



European Internet Exchange Association

2010 Report on European IXPs

Serge Radovic of Euro-IX

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Section 1. Introduction

1.1 Foreword

This report has been compiled by the European Internet Exchange Association (Euro-IX) in an attempt to get a better picture of the past and current situation in regards to the number of Internet Exchange Points (IXPs) operating in Europe, the amount of traffic being exchanged at these IXPs, the number of connected parties peering there, and other relevant statistics and trends that are now appearing in the European IXP market.

1.2 Internet Exchange Point (IXP)

Euro-IX has accepted the industry definition of an IXP as being:

“A physical network infrastructure operated by a single entity with the purpose to facilitate the exchange of Internet traffic between Autonomous Systems. The number of Autonomous Systems connected should at least be three and there must be a clear and open policy for others to join.”

1.3 Euro-IX

The European Internet Exchange Association (Euro-IX) was formed in May 2001 with the intention to further develop, strengthen and improve the Internet Exchange Point (IXP) community.

A number of Internet Exchange Points recognised a need to combine their resources so as to coordinate technical standards across the continent, develop common procedures, and share and publish statistics and other information. This publishing of information would in turn give all interested parties a better insight into the world of IXPs.

Euro-IX was originally set-up as a discussion forum for European based IXPs however as interest started to grow from other regions it seemed a natural progression for Euro-IX to expand beyond its original boundaries. Thus in January of 2005 the association decided to open its doors to IXPs from outside of Europe and this saw the introduction of allowing non-European based associate member IXPs to join Euro-IX.

Today Euro-IX has 40 member IXPs from some 26 European countries, as well as 12 associate member IXPs from Brazil, Curacao, Iceland, Egypt, Japan, India, Nepal and the United States and 11 patrons from the switch vendor and the collocation sectors of our community. The complete Euro-IX affiliated list is presented below [see *1.4 List of Euro-IX affiliates*]

1.4 List of Euro-IX affiliates

1.4.1 Euro-IX Member IXPs (Europe)

AMS-IX	Amsterdam	Netherlands
BCIX	Berlin	Germany
BIX	Budapest	Hungary
BIX.BG	Sofia	Bulgaria
BNIX	Brussels	Belgium
CATNIX	Barcelona	Spain
CIX	Zagreb	Croatia
CIXP	Geneva	Switzerland
DE-CIX	Frankfurt	Germany
ECIX	3 Cities	Germany
Equinix	2 Cities	Europe
FICIX	3 Cities	Finland
France-IX	Paris	France
FVG-IX	Udine	Italy
GigaPIX	Lisbon	Portugal
GN-IX	Groningen	Netherlands
GR-IX	Athens	Greece
INEX	Dublin	Ireland
InterLAN	Bucharest	Romania
LINX	London	United Kingdom
LONAP	London	United Kingdom
Lyonix	Lyon	France
LU-CIX	Luxembourg	Luxembourg
MIX	Milan	Italy
MSK-IX	Moscow	Russia
NaMeX	Rome	Italy
Netnod	Stockholm	Sweden
NIX	5 Cities	Norway
NIX.CZ	Prague	Czech Republic
NL-ix	17 Cities	The Netherlands
PacketExchange	26 Cities	Europe and United States
PLIX	Warsaw	Poland
RoNIX	Bucharest	Romania
SIX	Ljubljana	Slovenia
SFINX	Paris	France
SwissIX	5 cities	Switzerland

1.4.1 Euro-IX Member IXPs (Europe) - Continued

TIX-Tuscany	Florence	Italy
TOP-IX	16 locations	Northwest Italy
VIX	Vienna	Austria
VSIX	Padova	Italy

1.4.2 Euro-IX Associate Member IXPs (outside of the Euro-IX region)

BBIX	Japan
CAR-IX	Curacao
Equinix (formerly Switch and Data)	United States
JPIX	Japan
JPNAP	Japan
MEIX	Egypt
NOTA/Terremark	United States
NIXI	India
NPIX	Nepal
PTTMetro	Brazil
RIX	Iceland
Telx	United States

1.4.3 Euro-IX Patrons

Arista Networks
Brocade
Cisco Systems
Extreme Networks
Force10 Networks
Glimmerglass
Interxion
Juniper Networks
MRV
TelecityGroup
Transmode

1.5 Notes on this report

- i. *The aggregated peak traffic statistics of the IXPs have been based on the publicly available web statistics that were gathered on the 31st of August 2010. These traffic figures do not take into account Privately Interconnected (PI) participants whose traffic does not pass over the IXP switching fabric.*
- ii. *Not all European IXPs publicly publish aggregated traffic statistics and no attempts at estimates were made where true figures were not presented.*
- iii. *All information has been gathered on a best effort basis and relies on the information that is publicly published 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 that check the information against up to date data.*
- iv. *The IXP traffic statistics are very dynamic and keep changing on a daily basis. While the actual traffic amounts may be outdated, it is nonetheless quite an accurate representation of the ranking of each IXP, city or country in relation to one another. Latest captured traffic rankings will be provided upon request.*
- v. *It should be noted that not all European 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.*
- vi. *While the scope of this report does not attempt to analyse each graph in any great depth, further information can be requested for specific sections.*
- vii. *A best effort was made to list all known IXPs in Europe, however it is expected that a very small number of IXPs may have been left out of this report. Euro-IX would welcome any information about IXPs that have not been covered in this report.*
- viii. *Certain IXPs that were listed in the 2009 report have not been included in the 2010 report due to the fact that either no contact can be made with them to verify if they are still operational, or they have no working website or we have received information that they are no longer operational. These IXPs are: Meriex, GEIX and FreeIX. Furthermore AIX of Athens changed its name to GR-IX.*
- ix. *In 2010 we have made further efforts, to get in contact with a larger percentage of the European IXP community, so that we were able to provide even more accurate information in this report. Euro-IX was in contact with 114 of the 127 listed IXPs. This increase in contact has allowed us to provide much more accurate trends on traffic statistics as well as better details of IXP establishment dates, participants and the switches that are being used at IXPs across Europe.*

1.6 Executive summary and previous year comparisons

This table attempts to capture the main numbers and figures from this and previous year's reports. It shows that IXPs are still being established at a modest rate. Those IXPs that already exist are increasing their number of sites at a healthy rate. The large jump in cities where IXPs are present is due to the additional information that has been gathered rather than the actual build out of new IXP sites in 2010. Aggregated peak traffic growth remains strong at just over 60%. The total number of IXP participants is still growing at a rate of around 10% per annum and the amount of unique ASNs peering at multiple IXPs is up around 15% on 2009.

	2010	2009	2008	2007
Known operating IXPs	127	121	116	116
Number of cities with IXPs	140	115	102	96
Total IXP Sites	415	389	324	282
Number of countries with IXPs	35	33	31	31
Aggregated peak IXP traffic (Gbps)	4415.730	2714.165	1765.78	1151.822
12 month IXP traffic growth	62.69%	53.71%	53.30%	82.41%
Gbps per Million people in Europe	6.320	3.943	2.583	1.695
Gbps per million users in Europe	10.311	7.464	n/a	n/a
Total IXP participants	5658	5167	4466	3959
Total published ASNs	5310	4719	3987	3458
Total unique published ASNs	3156	2822	2340	2105
Estimated total unique ASNs	3350	3090	2621	2410
Average traffic per IXP participant	780 Mbps	437 Mbps	326 Mbps	295 Mbps
Average traffic per unique ASN	1318 Mbps	571 Mbps	444 Mbps	547 Mbps
ASNs peering at 2 or more IXPs	902	782	661	577
ASNs peering at 10 or more IXPs	36	29	18	17
Total number of switches at IXPs	586	564	434	372
Average Traffic load per switch	7.4 Gbps	5.9 Gbps	5.1 Gbps	3.9 Gbps

Section 2. IXPs in Europe

2.1 IXPs listed per country

The following pages list all *known active* IXPs in Europe. This totals some **127 IXPs in 140 different cities in 35 European countries.**

Austria (2)

AAIX	Alpen Adria Internet eXchange in Klagenfurt	Klagenfurt
VIX	Vienna Internet eXchange	Vienna

Belarus (1)

BYIX	Belarus National Internet Exchange Point	Minsk
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Belgium (2)

BNIX	Belgian National Internet Exchange	Brussels
FreeBIX	FreeBIX	Brussels

Bulgaria (2)

BIX.BG	Bulgarian Internet Exchange	Sofia
B-IX	Balkan Internet Exchange	Sofia

Croatia (1)

CIX	Croatian Internet eXchange	Zagreb
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Cyprus (1)

CyIX	Cyprus Internet Exchange	Nicosia
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Czech Republic (2)

CBIX	Commercial Brno Internet Exchange	Brno
NIX.CZ	Neutral Internet eXchange of the Czech Republic	Prague

Denmark (1)

DIX	Danish Internet eXchange point	Lyngby
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Estonia (2)

TIX	Tallinn Internet eXchange	Tallinn
TLLIX	Tallinn Internet Exchange	Tallinn

Finland (4)

FICIX 1	Finnish Communication and Internet Exchange	Espoo
FICIX 2	Finnish Communication and Internet Exchange	Helsinki
FICIX 3	Finnish Communication and Internet Exchange	Oulu
TREX	Tampere Region Exchange	Tampere

France (10)

Equinix	Equinix	Paris
FNIX6	French National Internet Exchange IPv6	Paris
France-IX	France-IX	Paris
Lyonix	Lyonix	Lyon
PaNAP	Paris Network Access Point	Paris
PARIX	Paris Internet Exchange	Paris
POUIX	POUIX	Paris
SainteTiX	SainteTiX	Saint-Etienne
SFINX	Service for French INternet eXchange	Paris
TOUIX	Le GIX de la grande region Toulousaine	Toulous

Germany (10)

ALP-IX	Alpen Internet Exchange	Munich
BCIX	Berlin Commercial Internet Exchange	Berlin
DE-CIX	Deutscher Commercial Internet Exchange	Frankfurt Berlin, Dusseldorf & Hamburg
ECIX	European Commercial Internet Exchange	Munich
INXS	Internet Exchange Point in Munich	Munich
KleyRex	Kleyer Rebstocker EXchange	Frankfurt
NDIX	Nederlands-Duitse Internet Exchange	Munster & Dusseldorf
N-IX	Nurnberger Internet eXchange	Nurnberg
S-IX	Stuttgarter internet eXchange	Stuttgart
WORK-IX	WORK-IX	Hamburg

Greece (2)

AIX	Athens Internet Exchange	Athens
GR-IX	Greek Internet Exchange	Athens

Hungary (1)

BIX	Budapest Internet eXchange	Budapest
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Iceland (1)

RIX	Reykjavik Internet Exchange	Reykjavik
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Ireland (3)

CNIX	Cork Neutral Internet Exchange	Cork
ExWest	eXchange West	Galway
INEX	Internet Neutral EXchange	Dublin

Italy (7)

FVG-IX	Friuli Venezia Giulia Internet eXchange	Udine
MINAP	Milan Neutral Access Point	Milan
MIX	Milan Internet eXchange	Milan
NaMeX	Nautilus Mediterranean Exchange Point	Rome
TIX Tuscany	Tuscany Internet eXchange	Florence
TOP-IX	Torino Piemonte Exchange Point	Torino
VSIX	VSIX Nap del Nord Est	Padova

Kazakhstan (1)

KAZ-IX	Kazakhstan Traffic Exchange	Almaty
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Latvia (2)

LIX	Latvian Internet eXchange	Riga
SMILE	Santa Monica Internet Local Exchange	Riga

Luxembourg (2)

LIX	Luxembourg Internet eXchange	Luxembourg
LU-CIX	Luxembourg Commercial Internet Exchange	Luxembourg

Malta (1)

MIX	Malta internet Exchange	Msida
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Moldova (1)

MD-IX	Moldova Internet Exchange	Chisinau
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Netherlands (6)

AMS-IX	Amsterdam Internet Exchange	Amsterdam
FR-IX	Friese Internet Exchange	Leeuwarden
GN-IX	Groningen Internet Exchange	Groningen
NDIX	Nederlands-Duitse Internet Exchange	Enschede
NL-IX	Netherlands Internet Exchange	Amsterdam
R-iX	Rotterdam Internet Exchange	Rotterdam
ZOD-IX	Zuid Oost Drentse Internet eXchange	Emmen

Norway (7)

BIX	Bergen Internet Exchange	Bergen
FIXO	Free Internet eXchange Oslo	Oslo
NIX1	Norwegian Internet eXchange	Oslo
NIX2	Norwegian Internet eXchange	Oslo
SIX	Stavanger Internet Exchange	Stavanger
TIX	Tromsø Internet Exchange	Tromsø
TRDIX	Trondheim Internet Exchange	Trondheim

Poland (4)

LIX	Lodz Internet Exchange	Lodz
PIX	Poznan Internet Exchange	Poznan
PLIX	Polish Internet Exchange	Warsaw
WIX	Warsaw Internet eXchange	Warsaw

Portugal (1)

GIGAPIX	GIGAbit Portuguese Internet eXchange	Lisbon
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Romania (2)

InterLAN	InterLAN IX	Bucharest
RoNIX	Romanian Network for Internet eXchange	Bucharest

Russia (14)

CHEL-PP	Chelyabinsk Peering Point	Chelyabinsk
EKT-IX	Ekaterinburg Internet Exchange	Ekaterinburg
IX-NN	IX of Nizhny Novgorod	Nizhny Novgorod
KRS-IX	Krasnoyarsk Internet Exchange	Krasnoyarsk
KZN-IX	Kazan Internet Exchange	Kazan
MSK-IX	Moscow Internet Exchange	Moscow
NSK-IX	Novosibirsk Internet eXchange	Novosibirsk
PERM-IX	Perm Internet Exchange	Perm
RND-IX	Rostov on Don Internet Exchange	Rostov on Don
SMR-IX	SAMARA-IX	Samara
SPB-IX	St.-Petersburg Internet eXchange	St.-Petersburg
ULN-IX	Ulyanovsk Internet Exchange	Ulyanovsk
Ural-IX	Ural-IX	Ekaterinburg
VLV-IX	Vladivostok Internet Exchange	Vladivostok

Slovakia (3)

SIX	Slovak Internet eXchange- Bratislava	Bratislava
SIX	Slovak Internet eXchange- Kosice	Kosice
sitelix	Sitel Internet eXchange	Bratislava

Slovenia (1)

SIX	Slovenian Internet Exchange	Ljubljana
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Spain (3)

CATNIX	Catalunya Neutral Internet Exchange	Barcelona
ESPANIX	Espana Internet Exchange	Madrid
EuskoNIX	Punto neutro Vasco de Internet	Bilboa

Sweden (12)

GIX	Gothenburg Internet Exchange	Gothenburg
IXOR	Internet eXchange point of the Oresund Region	Malmoe
MALMIX	Malmoe Internet Exchange	Malmoe
Netnod	Internet Exchange i Sverige	Stockholm
Netnod	Netnod - Gothenburg	Gothenburg
Netnod	Netnod - Lulea	Lulea
Netnod	Netnod - Malmoe	Malmoe
Netnod	Netnod - Sundsvall	Sundsvall
NorrNod	NorrNod	Umea
RIX-GH	Regional Internet Exchange Gästrikland-Hälsingland	Gavle
STHIX	Stockholm Internet Exchange	Stockholm
SOLIX	SOLIX	Stockholm

Switzerland (3)

CIXP	CERN Internet eXchange Point	Geneva
Equinix	Equinix	Zurich
SwissIX	Swiss Internet Exchange	Zurich

Ukraine (5)

Crimea-IX	Crimea-IX	Simferopol
DTEL-IX	Digital Telecom Internet Exchange	Kiev
Od-IX	Odessa Internet Exchange	Odessa
KH-IX	Kharkov Internet Exchange	Kharkov
UA-IX	Ukrainian Internet Exchange	Kiev

United Kingdom (8)

IX Leeds	IX Leeds	Leeds
LINX	London Internet Exchange	London
LIPEX	London Internet Providers EXchange	London
LONAP	London Network Access Point	London
MaNAP (Edge-IX)	Manchester Network Access Point	Manchester
MCIX	Manchester Commercial Internet Exchange	Manchester
PacketExchange	PacketExchange	London
RBEIX	RBEIX	London

2.2 Number of IXPs per country

This table lists the total number of IXPs that are known to exist in each European country. Where an IXP has multiple connected locations in more than one city within a country, this IXP has only been counted once for that particular country.

Country	No. of IXPs
Russia	14
Sweden	12
France	10
Germany	10
United Kingdom	8
Italy	7
Netherlands	7
Norway	7
Ukraine	5
Finland	4
Poland	4
Ireland	3
Slovakia	3
Spain	3
Switzerland	3
Austria	2
Belgium	2
Bulgaria	2
Czech Republic	2
Estonia	2
Latvia	2
Luxembourg	2
Romania	2
Belarus	1
Croatia	1
Cyprus	1
Denmark	1
Greece	1
Hungary	1
Iceland	1
Kazakhstan	1
Malta	1
Moldova	1
Portugal	1
Slovenia	1
35 countries	127

2.3 Total Number of IXP's points of presence per European City (part 1)

The following three tables indicate the number of IXPs that are present in a particular European city. It should be noted that an IXP's individual, connected, sites are counted as one IXP. IXPs that have sites in multiple cities receive a count in each of the cities that they are present in.

City	Country	No. IXP
Paris	France	7
London	United Kingdom	5
Oslo	Norway	3
Stockholm	Sweden	3
Amsterdam	Netherlands	2
Arnhem	Netherlands	2
Berlin	Germany	2
Bratislava	Slovakia	2
Brussels	Belgium	2
Bucharest	Romania	2
Dublin	Ireland	2
Dusseldorf	Germany	2
Ede	Netherlands	2
Edinburgh	United Kingdom	2
Ekaterinburg	Russia	2
Enschede	Netherlands	2
Frankfurt	Germany	2
Gothenburg	Sweden	2
Groningen	Netherlands	2
Hamburg	Germany	2
Helsinki	Finland	2
Hengelo	Netherlands	2
Kiev	Ukraine	2
Luxembourg	Luxembourg	2
Malmoe	Sweden	2
Manchester	United Kingdom	2
Milan	Italy	2
Munich	Germany	2
Riga	Latvia	2
Rotterdam	Netherlands	2
Sofia	Bulgaria	2
Tallinn	Estonia	2
Warsaw	Poland	2
Zurich	Switzerland	2
Alessandria	Italy	1
Aalsmeer	Netherlands	1
Alkmaar	Netherlands	1
Almaty	Kazakhstan	1
Almelo	Netherlands	1
Almere	Netherlands	1
Amersfoort	Netherlands	1
Alphen	Netherlands	1
Aosta	Italy	1
Asti	Italy	1
Athens	Greece	1
Barcelona	Spain	1

2.3 Total Number of IXPs points of presence per European City (part 2)

City	Country	No. IXP
Bergen	Norway	1
Biella	Italy	1
Bilboa	Spain	1
Boras	Sweden	1
Borghorst	Germany	1
Brno	Czech Republic	1
Budapest	Hungary	1
Capelle	Netherlands	1
Chelyabinsk	Russia	1
Chisinau	Moldova	1
Cork	Ireland	1
Cuneo	Italy	1
Den Haag	Netherlands	1
Deventer	Netherlands	1
Doetinchem	Netherlands	1
Dublin	Ireland	1
Emmen	Netherlands	1
Emsdetten	Germany	1
Florence	Italy	1
Galway	Ireland	1
Galve	Sweden	1
Geneva	Switzerland	1
Greven	Germany	1
Gronau	Germany	1
Hardenburg	Netherlands	1
Harderwijk	Netherlands	1
Haarlem	Netherlands	1
Hilversum	Netherlands	1
Ivrea	Italy	1
Kazan	Russia	1
Kharkov	Ukraine	1
Klagenfurt	Austria	1
Kosice	Slovakia	1
Krakow	Poland	1
Krasnoyarsk	Russia	1
Leeds	United Kingdom	1
Leeuwarden	Netherlands	1
Leipzig	Germany	1
Lisbon	Portugal	1
Ljubljana	Slovenia	1
Lodz	Poland	1
Lulea	Sweden	1
Lyngby	Denmark	1
Lyon	France	1
Madrid	Spain	1
Marseille	France	1
Minsk	Russia	1
Moscow	Russia	1
Msida	Malta	1
Munster	Germany	1

2.3 Total Number of IXPs points of presence per European City (part 3)

City	Country	No. IXP
Nicosia	Cyprus	1
Nizhny Novgorod	Russia	1
Nordhorn	Germany	1
Novara	Italy	1
Novosibirsk	Russia	1
Nurnberg	Germany	1
Odessa	Ukraine	1
Oldenzaal	Netherlands	1
Oulu	Finland	1
Padova	Italy	1
Perm	Russia	1
Pont St. Martin	Italy	1
Poznan	Poland	1
Prague	Czech Republic	1
Reykjavik	Iceland	1
Rijen	Netherlands	1
Rome	Italy	1
Rostov on Don	Russia	1
Rotterdam	Netherlands	1
Samara	Russia	1
Schiphol Rijk	Netherlands	1
Simferopol	Ukraine	1
Saint-Etienne	France	1
St.-Petersburg	Russia	1
Stavanger	Norway	1
Steenbergen	Netherlands	1
Steinfurt	Germany	1
Strasbourg	France	1
Stuttgart	Germany	1
Sundsvall	Sweden	1
Tampere	Finland	1
Torino	Italy	1
Tromsø	Norway	1
Trondheim	Norway	1
Toulous	France	1
Udine	Italy	1
Ulyanovsk	Russia	1
Umea	Sweden	1
Verbania	Italy	1
Vercelli	Italy	1
Vienna	Austria	1
Vladivostok	Russia	1
Zagreb	Croatia	1
Zwolle	Netherlands	1
Cities	140	
Countries	35	

Section 3. European IXP growth since 1992

3.1 IXP growth in Europe since 1992

This table details the ‘official’ establishment dates of IXPs in Europe since 1992. In some cases the IXP may have been ‘unofficially’ established (i.e. actually operating without any legal entity being established) earlier than some of the dates used in this table, however this report has been based on official establishment dates only.

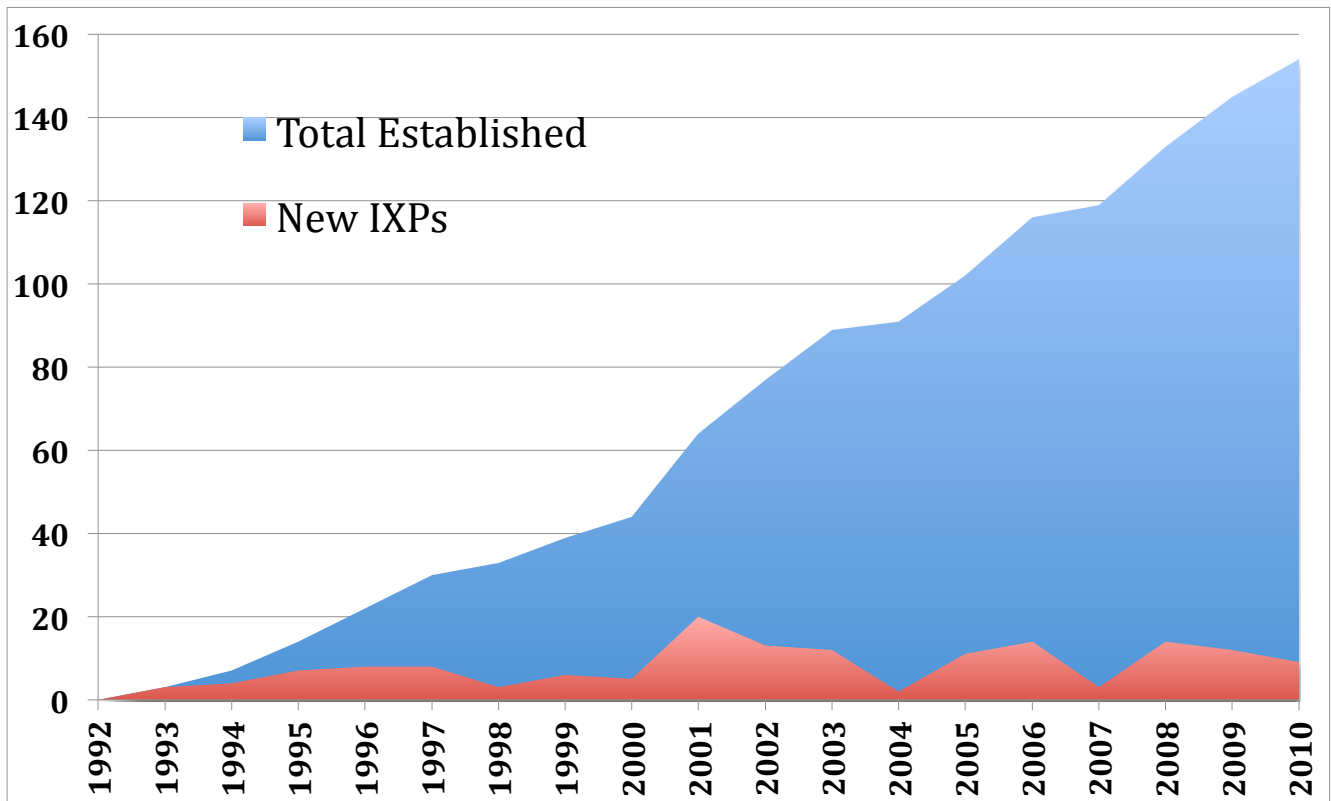
The three-year period between 2001 and 2003 saw the establishment of some 45 IXPs in Europe. While the growth of new IXPs had definitely slowed down since then, it is still evident that there is some growth in the IXP sector. In the last three years some 35 IXPs have begun operations however some 21 IXPs have ceased to operate in the same period.

Year	New IXP	% of tot	Closed IXP	Operational IXPs	Tot established
1992	0	0%	0	0	0
1993	3	2%	0	3	3
1994	4	3%	0	7	7
1995	7	5%	0	14	14
1996	8	5%	0	22	22
1997	8	5%	0	30	30
1998	3	2%	0	33	33
1999	6	4%	0	39	39
2000	5	3%	0	44	44
2001	20	13%	0	64	64
2002	13	8%	0	77	77
2003	12	8%	0	89	89
2004	2	1%	0	91	91
2005	11	7%	0	102	102
2006	14	9%	0	116	116
2007	3	2%	6	113	119
2008	14	9%	12	115	133
2009	12	8%	5	122	145
2010	9	6%	4	127	154

Note: Euro-IX has been putting together such reports since 2006 thus it was not until 2007 that we were able to accurately recognize if IXPs had ceased to operate. The above table does not take into account the possibility of IXPs both being established and ceasing to operate before 2006.

3.2 Additional and total IXP growth per year

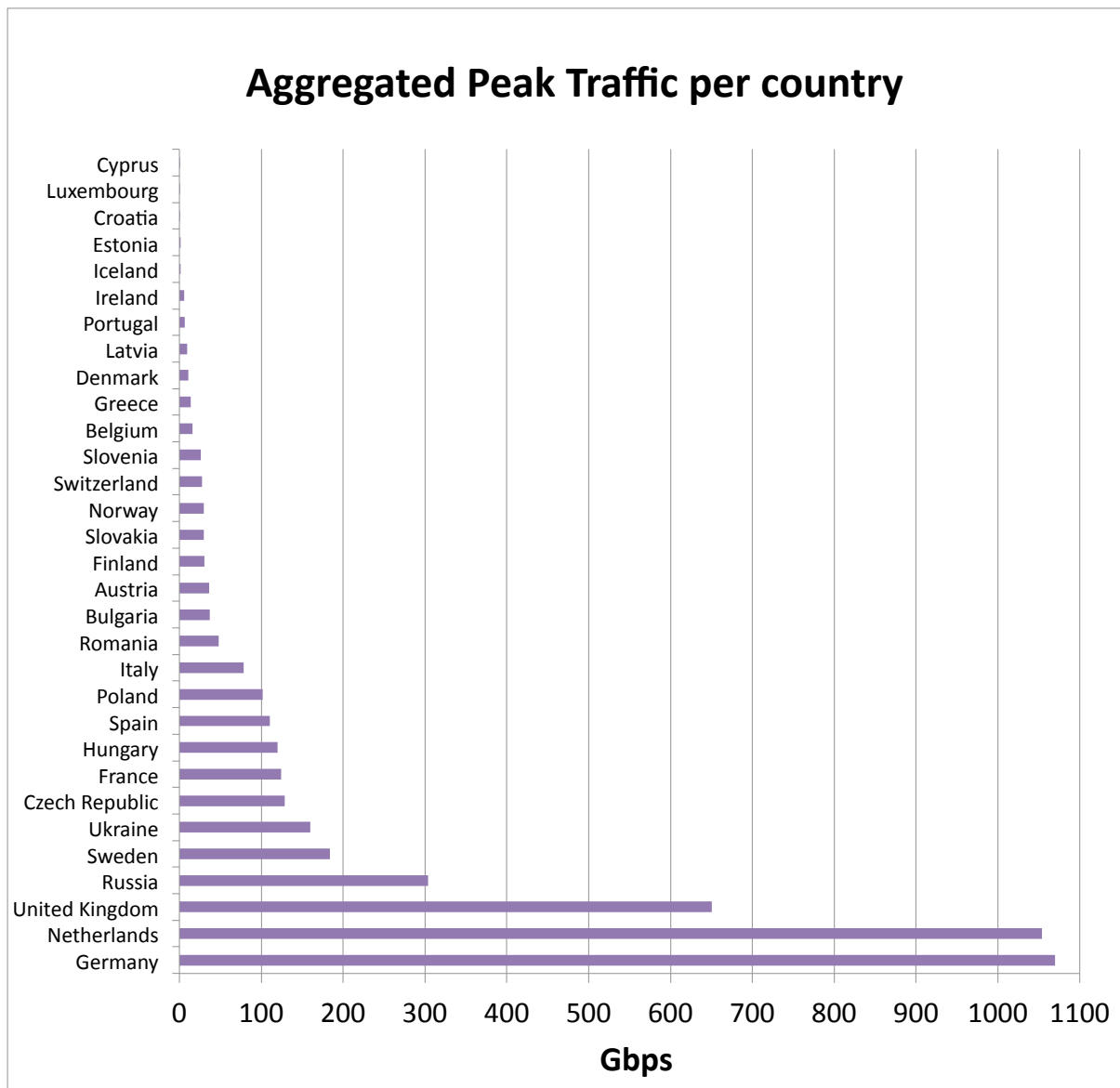
This graph highlights the establishment of new IXPs, per year, in comparison to the total amount of existing European IXPs. One can see from the graph that 2001, 2002 and 2003 were all years of exceptional growth in the establishment of IXPs in Europe. The last three years have seen the establishment of almost 35 IXPs that would suggest that the growth is still very much present.



Section 4. IXP peak traffic

4.1 Aggregated peak traffic per country

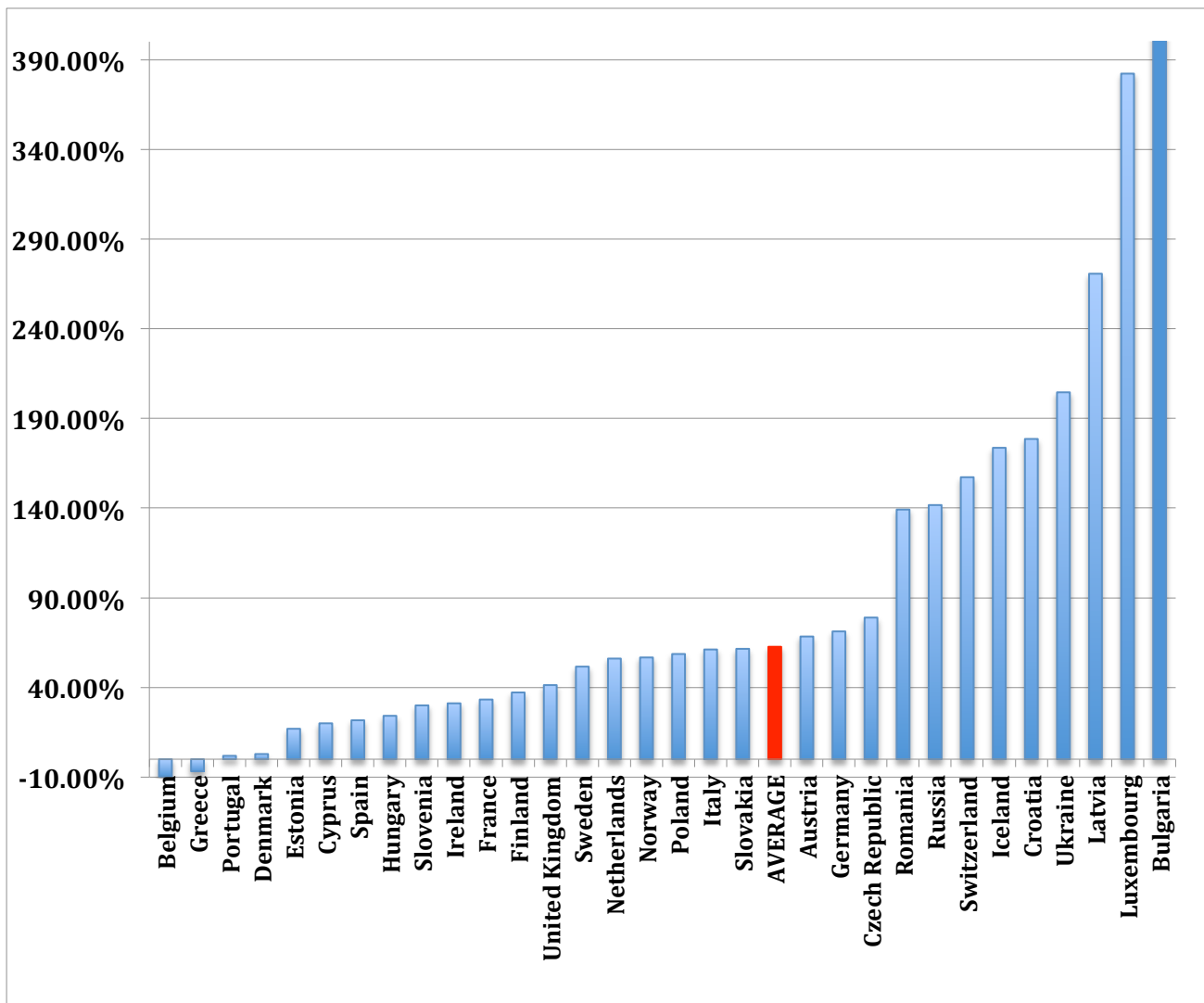
This graph outlines the total aggregated peak IXP traffic per country in Europe. The totals for each country have been reached by adding the various IXP's traffic together from any one particular country. It should be noted that this data is taken from publicly viewable traffic statistics and information that is provided to Euro-IX via IXPs directly. These statistics do not include Private Interconnect traffic that does not pass over the public peering infrastructure.



Note: This traffic data was captured on the 31st of August 2010

4.2 Annual growth of aggregated peak traffic per country

This graph shows the total aggregated peak IXP traffic per country growth rate from the 27th of August 2009 to the 31st of August 2010. The totals for each country have been reached by adding the various IXP's traffic together from any one particular country. It should be noted that this data is taken from publicly viewable traffic statistics and information that is provided to Euro-IX via IXPs directly. These statistics do not include Private Interconnect traffic that does not pass over the public peering infrastructure.



Note: This traffic data was captured on the 31st of August 2010 and compared to data from 27th of August 2009.

4.3 IXP traffic per country

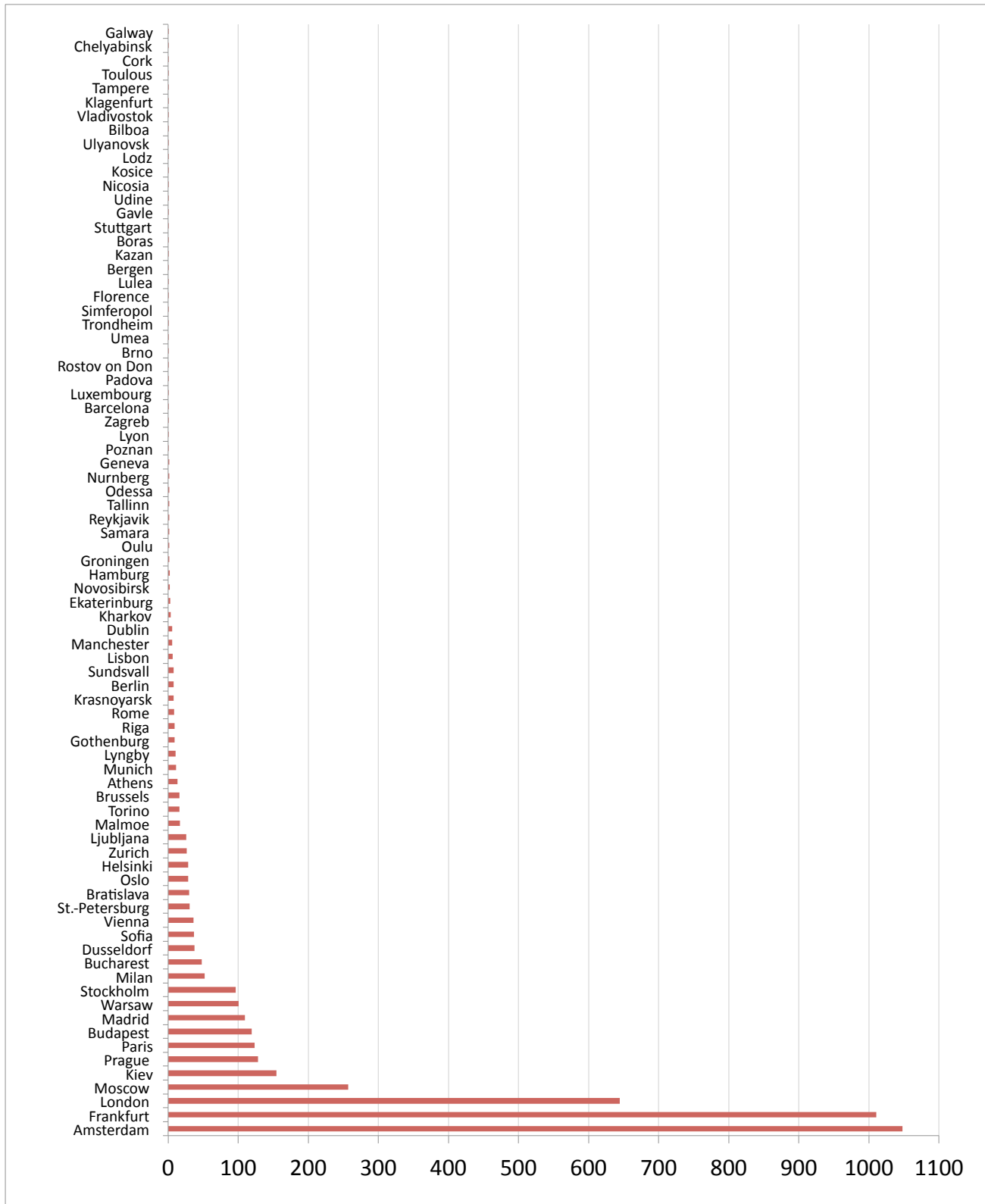
This table details the total aggregated peak IXP traffic per country in Europe. It further details the per country growth rate from the 27th of August 2009 to the 31st of August 2010. The totals for each country have been reached by adding the various IXPs' traffic together from any one particular country. It should be noted that this data is taken from publicly viewable traffic statistics and information that is provided to Euro-IX via IXPs directly. These statistics do not include Private Interconnect traffic that does not pass over the public peering infrastructure.

Country	Gbps 2010	% of total	Gbps 2009	Inc over 2009
Austria	36.090	0.82%	21.430	68.41%
Belgium	15.910	0.36%	17.600	-9.60%
Bulgaria	37.230	0.84%	0.100	37130.00%
Croatia	0.961	0.02%	0.345	178.55%
Cyprus	0.120	0.00%	0.100	20.00%
Czech Republic	128.500	2.91%	71.800	78.97%
Denmark	10.700	0.24%	10.400	2.88%
Estonia	1.379	0.03%	1.179	16.96%
Finland	30.315	0.69%	22.093	37.22%
France	124.395	2.82%	93.340	33.27%
Germany	1069.850	24.23%	624.720	71.25%
Greece	13.540	0.31%	14.516	-6.72%
Hungary	119.600	2.71%	96.300	24.20%
Iceland	1.390	0.03%	0.508	173.62%
Ireland	5.506	0.12%	4.198	31.16%
Italy	78.334	1.77%	48.602	61.17%
Latvia	9.430	0.21%	2.544	270.68%
Luxembourg	0.950	0.02%	0.197	382.23%
Netherlands	1053.670	23.86%	674.980	56.10%
Norway	29.542	0.67%	18.850	56.72%
Poland	101.810	2.31%	64.170	58.66%
Portugal	6.330	0.14%	6.213	1.88%
Romania	47.820	1.08%	19.993	139.18%
Russia	303.946	6.88%	125.753	141.70%
Slovakia	29.930	0.68%	18.528	61.54%
Slovenia	26.000	0.59%	20.000	30.00%
Spain	110.812	2.51%	91.053	21.70%
Sweden	183.910	4.16%	121.297	51.62%
Switzerland	27.600	0.63%	10.730	157.22%
Ukraine	159.920	3.62%	52.511	204.55%
United Kingdom	650.240	14.73%	460.115	41.32%
Total	4,415.730		2,714.165	62.69%

Note: This traffic data was captured on the 31st of August 2010

4.4 Peak aggregated traffic per city

This graph illustrates the total aggregated peak IXP traffic per European city in Gbps.



Note: This traffic data was captured on the 31st of August 2010

4.5 IXP traffic per city (A - M)

This table details the total amount of aggregated peak IXP traffic per European city and shows what percentage the city's IXP traffic is compared to Europe's IXP traffic as a whole. It further details the per city growth rate from the 27th of August 2009 to the 31st of August 2010.

City	Country	Traffic Gbps	% of total	2009 Traffic	Growth
Amsterdam	Netherlands	1047.880	24.02%	668.540	56.74%
Athens	Greece	13.540	0.31%	14.516	-6.72%
Barcelona	Spain	0.952	0.02%	0.793	20.05%
Bergen	Norway	0.252	0.01%	0.071	254.93%
Berlin	Germany	7.730	0.18%	3.400	127.35%
Bilboa	Spain	0.060	0.00%	0.060	0.00%
Boras	Sweden	0.172	0.00%	0.172	0.00%
Bratislava	Slovakia	29.820	0.68%	18.420	61.89%
Brno	Czech Republic	0.500	0.01%	0.200	150.00%
Brussels	Belgium	15.910	0.36%	17.600	-9.60%
Bucharest	Romania	47.820	1.10%	19.993	139.18%
Budapest	Hungary	119.000	2.73%	96.300	23.57%
Chelyabinsk	Russia	0.003	0.00%	2.600	-99.88%
Cork	Ireland	0.005	0.00%	n/a	n/a
Dublin	Ireland	5.500	0.13%	4.197	31.05%
Dusseldorf	Germany	37.540	0.86%	15.920	135.80%
Ekaterinburg	Russia	3.210	0.07%	0.667	381.26%
Florence	Italy	0.274	0.01%	0.201	36.32%
Frankfurt	Germany	1010.160	23.15%	595.380	69.67%
Galway	Ireland	0.001	0.00%	0.001	0.00%
Gavle	Sweden	0.158	0.00%	0.158	0.00%
Geneva	Switzerland	1.320	0.03%	1.210	9.09%
Göteborg	Sweden	9.540	0.22%	8.166	16.83%
Groningen	Netherlands	1.790	0.04%	2.440	-26.64%
Hamburg	Germany	2.300	0.05%	2.300	0.00%
Helsinki	Finland	28.800	0.66%	21.435	34.36%
Kazan	Russia	0.220	0.01%	n/a	n/a
Kharkov	Ukraine	3.570	0.08%	0.800	346.25%
Kiev	Ukraine	154.700	3.55%	50.000	209.40%
Klagenfurt	Austria	0.040	0.00%	n/a	n/a
Kosice	Slovakia	0.110	0.00%	0.108	1.85%
Krasnoyarsk	Russia	8.000	0.18%	n/a	n/a
Lisbon	Portugal	6.330	0.15%	6.213	1.88%
Ljubljana	Slovenia	26.000	0.60%	20.000	30.00%
Lodz	Poland	0.100	0.00%	0.050	100.00%
London	United Kingdom	644.590	14.77%	454.465	41.83%
Lulea	Sweden	0.260	0.01%	0.210	23.81%
Luxembourg	Luxembourg	0.950	0.02%	0.197	382.23%
Lyngby	Denmark	10.700	0.25%	10.400	2.88%
Lyon	France	1.170	0.03%	0.550	112.73%
Madrid	Spain	109.800	2.52%	90.200	21.73%
Malmö	Sweden	16.700	0.38%	15.314	9.05%

Note: This traffic data was captured on the 31st of August 2010

4.6 IXP traffic per city (M - Z)

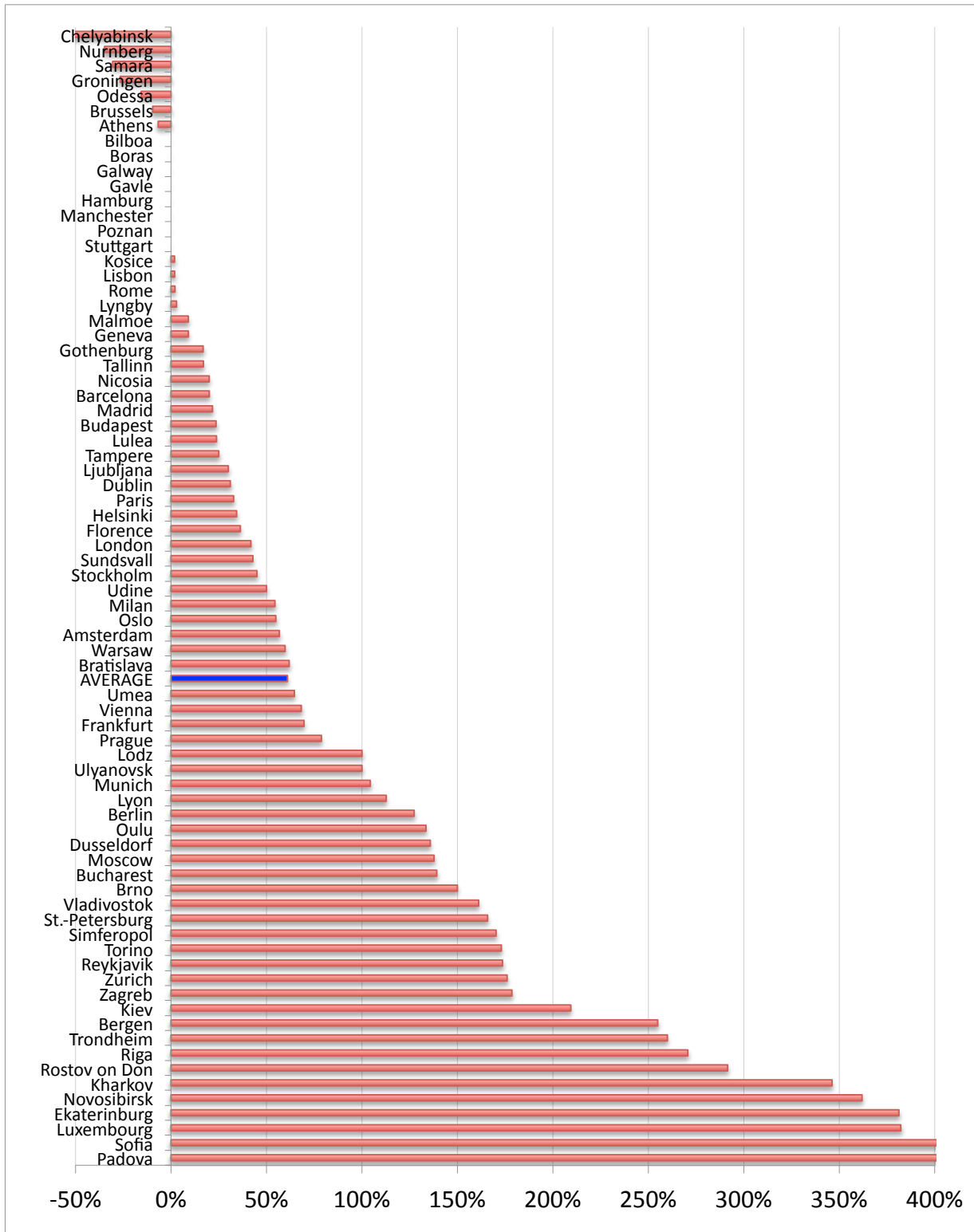
This table details the total amount of aggregated peak IXP traffic per European city and shows what percentage the city's IXP traffic is compared to Europe's IXP traffic as a whole. It further details the per city growth rate from the 27th of August 2009 to the 31st of August 2010.

City	Country	Traffic Gbps	% of total	2009 Traffic	Growth
Manchester	United Kingdom	5.800	0.13%	5.650	2.65%
Milan	Italy	52.460	1.20%	33.971	54.43%
Moscow	Russia	257.000	5.89%	108.087	137.77%
Munich	Germany	11.260	0.26%	5.510	104.36%
Nicosia	Cyprus	0.120	0.00%	0.100	20.00%
Novosibirsk	Russia	2.610	0.06%	0.565	361.95%
Nurnberg	Germany	1.330	0.03%	2.040	-34.80%
Odessa	Ukraine	1.350	0.03%	1.600	-15.63%
Oslo	Norway	28.930	0.66%	18.679	54.88%
Oulu	Finland	1.490	0.03%	0.638	133.54%
Padova	Italy	0.560	0.01%	0.001	55900.00%
Paris	France	123.205	2.82%	92.790	32.78%
Poznan	Poland	1.200	0.03%	1.200	0.00%
Prague	Czech Republic	128.000	2.93%	71.600	78.77%
Reykjavik	Iceland	1.390	0.03%	0.508	173.62%
Riga	Latvia	9.430	0.22%	2.544	270.68%
Rome	Italy	8.500	0.19%	8.326	2.09%
Rostov on Don	Russia	0.556	0.01%	0.142	291.55%
Samara	Russia	1.420	0.03%	2.045	-30.56%
Simferopol	Ukraine	0.300	0.01%	0.111	170.27%
Sofia	Bulgaria	37.230	0.85%	0.100	37130.00%
St.-Petersburg	Russia	30.780	0.71%	11.579	165.83%
Stockholm	Sweden	133.879	3.03%	91.957	45.59%
Stuttgart	Germany	0.170	0.00%	0.170	0.00%
Sundsvall	Sweden	7.500	0.17%	5.249	42.88%
Tallinn	Estonia	1.379	0.03%	1.179	16.96%
Tampere	Finland	0.025	0.00%	0.020	25.00%
Torino	Italy	16.390	0.38%	6.003	173.03%
Toulouse	France	0.020	0.00%	n/a	n/a
Trondheim	Norway	0.360	0.01%	0.100	260.00%
Udine	Italy	0.150	0.00%	0.100	50.00%
Ulyanovsk	Russia	0.100	0.00%	0.050	100.00%
Umea	Sweden	0.400	0.01%	0.243	64.61%
Vienna	Austria	36.050	0.83%	21.430	68.22%
Vladivostok	Russia	0.047	0.00%	0.018	161.11%
Warsaw	Poland	100.510	2.30%	62.920	59.74%
Zagreb	Croatia	0.961	0.02%	0.345	178.55%
Zurich	Switzerland	26.280	0.60%	9.520	176.05%
Total		4415.730		2714.165	62.69%

Note: This traffic data was captured on the 31st of August 2010

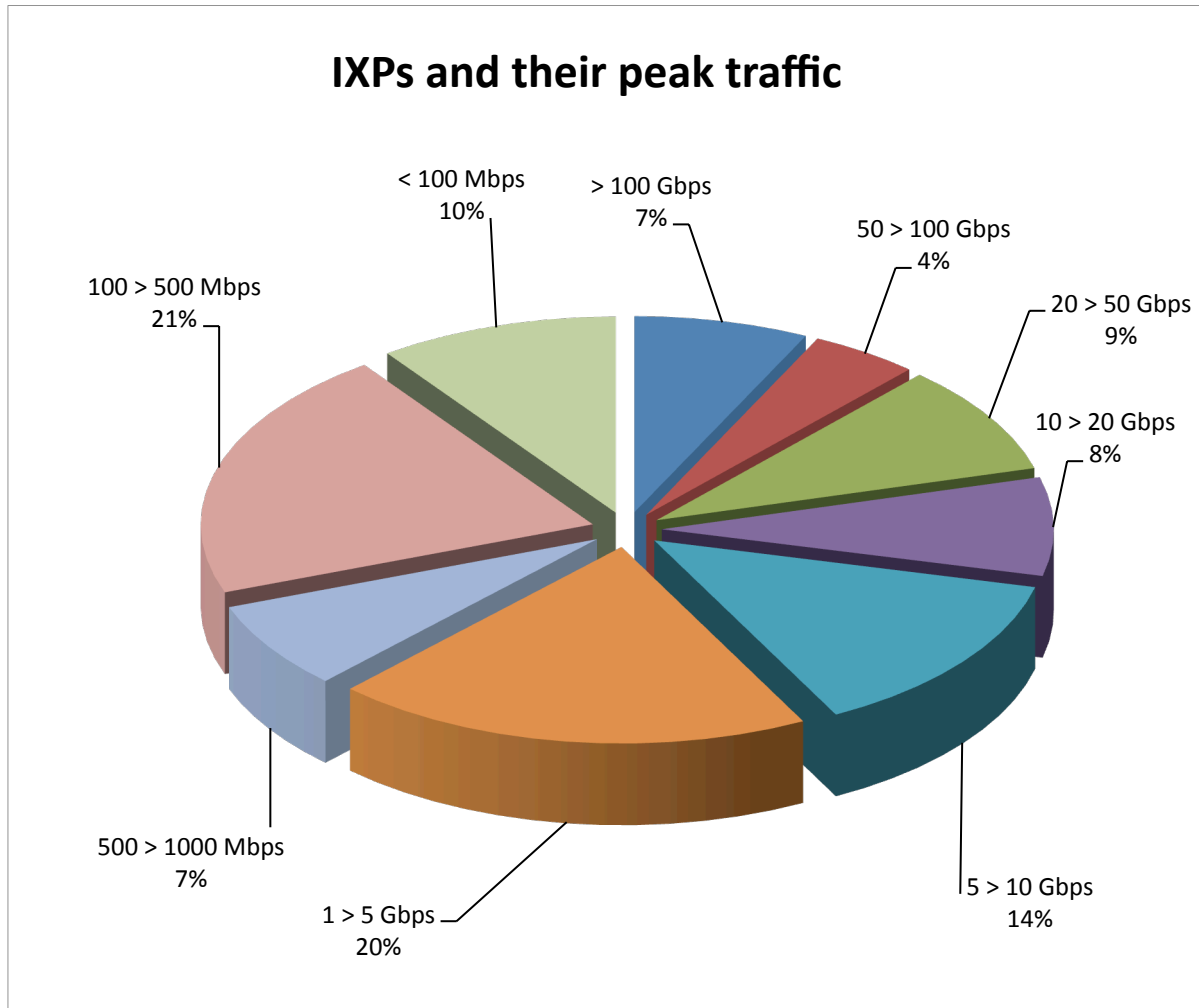
4.7 Annual IXP traffic growth per city

This graph details the growth rate of aggregated peak IXP traffic per European city from the 27th of August 2009 to the 31st of August 2010.



4.8 Percentage of IXPs and their peak traffic

This graph highlights the percentage of European IXPs having a particular amount of peak traffic at their exchange. It should be noted that reliable traffic statistics could only be gathered from 111 of the 127 European IXPs, these percentages are therefore based on these 111 IXPs.



Peak traffic	# of IXPs	% of total
> 100 Gbps	8	7%
50 > 100 Gbps	5	4%
20 > 50 Gbps	10	9%
10 > 20 Gbps	9	8%
5 > 10 Gbps	15	14%
1 > 5 Gbps	22	20%
500 > 1000 Mbps	8	7%
100 > 500 Mbps	23	21%
< 100 Mbps	11	10%
Total	111	100%

4.9 IXP traffic per million inhabitants and Internet users

This table details the total amount of peak IXP traffic per country in Gbps per million inhabitants and per million Internet users in that same country. The July 2010 population estimates were taken from the *CIA World Factbook* the August 2010 Internet user estimates were taken from www.internetworldstats.com

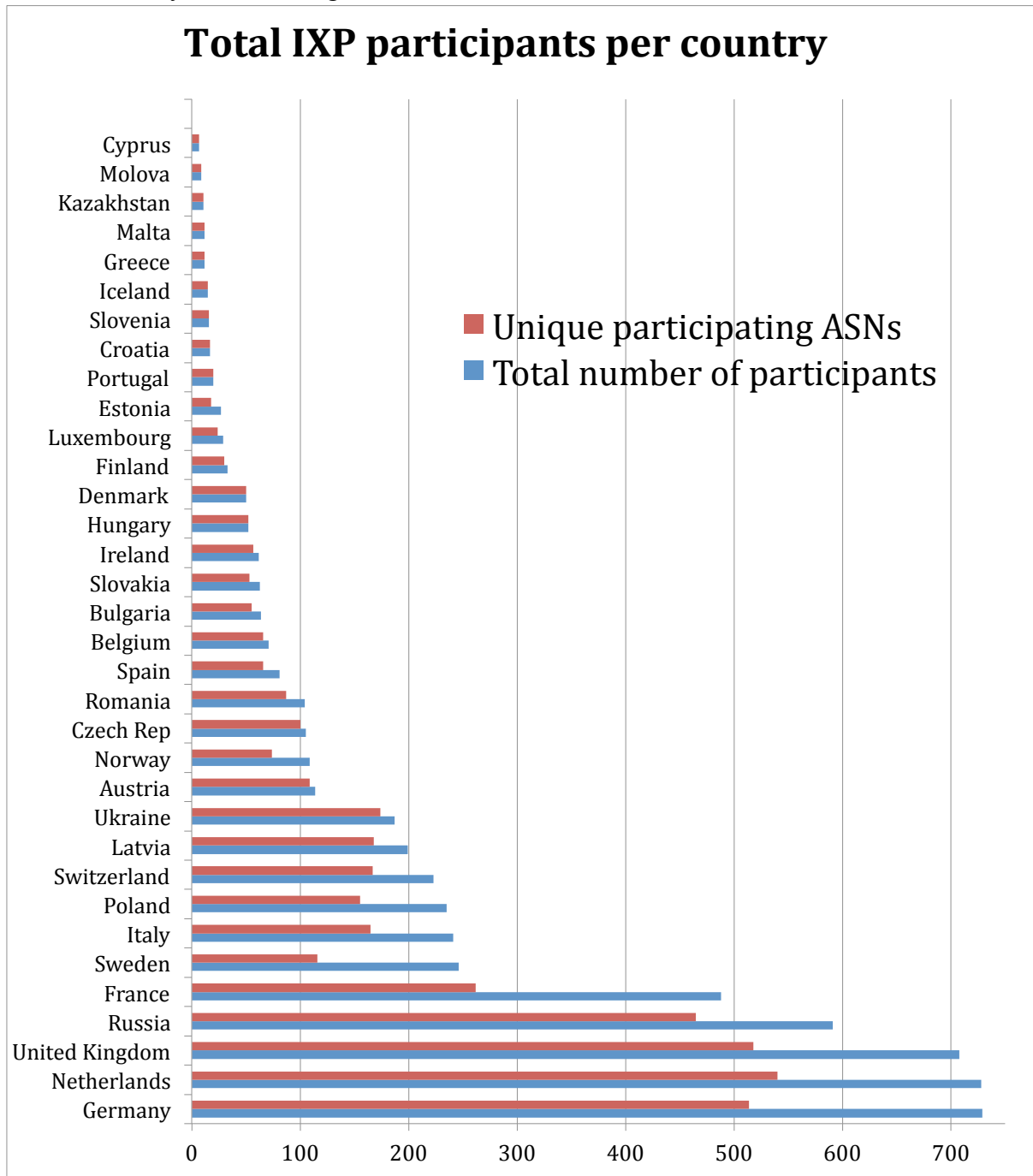
Country	Gbps	Population (in Millions)	Gbps per M people	Internet Users (M)	Gbps per Million users
Austria	36.090	8.210	4.396	6.144	5.874
Belgium	15.910	10.414	1.528	8.113	1.961
Bulgaria	37.230	7.205	5.167	3.395	10.966
Croatia	0.961	4.489	0.214	2.244	0.428
Cyprus	0.120	1.084	0.111	0.434	0.276
Czech Republic	128.500	10.212	12.583	6.681	19.234
Denmark	10.700	5.501	1.945	4.750	2.253
Estonia	1.379	1.299	1.062	0.970	1.422
Finland	30.315	5.250	5.774	4.481	6.765
France	124.395	64.420	1.931	44.625	2.788
Germany	1069.850	82.330	12.995	65.124	16.428
Greece	13.540	10.737	1.261	4.971	2.724
Hungary	119.600	9.506	12.582	6.176	19.365
Iceland	1.390	0.307	4.528	0.302	4.603
Ireland	5.506	4.203	1.310	3.043	1.809
Italy	78.334	58.126	1.348	30.026	2.609
Latvia	9.430	2.232	4.225	1.503	6.274
Luxembourg	0.950	0.492	1.931	0.425	2.235
Netherlands	1053.670	16.716	63.034	14.872	70.849
Norway	29.542	4.661	6.338	4.431	6.667
Poland	101.810	38.483	2.646	22.451	4.535
Portugal	6.330	10.708	0.591	5.169	1.225
Romania	47.820	22.215	2.153	7.787	6.141
Russia	303.946	140.041	2.170	59.700	5.091
Slovakia	29.930	5.463	5.479	4.064	7.365
Slovenia	26.000	2.006	12.961	1.299	20.015
Spain	110.812	40.525	2.734	29.094	3.809
Sweden	183.910	9.060	20.299	8.398	21.899
Switzerland	27.600	7.604	3.630	5.739	4.809
Ukraine	159.920	45.700	3.499	15.300	10.452
United Kingdom	650.240	61.113	10.640	51.422	12.645
Total	4,415.730	690.312	6.397	423.133	10.436

Note: This data was captured on the 31st of August 2010

Section 5. IXP participants

5.1 Total number of IXP participants per country

This graph displays combined number of IXP participants in any given country. It further details the amount of unique ASNs peering in each country i.e. if an ASN is peering at more than one IXP in a country it is not being counted twice.



Note: This data was captured on the 31st of August 2010

5.2 Total number of IXP participants per country

This table details:

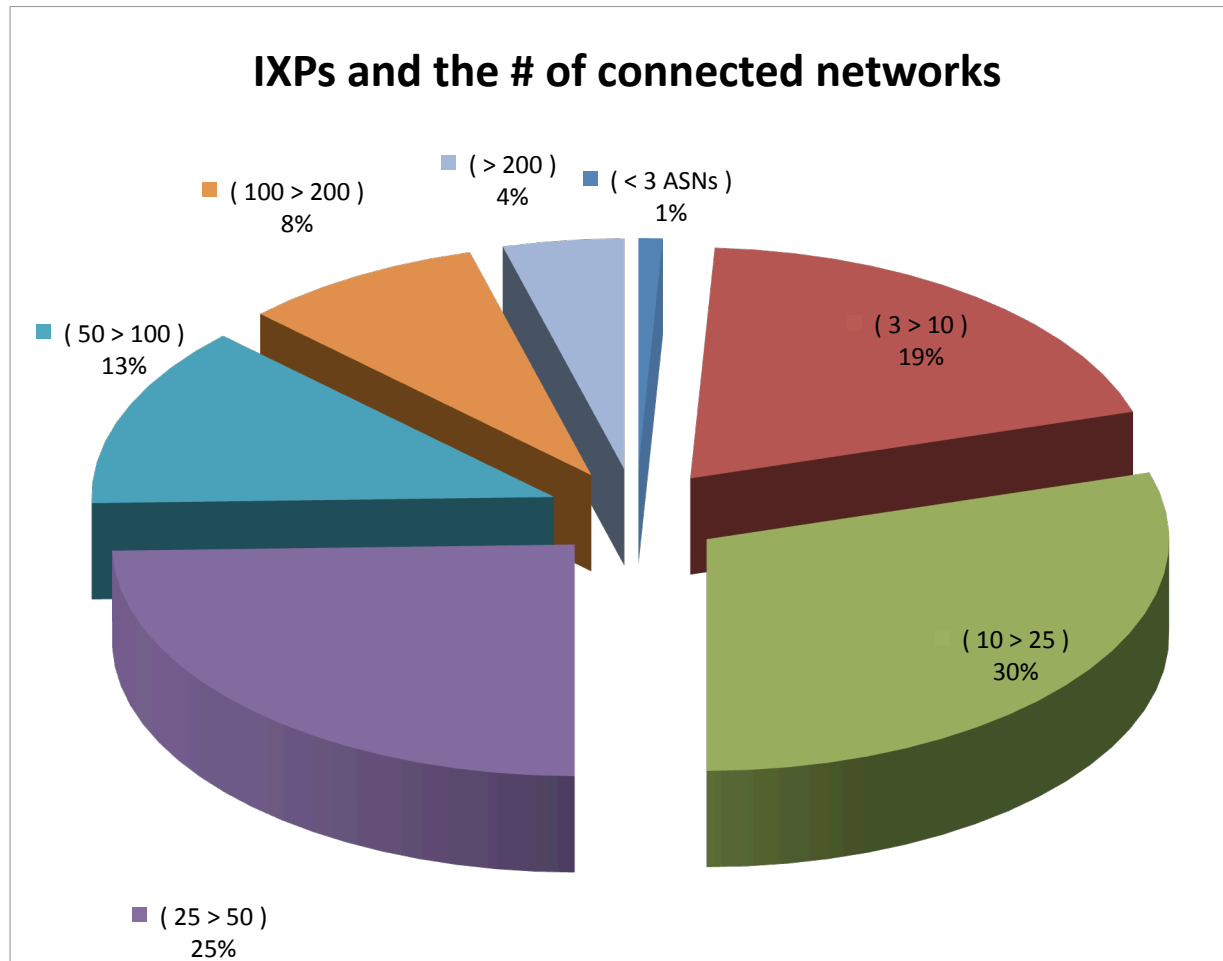
- Combined total number of IXP participants per country. This figure will include those participants that are present at more than one IXP in any given country.
- Total number of listed or published ASNs per country. In some circumstances IXP participants do not wish to publicly advertise their ASN at a particular IXP or the IXP does not publish a list of their participant's ASNs.
- Total number of unique ASNs participating per country. ASNs that participate at more than one IXP per country are only counted once in this column.

Country	Participants (a)	Published ASNs (b)	Unique ASN (c)
Germany	729	691	514
Netherlands	728	675	540
United Kingdom	708	676	518
Russia	591	549	465
France	488	448	262
Sweden	246	216	116
Italy	241	241	165
Poland	235	156	155
Switzerland	223	221	167
Latvia	199	177	168
Ukraine	187	158	174
Latvia	167	167	167
Austria	114	114	109
Norway	109	109	74
Czech Rep	105	105	100
Romania	104	102	87
Spain	81	79	66
Belgium	71	71	66
Bulgaria	64	64	55
Slovakia	63	63	53
Ireland	62	61	57
Hungary	52	52	52
Denmark	50	50	50
Finland	33	33	30
Luxembourg	29	29	24
Estonia	27	27	18
Portugal	20	20	20
Croatia	17	17	17
Slovenia	16	16	16
Iceland	15	15	15
Greece	12	12	12
Malta	12	0	N/A
Kazakhstan	11	0	N/A
Moldova	9	0	N/A
Cyprus	7	7	7
Totals	5658	5310	4352
Unique published ASNs peering at IXPs in Europe			3156
Estimated total Unique ASNs peering at IXPs in Europe			3350

Note: This data was captured on the 31st of August 2010

5.3 Percentage of IXPs and their number of participants

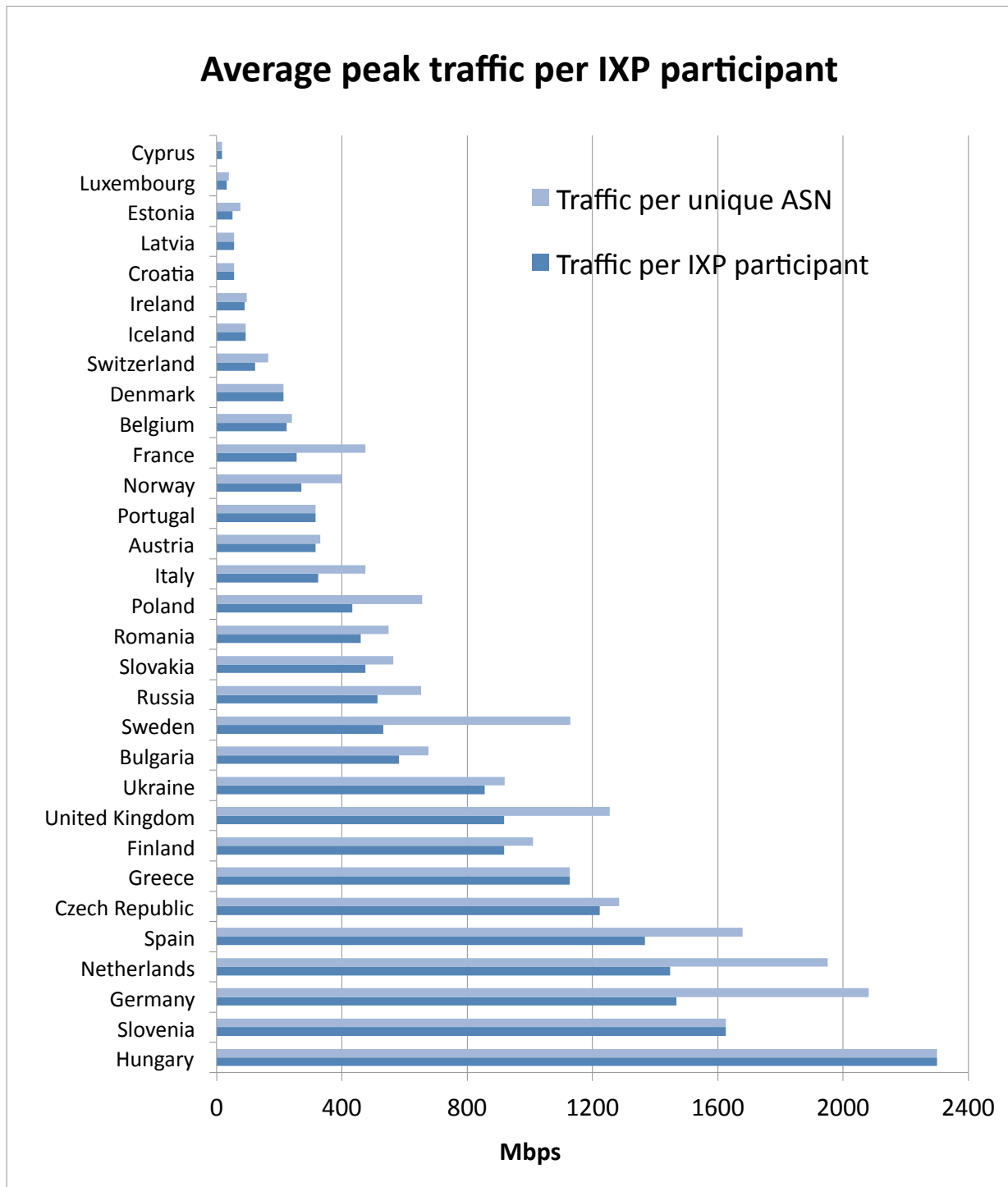
This graph highlights the percentage of European IXPs having a particular amount of participants at their exchange. Note that at 9 IXPs we were not able to collect accurate participant numbers.



# of ASNs	# of IXPs	% of total
(< 3 ASNs)	1	0.8%
(3 > 10)	23	19.5%
(10 > 25)	35	29.7%
(25 > 50)	29	24.6%
(50 > 100)	15	12.7%
(100 > 200)	10	8.5%
(> 200)	5	4.2%
	118	100.0%

5.4 Average peak traffic per IXP participant per country

This graph displays the average amount of peak traffic per IXP participant per country and furthermore displays the average amount of peak traffic per unique ASN peering in each country.



Note: This traffic data was captured on the 31st of August 2010

5.5 Average peak traffic per IXP participant per country

This table details the average amount of peak traffic per IXP participant per country as well as identifying the average peak traffic per unique participant per country. The average traffic per participant has been derived by dividing the total amount of IXP participants, in a country, by the aggregated IXP traffic within that same country. While the traffic per unique ASN has been derived by dividing the total amount of unique ASNs known to be peering in a country by the total amount of IXP traffic in a given country.

Country	Traffic in Gbps	Participants	Traffic per participant in Mbps	Unique ASNs	Traffic per unique ASN in Mbps
Austria	36.090	114	316.58	109	331.10
Belgium	15.910	71	224.08	66	241.06
Bulgaria	37.230	64	581.72	55	676.91
Croatia	0.961	17	56.53	17	56.53
Cyprus	0.120	7	17.14	7	17.14
Czech Republic	128.500	105	1223.81	100	1285.00
Denmark	10.700	50	214.00	50	214.00
Estonia	1.379	27	51.07	18	76.61
Finland	30.315	33	918.64	30	1010.50
France	124.395	488	254.91	262	474.79
Germany	1069.850	729	1467.56	514	2081.42
Greece	13.540	12	1128.33	12	1128.33
Hungary	119.600	52	2300.00	52	2300.00
Iceland	1.390	15	92.67	15	92.67
Ireland	5.506	62	88.81	57	96.60
Italy	78.334	241	325.04	165	474.75
Latvia	9.430	168	56.13	168	56.13
Luxembourg	0.950	29	32.76	24	39.58
Netherlands	1053.670	728	1447.35	540	1951.24
Norway	29.542	109	271.03	74	399.22
Poland	101.810	235	433.23	155	656.84
Portugal	6.330	20	316.50	20	316.50
Romania	47.820	104	459.81	87	549.66
Russia	303.946	591	514.29	465	653.65
Slovakia	29.930	63	475.08	53	564.72
Slovenia	26.000	16	1625.00	16	1625.00
Spain	110.812	81	1368.05	66	1678.97
Sweden	183.910	246	747.60	116	1585.43
Switzerland	27.600	223	123.77	167	165.27
Ukraine	159.920	187	855.19	174	919.08
United Kingdom	650.240	708	918.42	518	1255.29
Europe	4415.730	5595	789.23	4172	1058.42

Note: This traffic data was captured on the 31st of August 2010

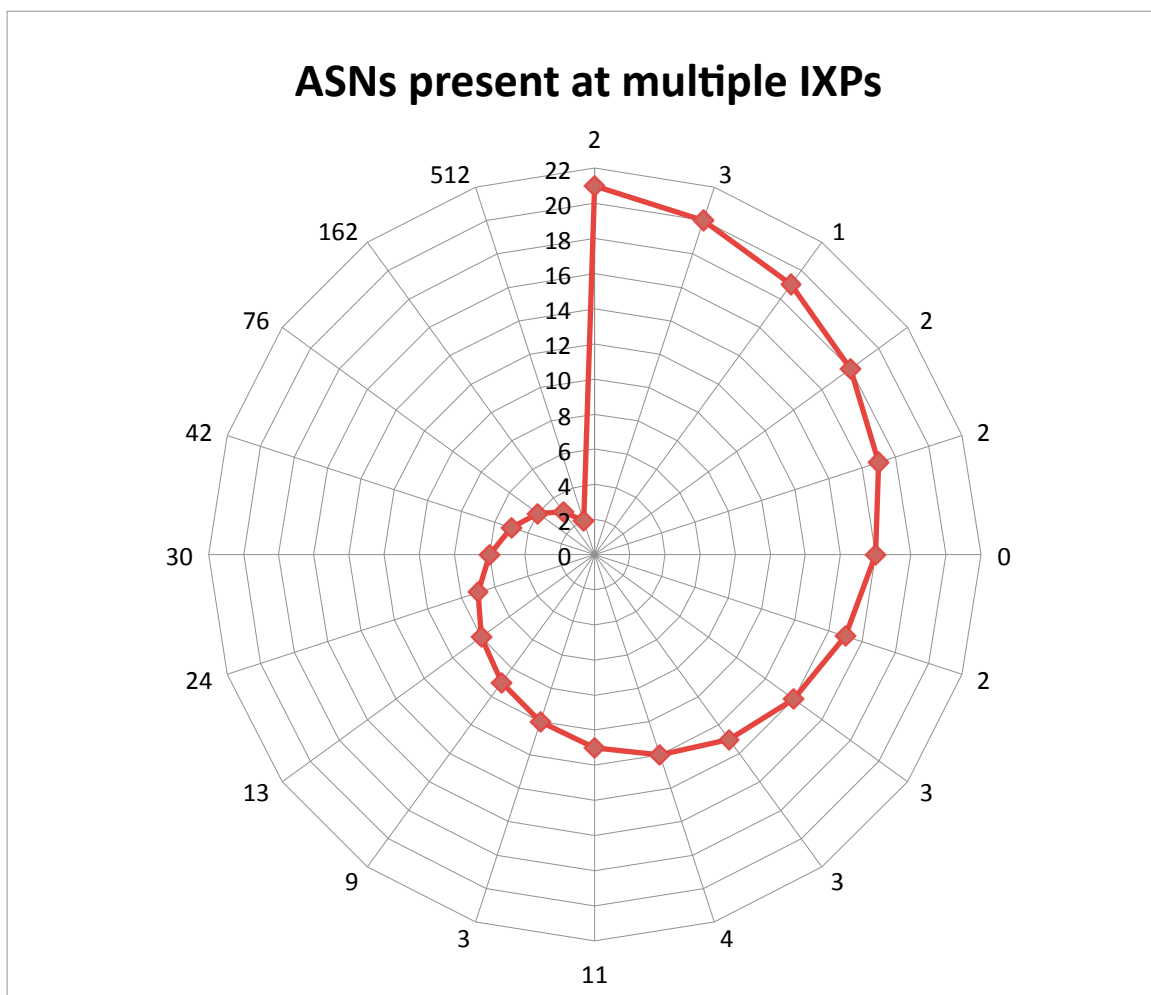
5.6 Number of ASNs present at more than one IXP in Europe

The chart below details the number of ASNs that are present at more than one European IXP.

The numbers bordering the circumference of the chart are the amount of ASNs that peer at a particular number of IXPs. The numbers starting at the centre of the chart and moving to the outside are the number of IXPs that the ASNs are present at.

Starting from the centre the chart shows that 512 ASNs peer at two IXPs, 162 ASNs peer at three IXP, 76 ASNs peer at four IXPs, etc. While the outermost ring of the chart shows that two ASNs peer at no less than 21 different European IXPs.

In total some 904 ASNs peer at more than one European IXP this is on the 728 ASNs in 2009.



Note: This data was captured on the 25th of October 2010

5.7 ASNs present at more than one IXP in Europe

The table below details the number of ASNs that are present at more than one European IXP. The ASN column displays the actual AS number of those 36 participants that peer at 10 or more European IXPs. In 2009 some 29 ASNs peered at 10 or more European IXPs.

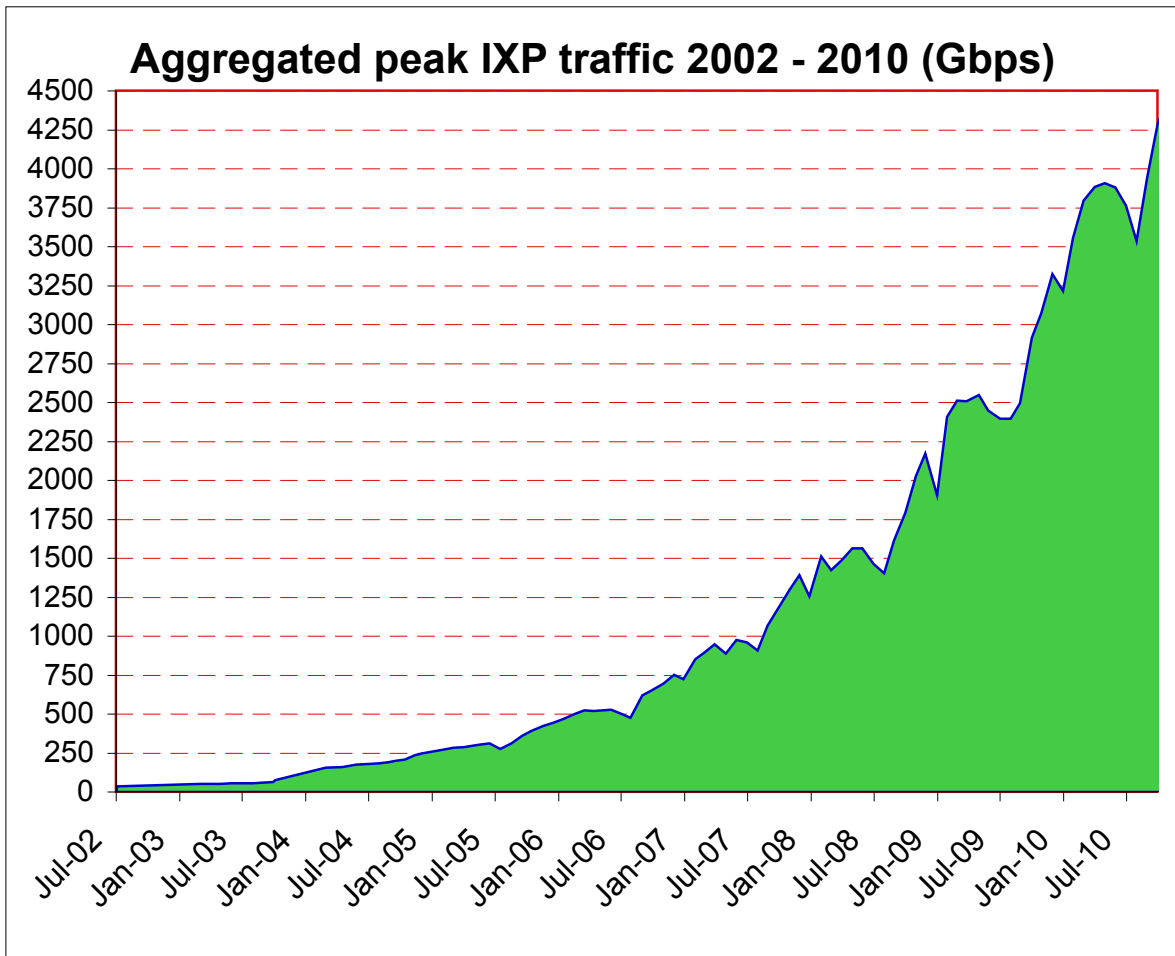
# of IXPs	# of ASNs	ASN
21	2	AS16265, AS15169
20	3	AS20940, AS8928, AS34695
19	1	AS702
18	2	AS2686, AS8220
17	2	AS174, AS9002
16	0	-
15	2	AS3856, AS33926
14	3	
13	3	
12	4	
11	11	
10	3	
9	9	
8	13	
7	24	
6	30	
5	42	
4	76	
3	162	
2	512	
Total ASNs at > 1 IXP		904

Note: This data was captured on the 25th of October 2010

Section 6. European IXP aggregated peak traffic trends

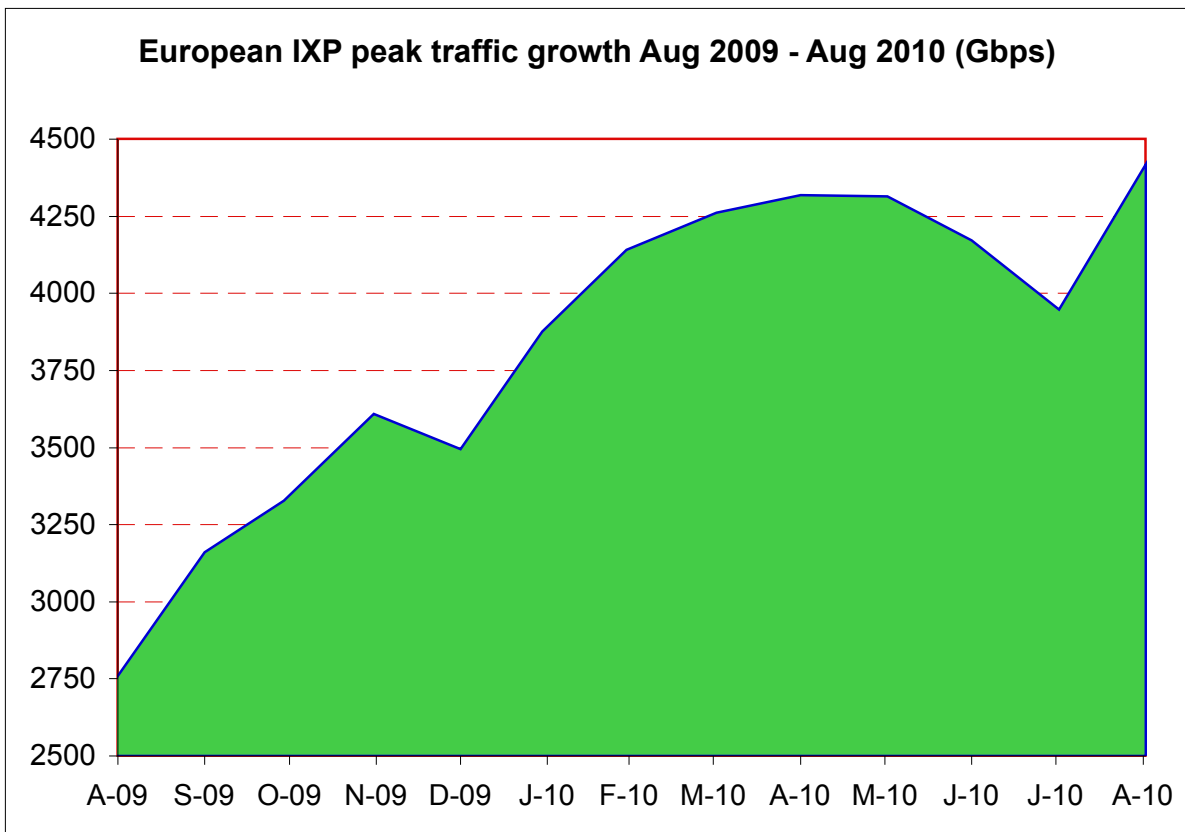
6.1 Aggregated peak traffic history 2002 - 2010

The graph displays the history of peak traffic of the Euro-IX membership since July 2002. The traffic statistics have been taken on a monthly basis from some 38 IXPs across Europe



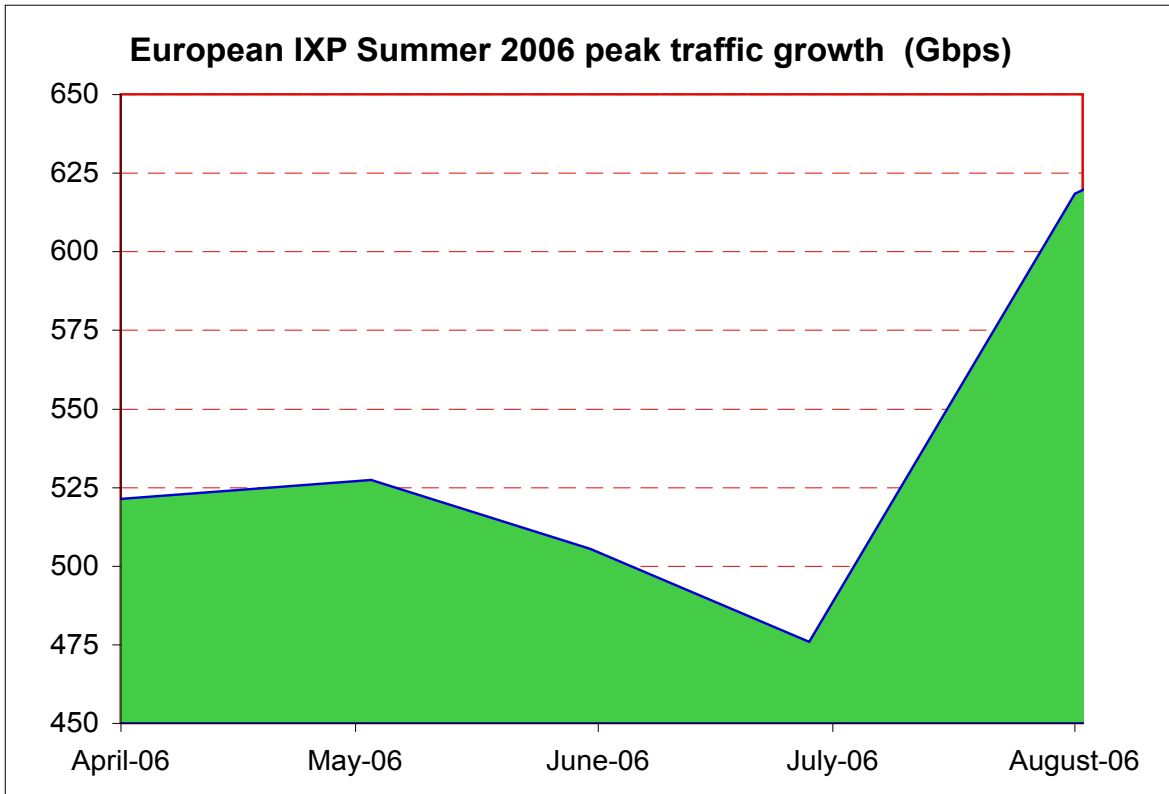
6.2 European traffic growth over 12 months – August 2009 to August 2010

The graph below shows the aggregated peak traffic of the 56 Euro-IX member IXPs that have public traffic statistics as well another 55 (non member) European IXPs. On the 31st of August 2010 the aggregated peak traffic of all 111 IXPs that have publicly viewable statistics came to 4.364 Tbps, this is up on the 2.682 Tbps that was recorded at the end of August 2009.



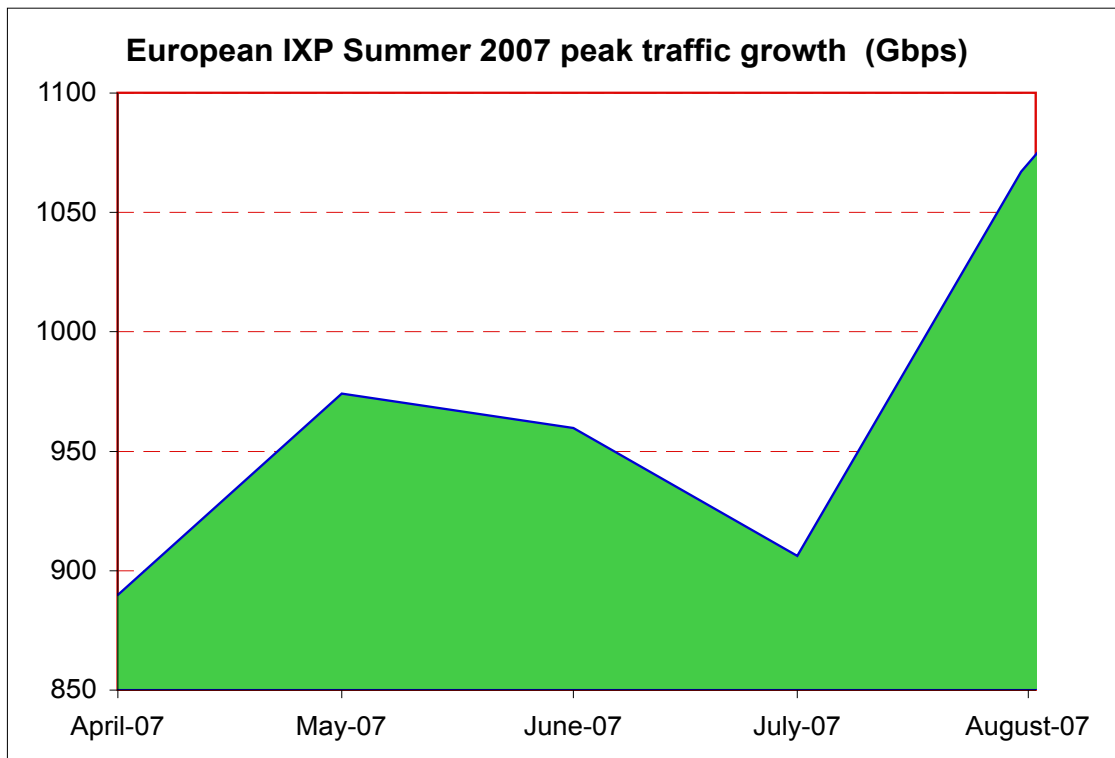
6.3 Summer peak traffic trend in Europe: 2006

This graph displays the aggregated IXP peak traffic during the summer of 2006. Drops in monthly peak traffic can be seen in both June and July of that year. The end of July to end of August peak increase was over 25% in 2006.



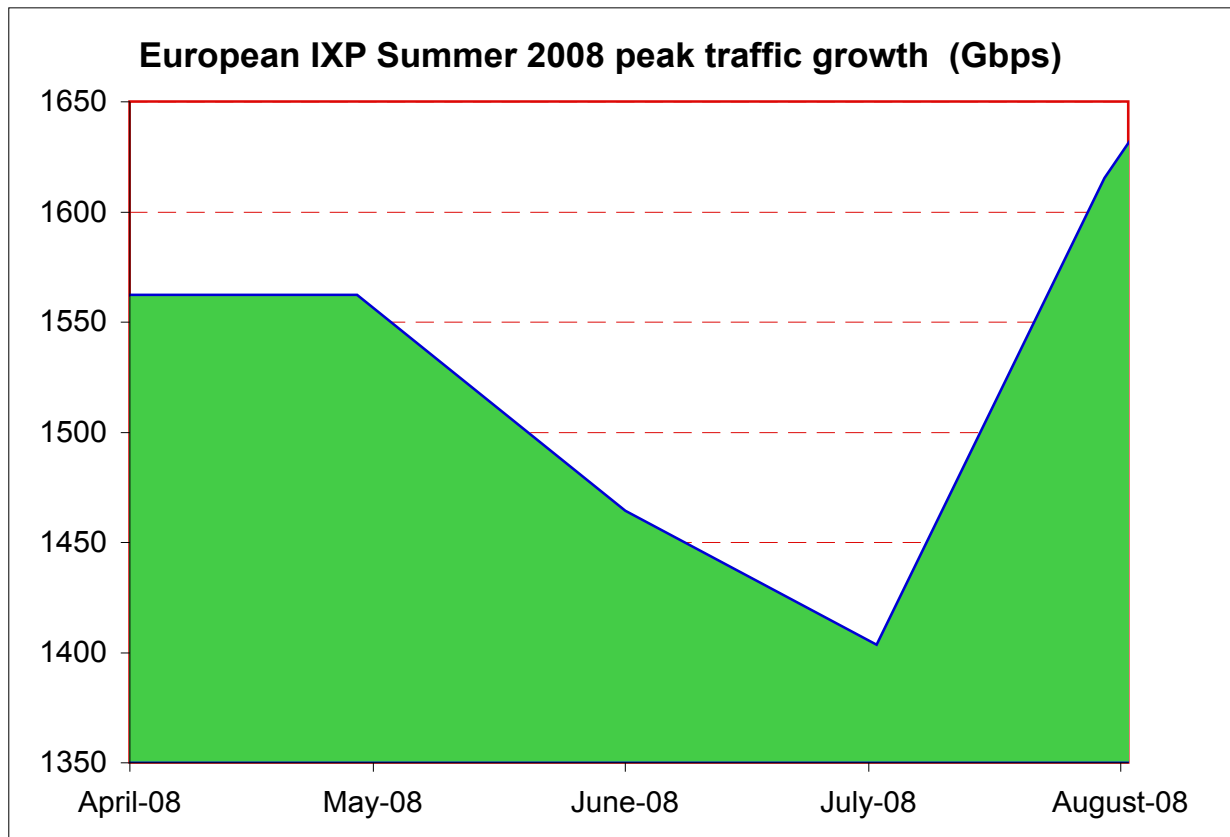
6.4 Summer peak traffic trend in Europe: 2007

This graph displays the aggregated IXP peak traffic during the summer of 2007. Drops in monthly peak traffic can be seen as early as April, this is widely agreed by IXPs across Europe that it was due to the unusually early warm weather that was experienced for about four weeks across the continent. After this warm weather period, the traffic returned to normal in May and then the usual summer trend of a decrease in aggregated traffic occurred and once again by mid to late August the traffic started to increase once again.



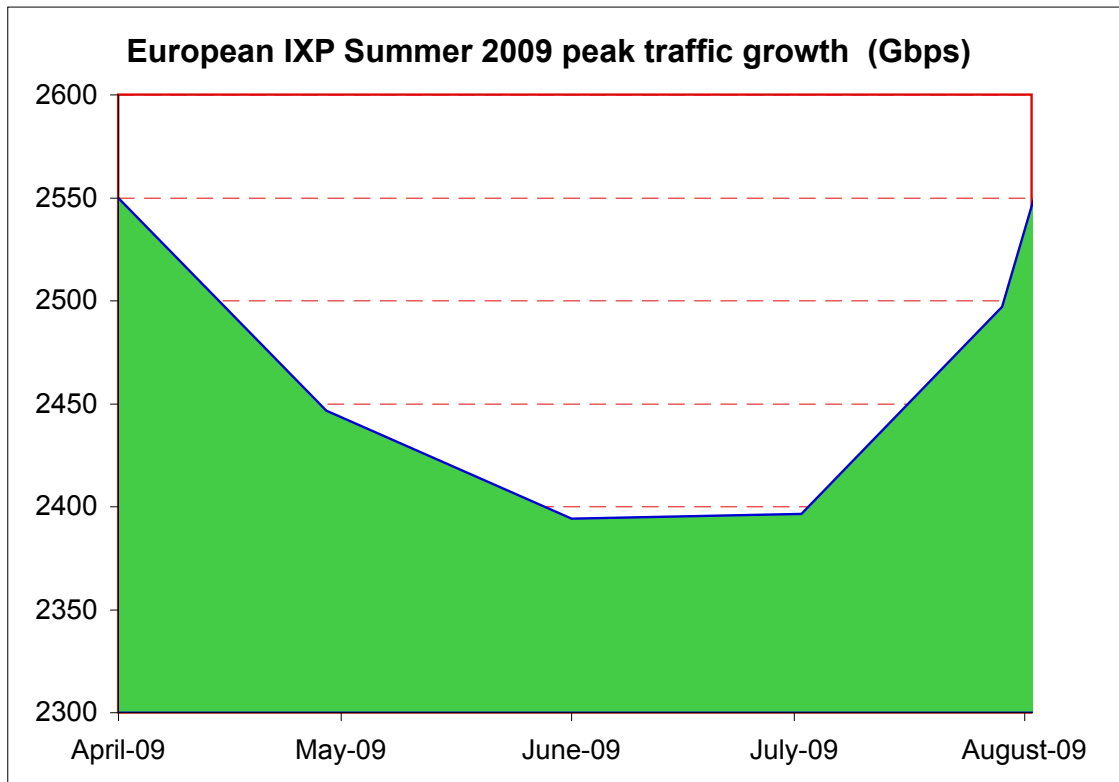
6.5 Summer peak traffic trend in Europe: 2008

This graph displays the aggregated IXP peak traffic during the summer of 2008. Showing a steady drop in peak IXP traffic through the summer months and a clear increase in traffic by the end of August, however the increase in peak traffic from the end of April to the end of August 2008 was only some 3.17% which is significantly down of the increase recorded in 2007 of 18.3% and in 2006 of 14.95% over the same period.



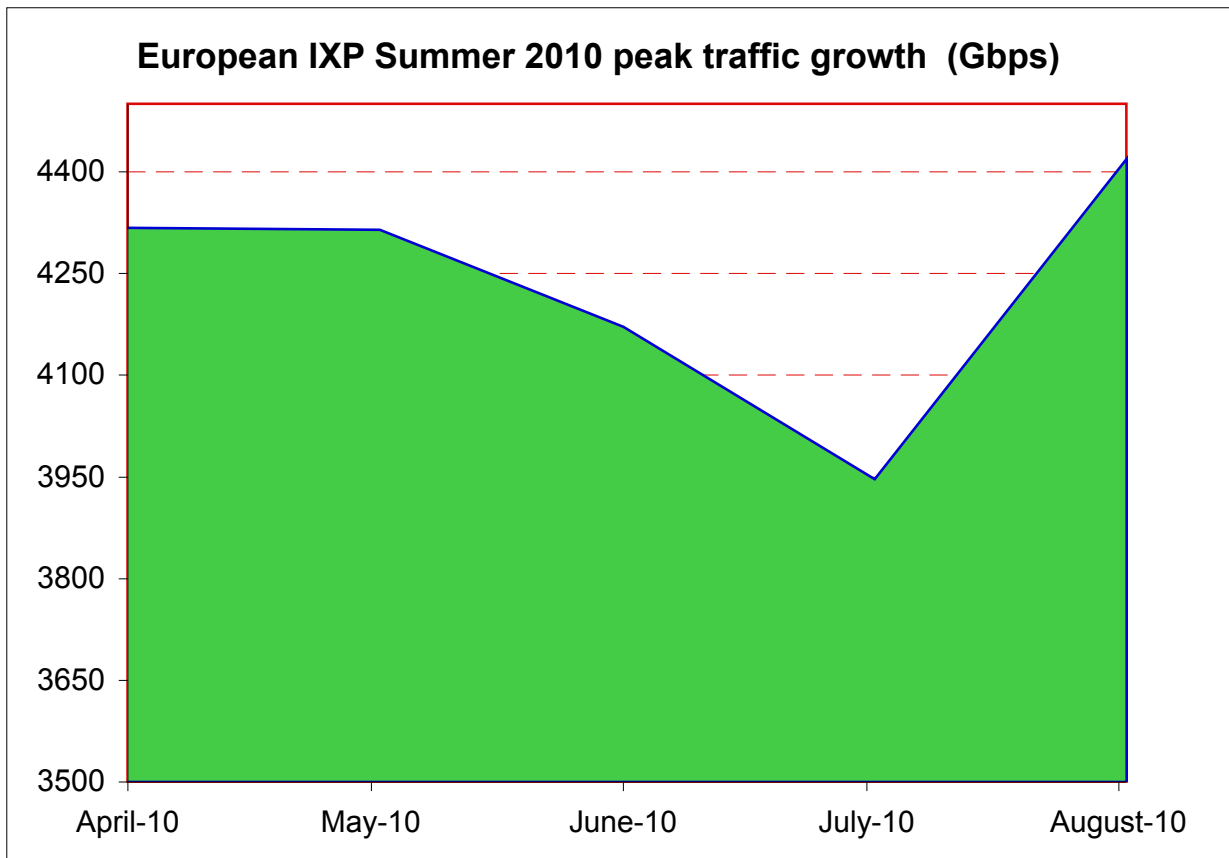
6.6 Summer peak traffic trend in Europe: 2009

This graph displays the aggregated IXP peak traffic during the summer of 2009. Showing a steady drop in peak IXP traffic through the summer months and a clear increase in traffic by the end of August, however the increase in peak traffic at the end of August still did not match the levels of peak traffic that were seen in April of that same year. This is a clear break in the trend that was seen in 2006 to 2008.



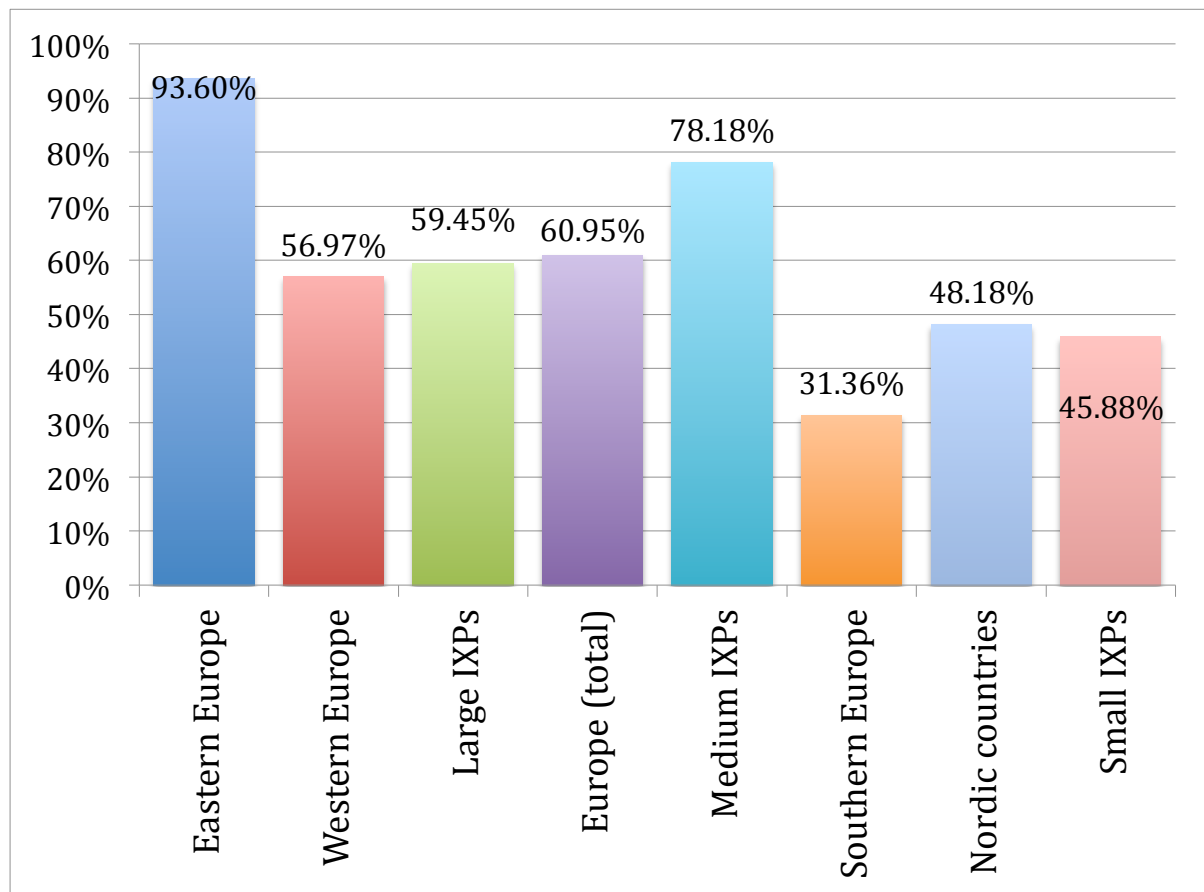
6.7 Summer peak traffic trend in Europe: 2010

This graph displays the aggregated IXP peak traffic during the summer of 2010. Once again showing a steady drop in peak IXP traffic through the summer months and a clear increase in traffic by the end of August taking traffic values back to those seen earlier in the year.



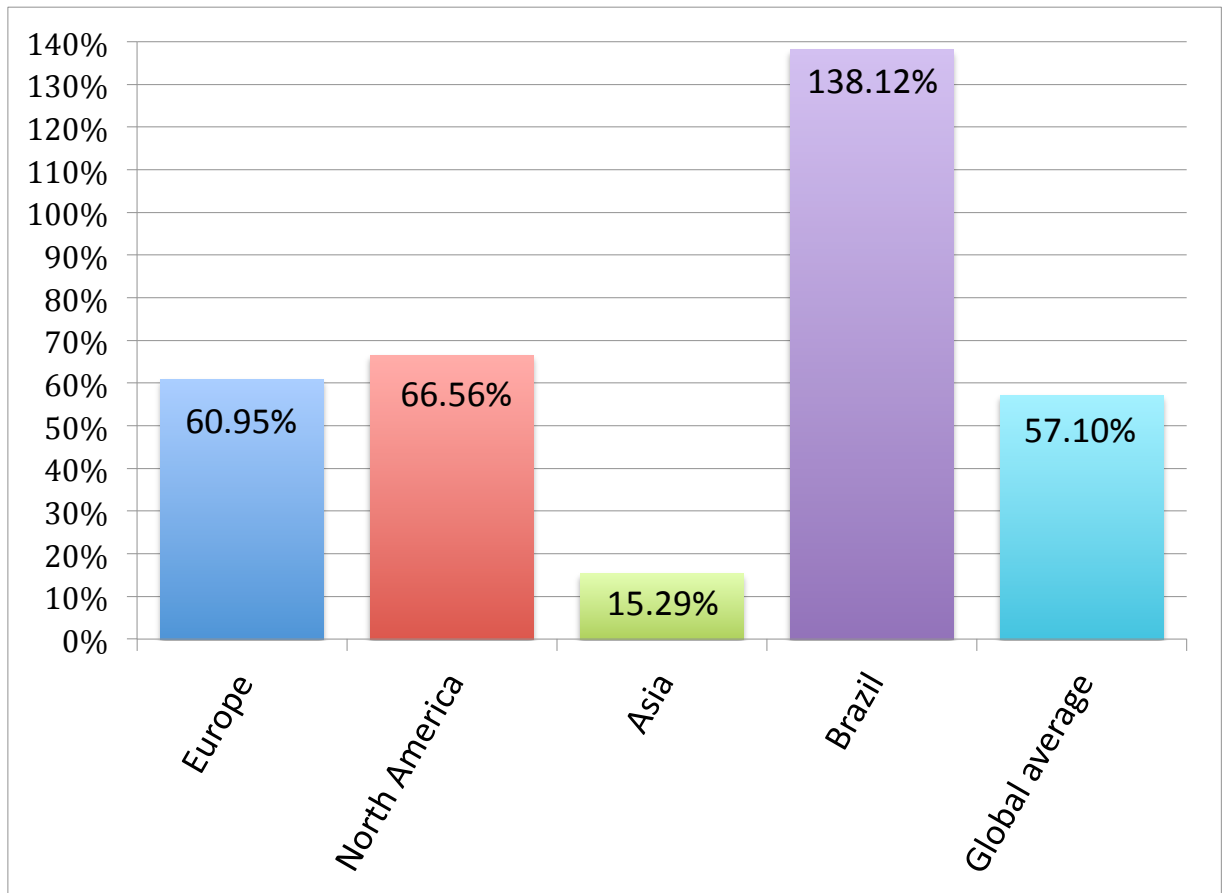
6.8 Categorized and regional IXP annual growth rate comparison

This graph displays the aggregated IXP peak traffic growth between the end of August 2009 and the end of August 2010. The IXPs have been categorized into different regions and sizes. Large IXPs are those whose peak traffic exceeds 50 Gbps, medium IXPs are those whose peak traffic is between 2 Gbps and 50 Gbps and small IXPs are those whose peak traffic does not exceed 2 Gbps.



6.9 Global annual IXP growth rate comparison

This graph displays the aggregated IXP peak traffic growth between the end of August 2009 and the end of August 2010, at European, North American, Asian and Brazilian IXPs. It should be noted that the peak traffic data was collected over a 12-month period from some 111 European IXPs while Euro-IX could only gather accurate data from 12 Asian IXPs, nine North American and 12 Brazilian IXPs.



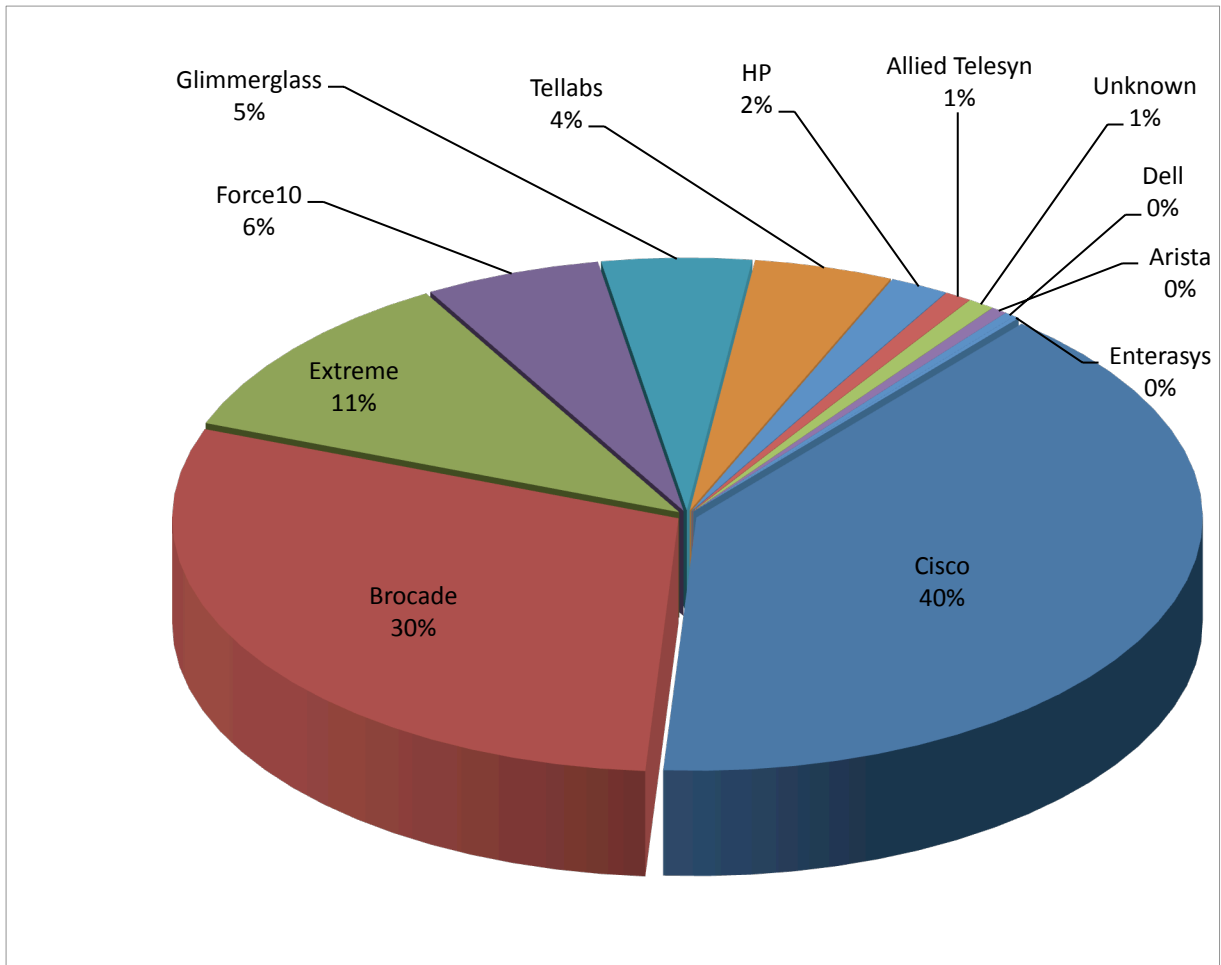
Section 7. IXP switching platform technology

Additional notes for this section:

- i) The amount of traffic to switch ratios is a simple guideline and this information should not be used for any other purposes than that.
- ii) The amount of devices/vendors is not related with the traffic an IXP transports or the IXP port density and the role of a switch (core, distribution/aggregation, edge)
- iii) The amount of devices/vendors is not related to the size (traffic, members) of an IXP or whether the devices have been self-purchased or donated
- iv) A proportion of the following switch data is manually added by Euro-IX member IXPs while the rest of the data is collected by making contact with IXPs
- v) Some IXPs use multiple vendors because of a dual-vendor strategy that they have on place
- vi) The vendors listed in this section are those known to be in use by European IXPs. It should be noted that this section outlines the IXP side equipment and NOT that of the participants that connect to the IXP. The list of vendors that the participants use to connect to the IXP may be somewhat larger than those listed in this section.

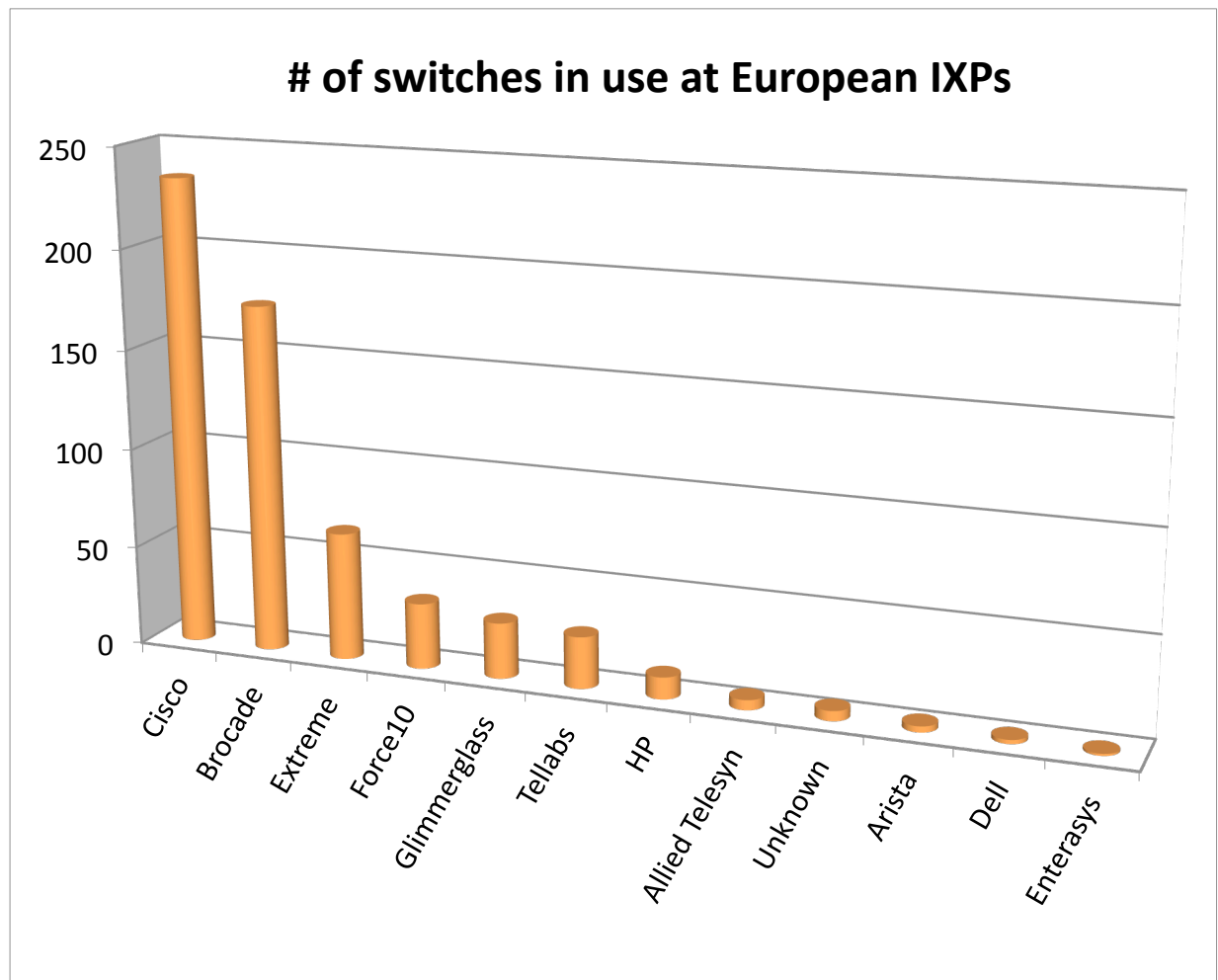
7.1 Percentage of the European IXP market share for switch vendors

This graph outlines the percentage of European IXP market share that a particular switch vendor has. The 'unknown' switches relates to the fact that Euro-IX was unable to collect accurate information on the brand of these switches.



7.2 Number of switches in use at European IXPs

This graph displays the number of a particular brand of switch being used by IXPs across Europe. The 'unknown' switches relates to the fact that Euro-IX was unable to collect accurate information on the brand of these switches.



7.3 European IXP's choice of switch vendor

This table details the number of particular vendor's switches being used at IXPs across Europe and the percentage change from 2009 figures. The 'unknown' switches relates to the fact that Euro-IX was unable to collect accurate information on the brand of these switches, this number has been somewhat reduced in 2010.

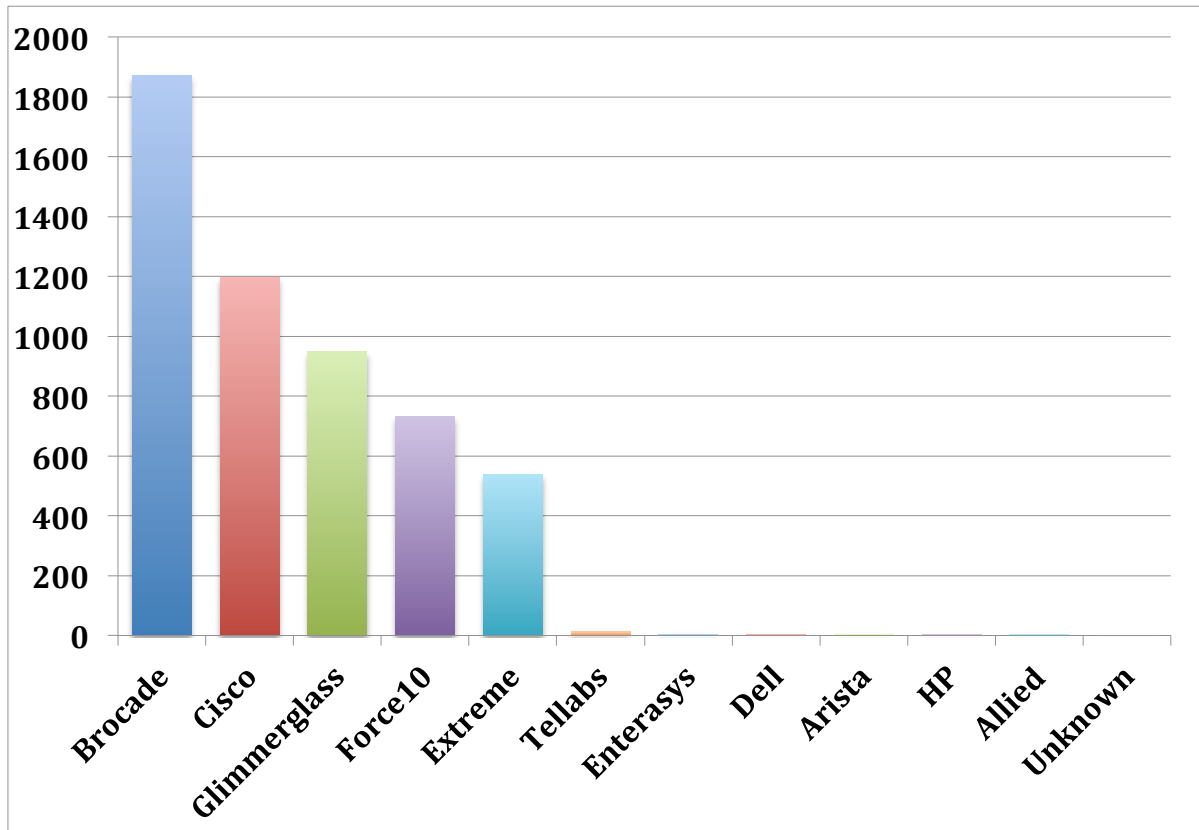
Switch vendor	Number of switches 2010	Percentage of total	Number of switches 2009	Percentage change
Cisco	234	41.3%	232	0.86%
Brocade	174	30.7%	170	2.35%
Extreme	64	11.3%	58	10.34%
Force10	33	5.8%	30	10.00%
Glimmerglass	28	4.9%	25	12.00%
Tellabs	26	4.6%	26	0.00%
HP	11	1.9%	11	0.00%
Allied Telesyn	5	0.9%	4	25.00%
Unknown	5	0.9%	3	66.67%
Arista	3	0.5%	2	50.00%
Dell	2	0.4%	2	0.00%
Enterasys	1	0.2%	1	0.00%
Total	586		564	3.90%

This table details the number of European IXPs that use a particular brand of switch and the percentage change from 2009 figures. Note that in some cases IXPs use more than one brand of switch at their IXP.

Switch vendor	Number of IXPs 2010	Percentage of all IXPs	Number of IXPs 2009	Percentage change
Cisco	83	69%	81	2.47%
Brocade	24	20%	24	0.00%
Extreme	17	14%	16	6.25%
Force10	9	7%	6	50.00%
Unknown	5	4%	3	66.67%
HP	4	3%	4	0.00%
Arista	2	2%	1	100.00%
Dell	2	2%	2	0.00%
Allied Telesyn	1	1%	1	0.00%
Enterasys	1	1%	1	0.00%
Glimmerglass	1	1%	1	0.00%
Tellabs	1	1%	1	0.00%

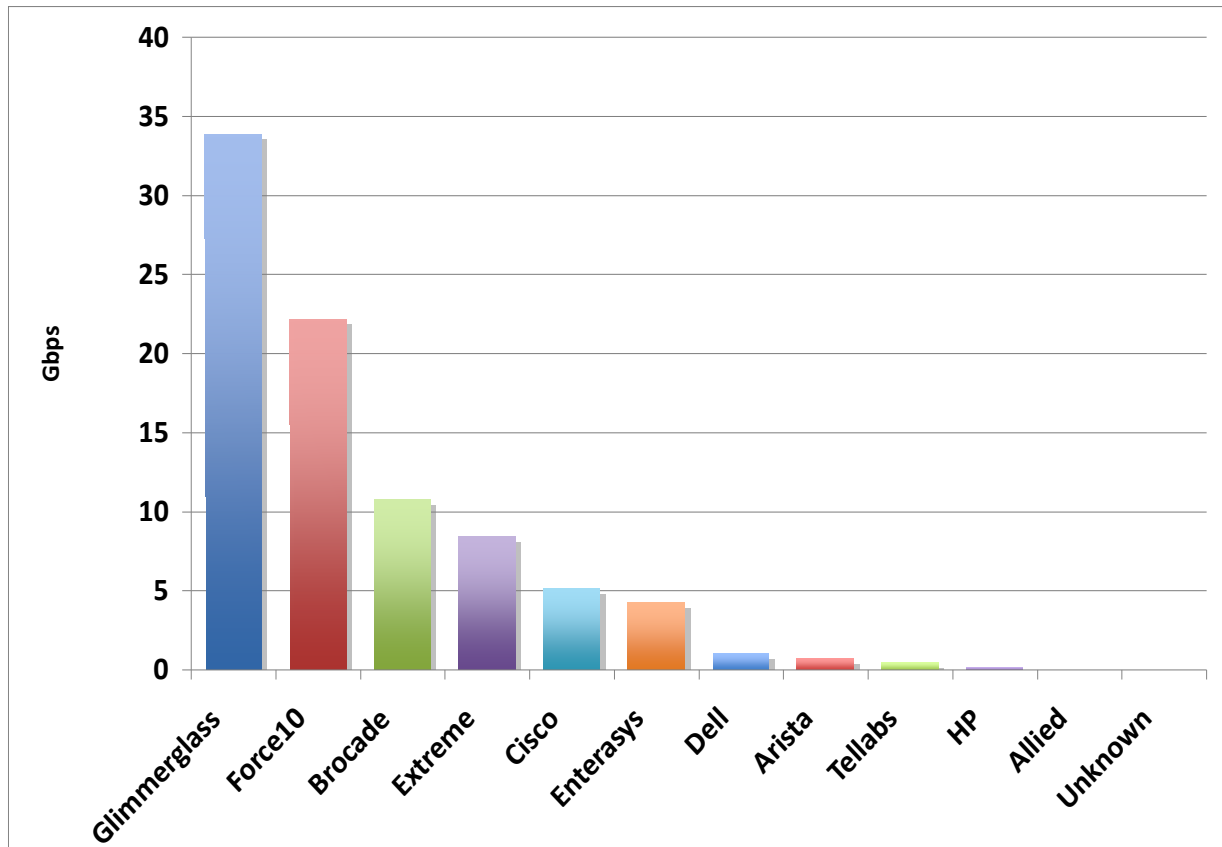
7.4 Amount of IXP traffic passing over a particular switch brand (in Gbps)

This graph displays the aggregated amount of peak IXP traffic, in Gbps, that passes over a particular brand of switch that is in use at European IXPs. In the case where a IXP uses multiple brands of switches the traffic was simply divided by the number of switches to calculate the brands share of traffic. It should be noted that in some cases the switches are not layer 2 devices, however the equipment nonetheless helps the IXPs deliver its service.



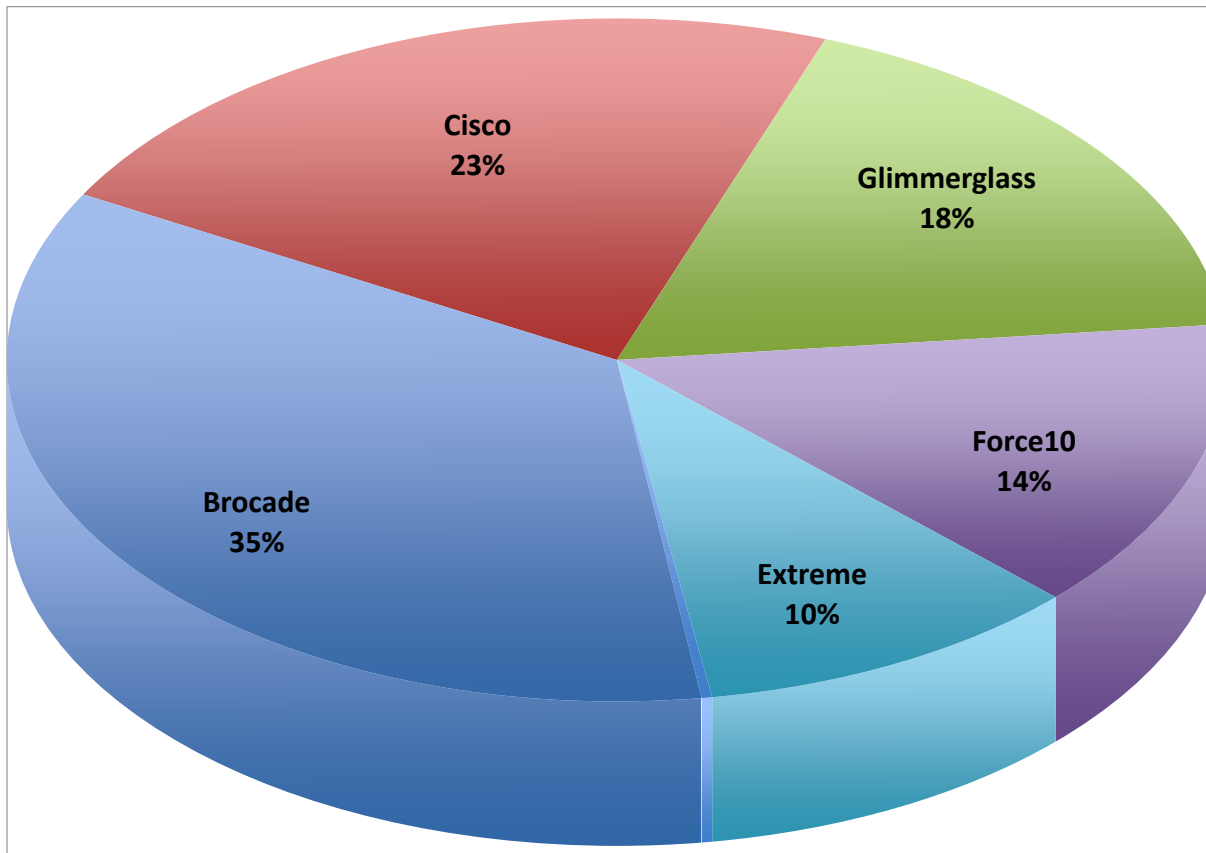
7.5 Amount of peak IXP traffic per switch (in Gbps)

This graph displays the average amount of peak traffic, in Gbps, that passes over a particular switch at European IXPs. These figures were calculated by dividing the amount of traffic by the number of switches in use at an IXP, in the case where an IXP uses multiple brands of switches the aggregated traffic was simply divided into equal switch shares. It should be noted that in some cases the switches are not layer 2 devices, however the equipment nonetheless helps the IXPs deliver its service.



7.6 Aggregated IXP traffic share of a particular switch brand

This graph displays the aggregated European IXP traffic share of a particular switch brand.



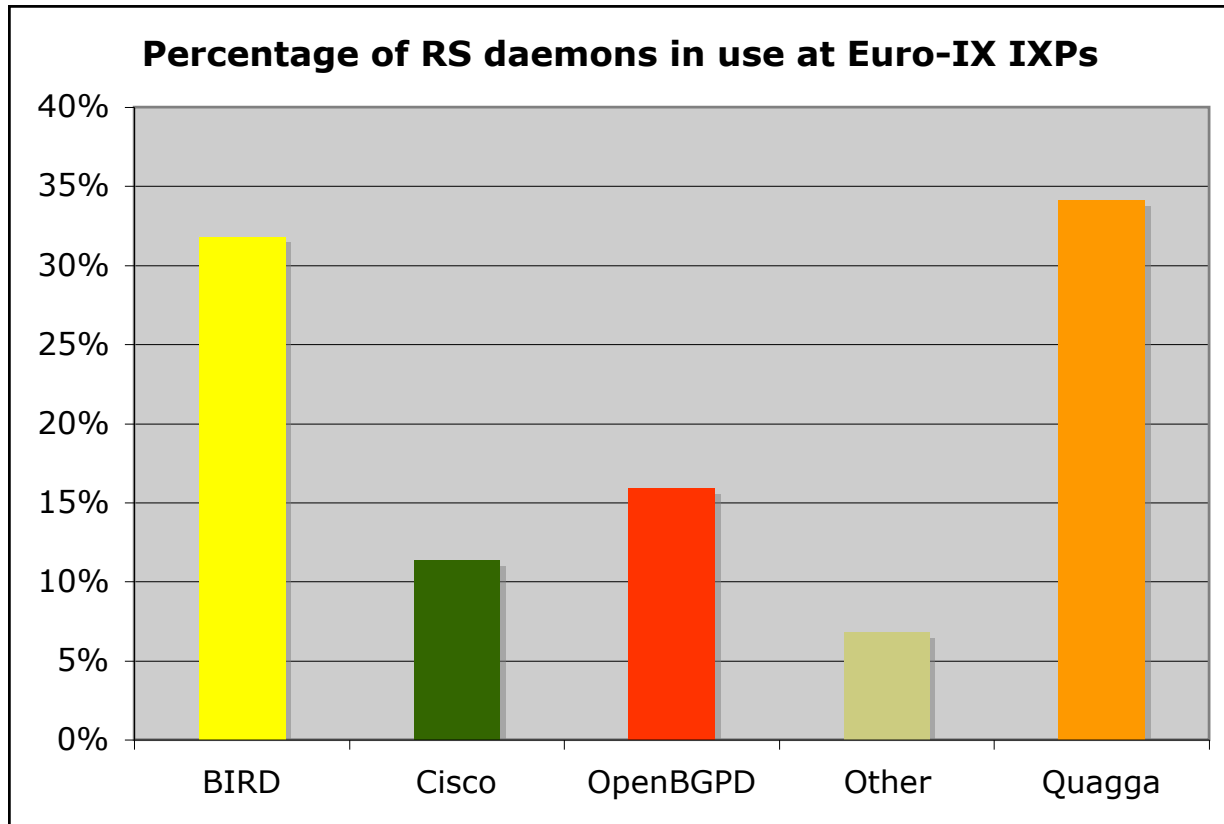
7.7 Amount of peak IXP traffic passing over a particular brand of switch

This table details the aggregated amount of peak IXP traffic that passes over a particular brand of switch and further breaking this down into per IXP and per switch traffic calculations. These figures were calculated by dividing the amount of traffic by the number of switches in use at an IXP, in the case where an IXP uses multiple brands of switches the aggregated traffic was simply divided into equal switch shares.

Switch vendor	# of IXPs	# of switches	Traffic in Gbps	% of total	Traffic per IXP (Gbps)	Traffic per switch (Gbps)
Allied	1	5	0.080	0.00%	0.080	0.016
Arista	2	3	2.030	0.06%	1.015	0.677
Brocade	24	174	1872.687	55.88%	78.029	10.763
Cisco	83	234	1197.707	35.74%	14.430	5.118
Dell	2	2	2.043	0.06%	1.022	1.022
Enterasys	1	1	4.250	0.13%	4.250	4.250
Extreme	17	64	538.463	16.07%	31.674	8.413
Force10	9	33	732.404	21.86%	81.378	22.194
Glimmerglass	1	28	948.000	28.29%	948.000	33.857
HP	4	11	1.423	0.04%	0.356	0.129
Tellabs	1	26	11.804	0.35%	11.804	0.454
Unknown	5	5	0.000	0.00%	0.000	0.000

7.8 Routes server daemons in use at Euro-IX member IXPs

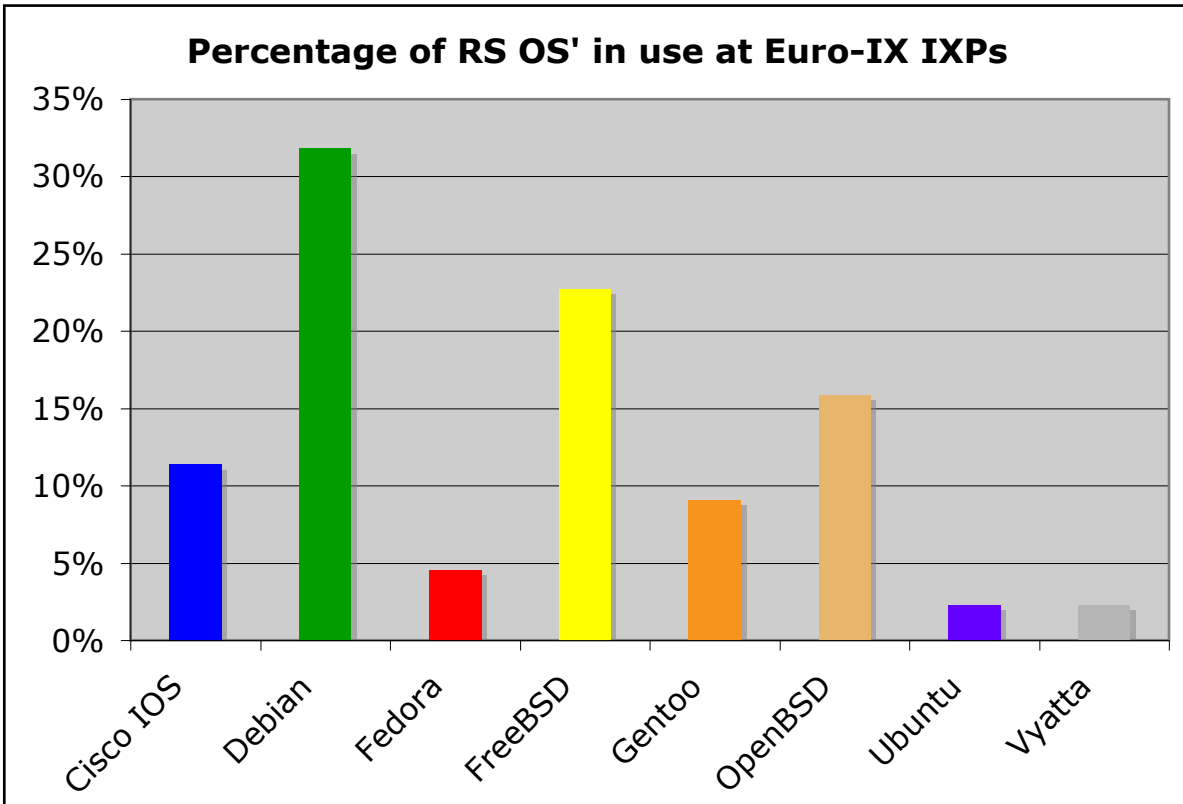
Since 2009 Euro-IX has implemented a route server database for its membership. This database allows the participating IXP to upload information about the route servers that they have in place at their IXPs: the hardware being used: the daemons being used: Operating systems: and the filters that are in place. Some 19 European Euro-IX IXPs have entered information in the route server database and they a total of 44 route servers in use at their IXPs. The following graph and table displays the number and percentage of RS daemons that are in operation at these IXPs.



Daemon	Number	% of total
BIRD	14	32%
Cisco	5	11%
OpenBGPD	7	16%
Other	3	7%
Quagga	15	34%
TOTAL	44	

7.9 Route server operating systems in use at Euro-IX member IXPs

The following graph and table displays the number and percentage of route server operating systems that are in use at European Euro-IX IXPs. This currently totals some 46 separate route servers at the 19 participating IXPs.



OS	Number	% of total
Cisco IOS	5	11%
Debian	14	32%
Fedora	2	5%
FreeBSD	10	23%
Gentoo	4	9%
OpenBSD	7	16%
Ubuntu	1	2%
Vyatta	1	2%
TOTAL	44	

Section 8. Further information

8.1 Resources

In an effort to seek out further information regarding IXPs that we were not able to get in direct contact with we made use of the **Peering Db** <https://www.peeringdb.com/> and we would like to express our appreciation to those responsible for managing this database.

Of course we would like to additionally thank all of the European IXPs, especially those that provide publicly available information of traffic statistics and participant's ASNs.

The biggest *thank you* goes to the 52 affiliated Euro-IX member and associate member IXPs that commit themselves to openly exchanging information with the rest of the IXP community via the Euro-IX website and the biannual Euro-IX Forums. Thank you Euro-IX members ☺

8.2 About the author

Serge Radovic is the Secretary General of Euro-IX. He has since 2000 been closely involved in working with European Internet Exchange Points. He is in personal and regular contact with more than 90 European IXPs and does his best to keep an eye of the rest of the community in Europe and other regions around the world!

8.3 Contact

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

Serge Radovic

serge@euro-ix.net

<http://www.euro-ix.net>