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)

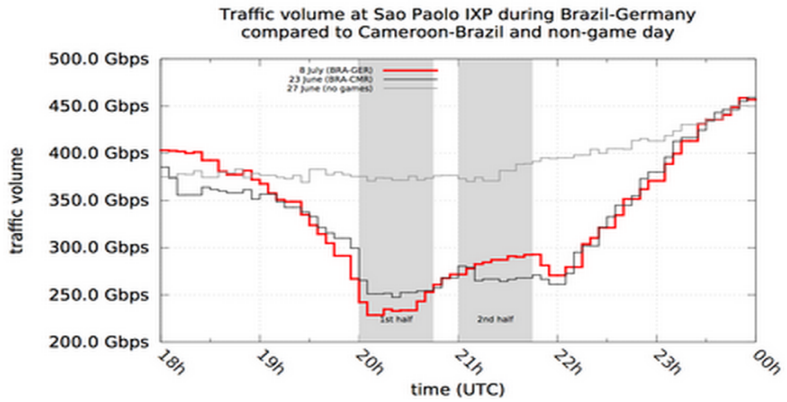
13 Patrons

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

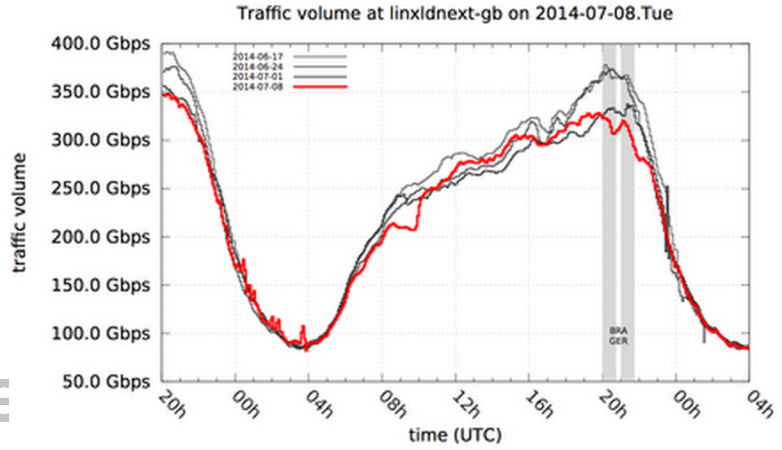
Euro-IX projects

Traffic during FIFA World Cup

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



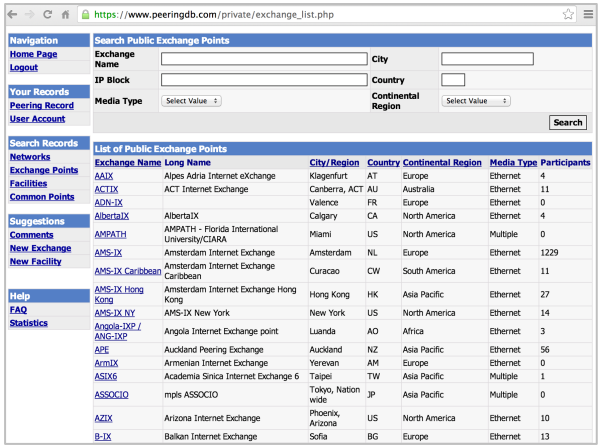
Traffic at PTT Sao Paulo during the Brazil vs. Germany Game

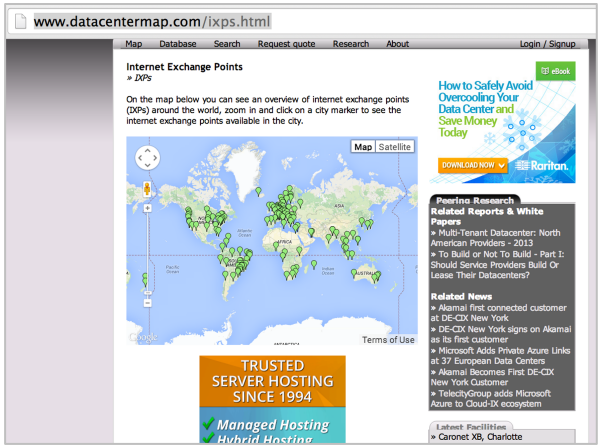


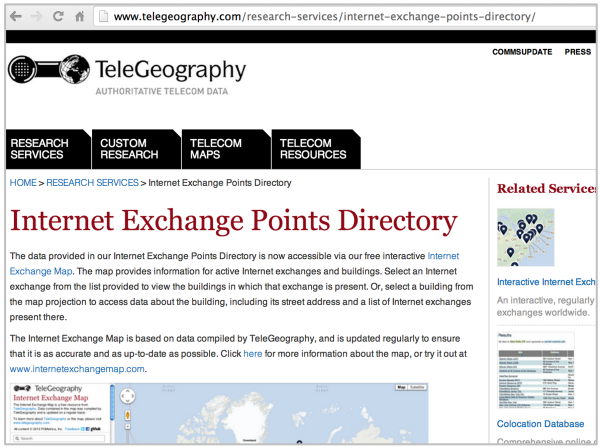
Traffic at LINX London (Extreme LAN) during the Brazil vs. Germany Game

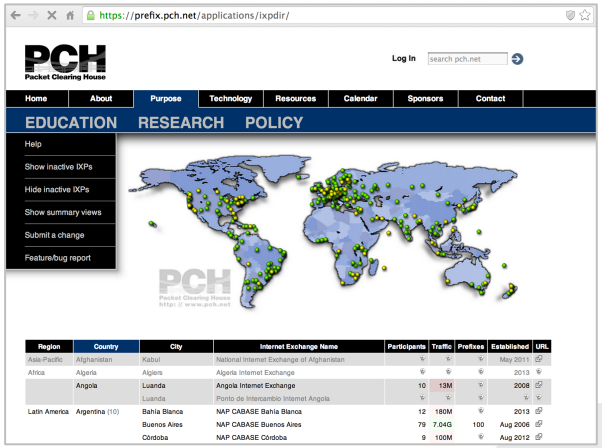
IXP Database Project

- There are many IXP Databases…







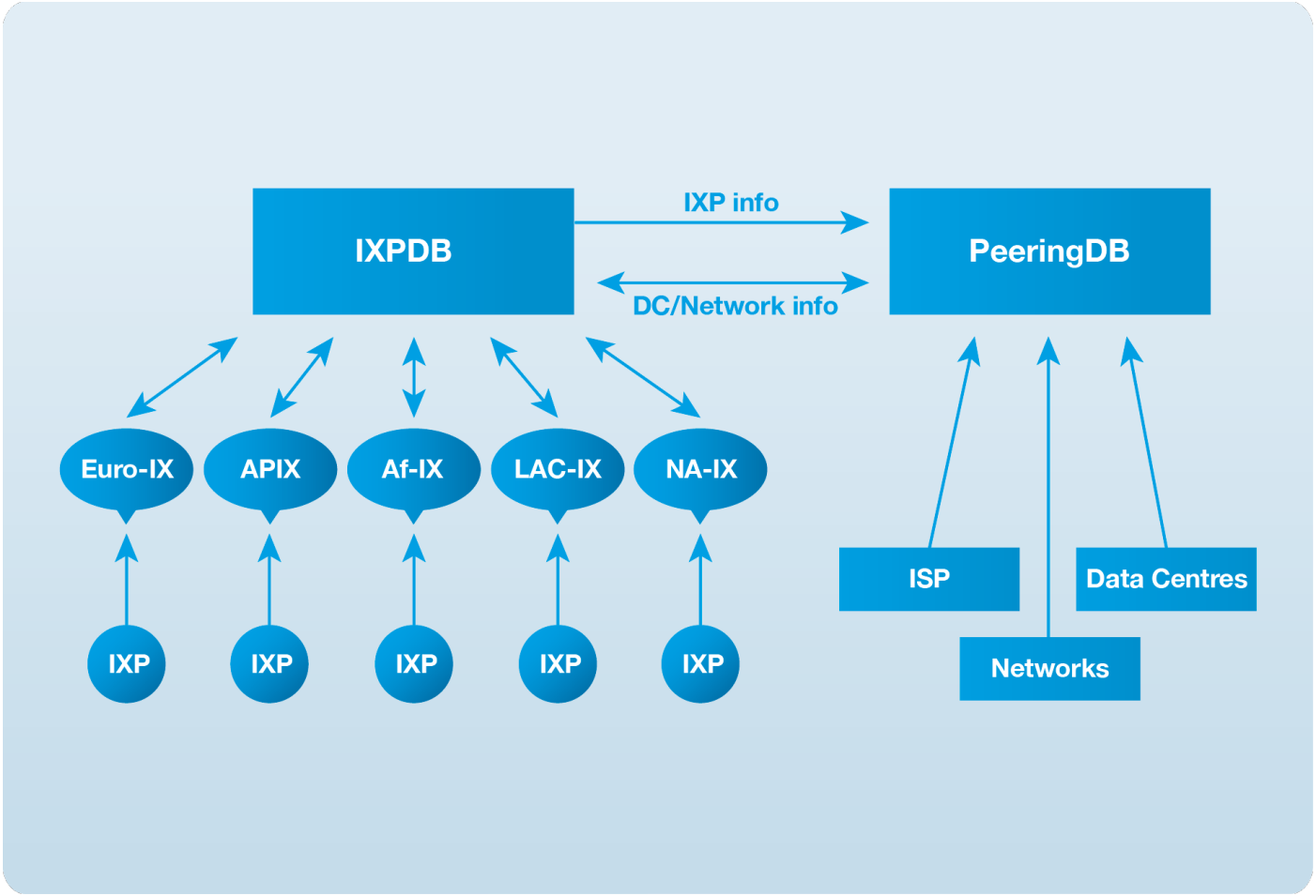


euro-IX

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


IXPDB
IXP info
DC/Network info
PeeringDB
Euro-IX
APIX
Af-IX
LAC-IX
NA-IX
IXP
IXP
IXP
IXP
IXP
ISP
Data Centres
Networks

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

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

Filter

Peering Matrix

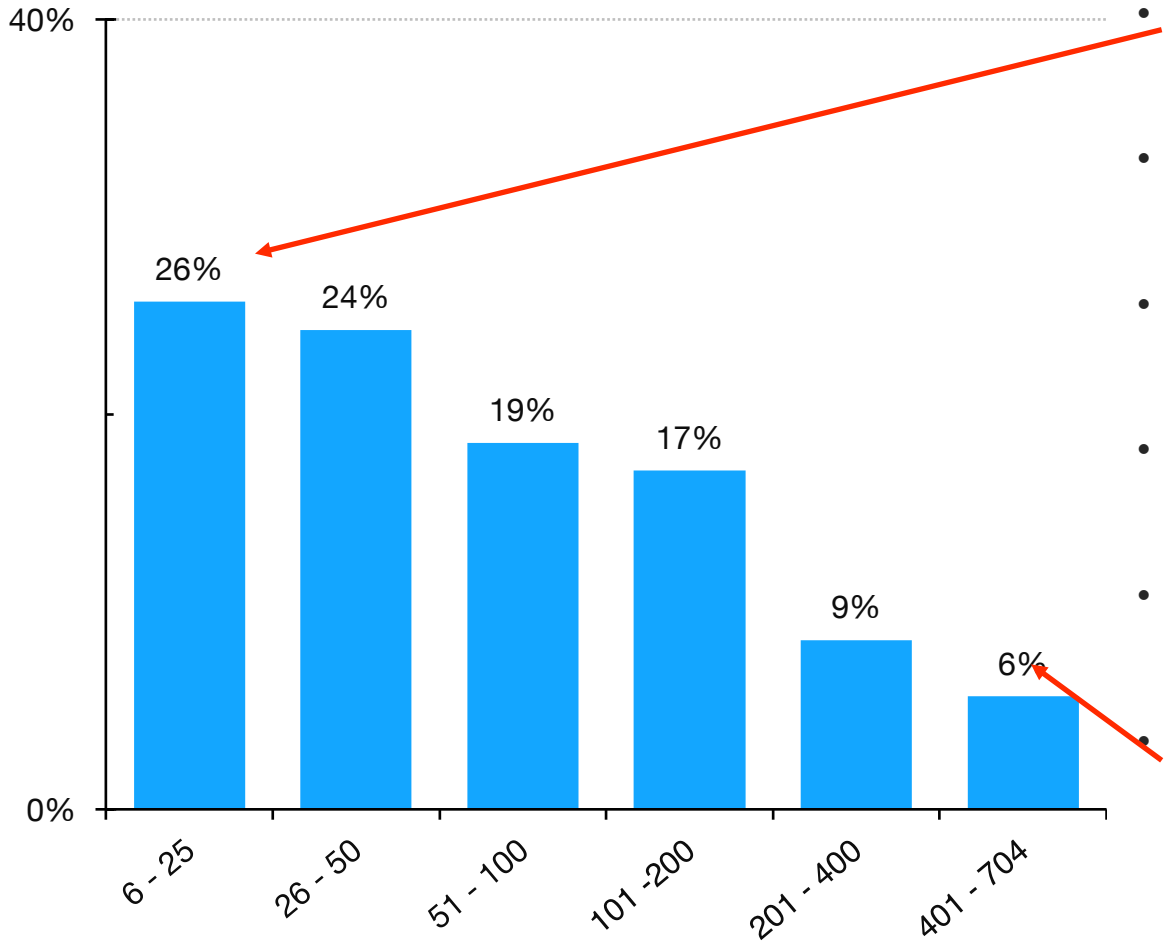
IXP	Total listed ASNs at IXP	ASNs that don't peer at other IXPs	% of ASNs that don't peer at other IXPs	ASNs that peer at other IXPs	% of ASNs that peer at other IXP	ADN-IX	ALB-IX	AMS-IX	AMS-IX Caribbean	AMS-IX East Africa	AMS-IX Hong Kong	AMS-IX New York	ANGONIX	ARMIX	BBIX - Fukuoka	BBIX - Nagoya	BBIX - 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 - Ballerup	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	0	1	1	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

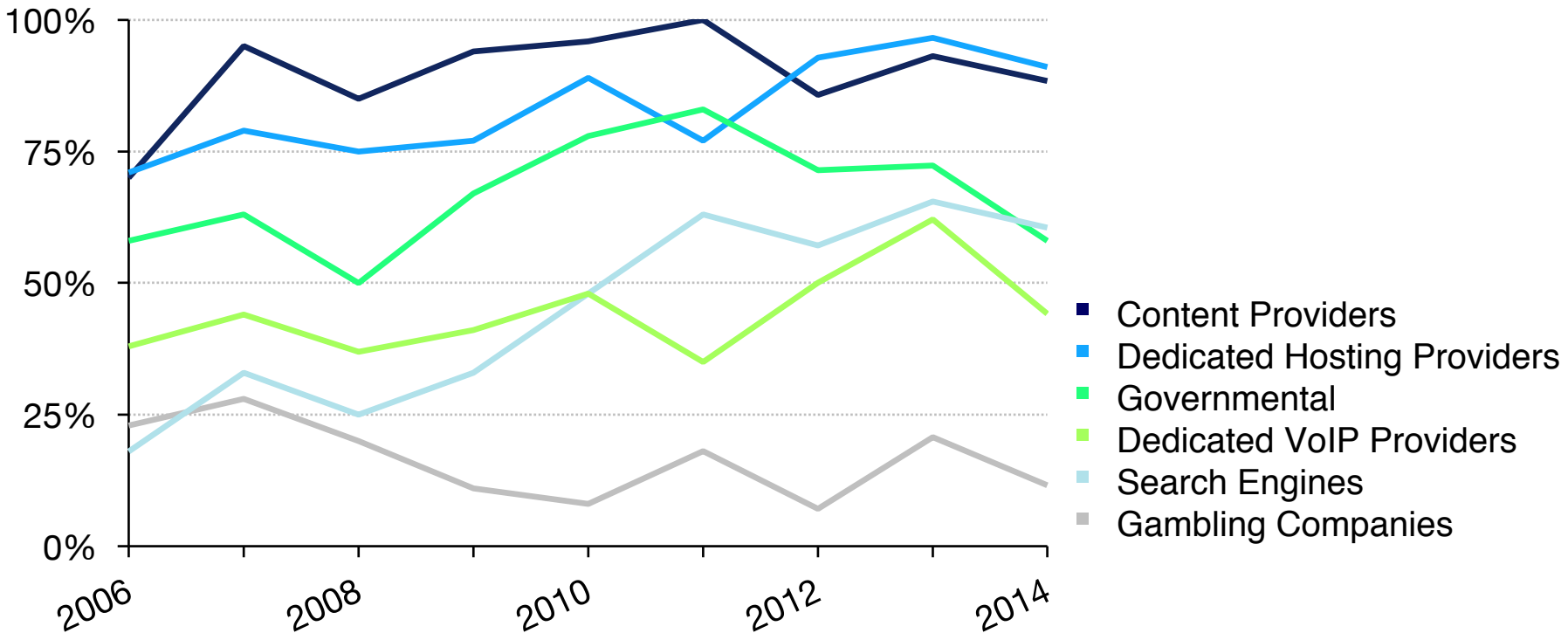
Range of ASNs connected to Members



- 6 - 25 ASNs
  KINIX (Congo), FICIX (Finland)
- 26 - 50 ASNs
  SOX (Serbia), DIX (Denmark)
- 51 - 100 ASNs
  BNIX (Belgium), NAMEX (Italy)
- 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)

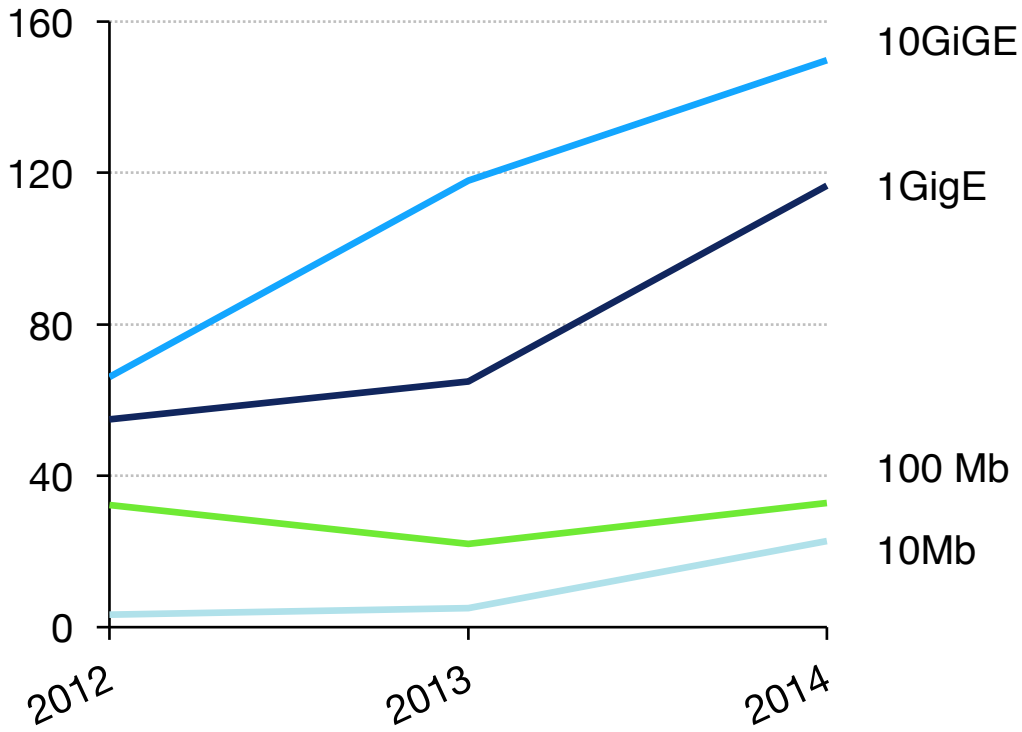
Who connect to our Members

=> 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



IXPs in Euro-IX Region

189 known IXPs

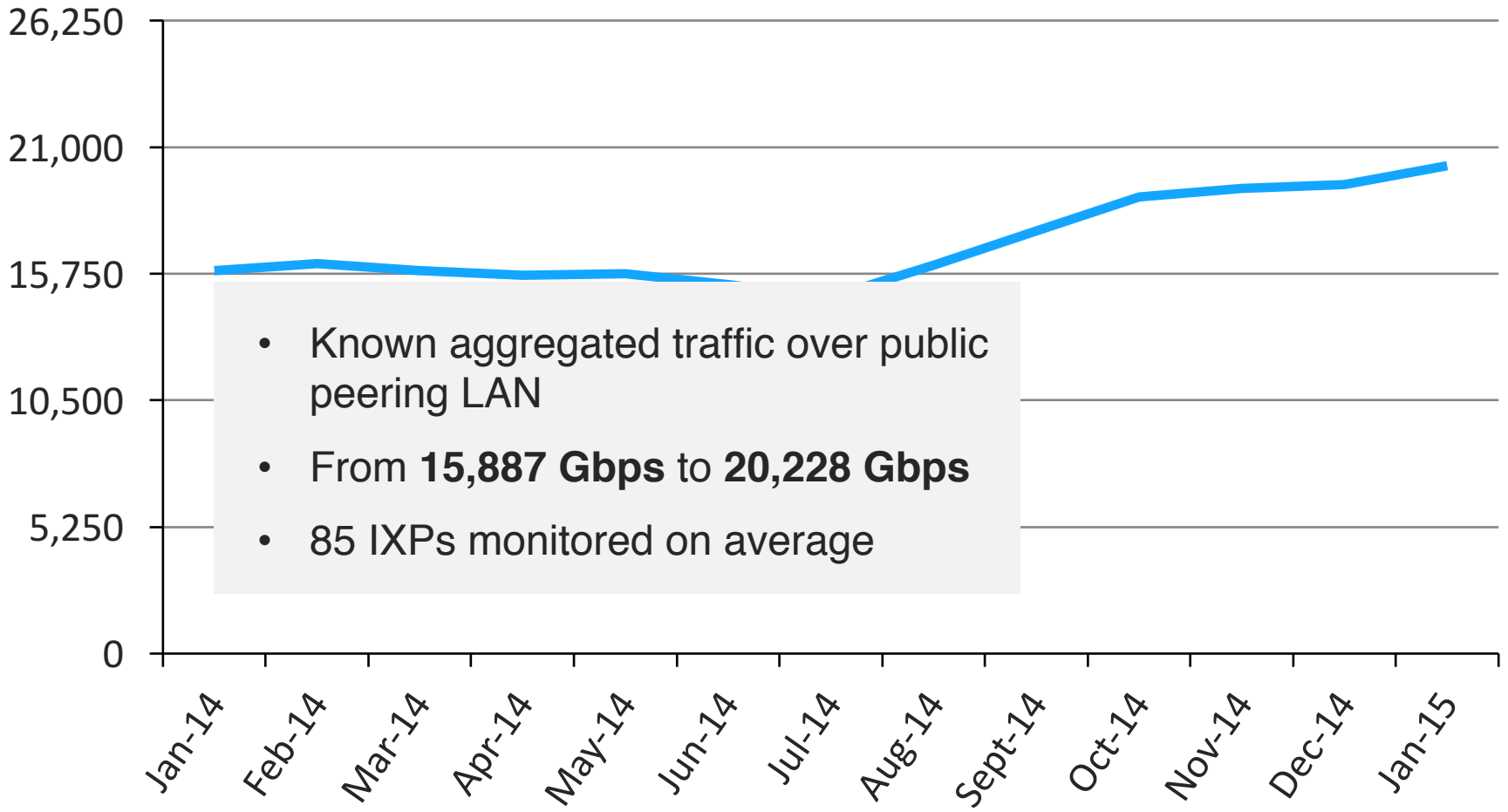
48 Countries

142 Cities

Check our Map:

https://www.euro-ix.net/ixps/ixp-map/

Traffic Growth in Euro-IX Region



Internet Exchange Federation

Other IXPAs

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

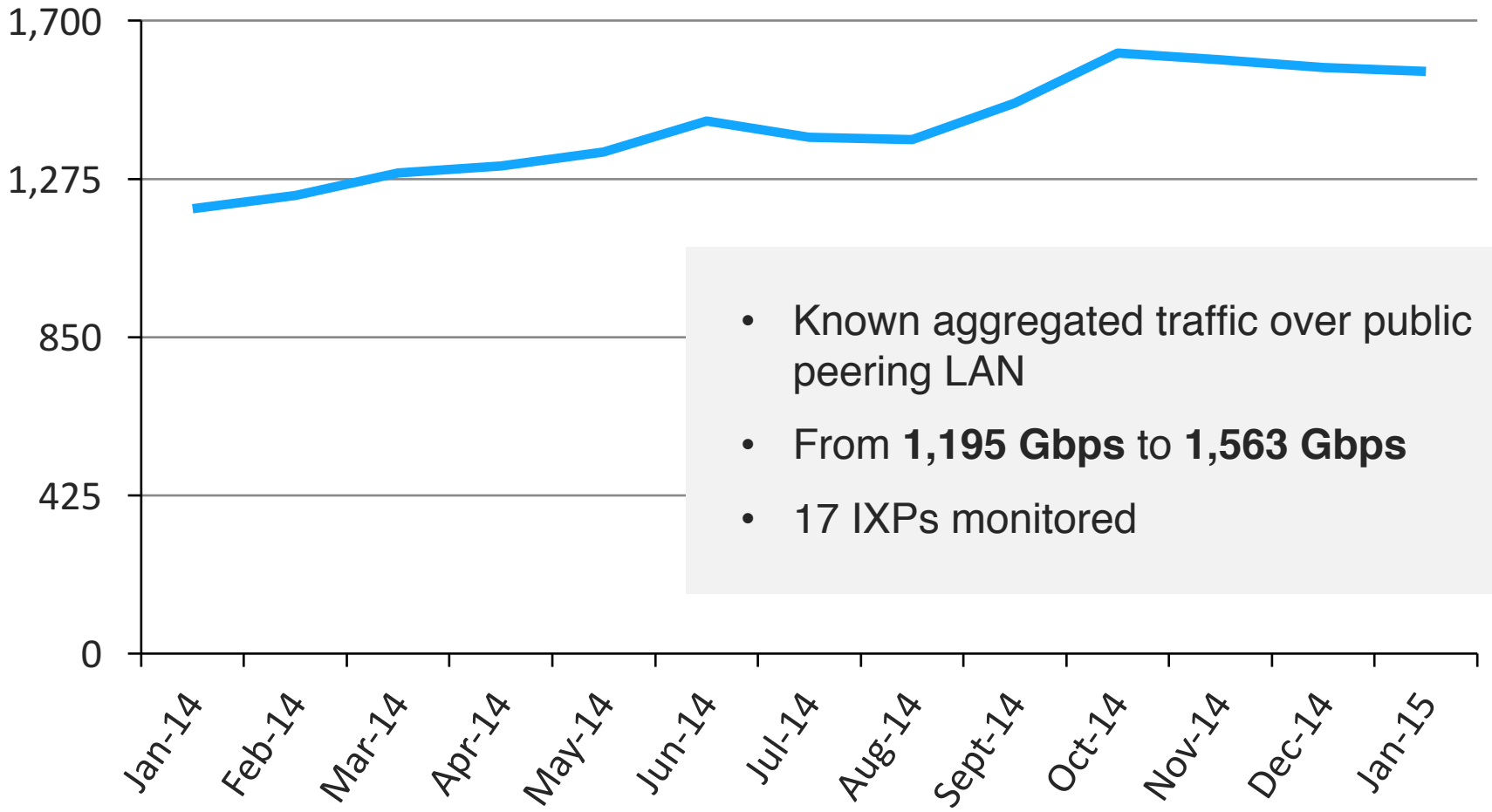
19 Countries

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

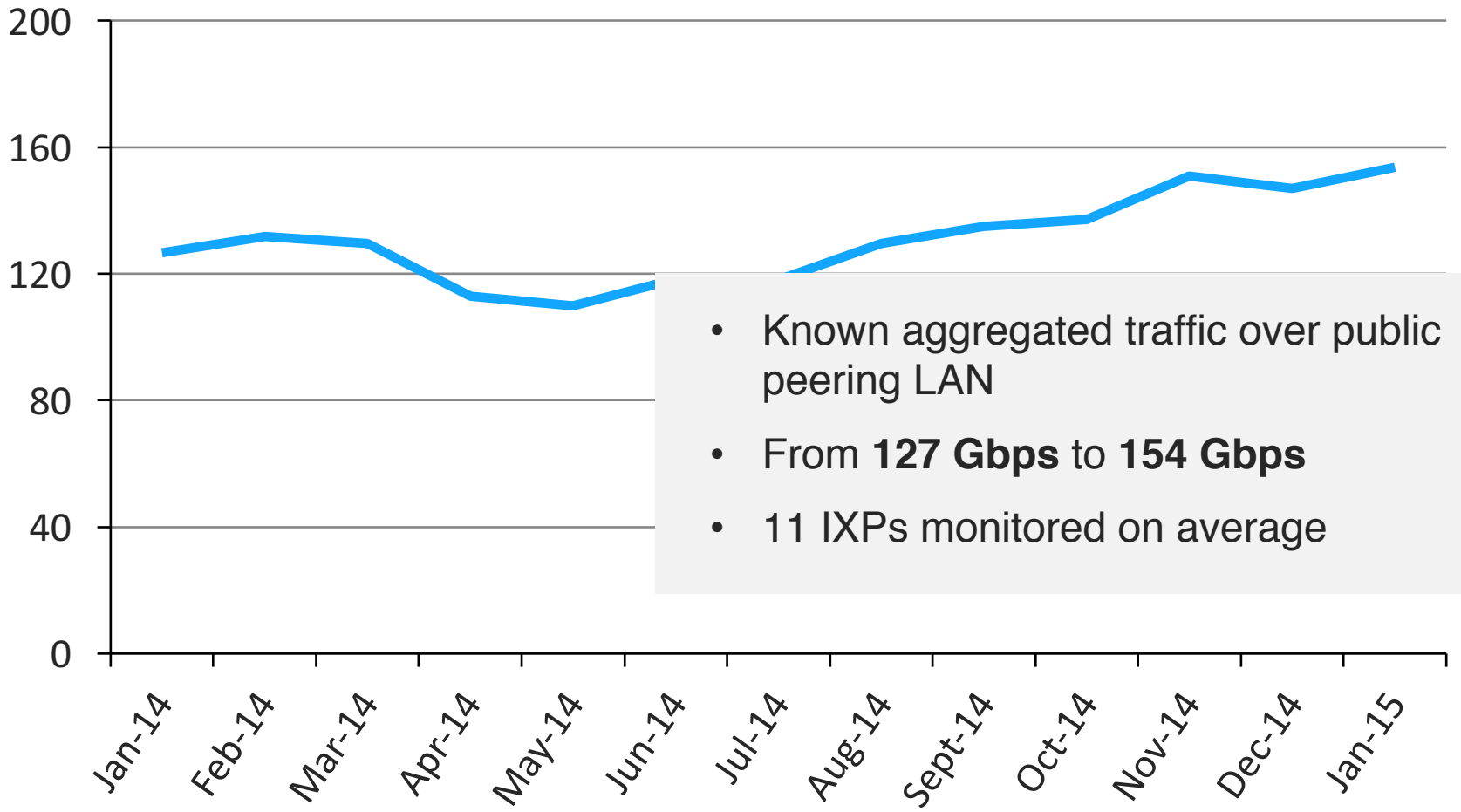
25 Countries

31 Cities

Check our Map:

https://www.euro-ix.net/ixps/ixp-map/

Traffic Growth in Af-IX Region



- 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

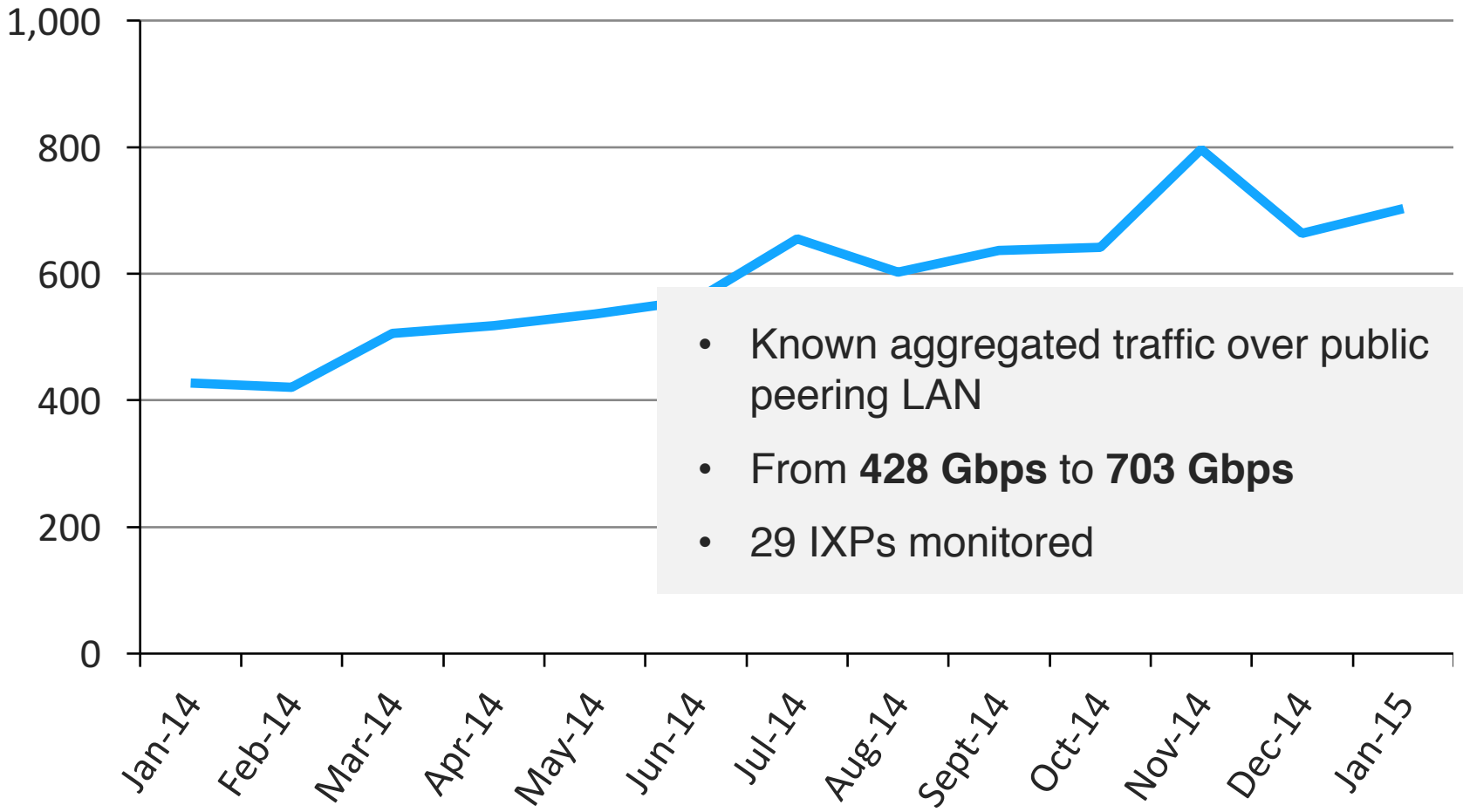
16 Countries

49 Cities

Check our Map:

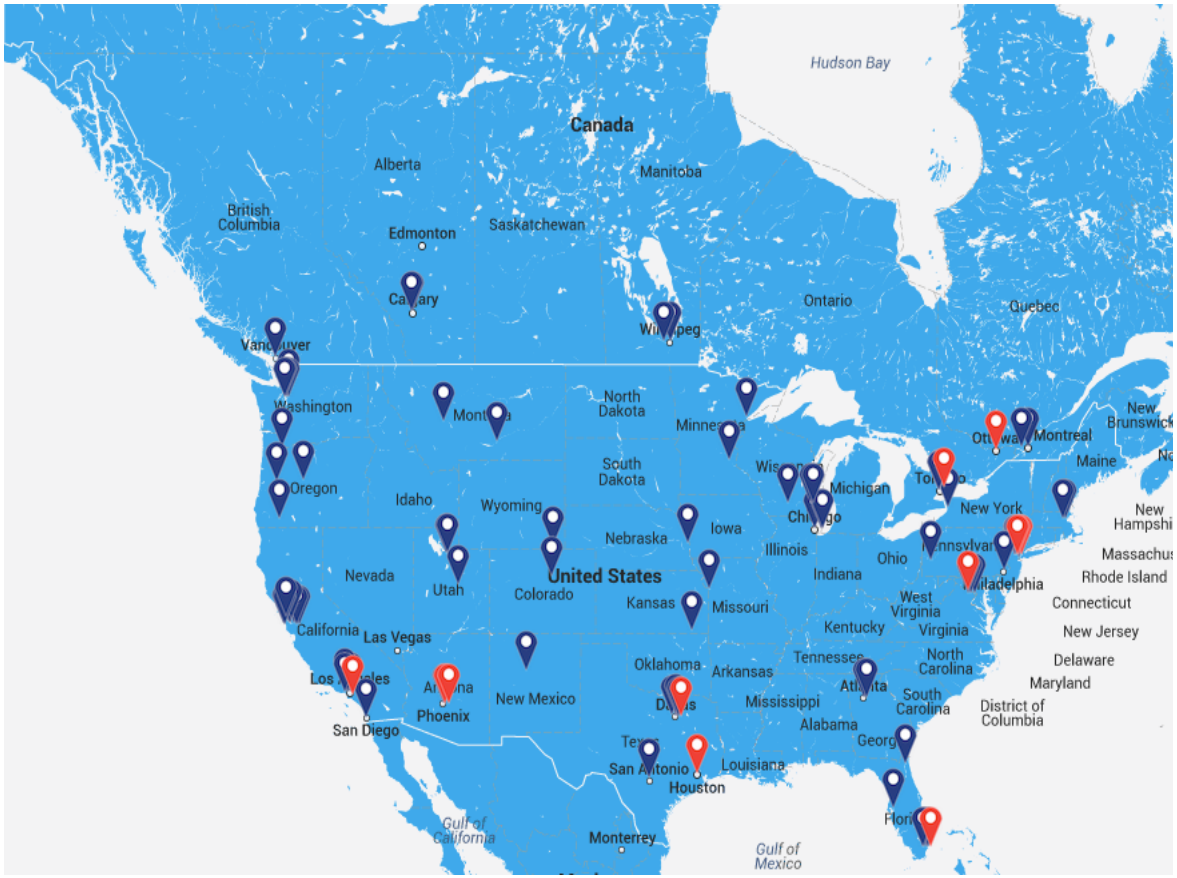
https://www.euro-ix.net/ixps/ixp-map/

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

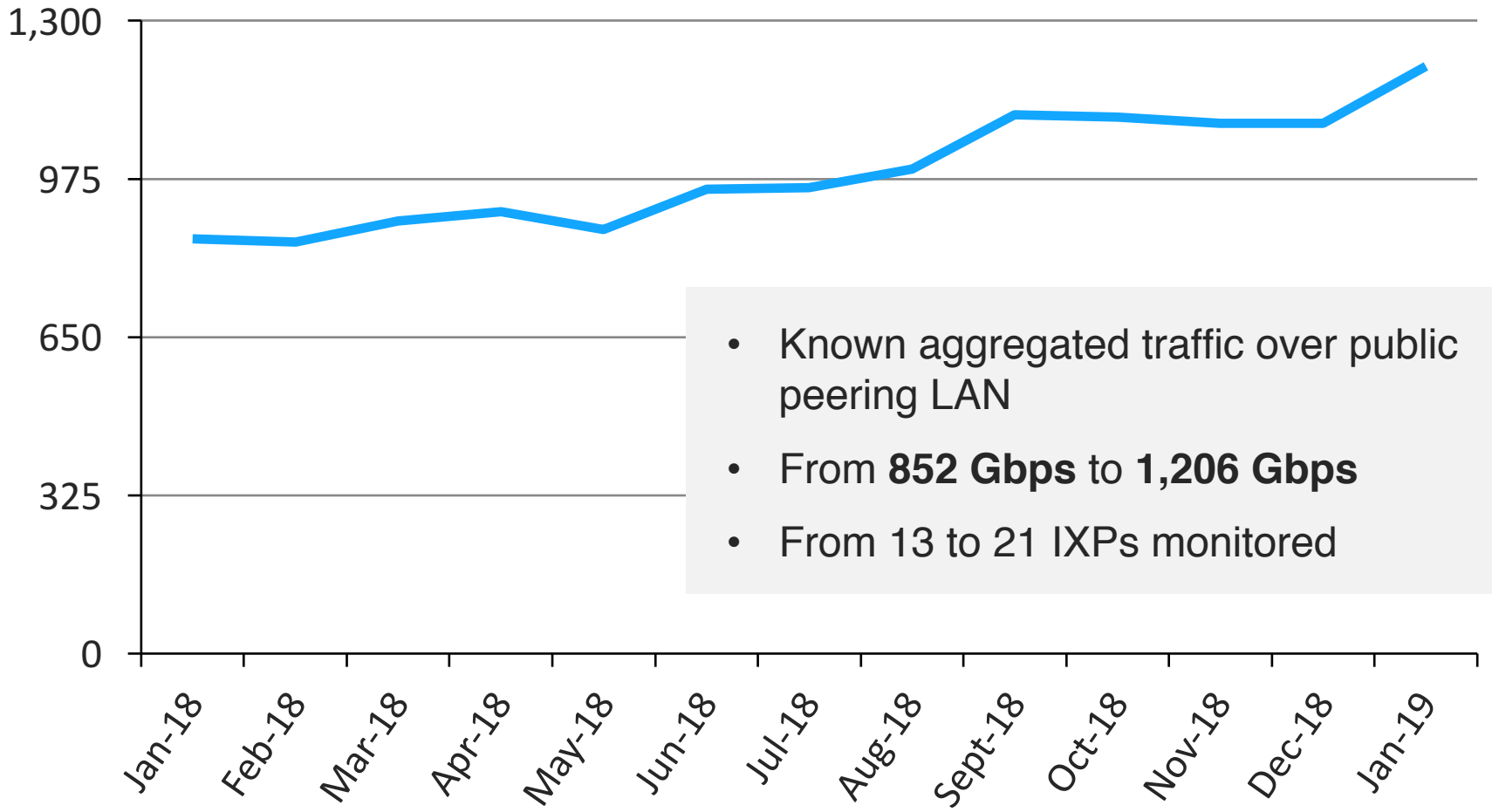
2 Countries

57 Cities

Check our Map:

https://www.euro-ix.net/ixps/ixp-map/

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

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 ourYoutube 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>
or individually:

Magnus Andersson, Netnod <magnus@netnod.se>
Pascal Delmoitie, BNIX <pascal@belnet.be>
Arnold Nipper, DE-CIX <arnold.nipper@de-cix.net>
Christian Panigl, VIX <panigl@vix.at>
Valeria Rossi, MIX <valeria.rossi@mix-it.net>
John Souter, LINX <john@linx.net>
Job Witteman, AMS-IX <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,

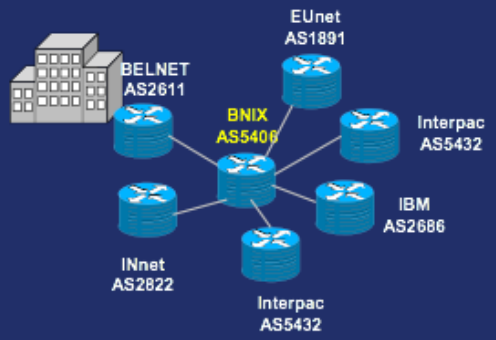
as discussed on the phone, BNIX will be represented at the 2nd Euro-IX forum by:

Ms. Edina Beylemans (edina@bnix.net)
Mr. Pascal Panneels (pascal@belnet.be)

History BNIX & Euro-IX

BNIX History

- 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

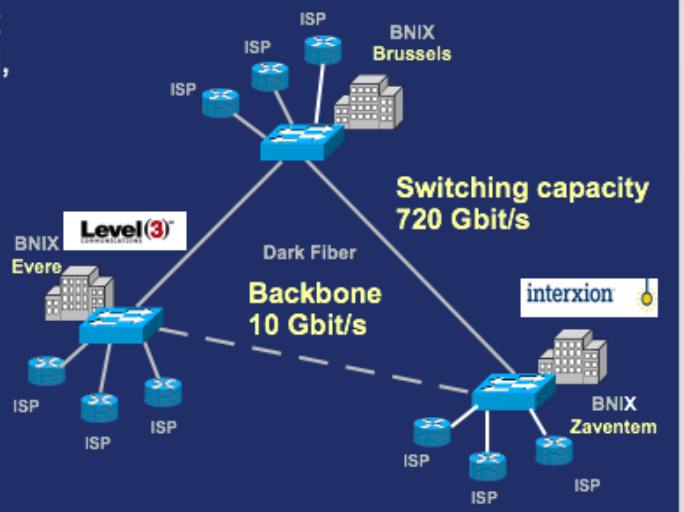


- As the number of participants grow and bandwidth demands increased, the router was replaced by a layer 2 Ethernet switch end 1996.
- In 1999, BNIX introduced the exchange of IP multicast traffic (MBNIX).
- In 2000, BNIX became open for IPv6 interconnections (BNIX6).

History BNIX & Euro-IX

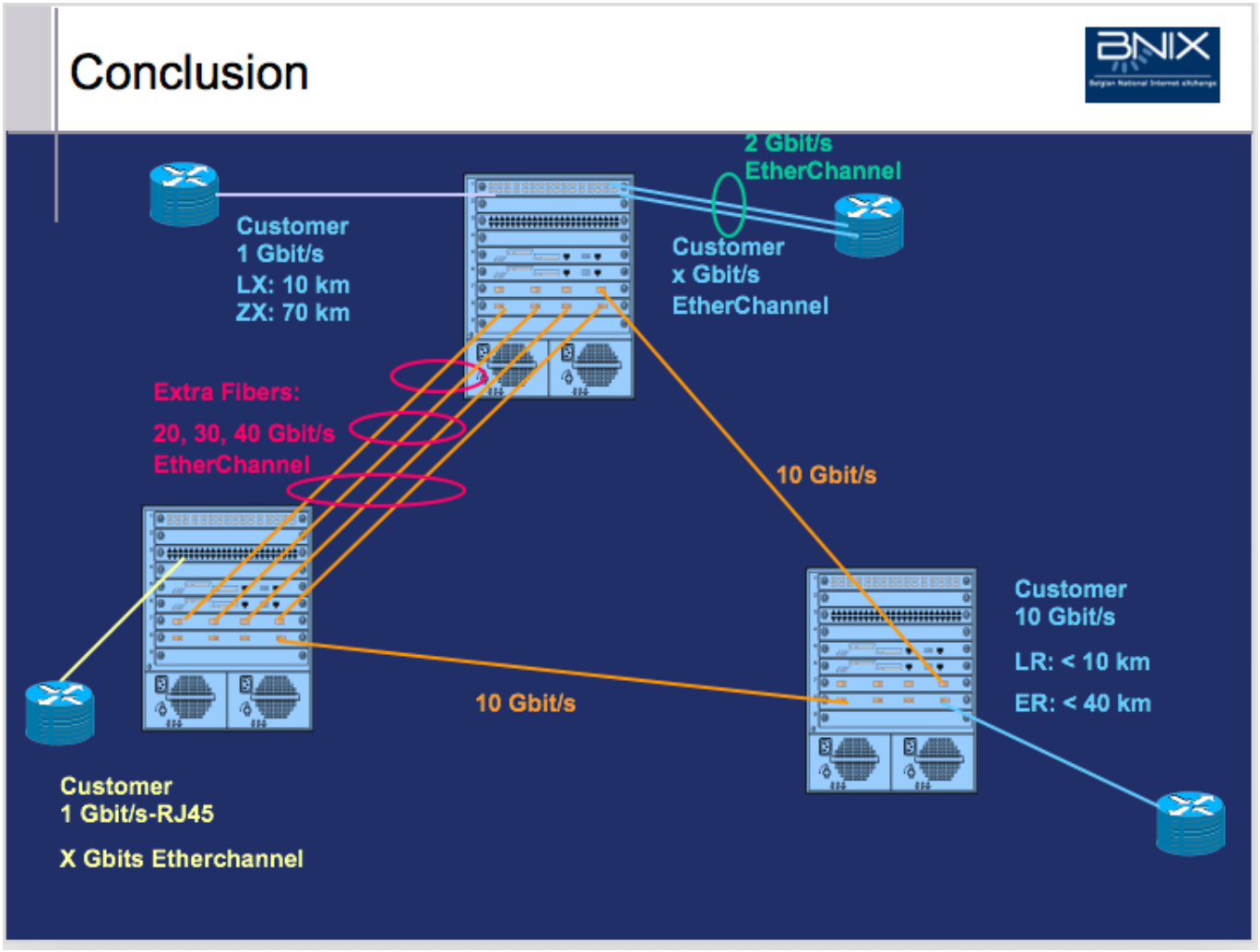
BNIX - History

- 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



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.

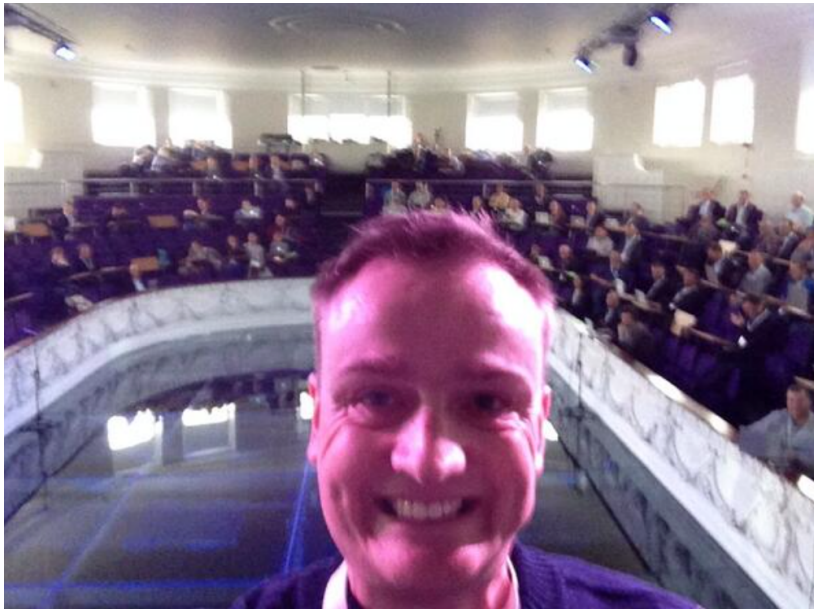
What did this mean for the forum?

- 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!!



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Thank you!

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