

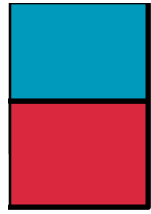


Internet Routing Table Analysis Update

Philip Smith

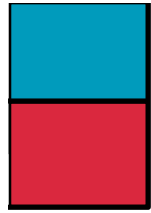
pfs@cisco.com

**IEPG49, San Diego,
December 2000**



Internet Routing Table Analysis

- **New:**
 - Unassigned but announced ASNs flagged**
 - /24 announcements from each /8 block**
- **Full Stats on APNIC web page**
<http://www.apnic.net/stats/bgp>

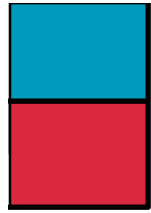


9th December summary

Global summary

Routing Report 9 December, 2000

BGP routing table entries examined	99034
Origin ASes present in the Internet Routing Table	9333
Origin ASes announcing only one prefix	3295
Transit ASes present in the Internet Routing Table	1252
Average AS path length visible in the Internet Routing Table	5.3
Max AS path length visible	18
Illegal AS announcements present in the Routing Table	15
Non-routable prefixes present in the Routing Table	0
Prefixes being announced from the IANA Reserved Address blocks	4
Number of addresses announced to Internet	1218748190
Equivalent to 72 /8s, 164 /16s and 159 /24s	
Percentage of available address space announced	32.9
Percentage of allocated address space announced	64.5
Percentage of available address space allocated	51.0

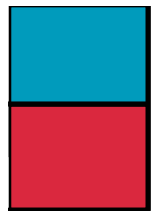


9th December summary

APNIC region summary

APNIC region Report 9 December, 2000

Prefixes being announced by APNIC Region ASes	16851
Prefixes being announced from the APNIC address blocks	15326
APNIC Region origin ASes present in the Internet Routing Table	1087
APNIC Region origin ASes announcing only one prefix	384
APNIC Region transit ASes present in the Internet Routing Table	177
Average APNIC Region AS path length visible	5.2
Max APNIC Region AS path length visible	14
Number of APNIC addresses announced to Internet	61921791
Equivalent to 3 /8s, 176 /16s and 217 /24s	
Percentage of available APNIC address space announced	72.9
APNIC AS Blocks	4608 - 4864, 7467 - 7722, 9216 - 10239, 17408 - 18431
APNIC Address Blocks	61/8, 202/7 and 210/7



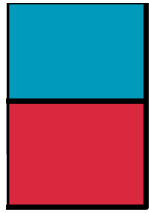
9th December summary

ARIN region summary

ARIN region Report 9 December, 2000

Prefixes being announced by ARIN Region ASes	67262
Prefixes being announced from the ARIN address blocks	45840
ARIN Region origin ASes present in the Internet Routing Table	5705
ARIN Region origin ASes announcing only one prefix	1653
ARIN Region transit ASes present in the Internet Routing Table	608
Average ARIN Region AS path length visible	5.1
Max ARIN Region AS path length visible	15
Number of ARIN addresses announced to Internet	170208661
Equivalent to 10 /8s, 37 /16s and 45 /24s	
Percentage of available ARIN address space announced	78.0

ARIN AS Blocks	1 - 1876, 1902 - 2042, 2044 - 2046, 2048 - 2106
	2138 - 2584, 2615 - 2772, 2823 - 2829, 2880 - 3153
	3354 - 4607, 4865 - 5119, 5632 - 6655, 6912 - 7466
	7723 - 8191, 10240 - 12287, 13312 - 15359
	16384 - 17407, 18432 - 19455
ARIN Address Blocks	63/8, 64/7, 66/8, 199/8, 200/8, 204/6, 208/7
	and 216/8

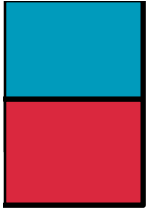


9th December summary

RIPE NCC region summary

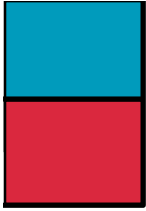
RIPE NCC region Report 9 December, 2000

Prefixes being announced by RIPE Region ASes	14906
Prefixes being announced from the RIPE address blocks	11772
RIPE Region origin ASes present in the Internet Routing Table	2541
RIPE Region origin ASes announcing only one prefix	1258
RIPE Region transit ASes present in the Internet Routing Table	466
Average RIPE Region AS path length visible	5.9
Max RIPE Region AS path length visible	18
Number of RIPE addresses announced to Internet	102566538
Equivalent to 6 /8s, 29 /16s and 10 /24s	
Percentage of available RIPE address space announced	87.3
RIPE AS Blocks	1877 - 1901, 2042, 2047, 2107 - 2136, 2585 - 2614 2773 - 2822, 2830 - 2879, 3154 - 3353, 5377 - 5631 6656 - 6911, 8192 - 9215, 12288 - 13311, 15360 - 16383
RIPE Address Blocks	62/8, 193/8, 194/7, 212/7 and 217/8



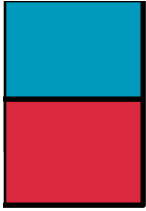
APNIC Region per AS prefix count summary

ASN	No of nets	/19 equiv	Description
1221	2154	1191	Telstra
9768	1498	75	Korea Telecom
2563	460	63	Seoul National University
2764	428	127	connect.com.au pty ltd
2907	367	908	SINET Japan
4740	351	73	Ozemail
4755	326	108	VSNL India
7657	316	16	The Internet Group Limited
4618	210	56	Internet Thailand
9269	207	23	Hong Kong CTI
703	193	146	UUNET Technologies, Inc.
4763	190	43	Telstra New Zealand
7545	178	6	TPG Internet Pty Ltd
7474	176	83	Optus Communications
4433	158	59	Access One Pty Ltd
4766	151	496	KORnet Powered BY Korea Telec
4134	147	426	Data Communications Bureau
4786	138	8	NetConnect Communications Pty
7496	128	10	Power Up
9797	128	10	Asia Online Australia



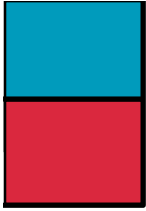
ARIN Region per AS prefix count summary

ASN	No of nets	/19 equiv	Description
701	2528	3461	UUNET Technologies, Inc.
705	1434	63	UUNET Technologies, Inc.
1	1015	4556	BBN Planet
7018	898	3025	AT&T
1239	717	1606	Sprint ICM-Inria
7046	680	514	UUNET Technologies, Inc.
2914	661	1298	Verio, Inc.
2548	637	564	Digital Express Group, Inc.
174	591	2754	PSINet Inc.
209	567	566	Qwest
3561	556	1368	Cable & Wireless USA
6082	538	66	Management Analysis, Incorpor
3549	498	433	Frontier GlobalCenter
3908	457	289	Supernet, Inc.
271	442	312	BCnet Backbone
3602	438	80	Sprint Canada
4293	437	55	Cable & Wireless USA
690	341	27	Merit Network
816	340	114	UUNET Canada4
8151	331	183	UniNet S.A. de C.V.



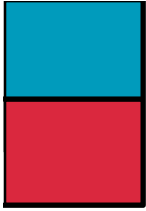
RIPE NCC Region per AS prefix count summary

ASN	No of nets	/19 equiv	Description
3301	395	307	TeliaNet Sweden
1257	336	258	Swipnet AB
702	304	425	UUNET Technologies, Inc.
1270	274	410	UUNET Germany
1849	209	316	PIPEX
3215	198	181	RAIN
719	190	154	LANLINK
5515	185	334	Sonera Finland
786	181	959	JANET IP Service
3320	159	457	Deutsche Telekom AG
1942	139	53	INRIA-Rocquencourt
517	138	146	Xlink
2856	132	384	BTnet UK Regional network
680	131	612	Deutschef Forschungsnetz
3303	125	277	Swisscom
2609	120	8	EUnet-TN
1275	106	535	DFN IP Service
1901	104	77	EUnet Austria
1267	97	987	IUnet S.p.A
1939	93	35	INRIA-Rocquencourt



Global per AS prefix count summary

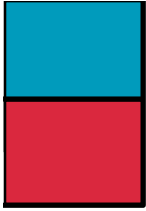
ASN	No of nets	/19 equiv	Description
701	2528	3461	UUNET Technologies, Inc.
1221	2154	1191	Telstra
9768	1498	75	Korea Telecom
705	1434	63	UUNET Technologies, Inc.
1	1015	4556	BBN Planet
7018	898	3025	AT&T
1239	717	1606	Sprint ICM-Inria
7046	680	514	UUNET Technologies, Inc.
2914	661	1298	Verio, Inc.
2548	637	564	Digital Express Group, Inc.
174	591	2754	PSINet Inc.
209	567	566	Qwest
3561	556	1368	Cable & Wireless USA
6082	538	66	Management Analysis, Incorpor
3549	498	433	Frontier GlobalCenter
2563	460	63	Seoul National University
3908	457	289	Supernet, Inc.
271	442	312	BCnet Backbone
3602	438	80	Sprint Canada
4293	437	55	Cable & Wireless USA



List of Illegal AS's

Bad AS	Designation	Network	Transit AS	Description
65501	PRIVATE	64.21.103.0/24	16890	Network Services, In
2027	UNALLOCATED	150.185.0.0/16	10530	Interpacket Group, I
2027	UNALLOCATED	150.185.128.0/18	8143	Publicom Corp.
2027	UNALLOCATED	150.186.0.0/16	10530	Interpacket Group, I
2027	UNALLOCATED	150.187.0.0/16	10530	Interpacket Group, I
2027	UNALLOCATED	150.188.0.0/16	10530	Interpacket Group, I
2027	UNALLOCATED	150.189.0.0/16	10530	Interpacket Group, I
1877	UNALLOCATED	192.108.196.0/24	1880	Stupi, house man's
1877	UNALLOCATED	192.108.209.0/24	1257	Swipnet AB
1877	UNALLOCATED	192.108.210.0/24	1257	Swipnet AB
1877	UNALLOCATED	192.108.214.0/24	1880	Stupi, house man's
5757	UNALLOCATED	192.239.13.0/24	701	UUNET Technologies,
64512	PRIVATE	202.61.84.0/24	4743	IPhil Communications
5757	UNALLOCATED	207.19.224.0/24	701	UUNET Technologies,
65535	PRIVATE	208.59.234.0/23	6079	Erol's Internet Serv

UUNET are aware of AS5757 and will resolve ASAP
RIPE NCC and Peter are aware of 1877 and will fix ASAP
ARIN are aware of AS2027 - no more news

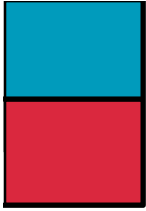


Advertised IANA Reserved Addresses

Network	Origin AS	Description
50.0.0.0/8	9487	Handong University
91.16.23.0/24	11770	Net56
105.200.136.0/30	9768	Korea Telecom
219.219.219.0/24	2563	Seoul National University

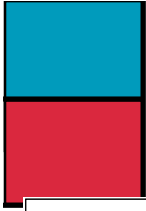
Number of prefixes announced by prefix length

/1:0	/2:0	/3:0	/4:0	/5:0	/6:0
/7:0	/8:23	/9:4	/10:5	/11:9	/12:32
/13:57	/14:188	/15:295	/16:6743	/17:990	/18:1965
/19:6148	/20:4208	/21:4146	/22:6282	/23:8277	/24:57128
/25:570	/26:976	/27:403	/28:154	/29:168	/30:157
/31:0	/32:106				



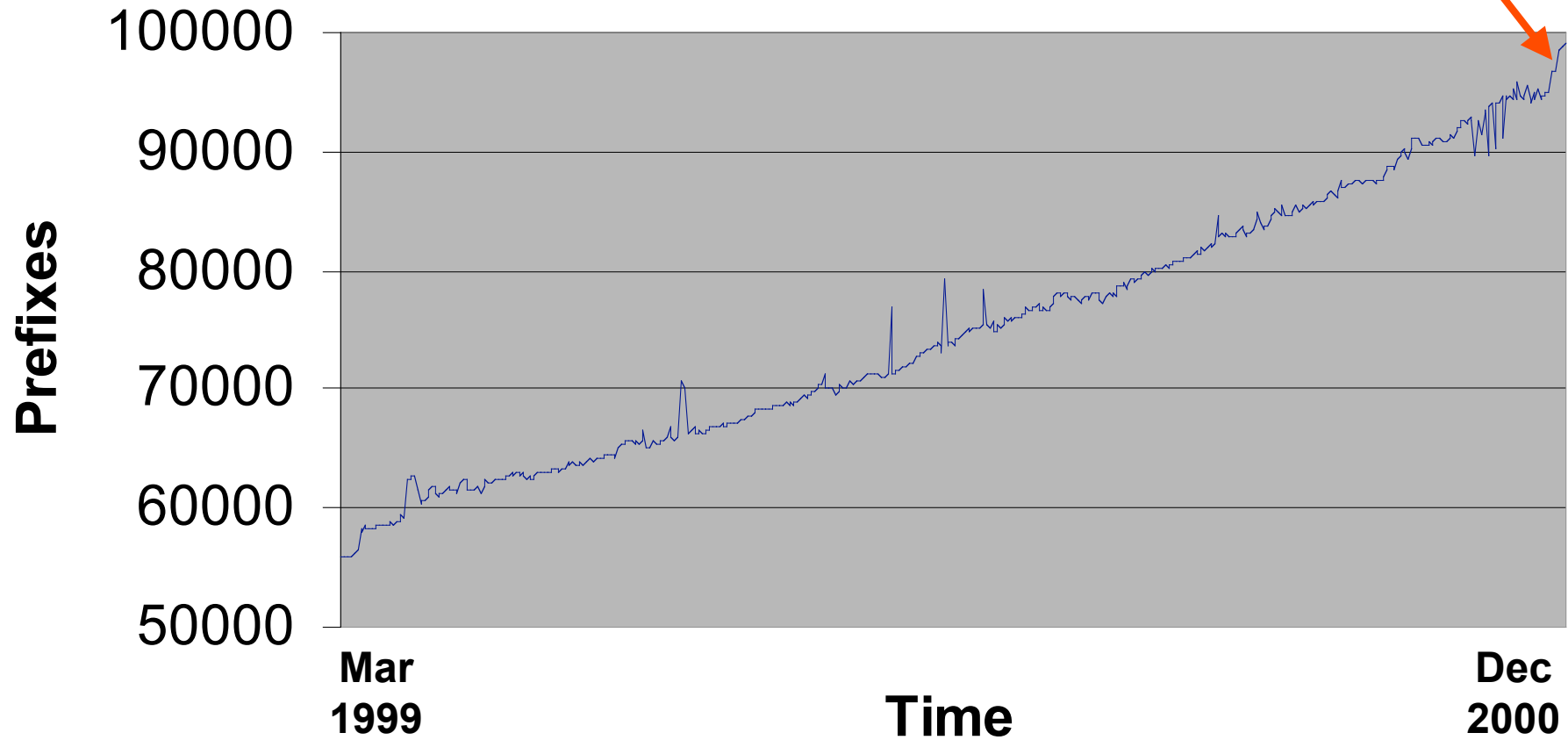
Number of /24s announced by per /8

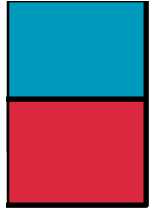
9:2	12:296	15:1	24:612	26:1	32:7
38:7	44:2	53:2	55:1	57:9	61:59
62:100	63:2395	64:1002	65:7	66:45	91:1
128:18	129:163	130:16	131:28	132:9	133:3
134:76	135:1	136:51	137:79	138:174	139:45
140:103	141:17	142:46	143:36	144:91	145:13
146:123	147:58	148:110	149:109	150:23	151:250
152:990	153:32	154:51	155:61	156:13	157:91
158:49	159:45	160:18	161:53	162:63	163:122
164:94	165:94	166:166	167:75	168:57	169:29
170:179	171:2	192:5321	193:1895	194:2003	195:854
196:359	198:3668	199:3402	200:1701	202:2469	203:5292
204:3507	205:2395	206:2734	207:2686	208:2765	209:3168
210:660	211:200	212:704	213:255	214:6	215:11
216:2530	217:67	219:1			



BGP Table Growth

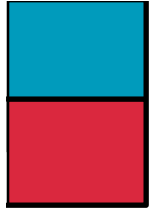
Telstra withdraw
203.0/10





What about...?

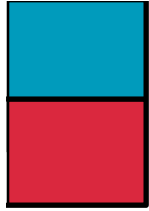
- **African Regional Registry**
- **Latin American and Caribbean Regional Registry**
- **Same statistics produced for those two future registry regions**
 - work out location of ASes and calculate accordingly**



African summary

Routing Report 9th December, 2000

Prefixes being announced by AFRINIC Region ASes:	753
Prefixes being announced from the AFRINIC address blocks:	0
AFRINIC Region origin ASes present in the Internet Routing Table:	43
AFRINIC Region origin ASes announcing only one prefix:	11
AFRINIC Region transit ASes present in the Internet Routing Table:	7
Average AFRINIC Region AS path length visible:	4.9
Max AFRINIC Region AS path length visible:	7
Number of AFRINIC addresses announced to Internet:	0
Equivalent to 0 /8s, 0 /16s and 0 /24s	
Percentage of available AFRINIC address space announced:	0.0

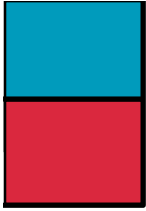


Central and South American summary

Routing Report 9th December, 2000

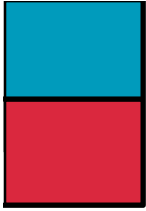
```
Prefixes being announced by LACNIC Region ASes:           4159
Prefixes being announced from the LACNIC address blocks:    0
LACNIC Region origin ASes present in the Internet Routing Table: 335
LACNIC Region origin ASes announcing only one prefix:      102
LACNIC Region transit ASes present in the Internet Routing Table: 56
Average LACNIC Region AS path length visible:              5.7
  Max LACNIC Region AS path length visible:                12
Number of LACNIC addresses announced to Internet:          0
  Equivalent to 0 /8s, 0 /16s and 0 /24s
  Percentage of available LACNIC address space announced:  0.0

LACNIC AS Blocks      none as yet
LACNIC Address Blocks none as yet
```



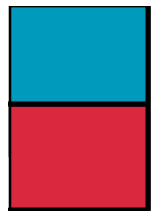
African per AS prefix count summary

ASN	No of nets	/19 equiv	Description
3741	282	361	The Internet Solution ZA
2018	81	100	Foundation for Research Devel
2905	74	128	The Internetworking Company o
5713	36	95	Telkom SA Ltd
5536	27	2	Internet Egypt Network
8094	23	3	POTCHEFSTROOM UNIVERSITY
15475	22	43	Nile Online
6083	18	17	Olivetti Africa
6089	16	3	Intertech Systems
8452	16	1	GEGA NET Autonomous System
7390	14	2	National Lan Suppliers
11569	14	12	satellite data networks
6127	13	13	Information and Decision Supp
6713	13	7	Itissalat Al-MAGHRIB
10798	11	0	Standard Bank of South Africa
6180	10	0	Network Information Services
8524	10	1	AUCEGYPT Autonomous System
10474	10	1	NetActive ISP
11845	10	1	Data Pro Business Online
8346	6	2	SONATEL-AS Autonomo



C+S American per AS prefix count summary

ASN	No of nets	/19 equiv	Description
8151	331	183	UniNet S.A. de C.V.
6503	158	93	AVANTEL, S.A.
6429	148	60	RdC Internet
10834	131	33	ADVANCE TELECOMUNICACIONES S.
4926	99	4	Telintar S.A.
13999	95	3	Mega Cable S.A. de C.V.
6471	89	44	ENTEL CHILE S.A.
2277	85	11	ECUANET - CORPORACION ECUATOR
1916	78	273	Fundacao de Amparo a Pesquisa
7984	77	20	Global One Colombia
6140	70	20	IMPSAT ARGENTINA, S.A.
7418	67	30	Provedora de Servicios de Co
11992	59	2	Integrated Systems
4270	57	15	Red de Interconexion Universi
7927	56	2	Global One Venezuela
3632	53	25	CONACYT Consejo Nacional de C
11415	51	18	IMPSAT Comunicacoes Ltda
13835	50	26	Impsat Argentina
7993	49	2	Global One Chile
11311	47	3	Sinectis S.A.



Final Slide...

- **What other stats would be interesting?**
- **Any comments?**