

## 2 Users/Clients

The tables and graphs in this section together give an impression of the users/clients of the NRENs.

Table 2.1 gives an overview of which types of institutions can be connected to the NREN. As is clear from the table, all NRENs can connect Universities. For other institutions, there are great differences between NRENs. Note that sometimes there are further restrictions, not included in the table. For example, some NRENs only connect government departments that have a connection to research and education, etc. For more details on individual NRENs, please consult the country entries on the website or the NREN websites themselves.

Some NRENs have sent us summaries of their Acceptable Use Policies or have given us the URLs to the Acceptable Use Policies as published on their websites. This information is now available on-line at <http://www.terena.nl/compendium/2004/aup.php>.

Tables 2.2 through 2.7 list information about the number of institutions connected to NRENs as well as about the bandwidth at which institutions are connected. For Universities, we have provided information comparing 2003 with 2004.

Absolutely no conclusion can be drawn about the situation in countries not included in the tables. Various cases may apply:

- \* The NREN may connect the relevant institutions, but may not have been able to answer these questions in the survey (see also the information in table 2.1);

- \* The Institutions may be connected through a different organisation. For example, secondary schools in many countries are connected to the Internet through separate organisations, federated in the European Schoolnet; <http://www.eun.org> provides more information about this;
- \* Institutions may be connected through commercial ISPs;
- \* Institutions may not be connected to the Internet at all.

Earlier issues of the Compendium have provided information about the 'market share' of the NRENs. In many cases, NRENs have been formed either by Universities or at the initiative of Governments. In the EU and EFTA countries, NRENs cater for all or almost all Universities. In the other countries, where NRENs are often less well-developed and are struggling to find finances, this is not always the case. The overall situation in 2004 is not much different from that of 2003. Therefore, no new table is provided in this edition of the Compendium.

## 2.1 Connection Policies

Table 2.1 Connection policies

EU & EFTA countries	NREN	Universities	Research institutes	Institutes of higher/further education	Secondary schools	Primary schools	Libraries, museums, national archives	Hospitals (other than university hospitals)	Government departments (national, regional, local)	Others
Austria	ACOnet	✓	✓	✓	✓	✓	✓	✓	✓	
Belgium	BELNET	✓	✓	✓	✓	✓	✓	✓	✓	X
Cyprus	CYNET	✓	✓	✓	X	X				
Czech Republic	CESNET	✓	✓	✓	✓	✓	✓	✓	✓	✓
Denmark	UNI•C	✓	✓	✓	X	X	✓	X	X	X
Estonia	EENet	✓	✓	✓	✓	✓	✓	✓	✓	X
Finland	FUNET	✓	✓	X	X	X	✓	X	✓	✓
France	RENATER	✓	✓	✓	✓	X	✓	✓	✓	X
Germany	DFN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Greece	GRNET	✓	✓	✓	✓	✓	✓	✓	✓	X
Hungary	HUNGARNET	✓	✓	✓	✓	✓	✓	X	✓	X
Iceland	RHnet	✓	✓	✓	X	X	X	X	X	X
Ireland	HEAnet	✓	✓	✓	✓	✓	✓	X	✓	X
Italy	GARR	✓	✓	✓	✓	✓	✓	✓	✓	X
Latvia	LANET	✓	✓	✓	✓	X	✓	✓	✓	
Latvia	LATNET	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lithuania	LITNET	✓	✓	✓	✓	✓	✓	✓	✓	✓
Luxembourg	RESTENA	✓	✓	✓	✓	✓	✓	✓	✓	X
Malta	CSC	✓	✓	✓						
Netherlands	SURFnet	✓	✓	✓	X	X	✓	✓	X	
Norway	UNINETT	✓	✓	✓	✓	✓	✓	X	X	X
Poland	PIONIER	✓	✓	✓	✓	X	✓	✓	✓	X
Portugal	FCCN	✓	✓	✓	✓	✓	✓	X	X	X
Slovakia	SANET	✓	✓	✓	✓	✓	✓	X	✓	X
Slovenia	ARNES	✓	✓	✓	✓	✓	✓	X	✓	X
Spain	RedIRIS	✓	✓	X	X	X		✓		
Sweden	SUNET	✓	✓	✓	X	X	✓	X	✓	✓
Switzerland	SWITCH	✓	✓	✓	X	X	✓		✓	X
United Kingdom	UKERNA	✓	✓	✓	✓	✓	✓	✓	✓	

Table 2.1 Connection Policies (continued)

Other countries	NREN	Universities	Research institutes	Institutes of higher/further education	Secondary schools	Primary schools	Libraries, museums, national archives	Hospitals (other than university hospitals)	Government departments (national, regional, local)	Others
Albania	ANA	✓	✓	✓			✓			
Algeria	CERIST	✓	✓	✓	✓	✓	✓	✓	✓	
Azerbaijan	AzRENA	✓	✓	X	✓	X		X	✓	
Azerbaijan	OSI-AF/ Azerbaijan	✓	X	✓	✓		✓		✓	✓
Belarus	BASNET	✓	✓	✓	✓	X	✓	✓	✓	
Bosnia/ Herzegowina	BIHARNET	✓	✓	✓	✓	✓	✓			
Bulgaria	IST Foundation	✓	✓	✓	✓	✓	✓	X	X	X
Croatia	CARNet	✓	✓	✓	✓	✓	✓	✓	✓	✓
Georgia	GRENA	✓	✓	✓	✓	X	✓	✓	X	X
Iran	IRANET	✓	✓	✓	✓	✓	✓	✓	✓	✓
Israel	IUCC	✓	✓			✓	✓			
Jordan	NITC	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kazakhstan	KazRENA	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kyrgyzstan	KRENA-AKNET	✓	✓	✓	✓	✓	✓	✓	X	X
Lebanon	CNRS	✓	✓	X	X	X	X	X	X	X
Moldova	RENAM	✓	✓	✓	✓	✓	✓	✓	✓	✓
Morocco	MARWAN	✓	✓	✓	X	X	✓	X	X	
Romania	RNC	✓	✓	✓	✓	X	✓	✓	✓	✓
Romania	RoEduNet	✓	✓	✓	✓	✓	✓	X	✓	X
Russian Federation	RBNet/RUNet	✓	✓	✓	✓		✓		✓	
Serbia/ Montenegro	AMREJ	✓	✓		✓	X	✓	✓		X
Turkey	ULAKBIM	✓	✓	✓	X	X	✓	X	✓	X
Ukraine	URAN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Uzbekistan	UzSciNet	✓	✓	✓	✓	✓	✓	✓	✓	✓

## 2.2 Number of connected Universities and bandwidth

The setup of Universities and other institutes can be very different from country to country. For example, in some countries Research Institutes are part of Universities; in other countries, they are not. Some countries have relatively few but large Universities, others have relatively many, but smaller ones. Also, some countries have listed entire Universities as one institution, others have counted faculties or schools that form part of a University but are geographically at different locations as different institutions.

In this section, information is provided for 2003 and 2004, showing the evolution over the past year, in three graphs: Graph 2.2.1. gives the situation in the EU and EFTA countries with more than 50 connected Universities. Graph 2.2.2. gives the situation in EU and EFTA countries with fewer than 50 connected Universities. Graph 2.2.3 gives the situation in the other countries.

Several points should be noted:

- \* The evolution is not gradual, but goes in leaps and bounds. Thus, if in some countries a major network upgrade took place in 2002, it is possible that another one will only take place in 2005. These upgrades generally require a considerable investment, both in terms of planning and in terms of equipment.

Likewise, bandwidth upgrades of individual institutions do not occur gradually – the evolution is often not, for example, from 34 MB/s to 155 Mb/s to 622 Mb/s to 1 Gb/s, but goes directly, for example, from 34 Mb/s to 1 Gb/s.

- \* Note that the Polish information from 2004 is accurate only concerning the division over the categories, not concerning the number of connected institutions. The PIONIER network is a consortium of autonomous MANs. PIONIER was not able to supply reliable data about the total number of connected Universities or other institutions for 2004.

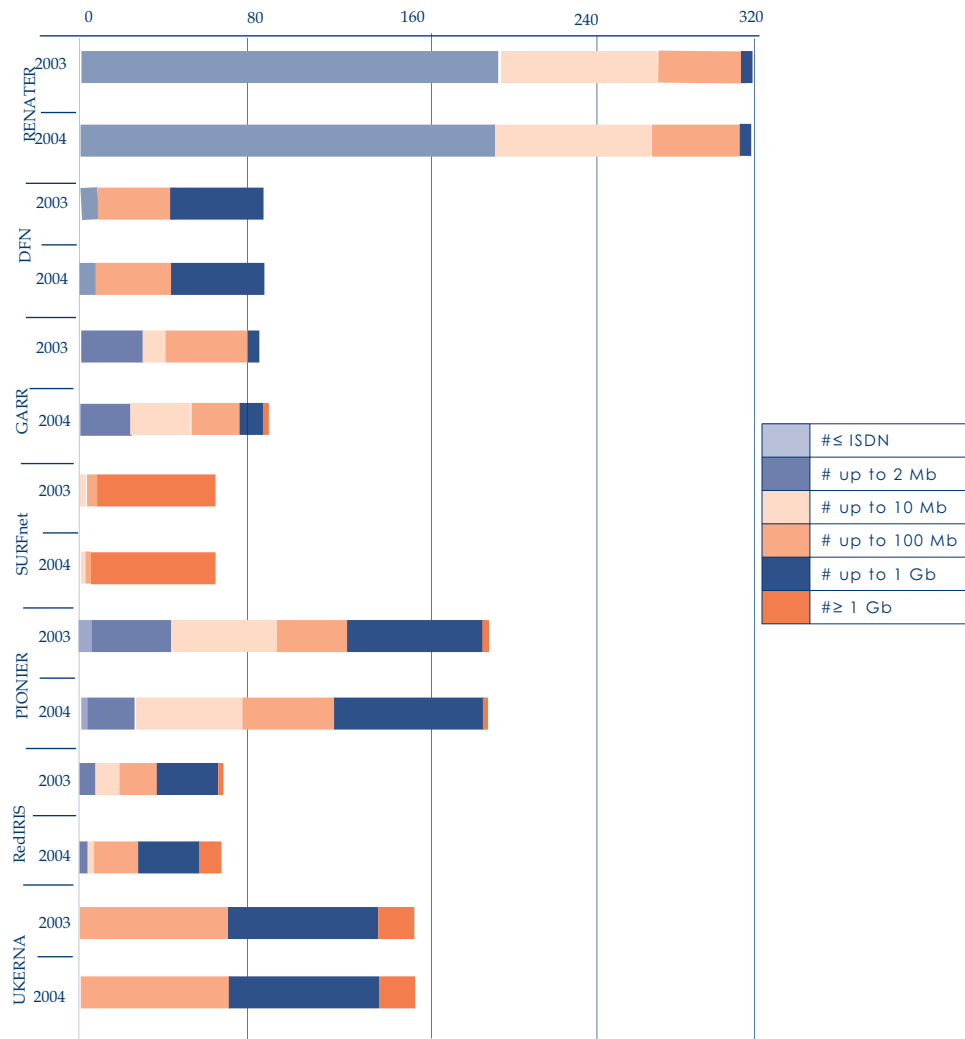
*RENATER (France) has given the information on the number of separate institutions that are connected. DFN (Germany) has instead given information about the number of connected Universities. France does not have four times the number of Universities that Germany has.*

*The information of some NRENs in 2003 (e.g., AMREJ, HUNGARNET, SWITCH) concerns the number of connected institutions, whereas in 2004 it concerns the number of connected Universities.*

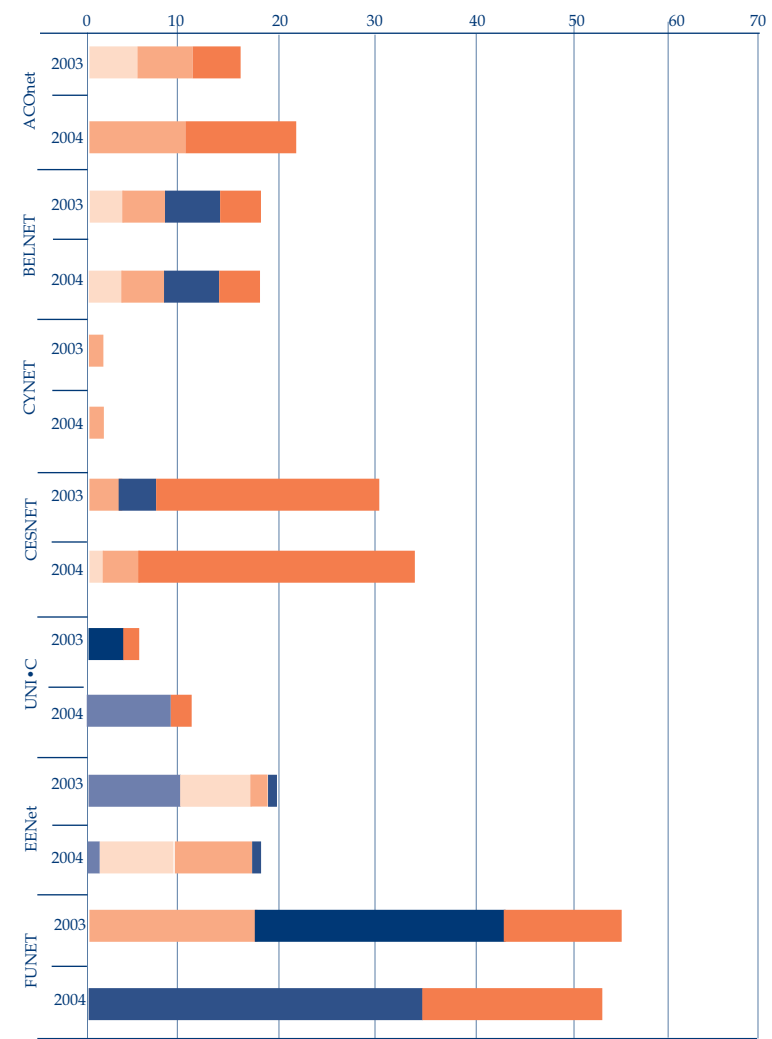
*In some cases (e.g., CARNET) the reverse applies: the information from 2003 concerns the number of connected Universities as such, the information from 2004 concerns rather the connections to the separate institutions that are part of those Universities.*

*It may not be possible to normalize this completely, because not all NRENs are able to supply the data in both ways.*

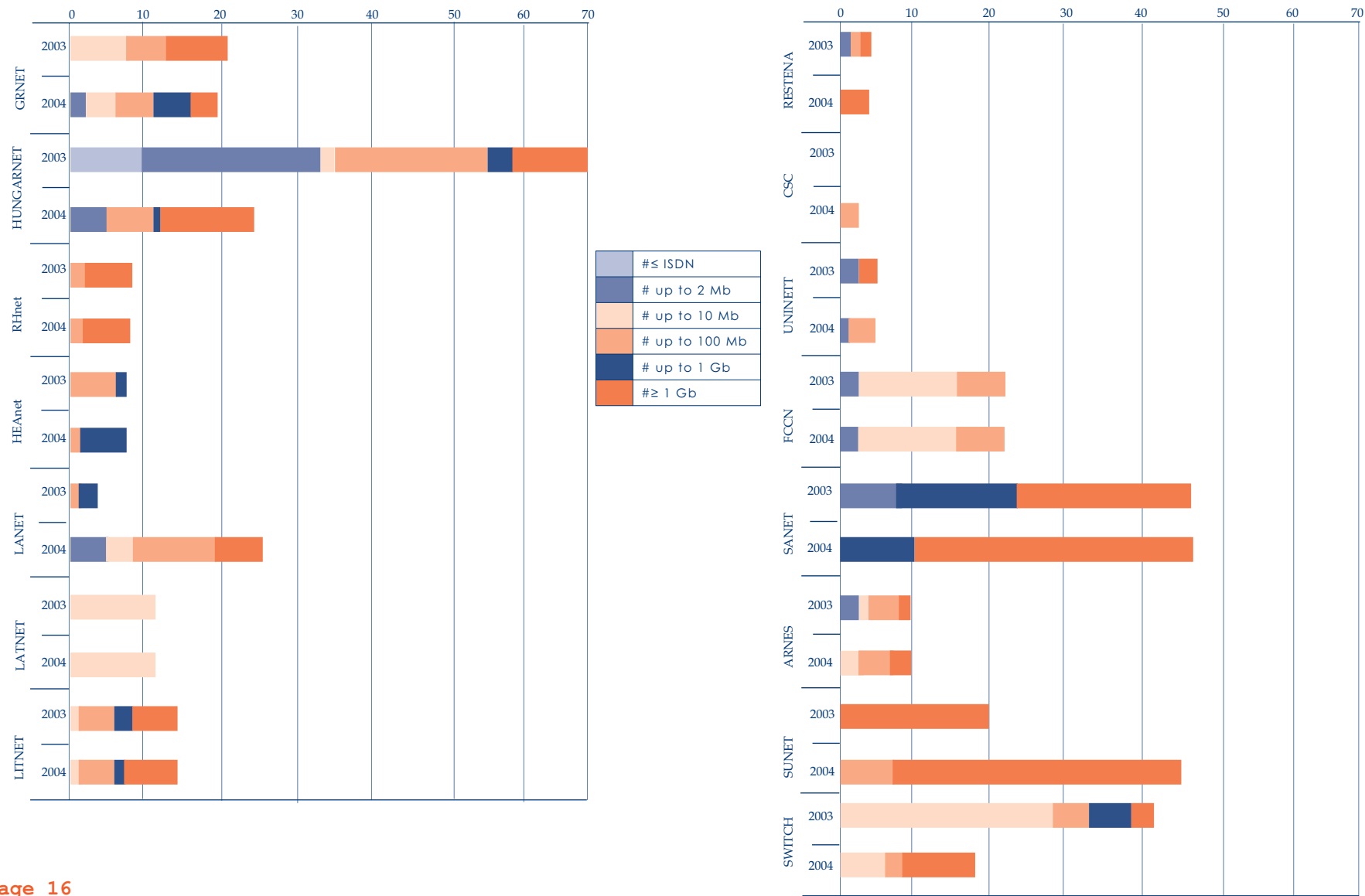
**Graph 2.2.1 Number of connected Universities and bandwidths >50  
EU & EFTA countries**



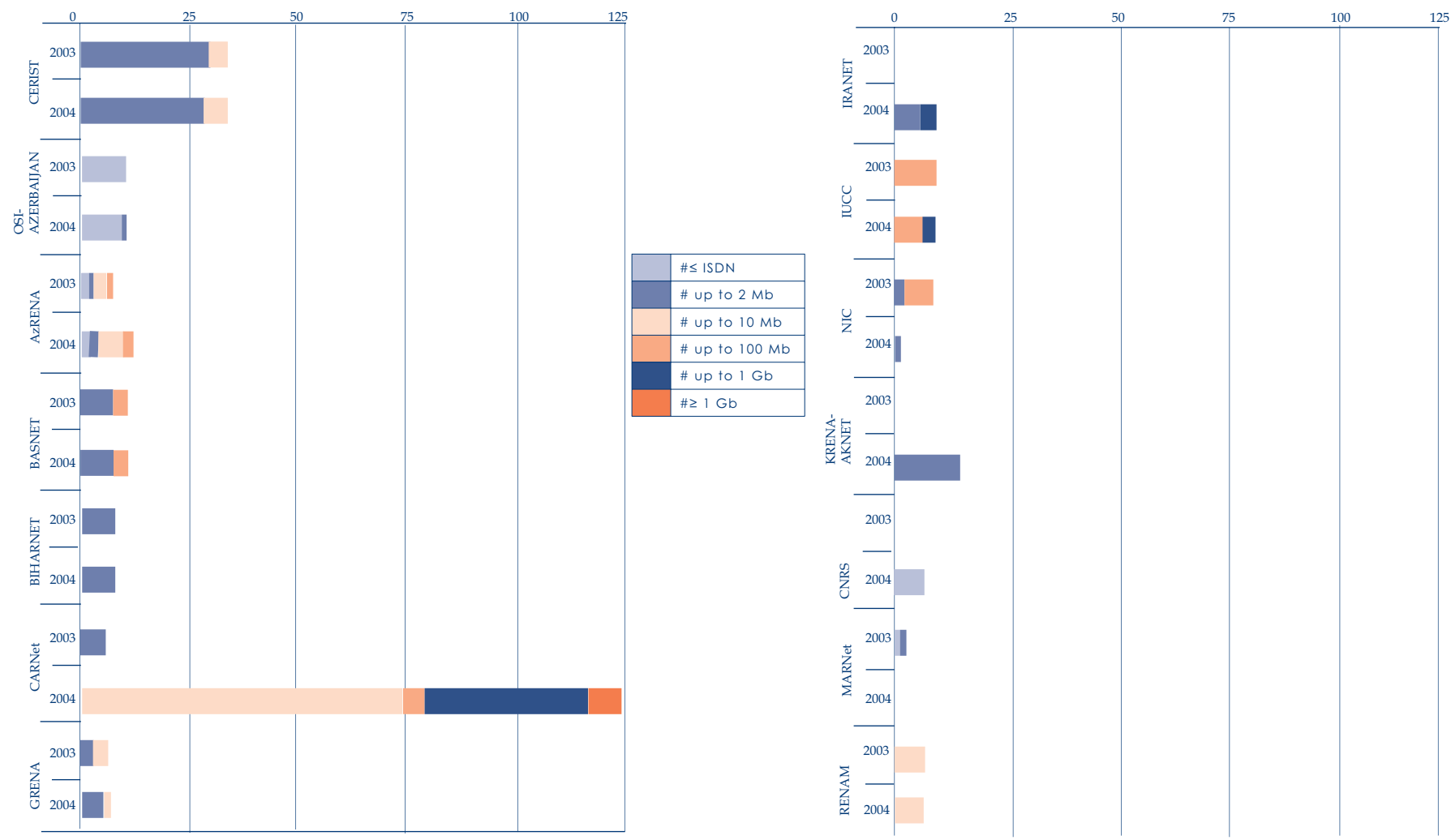
**Graph 2.2.2 Number of connected Universities and bandwidth <50  
EU & EFTA countries**



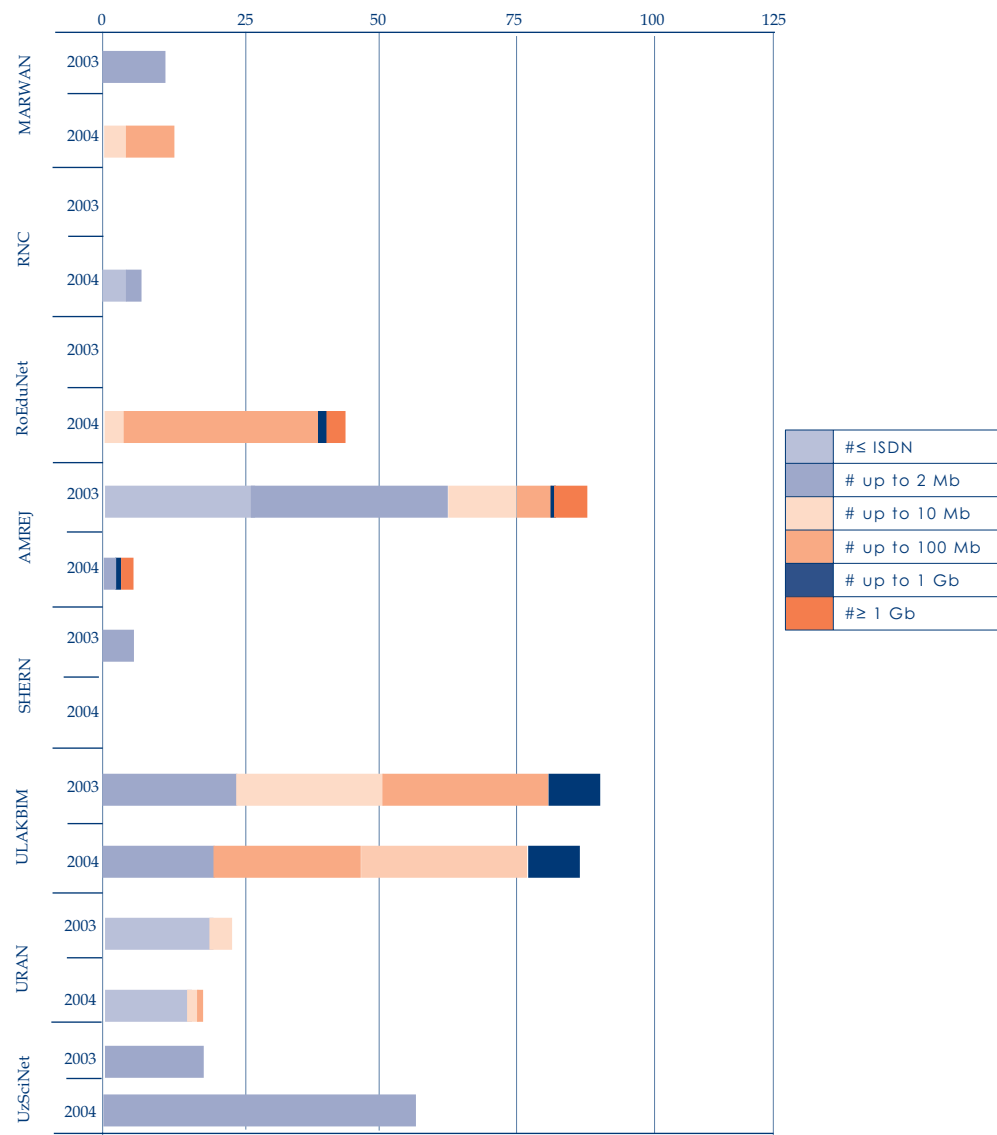
Graph 2.2.2 Number of connected Universities and bandwidth <50  
EU & EFTA countries (continued)



**Graph 2.2.3 Number of connected Universities and bandwidth**  
**Other countries**



Graph 2.2.3 Number of connected Universities and bandwidth  
Other countries (continued)





**Table 2.3 Number of connected research institutes and bandwidth, EU & EFTA countries**

EU & EFTA countries	NREN	Number	% ≤ ISDN	% up to 2Mb	% up to 10 Mb	% up to 100 Mb	% up to 1 Gb	% ≥ 1 Gb
Austria	ACOnet	11		18.2	54.5	27.3		
Belgium	BELNET	34			79.0	21.0		
Cyprus	CYNET	3		100.0				
Czech Republic	CESNET	23		56.6	30.5	8.5	4.5	
Denmark	UNI•C	25		75.0	10.0	15.0		
Estonia	EENet	19		10.0	74.0	16.0		
Finland	FUNET	15			10.0	20.0	60.0	10.0
France	RENATER	165		70.0	22.0	8.0		
Greece	GRNET	19	5.0	21.0	63.0	11.0		
Hungary	HUNGARNET	84	24.0	48.0	8.0	6.0	2.0	12.0
Iceland	RHnet	7						100.0
Ireland	HEAnet	9		67.0	11.0	22.0		
Italy	GARR	142		45.0	16.0	20.0	18.0	1.0
Latvia	LANET	36				100.0		
Latvia	LATNET	5			100.0			
Lithuania	LITNET	43		7.0	88.0			5.0
Luxembourg	RESTENA	16			25.0		20.0	55.0
Netherlands	SURFnet	65		20.0	5.0	10.0	5.0	60.0
Norway	UNINETT	80		50.0	25.0	17.0	5.0	3.0
Portugal	FCCN	12		60.0	40.0			
Slovakia	SANET	20			10.0		80.0	10.0
Slovenia	ARNES	57	14.0	35.0	21.0	23.0		7.0
Spain	RedIRIS	150	5.0	36.0	30.0	20.0	3.0	6.0
Sweden	SUNET	2					50.0	50.0
Switzerland	SWITCH	7			29.0	29.0		42.0
United Kingdom	UKERNA	50		20.0	40.0	25.0	10.0	5.0

**Table 2.3 Number of connected research institutes and bandwidth, other countries**

Other countries	NREN	Number	% ≤ ISDN	% up to 2Mb	% up to 10 Mb	% up to 100 Mb	% up to 1 Gb	% ≥ 1 Gb
Algeria	CERIST	9		100.0				
Azerbaijan	AzRENA	16	20.0			80.0		
Belarus	BASNET	180		60.0	35.0	5.0		
Croatia	CARNet	43	2.0	86.0	2.0	2.0		8.0
Georgia	GRENA	30	10.0	90.0				
Iran	IRANET	6		100.0				
Israel	IUCC	4		50.0	50.0			
Kyrgyzstan	KRENA-AKNET	3		100.0				
Lebanon	CNRS		50.0	50.0				
Moldova	RENAM	21			100.0			
Morocco	MARWAN	5		100.0				
Romania	RNC	50	50.0	50.0				
Romania	RoEduNet	35		20.0	20.0	50.0		10.0
Serbia/Montenegro	AMREJ	33	33.0	24.0	27.0	3.0		12.0
Turkey	ULAKBIM	8		62.0	12.5	25.0		
Ukraine	URAN	5	33.0		67.0			
Uzbekistan	UzSciNet	21		90.0		10.0		

**Table 2.4 Number of connected institutions of higher/further education and bandwidth, EU and EFTA countries**

EU & EFTA countries	NREN	Number	% ≤ ISDN	% up to 2Mb	% up to 10 Mb	% up to 100 Mb	% up to 1 Gb	% ≥ 1 GB
Austria	ACOnet	5			60	40		
Belgium	BELNET	35			54	43	3	
Cyprus	CYNET	6				100		
Czech Republic	CESNET	19		42	47	11		
Denmark	UNI•C	74		50	20	20	10	
Estonia	EENet	17		47	47	6		
France	RENATER	68		65	28	7		
Greece	GRNET	158	89	3	7	1		
Hungary	HUNGARNET	35		30	14	28	22	6
Iceland	RHnet	2			50	50		
Ireland	HEAnet	21		5	5	90		
Italy	GARR	5			40	60		
Latvia	LATNET	18	10		90			
Lithuania	LITNET	83			90	10		
Luxembourg	RESTENA	10	25	75				
Netherlands	SURFnet	15		50			50	
Norway	UNINETT	64		31	17	14	31	6
Portugal	FCCN	24		50	50			
Slovakia	SANET	4		25			75	
Slovenia	ARNES	10		70		30		
Switzerland	SWITCH	1				100		
United Kingdom	UKERNA	560		70	20	10		

**Table 2.4 Number of connected institutions of higher/further education and bandwidth, other countries**

Other countries	NREN	Number	% ≤ ISDN	% up to 2 Mb	% up to 10 Mb	% up to 100 Mb	% up to 1 Gb	% ≥ 1 Gb
Algeria	CERIST	11		100				
Azerbaijan	AzRENA	2	100					
Azerbaijan	OSI-AF/ Azerbaijan	5	100					
Belarus	BASNET	40		100				
Croatia	CARNet	34			85	11		4
Georgia	GRENA	20	100					
Iran	IRANET	10		100				
Israel	IUCC	9			100			
Jordan	NITC	28	93	7				
Kyrgyzstan	KRENA-AKNET	1		100				
Moldova	RENAM	2			100			
Morocco	MARWAN	12						
Romania	RNC	5	60	40				
Serbia/Montenegro	AMREJ	100						
Turkey	ULAKBIM	199		100				
Ukraine	URAN	1	75		25			

Table 2.5 Number of connected secondary schools and bandwidth

EU & EFTA countries	NREN	Number	% ≤ ISDN	% up to 2Mb	% up to 10 Mb	% up to 100 Mb	% up to 1 Gb	% ≥ 1 Gb
Czech Republic	CESNET	74		79.5	20.5			
Estonia	EENet	112		33	22	30	15	
France	RENATER	53		56	30	4		
Greece	GRNET	3546	97	1	2			
Hungary	HUNGARNET	34	9	64	18	9		
Ireland	HEAnet	4		100				
Latvia	LANET	11	100					
Latvia	LATNET	35	15		85			
Lithuania	LITNET	294		90	4	5		
Luxembourg	RESTENA	52			48			52
Norway	UNINETT	19		79	5		16	
Portugal	FCCN	1700	100					
Slovakia	SANET	80		20		80		
Slovenia	ARNES	156	38	43	13	6		
<b>Other countries</b>								
Algeria	CERIST	100	100					
Azerbaijan	AzRENA	3	100					
Azerbaijan	OSI-AF/Azerbaijan	3	100					
Belarus	BASNET	20		100				
Bosnia Herzegovina	BIHARNET	4						
Bulgaria	IST Foundation		60	40				
Croatia	CARNet	7	14	14	58	14		
Georgia	GRENA	30	100					
Iran	IRANET	2		100				
Jordan	NITC	2		100				
Kyrgyzstan	KRENA-AKNET	2		100				
Romania	RNC	8	75	25				
Romania	RoEduNet	450	50	25		25		
Serbia/Montenegro	AMREJ	2	100					
Uzbekistan	UzSciNet	27						

**Table 2.6 Number of connected primary schools and bandwidth**

EU & EFTA countries	NREN	Number	% ≤ ISDN	% up to 2Mb	% up to 10 Mb	% up to 100 Mb	% up to 1 Gb	% ≥ 1Gb
Czech Republic	CESNET	25		100				
Estonia	EENet	93		91	1	8		
Greece	GRNET	5004	100					
Hungary	HUNGARNET	52	100					
Ireland	HEAnet	9		100				
Latvia	LATNET	3			100			
Lithuania	LITNET	25		100				
Luxembourg	RESTENA	153	40	59	2			
Norway	UNINETT	60	17	83				
Portugal	FCCN	7500	100					
Slovakia	SANET	20		20		80		
Slovenia	ARNES	419	73	26				
<b>Other countries</b>								
Croatia	CARNet	3		100				
Iran	IRANET	1		100				
Kyrgyzstan	KRENA-AKNET	1		100				
Romania	RoEduNet	200	95	5				

**Table 2.7 Number of other connected institutions and bandwidth**

EU & EFTA countries	NREN	Number	% ≤ ISDN	% up to 2Mb	% up to 10 Mb	% up to 100 Mb	% up to 1 Gb	% ≥ 1 Gb
Belgium	BELNET	4					25	75
Czech Republic	CESNET	41		37	45	15	3	
Denmark	UNI•C	10		40	30	30		
Estonia	EENet	222		72	14	14		
Finland	FUNET	18			20	30	50	
Greece	GRNET	545	87	4	4	9	1	
Hungary	HUNGARNET	423	59	35		3	1	2
Ireland	HEAnet	6			84	16		
Italy	GARR	76		96	1	2	1	
Lithuania	LITNET	170		100				
Luxembourg	RESTENA	57	20	80				
Netherlands	SURFNet	20	20		30	5	5	60
Norway	UNINETT	8	100					
Slovenia	ARNES	213	37	50	8	5		
Spain	RedIRIS	1					100	
Sweden	SUNET	20			20	60	20	
Switzerland	SWITCH	17			15	70		15
<b>Other countries</b>								
Azerbaijan	AzRENA	2	50	50				
Azerbaijan	OSI-AF/ Azerbaijan	5	100					
Croatia	CARNet	80	10	58	4	15	5	8
Iran	IRANET	15		100				
Jordan	NITC	268	58	42				
Kyrgyzstan	KRENA-AKNET	4		100				
Romania	RNC	19	63	37				
Romania	RoEduNet	70	25	20	25	25		5
Serbia/Montenegro	AMREJ	11		27	36	27		9
Turkey	ULAKBIM	120	85.8	1.7	12.5			
Ukraine	URAN	6	33		67			
Uzbekistan	UzSciNet	49	100					