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# 150 Internet Exchange Points And Beyond!

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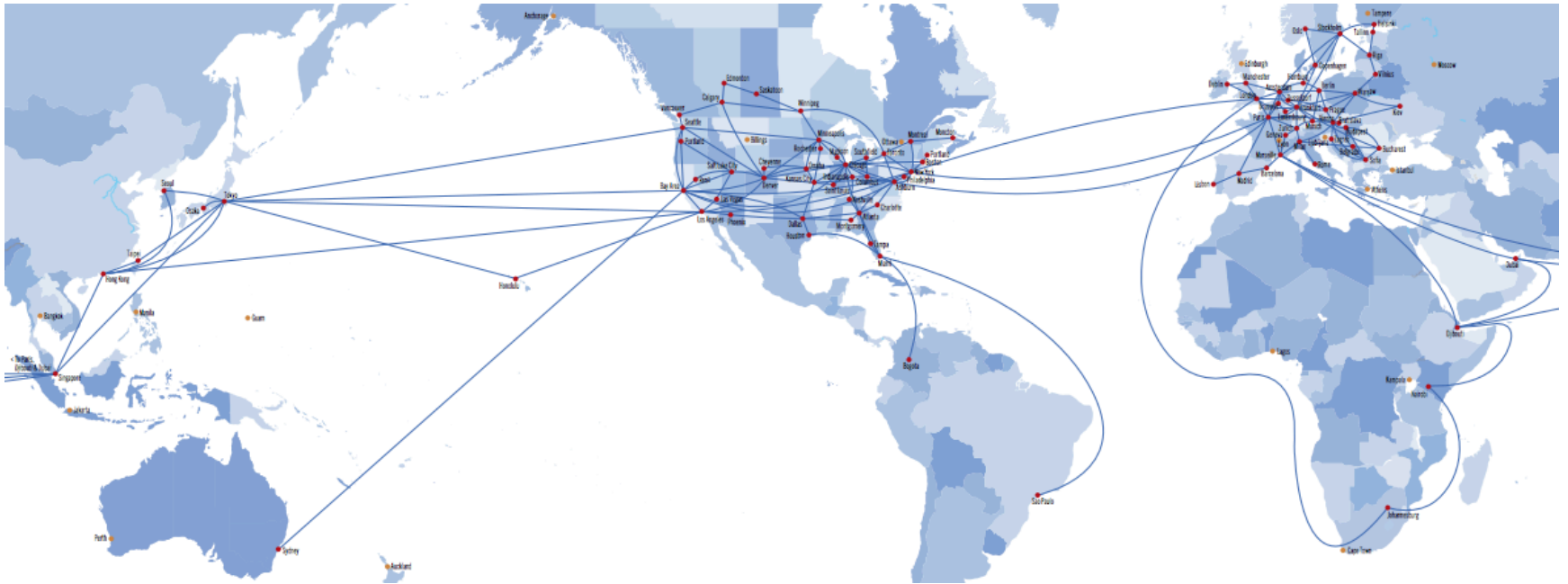
HKNOG 2018  
Hong Kong

Walt Wollny, Director Interconnection Strategy  
Hurricane Electric AS6939

# Who is Walt Wollny?

- ❑ Hurricane Electric AS6939 – 4 years
  - ❑ Director Interconnection Strategy – supporting the network to reach to over 44 countries and over 180 Internet Exchanges. Focus on Global connectivity.
- ❑ Amazon AS16509 – 4 years
  - ❑ Developed IP Transit and Peering on five continents.
  - ❑ Primary focus on Japan, Singapore, Hong Kong, India, Taiwan, Philippines, Australia.
  - ❑ Over 62 new CDN sites.
- ❑ Microsoft AS8075 – 13 years
  - ❑ Developed IP Transit and Peering on four continents.
  - ❑ Primary focus on US, UE and South America.

# Hurricane Electric Network



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# Why so many Exchanges?

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# Expansion is the Answer!

## January 2015

90 Internet exchanges  
IPv4 3,644 unique adjacencies  
IPv6 2,475 unique adjacencies

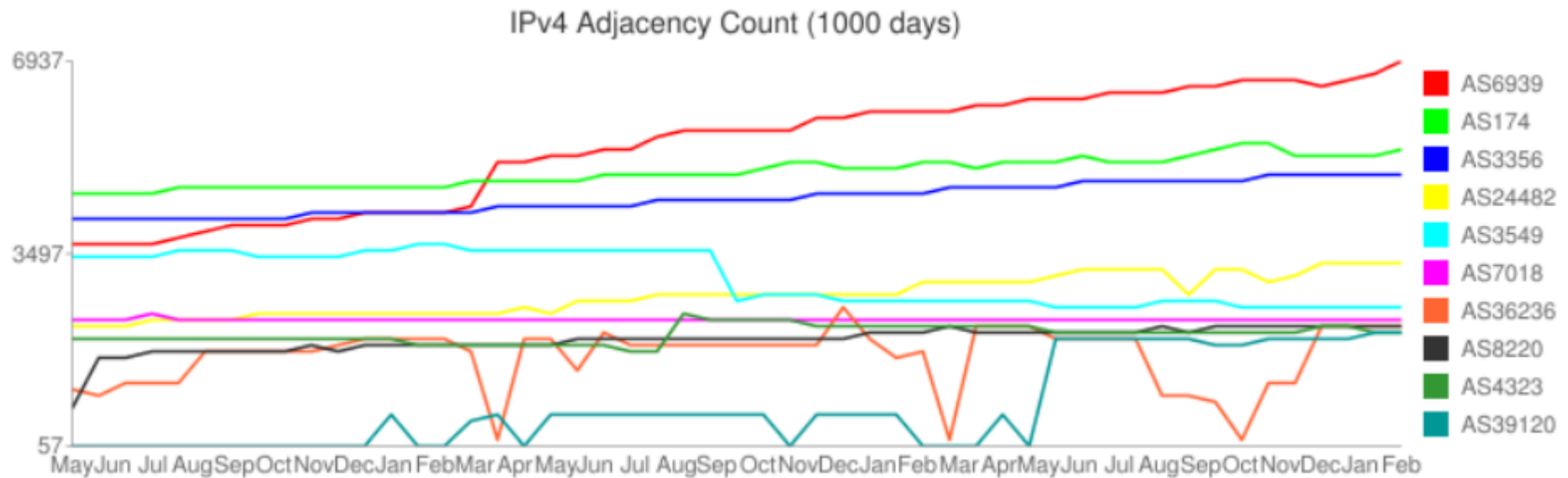
## January 2018

179	Internet exchanges	99% increase
IPv4	6,896 unique adjacencies	89% increase
IPv6	4,183 unique adjacencies	69% increase

<https://bgp.he.net/report/peers>

IPv4 Adjacencies		
ASN	Name	Count
<u>AS6939</u>	<u>Hurricane Electric, Inc.</u>	6,893
<u>AS174</u>	<u>Cogent Communications</u>	5,367
<u>AS3356</u>	<u>Level 3 Communications, Inc.</u>	4,961
<u>AS24482</u>	<u>SG.GS</u>	3,369
<u>AS3549</u>	<u>Level 3 Communications, Inc. (GBLX)</u>	2,545
<u>AS7018</u>	<u>AT&amp;T Services, Inc.</u>	2,370
<u>AS36236</u>	<u>NetActuate, Inc</u>	2,274
<u>AS8220</u>	<u>COLT Technology Services Group Limited</u>	2,240
<u>AS4323</u>	<u>tw telecom holdings, inc.</u>	2,175
<u>AS39120</u>	<u>Convergenze S.p.A.</u>	2,144

[https://bgp.he.net/report/peers#\\_adjacencyhistory](https://bgp.he.net/report/peers#_adjacencyhistory)



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# Hurricane Electric

I'm here to share with you the following:

- What Hurricane Electric looks for in a new IX
- How IX operators can attract more members



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# What we look for in a new IX

- Unique ASN adjacencies opportunities
- New countries
- Customer request
  
- Does it make financial business sense?
- Cost of long-haul circuits
- Datacenter cost
- Dark fiber/metro and cross connect cost
- Local import issues, taxes, ETC...
- Internet exchange cost

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# Benefits

- When Hurricane Electric connects to a new exchange, we are trying to achieve these goals:
  - ❑ Reduce average per-bit delivery cost
  - ❑ Increase supply of bandwidth to keep up with growing demand
  - ❑ Improve quality: reduce loss, latency, out-of-order delivery and jitter
  - ❑ Meet and connect new potential customers

# New exchanges in the next 90 days

- MSK-IX Moscow 303 unique adjacencies
  - MyIX Kuala Lumpur 95 unique adjacencies
  - RVA-IX Richmond VA 3 unique adjacencies
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- Total new 401 unique adjacencies

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# Possible new locations 2018 - 2019

- Bangkok
- Manila
- Guam
- Athens
- Istanbul
- Mumbai
- Perth
- Kuala Lumpur

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# And several others

<http://www.he.net/HurricaneElectricNetworkMap.pdf>

This is updated frequently with locations of interest

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# How IX operators can attract more members

If we don't know about you, how can we connect!

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# Tell the world about your exchange!



PeeringDB



WIKIPEDIA  
The Free Encyclopedia



TeleGeography

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# Get Your Exchange Listed Publicly

You put extensive effort into starting and running your exchange:

- ❑ Talk to network operators and recruit the members.
- ❑ Negotiate with data center operators for space to install exchange.
- ❑ Obtain, deploy and maintain hardware for the exchange.
- ❑ Prompt ongoing communication between your participants.

Taking the last step, publicizing your exchange, maximizes its value both to current participants and future members.



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# Your IX members page

List participants on your website including:

- ASN
- IPv4 and IPv6 addresses
- Peering and NOC contact details
- Peering policy

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# Why List Participants?

Current and prospective participants need this information to add peering sessions, increase peered traffic, and for the IX to grow revenue.

Network operators continuously evaluate additional IXPs for potential expansion opportunities. To make this determination they need participant AS numbers and, ideally, to see what prefixes those peers advertise to a route-server at the exchange.

# Example: Seattle IX (SIX) Members Page

## <https://www.seattleix.net/participants.htm>

206.81.80.10/23	Altopia Corporation	6456	<a href="mailto:noc@alt.net">noc@alt.net</a>
206.81.80.11/23	RealNetworks, Inc.	11922	<a href="mailto:nso@real.com">nso@real.com</a>
206.81.80.12/23	NuclearFallout Enterprises, Inc.	32751	<a href="mailto:noc@nfoe.net">noc@nfoe.net</a>
206.81.80.13/23	Beyond the Network (PCCW)	3491	<a href="mailto:peering@pccwglobal.com">peering@pccwglobal.com</a>
206.81.80.14/23	Mouat's Technology Services, Inc.	3601	<a href="mailto:peering@mouats.com">peering@mouats.com</a>
206.81.80.16/23	Semaphore Corporation	3742	<a href="mailto:noc@semaphore.com">noc@semaphore.com</a>
206.81.80.17/23	Google	15169	<a href="mailto:peering@google.com">peering@google.com</a>
206.81.80.18/23	Cortland Electronics Corporation	4319	<a href="mailto:peering@cortland.com">peering@cortland.com</a>
206.81.80.19/23	Zayo (was AboveNet)	6461	<a href="mailto:peering@zayo.com">peering@zayo.com</a>
206.81.80.20/23	TierPoint Spokane	30340	<a href="mailto:peering@tierpoint.com">peering@tierpoint.com</a>
206.81.80.21/23	Metapeer, Inc.	13331	<a href="mailto:noc@metapeer.com">noc@metapeer.com</a>
206.81.80.23/23	RGnet/PSGnet	3130	<a href="mailto:peering@rg.net">peering@rg.net</a>
206.81.80.27/23	In2net Network	26753	<a href="mailto:noc@in2net.com">noc@in2net.com</a>
206.81.80.28/23	Threshold Communications, Inc.	7752	<a href="mailto:noc@thresholdcommunications.com">noc@thresholdcommunications.com</a>
206.81.80.29/23	Zillow.com	18888	<a href="mailto:noc@zillow.com">noc@zillow.com</a>
206.81.80.34/23	Connect Northwest Internet Services	10557	<a href="mailto:noc@cnw.com">noc@cnw.com</a>
206.81.80.37/23	Wowrack.com	23033	<a href="mailto:noc@wowrack.com">noc@wowrack.com</a>
206.81.80.38/23	Peer 1 Network	13768	<a href="mailto:peering@peer1.net">peering@peer1.net</a>
206.81.80.40/23	Hurricane Electric	6939	<a href="mailto:peering@he.net">peering@he.net</a>

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# JSON API

Many exchanges are starting to publish a list of their members in JSON format at a URL. This API allows anyone to automate collection of a current member list and thus automate peering

<https://ripe70.ripe.net/presentations/96-inex-ripe-connectwg-amsterdam-2015-05-13.pdf>

<https://github.com/euro-ix/json-schemas>

Open-source tools, like IXP-Manager, do it for you:

<https://github.com/inex/IXP-Manager>

# JSON Data Feed Health

<a href="#">HKIX</a>	☆	281	✓	HK	Hong Kong	<a href="http://www.hkix.net">www.hkix.net</a>
<a href="#">Equinix Hong Kong</a>	☆	138	✗	HK	Hong Kong	<a href="http://ix.equinix.com">ix.equinix.com</a>
<a href="#">iAIX</a>	☆	13	✗	HK	Hong Kong	<a href="http://www.iadvantage.net">www.iadvantage.net</a>
<a href="#">MegalX Hong Kong</a>	☆	5	✓	HK	Hong Kong	<a href="http://www.megaport.com">www.megaport.com</a>
<a href="#">BBIX Hong Kong</a>	☆	26	✗	HK	Hong Kong	<a href="http://www.bbix.net">www.bbix.net</a>
<a href="#">AMS-IX Hong Kong</a>	☆	40	✓	HK	Hong Kong	<a href="http://www.ams-ix.hk">www.ams-ix.hk</a>

# <https://lg.megaport.com/megaport.json>

```
{
  "ixp_list" : [
    {
      "shortname" : "IX-SYD",
      "name" : "Sydney IX",
      "ixp_id" : 1,
      "vlan" : [
        {
          "ipv6" : {
            "mask_length" : 64,
            "prefix" : "2001:DEA:0:10:0:0:0:0"
          },
          "ipv4" : {
            "mask_length" : 23,
            "prefix" : "103.26.68.0"
          },
          "name" : "IX-SYD",
          "id" : 0
        }
      ],
      "support_email" : "support@megaport.com",
      "url" : "http://www.megaport.com",
      "support_phone" : "+61 7 3088 5996",
      "support_contact_hours" : "24/7"
    },
    {
      "shortname" : "IX-BNE",
      "name" : "Brisbane IX",
      "ixp_id" : 2,
      "vlan" : [
        {
          "ipv6" : {
            "mask_length" : 64,
            "prefix" : "2001:DEA:0:20:0:0:0:0"
          },
          "ipv4" : {
            "mask_length" : 24,
            "prefix" : "103.26.70.0"
          },
          "name" : "IX-BNE",
          "id" : 0
        }
      ],
      "support_email" : "support@megaport.com",
      "url" : "http://www.megaport.com",

```

# Why Use JSON

- Peeringdb.com data may not be accurate as it relies on each network to update their records
- You're in control of your JSON data!
- Automation!

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# Conclusions

It is Hurricane Electric's vision to continue our expansion globally to as many locations as possible and help overcome illiteracy globally.

I need your help! So please make your IX information public, as membership information is key when making decisions about where to invest next.

Next milestone 200 Internet Exchanges



# Questions?

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