

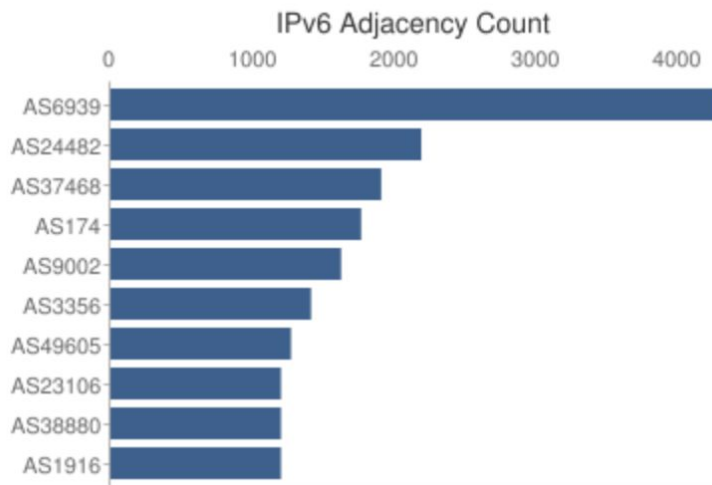
The IPv6 Global View

Hurricane Electric - IPv6 Native Services

- 11+ years into fully commercial/native IPv6 deployment
- IPv6 native platform across all PoPs - 159 PoPs, 41 countries & 6 continents
- All IPv6 BGP customer connections are native
- All IPv6 datacenter customers are native
- Every customer is IPv6 enabled by default (Important!)
- IPv6 enabled route servers and looking glass
- 24x7 NOC with IPv6 expertise

Top networks by IPv6 adjacencies

IPv6 Adjacencies		
ASN	Name	Count
AS6939	Hurricane Electric LLC	4,309
AS24482	SG.GS	2,214
AS37468	Angola Cables	1,975
AS174	Cogent Communications	1,800
AS9002	RETN Limited	1,637
AS3356	Level 3 Parent, LLC	1,478
AS49605	Digital Telecommunication Services S.r.l.	1,286
AS23106	Cemig Telecomunicaes SA	1,270
AS38880	Micron21 Datacentre Pty Ltd	1,207
AS1916	Associao Rede Nacional de Ensino e Pesquisa	1,203



Source: <https://bgp.he.net> (Date: 20 June 2018)

Hurricane Electric mindset - Always yet to IPv6!

- It's 2018 (not 2001!)
 - IPv6 capable hardware systems are available
 - IPv6 capable operating systems are available
 - IPv6 capable open source packages are available
 - IPv6 capable service providers are available
 - IPv6 expertise is absolutely available!
- It's 2018
 - No reason to say “No” to IPv6 anymore
- Lot of work needs to be done both on core (peering, dual stacking sessions) as well as access network

Hurricane Electric's Free IPv6 Certification Program

<https://ipv6.he.net/certification/>

Hurricane Electric IPv6 Certification

- Prove that you have IPv6 connectivity
- Prove that you have working IPv6 web server
- Prove that you have working IPv6 email address
- Prove that you have working IPv6 DNS (authoritative DNS, forward record)
- Prove that you have working IPv6 reverse DNS record for mail server
- Prove your knowledge of IPv6 technologies through quick and easy testing
 - The format of IPv6 addresses
 - AAAA record
 - ip6.arpa rDNS record
 - IPv6 localhost address
 - IPv6 default route
- And lot more!

And ofcourse the T-shirt!



Is IPv6 routing table ready for real world
use?

Is IPv6 routing table ready?

- Theory 1: It has been ready for years...
 - Plenty of backbones running IPv6 routing
 - Plenty of IPv6 inter backbone peering
 - Almost all large to mid size IXPs support IPv6
 - Plenty of IPv6 talk at conferences!

- Theory 2: We are not ready yet but close...
 - Still a few gaps in routing table
 - Still some spotty cleanup here & there


bgp.he.net - Available Information

- BGP Prefix Report
 - Prefixes, Networks, Distribution
 - IPv4/IPv6 Prefixes originated
 - ASNs with IPv4/IPv6 announcements
 - IPv4/IPv6 announced prefix count by CIDR
- BGP Peer Report
 - Adjacencies, adjacency history
 - IPv4/IPv6 adjacencies
 - IPv4/IPv6 adjacency count (90 days)
 - Prefixes, Prefix history
 - IPv4/IPv6 prefix announced
- Bogons
 - IPv4 & IPv6
- Top Host Report
- Internet Statistics

Current Internet Statistics

- Publically visible ASNs in IPv4 routing table: 62,130
- Publically visible ASNs in IPv6 routing table: 16,003

Current Internet Statistics: Taiwan Report

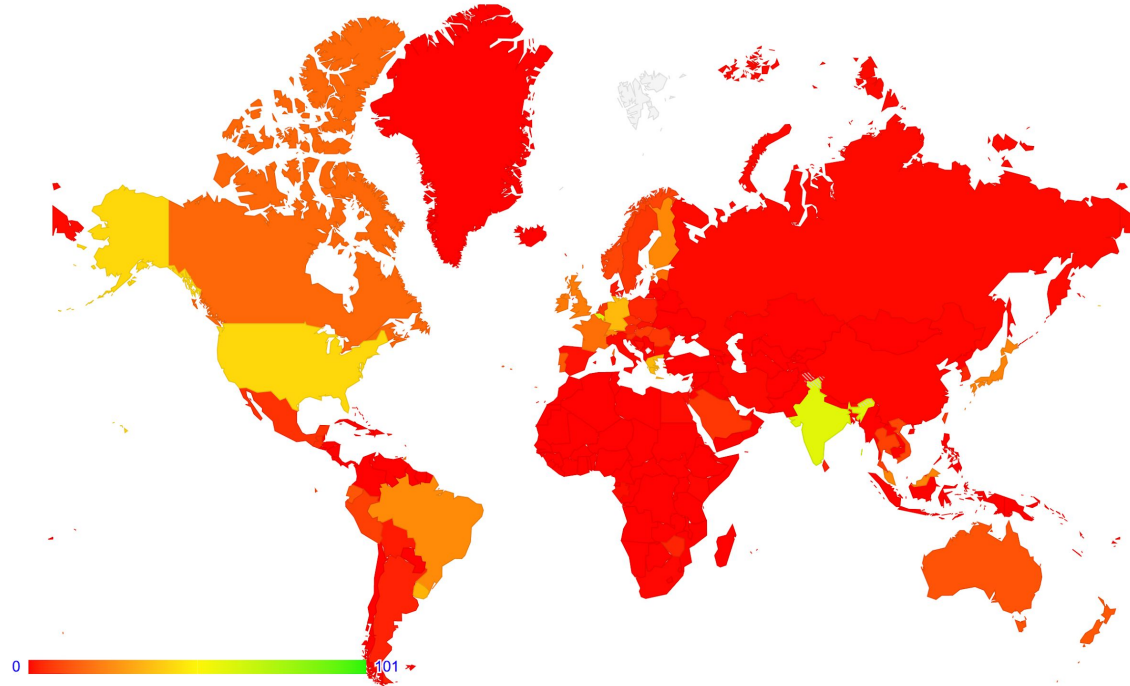
 Networks: Taiwan					
ASN	Name	Adjacencies v4	Routes v4	Adjacencies v6	Routes v6
AS9505	Taiwan Internet Gateway	697	2,612	163	137
AS24167	Academia Sinica Grid Computing Center	101	9	9	1
AS9924	Taiwan Fixed Network, Telco and Network Service Provider.	98	320	12	77
AS9680	HiNet Service Center in U.S.A	88	691	15	63
AS17408	AboveNet Communications Taiwan	71	397	15	13
AS4780	Digital United Inc.	64	2,004	12	4
AS3462	Data Communication Business Group	61	683	24	67
AS17709	Asia Pacific Telecom	43	576	21	29
AS9416	Hoshin Multimedia Center Inc.	35	196	8	2
AS9264	Academic Sinica Network	35	49	21	28
AS10133	Chief Telecom Inc.	30	430	7	3
AS7539	National Center for High-performance Computing	19	48	8	5
AS18042	Koos Broadband Telecom	17	43	2	6
AS18046	DongFong Technology Co. Ltd.	16	53	1	1
AS45250	Vocom International Telecommunications Inc. Taiwan POP Internet Service Srovider	14	27	0	0
AS24155	Asia Pacific Broadband Wireless Communications Inc	10	113	1	1

Source: <https://bgp.he.net/country/TW>

But that's about the BGP world, what about actual traffic flow?

APNIC IPv6 Measurement Stats

IPv6 Capable Rate by country (%)

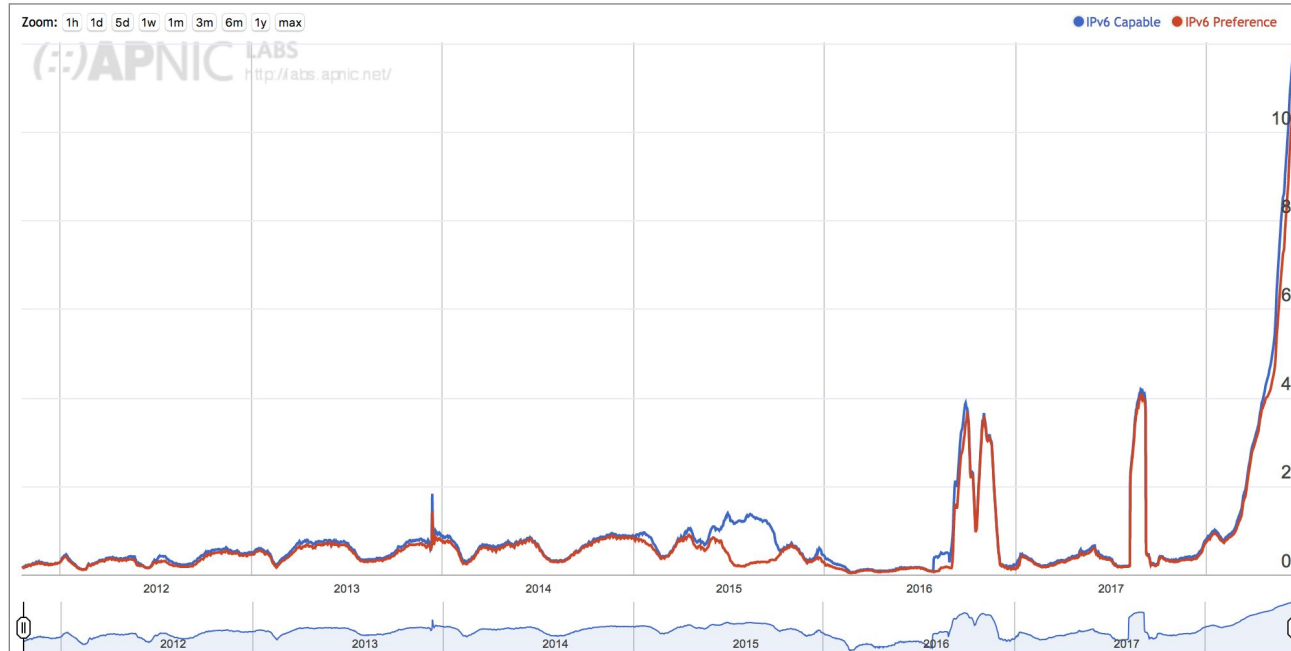


APNIC IPv6 Measurement Stats

Code	SubRegion	IPv6 Capable	IPv6 Preferred	Samples
XT	Southern Asia, Asia	46.63%	45.60%	44,558,468
XQ	Northern America, Americas	42.02%	40.17%	24,598,364
QO	Western Europe, Europe	29.85%	28.70%	12,998,327
QM	Northern Europe, Europe	21.34%	20.52%	7,335,466
XP	South America, Americas	17.60%	16.55%	20,110,891
QP	Australia and New Zealand, Oceania	17.11%	14.61%	1,934,860
XO	Central America, Americas	8.76%	8.36%	5,660,011
XU	South-Eastern Asia, Asia	8.45%	8.07%	16,180,958
QN	Southern Europe, Europe	5.95%	5.79%	8,155,287
XS	Eastern Asia, Asia	5.41%	4.92%	70,614,680
XW	Eastern Europe, Europe	3.74%	3.53%	14,857,000
XN	Caribbean, Americas	3.25%	3.16%	1,304,177
XV	Western Asia, Asia	2.12%	1.98%	10,332,759
XJ	Northern Africa, Africa	1.17%	1.11%	6,268,766
XH	Eastern Africa, Africa	1.00%	0.94%	4,049,116
XK	Southern Africa, Africa	0.95%	0.89%	2,414,304
XL	Western Africa, Africa	0.04%	0.03%	8,883,230
XI	Middle Africa, Africa	0.04%	0.04%	1,250,571
QQ	Melanesia, Oceania	0.01%	0.01%	134,070
XR	Central Asia, Asia	0.00%	0.00%	2,399,668
QS	Polynesia, Oceania	0.00%	0.00%	22,200
QR	Micronesia, Oceania	0.00%	0.00%	13,682

APNIC IPv6 Measurement Stats for Taiwan

Use of IPv6 for Taiwan (TW)



APNIC IPv6 Measurement Stats for Taiwan

ASN	AS Name	IPv6 Capable	IPv6 Preferred	Samples
AS3462	HINET Data Communication Business Group	16.97%	16.01%	701,651
AS17421	EMOME-NET Mobile Business Group	35.72%	32.05%	212,947
AS24158	TAIWANMOBILE-AS Taiwan Mobile Co., Ltd.	0.01%	0.01%	202,337
AS9674	FET-TW Far EastTone Telecommunication Co., Ltd.	0.02%	0.01%	173,475
AS24157	VIBO-NET-AS Taiwan Star Telecom Corporation Limited.(Former Vibo Telecom Inc.)	0.01%	0.01%	79,379
AS9924	TFN-TW Taiwan Fixed Network, Telco and Network Service Provider.	0.08%	0.01%	38,148
AS9416	MULTIMEDIA-AS-AP Hoshin Multimedia Center Inc.	0.04%	0.01%	36,657
AS38841	KBRO-AS-TW kbro CO. Ltd.	0.34%	0.16%	29,793
AS131591	AMBIT-AS-TW Ambit Microsystem Corporation	0.04%	0.02%	25,287
AS4780	SEEDNET Digital United Inc.	0.08%	0.03%	24,403
AS1659	ERX-TANET-ASN1 Taiwan Academic Network (TANet) Information Center	19.83%	19.16%	21,722
AS131596	TBCOM-NET TBC	0.07%	0.01%	19,459
AS24164	YJL-MEDIATV-NET YEONG JIA LEH CABLE TV CO., LTD.	0.01%	0.01%	15,186
AS18182	SONET-TW Sony Network Taiwan Limited	0.03%	0.02%	9,186
AS9919	NCIC-TW New Century InfoComm Tech Co., Ltd.	0.18%	0.15%	8,844
AS18419	DADA-AS-TW DaDa Broadband LTD.	0.01%	0.00%	8,323
AS4662	QTCN-ASN1 GCNet (Reach Range Inc.)	0.00%	0.00%	7,815
AS4782	GSNET Data Communication Business Group	10.54%	6.82%	7,346
AS18049	TINP-TW Taiwan Infrastructure Network Technologie	0.17%	0.08%	7,133
AS7482	APOL-AS Asia Pacific On-line Service Inc.	0.06%	0.06%	5,164
AS24165	PHOENIX-NET-TW PHOENIX CATV CO.,LTD	0.00%	0.00%	3,418
AS24163	UBBNET-AS-TW UNION BROADBAND NETWORK	0.00%	0.00%	3,301
AS17809	VEETIME-TW-AP VEE TIME CORP.	0.00%	0.00%	3,191
AS17408	ABOVE-AS-AP AboveNet Communications Taiwan	0.00%	0.00%	3,125
AS18429	EXTRALAN-TW Extra-Lan Technologies Co., LTD	0.03%	0.00%	2,895
AS17716	NTU-TW National Taiwan University	1.02%	0.79%	2,539
AS9676	SAVECOM-TW SaveCom Internation Inc.	0.05%	0.05%	2,134

References

- Hurricane Electric BGP toolkit - <https://bgp.he.net>
- APNIC IPv6 Measurements Maps - <https://stats.labs.apnic.net/ipv6/>

Thankyou!

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