

Hurricane Electric

Building out the second-largest IPv6 Network

IPv6 Native Backbone – Massive Peering!

Global IPv6 Summit 2008 – Seoul, Korea
19th June 2008

Martin J. Levy, Director IPv6 Strategy
Hurricane Electric

Hurricane Electric – Roots and History

- Founded 14 years ago - ISP & datacenter operator
 - Roots within the Silicon Valley high-tech community
 - Nationwide network in 1999
 - Starts IPv6 native and tunnel connectivity in 2001
 - European expansion in 2005
 - Purchased 206,000 sq ft datacenter building in 2006
 - Native IPv6 backbone in Q1 2007
 - Ranked #1 IPv6 backbone for BGP adjacencies in Q1 2008
 - Expands IPv6 TunnelBroker to nine US & European cities
- Supports and sponsors global open-software projects



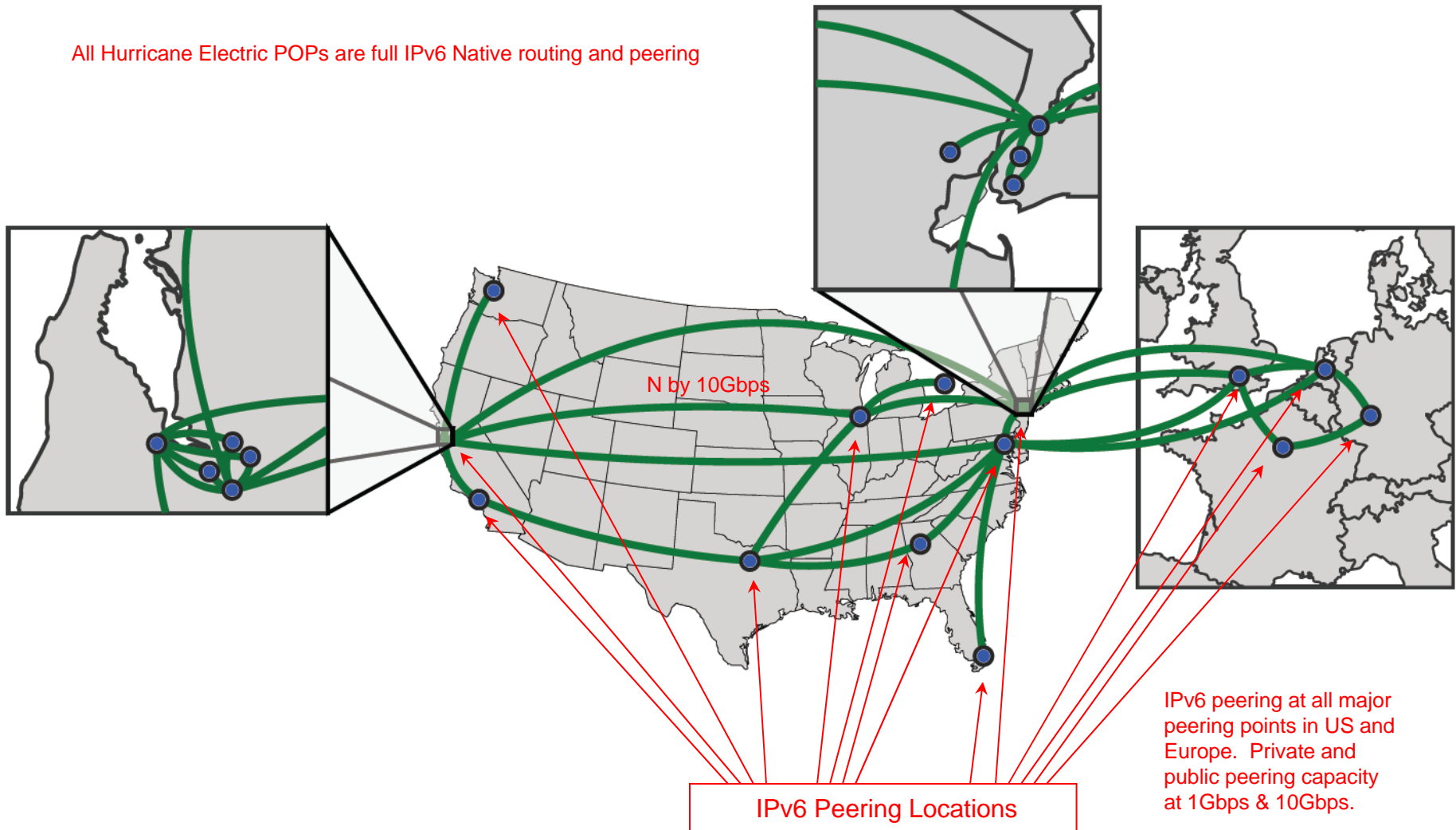
Hurricane Electric

The Network and its Peering



Hurricane Electric – IPv6 Network Reach

All Hurricane Electric POPs are full IPv6 Native routing and peering



Hurricane Electric – IPv6 Peering Points

Location	Exchange	100FE	GigE	10GigE	IPv4 Address	IPv6 Address
Seattle, Washington	SIX			10GigE	198.32.180.40	2001:478:180::40
San Francisco Bay Area	PAIX Palo Alto			10GigE	198.32.176.20	2001:504:d::10
	EQUINIX-SJC			10GigE	206.223.116.37	2001:504:0:1::6939:1
Los Angeles, CA	Any2-LAX			10GigE	206.223.143.122	2001:504:13:0:0:0:0:1A
	LAIIX		GigE		198.32.146.50	2001:504:a::a500:6939:1
	EQUINIX-LAX			10GigE	206.223.123.37	2001:504:0:3::6939:1
Chicago, Illinois	EQUINIX-CHI			10GigE	206.223.119.37	2001:504:0:4::6939:1
Dallas, Texas	EQUINIX-DAL			10GigE	206.223.118.37	2001:504:0:5::6939:1
New York	PAIX New York			10GigE	198.32.118.57	2001:504:f::39
	NYIIX			10GigE	198.32.160.61	2001:504:1::a500:6939:1
	NYCX		GigE		198.32.229.22	
	BIGEAPE	100FE				2001:458:26:2::500
Washington, DC	EQUINIX-ASH			10GigE	206.223.115.37	2001:504:0:2::6939:1
Miami, Florida	NOTA			10GigE	198.32.124.176	2001:478:124::176
London, England	LINX			10GigE	195.66.224.21	2001:7f8:4:0::1b1b:1
	LoNAP		GigE		193.203.5.128	2001:7f8:17::1b1b:1
Amsterdam, Netherlands	AMS-IX			10GigE	195.69.145.150	2001:7f8:1::a500:6939:1
	NL-IX		GigE		193.239.116.14	2001:7f8:13::a500:6939:1
Paris, France	PaNAP			10GigE	62.35.254.111	2001:860:0:6::6939:1
Frankfurt, Germany	DE-CIX			10GigE	80.81.192.172	2001:7f8::1b1b:0:1



Hurricane Electric – Network Philosophy

- Single hardware partner – Foundry Networks
 - 20 months into IPv6 native network deployment
 - Partnered to “iron-out” operational issues
 - Efficient per-port costs (at 1Gbps & 10Gbps)
 - Full *sflow* data

- MPLS capable POP to POP to POP
 - Provides granular control of network bandwidth
 - Clean network design end-to-end – no legacy elements

- Scalable!



Hurricane Electric

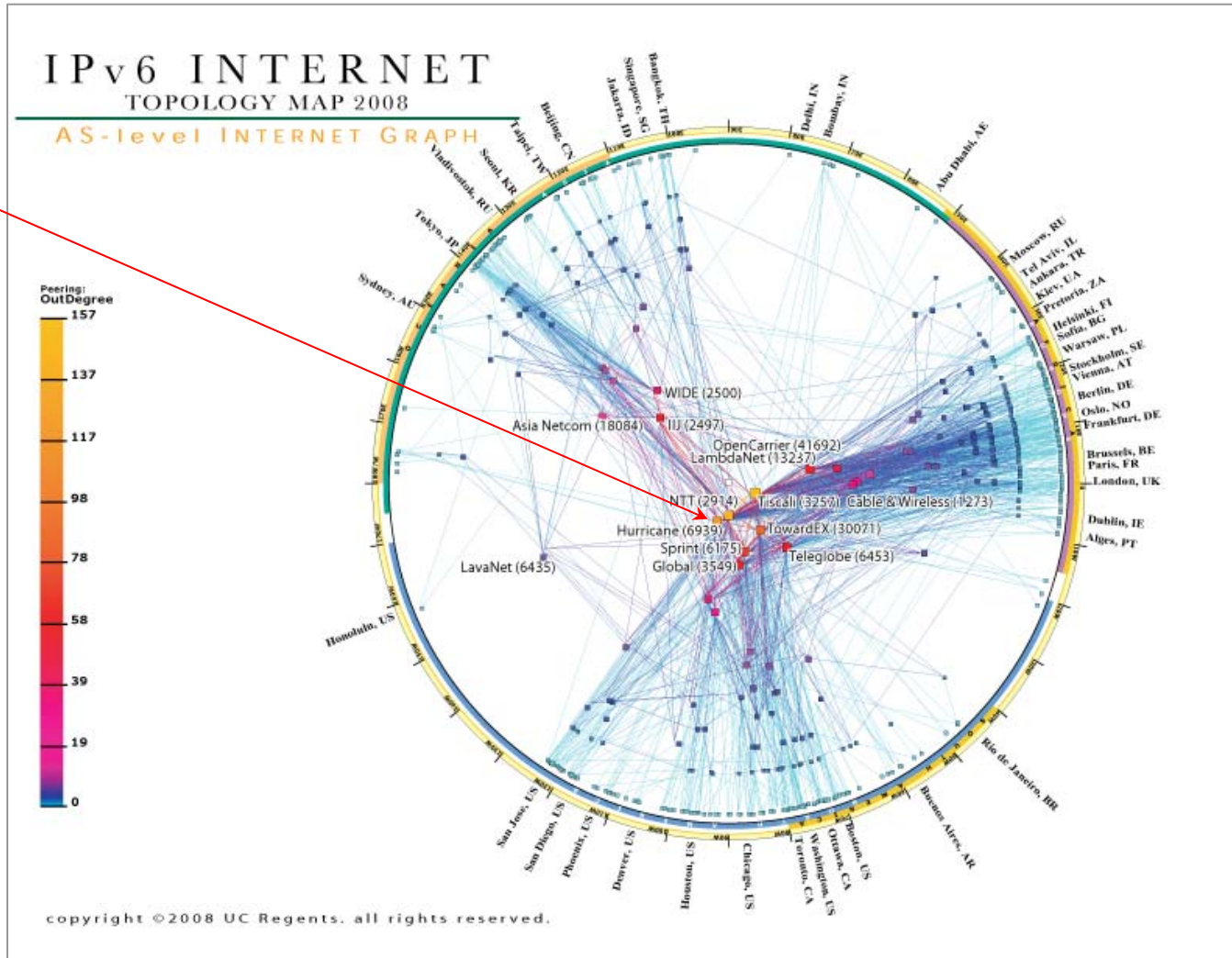
Where did all this lead us?

(or – was it worth it?)



Hurricane Electric – IPv6 Status (CAIDA)

Hurricane Electric

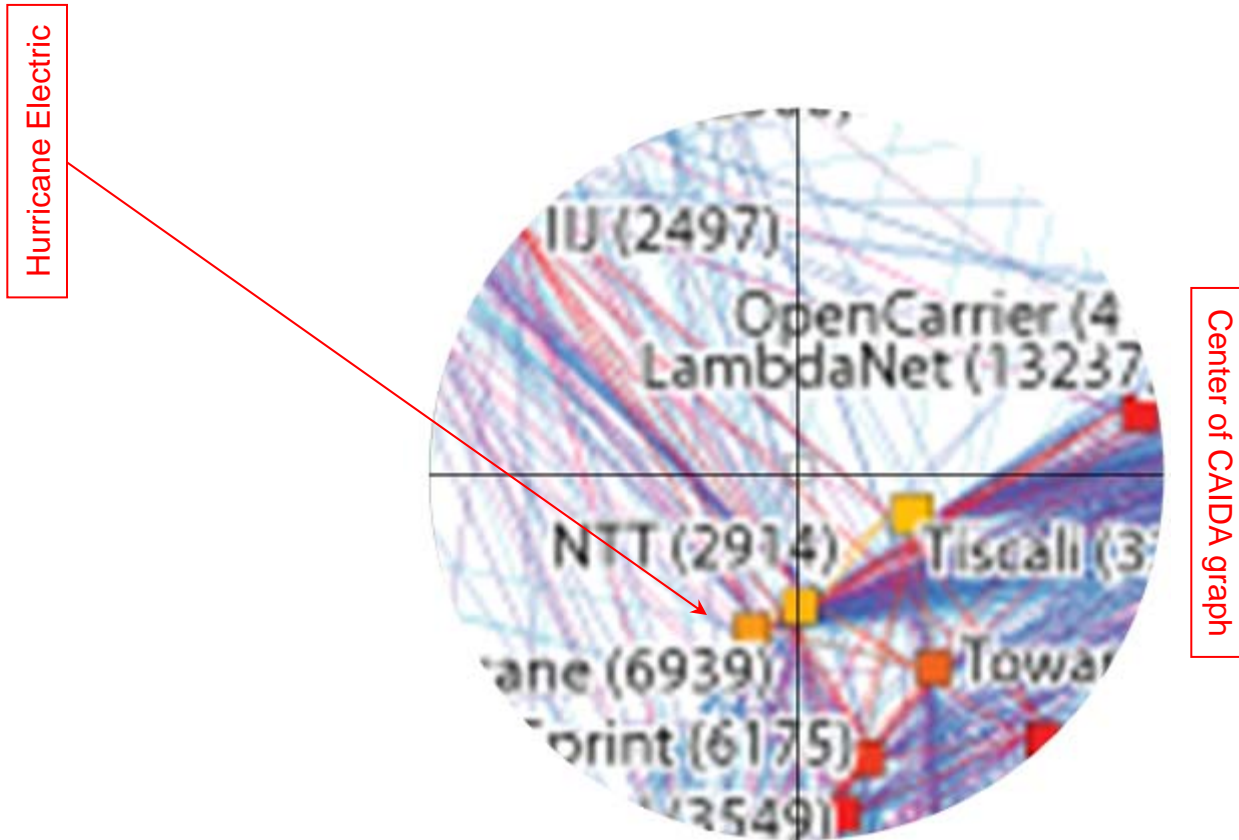


CAIDA status as of January 2008 – Further improved since

See: http://www.caida.org/research/topology/as_core_network/ipv6.xml for full description and explanation.

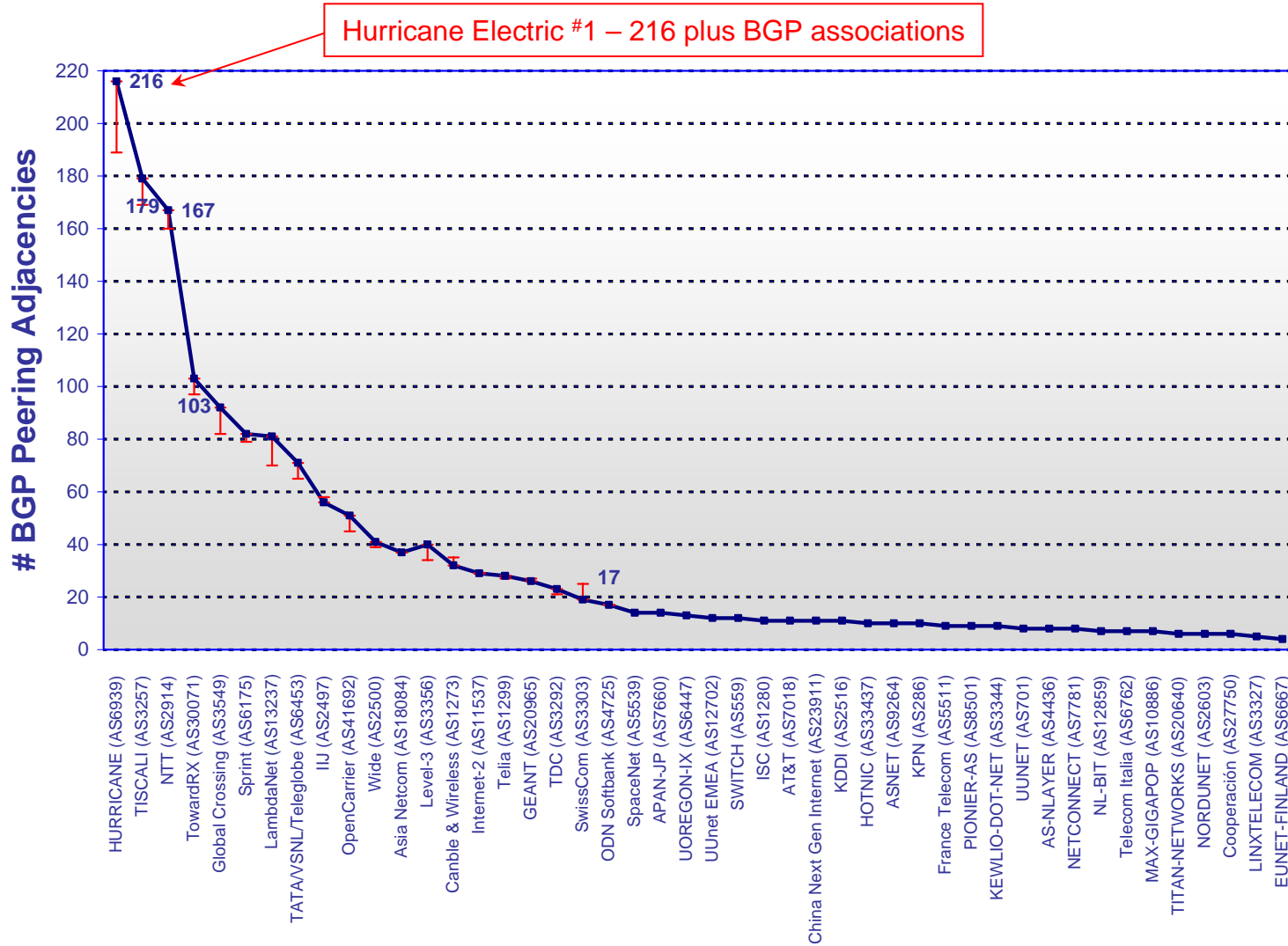


Hurricane Electric – IPv6 Status (CAIDA)



Yes!

Hurricane Electric – IPv6 Status (Oregon)



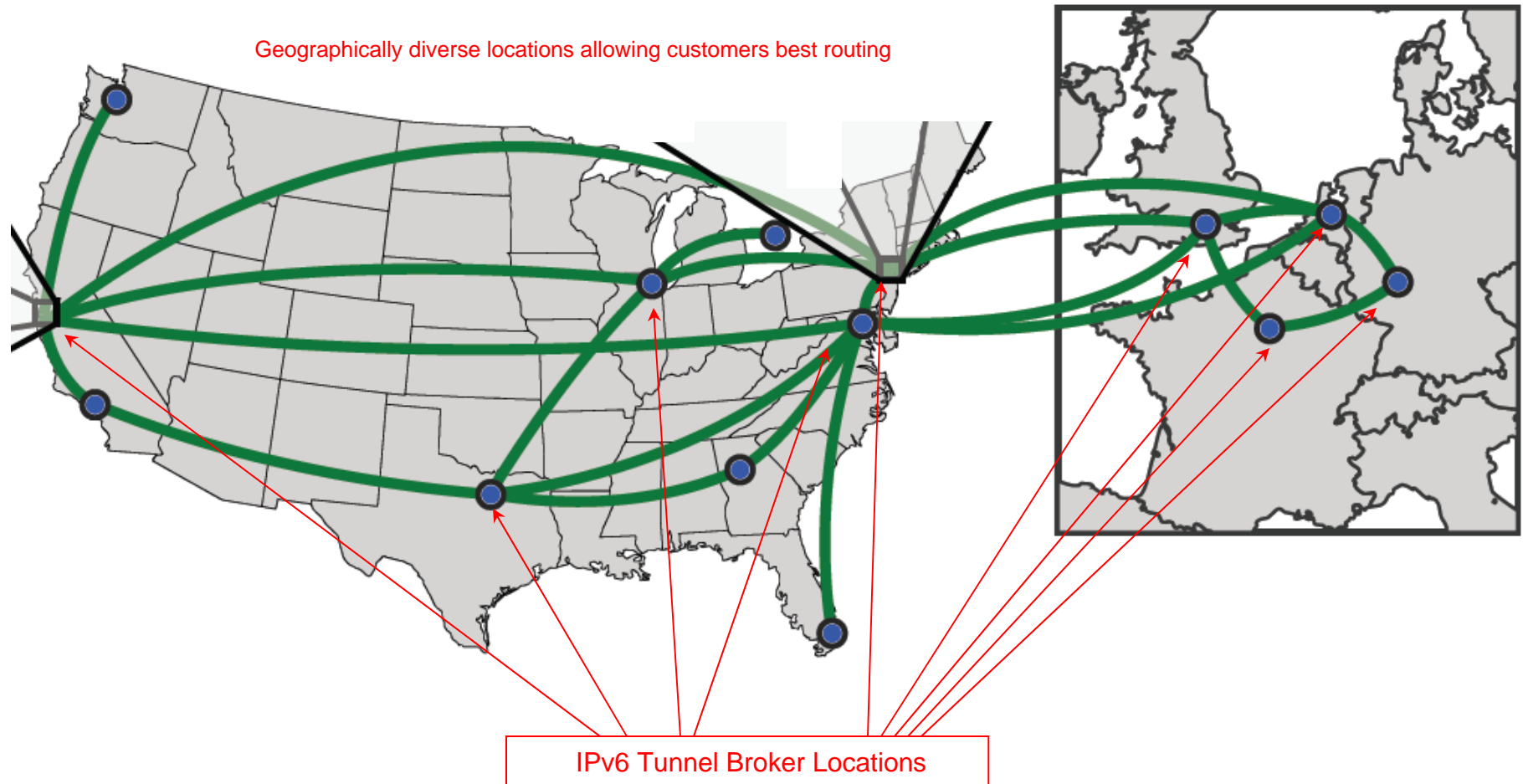
Data extracted from <http://bgp.potaroo.net/v6/as6447/bgp-as-adj.txt>.



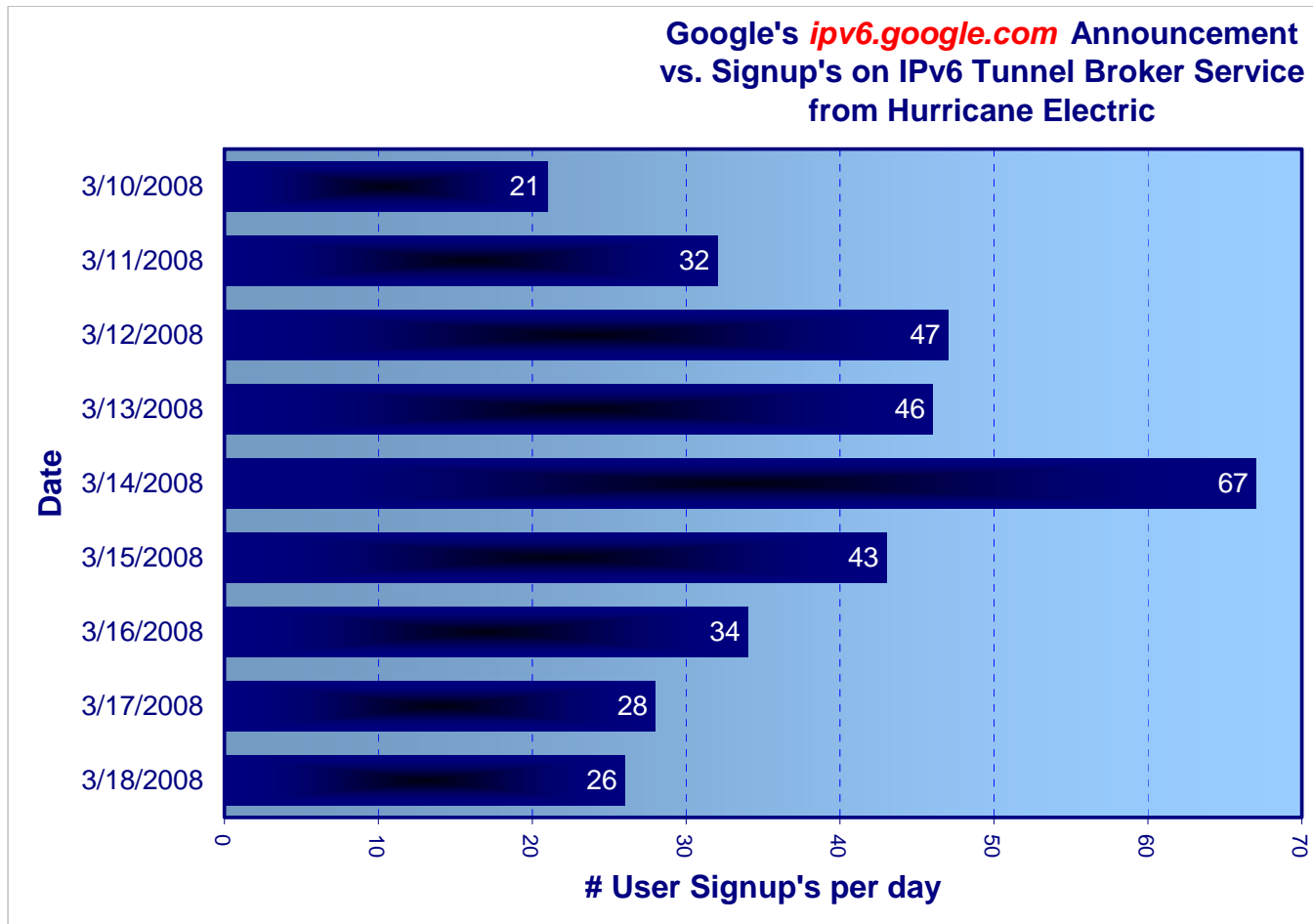
Native IPv6 connections vs. all those tunnels



Hurricane Electric – IPv6 Tunnel Broker



Hurricane Electric – TunnelBroker stats



Google announcement matches IETF meeting timeline



Hurricane Electric – IPv6 Native Services

- IPv6 native router platform across all POP's
 - All IPv6 BGP customer connections are native
- IPv6 dual-stack & native DNS servers
- IPv6 dual-stack & native NTP servers
- IPv6 & IPv4 public looking glass & route servers
- 24/7 NOC with IPv6 expertise
- Datacenter facilities with IPv6 hosting services



Q&A



Contact:

Martin J. Levy
Director, IPv6 Strategy
Hurricane Electric
760 Mission Court
Fremont, CA 94539, USA
<http://he.net/>

martin at he dot net
+1 (510) 580 4167

