



APNIC

APNIC response to TSB ‘Questionnaire on IPv6 address allocation and encouraging the deployment of IPv6’

On 27 March 2009, the Telecommunication Standardization Bureau (TSB) issued a *‘Questionnaire on IPv6 address allocation and encouraging the deployment of IPv6’* to all Member States of the Union, to be returned by 12 June 2009.

The results of the questionnaire will then form part of the study evaluating a request by some developing countries for the TSB to become an additional registry for IP addresses. The final report will be submitted to the closed ITU Council meeting in Geneva, 20-30 October 2009.

The Asia Pacific Network Information Centre (APNIC), an ITU-D sector member, respectfully offers this public response to assist member states with data that may help in completing the questionnaire. The data is ordered according to the questions in the TSB survey.

1) What is the number (absolute number, for example 10'000) of IPv4 addresses currently available and used in your country?

The five Regional Internet Registries (RIRs) provide publicly accessible daily updated reports on IPv4 address delegations by economy. The reports are available from:

<http://www.nro.net/statistics>

In the table below, APNIC has provided a summary of the data published by all five RIRs and invites Member States to consider this when completing the TSB questionnaire.

Notes about the data below:

- Because of the very large numbers of IPv4 addresses possible in some cases, the table includes a column showing the number of addresses using the standard Internet technical equivalent of a total number of /8s (a “slash 8s” represents 2^{24} IP addresses, or what was known historically as a “Class A” address block).
- Due to the routing architecture of the Internet and international reach of many businesses and networks, there are also addresses delegated to organizations that operate in more than one economy. Allocations made on a specific regional basis are shown in the last row of the table, beneath the economy-based allocations. Some of the apparently economy-based allocations listed in the table below may also contain elements of cross-border use. Only individual organizations using the addresses can specify definitively whether all their addresses are used in-country.
- It is important to note that, due to the hierarchical nature of addressing, not all IP addresses that are delegated to a network can, in fact be used. Nor is it practical for a country to track the number of private IP addresses—often deployed for their perceived security advantages—that are in active use on networks.

IPv4 distribution by economy (as of 14 April 2009)					
Economy	Absolute number of addresses allocated	/8s allocated	Economy	Absolute number of addresses allocated	/8s allocated
Afghanistan	65,792	0.00392	Lesotho	12,544	0.00075
Aland Islands	4,096	0.00024	Liberia	1,024	0.00006
Albania	150,784	0.00899	Libyan Arab Jamahiriya	294,912	0.01758
Algeria	265,728	0.01584	Liechtenstein	53,792	0.00321
American Samoa	4,096	0.00024	Lithuania	2,009,216	0.11976
Andorra	24,576	0.00146	Luxembourg	460,608	0.02745
Angola	49,152	0.00293	Macao	163,072	0.00972
Anguilla	4,096	0.00024	Macedonia	528,128	0.03148
Antigua and Barbuda	47,104	0.00281	Madagascar	37,888	0.00226
Argentina	7,239,424	0.43150	Malawi	19,968	0.00119
Armenia	150,816	0.00899	Malaysia	4,147,456	0.24721
Aruba	18,432	0.00110	Maldives	37,376	0.00223
Australia	36,573,184	2.17993	Mali	24,576	0.00146
Austria	7,290,592	0.43455	Malta	476,160	0.02838

IPv4 distribution by economy (as of 14 April 2009)					
Economy	Absolute number of addresses allocated	/8s allocated	Economy	Absolute number of addresses allocated	/8s allocated
Azerbaijan	237,568	0.01416	Marshall Islands	2,048	0.00012
Bahamas	67,584	0.00403	Mauritania	24,576	0.00146
Bahrain	233,984	0.01395	Mauritius	270,080	0.01610
Bangladesh	588,032	0.03505	Mexico	21,504,000	1.28174
Barbados	119,552	0.00713	Micronesia	2,048	0.00012
Belarus	332,800	0.01984	Moldova	308,736	0.01840
Belgium	6,412,416	0.38221	Monaco	65,856	0.00393
Belize	49,664	0.00296	Mongolia	109,312	0.00652
Benin	17,408	0.00104	Montenegro	28,672	0.00171
Bermuda	80,384	0.00479	Montserrat	1,280	0.00008
Bhutan	22,528	0.00134	Morocco	881,920	0.05257
Bolivia	414,976	0.02473	Mozambique	48,128	0.00287
Bosnia and Herzegovina	395,520	0.02357	Myanmar	12,288	0.00073
Botswana	72,960	0.00435	Namibia	132,096	0.00787
Brazil	29,754,880	1.77353	Nauru	8,192	0.00049
British Indian Ocean Territory	3,072	0.00018	Nepal	147,968	0.00882
British Virgin Islands	1,024	0.00006	Netherlands	21,290,792	1.26903
Brunei Darussalam	191,232	0.01140	Netherlands Antilles	211,968	0.01263
Bulgaria	3,334,912	0.19878	New Caledonia	63,488	0.00378
Burkina Faso	22,272	0.00133	New Zealand	6,115,072	0.36449
Burundi	2,304	0.00014	Nicaragua	166,144	0.00990
Cambodia	130,560	0.00778	Niger	9,216	0.00055
Cameroon	59,904	0.00357	Nigeria	461,312	0.02750
Canada	59,056,384	3.52003	Niue	1,024	0.00006
Cape Verde	8,192	0.00049	Norfolk Island	1,536	0.00009
Cayman Islands	31,744	0.00189	Northern Mariana Islands	12,288	0.00073
Central African Republic	3,328	0.00020	Norway	24,202,800	1.44260
Chile	4,731,136	0.28200	Oman	163,840	0.00977
China	191,119,104	11.39159	Pakistan	1,637,632	0.09761
Colombia	4,261,632	0.25401	Palau	4,096	0.00024
Congo, Democratic Republic	6,656	0.00040	Palestinian Territory	248,320	0.01480
Congo	1,024	0.00006	Panama	1,130,240	0.06737
Cook Islands	8,192	0.00049	Papua New Guinea	38,656	0.00230
Costa Rica	1,502,208	0.08954	Paraguay	141,568	0.00844
Cote D'Ivoire	112,896	0.00673	Peru	1,715,968	0.10228
Cuba	105,472	0.00629	Philippines	4,070,656	0.24263
Cyprus	521,248	0.03107	Poland	13,869,704	0.82670
Czech Republic	6,040,960	0.36007	Portugal	4,473,952	0.26667
Denmark	9,281,632	0.55323	Puerto Rico	712,192	0.04245
Djibouti	4,096	0.00024	Qatar	378,880	0.02258
Dominican Republic	405,248	0.02415	Reunion	32,768	0.00195
Ecuador	803,072	0.04787	Romania	8,640,512	0.51501
Egypt	2,731,008	0.16278	Russian Federation	24,529,224	1.46206
El Salvador	406,528	0.02423	Rwanda	154,624	0.00922
Equatorial Guinea	2,048	0.00012	Samoa	13,568	0.00081
Eritrea	4,096	0.00024	San Marino	22,528	0.00134
Estonia	1,021,464	0.06088	Saudi Arabia	2,703,616	0.16115

IPv4 distribution by economy (as of 14 April 2009)					
Economy	Absolute number of addresses allocated	/8s allocated	Economy	Absolute number of addresses allocated	/8s allocated
Ethiopia	16,384	0.00098	Senegal	92,416	0.00551
Faeroe Islands	33,792	0.00201	Serbia	131,328	0.00783
Fiji	110,080	0.00656	Serbia and Montenegro	997,632	0.05946
Finland	8,932,864	0.53244	Seychelles	17,408	0.00104
France	85,148,096	5.07522	Sierra Leone	15,360	0.00092
French Guiana	2,048	0.00012	Singapore	4,410,880	0.26291
French Polynesia	39,424	0.00235	Slovakia (Slovak Republic)	1,611,520	0.09605
Gabon	155,136	0.00925	Slovenia	1,277,952	0.07617
Gambia	11,264	0.00067	Solomon Islands	8,704	0.00052
Georgia	555,520	0.03311	South Africa	14,009,344	0.83502
Germany	68,397,208	4.07679	Spain	21,794,976	1.29908
Ghana	162,304	0.00967	Sri Lanka	436,736	0.02603
Gibraltar	59,392	0.00354	St. Kitts and Nevis	5,120	0.00031
Greece	3,834,624	0.22856	St. Lucia	256	0.00002
Greenland	16,384	0.00098	St. Pierre and Miquelon	4,096	0.00024
Grenada	1,280	0.00008	St. Vincent and the Grenadines	6,144	0.00037
Guadeloupe	6,144	0.00037	Sudan	67,584	0.00403
Guam	82,176	0.00490	Suriname	44,032	0.00262
Guatemala	489,472	0.02917	Swaziland	25,344	0.00151
Guernsey	4,096	0.00024	Sweden	18,982,304	1.13143
Guinea-Bissau	1,024	0.00006	Switzerland	25,026,536	1.49170
Guyana	16,384	0.00098	Syrian Arab Republic	263,168	0.01569
Haiti	57,344	0.00342	Taiwan	24,680,704	1.47108
Holy See (Vatican City State)	8,192	0.00049	Tajikistan	34,816	0.00208
Honduras	94,464	0.00563	Tanzania	105,472	0.00629
Hong Kong	8,206,848	0.48917	Thailand	4,743,936	0.28276
Hrvatska (Croatia)	1,623,136	0.09675	Togo	12,288	0.00073
Hungary	3,716,480	0.22152	Tonga	4,352	0.00026
Iceland	545,792	0.03253	Trinidad and Tobago	307,968	0.01836
India	18,285,568	1.08990	Tunisia	632,064	0.03767
Indonesia	6,997,248	0.41707	Turkey	10,417,600	0.62094
Iran	1,894,400	0.11292	Turkmenistan	8,192	0.00049
Iraq	45,056	0.00269	Turks and Caicos Islands	7,168	0.00043
Ireland	4,203,680	0.25056	Tuvalu	8,192	0.00049
Isle of Man	16,384	0.00098	Uganda	142,592	0.00850
Israel	3,949,760	0.23542	Ukraine	5,507,904	0.32830
Italy	32,202,432	1.91941	United Arab Emirates	2,286,848	0.13631
Jamaica	130,048	0.00775	United Kingdom	87,452,504	5.21258
Japan	169,189,888	10.08450	United States Minor Outlying Islands	512	0.00003
Jersey	6,400	0.00038	United States of America	1,456,462,592	86.81194
Jordan	302,848	0.01805	Uruguay	663,808	0.03957
Kazakhstan	873,216	0.05205	US Virgin Islands	87,040	0.00519
Kenya	265,472	0.01582	Uzbekistan	168,448	0.01004
Kiribati	3,072	0.00018	Vanuatu	6,400	0.00038
Korea	72,142,592	4.30003	Venezuela	3,693,056	0.22012
Kuwait	781,568	0.04659	Viet Nam	6,707,456	0.39980

IPv4 distribution by economy (as of 14 April 2009)					
Economy	Absolute number of addresses allocated	/8s allocated	Economy	Absolute number of addresses allocated	/8s allocated
Kyrgyz Republic	129,024	0.00769	Wallis and Futuna Islands	2,048	0.00012
Lao People's Democratic Republic	41,216	0.00246	Yemen	24,576	0.00146
Latvia	1,384,448	0.08252	Zambia	36,096	0.00215
Lebanon	304,384	0.01814	Zimbabwe	37,376	0.00223
Asia Pacific	559,616	0.03336	European Union	114,024,608	6.79640

2) What is the number (absolute number, for example 10'000) of IPv6 addresses currently available and used in your country?

The five RIRs publish daily updated reports on IPv6 address delegations by economy. In the table below, APNIC has provided a summary of the data published by all five RIRs below and invites Member States to consider this data when completing the TSB questionnaire.

Notes about the data below:

- Because of the very large scale of numbers allocated in the IPv6 address space, we have not included absolute numbers of individual IP addresses, but have used /64 (or 2^{64} addresses) notation. A single /64 is used to address a single IPv6 subnet where auto-configuration of host addresses is desired. The table also includes a column to show the number of addresses using the standard Internet technical equivalent of a total number of /32s (which represent 2^{96} IP addresses, the standard minimum address block allocated to a network).
- Due to the routing architecture of the Internet and international reach of many businesses and networks, there are also addresses that have been delegated to organizations that operate in more than one economy. Allocations made on a specific regional basis are shown in the last row of the table, beneath the economy-based allocations. Some of the apparently economy-based allocations listed below may also contain elements of cross-border use. Only individual organizations using the addresses can specify definitively whether all their addresses are used in-country.
- It is important to note that, due to the hierarchical nature of addressing, not all IP addresses that are delegated to a network can, in fact be used. This is particularly relevant to networks using IPv6, as the protocol's addressing scheme is designed to facilitate more efficient network management and routing rather than efficient use of individual addresses.
- APNIC suggests using caution when analysing IPv6 distribution by economy as the total number of IPv6 addresses made to regionally-based networks forms a significant proportion of IPv6 allocations made to date.

IPv6 distribution by economy (as of 14 April 2009)					
Economy	/64s allocated	/32s allocated	Economy	/64s allocated	/32s allocated
Algeria	4,294,967,296	1.00	Macedonia	4,294,967,296	1.00
Andorra	4,294,967,296	1.00	Madagascar	4,294,967,296	1.00
Angola	4,294,967,296	1.00	Malawi	4,294,967,296	1.00
Argentina	163,208,822,784	38.00	Malaysia	77,309,476,864	18.00
Armenia	12,884,901,888	3.00	Mali	4,294,967,296	1.00
Australia	35,382,478,241,792	8238.13	Malta	12,884,901,888	3.00
Austria	187,904,884,736	43.75	Mauritius	17,179,869,184	4.00
Bahamas	4,294,967,296	1.00	Mexico	64,424,640,512	15.00
Bahrain	4,294,967,296	1.00	Moldova	8,589,934,592	2.00
Bangladesh	30,064,836,608	7.00	Monaco	8,589,934,592	2.00

IPv6 distribution by economy (as of 14 April 2009)					
Economy	/64s allocated	/32s allocated	Economy	/64s allocated	/32s allocated
Belgium	87,510,220,800	20.38	Morocco	8,589,934,592	2.00
Benin	4,294,967,296	1.00	Mozambique	4,294,967,296	1.00
Bermuda	4,294,967,296	1.00	Namibia	65,536	0.00
Bhutan	4,294,967,296	1.00	Nepal	4,294,967,296	1.00
Bolivia	12,884,901,888	3.00	Netherlands	2,643,552,698,368	615.50
Bosnia and Herzegovina	8,589,934,592	2.00	Netherlands Antilles	12,885,098,496	3.00
Brazil	282,299,610,431,488	65728.00	New Zealand	137,439,543,296	32.00
Bulgaria	47,244,705,792	11.00	Nicaragua	8,589,934,592	2.00
Cameroon	4,294,967,296	1.00	Nigeria	8,589,934,592	2.00
Canada	214,752,428,032	50.00	Norway	1,251,446,226,944	291.38
Chile	42,949,738,496	10.00	Oman	4,294,967,296	1.00
China	244,813,266,944	57.00	Pakistan	34,359,738,368	8.00
Colombia	38,654,771,200	9.00	Palau	4,294,967,296	1.00
Costa Rica	25,769,803,776	6.00	Panama	12,884,901,888	3.00
Cote D'Ivoire	8,589,934,592	2.00	Papua New Guinea	4,294,967,296	1.00
Cuba	17,179,869,184	4.00	Paraguay	4,294,967,296	1.00
Cyprus	17,179,869,184	4.00	Peru	30,064,771,072	7.00
Czech Republic	199,179,239,424	46.38	Philippines	64,424,509,440	15.00
Denmark	100,394,926,080	23.38	Poland	9,014,062,678,016	2098.75
Djibouti	4,294,967,296	1.00	Portugal	70,330,220,544	16.38
Dominican Republic	12,884,901,888	3.00	Puerto Rico	4,295,032,832	1.00
Ecuador	17,180,000,256	4.00	Qatar	4,294,967,296	1.00
Egypt	21,474,836,480	5.00	Romania	42,949,738,496	10.00
El Salvador	4,294,967,296	1.00	Russian Federation	248,034,426,880	57.75
Estonia	35,970,482,176	8.38	Rwanda	4,294,967,296	1.00
Fiji	4,295,032,832	1.00	Saudi Arabia	17,179,869,184	4.00
Finland	66,572,124,160	15.50	Senegal	4,294,967,296	1.00
France	35,730,370,134,016	8319.13	Serbia	4,294,967,296	1.00
Germany	41,824,392,183,808	9738.00	Serbia and Montenegro	21,474,836,480	5.00
Ghana	4,294,967,296	1.00	Seychelles	4,294,967,296	1.00
Gibraltar	4,294,967,296	1.00	Singapore	73,014,575,104	17.00
Greece	23,085,514,752	5.38	Slovakia (Slovak Republic)	38,654,836,736	9.00
Guatemala	17,179,869,184	4.00	Slovenia	42,949,738,496	10.00
Haiti	4,294,967,296	1.00	South Africa	68,720,394,240	16.00
Holy See (Vatican City State)	4,294,967,296	1.00	Spain	117,574,860,800	27.38
Hong Kong	81,604,444,161	19.00	Sri Lanka	12,884,967,424	3.00
Hrvatska (Croatia)	21,474,902,016	5.00	Sudan	4,294,967,296	1.00
Hungary	57,445,253,120	13.38	Swaziland	4,294,967,296	1.00
Iceland	30,064,836,608	7.00	Sweden	759,135,928,320	176.75
India	85,899,411,456	20.00	Switzerland	426,812,637,184	99.38
Indonesia	90,194,509,824	21.00	Taiwan	9,921,374,519,296	2310.00
Iran	55,834,574,848	13.00	Tanzania	12,884,967,424	3.00
Ireland	97,710,571,520	22.75	Thailand	68,719,607,808	16.00
Isle of Man	4,294,967,296	1.00	Trinidad and Tobago	8,589,934,592	2.00
Israel	25,769,869,312	6.00	Tunisia	4,294,967,296	1.00
Italy	17,854,716,116,992	4157.13	Turkey	73,014,444,032	17.00

IPv6 distribution by economy (as of 14 April 2009)					
Economy	/64s allocated	/32s allocated	Economy	/64s allocated	/32s allocated
Japan	35,774,393,876,482	8329.38	Ukraine	60,129,542,144	14.00
Jordan	4,294,967,296	1.00	United Arab Emirates	12,884,901,888	3.00
Kenya	17,180,000,256	4.00	United Kingdom	5,147,519,025,153	1198.50
Korea	22,329,535,037,441	5199.00	United States of America	63,728,856,399,872	14838.03
Kyrgyz Republic	4,294,967,296	1.00	Uruguay	81,604,640,768	19.00
Latvia	21,474,836,480	5.00	US Virgin Islands	4,294,967,296	1.00
Liechtenstein	8,589,934,592	2.00	Uzbekistan	4,294,967,296	1.00
Lithuania	10,200,612,864	2.38	Venezuela	60,129,542,144	14.00
Luxembourg	48,855,318,528	11.38	Viet Nam	42,950,787,072	10.00
Macao	8,589,934,592	2.00	Zimbabwe	4,294,967,296	1.00
Asia Pacific	94,492,688,384	22.00	European Union	26,449,482,743,808	6158.25

3) What is the number (absolute number, for example 100) of organizations in your country that currently have been allocated an IPv4 addresses block from one of the Regional Internet Registries (RIRs)?

Each RIR maintains data on the number of current account holders with address space. To assist Member States in completing their questionnaires, APNIC invites Member States from the Asia Pacific region to use the data on Asia Pacific economies summarized in the table below. Member States from other regions are advised to contact the appropriate RIR for similar statistics.

Country	Organizations with IPv4 addresses from RIR pools
Afghanistan	10
American Samoa	1
Australia	1028
Bangladesh	80
Bhutan	4
British Indian Ocean Territory	1
Brunei Darussalam	4
Cambodia	31
China	278
Cook Islands	1
Christmas Island	1
Fiji	9
French Polynesia	1
Guam	7
Hong Kong	163
India	260
Indonesia	216
Japan	345
Kiribati	2
Korea	158
Lao People's Democratic Republic	5
Macao	4
Malaysia	63
Maldives	4
Marshall Islands	1
Micronesia	1
Mongolia	24
Myanmar	2
Nauru	1
Nepal	18
New Caledonia	6
New Zealand	171
Niue	1
Norfolk Island	2
Northern Mariana Islands	1
Pakistan	57
Palau	1

Country	Organizations with IPv4 addresses from RIR pools
Papua New Guinea	7
Philippines	94
Samoa	4
Singapore	94
Solomon Islands	1
Sri Lanka	13
Taiwan	102
Thailand	77
Tonga	2
Tuvalu	1
Vanuatu	2
Viet Nam	45

4) What is the number (absolute number, for example 100) of organizations in your country that currently have been allocated an IPv6 addresses block from one of the Regional Internet Registries (RIRs)?

Each RIR maintains data on the number of current account holders with address space. To assist Member States complete the TSB questionnaire, APNIC invites Member States from the Asia Pacific region to use the data on Asia Pacific economies summarized in the table below. Member States from other regions are advised to contact the appropriate RIR for similar statistics.

Economy	Organizations with IPv6 addresses from RIR pools
Australia	56
Bangladesh	8
Brunei Darussalam	1
Bhutan	1
China	24
Fiji	2
Hong Kong	19
Indonesia	26
India	19
Japan	128
Korea	49
Sri Lanka	4
Macao	2
Malaysia	18
Nepal	1
New Zealand	35
Papua New Guinea	1
Philippines	15
Pakistan	7
Palau	1
Singapore	17
Thailand	18
Taiwan	30
Viet Nam	26

5) What would you expect your requirements to be in terms of the number (absolute number, for example 10'000) of IPv4 addresses in your country in the future?

The data published by the RIRs enables anyone to make projections of future address consumption based on past trends in address consumption. APNIC invites Member States to use the data summarized in the table below, which shows trends in address space consumption on a per-country basis over the past four years.

Notes about the data below:

- APNIC also suggests that, as Internet penetration rates have been increasing more rapidly in the past few years, Member States should consider placing greater weight on the trends for the last year or two, rather than earlier data trends.
- For economies that have experienced a change from no IPv4 addresses in 2007 to having IPv6 addresses in 2008, it is not possible to calculate a percentage increase. In such cases, the table below shows "NA" (not applicable).

Trends in IPv4 allocations, 2005-2008					
Economy	Total address holdings				% increase 2007-2008
	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	
Afghanistan	32,768	38,912	61,440	63,744	3.75%
Aland Islands	0	4,096	4,096	4,096	0.00%
Albania	32,768	32,768	110,848	150,784	36.03%
Algeria	72,960	240,896	264,704	265,728	0.39%
American Samoa	4,096	4,096	4,096	4,096	0.00%
Andorra	16,384	24,576	24,576	24,576	0.00%
Angola	10,240	22,784	46,336	49,152	6.08%
Anguilla	2,048	4,096	4,096	4,096	0.00%
Antigua & Barbuda	32,768	36,864	47,104	47,104	0.00%
Argentina	3,066,624	3,884,288	5,181,184	6,941,952	33.98%
Armenia	86,016	98,304	107,296	145,952	36.03%
Aruba	16,384	18,432	18,432	18,432	0.00%
Australia	26,377,984	30,228,992	32,959,232	36,064,256	9.42%
Austria	5,485,984	6,042,592	6,704,352	7,010,272	4.56%
Azerbaijan	96,256	133,120	141,312	221,184	56.52%
Bahamas	45,056	57,344	57,344	67,584	17.86%
Bahrain	71,680	104,448	153,600	233,984	52.33%
Bangladesh	183,808	257,536	359,936	580,352	61.24%
Barbados	54,016	70,400	99,072	119,552	20.67%
Belarus	123,904	152,576	158,720	328,704	107.10%
Belgium	4,279,040	5,031,040	5,454,208	6,297,216	15.46%
Belize	25,088	33,280	49,664	49,664	0.00%
Benin	5,120	6,144	6,144	17,408	183.33%
Bermuda	69,120	69,120	79,360	80,384	1.29%
Bhutan	10,240	12,288	22,528	22,528	0.00%
Bolivia	267,520	318,720	343,296	398,592	16.11%

Trends in IPv4 allocations, 2005-2008					
Economy	Total address holdings				% increase 2007-2008
	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	
Bosnia & Herzegovina	122,880	155,648	280,576	378,880	35.04%
Botswana	1,024	3,072	6,144	72,960	1087.50%
Brazil	17,171,968	19,269,120	23,463,424	29,754,880	26.81%
British Indian Ocean Territory	1,024	3,072	3,072	3,072	0.00%
Brunei Darussalam	172,544	172,544	174,592	191,232	9.53%
Bulgaria	1,483,776	1,899,520	2,487,808	3,264,256	31.21%
Burkina Faso	13,056	13,056	13,056	22,272	70.59%
Burundi	2,048	2,304	2,304	2,304	0.00%
Cambodia	34,816	53,248	96,768	120,064	24.07%
Cameroon	10,496	36,096	53,760	58,880	9.52%
Canada	45,796,096	47,670,784	52,122,112	55,399,424	6.29%
Cape Verde	0	0	4,096	8,192	100.00%
Cayman Islands	22,528	22,528	27,648	31,744	14.81%
Central African Republic	0	2,048	3,072	3,328	8.33%
Chile	3,096,320	3,600,640	4,168,960	4,626,688	10.98%
China	74,349,056	97,991,168	135,282,944	181,778,176	34.37%
Colombia	1,108,992	1,805,312	3,097,856	4,154,880	34.12%
Congo	0	0	0	1,024	NA
Congo, Democratic Republic Of The	1,024	1,024	2,048	6,144	200.00%
Cook Islands	8,192	8,192	8,192	8,192	0.00%
Costa Rica	1,254,144	1,270,528	1,307,392	1,451,008	10.98%
Cote D'ivoire	16,384	40,960	73,984	100,608	35.99%
Croatia (Hrvatska)	445,024	646,752	952,416	1,546,336	62.36%
Cuba	91,136	97,280	101,376	105,472	4.04%
Cyprus	267,552	352,288	430,112	520,736	21.07%
Czech Republic	3,088,640	4,264,320	4,901,760	5,898,624	20.34%
Denmark	6,769,088	7,366,144	7,867,232	9,177,184	16.65%
Djibouti	4,096	4,096	4,096	4,096	0.00%
Dominican Republic	147,200	196,352	265,984	405,248	52.36%
Ecuador	267,008	344,320	553,216	735,488	32.95%
Egypt	1,238,784	1,382,400	2,138,880	2,423,552	13.31%
El Salvador	156,672	300,032	336,896	406,528	20.67%
Equatorial Guinea	0	0	2,048	2,048	0.00%
Eritrea	4,096	4,096	4,096	4,096	0.00%
Estonia	695,040	937,984	973,824	1,002,520	2.95%
Ethiopia	16,384	16,384	16,384	16,384	0.00%
Faroe Islands	20,480	33,792	33,792	33,792	0.00%
Fiji	88,832	90,880	91,392	110,080	20.45%
Finland	7,471,232	8,441,472	8,691,840	8,920,576	2.63%
France	57,798,784	70,816,672	84,190,240	84,813,760	0.74%
French Guiana	0	2,048	2,048	2,048	0.00%
French Polynesia	23,040	39,424	39,424	39,424	0.00%
Gabon	6,656	23,040	24,064	155,136	544.68%
Gambia	10,240	10,240	10,240	11,264	10.00%
Georgia	147,456	192,512	243,712	485,888	99.37%

Trends in IPv4 allocations, 2005-2008					
	Total address holdings				
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Germany	36,641,880	47,818,616	59,039,608	66,851,704	13.23%
Ghana	58,368	82,944	121,344	136,704	12.66%
Gibraltar	47,104	47,104	47,104	57,344	21.74%
Greece	1,750,272	2,344,704	3,124,992	3,735,808	19.55%
Greenland	16,384	16,384	16,384	16,384	0.00%
Grenada	256	256	256	256	0.00%
Guadeloupe	0	1,024	4,096	6,144	50.00%
Guam	51,456	67,840	73,984	82,176	11.07%
Guatemala	145,152	225,024	262,144	354,304	35.16%
Guernsey	0	0	2,048	4,096	100.00%
Guinea-Bissau	1,024	1,024	1,024	1,024	0.00%
Guyana	0	16,384	16,384	16,384	0.00%
Haiti	28,672	28,672	32,768	45,056	37.50%
Holy See (Vatican City State)	8,192	8,192	8,192	8,192	0.00%
Honduras	8,448	45,312	61,696	94,464	53.11%
Hong Kong	6,080,256	6,564,352	7,148,032	7,901,440	10.54%
Hungary	2,265,984	2,928,000	3,330,688	3,613,824	8.50%
Iceland	440,320	516,096	528,384	545,280	3.20%
India	5,975,808	8,202,752	13,810,944	18,047,488	30.68%
Indonesia	1,628,416	1,891,328	2,718,208	6,877,952	153.03%
Iran (Islamic Republic Of)	786,944	1,008,128	1,339,904	1,816,064	35.54%
Iraq	6,144	10,240	30,720	36,864	20.00%
Ireland	2,831,008	3,356,064	3,911,840	4,191,648	7.15%
Isle Of Man	0	0	6,144	16,384	166.67%
Israel	2,636,736	3,050,176	3,604,416	3,921,600	8.80%
Italy	17,721,440	18,516,416	23,613,632	29,462,464	24.77%
Jamaica	68,608	101,376	105,472	125,952	19.42%
Japan	142,736,640	151,128,064	158,272,000	168,335,872	6.36%
Jersey	0	0	2,048	6,400	212.50%
Jordan	154,880	169,216	220,928	290,560	31.52%
Kazakhstan	288,768	341,504	580,608	873,216	50.40%
Kenya	94,208	136,192	190,976	253,184	32.57%
Kiribati	1,024	3,072	3,072	3,072	0.00%
Korea, Republic Of	43,195,904	51,126,528	58,859,008	66,821,632	13.53%
Kuwait	285,696	433,920	529,920	772,352	45.75%
Kyrgyzstan	65,536	86,272	97,536	129,024	32.28%
Lao People's Democratic Republic	20,736	22,784	22,784	41,216	80.90%
Latvia	879,168	1,024,320	1,241,152	1,361,920	9.73%
Lebanon	116,736	182,272	221,440	302,080	36.42%
Lesotho	6,144	6,400	6,400	12,544	96.00%
Liberia ¹	0	0	0	0	0.00%

¹ Liberia received IPv4 address space in 2009, which is outside the time period used to assess growth rate in this table.

Trends in IPv4 allocations, 2005-2008					
	Total address holdings				
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Libyan Arab Jamahiriya	8,192	24,576	286,720	286,720	0.00%
Liechtenstein	49,184	53,280	53,280	53,792	0.96%
Lithuania	1,009,536	1,303,936	1,955,456	1,997,952	2.17%
Luxembourg	283,392	294,144	359,680	448,320	24.64%
Macau	144,640	144,640	146,688	163,072	11.17%
Macedonia, The Former Yugoslav Republic Of	143,360	194,560	277,248	455,680	64.36%
Madagascar	4,096	20,480	20,480	37,888	85.00%
Malawi	3,072	3,072	8,704	19,968	129.41%
Malaysia	2,532,864	2,785,280	3,275,776	4,122,624	25.85%
Maldives	10,752	12,800	20,992	37,376	78.05%
Mali	16,384	16,384	20,480	24,576	20.00%
Malta	273,408	283,648	392,192	476,160	21.41%
Marshall Islands	0	0	2,048	2,048	0.00%
Mauritania	8,192	8,192	8,192	24,576	200.00%
Mauritius	51,968	159,488	202,496	204,544	1.01%
Mexico	11,016,448	16,259,328	21,502,208	21,504,000	0.01%
Micronesia, Federated States Of	0	2,048	2,048	2,048	0.00%
Moldova, Republic Of	79,872	137,472	170,752	253,952	48.73%
Monaco	63,488	64,576	64,576	65,856	1.98%
Mongolia	47,104	79,872	98,560	109,056	10.65%
Montenegro	0	0	16,384	28,672	75.00%
Montserrat	0	0	256	1,280	400.00%
Morocco	299,264	569,600	585,984	618,752	5.59%
Mozambique	14,336	26,624	34,816	44,032	26.47%
Myanmar	12,288	12,288	12,288	12,288	0.00%
Namibia	30,464	39,680	39,936	115,712	189.74%
Nauru	8,192	8,192	8,192	8,192	0.00%
Nepal	49,664	51,712	88,576	135,680	53.18%
Netherlands	16,354,472	18,079,144	19,947,816	20,860,712	4.58%
Netherlands Antilles	45,056	118,784	200,704	207,872	3.57%
New Caledonia	34,816	38,912	43,008	63,488	47.62%
New Zealand	4,426,496	4,932,608	5,414,656	6,100,736	12.67%
Nicaragua	89,600	89,856	124,928	166,144	32.99%
Niger	0	0	0	9,216	NA
Nigeria	144,640	185,600	272,896	450,816	65.20%
Niue	1,024	1,024	1,024	1,024	0.00%
Norfolk Island	1,280	1,280	1,280	1,536	20.00%
Northern Mariana Islands	8,192	12,288	12,288	12,288	0.00%
Norway	22,376,992	22,966,560	23,416,352	23,981,872	2.42%
Oman	163,840	163,840	163,840	163,840	0.00%
Pakistan	345,600	440,832	668,672	1,372,416	105.25%
Palau	4,096	4,096	4,096	4,096	0.00%
Palestinian Territory	174,080	241,664	241,664	245,760	1.69%
Panama	414,464	816,384	905,216	1,113,856	23.05%
Papua New Guinea	19,200	21,248	34,560	38,656	11.85%

Trends in IPv4 allocations, 2005-2008					
	Total address holdings				
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Paraguay	47,104	63,488	69,632	135,168	94.12%
Peru	679,424	970,496	1,253,120	1,584,896	26.48%
Philippines	1,159,424	2,132,992	2,418,944	3,051,776	26.16%
Poland	7,420,768	10,171,336	12,214,248	13,466,728	10.25%
Portugal	2,573,888	3,233,856	3,515,712	4,170,848	18.63%
Puerto Rico	467,200	532,736	609,536	684,288	12.26%
Qatar	176,128	241,664	372,736	374,784	0.55%
Reunion	0	0	0	32,768	NA
Romania	3,820,672	4,591,488	6,703,232	8,183,296	22.08%
Russian Federation	10,806,152	13,764,360	16,945,544	23,116,872	36.42%
Rwanda	8,192	12,288	77,824	154,624	98.68%
Saint Kitts & Nevis	1,024	2,048	3,072	5,120	66.67%
Saint Lucia	256	256	256	256	0.00%
Saint Vincent & The Grenadines	0	0	2,048	6,144	200.00%
Samoa	8,448	8,448	11,520	12,544	8.89%
San Marino	8,192	16,384	20,480	22,528	10.00%
Saudi Arabia	991,232	1,374,720	1,658,880	2,168,320	30.71%
Senegal	2,304	2,304	2,304	2,304	0.00%
Serbia	0	16,384	53,504	86,272	61.24%
Serbia and Montenegro	409,856	615,168	757,760	964,096	27.23%
Seychelles	3,072	7,168	12,288	16,384	33.33%
Sierra Leone	0	12,288	13,312	14,336	7.69%
Singapore	2,839,296	3,071,488	3,982,080	4,365,568	9.63%
Slovakia (Slovak Republic)	1,025,024	1,197,312	1,374,208	1,461,760	6.37%
Slovenia	704,896	968,064	1,058,176	1,226,240	15.88%
Solomon Islands	8,704	8,704	8,704	8,704	0.00%
South Africa	8,304,640	9,506,048	13,553,664	13,991,680	3.23%
Spain	16,172,320	18,548,256	20,357,792	21,659,040	6.39%
Sri Lanka	147,456	231,424	290,816	305,664	5.11%
St. Pierre & Miquelon ²	0	0	0	0	0.00%
Sudan	40,960	57,344	66,560	66,560	0.00%
Suriname	7,168	11,264	19,456	44,032	126.32%
Swaziland	4,864	13,056	21,248	25,344	19.28%
Sweden	12,350,080	15,228,960	17,289,312	17,749,920	2.66%
Switzerland	23,646,688	24,145,120	24,546,496	24,705,000	0.65%
Syrian Arab Republic	25,600	115,712	128,000	177,152	38.40%
Taiwan	16,248,320	18,126,592	19,800,832	23,977,216	21.09%
Tajikistan	20,480	20,480	28,672	34,816	21.43%
Tanzania, United Republic Of	31,744	54,272	70,144	75,520	7.66%
Thailand	2,826,240	3,305,472	3,911,936	4,431,872	13.29%
Togo	4,096	12,288	12,288	12,288	0.00%

² St. Pierre & Miquelon received IPv4 address space in 2009, which is outside the time period used to assess growth rate in this table.

Trends in IPv4 allocations, 2005-2008					
	Total address holdings				
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Tonga	256	4,352	4,352	4,352	0.00%
Trinidad & Tobago	66,304	137,984	242,432	258,816	6.76%
Tunisia	106,752	631,040	631,040	632,064	0.16%
Turkey	5,577,408	5,717,952	8,338,112	10,028,224	20.27%
Turkmenistan	4,096	4,096	4,096	8,192	100.00%
Turks & Caicos Islands	0	0	4,096	4,096	0.00%
Tuvalu	8,192	8,192	8,192	8,192	0.00%
Uganda	73,728	80,896	114,944	124,160	8.02%
Ukraine	1,333,184	2,006,464	2,843,200	4,949,568	74.08%
United Arab Emirates	963,840	1,228,032	1,492,224	2,286,848	53.25%
United Kingdom	73,117,496	76,967,256	83,377,656	86,434,648	3.67%
United States	1,258,942,720	1,303,634,688	1,352,182,528	1,406,022,912	3.98%
United States Minor Outlying Islands	0	512	512	512	0.00%
Uruguay	222,976	366,848	441,088	663,808	50.49%
Uzbekistan	79,872	120,832	129,024	164,096	27.18%
Vanuatu	4,096	4,096	4,352	6,400	47.06%
Venezuela	1,794,048	2,417,152	3,551,744	3,635,712	2.36%
Viet Nam	772,352	823,040	3,839,232	6,624,000	72.53%
Virgin Islands (British)	1,024	1,024	1,024	1,024	0.00%
Virgin Islands (U.S.)	76,800	76,800	82,944	87,040	4.94%
Wallis & Futuna Islands	0	0	2,048	2,048	0.00%
Yemen	16,384	24,576	24,576	24,576	0.00%
Zambia	10,240	12,544	13,568	35,072	158.49%
Zimbabwe	14,592	22,784	29,184	37,376	28.07%

6) What would you expect your requirements to be in terms of the number (absolute number, for example 10'000) of IPv6 addresses in your country in the future?

The data published by the RIRs enables anyone to make projections of future address consumption based on past trends in address consumption. APNIC invites Member States to use the data summarized in the table below, which shows trends in address space consumption on a per-country basis over the past four years.

Notes about the data below:

- APNIC notes that as IPv6 adoption has historically been slow, Member States may wish to base their projections on a synthesis of both IPv6 and IPv4 consumption trends.
- For economies that have experienced a change from no IPv6 addresses in 2007 to having IPv6 addresses in 2008, it is not possible to calculate a percentage increase. In such cases, the table below shows “NA” (not applicable).

Trends in IPv6 allocations, 2005-2008					
	Total address holdings (measured in units of /64)				
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Algeria	0	0	0	4,294,967,296	NA
Andorra	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Angola	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Argentina	120,259,084,288	128,849,018,880	146,028,953,600	163,208,822,784	11.76%
Armenia	8,589,934,592	8,589,934,592	8,589,934,592	12,884,901,888	50.00%
Australia	17,635,672,981,504	17,635,673,047,040	35,257,923,862,528	35,361,003,405,312	0.29%
Austria	84,825,669,632	97,710,571,520	110,595,473,408	166,430,048,256	50.49%
Bahamas	0	0	4,294,967,296	4,294,967,296	0.00%
Bahrain	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Bangladesh	0	4,294,967,296	17,179,869,184	25,769,869,312	50.00%
Belgium	23,085,580,288	35,970,482,176	53,150,351,360	83,215,253,504	56.57%
Benin	0	0	4,294,967,296	4,294,967,296	0.00%
Bermuda	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Bhutan	0	0	0	4,294,967,296	NA
Bolivia	4,294,967,296	8,589,934,592	8,589,934,592	8,589,934,592	0.00%
Bosnia & Herzegovina	0	0	4,294,967,296	8,589,934,592	100.00%
Brazil	0	0	0	282,299,610,431,488	NA
Bulgaria	12,884,967,424	12,884,967,424	21,474,902,016	42,949,738,496	100.00%
Cameroon	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Canada	81,604,378,624	98,785,034,240	154,621,247,488	201,867,526,144	30.56%
Chile	12,884,901,888	12,884,901,888	30,064,771,072	38,654,771,200	28.57%
China	73,014,509,568	111,669,280,768	133,144,117,248	244,813,266,944	83.87%
Colombia	0	8,589,934,592	21,474,902,016	34,359,803,904	60.00%
Costa Rica	4,294,967,296	4,294,967,296	8,589,934,592	25,769,803,776	200.00%
Cote D'ivoire	0	0	4,294,967,296	4,294,967,296	0.00%
Croatia (Hrvatska)	8,590,000,128	8,590,000,128	8,590,000,128	17,179,934,720	100.00%
Cuba	12,884,901,888	12,884,901,888	12,884,901,888	17,179,869,184	33.33%

Trends in IPv6 allocations, 2005-2008					
	Total address holdings (measured in units of /64)				
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Cyprus	8,589,934,592	8,589,934,592	8,589,934,592	17,179,869,184	100.00%
Czech Republic	53,150,285,824	61,740,285,952	91,805,057,024	169,114,468,352	84.21%
Czechoslovakia	12,884,901,888	12,884,901,888	12,884,901,888	17,179,869,184	33.33%
Denmark	27,380,482,048	27,380,482,048	48,855,318,528	87,510,024,192	79.12%
Djibouti	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Dominican Republic	12,884,901,888	12,884,901,888	12,884,901,888	12,884,901,888	0.00%
Ecuador	0	4,294,967,296	8,589,934,592	12,884,967,424	50.00%
Egypt	4,294,967,296	12,884,901,888	17,179,869,184	21,474,836,480	25.00%
El Salvador	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Estonia	18,790,547,456	31,675,514,880	31,675,514,880	35,970,482,176	13.56%
Fiji	0	0	4,295,032,832	4,295,032,832	0.00%
Finland	49,392,254,976	53,687,222,272	53,687,222,272	66,572,124,160	24.00%
France	35,300,873,273,344	35,335,233,011,712	35,369,592,750,080	35,721,780,199,424	1.00%
Germany	39,921,721,344,000	41,068,477,743,104	41,446,434,996,224	41,742,787,805,184	0.72%
Ghana	0	0	4,294,967,296	4,294,967,296	0.00%
Gibraltar	0	0	0	4,294,967,296	NA
Greece	1,610,612,736	1,610,612,736	10,200,547,328	18,790,547,456	84.21%
Guatemala	4,294,967,296	8,589,934,592	17,179,869,184	17,179,869,184	0.00%
Haiti	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Holy See (Vatican City State)	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Hong Kong	21,474,836,481	30,064,771,073	38,654,705,665	64,424,574,977	66.67%
Hungary	10,200,612,864	18,790,547,456	27,380,482,048	53,150,285,824	94.12%
Iceland	4,294,967,296	4,294,967,296	12,884,901,888	25,769,803,776	100.00%
India	47,244,640,256	60,129,542,144	60,129,607,680	85,899,411,456	42.86%
Indonesia	25,769,934,848	51,539,738,624	68,719,607,808	85,899,542,528	25.00%
Iran (Islamic Republic Of)	25,769,803,776	25,769,803,776	34,359,738,368	47,244,640,256	37.50%
Ireland	24,696,127,488	54,760,898,560	71,940,767,744	97,710,571,520	35.82%
Isle of Man	0	0	4,294,967,296	4,294,967,296	0.00%
Israel	17,179,869,184	17,179,869,184	17,179,934,720	21,474,902,016	25.00%
Italy	120,796,151,808	17,717,277,163,520	17,743,046,967,296	17,837,536,247,808	0.53%
Japan	31,204,548,083,714	31,217,432,985,602	35,636,954,398,722	35,735,738,974,210	0.28%
Kenya	0	4,294,967,296	4,295,032,832	17,180,000,256	300.00%
Korea, Republic Of	17,802,639,507,457	22,269,405,495,297	22,295,175,299,073	22,325,240,070,145	0.13%
Kyrgyzstan	0	0	0	4,294,967,296	NA
Latvia	4,294,967,296	4,294,967,296	12,884,901,888	21,474,836,480	66.67%
Liechtenstein	0	0	0	8,589,934,592	NA
Lithuania	5,905,580,032	5,905,580,032	5,905,580,032	10,200,612,864	72.73%
Luxembourg	18,790,547,456	18,790,547,456	27,380,482,048	48,855,318,528	78.43%
Macao	8,589,934,592	8,589,934,592	8,589,934,592	8,589,934,592	0.00%
Macedonia, The Former Yugoslav Republic Of	0	0	4,294,967,296	4,294,967,296	0.00%
Madagascar	0	0	0	4,294,967,296	NA
Malawi	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%

Trends in IPv6 allocations, 2005-2008					
	Total address holdings (measured in units of /64)				
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Malaysia	34,359,738,368	47,244,640,256	60,129,542,144	73,014,509,568	21.43%
Mali	0	0	4,294,967,296	4,294,967,296	0.00%
Malta	4,294,967,296	12,884,901,888	12,884,901,888	12,884,901,888	0.00%
Mauritius	0	8,589,934,592	8,589,934,592	17,179,869,184	100.00%
Mexico	38,654,705,664	47,244,640,256	47,244,640,256	55,834,574,848	18.18%
Moldova, Republic Of	0	0	4,294,967,296	4,294,967,296	0.00%
Monaco	4,294,967,296	4,294,967,296	4,294,967,296	8,589,934,592	100.00%
Morocco	4,294,967,296	8,589,934,592	8,589,934,592	8,589,934,592	0.00%
Mozambique	0	0	0	4,294,967,296	NA
Namibia	0	0	0	65,536	NA
Nepal	0	0	0	4,294,967,296	NA
Netherlands	2,385,854,595,072	2,394,444,529,664	2,437,394,202,624	2,583,423,156,224	5.99%
Netherlands Antilles	0	4,294,967,296	4,294,967,296	12,885,098,496	200.00%
New Zealand	34,359,869,440	55,834,705,920	73,014,837,248	124,554,575,872	70.59%
Nicaragua	4,294,967,296	4,294,967,296	4,294,967,296	8,589,934,592	100.00%
Nigeria	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Norway	1,139,777,011,712	1,144,071,979,008	1,165,546,815,488	1,234,266,357,760	5.90%
Oman	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Pakistan	4,294,967,296	17,179,869,184	21,474,836,480	30,064,771,072	40.00%
Palau	0	0	0	4,294,967,296	NA
Panama	4,294,967,296	12,884,901,888	12,884,901,888	12,884,901,888	0.00%
Papua New Guinea	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Paraguay	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Peru	21,474,836,480	21,474,836,480	25,769,803,776	30,064,771,072	16.67%
Philippines	21,474,836,480	30,064,771,072	34,359,738,368	51,539,607,552	50.00%
Poland	84,825,604,096	8,889,508,560,896	8,966,817,972,224	9,001,177,776,128	0.38%
Portugal	35,970,482,176	44,560,416,768	44,560,416,768	61,740,285,952	38.55%
Puerto Rico	0	65,536	65,536	65,536	0.00%
Qatar	4,294,967,296	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Romania	21,474,836,480	21,474,836,480	21,474,836,480	34,359,738,368	60.00%
Russian Federation	24,696,127,488	33,286,062,080	80,530,702,336	222,264,623,104	176.00%
Rwanda	0	0	4,294,967,296	4,294,967,296	0.00%
Saudi Arabia	8,589,934,592	8,589,934,592	8,589,934,592	8,589,934,592	0.00%
Senegal	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Serbia	0	0	0	4,294,967,296	NA
Seychelles	0	0	4,294,967,296	4,294,967,296	0.00%
Singapore	25,769,803,776	25,769,803,776	30,064,771,072	64,424,640,512	114.29%
Slovakia (Slovak Republic)	8,590,000,128	17,179,934,720	25,769,934,848	34,359,869,440	33.33%
Slovenia	12,884,901,888	17,179,869,184	17,179,869,184	38,654,771,200	125.00%
South Africa	8,589,934,592	30,064,771,072	55,834,836,992	64,425,361,408	15.39%
Spain	61,740,285,952	83,215,122,432	83,215,122,432	108,984,926,208	30.97%
Sri Lanka	0	0	4,294,967,296	8,590,000,128	100.00%
Sudan	0	4,294,967,296	4,294,967,296	4,294,967,296	0.00%
Swaziland	0	0	0	4,294,967,296	NA

Trends in IPv6 allocations, 2005-2008					
Total address holdings (measured in units of /64)					
Economy	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	% increase 2007-2008
Sweden	71,940,898,816	84,825,931,776	114,890,768,384	729,071,157,248	534.58%
Switzerland	233,539,043,328	255,013,945,344	280,783,749,120	418,222,702,592	48.95%
Taiwan	485,331,369,984	9,637,906,677,760	9,917,079,552,000	9,917,079,552,000	0.00%
Tanzania, United Republic Of	0	8,589,934,592	8,590,000,128	12,884,967,424	50.00%
Thailand	30,064,771,072	38,654,705,664	55,834,640,384	68,719,607,808	23.08%
Trinidad & Tobago	0	4,294,967,296	8,589,934,592	8,589,934,592	0.00%
Tunisia	0	0	0	4,294,967,296	NA
Turkey	12,884,901,888	17,179,869,184	30,064,771,072	73,014,444,032	142.86%
Ukraine	0	4,294,967,296	8,589,934,592	51,539,607,552	500.00%
United Arab Emirates	4,294,967,296	4,294,967,296	4,294,967,296	12,884,901,888	200.00%
United Kingdom	362,925,326,337	423,054,868,481	4,932,770,660,353	5,091,684,450,305	3.22%
United States	627,068,370,944	837,523,734,528	1,378,733,654,016	63,561,341,272,064	4510.12%
Uruguay	8,589,934,592	8,589,934,592	77,309,411,328	81,604,640,768	5.56%
Venezuela	17,179,869,184	25,769,803,776	55,834,574,848	60,129,542,144	7.69%
Viet Nam	8,590,000,128	8,590,000,128	17,179,934,720	42,950,787,072	150.01%
Zimbabwe	0	0	4,294,967,296	4,294,967,296	0.00%

7) What, if any, facilities are present in your country, to encourage IPv6 deployment?

APNIC finds this to be an ambiguous question that is therefore difficult to answer. APNIC invites Member States to ask TSB to clarify what it intends Member States to interpret as “facilities”.

8) What would you expect requirements to be in your country in terms of equipment necessary for the transition from IPv4 to IPv6?

APNIC would like to clarify that because the transition from IPv4 to IPv6 will take up to 20 years to complete, there will be a long period where both IPv4-only and IPv4/IPv6 networks will continue to exist. Timelines for the migration to IPv6 will vary significantly depending on the strategy network operators in each country find most appropriate for their circumstances. Therefore, there will be a continuous scale of requirements, from networks that do not need to make any equipment changes now, to networks choosing to make those changes now, to networks that can simply buy IPv6-compatible equipment as part of the natural replacement cycle.

9) What would you expect the cost to be of that equipment?

As noted above, this will be a very difficult question for Member States to answer as it depends on the strategy, or combination of strategies, best suited for the networks in their country.

10) Do you consider that you have adequate information on IP address allocation and registration policies and mechanisms?

All RIRs provide free and unfettered access to all IP address allocation and registration policies from their websites. Documents are also often available in multiple languages. The RIRs have a long and consistent history of engaging governments to help them understand how IP address management systems work and how stakeholders can participate in the open and transparent policy making processes that develop the allocation policies. APNIC invites Member States to visit the RIR websites linked from the NRO website at:

<http://www.nro.net>

APNIC also invites Member States to make use of the NRO as a single point of contact for all five RIRs and to contact the NRO if they are unsure which RIR is allocating address space to networks in their economy.

nro@nro.net

11) If you answered “no” to question 10 above, indicate what additional information would be useful for you:

Given the transparency of the RIR system and the RIRs’ engagement with Member States through not only the RIR system, but through other forums such as the ITU, the IGF and the OECD, the RIRs are confident that any Member State with a genuine interest in IP address distribution has ample opportunity to find any information it needs on allocation, registration, and associated IP addressing issues.

12) What are, to the best of your knowledge, the real or perceived barriers to IPv6 uptake, (for example, institutional barriers, cost of equipment, cost of training, current allocation policy, etc)?

In 2008, ARIN conducted a worldwide survey on IPv6 that asked a very similar question. The responses received to that survey have been summarized below. The full survey by ARIN and CAIDA can be found at:

http://www.getipv6.info/index.php/IPv6_Penetration_Survey_Results

ARIN and CAIDA IPv6 2008 survey question: Comment on what has been (or will be) the biggest hurdle(s) to your organization deploying IPv6	
Barrier	% response
Dual support for IPv4 and IPv6 at the application level	49.4%
Cost of new hardware	27.0%
Vendor support – routers	26.8%
Vendor support – firewalls	23.5%
Vendor support – OS	14.4%
Vendor support - host applications	16.7%
Vendor support - server applications	21.9%
Problems with legacy network system	25.2%
Problems with legacy applications	28.1%
Lack of support from transit providers	36.0%
Lack of support from end users	29.6%
Multi-home problems	14.7%
Lack of IPv6 expertise	44.8%
Other	8.6%

13) What specific information would you expect to find on the ITU web site that will be created pursuant to WTSA Resolution 64?

It would be useful for the ITU website to contain links to existing good sources of IPv6 information, such as RIR and ISOC websites. Links to IPv6 resources in languages other than English would also be valuable. The ITU website should also contain links to information on IPv6 activities by country, to assist Member States benchmark activities that are conducive to IPv6 adoption.

14) If you have any additional comments, please write them in below, or in an additional page.

In January and February this year, APNIC conducted a survey of IPv6 readiness of organizations in the Asia Pacific. Member States from the Asia Pacific may find it useful to review the results on pages 36-45 of:

<http://www.apnic.net/survey/2009/2009-survey-report.pdf>

ISOC has also conducted a recent survey on IPv6 deployment experiences, the results of which are documented in this summary:

<http://www.isoc.org/pubs/2009-IPv6-OrgMember-Report.pdf>