

MyIX Peering Forum

George Michaelson

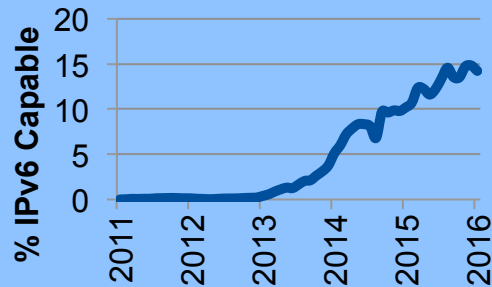
Byron Ellacott

APNIC Research

10,000 Ft view of Internet in Malaysia

- What do we see in public sources?
 - BGP
 - ROA data
 - IPv6 measurements
 - delegation statistical summaries
 - DNS measurements
- How are you guys doing, compared to others in your immediate region?

MY



30,858,985 people

20,829,814 users

67% penetration

219 ASes

296.22B GDP

IPv4

6,707,456 addresses

0.22 per head

159 in BGP

89% visible

IPv6

481,039 M addresses

15,588 per head

14% capability

56 in BGP

24% visible

ipv4

APNIC

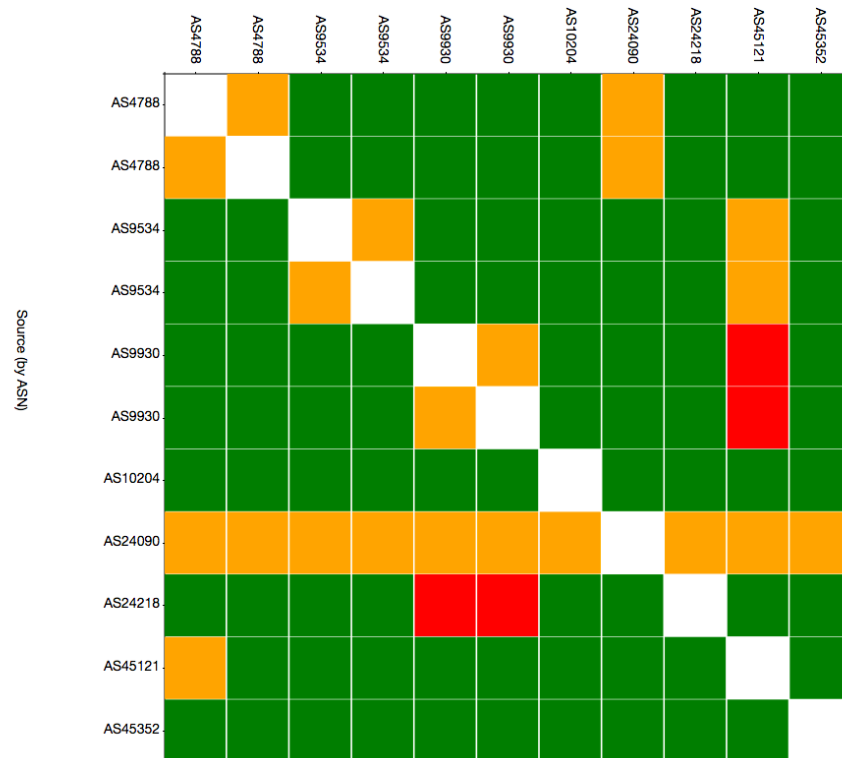


APNIC



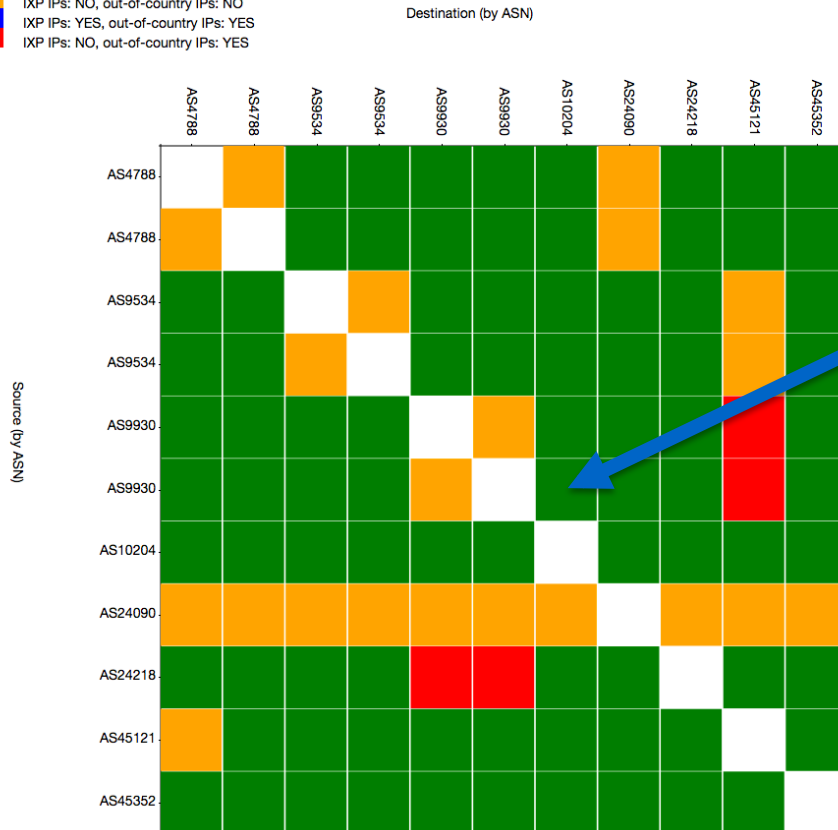
Network paths

■ IXP IPs: YES, out-of-country IPs: NO
■ IXP IPs: NO, out-of-country IPs: NO
■ IXP IPs: YES, out-of-country IPs: YES
■ IXP IPs: NO, out-of-country IPs: YES



Network paths

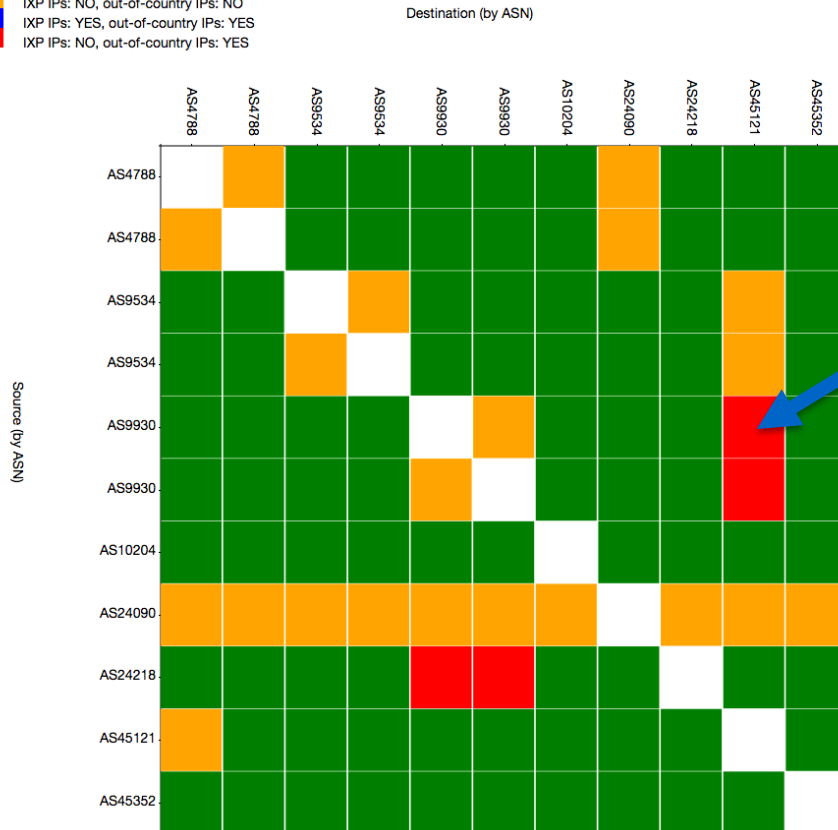
■ IXP IPs: YES, out-of-country IPs: NO
■ IXP IPs: NO, out-of-country IPs: NO
■ IXP IPs: YES, out-of-country IPs: YES
■ IXP IPs: NO, out-of-country IPs: YES



```
## msm_id:6108678 prb_id:17450 dst:203.115.224.250 ts:2016-10-02 09:30:29 -00:00
1 () 172.16.10.1 [0.376, 0.423, 0.577] ||
2 (AS9930) ag-01-glsfb.ni.time.net.my [2.635, 2.721, 3.011] ||
3 (AS9930) ae2-er-01-glsfb.ni.time.net.my [2.236, 2.25, 2.279] ||
4 (AS9930) 223.28.2.1 [5.363, 5.73, 5.765] ||
5 (AS9930) bundle-ether1-br-01-csfc.ni.time.net.my [4.146, 4.162, 4.381] ||
6 () ntt-arcnet.myix.gov.my [4.315, 4.382, 4.434] |Kuala Lumpur,Kuala Lumpur,MY|
7 (AS10204) cbj-br2-ge-1-0-7.arc.net.my [4.742, 4.766, 5.179] ||
8 (AS10204) cbj-br1-so-2-0-0.arc.net.my [4.792, 4.95, 5.108] ||
9 (AS10204) cbj-ar4-gi-1-0.arc.net.my [4.76, 4.848, 4.85] ||
10 (AS10204) 203.115.224.250 [5.005, 5.108, 5.111] ||
```

Network paths

■ IXP IPs: YES, out-of-country IPs: NO
■ IXP IPs: NO, out-of-country IPs: NO
■ IXP IPs: YES, out-of-country IPs: YES
■ IXP IPs: NO, out-of-country IPs: YES



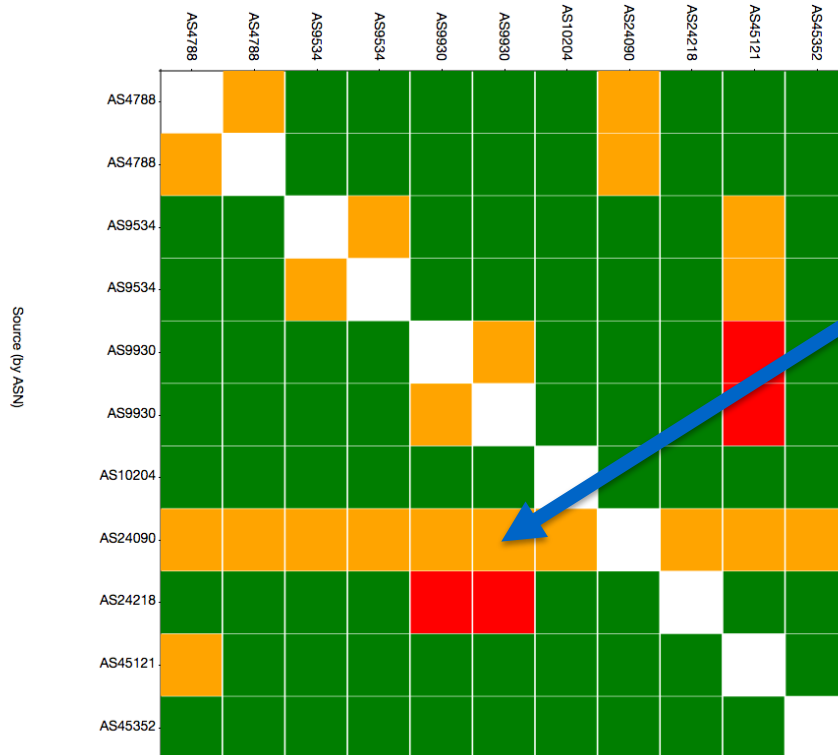
```

## msm_id:6108671 prb_id:19184 dst:122.0.31.242 ts:2016-10-02 09:30:15 -00:00
1 ( ) 192.168.254.1 [0.252, 0.295, 0.56] ||
2 (AS9930) ag-01-glsfb.ni.time.net.my [2.674, 2.775, 2.858] ||
3 (AS9930) ae2-er-01-glsfb.ni.time.net.my [2.493, 2.524, 2.611] ||
4 (AS9930) 223.28.2.1 [8.758, 13.761, 13.769] ||
5 (AS9930) bundle-ether1-br-01-mciwg.ni.time.net.my [8.596, 8.747, 8.748] ||
6 ( ) newmediaexpress.sgix.sg [9.515, 9.542, 9.661] |Singapore,,SG|
7 ( ) 10.11.34.13 [10.401, 10.497, 10.564] ||
8 (AS38001) 203-174-80-186.rev.ne.com.sg [170.394, 182.561, 182.645] ||
9 (AS23678) static-122-0-16-137.mykris.net [10.526, 10.974, 11.243] ||
10 (AS23678) static-122-0-16-254.mykris.net [17.196, 17.294, 17.311] ||
11 (AS45121) static-122-0-31-226.mykris.net [17.064, 17.239, 17.399] ||
12 (AS45121) static-122-0-31-242.mykris.net [16.825, 17.306, 17.535] ||
    
```


Network paths

IXP IPs: YES, out-of-country IPs: NO
IXP IPs: NO, out-of-country IPs: NO
IXP IPs: YES, out-of-country IPs: YES
IXP IPs: NO, out-of-country IPs: YES

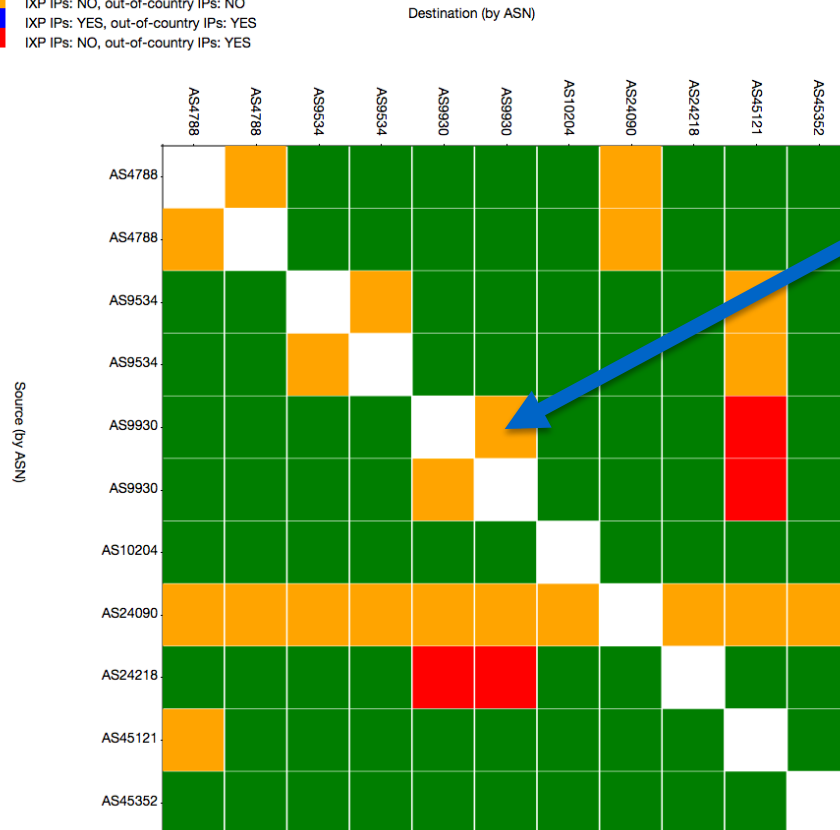
Destination (by ASN)



```
## msm_id:6108674 prb_id:4443 dst:61.6.55.165 ts:2016-10-02 09:30:24 -00:00
1 () 192.168.200.1 [1.635, 1.784, 2.273] ||
2 () 10.207.160.1 [2.318, 2.458, 2.478] ||
3 () 10.253.1.41 [2.385, 2.406, 18.98] ||
4 () 192.168.1.5 [1.884, 1.925, 2.342] ||
5 () 192.168.9.4 [2.293, 2.343, 2.655] ||
6 err:{u'x': u'*'}
6 () 192.168.10.2 [2.804] ||
7 err:{u'x': u'*'}
8 err:{u'x': u'*'}
9 err:{u'x': u'*'}
10 err:{u'x': u'*'}
11 err:{u'x': u'*'}
255 (AS9930) broadband.time.net.my [15.795, 17.034, 17.196] ||
```

Network paths

■ IXP IPs: YES, out-of-country IPs: NO
■ IXP IPs: NO, out-of-country IPs: NO
■ IXP IPs: YES, out-of-country IPs: YES
■ IXP IPs: NO, out-of-country IPs: YES



```
## msm_id:6108674 prb_id:19184 dst:61.6.55.165 ts:2016-10-02 09:30:20 -00:00
1 ( ) 192.168.254.1 [0.271, 0.3, 0.542] ||
2 (AS9930) ag-01-glsfb.ni.time.net.my [2.691, 14.941, 42.088] ||
3 (AS9930) broadband.time.net.my [4.2, 4.271, 4.633] ||
```

Around the region

Thailand

8,973,312 addresses

0.13 per head

302 in BGP

94% visible

Singapore

6,488,576 addresses

1.13 per head

274 in BGP

86% visible

Indonesia

17,910,784 addresses

0.07 per head

758 in BGP

89% visible

Philippines

5,453,056 addresses

0.05 per head

231 in BGP

92% visible

6,707,456 addresses

0.22 per head

159 in BGP

89% visible

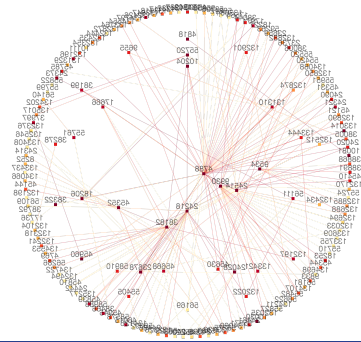
Around the region

Thailand

Singapore

Indonesia

Philippines

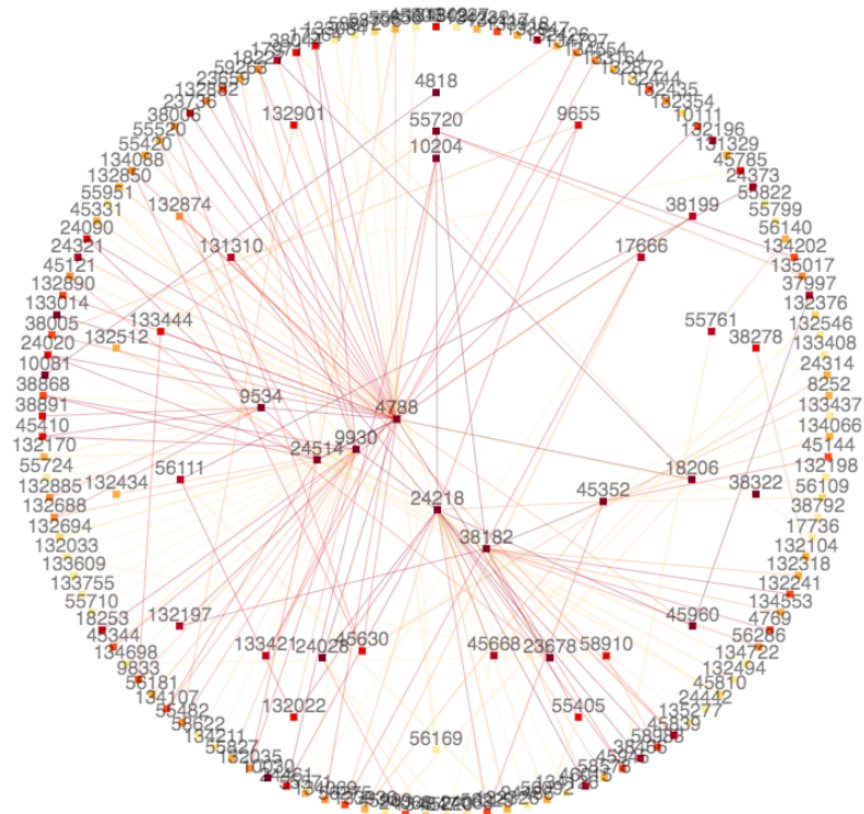


IPv6

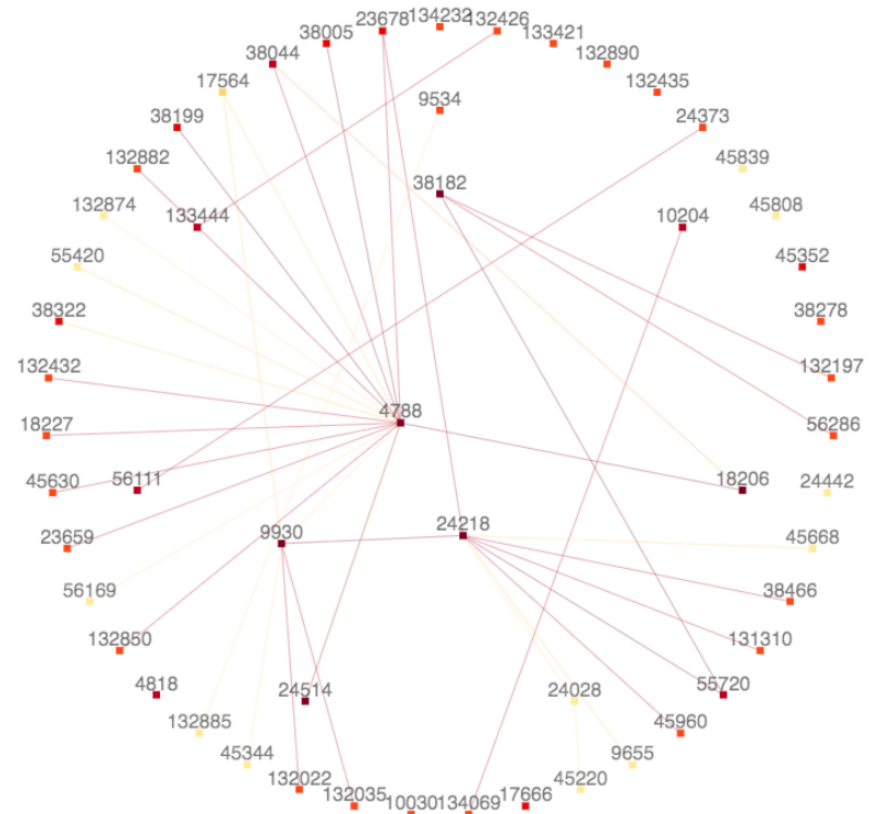
APNIC



IPv4



IPv6



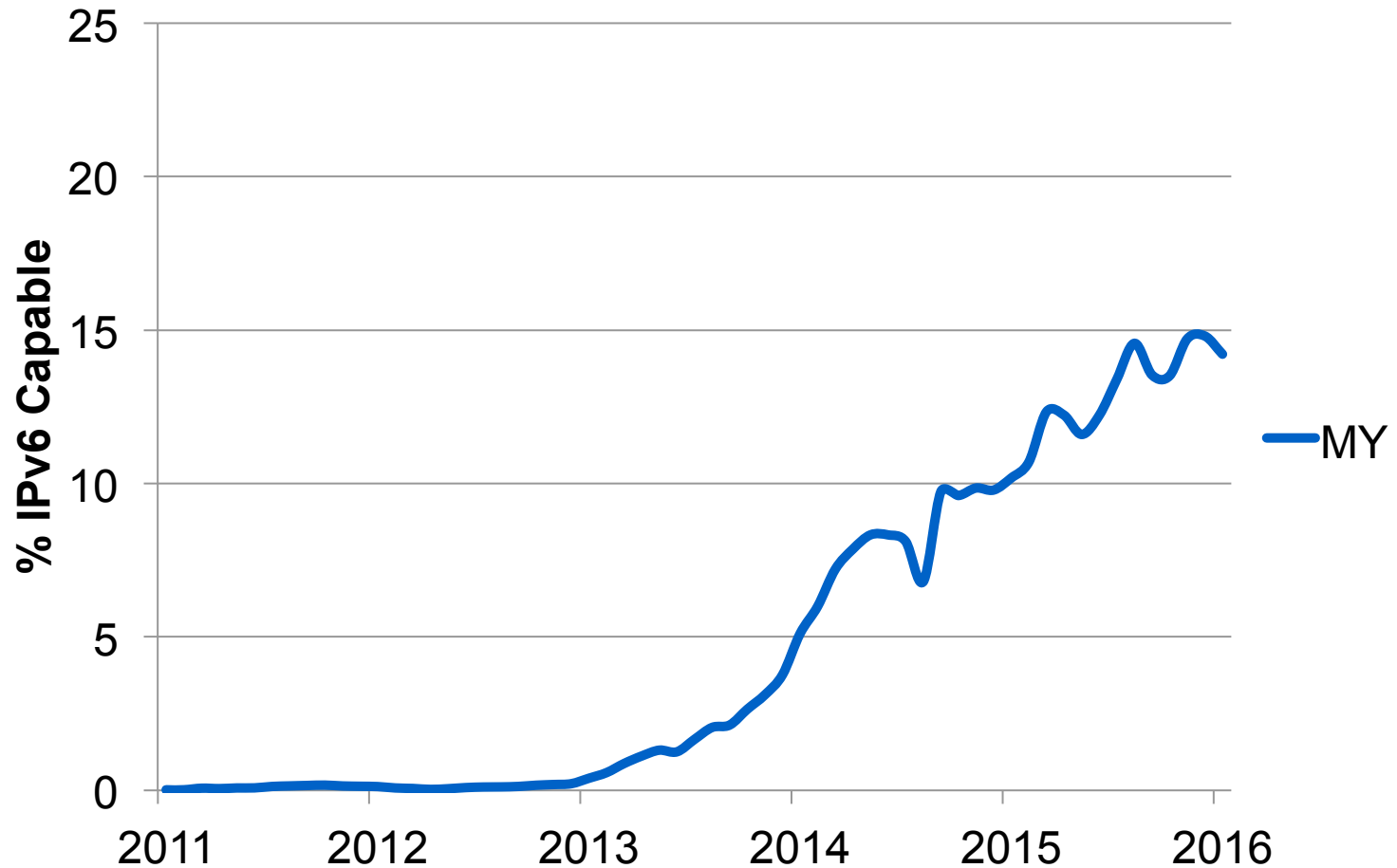
CC	IPv6 %	CC	IPv6 %	CC	IPv6 %	CC	IPv6 %	CC	IPv6 %	CC	IPv6 %
BE	55.47%	US	33.96%	CH	31.30%	GR	28.66%	DE	28.28%	PT	25.62%
LU	23.02%	EC	19.59%	GB	19.51%	PE	18.96%	EE	17.18%	JP	16.99%
FR	14.63%	MY	14.30%	FI	13.88%	CA	12.75%	BR	9.99%	NO	9.83%
CZ	9.54%	TT	8.29%	SG	8.05%	NL	7.74%	IE	7.47%	AU	7.37%
RO	6.59%										

Above and

Below the Line:

CC	IPv6 %	CC	IPv6 %	CC	IPv6 %	CC	IPv6 %	CC	IPv6 %	CC	IPv6 %
AT	5.38%	BO	5.10%	SA	4.87%	HU	4.63%	SE	4.39%	TR	3.65%
IN	3.42%	BA	3.35%	NZ	2.69%	PL	2.35%	HK	2.31%	LK	2.16%
AX	1.64%	SI	1.59%	RU	1.51%	KR	1.25%	TW	1.06%	TH	0.96%
DK	0.82%	IL	0.77%	IT	0.69%	BG	0.68%	VN	0.66%	LV	0.48%
LR	0.35%	MD	0.33%	CN	0.32%	BT	0.29%	SK	0.25%	SD	0.21%
MT	0.19%	UA	0.19%	ID	0.16%	KN	0.14%	IS	0.14%	BW	0.12%
LT	0.11%	RE	0.10%	ZA	0.08%	CY	0.07%				

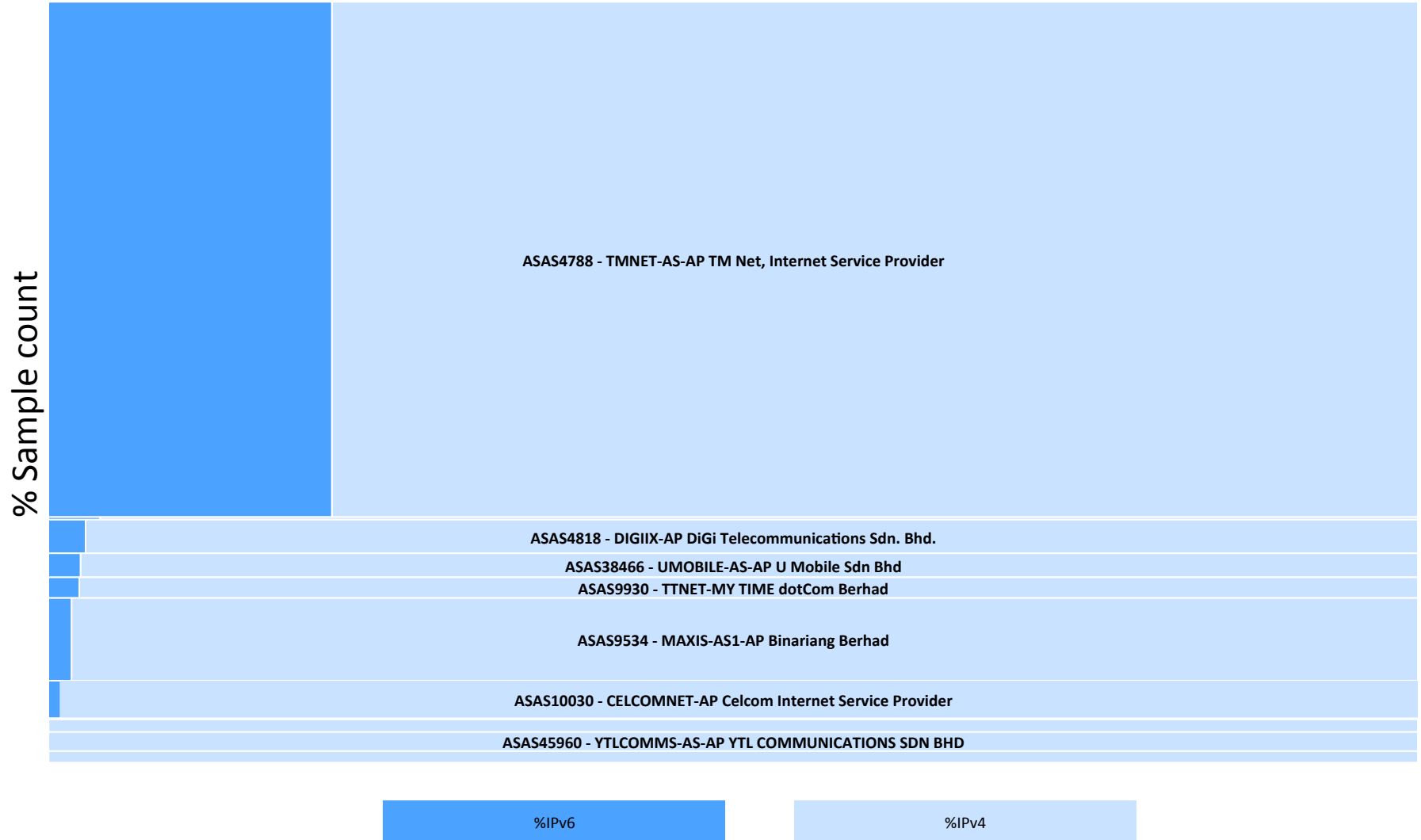
IPv6 up-and-to-the-right



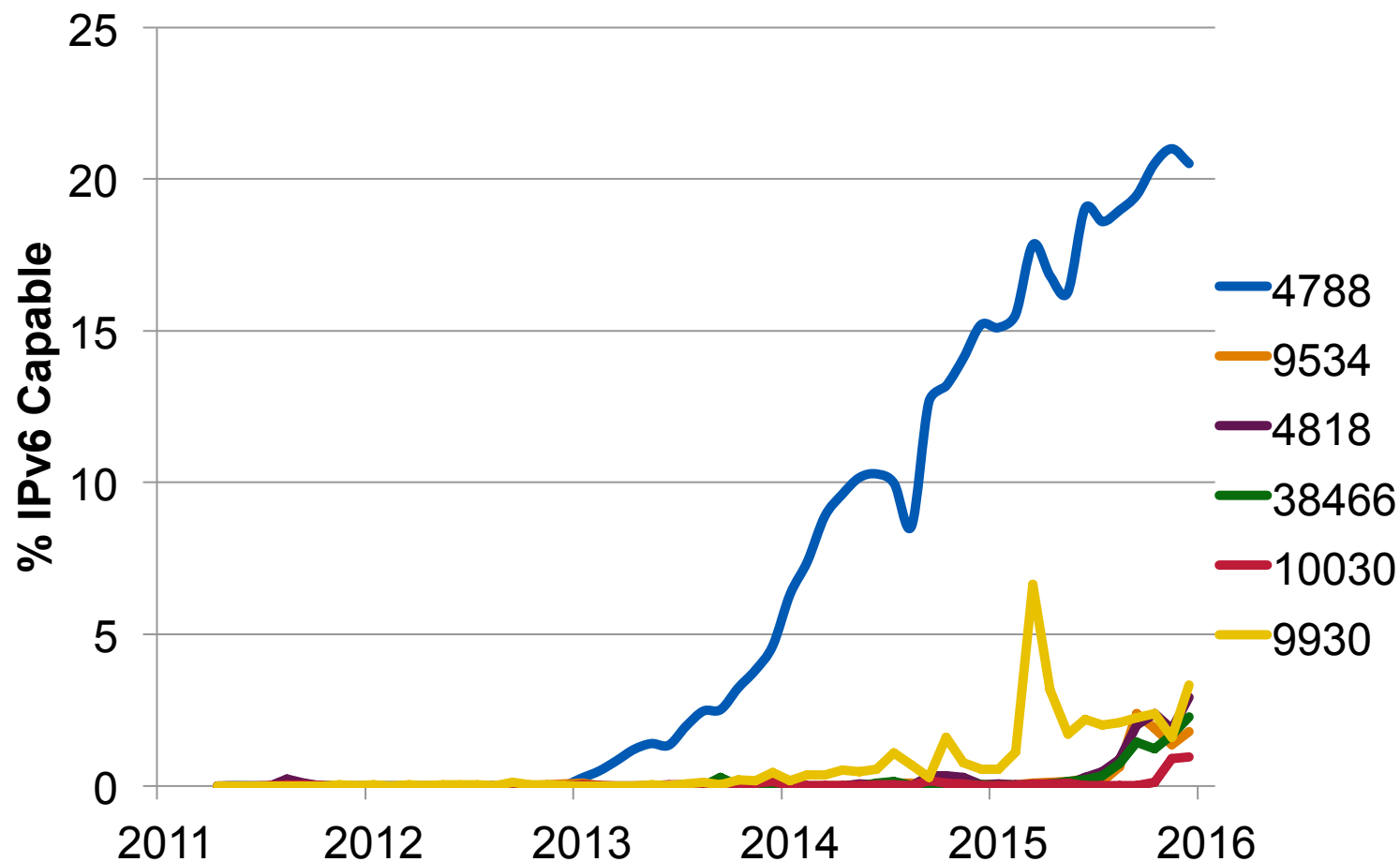
Top 10 IPv6 Capable

ASN	AS Name	Capable	Preferred	# Samples
AS17564	GITN (M) Sdn. Bhd.	25.02%	19.87%	10085
AS4788	TM Net, Internet Service Provider	20.71%	18.93%	6985155
AS55720	Gigabit Hosting Sdn Bhd	8.42%	0.00%	582
AS38044	GITN-NETWORK	3.79%	3.06%	35460
AS38278	VTelecoms Berhad - Malaysia	3.47%	3.31%	605
AS132035	Computer Center	2.82%	2.24%	3119
AS4818	DiGi Telecommunications Sdn. Bhd.	2.72%	2.64%	455411
AS38466	U Mobile Sdn Bhd	2.36%	2.19%	325771
AS9930	TIME dotCom Berhad	2.26%	1.27%	280327
AS9534	Binariang Berhad	1.70%	1.58%	1121257

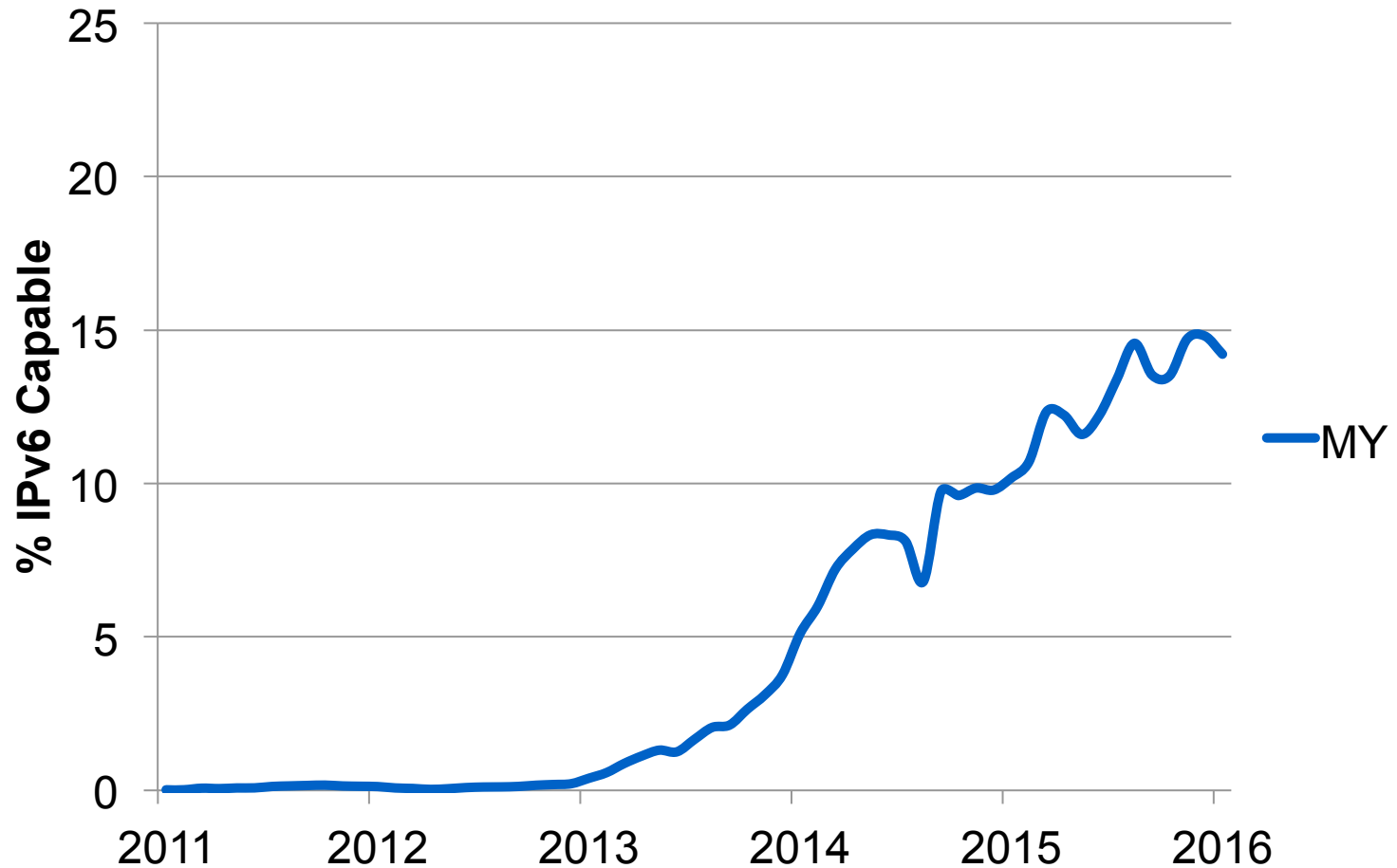
Top 10 IPv6 Capable



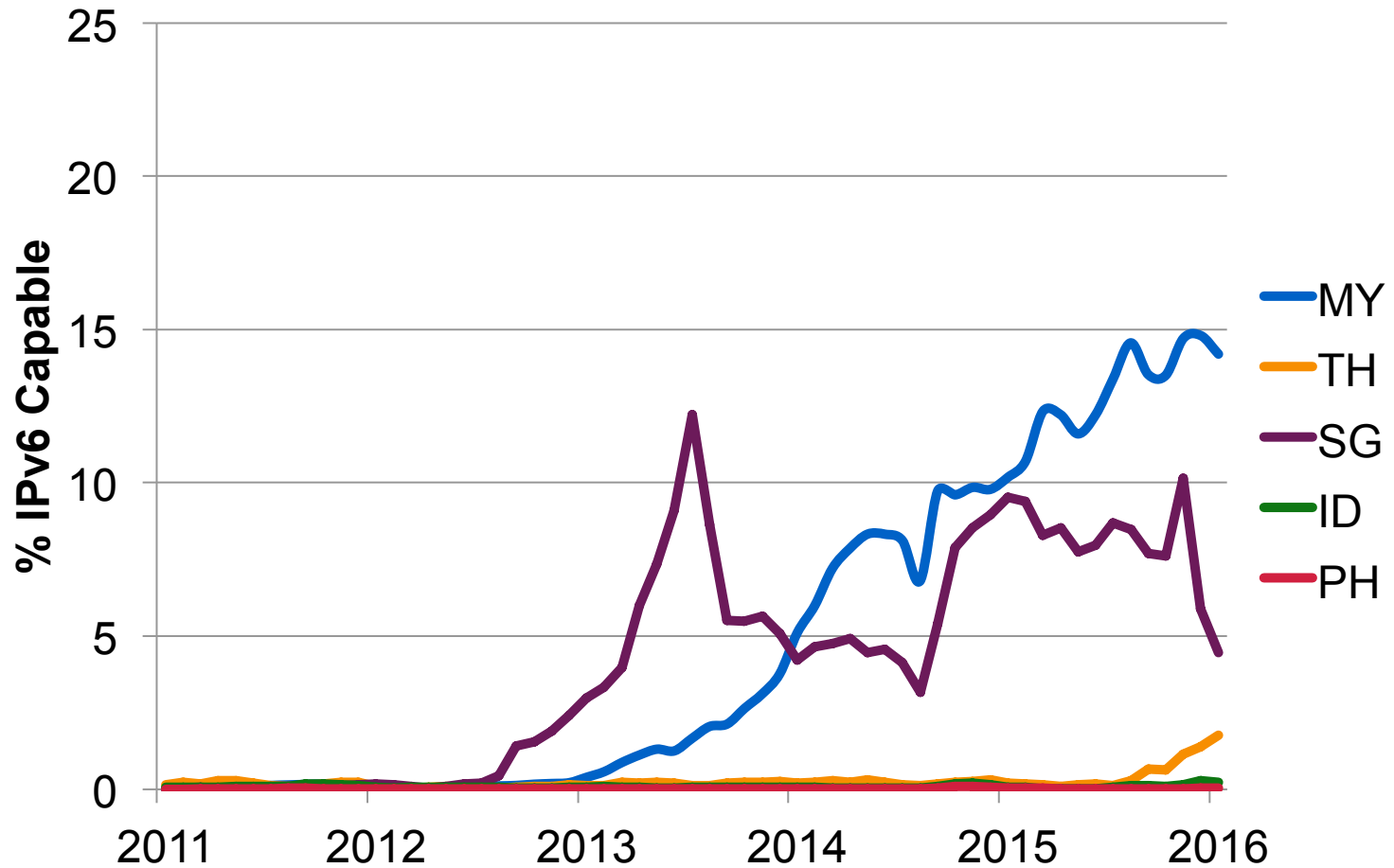
IPv6 Capable ASNs



IPv6 up-and-to-the-right



Around the region



Around the region

Thailand

356,484 M addresses

5,228 per head

2% capability

87 in BGP

14% visible

Singapore

850,411 M addresses

148,682 per head

4% capability

113 in BGP

15% visible

Indonesia

1,043,692 M addresses

3,993 per head

0% capability

143 in BGP

12% visible

Philippines

253,404 M addresses

2,468 per head

0% capability

29 in BGP

12% visible

481,039 M addresses

15,588 per head

14% capability

56 in BGP

24% visible

Around the region

Thailand

Singapore

Indonesia

Philippines

Security

DNSSEC validation



ROA coverage

Economy	Host Count	Under ROA	% ROA	Host Count	Under Roa	% ROA
PH	5,453,568	3,753,024	68.82%	989,861,888	100,664,064	10.17%
MY	6,706,432	827,648	12.34%	1,744,844,288	67,109,120	3.85%
SG	6,489,344	611,328	9.42%	3,321,920,512	84,938,240	2.56%
TH	8,973,056	307,968	3.43%	1,392,518,656	16,778,240	1.21%

EXTREMEBB-MY	TM-COINS-MY	GTC-MY	TMNET-MY
IIUM-MY	IPSERVERONE-MY	LARGESERVERS-MY	EVERWORKS-MY

Whats the 10,000 ft conclusion?

- You have a good, active IX community. We found some instances which suggest out of IX dataflow, but its not a huge problem in context.
- You have a really good IPv6 story. Your economy is ahead of world average, and is heading to the top of the worldwide leaderboard in end-user IPv6. This is really good.
- You are strong players in the regional Internet economy
- You can find low hanging fruit in security, IPv6, peering to continue to work on, to improve things.
 - 67 entries in <https://www.peeringdb.com/ix/250>

Questions!

