HURRICANE ELECTRIC
INTERNET SERVICES

200 Internet Exchange Points
And Beyond!

Af-IX 2018
Cape Town

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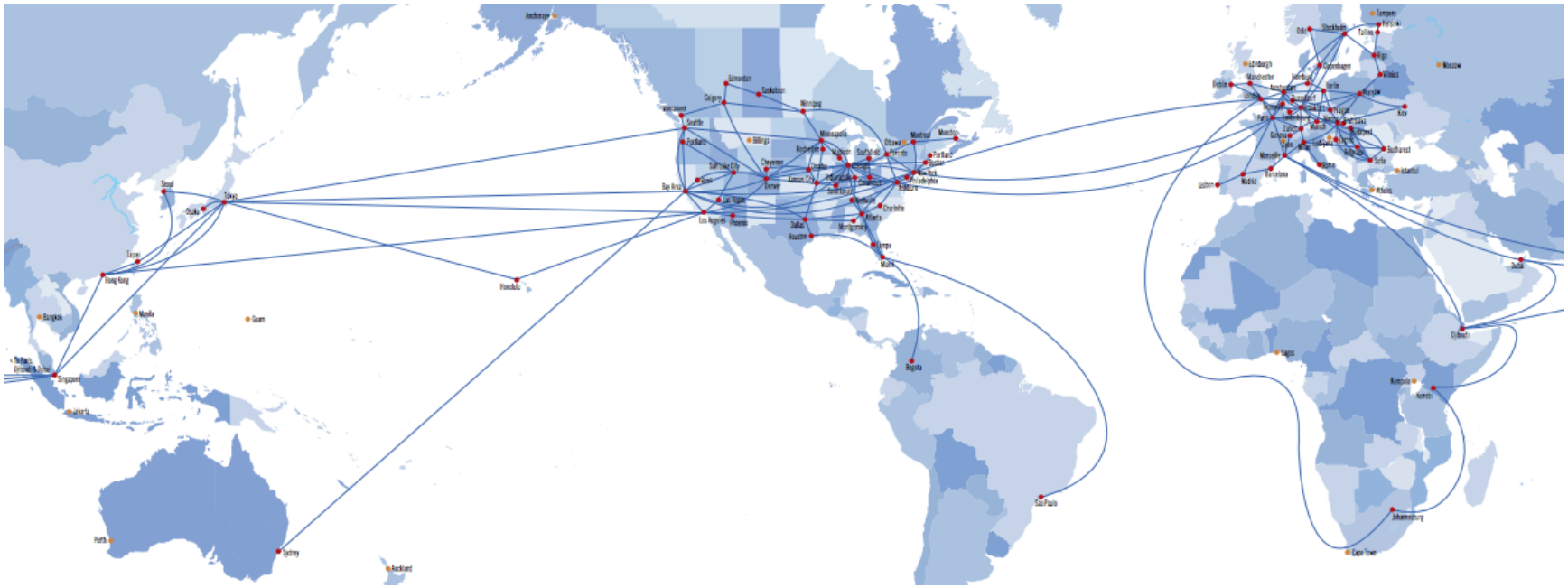
Hurricane Electric AS6939

Who is Walt Wollny?

- Hurricane Electric AS6939 – 4 years
  - Director Interconnection Strategy – supporting the network to reach to over 41 counties, 165 POPs and over 189 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, EU and South America.

Hurricane Electric Network



Why so many Exchanges?

Expansion is the Answer!

January 2015

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

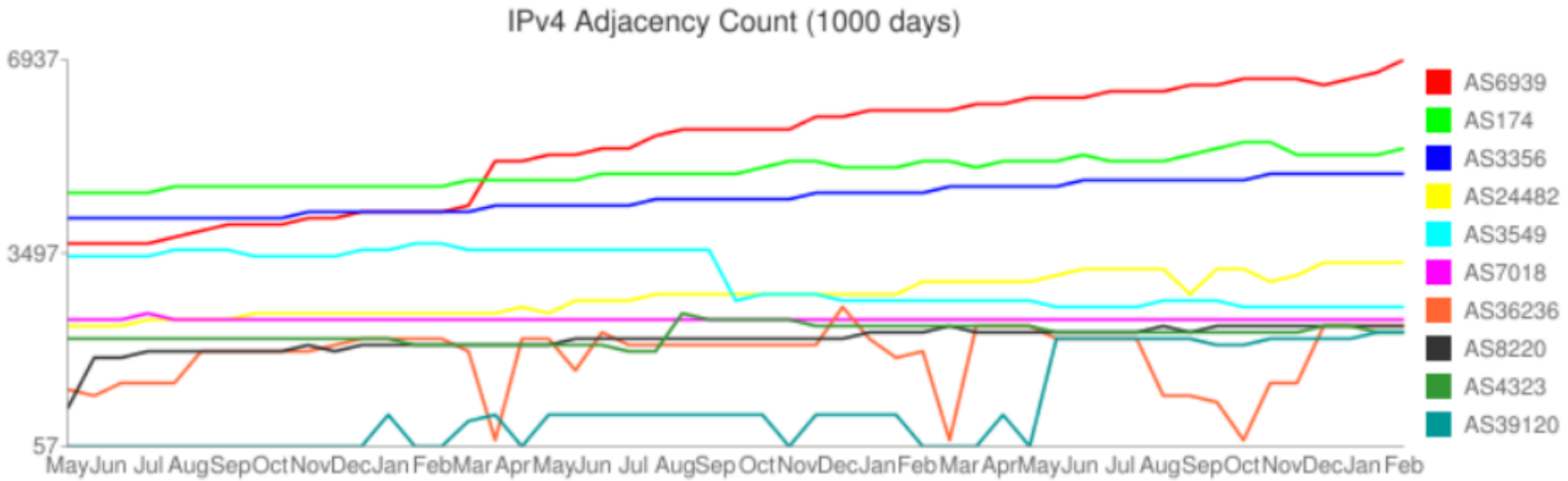
January 2018

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**
AS6939	Hurricane Electric LLC	7,438
AS174	Cogent Communications	5,598
AS3356	Level 3 Parent, LLC	5,135
AS24482	SG.GS	3,569
AS8220	COLT Technology Services Group Limited	2,915
AS51185	Onecom Global Communications LTD	2,571
AS37468	Angola Cables	2,526
AS3549	Level 3 Communications, Inc. (GBLX)	2,478
AS7018	AT&T Services, Inc.	2,422
AS57463	NetIX Communications Ltd.	2,393

https://bgp.he.net/report/peers#_adjacencyhistory



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

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

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

- Total new 401 unique adjacencies

Possible new locations 2018 - 2019

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

And several others

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

This is updated frequently with locations of interest

How IX operators can attract more members

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

Tell the world about your exchange!

PeeringDB

PCH

WIKIPEDIA
The Free Encyclopedia

TeleGeography

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.

Your IX members page

List participants on your website including:

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

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

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

HKIX	281	✓	HK	Hong Kong	www.hkix.net
Equinix Hong Kong	138	✗	HK	Hong Kong	ix.equinix.com
iAIX	13	✗	HK	Hong Kong	www.iadvantage.net
MegaIX Hong Kong	5	✓	HK	Hong Kong	www.megaport.com
BBIX Hong Kong	26	✗	HK	Hong Kong	www.bbix.net
AMS-IX Hong Kong	40	✓	HK	Hong Kong	www.ams-ix.hk

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!

AfIX Results

Name of IXP	peeringdb	JSON
Angola-IXP (ANG-IXP)	PASS	PASS
Angonix (Angonix)	PASS	PASS
Benin IX (BENINIX)	PASS	FAIL
Botswana Internet Exchange (BIXP)	FAIL	FAIL
Burkina Faso Internet Exchange Point (BFIX)	FAIL	FAIL
Burundi National Internet Exchange Point (BDIXP)	FAIL	FAIL
Cote d'Ivoire Internet Exchange Point (CIVIX)	PASS	FAIL
Kinshasa Internet eXchange point (KINIX)	PASS	FAIL
Djibouti Internet Exchange (DjIX)	PASS	FAIL
Cairo IX (CAIX)	PASS	FAIL
Gabon Internet Exchange Point (GAB-IX)	PASS	FAIL

AfIX Results

Name of IXP	peeringdb	JSON
Serekunda Internet Exchange Point (SIXP)	FAIL	FAIL
Ghana Internet Exchange (GIX)	PASS	FAIL
Kenya Internet Exchange Point - Mombasa (KIXP - MSA)	PASS	FAIL
Kenya Internet Exchange Point - Nairobi (KIXP)	PASS	FAIL
Lesotho Internet Exchange Point (LIXP)	FAIL	FAIL
Liberia Internet Exchange Point (LIXP)	FAIL	FAIL
Madagascar Global Internet eXchange (MGIX)	PASS	FAIL
Malawi Internet Exchange (MIX)	PASS	FAIL
Mauritius Internet Exchange Point (MIXP)	PASS	PASS
Mozambique Internet Exchange (MOZIX)	PASS	FAIL
Internet eXchange Point Namibia (IXWHK)	PASS	FAIL
Abuja IX (IXPN)	PASS	PASS
Internet eXchange Point of Nigeria (IXPN)	PASS	PASS

AfIX Results

Name of IXP	peeringdb	JSON
Port Harcourt IX (IXPN)	FAIL	FAIL
Congo Internet Exchange (CGIX)	PASS	FAIL
Rwanda Internet Exchange (RINEX)	PASS	FAIL
Senegal Internet Exchange (SENIX)	FAIL	FAIL
Cape Town Internet Exchange Point (CINX)	PASS	PASS
NAPAfrica IX Cape Town (NAPAfrica CT1)	PASS	PASS
Durban Internet Exchange Point (DINX)	PASS	PASS
NAPAfrica IX Durban (NAPAfrica DB1)	PASS	PASS
Johannesburg Internet Exchange Point (JINX)	PASS	PASS
NAPAfrica IX Johannesburg (NAPAfrica JB1)	PASS	PASS
Sudan Internet Exchange Point (SIXP)	FAIL	FAIL

AfIX Results

Name of IXP	peeringdb	JSON
Arusha Internet Exchange Point (AIXP)	PASS	FAIL
Tanzania Internet Exchange (TIX)	PASS	FAIL
Mwanza Internet Exchange Point (MIXP)	PASS	PASS
Zanzibar Internet Exchange Point (ZIXP)	FAIL	FAIL
Togo Internet Exchange Point (TGIX)	FAIL	FAIL
Tunisia IXP Tunis (TunIXP)	PASS	FAIL
Uganda Internet eXchange Point (UIXP)	PASS	FAIL
Zambia Internet Exchange Point (ZIXP)	FAIL	FAIL
Harare Internet Exchange Point (HIXP)	FAIL	FAIL

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

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Questions?

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