Euro-IX Report

VIX - Technical Meeting

"10 years of VIX"

Serge Radovcic - Euro-IX

Vienna Austria

23/11/2006

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What is Euro-IX?

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- 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

What Euro-IX offers (1)

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- 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.

- Virtual Working Groups

- Online conferencing facilities

- Representation at meetings around the world

- Public affair updates

- Website listing

- Mailing lists

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What Euro-IX offers (2)

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- 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

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Euro-IX affiliates

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- 39 affiliated IXPs:
  - Europe: 32
    - From 30 cities in 20 countries
  - Asia: 4
    - BBIX, JPNAP, JPIX (all in Japan) & NIXI (India)
  - USA: 3
    - Terremark, Switch and Data & Equinix

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

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VIX and Euro-IX

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- VIX is one of our seven charter members (2001)

- Christian Panigl of VIX has continually served on the Euro-IX Board since 2001
  - He was Chairman of the Euro-IX board for two years
  - He was re-elected to the board at the last GM in October for another two year term
- Christian, Harald Michl and VIX as a whole have been valuable contributors to the Euro-IX community, via the mailing lists, forum presentations and their website repository updates
- Christian has also chaired numerous Euro-IX Forums

- VIX is also one of our top web referrers :-)

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Euro-IX and VIX

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- Contact and relationships with numerous IXP representatives

- Help with researching for new switching platform

- Switch bugs and upgrading software information via Euro-IX switch DB

- Vendor discussion and reports via mailing lists

- Information and ideas taken from presentations and discussions at Euro-IX Forums

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The European IXP scene

VIX is one of a 100 IXPs operating
in Europe today, so how does VIX
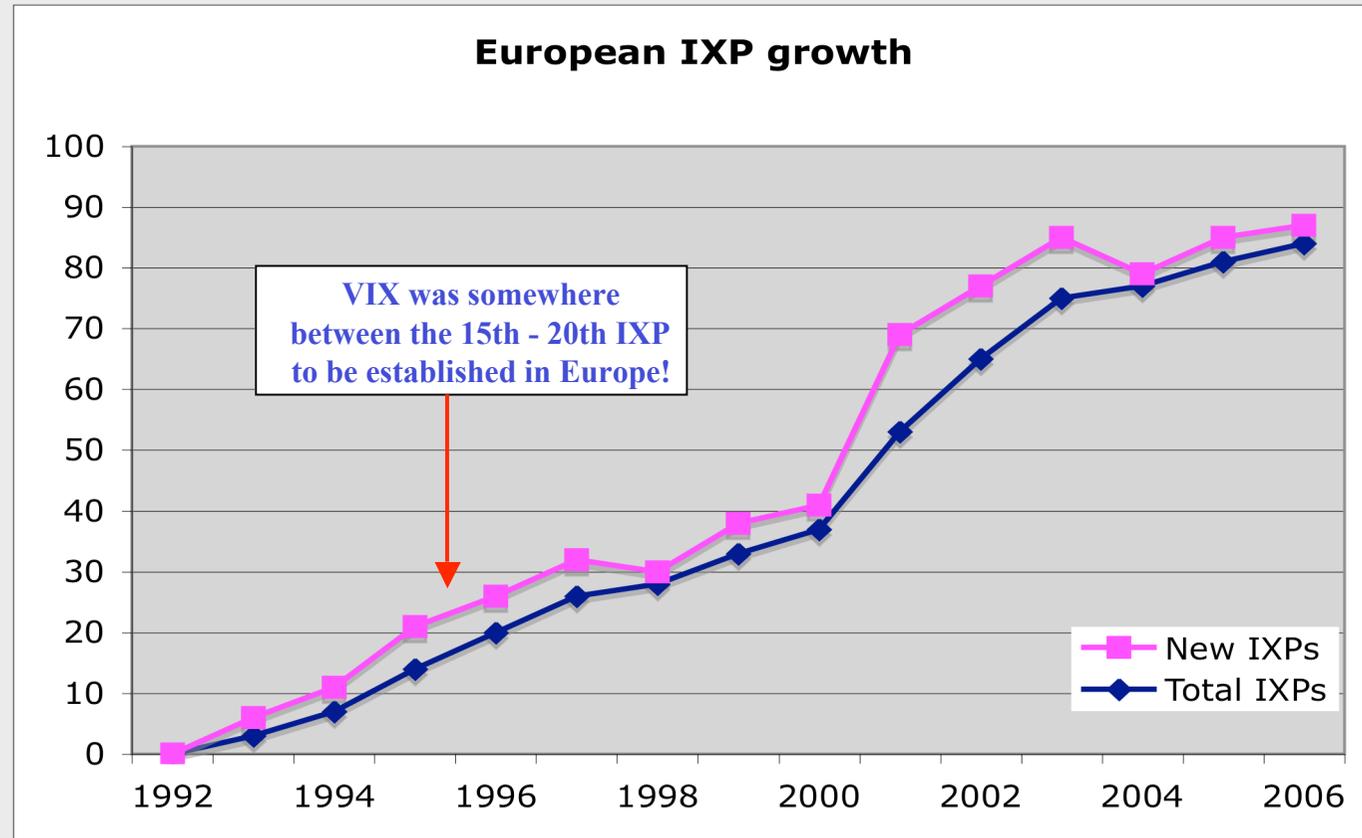shape up against them?

Growth of IXPs in Europe

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European IXP growth

VIX was somewhere between the 15th - 20th IXP to be established in Europe!

Legend: New IXPs, Total IXPs

2001 +16 IXPs
2002 +12 IXPs
2003 +10 IXPs

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

European IXP traffic
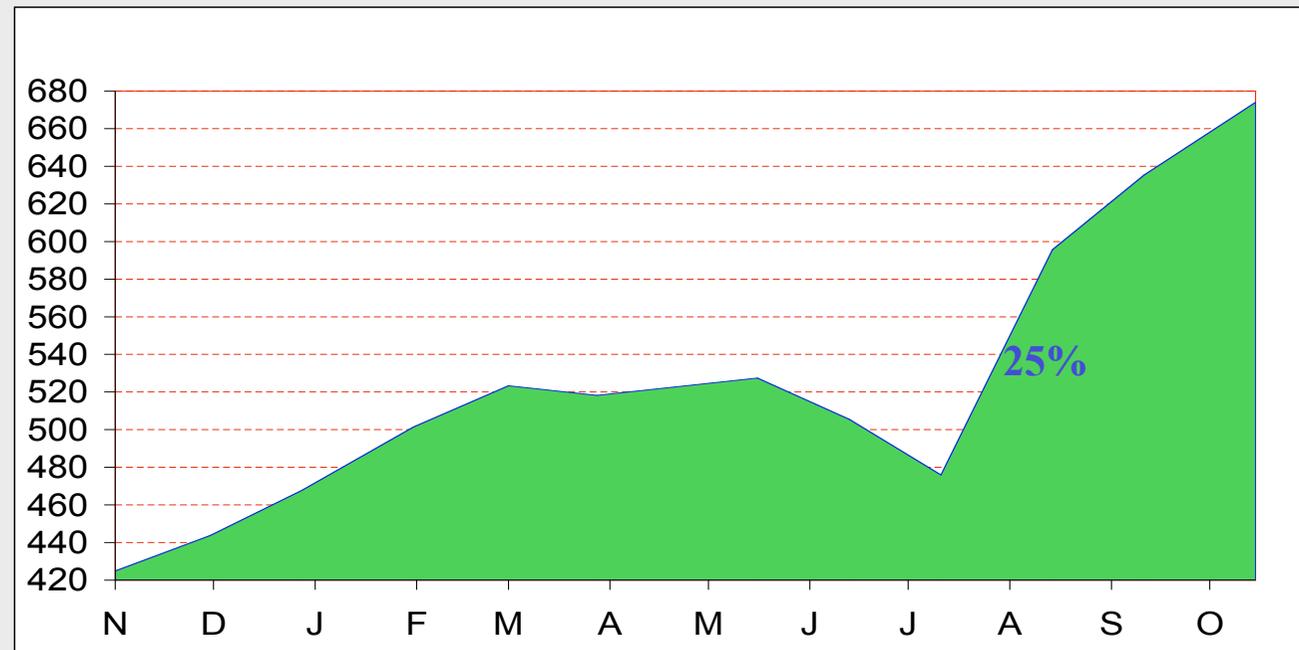
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- Combined European **Euro-IX member** IXP peak traffic has risen from:
  - **518 Gbps** in May '06 to **674 Gbps** end Oct '06
    (156 Gbps or 30% increase in past 6 months)

- Non member IXP traffic is approximately 75 Gbps
- Estimated combined peak IXP traffic in Europe is **750 Gbps**

- **Note:** these statistics are based on information gathered at the end of October 2006.
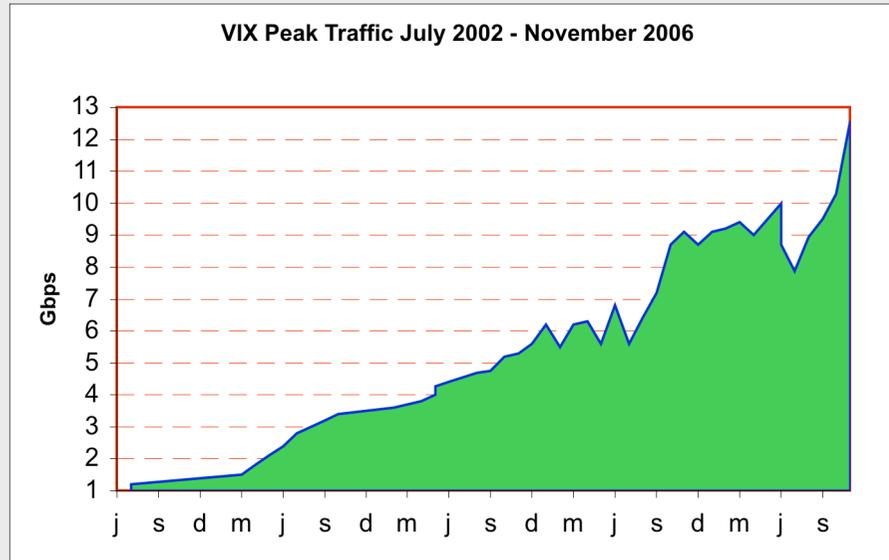
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VIX traffic growth versus Euro-IX

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VIX Peak Traffic July 2002 - November 2006

July 2002 = 1.20 Gbps

Nov 2006 = 12.57 Gbps

1050% increase in just Over 4 years!
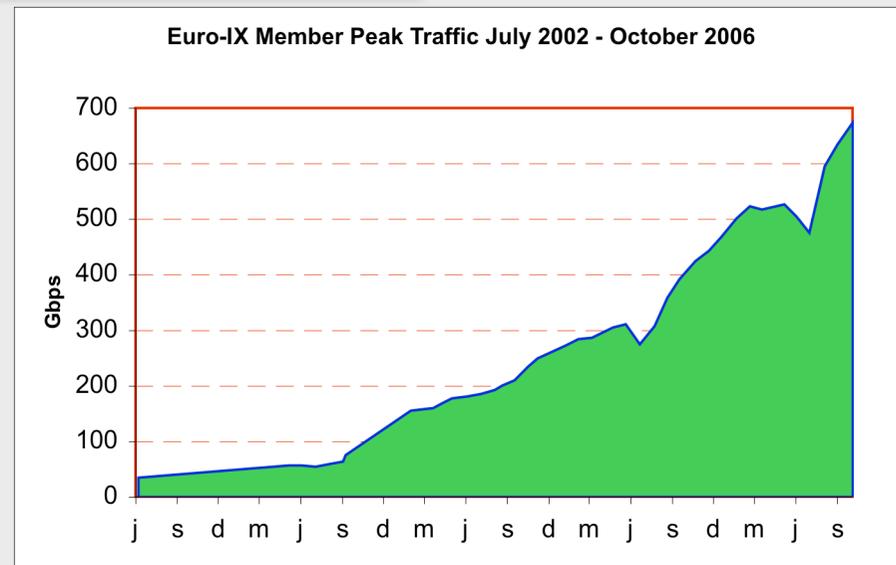
Euro-IX Member Peak Traffic July 2002 - October 2006

Traffic ranking of IXPs

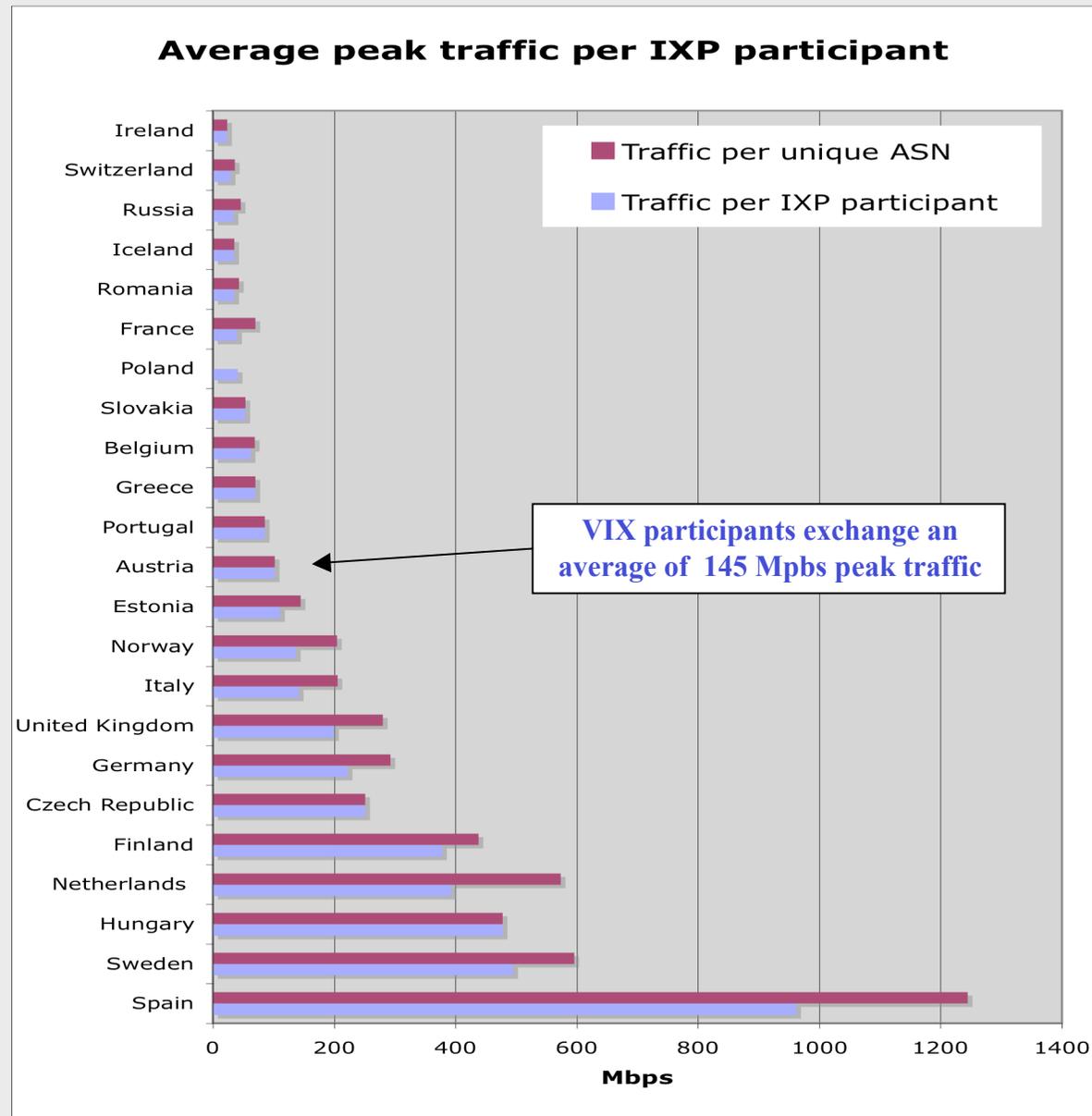| Ranking	IXP name	City	Gbps
1	AMS-IX	Amsterdam	208,70
2	LINX	London	120,07
3	DE-CIX	Frankfurt	93,85
4	ESPANIX	Madrid	68,00
5	Netnod	Stockholm	57,78
6	BIX	Budapest	33,70
7	NIX.CZ	Prague	18,50
8	PARIX	Paris	17,00
9	SFINX	Paris	16,00
10	DIX	Copenhagen	15,50
11	NIX	Oslo	13,60
12	NL-IX	Amsterdam	13,53
13	FICIX	Helsinki	12,90
14	Netnod	Malmoe	12,79
15	**VIX**	**Vienna**	**12,57**
16	MIX	Milan	12,24
17	MSK-IX	Moscow	10,83
18	BNIX	Brussels	7,80
19	NameX	Rome	3,57
20	TIX	Zurich	3,45

* Statistics gathered on the 15th of November 2006

Average peak traffic per ASN per country

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Average peak traffic per IXP participant

VIX participants exchange an average of 145 Mpbs peak traffic

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European IXP benchmarking (1)

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• VIX connection fees

		VIX	Euro-IX avg.	Difference
Set-up fee	One time	€ 1.000	€ 1.783	↓ 44%
Switch port	100Mbps	€ 200	€ 401	↓ 50%
	1Gbps	€ 700	€ 846	↓ 14%
	10Gbps	€ 2.200	€ 2.522	↓ 13%
Annual fee	Reoccurring	€ 0	€ 2.323	↓ 100%
				Average ↓ 44%

European IXP benchmarking (2)

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- Extra IXP services:

  - IXPs that offer 'advanced services' (i.e. services that go beyond ports for peering)? = 50%

  - IXPs that offer private VLAN based services? = 50%

  - IXPs that offer managed (non-VLAN) private interconnect services? = 37%

- IXPs that allow content providers = 70%

  - Case study: AMS-IX
  - Almost 20% or 50 of their connected members are content providers!

- .... and what about remote peering?

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Remote peering at IXPs

- AMS-IX:
  - Pseudowire connects:
    - 25 parties or 10% of customer base
  - Exact traffic unknown but said to be substantial

- LINX:
  - Pseudowire connects:
    - 15 parties brought to the IXP by 12 carriers
  - Traffic peaks at just under 10Gbps

- Benefits to current IXP participants:
  - More members, more potential peers/routes
  - More traffic
  - Wider geographical reach

- Some administration overhead for IXP
  - Multiple contracts, longer set-up, time differences etc.

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IXP rankings by number of participants

Ranking	IXP name	City	Participants
1	AMS-IX	Amsterdam	253
2	LINX	London	233
3	DE-CIX	Frankfurt	189
4	MSK-IX	Moscow	184
5	NL-IX	Amsterdam	132
6	FreeIX	Paris	109
7	LIX	Riga	104
8	**VIX**	**Vienna**	**87**
9	UK6x	London	79
10	PaNAP	Paris	76
11	UA-IX	Kiev	75
12	NIX	Oslo	71
13	SFINX	Paris	63
14	NIX.CZ	Prague	60
15	FreeBIX	Brussels	59
16	Swissix	Zurich	59
17	MIX	Milan	58
18	LIPEX	London	57
19	TIX	Zurich	57
20	BIX	Budapest	50
21	BNIX	Brussels	48
22	LONAP	London	48
23	WIX	Warsaw	45
24	SIX	Bratislava	44
25	PARIX	Paris	42

VIX participants

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- According to the Euro-IX ASN DB there are 87 ASNs connected to VIX

- 49 or 56% don't peer at any other IXP
- 38 or 44% do peer at other IXPs

- The most popular alternative IXPs for VIX participants are:

  DE-CIX (Frankfurt) - 27
  LINX (London) - 24
  AMS-IX (Amsterdam) - 23
  TIX (Zurich) - 14
  MIX (Milan) - 10

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'Open' peering policy trend
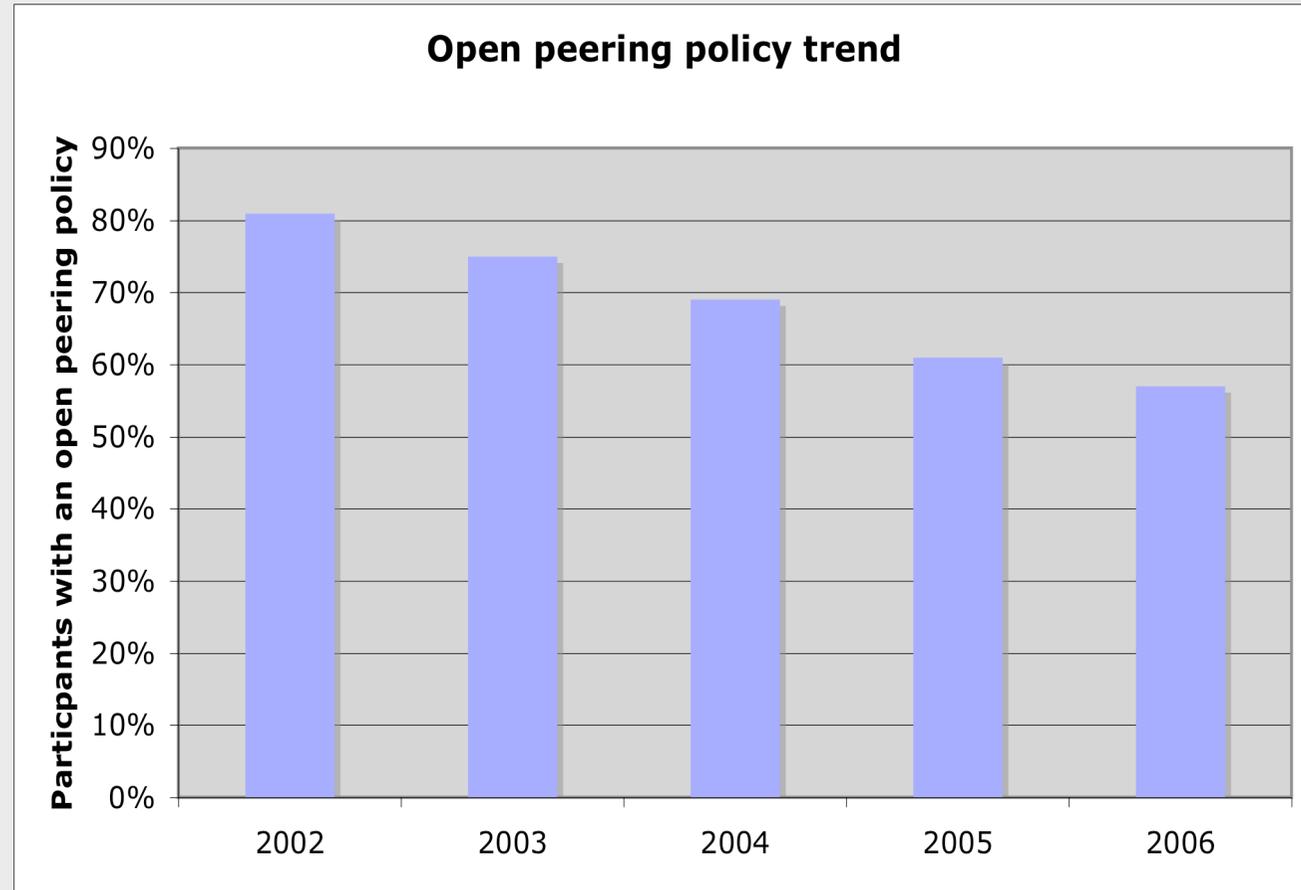
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Open peering policy trend

Participants with an open peering policy (Y-axis, 0%–90%):
- 2002: 81%
- 2003: 75%
- 2004: 69%
- 2005: 61%
- 2006: 57%

What is the trend at VIX?

- My quick scan of the VIX peering matrix would suggest about 54 participants (60%) have what would be considered an 'open' peering policy

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Thank you

Serge Radovcic
Euro-IX

http://www.euro-ix.net/
info@euro-ix.net