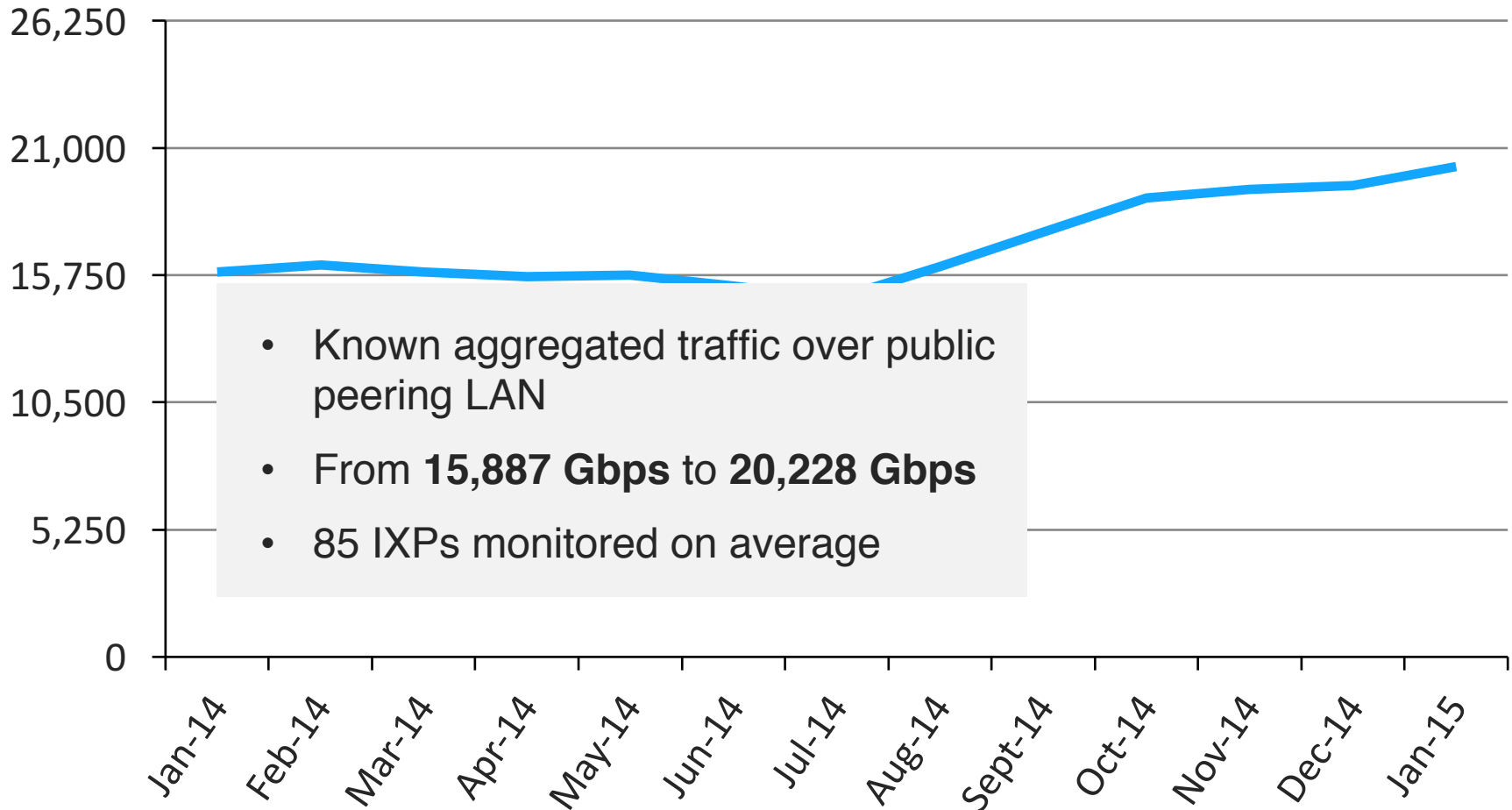
IXPs in Euro-IX Region



189 known IXPs
48 Countries
142 Cities

Check our Map:
<https://www.euro-ix.net/ixps/ixp-map/>

➤ 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 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

➤ What is the IX-F?

- **AFIX**

Nishal Goburdhan – JINX (South Africa)

Kyle Spencer – UIXP (Uganda)

- **APIX**

Gaurab Raj Upadhaya - NPIX (Nepal)

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

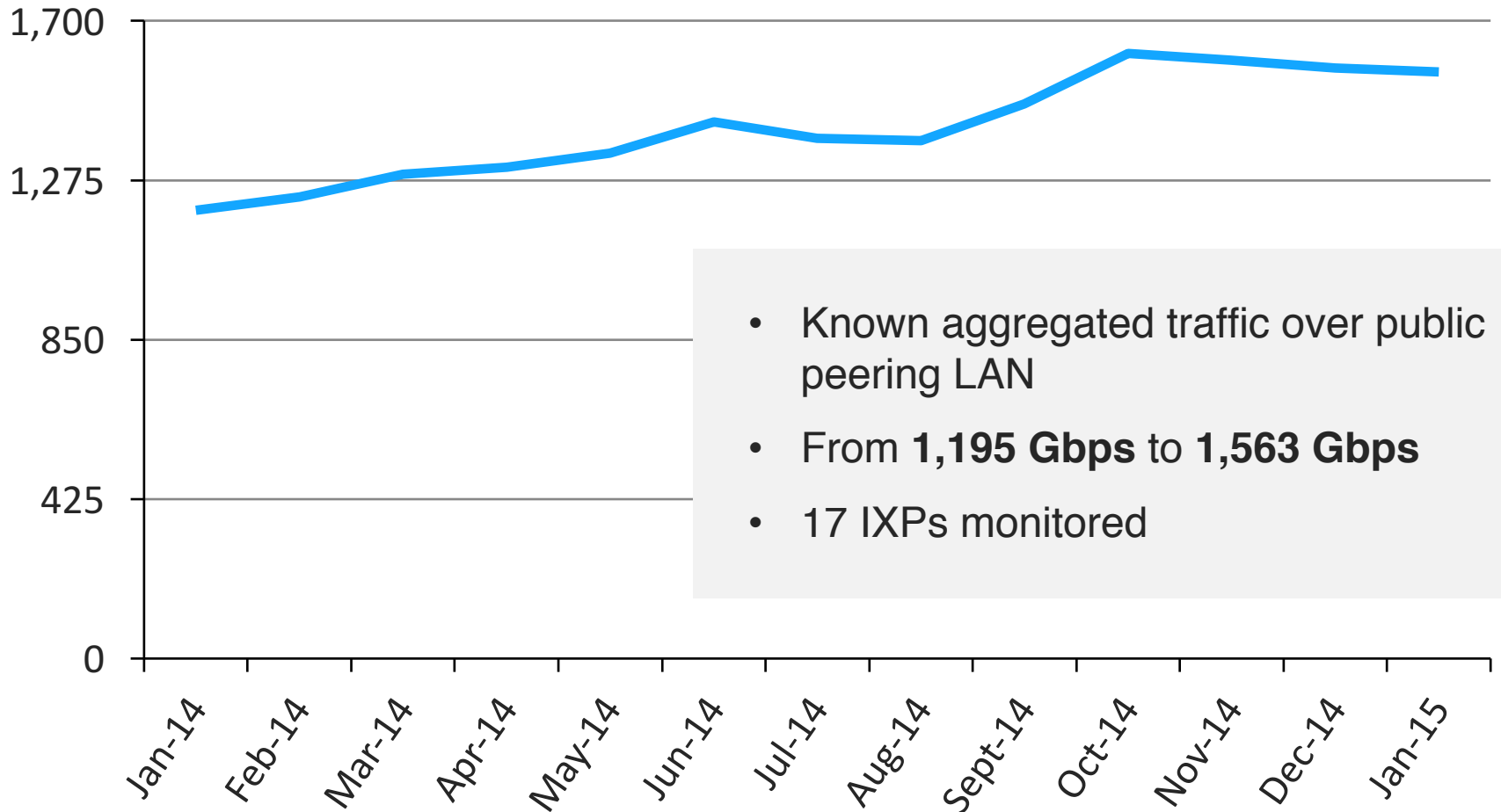
IXPs in APIX Region



89 known IXPs
19 Countries
49 Cities

Check our Map:
<https://www.euro-ix.net/ixps/ixp-map/>

➤ Traffic Growth in APIX Region



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

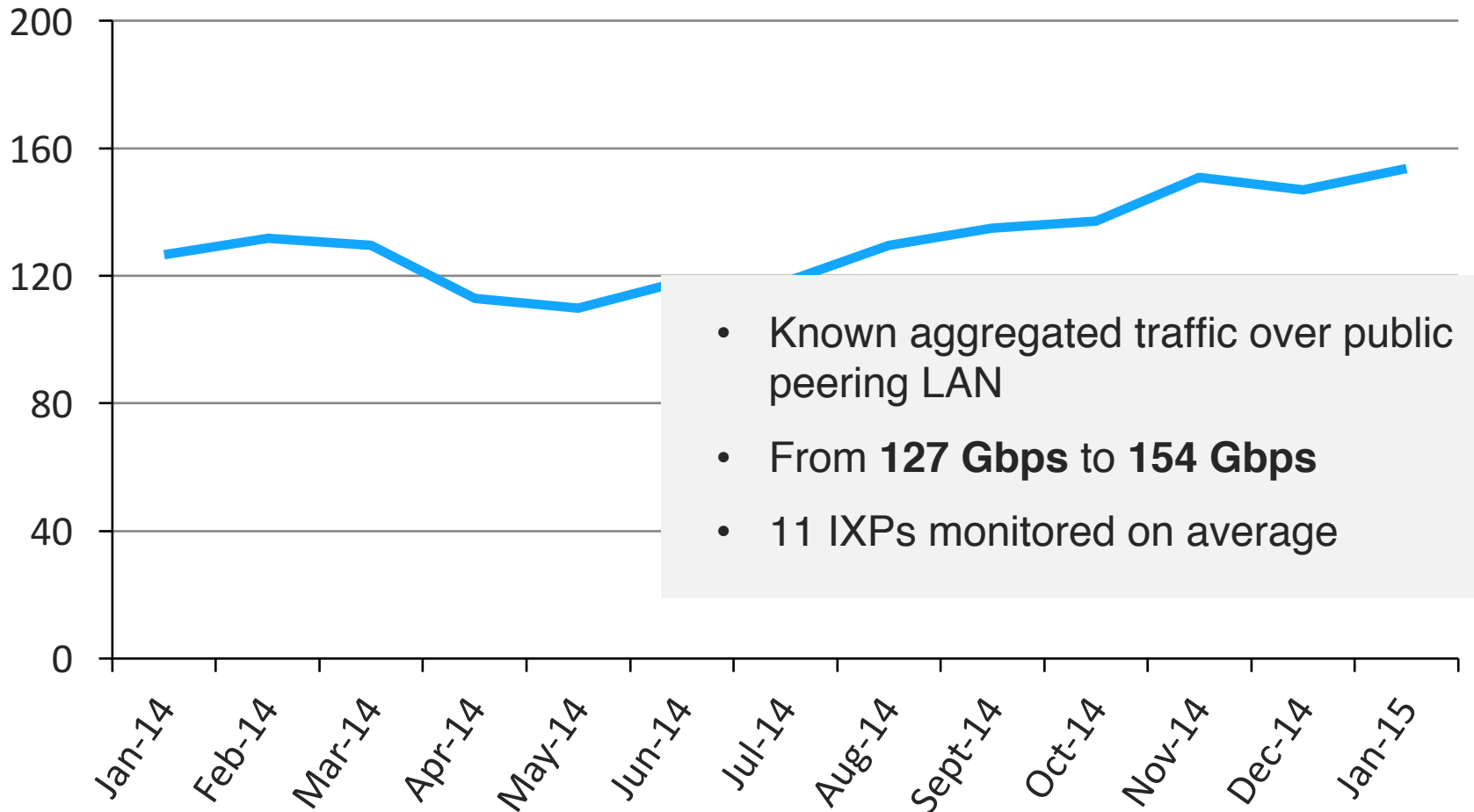
IXPs in Af-IX Region



33 known IXPs
25 Countries
31 Cities

Check our Map:
<https://www.euro-ix.net/ixps/ixp-map/>

➤ Traffic Growth in Af-IX Region



IXP's in LAC-IX Region



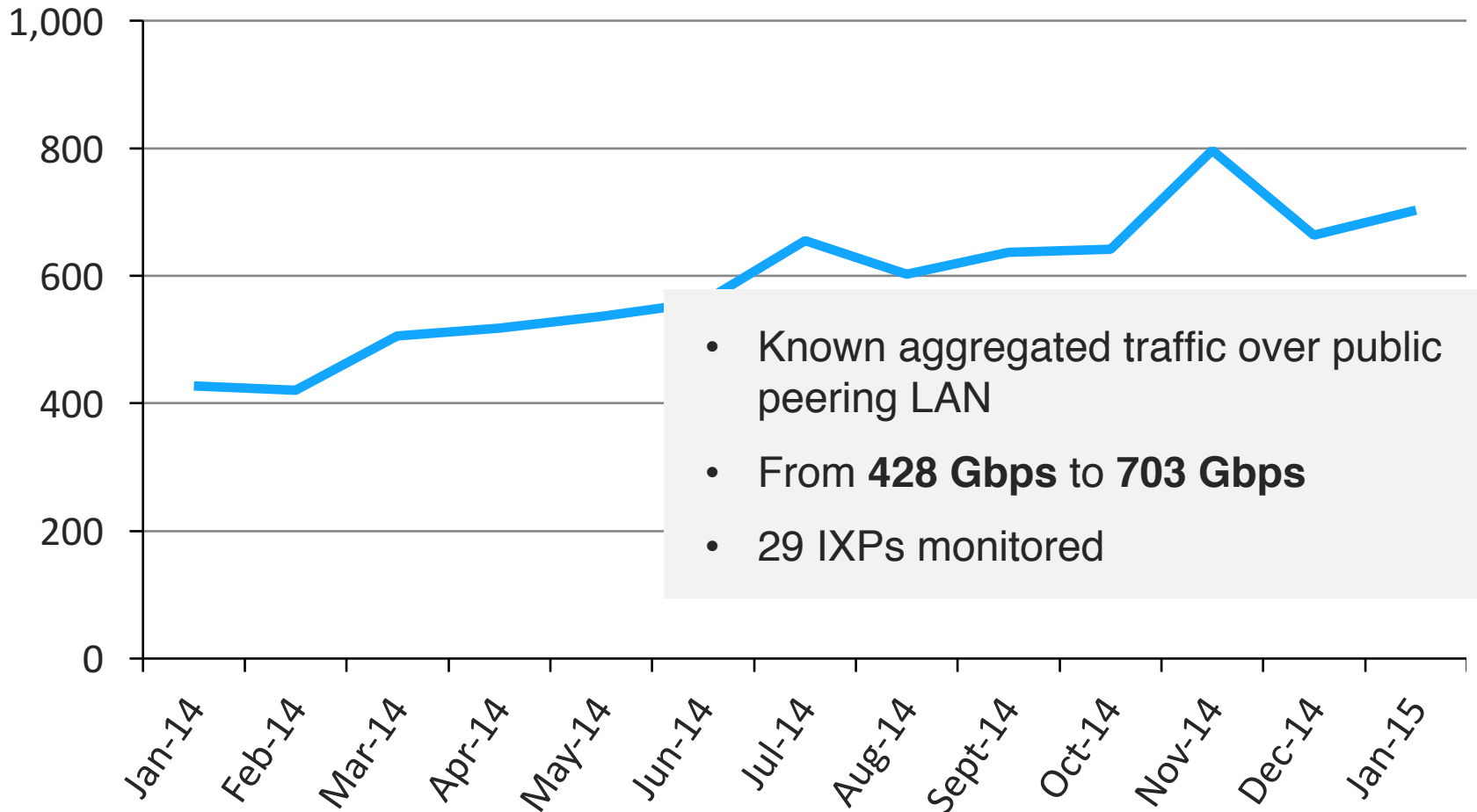
56 known IXPs

16 Countries

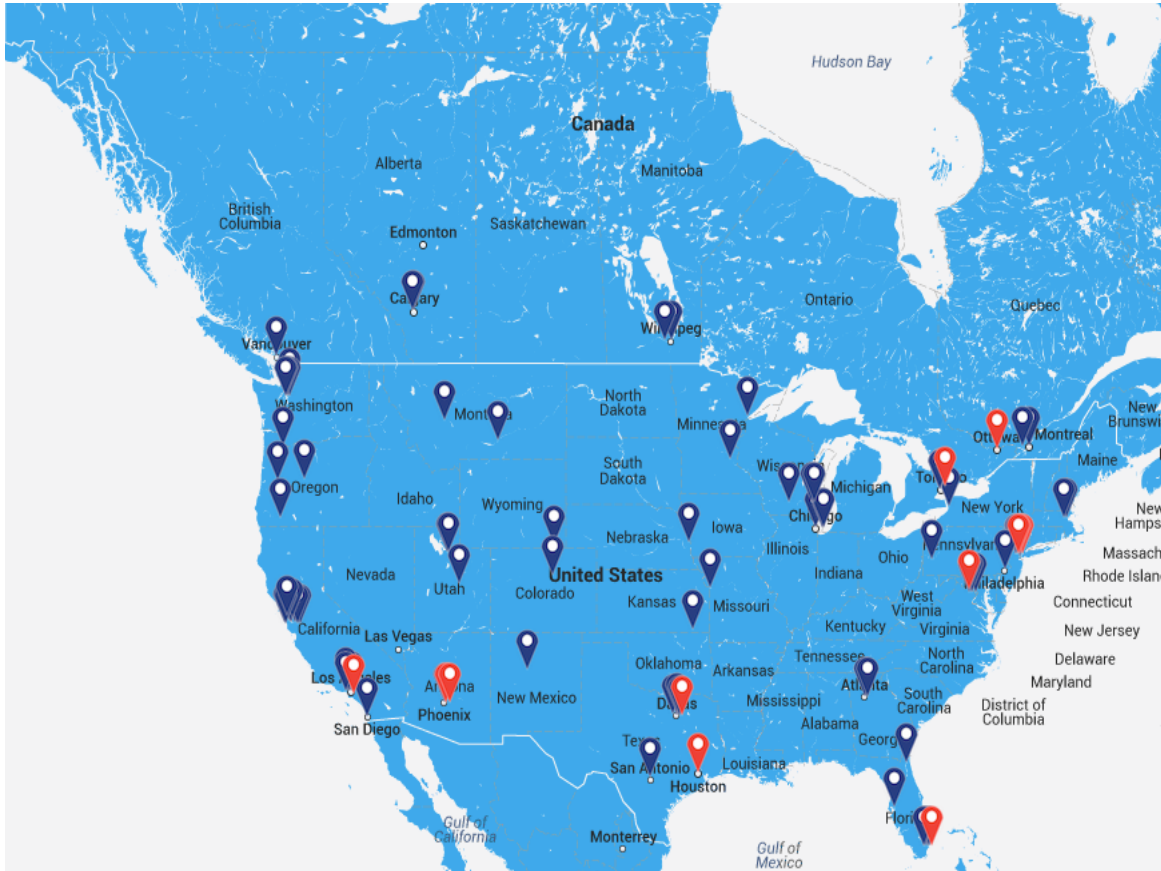
49 Cities

Check our Map:
<https://www.euro-ix.net/ixps/ixp-map/>

➤ Traffic Growth in LAC-IX Region



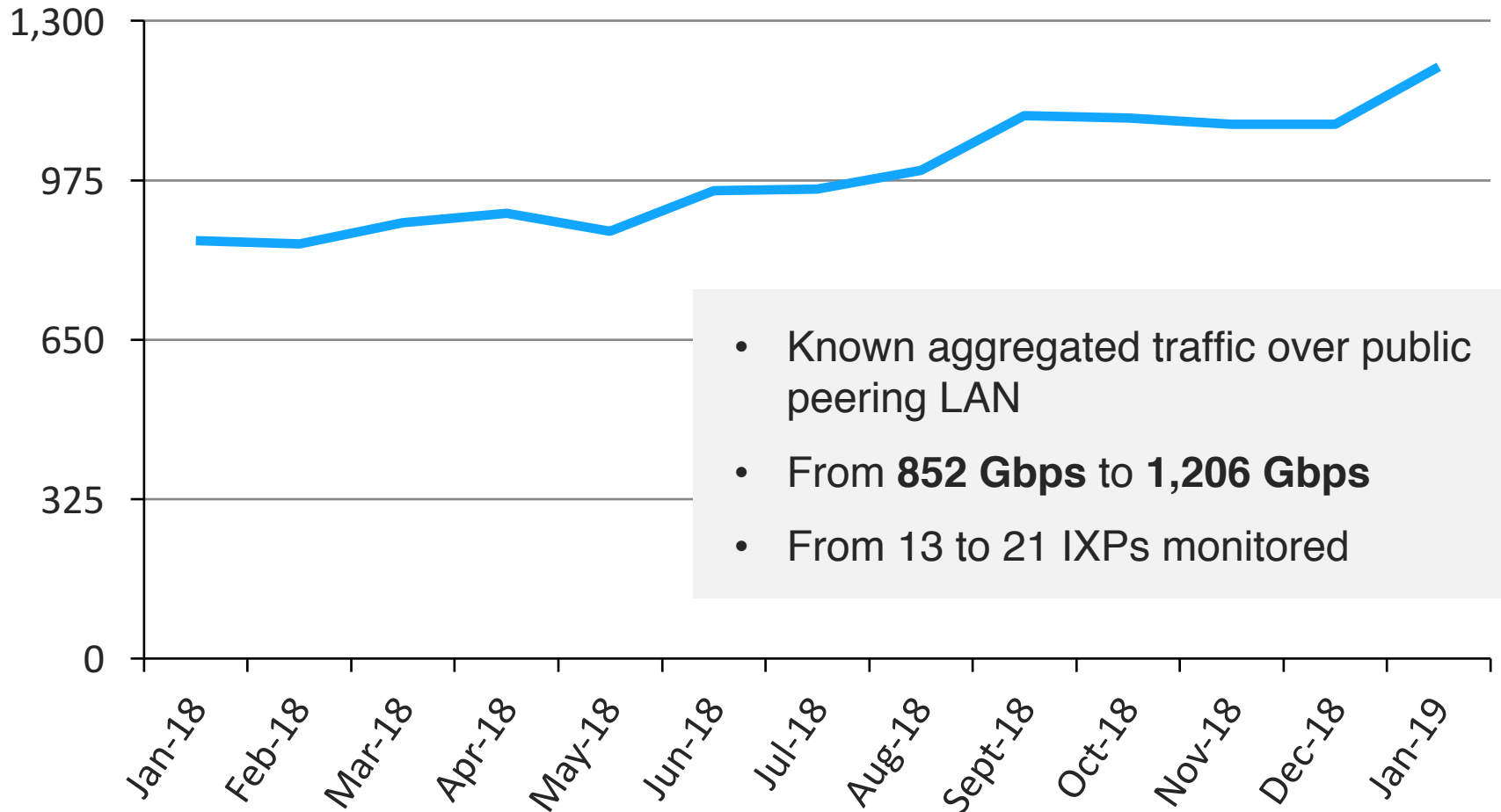
IXPs in NA-IX Region



102 known IXPs
2 Countries
57 Cities

Check our Map:
<https://www.euro-ix.net/ixps/ixp-map/>

➤ Traffic Growth in NA-IX Region



➤ 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

➤ The Internet Revealed – IXP Movie



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!



What about BNIX?

> History BNIX & Euro-IX

- One of founding members..

From decix@nipper.de **Wed May 9 19:18:56 2001**

Cc: info@euro-ix.net

Subject: Euro-IX: Announcement and Invitation

Reply-To: info@euro-ix.net

Dear EIX-WG Member,
dear Fellow IXP Operators

-
-
-

[<board@euro-ix.net>](mailto:board@euro-ix.net)

or individually:

Magnus Andersson, Netnod [<magnus@netnod.se>](mailto:magnus@netnod.se)

Pascal Delmoitie, BNIX [<pascal@belnet.be>](mailto:pascal@belnet.be)

Arnold Nipper, DE-CIX [<arnold.nipper@de-cix.net>](mailto:arnold.nipper@de-cix.net)

Christian Panigl, VIX [<panigl@vix.at>](mailto:panigl@vix.at)

Valeria Rossi, MIX [<valeria.rossi@mix-it.net>](mailto:valeria.rossi@mix-it.net)

John Souter, LINX [<john@linx.net>](mailto:john@linx.net)

Job Witteman, AMS-IX [<job.witteman@ams-ix.net>](mailto:job.witteman@ams-ix.net)

> History BNIX & Euro-IX

Begin forwarded message:

From: "Valeria Rossi" <Valeria.Rossi@MIX-IT.NET>

Subject: Nomination for Jan Torreele

Date: 11 September 2001 14:28:59 CEST

To: <board@euro-ix.net>

Dear all,

I'm here for nominating Mr. Jan Torreele of BNIX as candidate for the next Euro-IX board.

Best regards

Valeria Rossi

- Jan was nominated on to the Euro-IX Board in October 2001

➤ History BNIX & Euro-IX

Begin forwarded message:

From: <Jan.Torreele@bnix.net>

Subject: BNIX attendance at Euro-IX forum Torino

Date: 7 March 2003 12:30:20 CET

To: <serge@euro-ix.net>, <jan@bnix.net>

Hello Serge,

as discussed on the phone, BNIX will be represented at the 2nd Euro-IX forum by:

Ms. Edina Beylemans (edina@bnix.net)

Mr. Pascal Panneels (pascal@belnet.be)

➤ History BNIX & Euro-IX

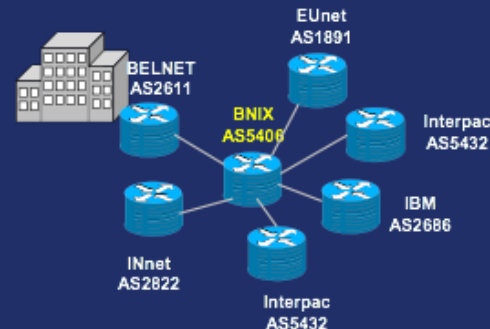
BNIX History



1995

- BNIX was founded end 1995, by BELNET.

- ❑ 6 participants
- ❑ Infrastructure, based on a Cisco Router
- ❑ Connection speed: up to 256 Kbit/s
- ❑ 1 location : BELNET

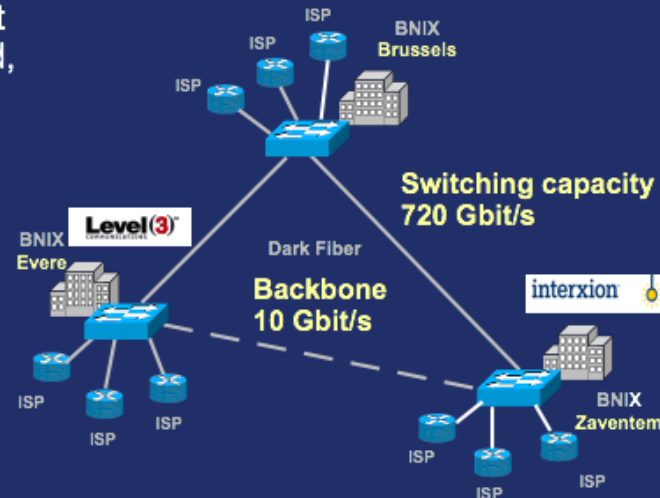


- As the number of participants grow and bandwidth demands increased, the router was replaced by a layer 2 Ethernet switch end 1996.
- In 1999, BNIX introduced the exchange of IP multicast traffic (MBNIX).
- In 2000, BNIX became open for IPv6 interconnections (BNIX6).

➤ History BNIX & Euro-IX

BNIX - History

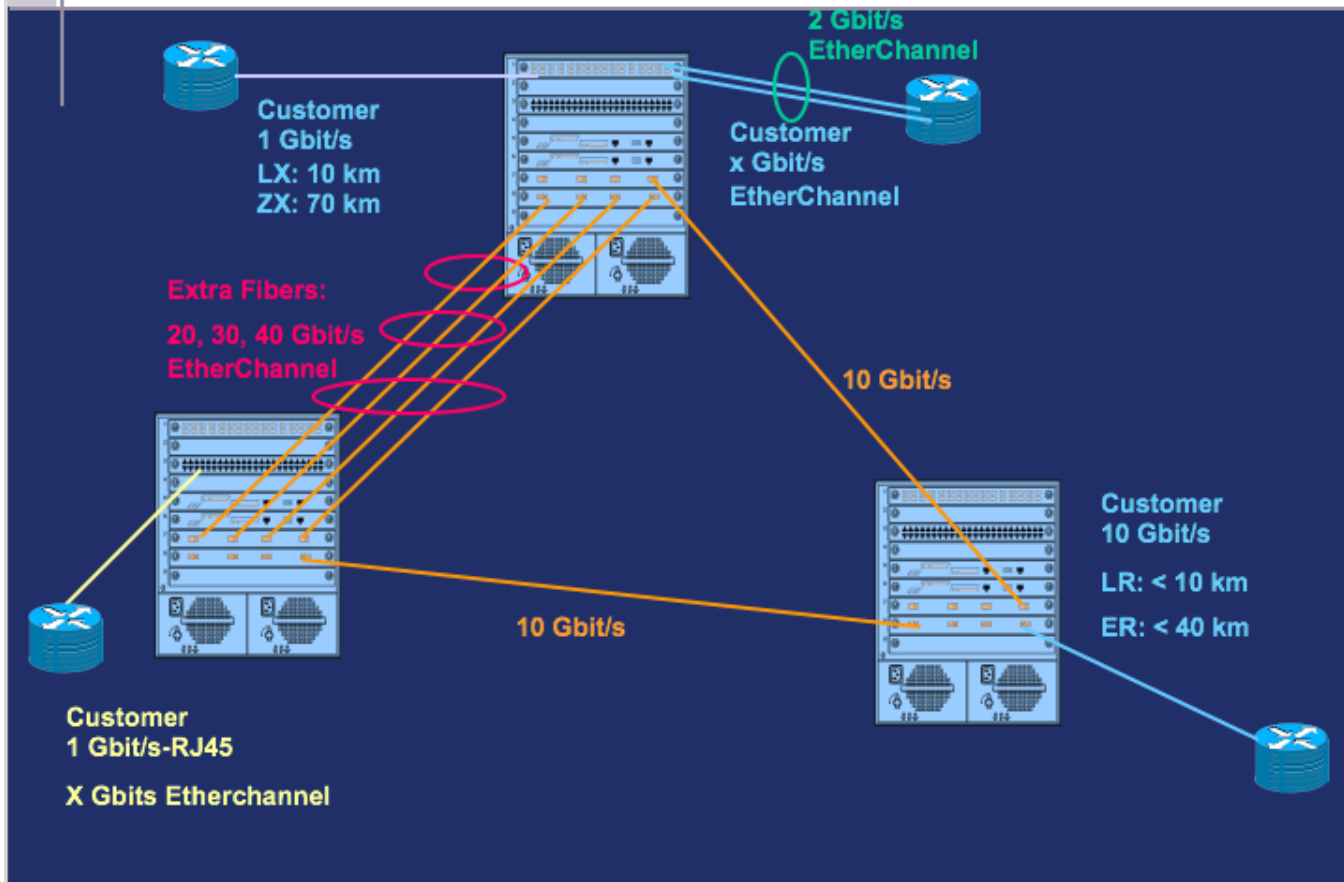
- To meet the increasing bandwidth requirements, a new infrastructure, based on Catalyst 6500 switches was implemented, in **2003**. (IOS)
- The switching capacity went up from 32 Gbit/s to 720 Gbit/s.
- The backbone capacity was upgraded from 1Gbit/s to 10Gbit/s (LR/ER).
- Fast convergence at failure of a backbone link (sub seconds), RSTP.
- New services: 1000 Base-LX, SMF
: 1000 Base-TX, UTP



- Future services: 10Gig LR
: 10Gig ER

➤ History BNIX & Euro-IX

Conclusion



➤ **BNIX hosts 16th Euro-IX Forum**

Volcano erupts in south Iceland

An Icelandic volcano, dormant for 200 years, has erupted, ripping a 1km-long fissure in a field of ice.

What did this mean for the forum?

- It still went ahead, with great attendance..
- Update from Serge - SERGE'S NERVES: are no longer existent and the BNIX/BELNET team have reported something similar (however they have been absolutely marvellous!!)

➤ BNIX hosts 16th Euro-IX Forum



➤ Continued Support

- Taking part in the BMC for the past 10 years..
- Actively involved at the Euro-IX forums, giving presentations, active on panels and starting the selfie on stage phenomenon!!





Thank you!

Bijal Sanghani
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