

Start of the Information Infrastructure Program

## Computation in Hungary

Development of

networking equipment ECFA meeting

software for PCs (X.25)

- electronic mail

Budapest

- remote login

- electronic billboard

- file transfer 24-25 September 1993

## Start of the Information Infrastructure Program 1986

Development of  
networking equipment and  
software for PCs (X.25)

- electronic mail
- remote login 1991
- electronic billboard
- file transfer operational 1991

NSF connectivity - end of 1991

IBM academic initiative

IBM 3090 mainframe

(University of Economics, Budapest)

IBM and EASInet act as sponsors for the T1 US link usage  
for academic networks in Hungary.

EARN 1991

## Networking

X.25 1990

UUCP 1990

Internet connection 1991

HEPNET line operational 1991

NSF connectivity – end of 1991

IBM academic initiative

IBM 3090 mainframe

(University of Economics, Budapest)

IBM and EASInet act as sponsors for the T1 US link usage  
for academic networks in Hungary.

EARN 1991

IP lines

Budapest University of Economics – Vienna

64 Kbit/sec

Information Infrastructure Program Networking Center  
– Vienna

64 Kbit/sec

Central Research Institute for Physics – CERN  
HEPNET line

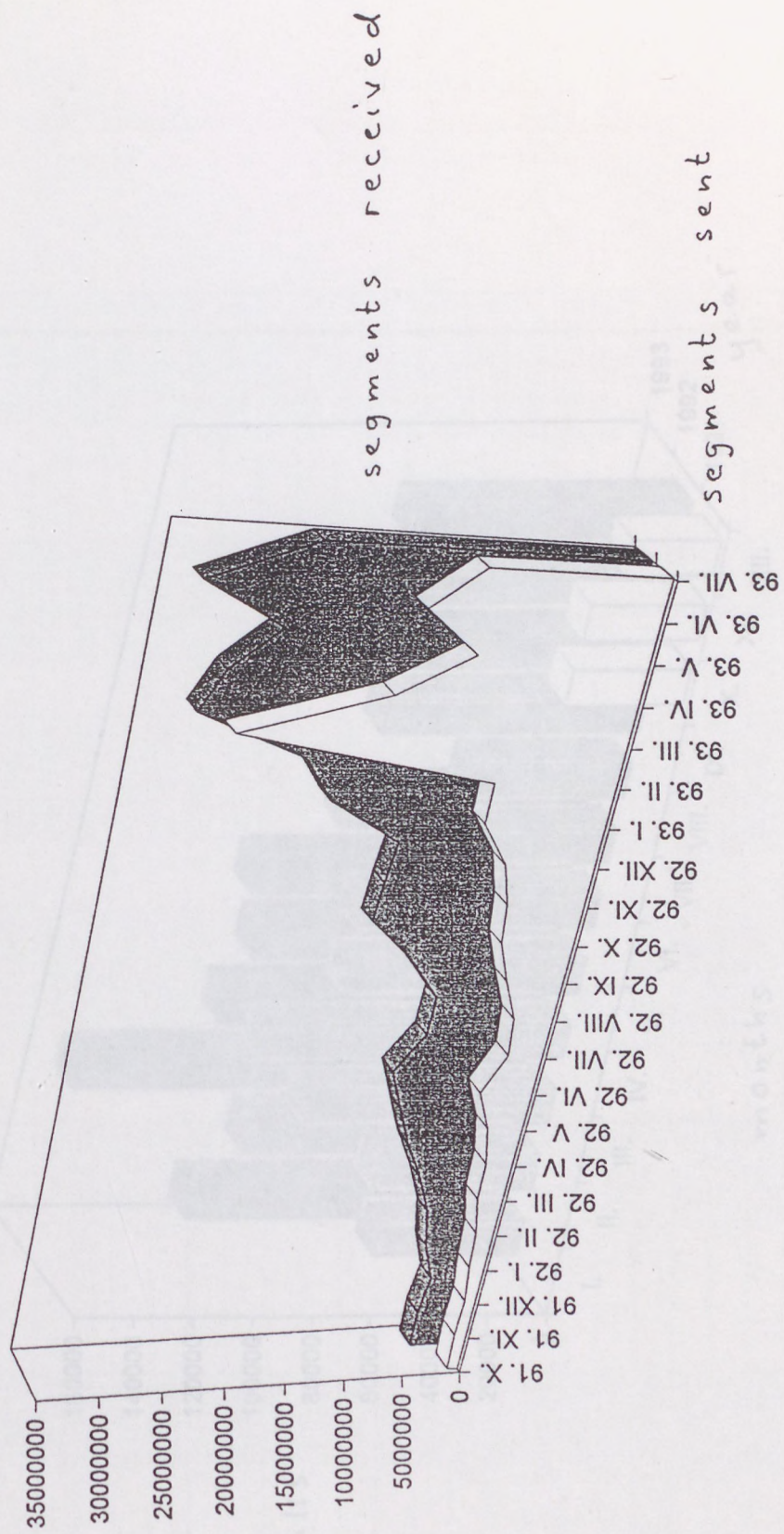
9.6 Kbit/sec

EMPB line

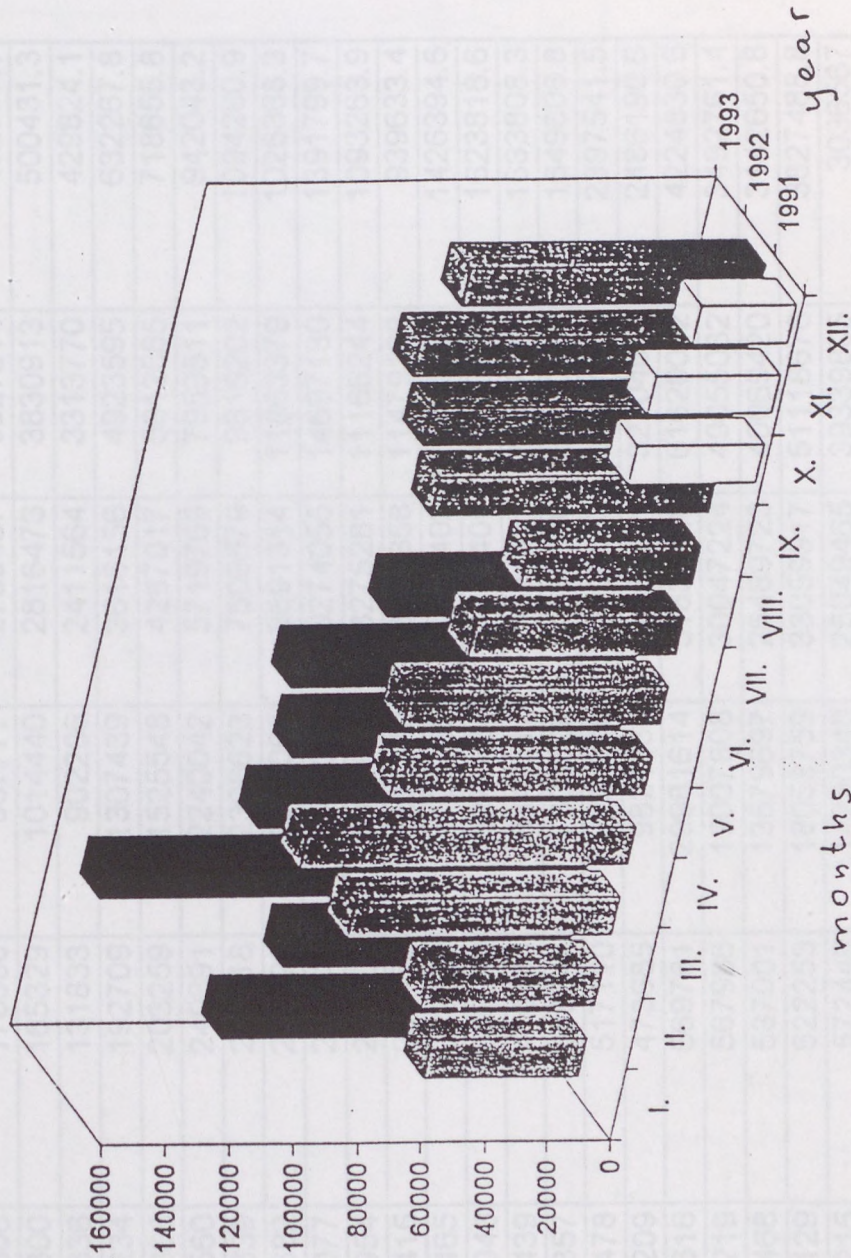
Hungarian PTT – Vienna

64 Kbit/sec

# X.25 traffic



Number of X.25 calls



number of calls

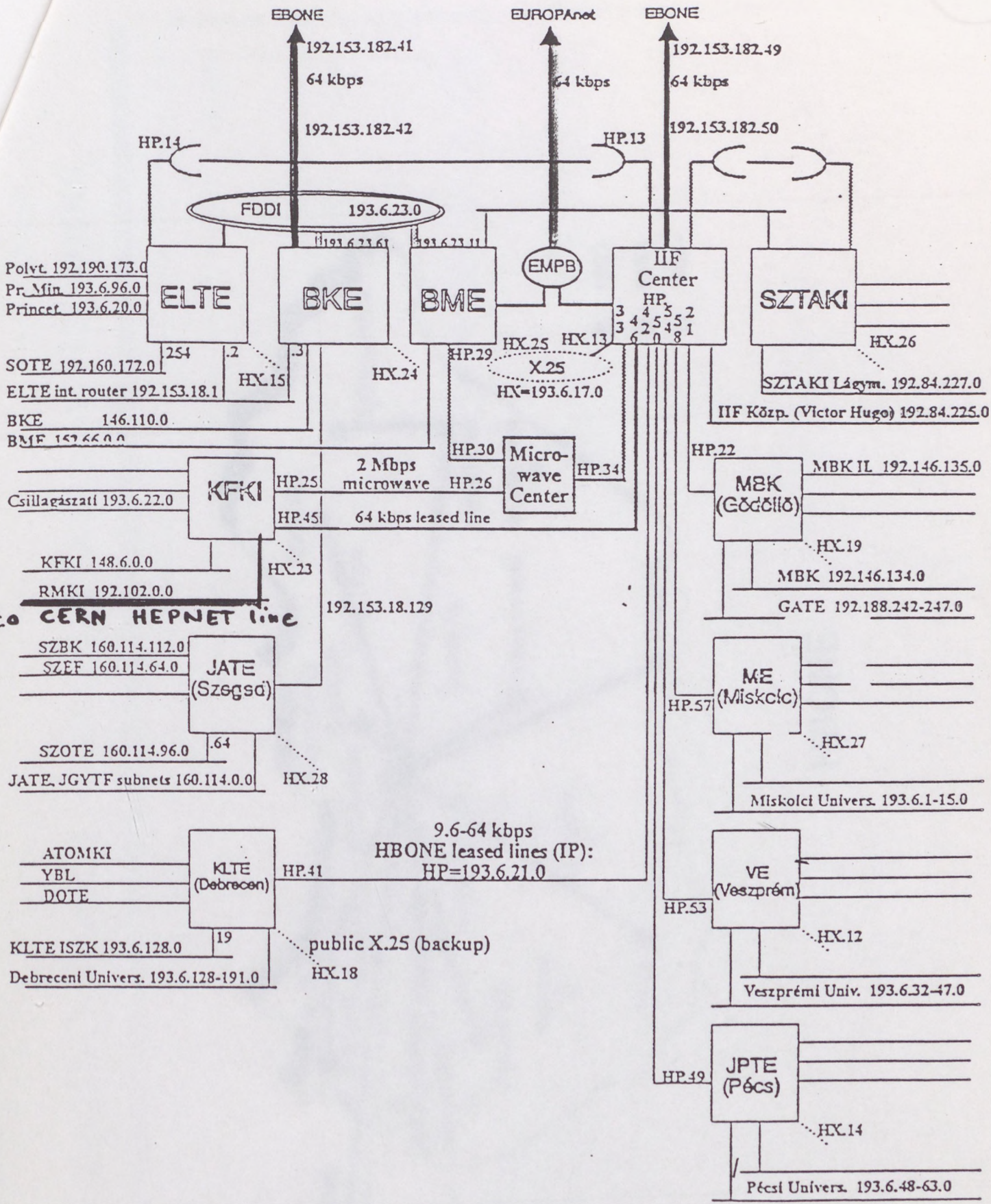
## X.25 traffic

Hónap	Hívások száma	Dijperc	Szegmensek		Összes	Dij (Ft)
			Adott	Kapott		
91. X.	39606	178500	867777	2759437	3627214	492887.5
91. XI.	38800	165329	1014440	2816473	3830913	500431.3
91. XII.	29636	131833	902206	2411564	3313770	429824.1
92. I.	49234	192709	1307439	3616156	4923595	632267.8
92. II.	54866	203259	1525548	4287017	5812565	718655.8
92. III.	83560	240891	2240042	5719769	7959811	942043.2
92. IV.	103339	256218	2306623	7509579	9816202	1094260.9
92. V.	80382	251620	2972065	8891314	11863379	1026368.3
92. VI.	81077	274246	4423075	10274055	14697130	1391799.7
92. VII.	65954	223505	2890963	8275281	11166244	1093263.9
92. VIII.	54415	207455	3261340	8217858	11479198	939633.4
92. IX.	87465	303550	4723765	11068402	15792167	1426394.6
92. X.	95043	359649	5971984	14948409	20920393	1623818.6
92. XI.	103439	410734	6342317	14724697	21067014	1633808.3
92. XII.	93357	388744	7306529	14363500	21670029	1649805.8
93. I.	103478	517110	9757848	20406157	30164005	2397541.5
93. II.	89209	473685	9821635	22882981	32704616	2486190.6
93. III.	151618	669781	29981614	31638448	61620062	4224830.6
93. IV.	107219	567986	19007808	30047224	49055032	3492761.4
93. V.	101468	537001	13579697	26489723	40069420	3142650.8
93. VI.	107129	622253	18058759	33059917	51118676	3827488.8
93. VII.	82215	572448	14290340	25049465	39339805	3036567
						38203294.9

to Vienna

to Vienna to Vienna

8

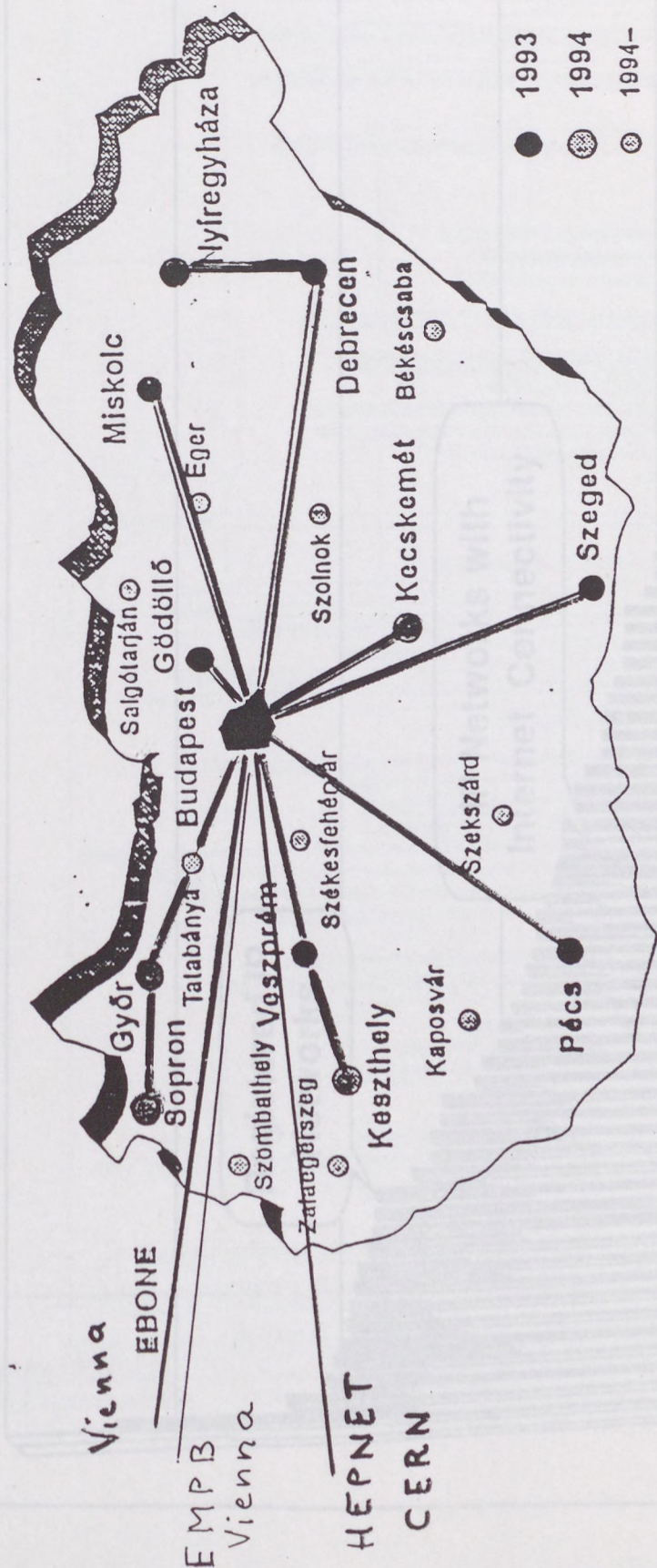


HBONE: the Hungarian IP backbone  
HBONE routers and links

7



# Global Distribution of Internet Protocol Networks



- 1993
- ⊖ 1994
- ⊕ 1994-

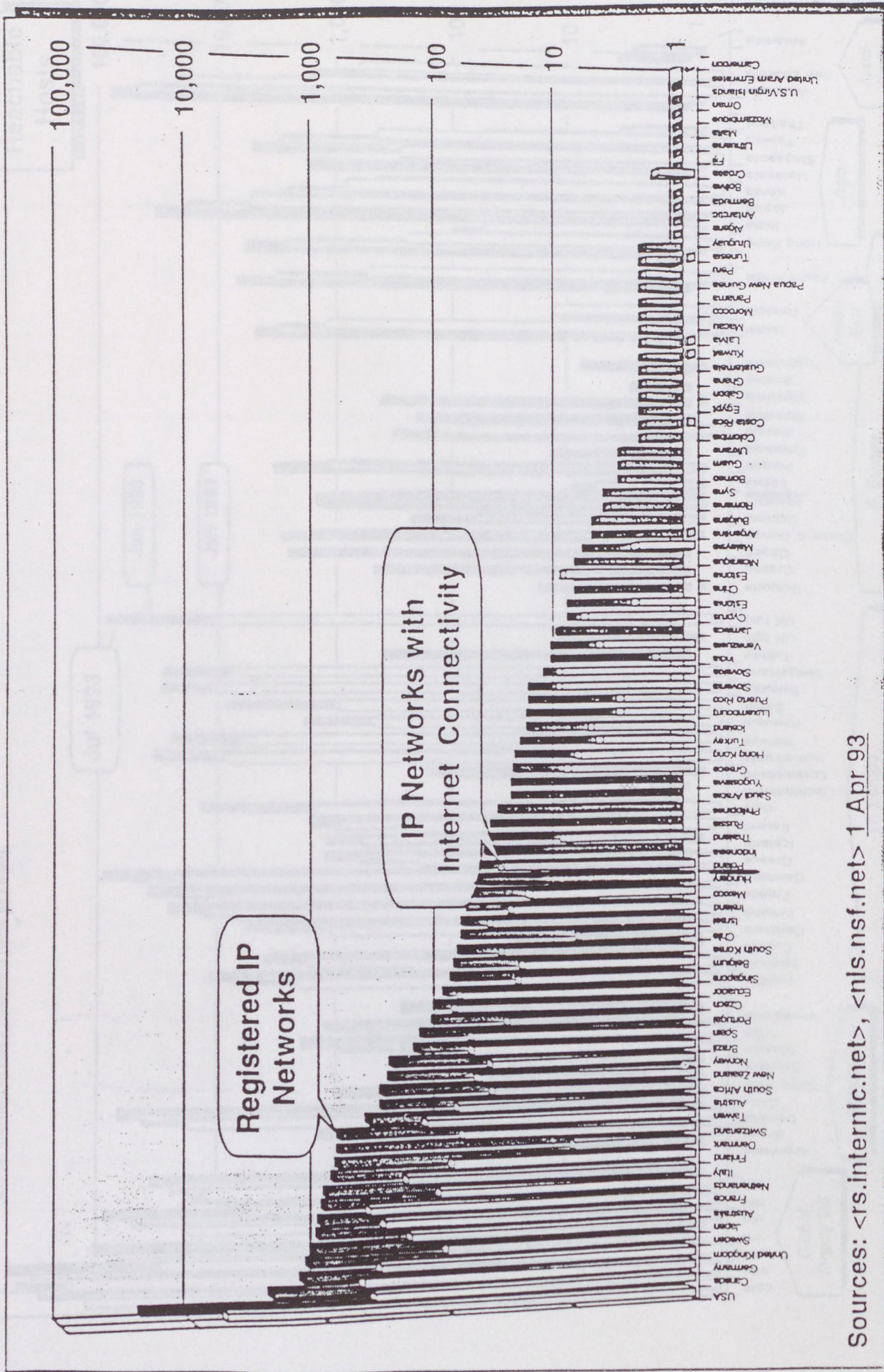
HBONE

Vienna  
EBONE

EMPB  
Vienna

HEPNET  
CERN

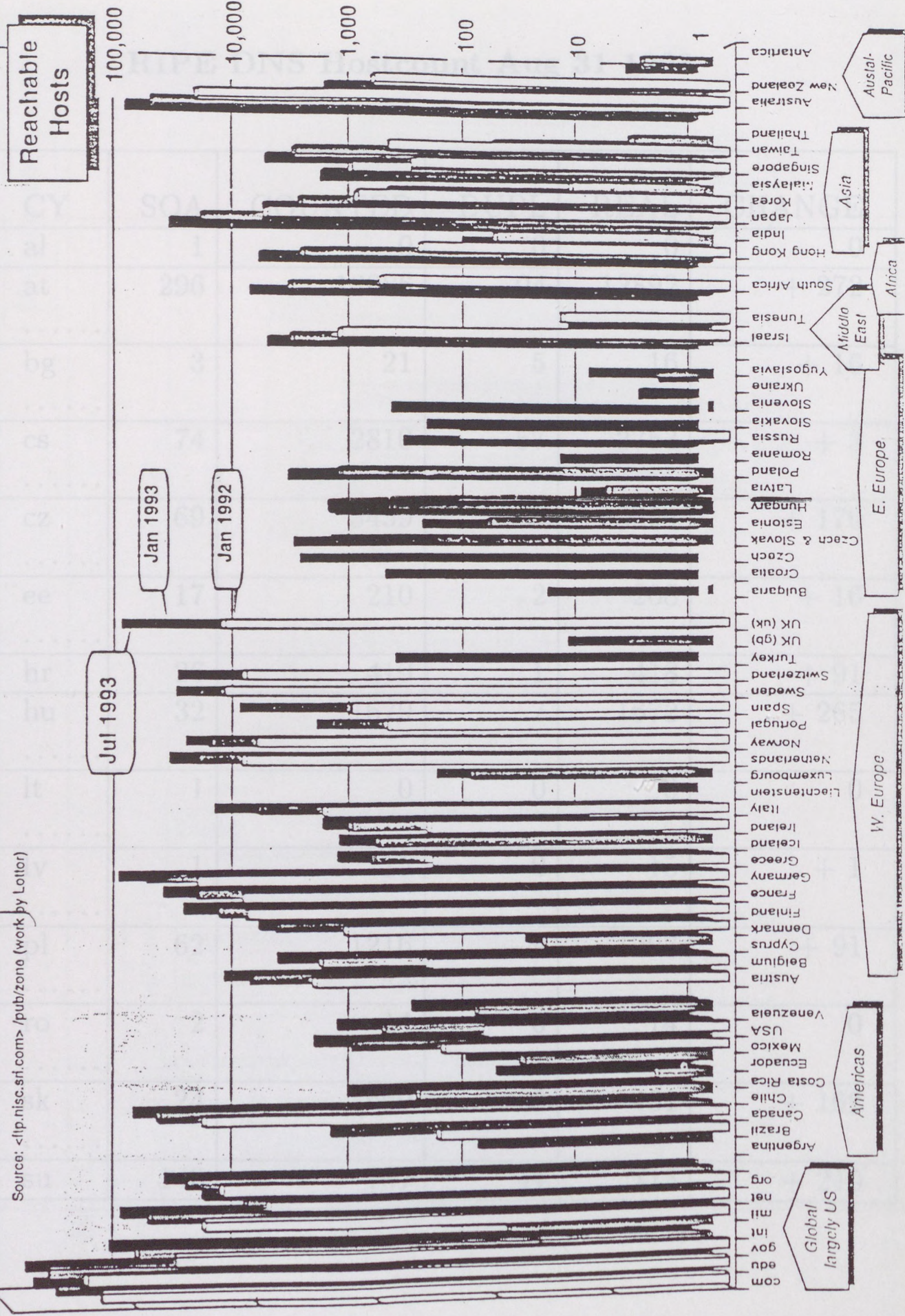
# Global Distribution of Internet Protocol Networks



Sources: <rs.internic.net>, <nls.nsf.net> 1 Apr 93

# Global Growth of Internet Hosts in 1992-93

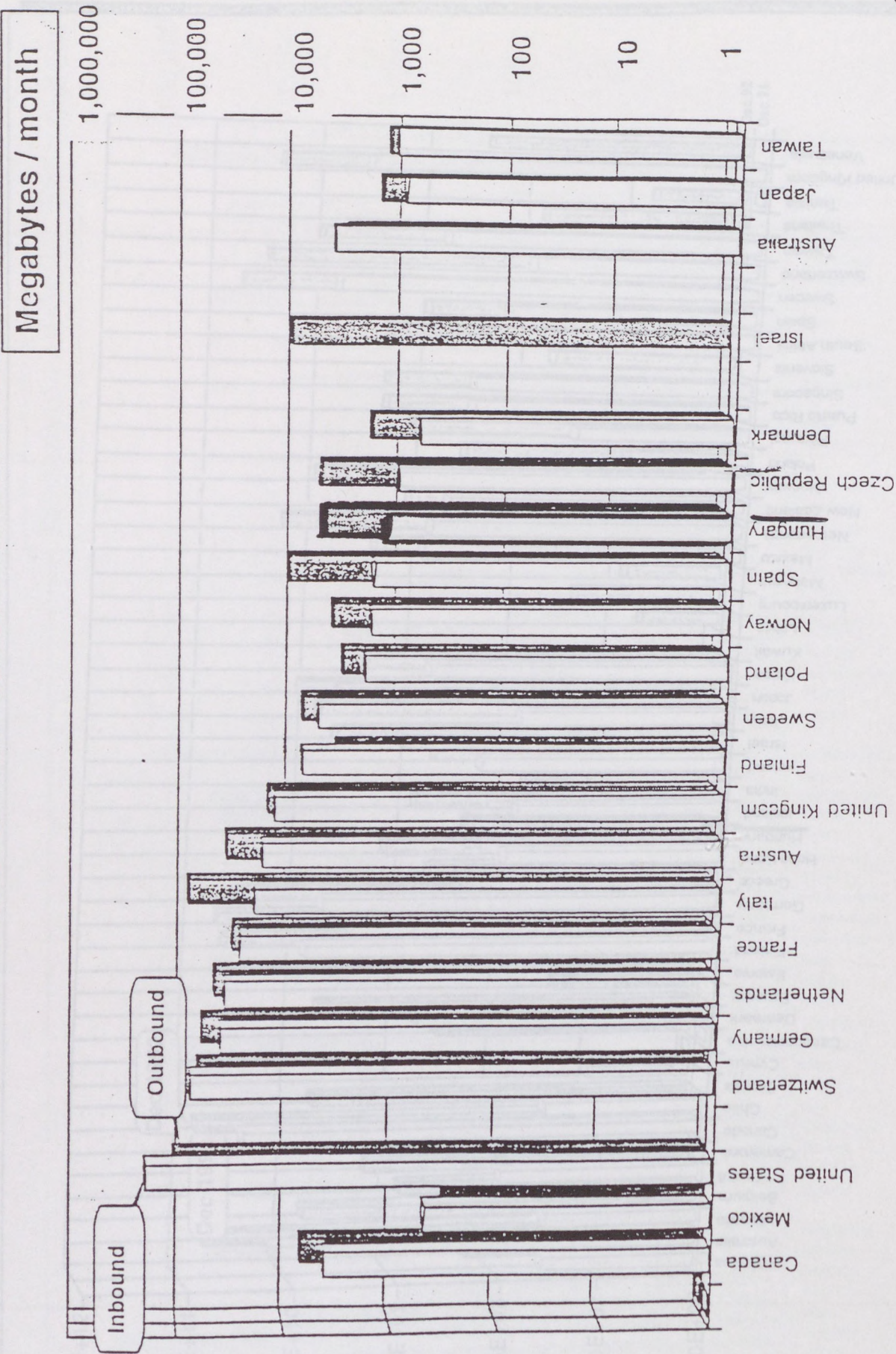
Source: <lp.nisc.srl.com>/pub/zone (work by Lottor)



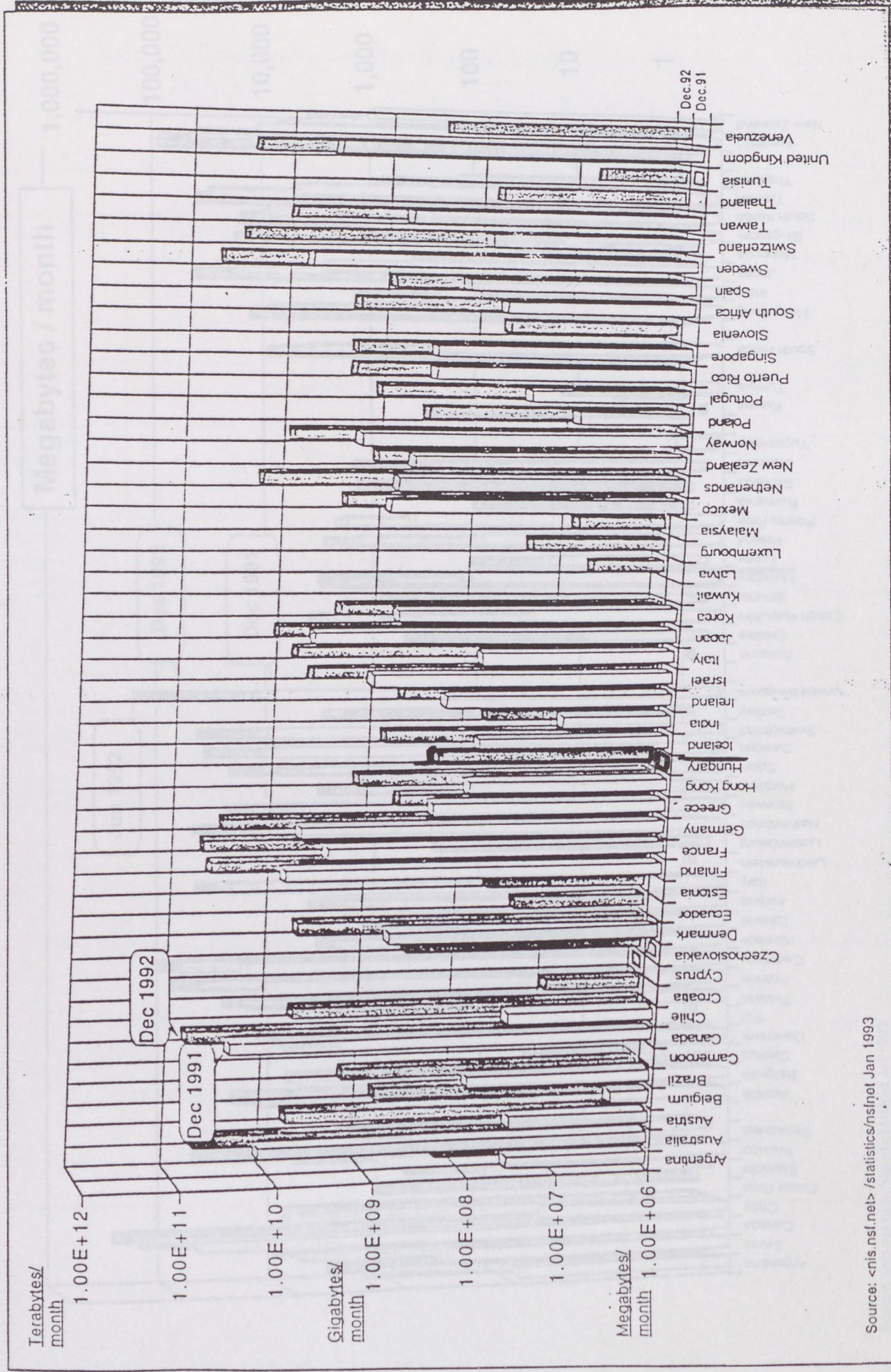
## RIPE DNS Hostcount Aug 31 1993

CY	SOA	COUNTED	DUPL	REAL	CHANGE
al	1	0	0	0	0
at	296	12986	94	12892	+ 272
.....					
bg	3	21	5	16	+ 16
.....					
cs	74	2810	57	2753	+ 3
.....					
cz	69	3439	85	3354	+ 170
.....					
ee	17	210	2	208	+ 16
.....					
hr	26	419	1	418	+ 91
hu	32	1679	7	1672	+ 265
.....					
lt	1	0	0	0	0
.....					
lv	1	15	0	15	+ 1
.....					
pl	62	1216	9	1207	+ 91
.....					
ro	2	14	0	14	0
.....					
sk	24	469	8	461	+ 162
.....					
su	143	757	44	713	+ 219

# CERN Exchange Internet Traffic March 1993

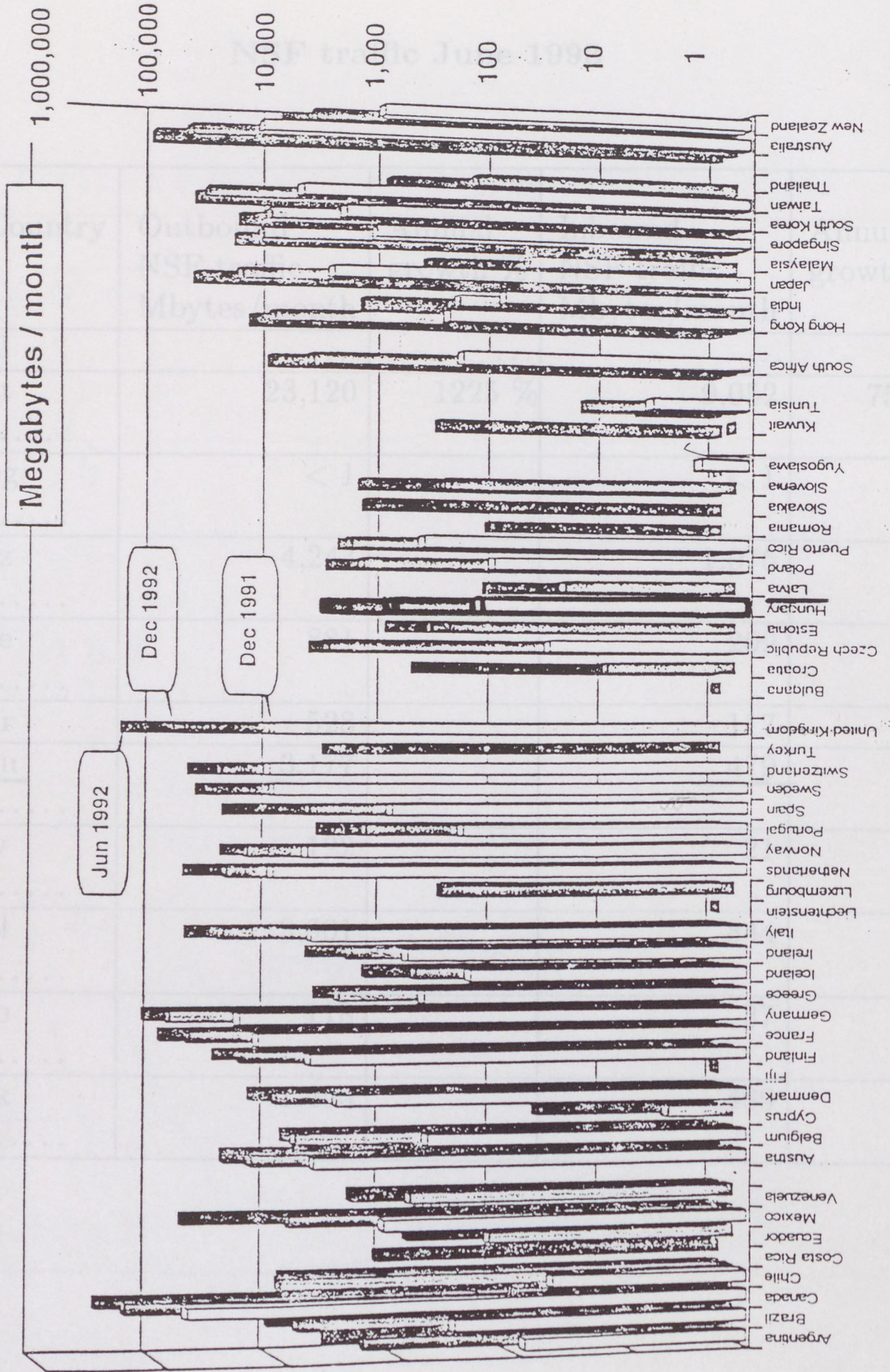


# 1992 Growth of Inbound US-NSF Internet Traffic



Source: <nls.nsf.net>/statistics/nsf/ot Jan 1993

# Growth of Outbound US-NSF Internet Traffic 1992-1993



## NSF traffic June 1993

Country	Outbound NSF traffic Mbytes/month	Annual growth %	Inbound NSF traffic Mbytes/month	Annual growth
al	...	...	...	..
at	23,120	1225 %	9,052	75 %
.....				
bg	< 1		< 1	
.....				
cz	4,243		1,076	
.....				
ee	881		209	
.....				
hr	528		117	
<u>hu</u>	<u>3,177</u>		<u>479</u>	
.....				
lv	122		21	
.....				
pl	3,061		844	
.....				
ro	118		37	
.....				
sk	1,453		489	
.....				



International networking organizations

RARE

RIPE

HEPnet

Hungary

BIUFO

BITNET

Internet

usenet

OSI

Fidonet

The Budapest University

FDDI ring

Eötvös Loránd University

Technical University of Budapest

University of Economics

FDDI ring (financed by Ministry of  
Education)

fiber optic backbone 1992

Eötvös Loránd University

>700 hosts on the Internet

(mostly PC's)

IBM 3090 at The University of Economics

IP line to Vienna (64 Kbit/sec)

~ 30 DEC computers

SUN Sparc workstations

Kossuth Lajos University (Debrecen)  
Computing Center

- 1 SUN SparcCenter 2000  
(2 processors, 256MByte RAM, 10GByte HD)
- 1 VAX 6000/510  
(128MByte RAM, 6GByte HD)
- 1 MicroVAX 3500  
(16MByte RAM, 1GByte HD)
- 2 MicroVAX II  
(16MByte RAM, 400MByte HD)
- 1 DECSsystem 5000/133  
(32MByte RAM, 1,7GByte HD)

workstations: SUN, Silicon Graphics,  
IBM RISC/6000

EARN node

HBONE node operational this year

ATOMKI connected to HBONE at this node

Central Research Institute for Physics

2 VAX compatible computers

1 SUN SparcCenter 2000

Research Institute for Particle

and Nuclear Physics

Research Institute for Measurement

and Computing Techniques

Research Institute for Solid State Physics

Research Institute for Materials Science

mini Research Institute for Atomic Energy

DECstation, IBM RS/6000, SUN etc.

HEP Institute for Isotopes

between Institute for Particle and Nuclear Physics

(RMKI) and CERN

1991 9.6 Kbit/s

HBONE July 1993

2 Mbit/s

packed switching

Services:

a) Mail gateways:

Computer Networking Center

2 VAX compatible computers

1 SUN SparcCenter 2000

(2 processors, 128 MByte RAM, 10GByte HD)

local area Ethernet network (1986)

DECNET and TCP/IP protocols

ca 270 Internet

ca 250 DECNET nodes

minicomputers, workstations (VAX compatibles,  
DECstation, IBM RS/6000, SUN etc)

HEPNET line

between Institute for Particle and Nuclear Physics  
(RMKI) and CERN

1991 9.6 Kbit/sec

HBONE July 1993

2 Mbit/sec microwave connection  
packed switching 9.6 Kbit/sec (X.25)

inter-et-club@iservaki.kfki.hu

user-services@iserv.kfki.hu

FIZINFO at rmk530.kfki.hu

h) help desk, user support

## Services:

- a) Mail gateways:  
DECNET/Internet/BITNET/ELLA  
(Multinet, MX Mail Exchange, VELLA)
- b) gateways for the X.25 services of the Information Infrastructure Program  
(ELLA, ELF, PETRA, TRILLA)
- c) library catalogues: library of the institute (catalogue of research reports available, catalogue of books is in preparation)  
X.25 and Internet
- d) experimental GOPHER server:  
gopher.kfki.hu
- e) World-Wide-Web:  
fserv.kfki.hu  
rmk530.kfki.hu
- f) anonymous ftp: fserv.kfki.hu
- g) mailing lists (listserver):  
internet-club@iserv.iki.kfki.hu  
user-services@fserv.kfki.hu  
FIZINFO at rmk530.kfki.hu
- h) help desk, user support

Extension of networking services  
Program library development  
graphics      Library automation  
multimedia

Technical University Budapest      center for users  
ALEPH VAX  
Internet and X.25

Library of the Hungarian Academy of Sciences

Budapest  
ALEPH VAX

University of Veszprém  
ALEPH SUN

Kossuth Lajos University Debrecen  
Voyager (Carlyle)

Several CDS/ISIS (UNESCO) based services  
Library of József Attila University Szeged  
Library of Central Research Institute for Physics

National Széchényi Library of Hungary  
DOBIS-LIBIS (IBM)

Extension of networking services

Program library development

graphics

multimedia

Dial-up phone lines to the center for users