



euro-IX

Internet Exchange Points

2018-2019 Report

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About Euro-IX

The European Internet Exchange Association was established on June 28, 2001, in Amsterdam, The Netherlands. Since this date, the European Internet Exchange Association (Euro-IX) has operated under the responsibility of an Association according to Dutch law. Euro-IX has been set-up as a non-profit association.

Euro-IX brings together the community with the aim to share ideas and experiences and coordinate technical standards, develop common procedures and publish statistics and other useful information. To compile this report on IXPs, we used data from the Internet Exchange Point Database (IXPDB) - <https://ixpdb.euro-ix.net/en/>

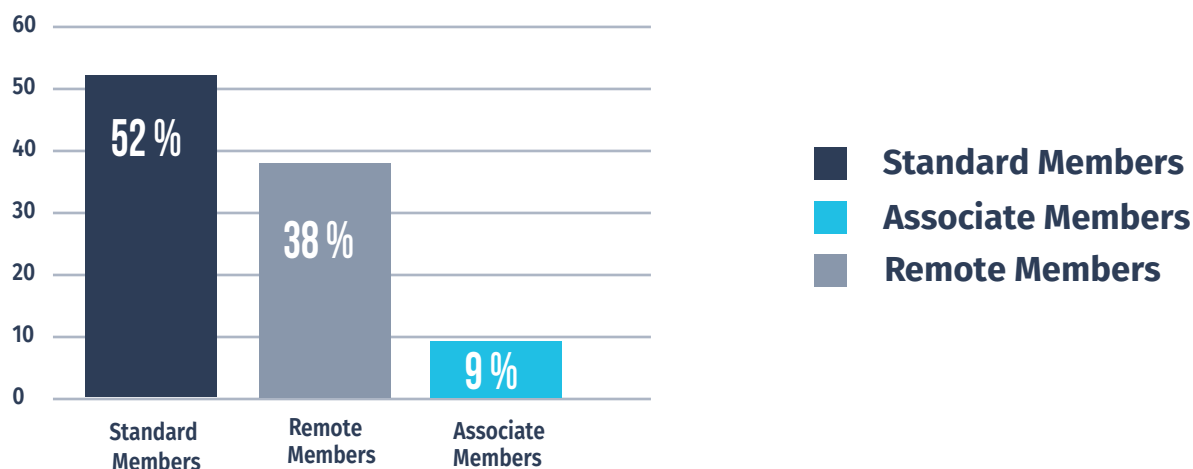
The IXPDB is an authoritative, comprehensive, public source of data related to IXPs. It collects data directly from IXPs through a recurring automated process. It also integrates data from third-party sources in order to provide a comprehensive and corroborated view of the global interconnection landscape. For example, it highlights networks that have not reported they are in PeeringDB and shows which IXPs are MANRS compliant. The combined data can be viewed,

analyzed, and exported through this web-based interface and an API.

In 2018-2019, Euro-IX counted 79 Members and 10 Patrons from the IXP-related equipment-vendor and colocation sectors of the community.

The 79 member IXPs are from 50 countries and the affiliations are as follows:

- **Standard Members:** 41 IXPs from 23 countries
- **Associate Members:** 7 IXPs from 4 countries (Brazil, Japan, UK and USA).
- **Remote Members:** 30 IXPs from 23 countries, including 13 IXPs from Europe (Albania, Armenia, Bulgaria, Finland, Iceland, Italy, Macedonia, Russia, Sweden and UK), 9 from the Af-IX region (Angola, Congo, Kenya, Mozambique, Nigeria, South Africa, Tanzania, Zambia), 3 IXPs from the APIX region (Australia, Nepal and Serbia) and 2 IXPs from the LAC-IX region (Costa Rica and Curacao) and 2 IXPs from North America (Canada).



1. Introduction

1.1 Foreword

This report has been compiled by the European Internet Exchange Association (Euro-IX) to give an overview of the IXP situation in Europe including:

- The number of Internet Exchange Points (IXPs) currently operating in Europe
- Related statistics and trends that are appearing in the European IXP market and a general global view
- The evolution over the last couple of years

1.2 Notes on this report

- Not all IXPs make their traffic statistics publicly available and no attempts at estimates were made where true figures were not presented.
- All information has been gathered on a best effort basis and relies on the information that is provided by individual IXPs. Therefore all information contained in this report is only as accurate as the information that has been published by these IXPs. If you are planning to base your decision on the information contained in this report, we strongly advise to check the information against up-to-date data.
- Not all IXPs measure their peak traffic using the same periodic average. While the majority of IXPs choose to take samples every five minutes, some have chosen to take these samples more or less frequently.
- A best effort was made to list all known operational IXPs in Europe. However we may be unaware of the existence of some IXPs and thus they do not appear in the list (Appendix 1). We welcome any information about IXPs missing from this report.
- Some IXPs that were listed in the 2016 report have not been included in the 2018-19 one due to the fact that either no contact could be made with them to verify if they are still operational, they have no working website or we have received information that they are no longer operational.

1.3 Internet Exchange Point (IXP)

Euro-IX has accepted the Internet Exchange Federations (IX-F) definition of an IXP being;

“A network facility that enables the interconnection and exchange of Internet traffic between more than two independent Autonomous Systems. 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 interfere with such traffic.”

2. IXPs in Europe

2.1 Number of operational IXPs in Europe

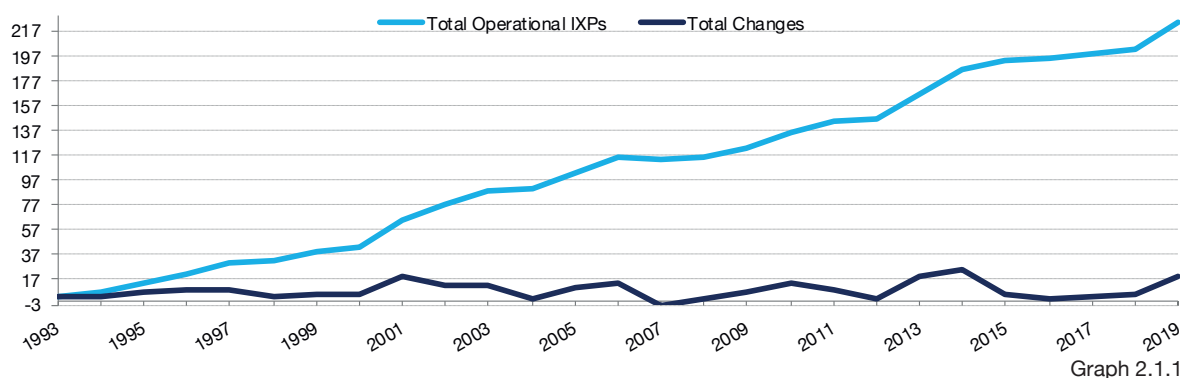
» IXP Growth in Europe over 14 years

The number of operational IXPs in Europe has increased by 119.6% over the past 14 years, going from 102 in 2005 to 224 in 2019. Whilst the growth had significantly slowed down during 2017 and 2018, 2019 saw IXP growth begin to pick up again.

Note: The growth of 19 IXPs in 2019 includes both newly established IXPs but also IXPs that were only identified by Euro-IX in 2019 (Source: IXPDB)

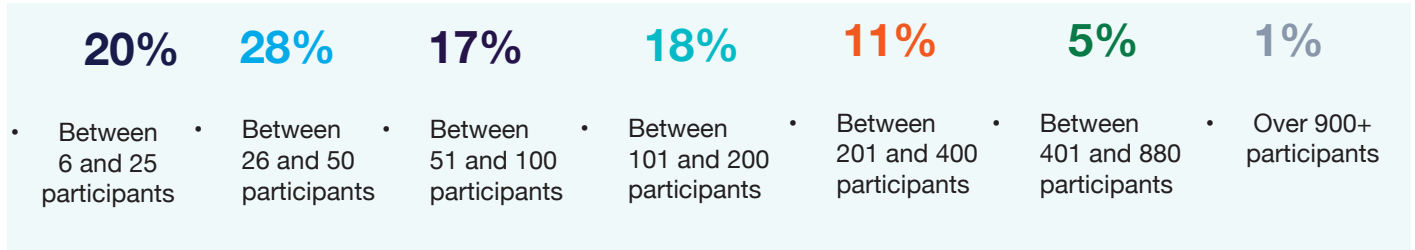
YEAR	IXPS STARTED	IXPS CLOSED OR INACTIVE	GROWTH	OPERATIONAL
2005	11	0	11	102
2006	14	0	14	116
2007	3	6	-3	113
2008	14	12	2	115
2009	12	5	7	122
2010	18	4	14	136
2011	8	0	8	144
2012	2	0	2	146
2013	22	2	20	166
2014	37	16	21	187
2015	17	11	6	193
2016	44	12	32	225
2017	5	2	3	198
2018	7	2	5	203
2019	21	2	19	224

Table 2.1.1



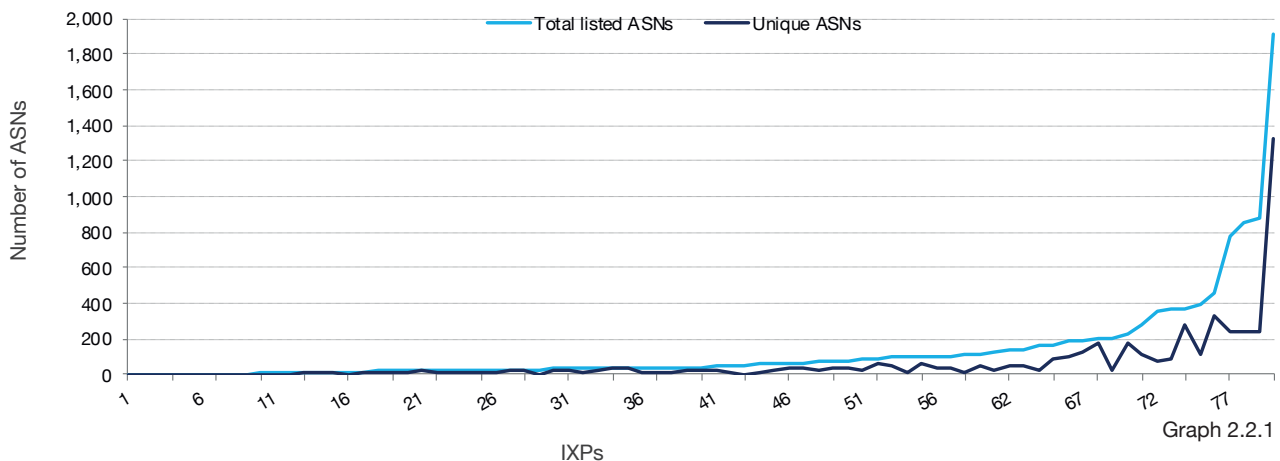
2.2 Number of connected parties amongst global Membership

» IXP Participants' distribution among Euro-IX Members



	IXP	Number of listed ASN
1	IX.br	1900
2	DE-CIX Frankfurt	880
3	AMS-IX	853
4	LINX	779
5	MSK-IX	454
6	NL-IX	389
7	NAP Africa	372
8	Equinix Paris	255
9	MIX Milan	274
10	France-IX Paris	203

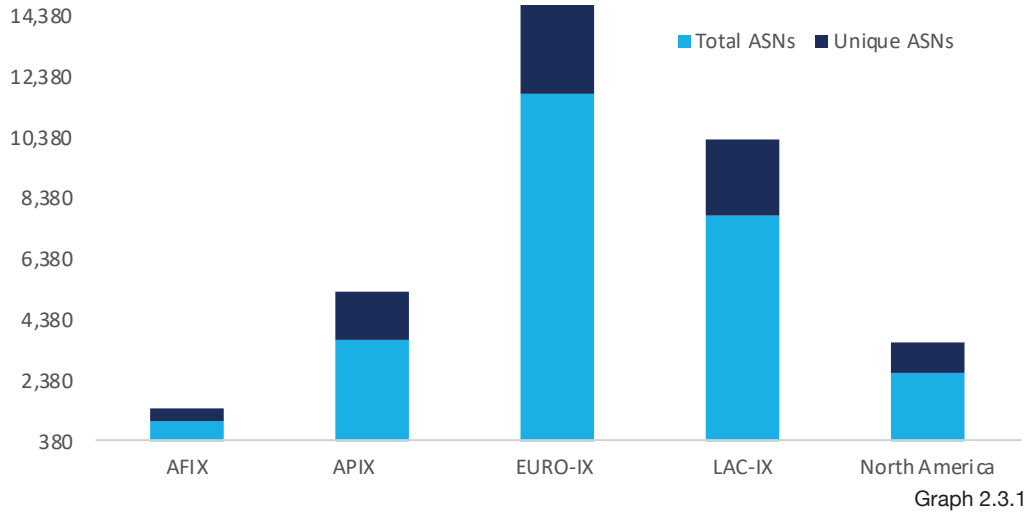
Table 2.2.1



The data shows the total listed ASNs, and unique ASNs within the Euro-IX Membership in all regions. The highest participants' distribution is from IX.br - Sao Paulo, Brazil, with over 900 ASNs. However, most IXPs have between 26 and 50 participants.

2.3 Number of connected parties globally

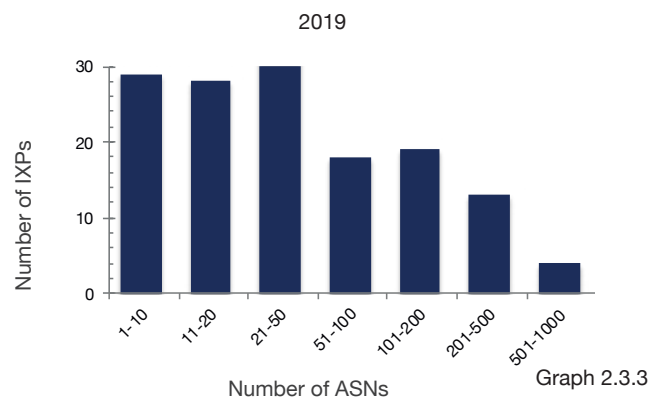
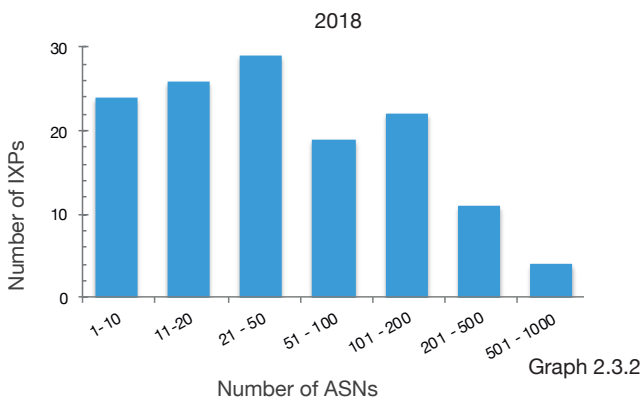
» Total and Unique Regional ASN Distribution



This bar chart shows the regional distribution of the ASNs. Unique ASNs in this context means ASNs that are not found in any of the other regions. The unique ASNs are important for networks, as they use this information when determining where they will peer. The more unique ASNs present in a country, city or at an IXP, means that you will only reach those networks by connecting in that country, city or IXP. For the 2018-19 report, we've used global data from the IXPDB to include connected parties from outside the Euro-IX Membership.

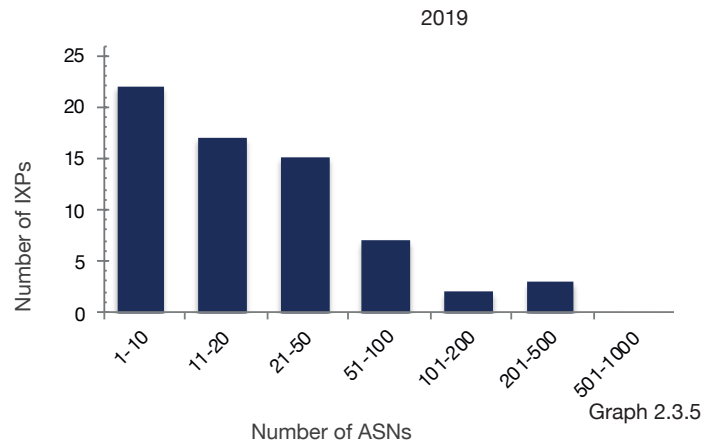
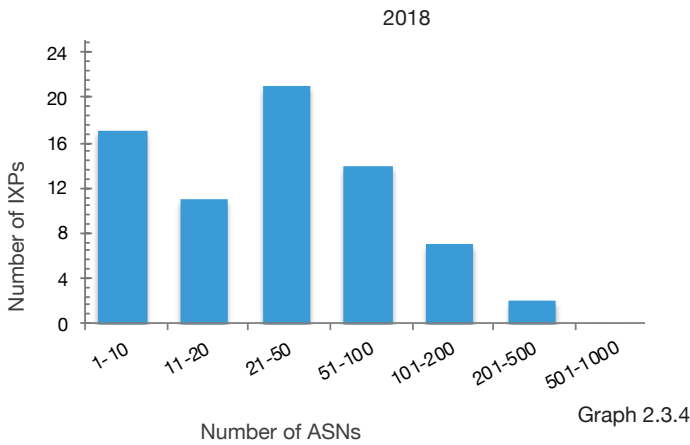
• In Europe we see the majority of IXPs that have between 21 - 50 ASNs connected, followed closely by the 11-20 range and then between 1-10. Comparing the data from 2018 and 2019 shows that there were no significant changes.

» Euro-IX Region



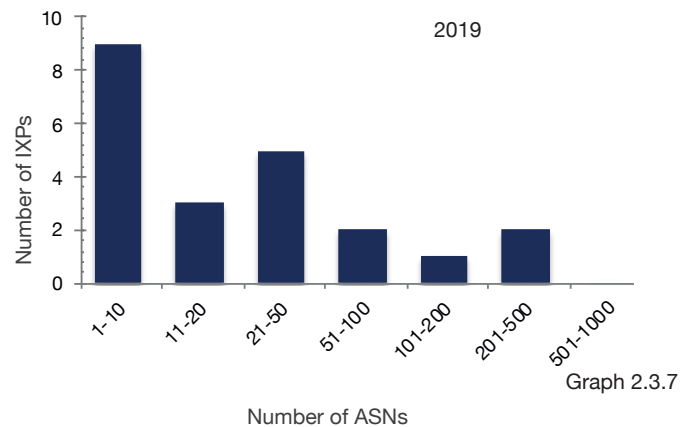
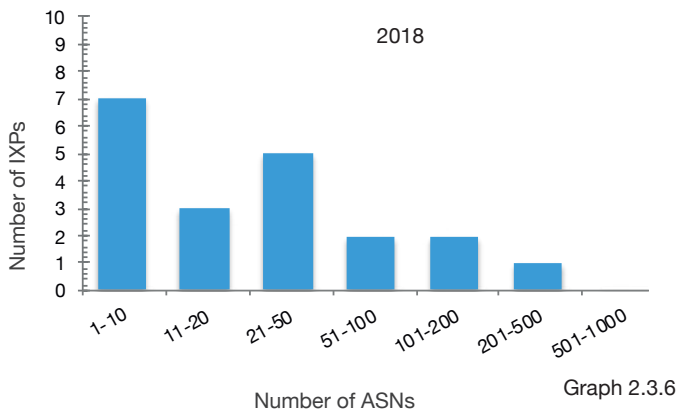
» APIX Region

• In Asia we also see the majority of IXPs had a range of 21-50 ASNs connected for 2018. This changed for 2019, where the majority of IXPs had a range of 1-10 ASNs connected. This could be due to the number of new IXPs that became live in 2019.



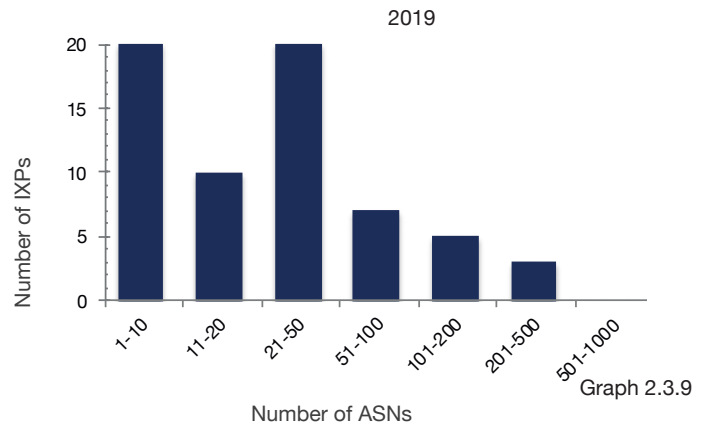
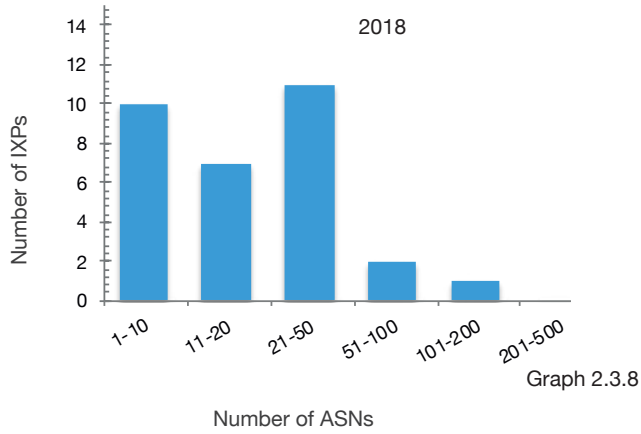
» Af-IX Region

• In Africa we see the largest majority of IXPs have a range between 1-10, followed closely by 21-50. This represents both 2018 and 2019.



» LAC-IX Region

• In the LAC region it is also clear that the majority of IXPs have between 21-50 ASNs connected in 2018. However, there was significant growth for the 1-10 category in 2019.



3. Global Traffic Statistics

3.1 Traffic Statistics in Europe

» Traffic growth over 10 years among Euro-IX membership

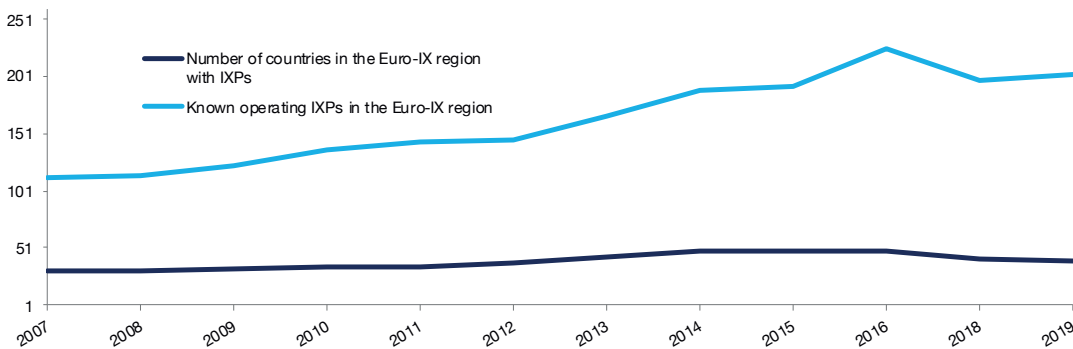
The average number of IXPs we collected data from went from 39 in 2009 to 56 in 2019. These include Euro-IX members and “sub-members”, i.e. other IXPs or PoPs operated by our members in Europe, such as LINX Manchester, Netnod Gothenburg etc.

Note: the aggregated peak traffic volume is determined by collecting publicly available traffic statistics from Euro-IX Member IXPs. The Data was captured during 12-month periods, from January to December each year.

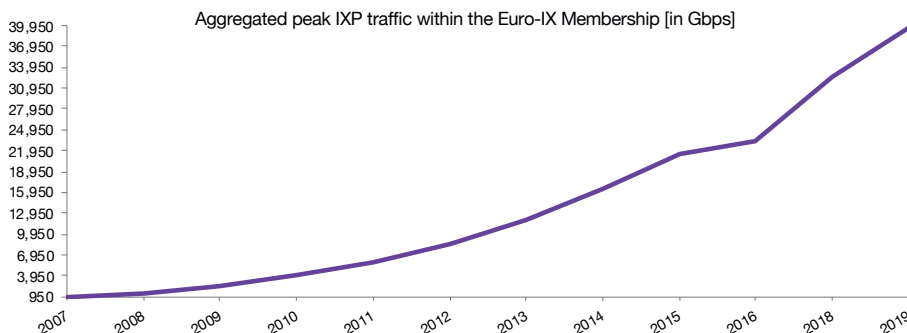
The difference in the number of countries in Europe with IXPs between 2017-2019, can be attributed to changes made to the IXPDB during this time.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Known operating IXPs in Europe	122	136	144	146	166	188	193	225	198	203	224
Number of countries in Europe with IXPs	33	35	35	38	43	48	48	49	49	42	40
Average number of IXPs we collected	39	42	44	43	45	54	55	58	54	57	56
Average aggregated peak traffic per year within Euro-IX membership (in Gbps)	2,608	4,140	6,080	7,629	10,515	13,877	18,765	23,192	26,136	27,117	34,342
Maximum aggregated peak traffic per year within the Euro-IX membership (in Gbps)	3,288	5,085	7,072	9,099	11,903	16,169	21,469	27,198	30,987	30,009	39,609

Table 3.1.1



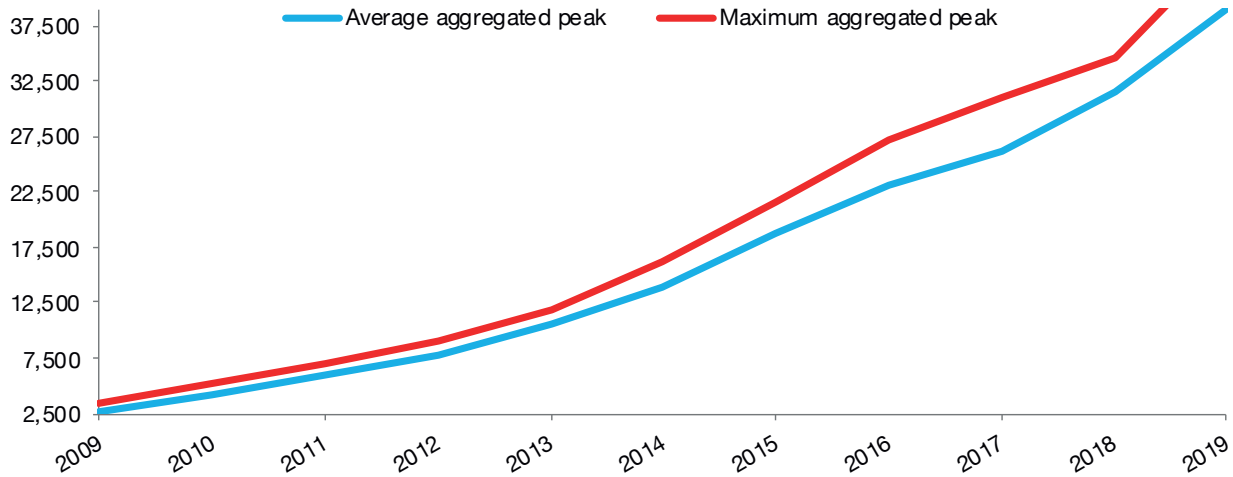
Graph 3.1.1



Graph 3.1.2

3.2 Global Traffic Statistics

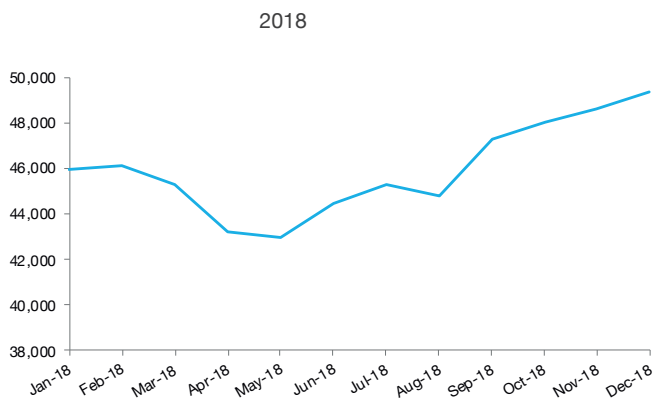
» Maximum Aggregated Global Traffic Statistics (in Gbps)



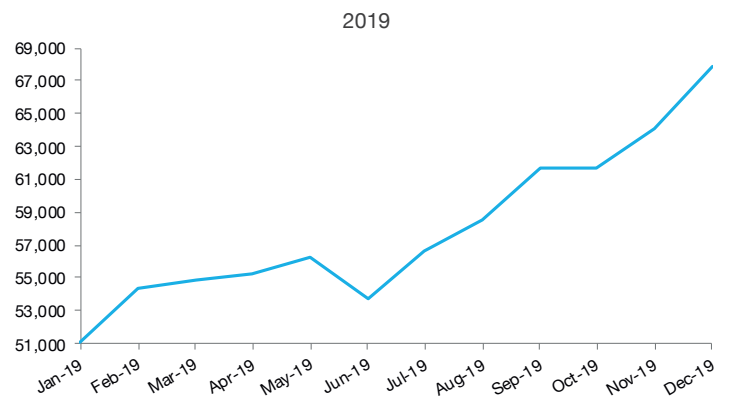
Graph 3.2.1

In 2009, the average peak and maximum peak were almost identical. However, from the graph above you can see that IXPs are better at handling peaks than they were in the earlier years.

» Total Aggregated Global Traffic Statistics (in Gbps)



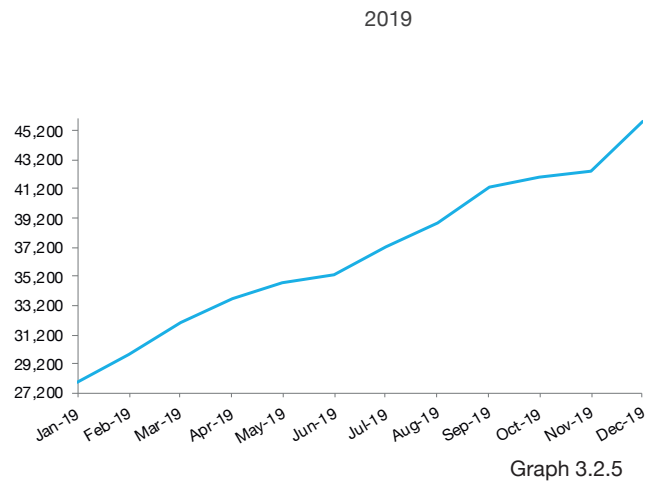
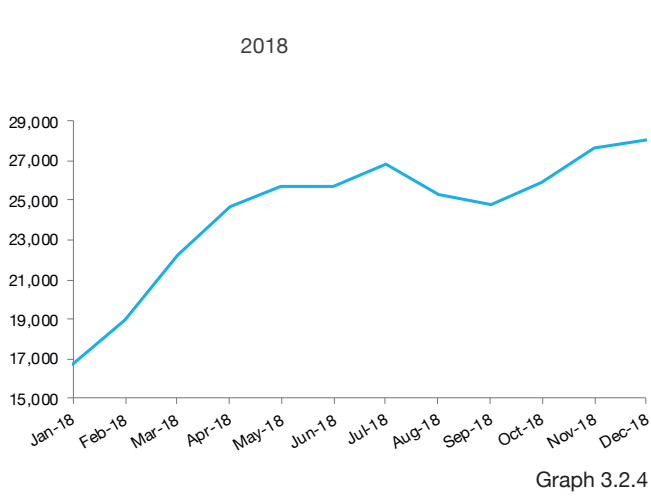
Graph 3.2.2



Graph 3.2.3

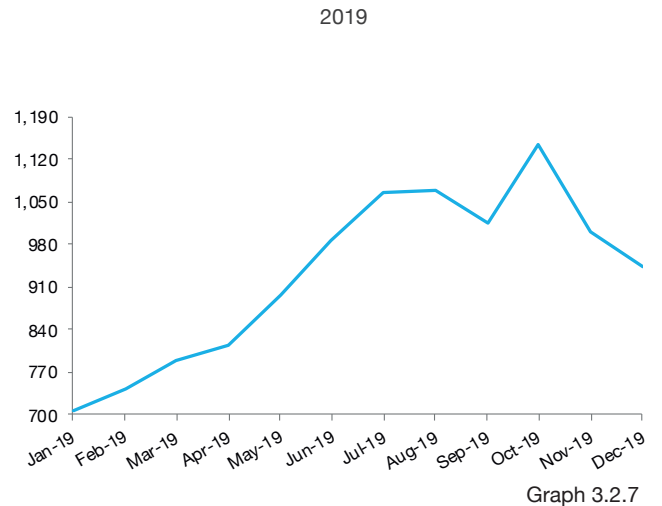
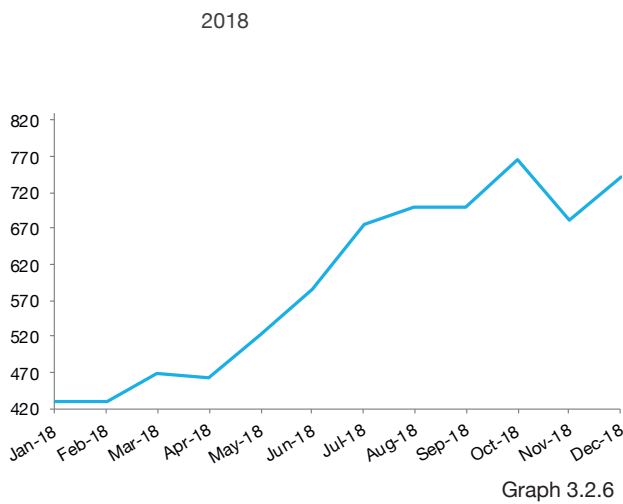
The average peak per IXP increased from 45,943 Gbps in January to 49,320 in December, with a slight drop in April and May 2018. By June/ July, there was an increase of 5.5% which can be attributed to the 2018 football World Cup. In 2019, the trend was smoother, going from 51,022 in January to 67,850 in December, with the usual summer dip.

» Traffic in the Euro-IX Region



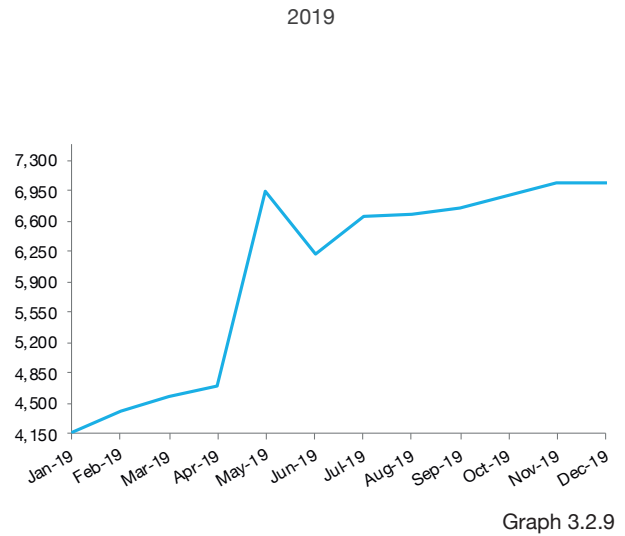
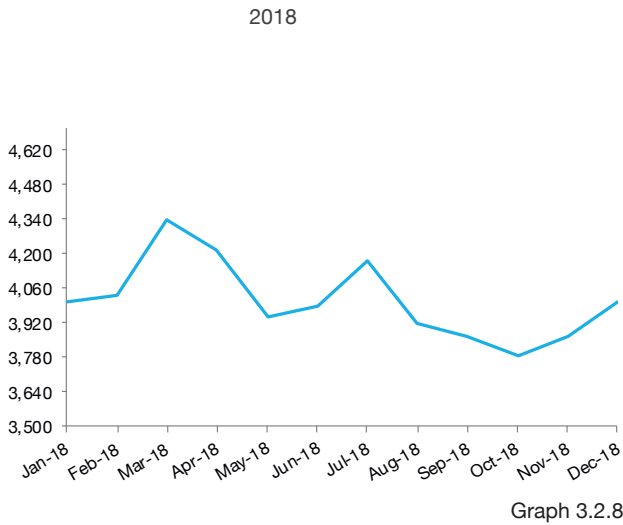
In the Euro-IX region, the traffic for 2018 and 2019 followed in similar pattern, starting low in both 2018 and 2019, with a slight dip in June and November 2019. This was due to a decrease in the number of IXPs collected from, as a result of website changes. In 2018, the average peak per IXP increased from 16,700 Gbps in January to 28,028 in December. In 2019 the total aggregated peak traffic went from 27,898 in January to 45,898 in December.

» Total Aggregated Traffic in the Af-IX Region (in Gbps)



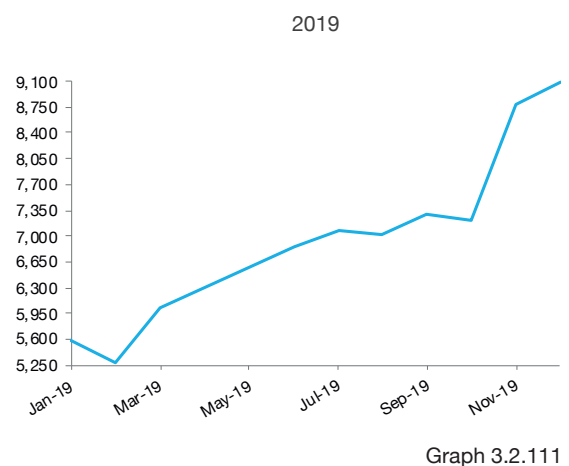
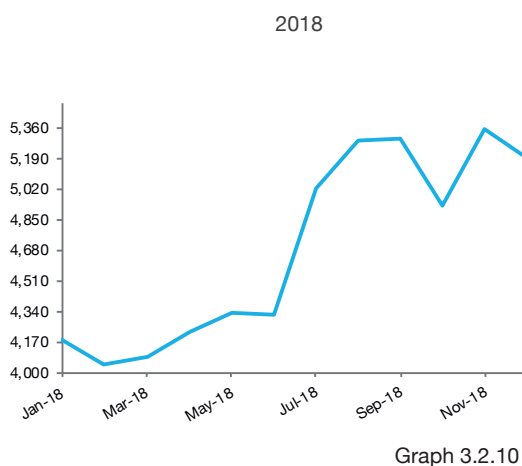
The total aggregated peak traffic in the Af-IX region has increased with 119% from January 2018 to December 2019, going from 429 Gbps in January 2018 to 941 Gbps in December 2019. These numbers are based on data collected from 8 IXPs on average, over public peering LAN.

» Total Aggregated Traffic in the APIX Region (in Gbps)



The APIX region had the most changes between 2018 and 2019. The total aggregated peaks ranged from 4,004 Gbps to 4,157 Gbps in January (2018 and 2019) and from 4,008 Gbps to 7,049 Gbps in December (2018 and 2019). In terms of traffic, the leading IXPs in the Asia-Pacific region are HKIX in Hong-Kong, JPNAP in Tokyo, JPIX in Tokyo and KINX in Seoul. For these 4 IXPs, the traffic peaks above 200 Gbps each month.

» Total Aggregated Traffic in the LAC-IX Region (in Gbps)



The total aggregated peak traffic in the LAC-IX region has increased with 117% going from 4,181 Gbps in January 2018 to 9,091 Gbps in December 2019. These numbers are based on data collected from 34 IXPs on average, over public peering LAN. The largest peaks can be attributed to IX.br.

3.3 Traffic Statistics - Top 10 among the Euro-IX Membership

» IXPs with the most traffic in 2018

	IXP	Maximum in Gbps in 2018
1	DE-CIX Frankfurt	6,670
2	AMS-IX	5,845
3	LINX LON1	3,966
4	MSK-IX	3,119
5	DATA-IX	2,800
6	France-IX	1,200
7	Netnod Stockholm	1,523
8	France-IX	1,200
9	PLIX*	931
10	NIX.cz	815

Table 3.3.1

» Countries with the most IXP traffic in 2018

	Country	Aggregated Traffic Peaks in 2018 (in Gbps)
1	Germany	8,951
2	The Netherlands	5,845
3	United Kingdom	5,104
4	Russian Federation	3,119
5	Sweden	1,869
6	Poland	1,381
7	Czech Republic	1,525
8	France	1,283
9	Italy	880
10	Vienna	552

Table 3.3.2

Note: *Traffic data taken when Equinix Warsaw was PLIX.

» IXPs with the most traffic in 2019

	IXP	Maximum in Gbps in 2019
1	DE-CIX Frankfurt	8,200
2	AMS-IX	7,000
3	LINX LON1	3,650
4	MSK-IX	3,366
5	NL-IX	2,730
6	France-IX	2,020
7	Netnod Sundsvall	1,950
8	Netnod Stockholm	1,650
9	Peering.cz	1,230
10	ECIX	1,217

Table 3.3.3

» Countries with the most IXP traffic in 2019

	Country	Aggregated Traffic Peaks in 2019 (in Gbps)
1	Germany	10,584
2	The Netherlands	9,730
3	United Kingdom	5,137
4	Russian Federation	3,824
5	Sweden	3,725
6	Czech Republic	2,430
7	France	2,143
8	Italy	1,229
9	Spain	1,087
10	Poland	846

Table 3.3.4

4. Port Price Distribution

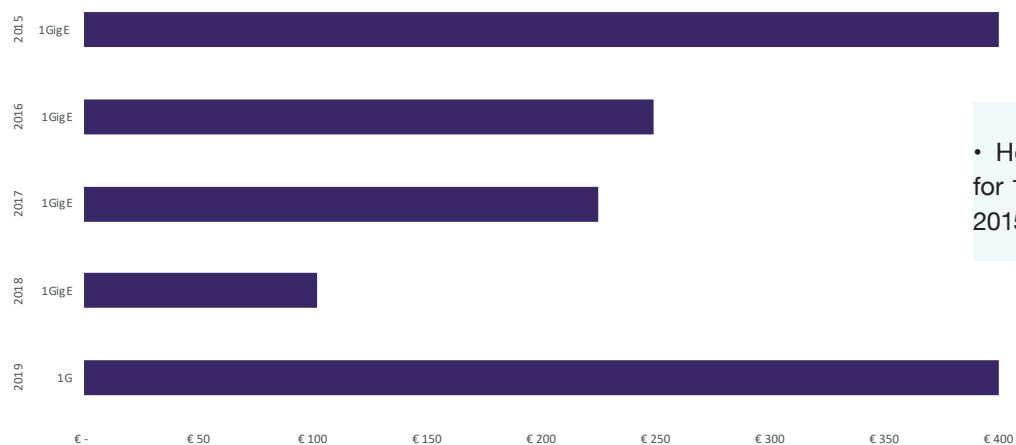
4.1 Port price distribution among Euro-IX Membership over 5 years

Port #	2015	2016	2017	2018	2019
100M (range)	€10-€ 390	€9-€230	€27-€206	€1-€272	€35-€250
Average €	€175	€80	€84	€9	€86
1Gig (range)	€61-€1,500	€26-€600	€27-€500	-	€77-€367
Average €	€400	€249	€225	-	€479
1GigE (range)	€55-€5,807	€104-€950	€70-€700	€1-€792	-
Average €	€551.50	€337	€373	€102	-
10GigE (range)	€375-€6,451	€169-€2,500	€163-€2,336	€4-€980	€54-€800
Average €	€867	€804	€754	€170	€463
40GigE (range)	€3,333-€5,400	€1300-€4,412	€781-€4,500	€300-€1,660	€155-€1,700
Average €	€3500	€2,366	€2,516	€990	€1,376
100GigE (range)	€1,468-€9,500	€2046-€9,500	€1304-€7,500	€1-€5,255	€194-€9,400
Average	€5,000	€4,292	€3,879	€3,500	€3,247

Table 4.1.1

*key; - = data unavailable

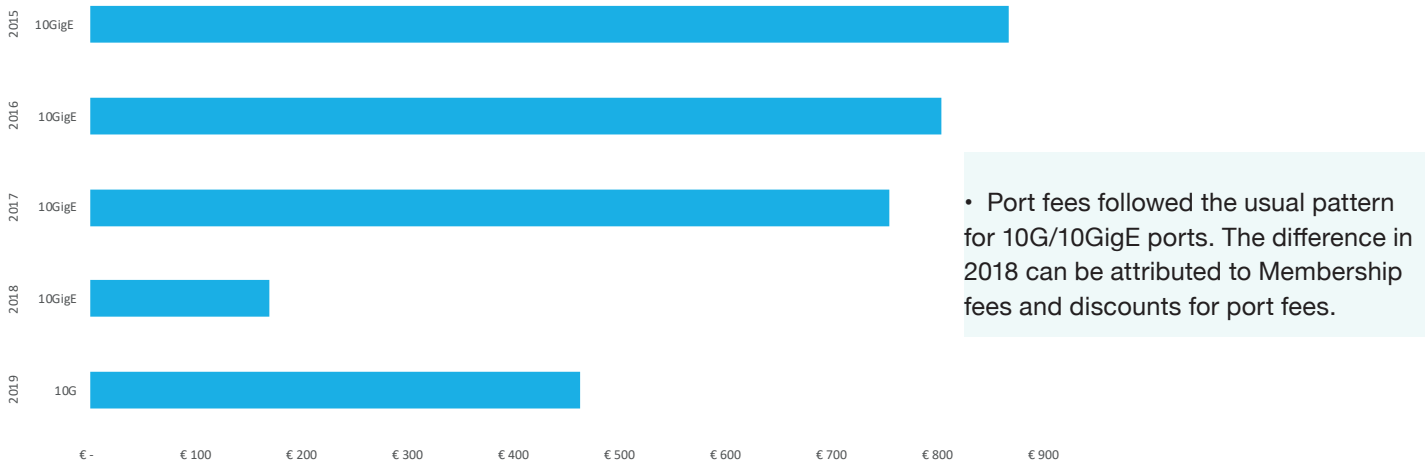
» Port price over 5 years for 1G/1GigE ports



• Here we see that the price for 1G in 2019 and 1GigE in 2015 is nearly the same.

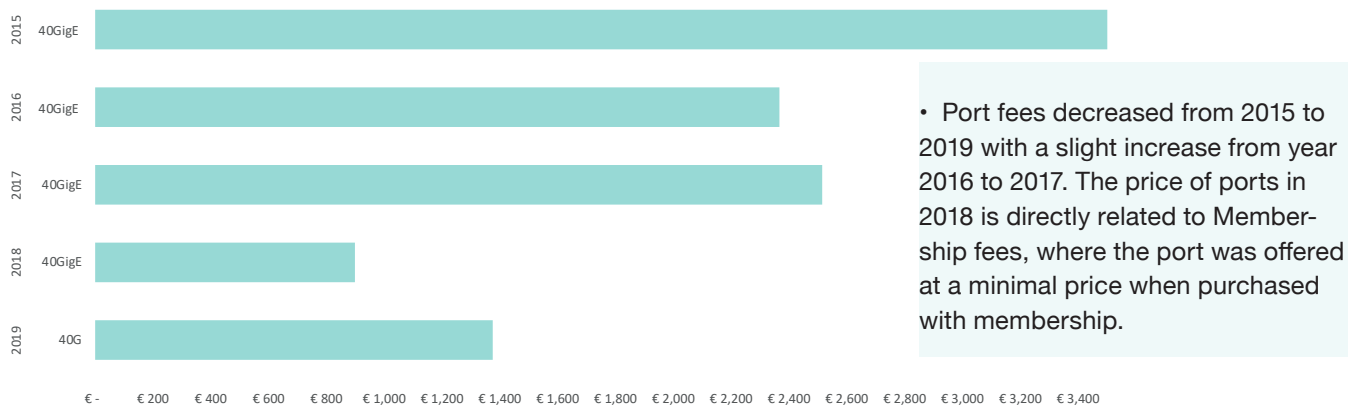
Graph 4.1.1

» Port price over 5 years for 10G/10GigE ports



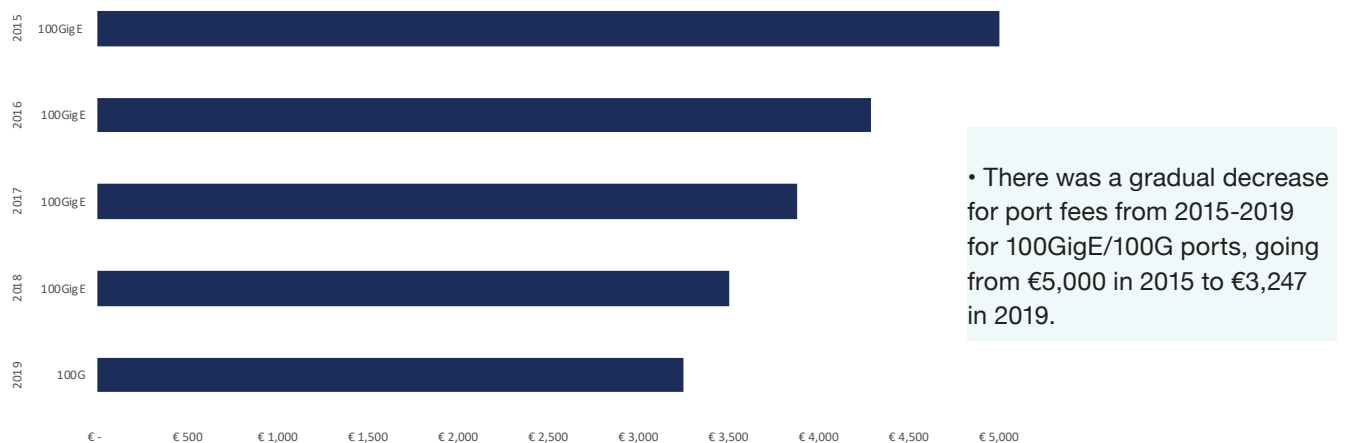
Graph 4.1.2

» Port price over 5 years for 40G/40GigE ports



Graph 4.1.3

» Port price over 5 years for 100g/100GigE ports



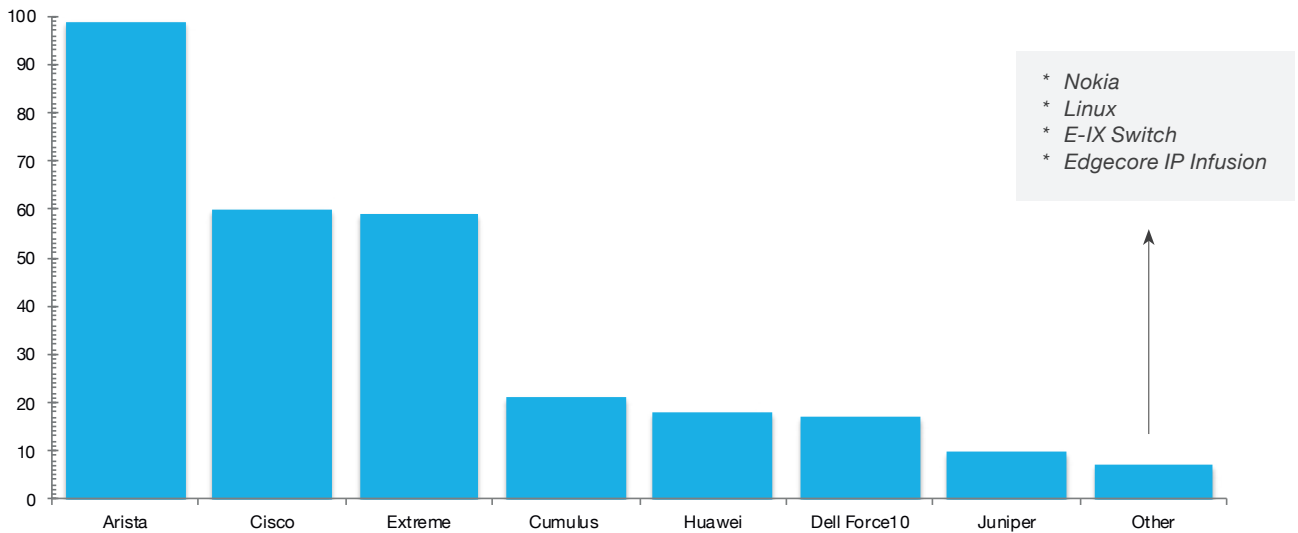
Graph 4.1.4

5. IXP Switching Platform Technology

5.1 Switches in use at IXPs

» Number of switches in use in 2018/2019

*Data source: IXPDB



* Nokia
 * Linux
 * E-IX Switch
 * Edgecore IP Infusion

Graph 5.1.1

» Market Share of Vendors

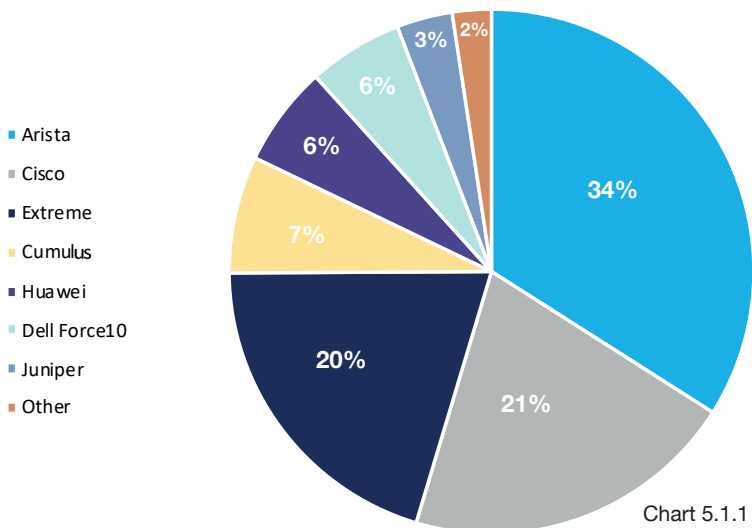
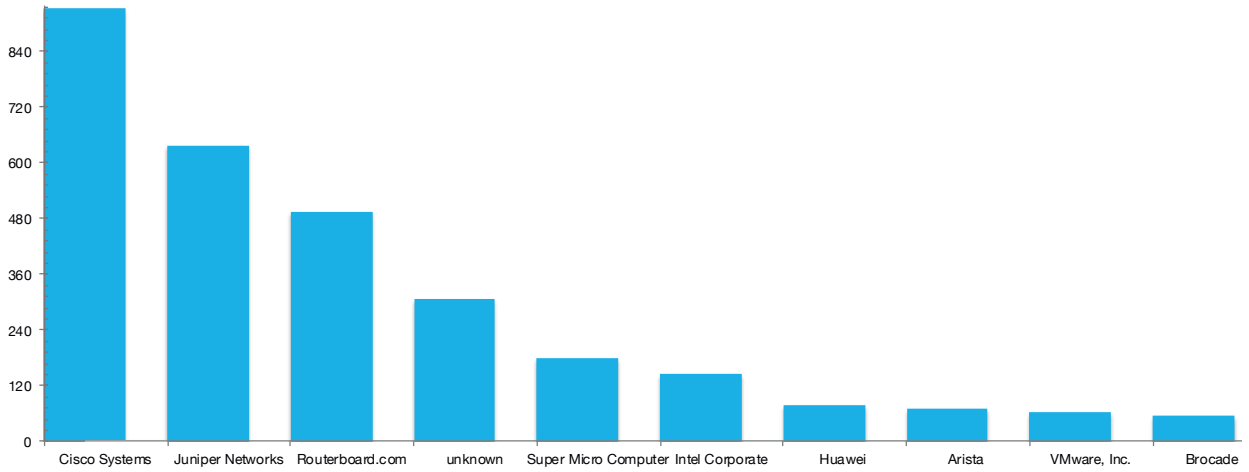


Chart 5.1.1

5.2 Network Peering Hardware

» Hardware used at the IXP participants



Graph 5.2.1

» IXP Participants' Market Share by Vendor

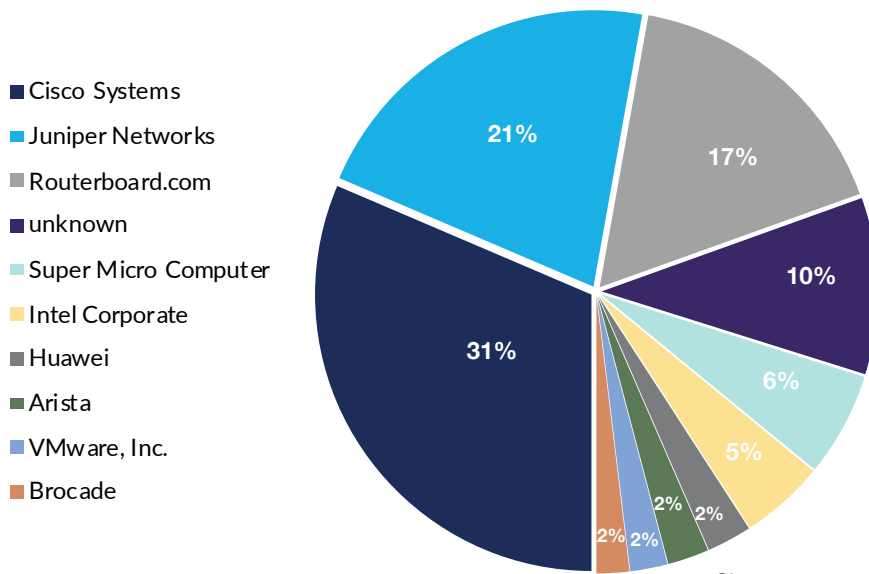


Chart 5.2.1

6. Further information

6.1 Resources

IXPDB - The data in the IXPDB is automatically updated from JSON feeds supplied directly by the IXPs. The data, in addition to Member lists and location information, also includes details of hardware used at IXPs.

We thank all sponsors of the IXPDB, Euro-IX Members and Patrons. We additionally thank all European IXPs, and especially those that provide publicly available information.

6.2 Contact

We welcome all forms of feedback and suggestions concerning this report and will do our best to answer any further requests for information.

The Euro-IX Secretariat
secretariat@euro-ix.net

Appendix 1

List of known IXPs in Europe

Note: * indicates Euro-IX Member / ** indicates IXPs operated by our Members

COUNTRY	# OF IXPS	CITY	FULL NAME OF IXP	ACRONYM
Albania	1			
		Tirana	Albanian Neutral Internet Exchange	ANIX*
Armenia	1			
		Yerevan	Armenia Internet Exchange	ARMIX*
Austria	5			
		Graz	Grazer Internet Exchange	GraX
		Klagenfurt	Alpes Adria Internet Exchange	AAIX
		Vienna	Community Internet Exchange - Vienna	Community-IX Vienna
		Vienna	Equinix Internet Exchange - Vienna	Equinix Vienna**
		Vienna	Vienna Internet eXchange	VIX*
Belarus	1			
		Minsk	Belarus National Internet Exchange Point	BY-IX
Belgium	2			
		Brussels	Belgian National Internet Exchange	BNIX*
		Waasmunster	Belgium Internet Exchange	BelgiumIX
Bosnia and Herzegovina	1			
		Sarajevo	Bosnia and Herzegovina Internet Exchange	BHNIX*
Bulgaria	5			
		Sofia	Balkan Internet Exchange	Balkan-IX
		Sofia	Bulgarian Internet Exchange	BIX.BG*
		Sofia	Sofia Internet Exchange	IX-SOF
		Sofia	NetIX	NetIX*
		Sofia	T-CIX	T-CIX
Croatia	1			
		Zagreb	Croatian Internet eXchange	CIX*
Cyprus	1			
		Nicosia	Cyprus Internet Exchange	CyIX
Czech Republic	3			
		Brno	Brno Internet Exchange Point	BR-IX
		Prague	Neutral Internet eXchange of Czech Republic	NIX.CZ*
		Prague	Peering.cz	Peering.cz*
Denmark	3			
		Copenhagen	Danish Internet eXchange point	DIX*
		Copenhagen	Netnod - Copenhagen	Netnod - Copenhagen**
		Copenhagen	Stockholm Internet Exchange - Copenhagen	STHIX Copenhagen**
Estonia	4			
		Riga	PITER-IX	PITER-IX Riga**
		Tallinn	Tallinn Governmental Internet Exchange	RTIX
		Tallinn	Tallinn Internet eXchange	TIX Tallinn
		Tallinn	Tallinn Internet Exchange	TLLIX

Finland 6			
	Espoo	Finnish Communication and Internet Exchange	FICIX - Espoo**
	Espoo	Global Internet Exchange - Helsinki	Global-IX - Espoo
	Helsinki	Finnish Communication and Internet Exchange	FICIX - Helsinki*
	Oulu	Finnish Communication and Internet Exchange	FICIX - Oulu**
	Helsinki	Global Internet Exchange - Helsinki	Global-IX - Helsinki
	Tampere	Tampere Region Exchange	TREX*
France 13			
	Clermont Ferrand	AuvernIX	AuvernIX
	Grenoble	Grenoble Internet Exchange Point	GrenobIX**
	Lille	Lille Internet Exchange	Lillix
	Lyon	Lyon Global Internet Exchange	LyonIX*
	Marseille	France Internet Exchange - Marseille	France-IX Marseille**
	Marseille	Deutscher Commercial Internet Exchange	DE-CIX Marseille**
	Nantes	OuestelX	OustelX
	Paris	Equinix Internet Exchange - Paris	Equinix Paris**
	Paris	French National Internet Exchange IPv6	FNIX6
	Paris	France Internet Exchange	France-IX*
	Paris	Service for French Internet eXchange	SFINX*
	Rennes	Breizh-IX	Breizh-IX
	Toulouse	GIX de la grande region Toulousaine	TOUIX*
Germany 20			
	Berlin	Berlin Commercial Internet Exchange	BCIX*
	Berlin	Europen Commercial Internet Exchange - Berlin	ECIX Berlin*
	Berlin	Community-IX	Community-IX
	Bremen	Bremen Internet Exchange	BREM-IX
	Dortmund	Dortmund Internet Exchange	DO-IX*
	Düsseldorf	Deutscher Commercial Internet Exchange	DE-CIX Düsseldorf**
	Düsseldorf	European Commercial Internet Exchange - Dusseldorf	ECIX Dusseldorf**
	Düsseldorf	Local Internet Exchange	LocIX Düsseldorf
	Düsseldorf	OpenCarrier e.G. Member IX Dusseldorf	OCIX Düsseldorf
	Frankfurt	Deutscher Commercial Internet Exchange	DE-CIX Frankfurt*
	Frankfurt	European Commercial Internet Exchange - Frankfurt	ECIX Frankfurt**
	Frankfurt	Equinix Internet Exchange - Frankfurt	Equinix Frankfurt**
	Frankfurt	Local Internet Exchange	LocIX Frankfurt
	Hamburg	Deutscher Commercial Internet Exchange	DE-CIX Hamburg**
	Hamburg	Europen Commercial Internet Exchange - Hamburg	ECIX Hamburg**
	Karlsruhe	Baden-Württemberg Internet Exchange Karlsruhe	BW-IX
	Munich	Deutscher Commercial Internet Exchange	DE-CIX Munich**
	Munich	Europen Commercial Internet Exchange - Munich	ECIX Munich**
	Nuernberg	Nuernberger Internet eXchange	N-IX
	Stuttgart	Stuttgarter Internet eXchange	S-IX
Greece 2			
	Athens	Greek Internet Exchange	GR-IX*
	Thessaloniki	Greek Internet Exchange	GR-IX Thessaloniki**

Hungary		1	
	Budapest	Budapest Internet eXchange	BIX*
Iceland		1	
	Reykjavik	Reykjavik Internet Exchange	RIX*
Ireland		3	
	Cork	Internet Neutral EXchange	INEX Cork**
	Dublin	Internet Neutral EXchange	INEX*
	Dublin	Equinix Internet Exchange - Dublin	Equinix Dublin**
Israel		1	
	Tel-Aviv	Israeli Internet eXchange	IIX - Tel Aviv
Italy		10	
	Florence	Tuscany Internet eXchange	TIX Tuscany*
	Milan	Equinix Internet Exchange - Milan	Equinix Milan**
	Milan	Milan Neutral Access Point	MiNAP
	Milan	Milan Internet eXchange	MIX-IT*
	Padova	VSIX Nap del Nord Est	VSIX*
	Palermo	Deutscher Commercial Internet Exchange - Palermo	DE-CIX Palermo**
	Piacenza	Piacenza Internet Exchange	PCIX
	Rome	Nautilus Mediterranean Exchange Point	NaMeX*
	Torino	Torino Piemonte Exchange Point	TOP-IX*
	Udine	Friuli Venezia Giulia Internet eXchange	FVG-IX*
Kazakhstan		2	
	Almaty	Kazakhstan Traffic Exchange	KAZ-IX
	Semey	KazNIX Exchange Point	KazNIX
Kosovo		1	
	Prishtinë	Kosovo Internet Exchange Point	KOSIX*
Latvia		3	
	Riga	Latvian Internet eXchange	LIX - Latvia
	Riga	Moscow Internet Exchange - Riga	MSK-IX Riga**
	Riga	Santa Monica Internet Local Exchange	SMILE
Lebanon		2	
	Beirut	Advanced Internet eXchange	A-IX
	Beirut	Beirut Internet Exchange	Beirut-IX*
Liechtenstein		1	
	Eschen	Rheintal IX Internet Exchange	Rheintal IX
Lithuania		3	
	Vilnius	Baltic Internet Exchange	BALT-IX
	Vilnius	Lietuvos Interneto paslaugų tiekėjų apsikeitimo mazgu	LIPTAM
	Vilnius	Lithuania Internet Exchange	litix
Luxembourg		1	
	Luxembourg	Luxembourg Commercial Internet Exchange	LU-CIX*
Macedonia		1	
	Skopje	Faculty of Computer Science and Engineering	IXP.mk
Moldova, Republic of		1	
	Chisinau	Internet eXchange Moldova	MD-IX
Netherlands		13	
	Amsterdam	Amsterdam Internet Exchange	AMS-IX*
	Amsterdam	Asteroid Amsterdam IX	Asteroid*
	Amsterdam	Equinix Internet Exchange - Amstedam	Equinix Amsterdam**
	Amsterdam	Global Internet Exchange - Amsterdam	Global-IX Amsterdam**
	Emmen	Zuid Oost Drentse Internet eXchange	ZOD-IX
	Enschede	Nederlands-Duitse Internet Exchange	NDIX
	Groningen	Groningen Internet Exchange	GN-IX
	Leeuwarden	Friese Internet Exchange	FR-IX

	Rotterdam	Rotterdam Internet Exchange	R-IX
	The Hague	Data Facilities Internet Exchange	DF-IX
	The Hague	LayerSwitch Internet Exchange	LSIX
	The Hague	Netherlands Internet Exchange	NL-ix*
		Local Internet Exchange	LocIX Netherlands
Norway	7		
	Bergen	Bergen Internet Exchange	BIX**
	Oslo	Free Internet eXchange Oslo	FIXO
	Oslo	Norwegian Internet eXchange	NIX*
	Oslo	Norwegian Internet eXchange	NIX2**
	Stavanger	Stavanger Internet Exchange	SIX - Stavanger
	Tromsø	Tromsø Internet Exchange	TIX
	Trondheim	Trondheim Internet Exchange	TRDIX**
Palestinian Territory, Occupied	1		
	Ramallah	Palestine Internet Exchange Point	PIX Palestine
Poland	12		
	Gdansk	Gdansk Internet eXchange	GIX Gdansk
	Katowice	E-Poludnie Internet Exchange - Katowice	EPIX Katowice
	Krakow	Cracow Internet Exchange	CIX KR
	Lodz	Lodz Telecommunication Node	IX.LODZ.PL
	Lodz	Lodz Internet Exchange	LIX - Poland
	Poznan	Poznan Internet Exchange	PIX
	Warsaw	KIX - Poland	KIX - Poland
	Warsaw	Polish Internet Exchange	PLIX (Equinix)**
	Warsaw	Equinix Internet Exchange - Warsaw	Equinix Warsaw **
	Warsaw	Orange Polska Internet Exchange	TPIX*
	Warsaw	Warsaw Internet eXchange	WIX - Poland
	Warsaw	E-Poludnie Internet Exchange - Warszawa	EPIX Warszawa
Portugal	3		
	Lisbon	Deutscher Commercial Internet Exchange - Lisbon	DE-CIX Lisbon**
	Lisbon	GIGAbit Portuguese Internet eXchange	GigaPix*
	Lisbon	Equinix Internet Exchange - Lisbon	Equinix Lisbon**
Romania	5		
	Bucharest	Balcan-IX Internet Exchange	BALCAN-IX
	Bucharest	InterLAN IX	InterLAN*
	Bucharest	Romanian Internet eXchange	RoNIX
	Constanta	Tomis Internet Exchange	Tomix
	Targoviste	LNK Internet Exchange	LNK-IX
Russian Federation	29		
	Barnaul	SFO-IX	SFO-IX
	Chelyabinsk	Chelyabinsk Peering Point	CHEL-PP
	Ekaterinburg	Moscow Internet Exchange - Ekaterinburg	MSK-IX Ekaterinburg**
	Kazan	Moscow Internet Exchange - Kazan	MSK-IX Kazan**
	Khabarovsk	DataIX - Khabarovsk	DataIX - Khabarovsk**
	Krasnodar	South Russia IX	Sea-IX
	Krasnoyarsk	Krasnoyarsk Internet Exchange	SIBIR-IX
	Moscow	Dataline Internet Exchange	DatalineIX
	Moscow	DataIX - Moscow	DataIX - Moscow**
	Moscow	MPIX	MPIX
	Moscow	Moscow Internet Exchange	MSK-IX*
	Moscow	PITER-IX Moscow	PIETER-IX Moscow**
	Nizhny Novgorod	IX of Nizhny Novgorod	NNOV-IX
	Novosibirsk	DataIX - Novosibirsk	DataIX - Novosibirsk**
	Novosibirsk	Moscow Internet Exchange - Novosibirsk	MSK-IX Novosibirsk**

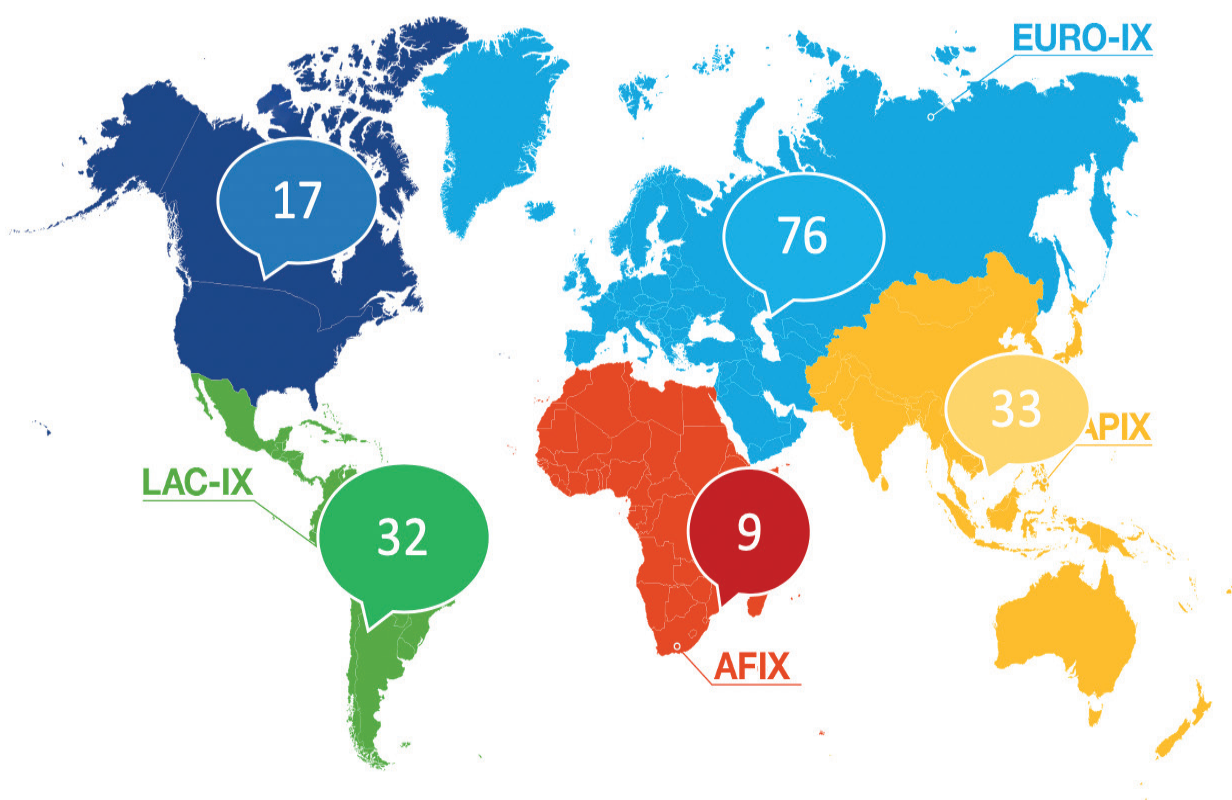
	Omsk	OMSK-IX	OMSK-IX
	Rostov on Don	Moscow Internet Exchange - Rostov on Don	MSK-IX Rostov-on-Don**
	Samara	Moscow Internet Exchange - Samara	MSK-IX - Samara**
	St.-Petersburg	DataIX - St Petersburg	DataIX - St. Petersburg
	St.-Petersburg	Global Internet Exchange	Global-IX
	St.-Petersburg	PIRIX Internet Exchange	PIRIX
	St.-Petersburg	Moscow Internet Exchange - St. Petersburg	MSK-IX - St. Petersburg**
	St.-Petersburg	PIETER-IX St.-Petersburg	PITER-IX St.-Petersburg*
	Simferopol	Crimea-IX	Crimea-IX
	Stavropol	Moscow Internet Exchange - Stavropol	MSK-IX - Stavropol**
	Ufa	DataIX - Ufa	DataIX - Ufa
	Ulyanovsk	Ulyanovsk Internet Exchange	ULN-IX
	Vladivostok	Moscow Internet Exchange - Vladivostok	MSK-IX - Vladivostok**
	Yaroslavl	Yaroslavl Internet Exchange	YAR-IX
Serbia	1		
	Belgrade	Serbian Open eXchange	SOX*
Slovakia	4		
	Bratislava	Sitel Internet eXchange	Sitelix
	Bratislava	Slovak Internet eXchange - Bratislava	SIX - Bratislava
	Bratislava	Neutral Internet eXchange of Slovakia	NIX.SK**
	Kosice	Slovak Internet eXchange - Kosice	SIX - Kosice
Slovenia	1		
	Ljubljana	Slovenian Internet Exchange	SIX*
Spain	7		
	Barcelona	Catalunya Neutral Internet Exchange	CATNIX*
	Barcelona	Equinix Internet Exchange - Barcelona	Equinix Barcelona**
	Bilboa	Punto neutro Vasco de Internet	EuskoNIX
	Madrid	Espana Internet Exchange	ESPANIX*
	Madrid	Deutscher Commercial Internet Exchange	DE-CIX Madrid**
	Madrid	Equinix Internet Exchange - Madrid	Equinix Madrid**
	Santiago	Galicia Neutral Internet eXchange	GalNIX
Sweden	14		
	Gothenburg	Gothenburg Internet Exchange	GIX
	Gothenburg	Internet Exchange i Sverige - Gothenburg	Netnod - Gothenburg**
	Gothenburg	Stockholm Internet Exchange	STHIX - Gothenburg**
	Lulea	Internet Exchange i Sverige - Lulea	Netnod - Lulea**
	Malmoe	Internet eXchange point of the Oresund Region	IXOR
	Stockholm	Global Internet Exchange - Stockholm	Global-IX - Stockholme**
	Stockholm	Internet Exchange i Sverige - Stockholm	Netnod - Stockholm*
	Stockholm	SOLIX	SOLIX - Stockholm
	Stockholm	Stockholm Internet Exchange	STHIX*
	Stockholm	Equinix Internet Exchange - Stockholm	Equinix Stockholm**
	Sundsvall	Internet Exchange i Sverige - Sundsvall	Netnod - Sundsvall**
	Sundsvall	Stockholm Internet Exchange - Sundsvall	STHIX - Sundsvall**
	Umea	Stockholm Internet Exchange- Umea	STHIX - Umea**
	Umea	NorrNod	NorrNod
Switzerland	5		
	Geneva	CERN Internet eXchange Point	CIXP*
	Lousanne	RomandIX	RomandIX
	Zurich	Equinix Internet Exchange - Zurich	Equinix Zurich*
	Zurich	Swiss Internet Exchange	SwissIX*
	Zurich	Community-IX.ch	Community-IX ch

Turkey	1		
		Istanbul	Deutscher Commercial Internet Exchange DE-CIX Istanbul**
Ukraine	5		
		Donetsk	Donetsk Internet Exchange DN-IX
		Kiev	Digital Telecom Internet Exchange DTEL-IX
		Kiev	Giganet Giganet
		Kiev	Ukrainian Internet Exchange UA-IX
		Odessa	Odessa Traffic Exchange Network Od-IX
United Arab Emirates	2		
		Abu Dhabi	SmartHub Internet Exchange SH IX
		Dubai	United Arab Emirates Internet Exchange UAE-IX*
United Kingdom	9		
		Cardiff	LINX Cardiff LINX Cardiff**
		Edinburgh	LINX Scotland LINX Scotland**
		Leeds	IXLeeds IXLeeds*
		Liverpool	Liverpool Internet Exchange IX Liverpool
		London	Equinix Internet Exchange - London Equinix London**
		London	London Internet Exchange LINX*
		London	London Network Access Point LONAP*
		Manchester	Equinix Internet Exchange - Manchester Equinix Manchester**
		Manchester	LINX Manchester LINX Manchester**

Appendix 2

IXP API exports in the IXPDB

» There were 167 API's in the IXPDB at the end of 2019



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Note: IXPDB sponsors in 2018 and 2019