IEEE 802.3 Bandwidth Assessment Ad hoc

The European Peering Scene

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Information source

- The European Internet Exchange Association (Euro-IX) is made up of
- 60 affiliated IXP entities:
 - Europe: 46 affiliates (27 countries)
 - 14 IXPs from the rest of the world
 - operating a total of 160 IXPs worldwide

What is an Internet Exchange Point

- Formal Definition (for example used in RIPE-451)
 - A physical (Ethernet based) network infrastructure operated by a single entity whose purpose it is to facilitate the exchange of internet traffic between ISPs. There must be a minimum of three ISPs connected
- ISP in this context is any company that sends and/or receives Internet IP traffic

What is an Internet Exchange Point

- Purpose:
 - Save on (transit-) cost
 - Optimize IP data path between providers
 - Keep local traffic local
 - Simplify interconnection between many providers

The IXPs IXP Traffic IXP Participants A peek at 2015

Growth of IXPs in Europe





How many IXPs are out there?

Region	# of IXPs	% of total
Europe	132	41%
Asia/Pacific	60	19%
Africa	22	7%
Latin America	27	8%
North America	80	25%
Global	321	

The European IXP "community"

- Euro-IX (represents 70 European IXPs which is just over 53% on the entire IXP community)
- European Peering Forum (last 6 years)
- Partner programs between IXPs
- IXPs promoting each other
- Inviting each other to GM, anniversaries, etc.

Monthly Average Customer Port Costs

Port	2005	2010	Decrease
10 Mb	1	0.20	80%
100 Mb	1	0.45	55%
1GigE	1	0.53	47%
10 GigE	1	0.44	56%

* Euro-IX European customer average costs

Port usage trends



* Euro-IX European member port usage

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Euro-IX IXP traffic

- Combined Euro-IX Member IXP traffic (Europe)
- Peak/trough variance approximately 81%



European IXP traffic

 Combined European IXP peak traffic has risen from: 4.9 Tbps (end Sep '10) to <u>7.2Tbps</u> (end Sep '11)
 2.4 Tbps or 49% increase in the past 12 months



The large IXPs

- The top 10 IXPs (traffic wise) in Europe produce around 5.985 Tbps
- i.e. top 8% make up 82% of the total European IXP traffic
- 3 IXPs have well over 1 Tbps of peak traffic
- another 8 IXPs have over 100 Gbps of peak traffic
- a further 7 IXPs have over 50 Gbps of peak traffic

IXP traffic and sport



LONAP (London) traffic on a 'normal' weekday



Wed. afternoon World Cup 2010 England vs Slovenia

Global annual IXP peak traffic growth rates 2010 (growth rates are per category)



Categorized IXP peak traffic growth rates 2010 (growth rates are per category)



Catergorized IXP peak traffic growth rates 2010 (growth rates are per category)



IXP traffic in Eastern Europe

- MSK-IX (Moscow, Russia)
 - 24 months ago **120 Gbps > now 660 Gbps**
- UA-IX (Kiev, Ukraine)
 - 24 months ago **58 Gbps > now 370 Gbps**
- BIX.BG (Sofia, Bulgaria)
 - 24 months ago 6 Gbps > now 150 Gbps
- NIX.CZ (Prague, Czech Republic)
 - 24 months ago **90 Gbps > now 180 Gbps**
- PLIX (Warsaw, Poland)
 - 24 months ago 72 Gbps > now 152 Gbps

The IXPs IXP Traffic IXP Participants A peek at 2015

European IXP participants

- 6,204 participants at 132 IXPs
- 3,329 unique participants
- 1,056 participants are present at >1 IXP in Europe
 - Average of 47 participants per IXP
 - Average of 1Gbps per IXP participant

"Estimated" IXP participants globally

Region	Participants	Unique	
Europe	6,204	3,329	
Asia/Pacific	1,246	677	
North America	2,205	934	
South America	447	286	
Africa	235	122	
Global	10,337	5,057	
* Data captured on 09 May 2011			

The IXPs IXP Traffic IXP Participants A peek at 2015

5 year peak European IXP traffic projection

- Increase in IXP peak traffic from the end of August 2005 to the end of August 2010 was 12 fold
- Exponential trend line suggests 47 Tbps+ in 2015



The Peering Scene in 2015?

- Number of IXPs: 145 (130)
- 8,000 (6,204) participants at these IXPs
- 4,400 (3,329) unique ASNs
- Aggregated European IXP traffic: 47 Tbps+ (6.3 Tbps)
- Average IXP peak traffic: 360 Gbps (48 Gbps)
- Average number of IXP participants: 55 (46)
- Average participant traffic: 6.5 Gbps (1 Gbps)

A few useful tools

Euro-IX ASN tools

- The ASN DB lists IXP participants from about 285 IXPs in five regions (10,300 DB entries)
- ASN DB search interface
- IXP-ASN filter tool (and ASN matrix)
- Most common ASNs (those at 10 or more IXPs)
- Latest entries in ASN DB (available as a RSS feed)

Euro-IX ASN tools

Euro-IX	European Internet Exchange Association	act Site map Search IXP directory Sth Euro-IX Forum
Home	You are here: Home Serge Radovcic Last login: March 30, 2010 Sign or	Lt Serge Radovcic
News & Events +	Wolcome to Fure IVI	Last login: March 30, 2010
Euro-IX +	welcome to Euro-IA:	Profile Sign out
For IXPs +	Europe's leading Internet exchange points, which connect the networks of Internet service providers (ISPs) to permit the exchange of	News & Events
For ISPs +		16th Euro-IX Forum
Patrons +	Latest NEWO	Tools
Resources +	Latest NEWG	ASN Filter (New!)
Members	Currently Brocade, Cisco Systems, Extreme Networks, Force10 Networks, Glimmerglass, Interxion, Juniper and TelecityGroup have	Peering Matrix
Euro-IX Meetings +	all affiliated themselves with Euro-IX joining our membership of 48 IXPs from 25 European countries, Egypt, India, Japan, Nepal and the United States.	Contraction Matrix
Your Web Updates	More News	Service Comparison Matrix
Mailing list Archives		List of European IXPs
Document Archive	For IXPs	Euro-IX ASN database
Route Server DB	If you are looking to start an IXP or your IXP needs a helping hand then go through to the IXP section.	Newest ASN DB entries (New!)
Switch Database	For ISPs	Most common ASNs (New!)
Regulatory Issues	If you are an ISP looking to peer at an European IXP then we are here to help quide you. Take a look at the ISP section	
Resources +		
Sign out		
Glossary Links Contact Webmaster	The Internet Revealed: A film about IXPs internet exchange 000/524	tools

 All tools are reachable from the right hand side of the home page: <u>www.euro-ix.net</u>

European Internet Exchange Association

http://www.euro-ix.net

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