



Euro-IX update

IX SIG

APNIC 23

Bali

Indonesia

Feb 28th 2007



APNIC 23 - IX SIG Bali Indonesia

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What is Euro-IX?

- European Internet Exchange Association
- Formed in May 2001
- The association's aim is to further develop, strengthen and improve the Internet Exchange Point (IXP) community.
- Since January 2005 Euro-IX has invited IXPs outside of Europe to join the association
- Euro-IX is NOT an Internet Exchange Point



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What Euro-IX offers its members (1)

- Biannual two day meetings known as the *Euro-IX Forums* where more than 30 IXPs and switch vendors come together to discuss a wide range of IXP specific topics
- Regulatory updates
- Website listing
- Mailing lists
- Online conferencing facilities
- Representation at meetings around the world

What Euro-IX offers its members (2)

- **Benchmarking club**
 - allowing members to compare certain performance aspects of their IXPs
- **A number of information repositories:**
 - Euro-IX Switch DB
 - Euro-IX Staff eXchange DB
 - Member developed network monitoring tools
- **A ‘closer’ IXP community**
 - Contact with almost 40 IXPs from around the world

Current Euro-IX affiliates

- 40 affiliated IXPs:
 - Europe: 34
 - From 31 cities in 22 countries
 - Asia (Japan): 3
 - BBIX, JPNAP and JPIX
 - USA: 3
 - Terremark, Switch and Data & Equinix

- 4 affiliated patrons:
 - Cisco Systems
 - Foundry Networks
 - Force10 Networks
 - Glimmerglass



What Euro-IX offers those looking to connect to an IXP

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- Information on 40 IXPs from around the world

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European Internet Exchange Association (Euro-IX)

Getting Started Latest Headlines

European Internet Exchange Association

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IXP Service Matrix

IXP	Location	ASN	# of customers	# of sites	Public stats	Non-profit	Privateering	IPv6	IPv6 VLAN type	IPv6 registry	Multicast	VLAN services	Out of hand access
AIK Traffic	Athens Greece	5408	14	1	Y	Y	-	Y	IPv6 VLAN	Sub-delegated from an LIR	Main LA	-	Y
AMS-IX Traffic	Amsterdam Netherlands	1200	253	4	Y	Y	Y	Y	On main LAN	RIPE	MC VLAN	Y	-
BCIX Traffic	Berlin Germany	16374	26	3	-	Y	Y	Y	N/A	N/A	MC VLAN	Y	-
BIX Traffic	Budapest Hungary	5507	50	6	Y	Y	Y	-	N/A	N/A	No	-	Y
BNIX Traffic	Brussels Belgium	5406	48	3	Y	Y	Y	Y	On main LAN	RIPE	MC VLAN	-	Y
CATNIX Traffic	Barcelona Spain	N/A	20	2	Y	Y	Y	Y	On main LAN	RIPE	MC VLAN	Y	Y
CIXP Traffic	Geneva Switzerland	513	38	3	-	Y	Y	Y	IPv6 VLAN	RIPE	MC VLAN	Y	Y
DE-CIX Traffic	Frankfurt am Main Germany	6695	189	4	Y	-	Y	Y	On main LAN	RIPE	MC VLAN	Y	Y
EQUINIX Traffic	11 international locations United States	65517	219	18	Y	-	Y	Y	-	-	MC VLAN	Y	-
ESIPANIX Traffic	Madrid Spain	6895	36	1	Y	Y	-	Y	IPv6 VLAN	RIPE	No	-	Y
FINIX Traffic	Helsinki Finland	N/A	24	2	Y	Y	-	Y	IPv6 VLAN	N/A	No	-	-
GigaPIX Traffic	Lisbon Portugal	1930	19	1	Y	Y	-	Y	IPv6 VLAN	RIPE	Main LA	-	Y
GIX-IX Traffic	Groningen Netherlands	24957	48	6	Y	Y	Y	Y	On main LAN	Sub-delegated from an LIR	No	Y	Y
INEX Traffic	Dublin Ireland	2128	28	2	Y	Y	Y	Y	On main LAN	N/A	-	-	-
JPIX Traffic	Tokyo, Nagoya, Osaka Japan	7527	116	8	Y	-	-	Y	N/A	N/A	-	-	-
JENAP Traffic	Tokyo, Osaka Japan	7521	58	4	Y	-	Y	Y	On main LAN	N/A	-	-	-

IXP Service comparison matrix

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Euro-IX Member IXPs

IXP	City	Country
AIK	Athens	Greece
AMS-IX	Amsterdam	Netherlands
BCIX	Berlin	Germany
BIX	Budapest	Hungary
BNIX	Brussels	Belgium
CATNIX	Barcelona	Spain
CIXP	Geneva	Switzerland
DE-CIX	Frankfurt am Main	Germany
EQUINIX	11 international locations	United States
ESIPANIX	Madrid	Spain
FINIX	Helsinki	Finland
GigaPIX	Lisbon	Portugal
GIX-IX	Groningen	Netherlands
INEX	Dublin	Ireland
JPIX	Tokyo, Nagoya, Osaka	Japan
JENAP	Tokyo, Osaka	Japan
LINX	London	United Kingdom
LIPEX	London	United Kingdom

Deutscher Commercial Internet Exchange (DE-CIX)

General Info Profile Network Services Pricing People Switches

General Info

Location	Frankfurt am Main, Germany
Established	1995
Affiliation	Member
E-mail	sales@de-cix.net
	Web site



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- **The Euro-IX ASN DB** (data captured 31 Jan 2007)
 - **DB repository of those connected to IXPs**
 - All 40 Euro-IX affiliated IXPs update the DB
 - **2733 entries** in the DB
 - **2516 ASNs** (some IXP customers do not wish to publicly advertise their ASN on the IXP website)
 - **1692 unique ASNs** (all Euro-IX affiliated IXPs)
 - **1376 unique ASNs** (European Euro-IX IXPs only)
- **Note:** I calculate that there are approximately 1800 unique ASNs peering at IXPs in Europe



Euro-IX tools

Euro-IX update

• The Euro-IX ASN DB

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Euro-IX European Internet Exchange Association

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Search the Euro-IX Database

Query:

Search in:

Sort results by:

Search the Euro-IX Database

Query:

Search in:

Sort results by:

Your results

Organisation	AS number	IXP
PCH	42	LINX
Cogent	174	LINX
KPN Telecom	286	LINX
UUNet	702	LINX
UKERNA	786	LINX
Tele2	1257	LINX
Cable & Wireless	1273	LINX
Telstra Europe	1290	LINX
Telia	1299	LINX
Esat	2110	LINX
Thus	2529	LINX
BELNET	2611	LINX
AT&T GNS	2686	LINX
BBC	2818	LINX
XO	2828	LINX
BTnet	2856	LINX
NTT/VERIO	2914	LINX
Arcor	3209	LINX

Search on an IXP



Euro-IX tools

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• The Euro-IX ASN DB

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Search the Euro-IX Database

Query:

Search in:

Sort results by:

Your results

Organisation	AS number	IXP
Cable & Wireless Netherlands B.V.	1273	AMS-IX
Cable & Wireless Telecommunication Services GmbH	1273	DE-CIX
Cable & Wireless PLC	1273	Equinix
Cable & Wireless	1273	ESPANIX
Cable & Wireless	1273	INEX
Cable & Wireless	1273	LINX
CABLE & WIRELESS	1273	NOTA
Cable & Wireless Europe	1273	PARIX

Search on an ASN

Search the Euro-IX Database

Query:

Search in:

Sort results by:

Your results

Organisation	AS number	IXP
Tiscali	3257	AMS-IX
Tiscali Nederland B.V.	5615	AMS-IX
Tiscali	3257	DE-CIX
Tiscali	3257	Equinix
Tiscali	3257	LINX
Tiscali	3257	MIX
Tiscali	8612	NaMeX
Tiscali	3257	Netnod
Tiscali	3257	NIX
Tiscali (.no)	13112	NIX
Tiscali	3257	NIX.CZ
Tiscali International Network	3257	TIX

Search on an organisation



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Some more Euro-IX statistics

- Average of 390 Mbps peak traffic per IXP participant (*up from 260Mbps in Jan 2006*)
- 20 (60%) European member IXPs are now offering 10GE port services (*up from 16 Jan 06*)
- Euro-IX Switch Database
 - 174 separate entries (31 IXPs)
 - Cisco (77), Foundry (56), Extreme (16)
 - Force10 (9), Glimmerglass (9) & Other (7)

Average European IXP connection fees

		IXPs that offer or charge	Euro-IX average	
			EUR	US\$
Set-up fee	One time	60%	€ 1.783	\$2.300
Switch port	10Mbps	80%	€ 236	\$305
	100Mbps	94%	€ 401	\$520
	1Gbps	100%	€ 846	\$1.095
	10Gbps	53%	€ 2.522	\$3.270
Annual fee	Reoccurring	36%	€ 2.323	\$3.010

Note: These prices were gathered from the 2nd round of the Euro-IX Benchmarking Club which closed in February 2006



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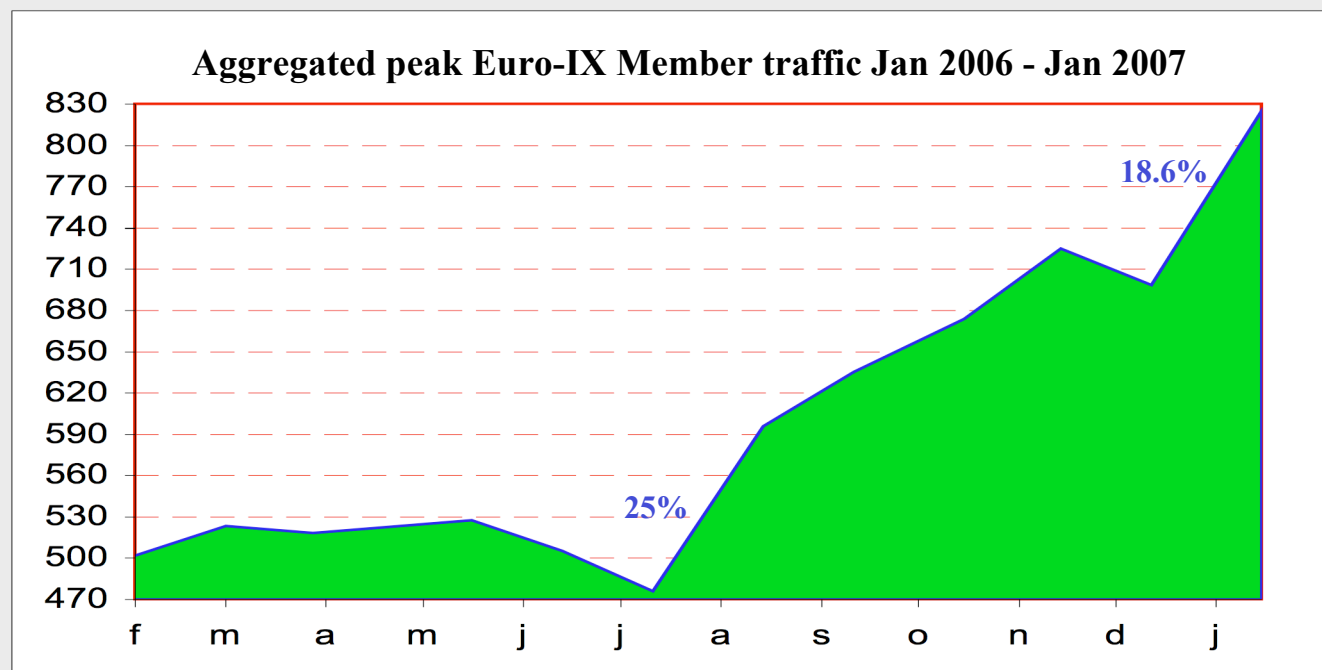
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European IXP traffic

- Combined European **Euro-IX member** IXP peak traffic has risen from:
 - **468 Gbps** in Jan '06 to **825 Gbps** end Jan '07
(357 Gbps or 76% increase in past 12 months)



- Non member European IXP traffic is approximately 95 Gbps
- Estimated combined peak IXP traffic at the end of January 2007 in Europe is more than **920 Gbps**



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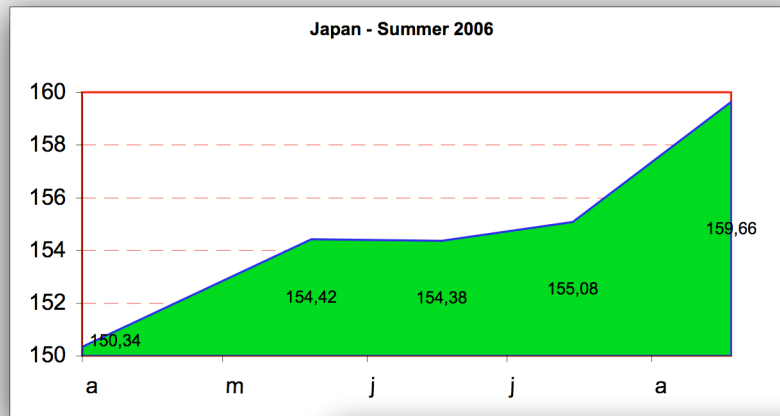
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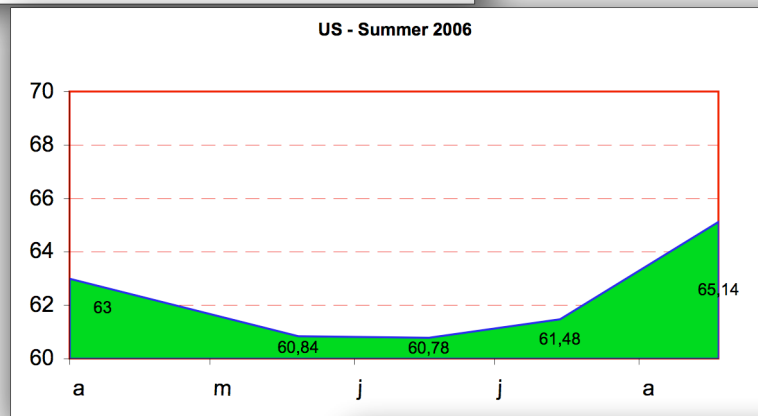
2006 regional summer IXP traffic trends



JAPAN

July - Aug = \uparrow 3.0%

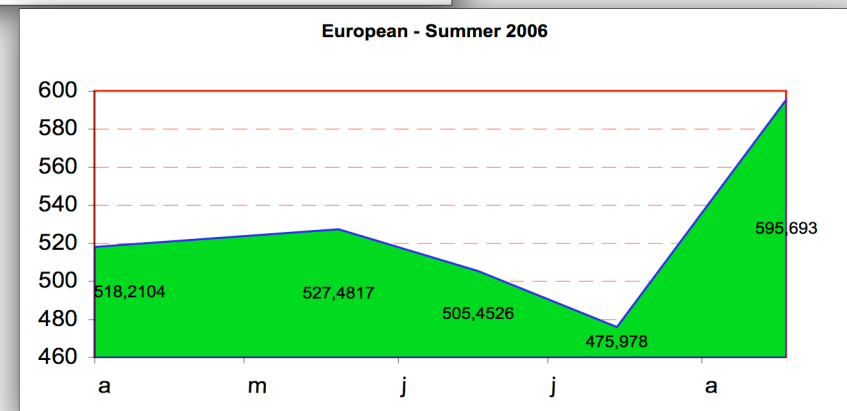
Apr - Aug = \uparrow 6.3%



USA

July - Aug = \uparrow 6.0%

Apr - Aug = \uparrow 3.4%



Europe

July - Aug = \uparrow 25.0%

Apr - Aug = \uparrow 15.0%

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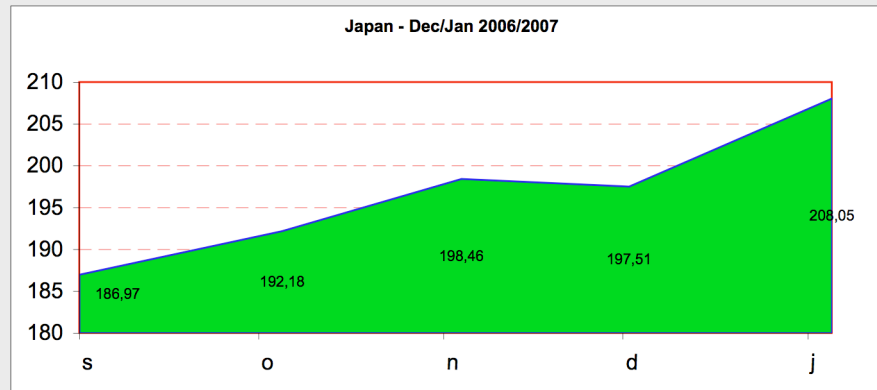
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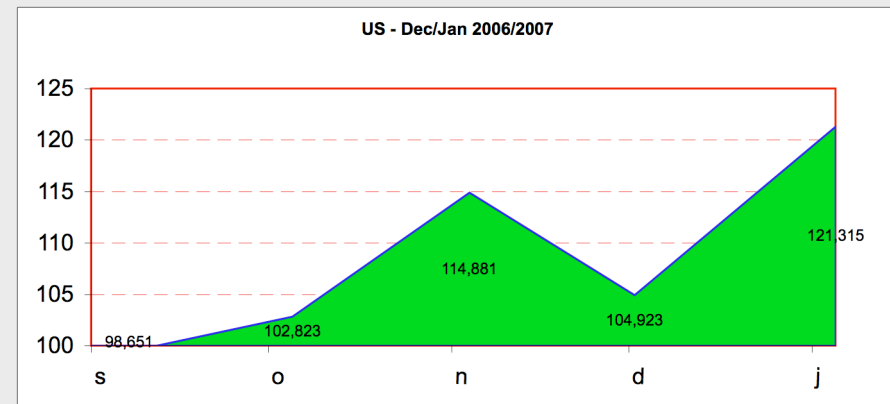
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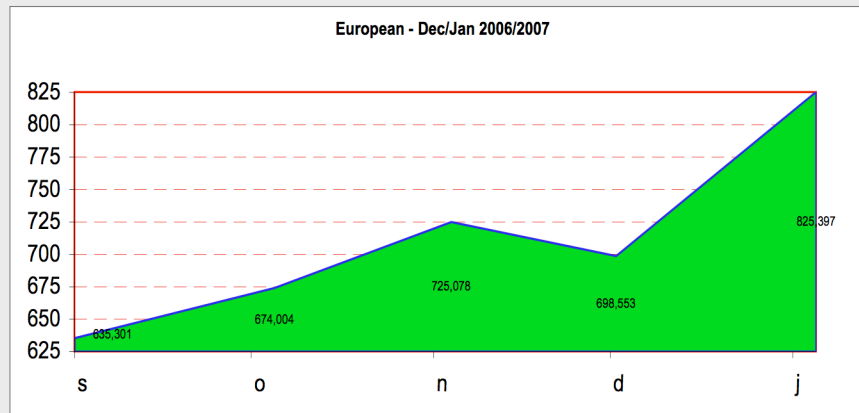
Regional end of year IXP traffic trends



Japan
 Nov - Dec = ↓ .5%
 Dec - Jan = ↑ 5.3%
 Nov - Jan = ↑ 4.8%



USA
 Nov - Dec = ↓ 8.7%
 Dec - Jan = ↑ 15.6%
 Nov - Jan = ↑ 5.6%



Europe
 Nov - Dec = ↓ 3.7%
 Dec - Jan = ↑ 18.2%
 Nov - Jan = ↑ 13.8%

Growth of IXPs in Europe

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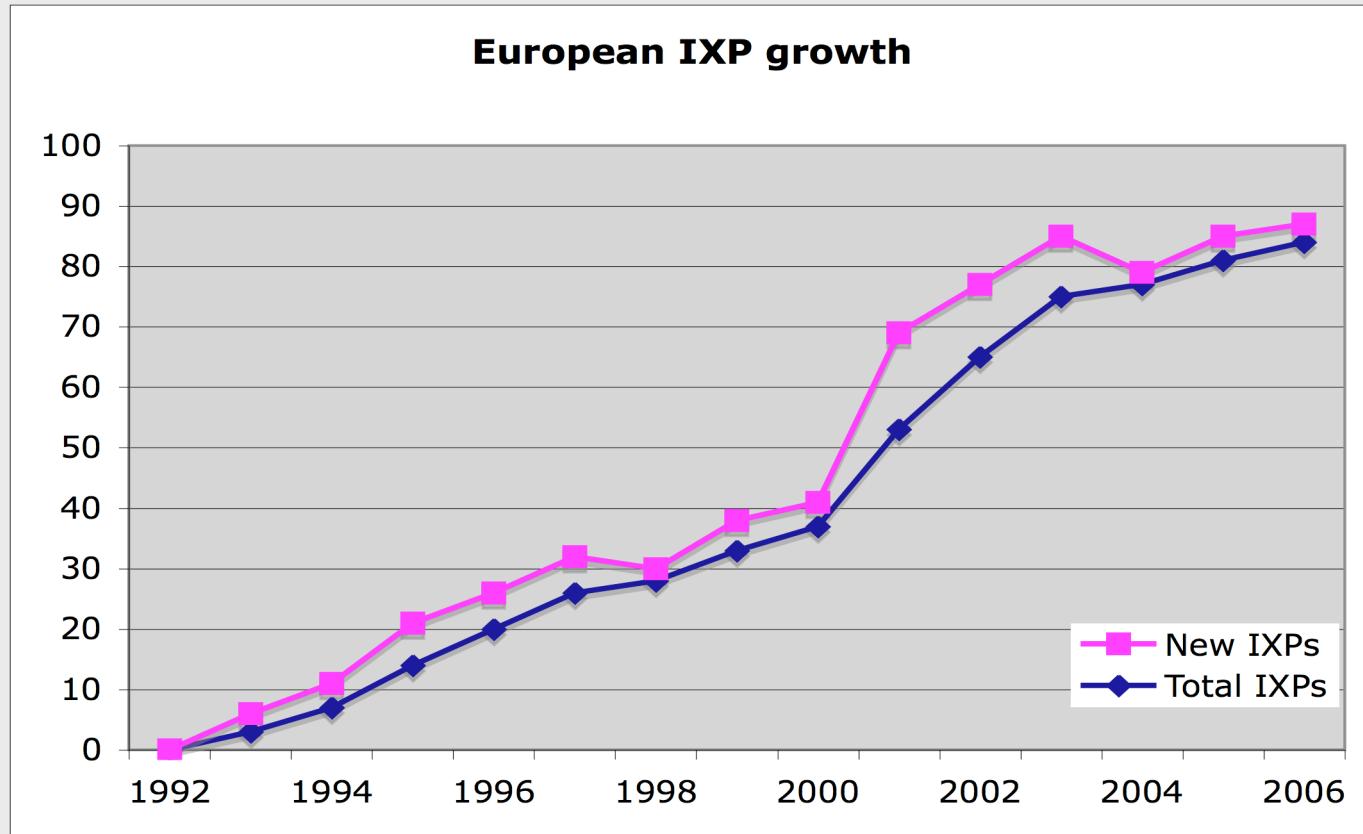
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European IXP growth



2001 +16 IXPs

2002 +12 IXPs

2003 +10 IXPs



These 3 years saw the establishment of 45% of today's IXPs!!

IXPs in Europe

- Attempt to compile the 'definitive list of European IXPs

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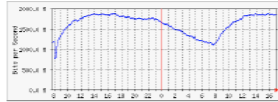

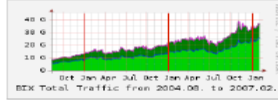

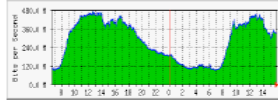

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List of the 103 known European IXPs

IXP ↓	Full name	City	Country	Public traffic stats
AIX	Athens Internet Exchange	Athens	GR	
AMS-IX	Amsterdam Internet Exchange	Amsterdam	NL	
BCIX	Berlin Commercial Internet Exchange	Berlin	DE	
BCIX - Brno	Commercial Brno Internet Exchange	Brno	CZ	
BIX	Budapest Internet eXchange	Budapest	HU	
BNIX	Belgian National Internet Exchange	Brussels	BE	
BUHIX	Bucharest Internet Exchange	Bucharest	RO	
CATNIX	Catalunya Neutral Internet Exchange	Barcelona	ES	
CIX	Croatian Internet eXchange	Zagreb	HR	

- <http://www.euro-ix.net/resources/list-eur.php>



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Joining Euro-IX

If you are a representative of an IXP or if you are a customer of an IXP who believes that your IXP should join Euro-IX.

Please contact me, Serge Radovcic
serge@euro-ix.net

Or take a look at our website:

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



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Any Questions?

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