

IPv6 Growth at Hurricane Electric - APNIC 46

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Hurricane Electric - IPv6 Native Services

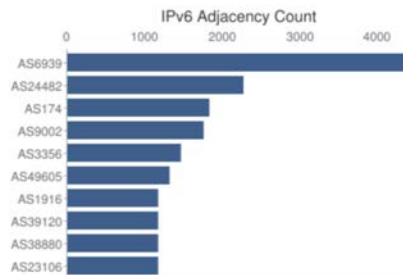
- 11+ years into fully commercial/native IPv6 deployment
- IPv6 native platform across all PoPs - 166 PoPs, 41 countries & 6 continents
- All IPv6 BGP customer connections are native
- All IPv6 datacenter customers are native
- Every customer is IPv6 enabled by default (Important!)
- IPv6 enabled route servers and looking glass
- 24x7 NOC with IPv6 expertise

Top networks by IPv6 adjacencies

IPv4 Adjacencies		
ASN	Name	Count
AS6939	Hurricane Electric LLC	7,406
AS174	Cogent Communications	5,609
AS3356	Level 3 Parent, LLC	5,152
AS24482	SG.GS	3,585
AS8220	COLT Technology Services Group Limited	2,949
AS51185	Onecom Global Communications LTD	2,590
AS3549	Level 3 Communications, Inc. (GBLX)	2,438
AS7018	AT&T Services, Inc.	2,422
AS60501	Sirius Technology SRL	2,390
AS57463	NetIX Communications Ltd.	2,378



IPv6 Adjacencies		
ASN	Name	Count
AS6939	Hurricane Electric LLC	4,465
AS24482	SG.GS	2,281
AS174	Cogent Communications	1,849
AS9002	RETN Limited	1,824
AS3356	Level 3 Parent, LLC	1,467
AS49605	Digital Telecommunication Services S.r.l.	1,324
AS1916	Associao Rede Nacional de Ensino e Pesquisa	1,225
AS39120	Convergenze S.p.A.	1,222
AS38880	Micron21 Datacentre Pty Ltd	1,216
AS23106	COMPANHIA ENERGETICA DE MINAS GERAIS	1,206



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
- Time has come to start exploring IPv6 only in access!

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: 62,914
- Publically visible ASNs in IPv6 routing table: 16,424

Current Internet Statistics: New Caledonia Report

Country Info					
 Networks: New Caledonia					
ASN	Name	Adjacencies v4	Routes v4	Adjacencies v6	Routes v6
AS18200	Office des Postes et Telecommunications New-Caledonia	25	68	18	14
AS136417	Canal+ Caledonie	2	1	0	0
AS131248	GOTV	2	1	0	0
AS56089	OFFRATEL	1	8	1	1
AS56055	Micro Logic Systems	1	5	1	1
AS45461	TeleNet	1	8	1	1
AS45345	Nautile	1	5	1	2
AS17480	CANL	1	9	1	1
AS137243	INGENIERIE DES SYSTEMES DES INFORMATIONS	1	1	1	1
AS131995	XLPM	1	4	0	0

<https://bgp.he.net/country/NC>

Current Internet Statistics: Fiji Report

Country Info					
 Networks: Fiji					
ASN	Name	Adjacencies v4	Routes v4	Adjacencies v6	Routes v6
AS45349	Telecom Fiji Ltd	17	104	0	0
AS38442	Vodafone Fiji Limited	15	9	0	0
AS9241	Fiji International Telecommunications Ltd	5	32	0	0
AS4638	Telecom Fiji Limited	2	104	0	0
AS45355	Digicel Fiji Limited	1	17	1	3
AS24390	University of the South Pacific	1	1	1	1
AS137890	Walesi Ltd	1	1	0	0
AS136921	Fiji National University	1	1	0	0
AS135647	Airports Fiji Limited	1	1	0	0

<https://bgp.he.net/country/FJ>

Current Internet Statistics: PNG Report

Country Info

Networks: Papua New Guinea

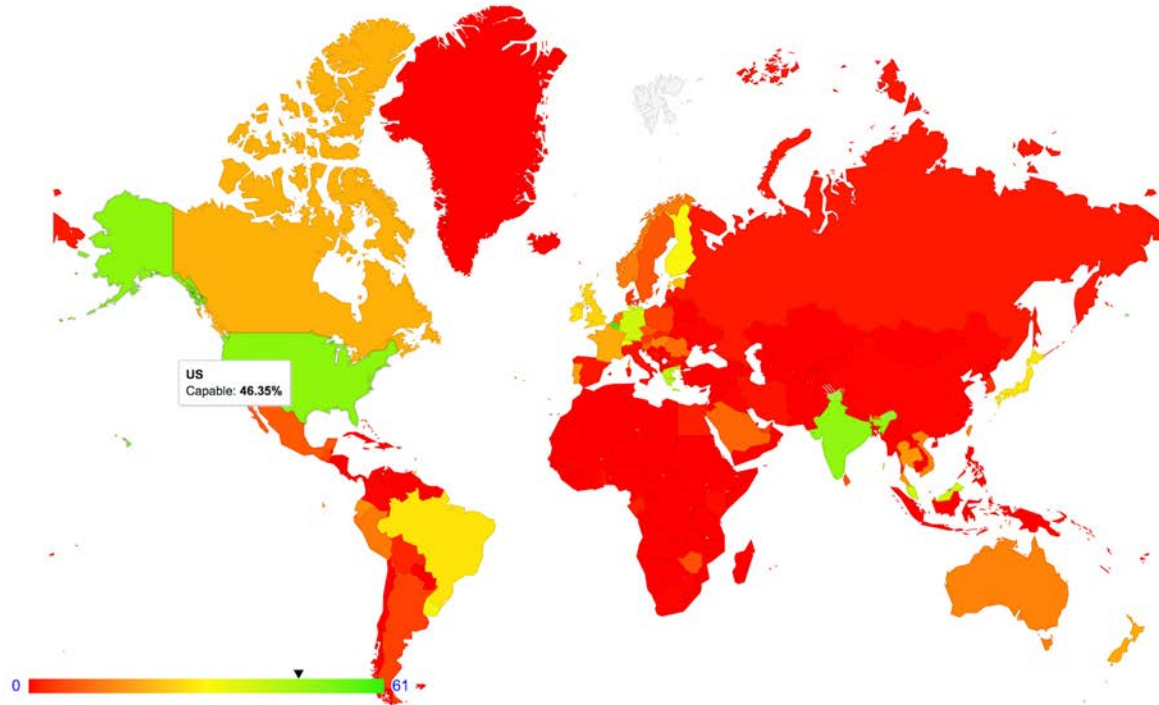
ASN	Name	Adjacencies v4	Routes v4	Adjacencies v6	Routes v6
AS17828	Tiare, a business unit of Telkom PNG	22	68	9	1
AS63945	Digitec PNG Limited	7	6	0	0
AS58460	Digicel (PNG) Ltd	5	18	0	0
AS55792	Datec-PNG	5	34	0	0
AS136587	PNG DATACO LIMITED	3	8	0	0
AS133137	Bemobile LTD	3	5	0	0
AS136239	CLICK PACIFIC LTD	2	4	0	0
AS134151	Steamships Ltd	2	6	0	0
AS45924	Global Technologies Limited	1	4	0	0
AS38009	Telikom PNG Satellite Tier 1 AS Internet Service	1	5	0	0
AS136940	ComSat Ltd	1	1	0	0

<https://bgp.he.net/country/PG>

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
XQ	Northern America, Americas	43.83%	42.62%	14,463,074
XT	Southern Asia, Asia	36.26%	35.38%	26,254,801
QO	Western Europe, Europe	29.39%	28.55%	7,627,220
QM	Northern Europe, Europe	22.01%	21.48%	4,309,072
XP	South America, Americas	17.73%	17.30%	11,833,459
QP	Australia and New Zealand, Oceania	16.82%	16.12%	1,140,634
XU	South-Eastern Asia, Asia	10.52%	10.25%	9,530,217
XO	Central America, Americas	9.35%	9.16%	3,336,930
QN	Southern Europe, Europe	5.93%	5.85%	4,775,593
XW	Eastern Europe, Europe	4.89%	4.57%	8,696,872
XS	Eastern Asia, Asia	4.66%	4.40%	41,431,930
XN	Caribbean, Americas	3.02%	2.92%	765,976
XV	Western Asia, Asia	2.70%	2.63%	6,103,106
XJ	Northern Africa, Africa	1.54%	1.48%	3,704,548
XH	Eastern Africa, Africa	1.34%	1.31%	2,404,819
XK	Southern Africa, Africa	0.62%	0.60%	1,423,133
XI	Middle Africa, Africa	0.07%	0.06%	743,956
XL	Western Africa, Africa	0.05%	0.05%	5,272,556
QQ	Melanesia, Oceania	0.04%	0.04%	79,185
XR	Central Asia, Asia	0.01%	0.01%	1,414,486
QS	Polynesia, Oceania	0.00%	0.00%	13,061
QR	Micronesia, Oceania	0.00%	0.00%	8,046

References

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

Thankyou!

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