

Don't be afraid of IPv6

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IPv6 isn't so scary

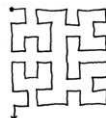
- What is scary.
- Changes in IPv6.
- Planning and using IPv6.
- What to expect.

MAP OF THE INTERNET THE IPv4 SPACE, 2006



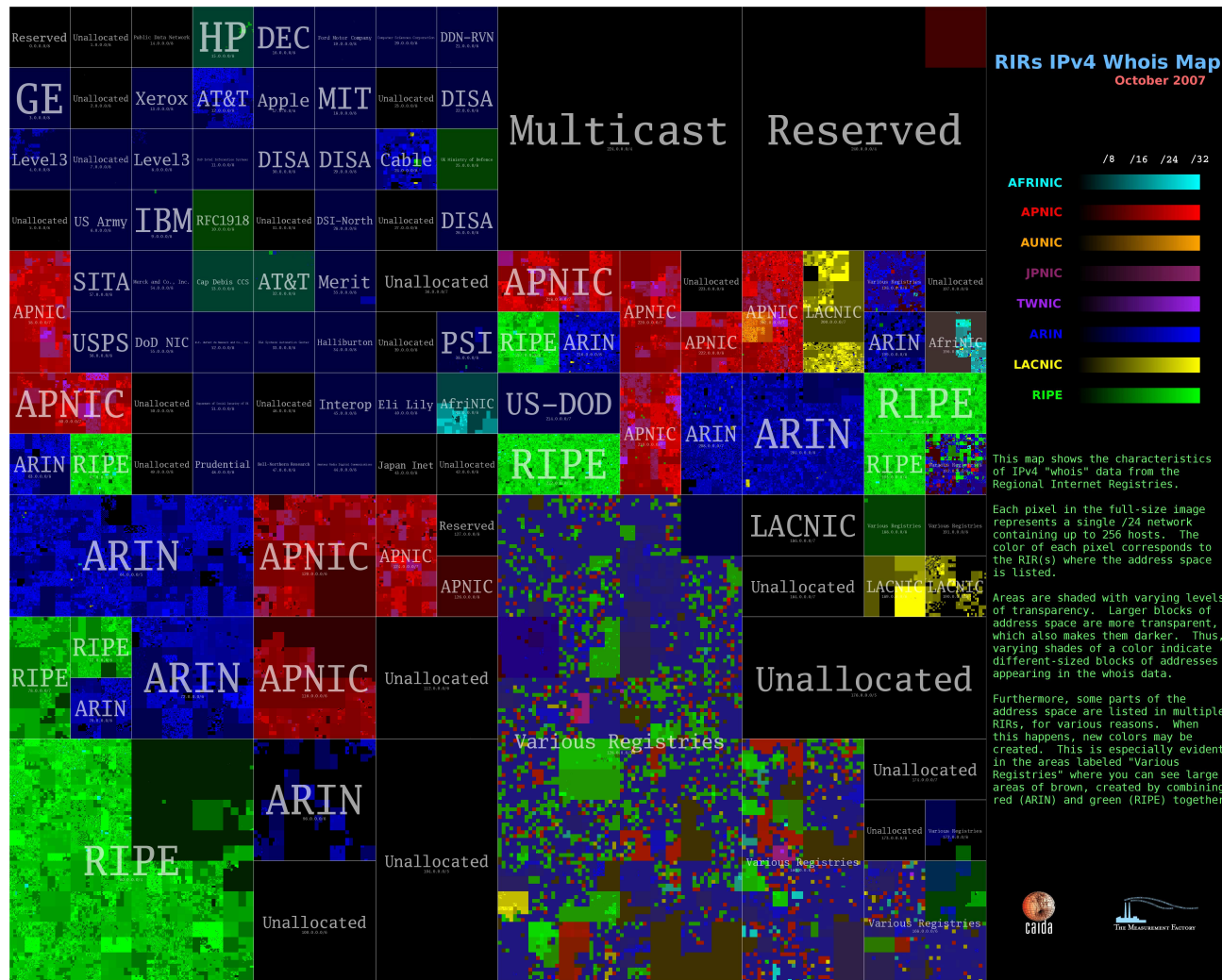
THIS CHART SHOWS THE IP ADDRESS SPACE ON A PLANE USING A FRACTAL MAPPING WHICH PRESERVES GROUPING--ANY CONSECUTIVE STRING OF IP_s WILL TRANSLATE TO A SINGLE COMPACT, CONTIGUOUS REGION ON THE MAP. EACH OF THE 256 NUMBERED BLOCKS REPRESENTS ONE /8 SUBNET (CONTAINING ALL IP_s THAT START WITH THAT NUMBER). THE UPPER LEFT SECTION SHOWS THE BLOCKS SOLD DIRECTLY TO CORPORATIONS AND GOVERNMENTS IN THE 1990's BEFORE THE RIRs TOOK OVER ALLOCATION.

0	1	14	15	16	19
3	2	13	12	17	18
4	7	8	11		
5	6	9	10		



 = UNALLOCATED BLOCK

<http://www.xkcd.com/>



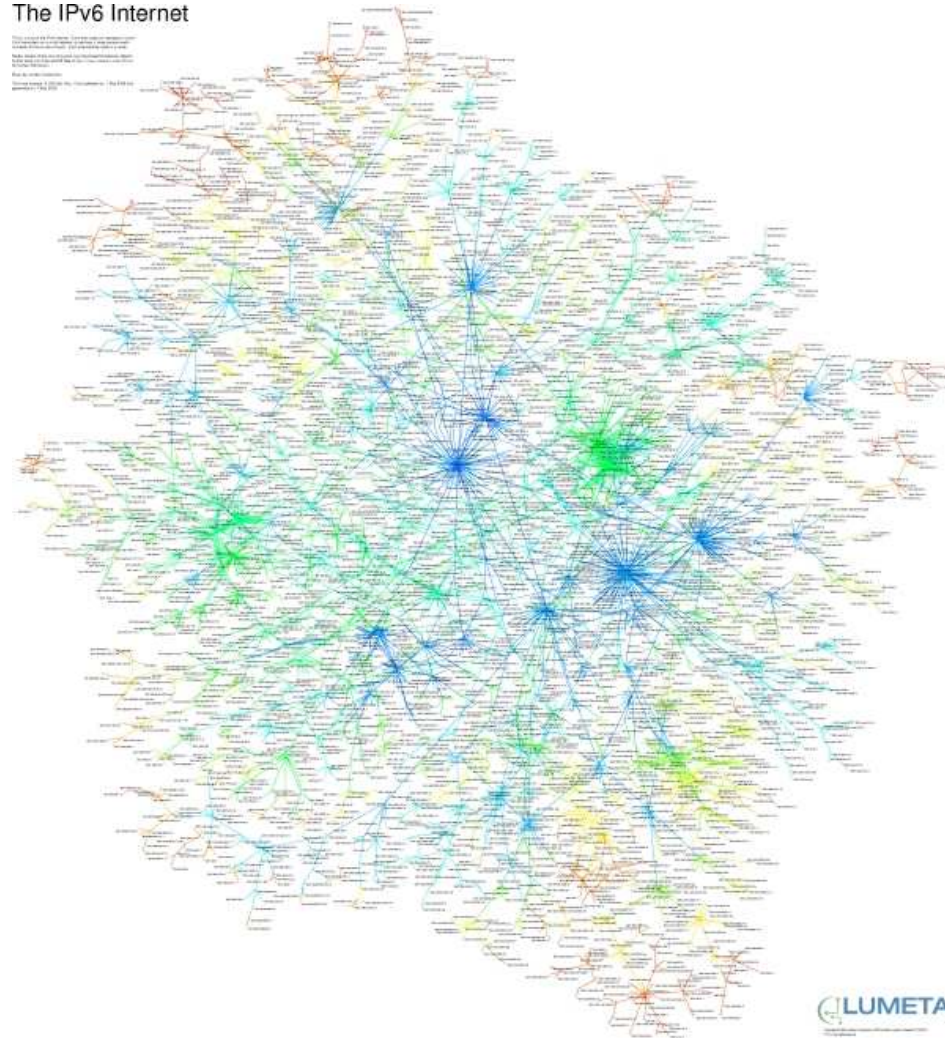
<http://www.caida.org/>

IPv6

- Replacement for layer 3 (IP).
- TCP/UDP/HTTP/... stay the same.
- Differences aren't all that big.
- OSes support is there (Vista, XP, OS X, Linux, *BSD, ...).
- Lots of networks already there.

The IPv6 Internet

This visualization shows the IPv6 Internet as a complex network of connections between various entities. The nodes are color-coded and the edges represent the connections between them. The network is highly interconnected, with many nodes having multiple connections. The visualization is a snapshot of the IPv6 Internet at the time of the data collection.



LUMETA

<http://blog.lumeta.com/>

Major changes

- Bigger addresses (128 bit from 32).
- Better extensibility (extension headers).
- Built in autoconfiguration (DHCP and PPP still possible).
- Mandatory IPsec.
- More integrated multicast.
- ARP replaced with Neighbour Discovery.

Addresses

- 2001:0770:0010:0300:0000:0000:86e2:510b
- 2001:770:10:300:0:0:86e2:510b
- 2001:770:10:300::86e2:510b
- 2001:770:10:300::134.226.81.11

Getting Familiar

- Start with 2 PCs in Lab.
 - Might just be ping and telnet.
- Get connected.
 - Tunnel plus web browser.
- It's already around you.
 - IPv6 configured out-of-box.
- Try on some pet service.

Planning

- Getting connected?
 - ISP, tunnel, firewalls?
- Hardware support.
 - Routers, switches, load balancers,
- Checking software.
 - Mail, Web, DNS, management,
Internal/External.
- Your own software.
 - Data over IPv6, IPv6 addresses, DNS.

Common Cases

- Consumer offerings: PPP, 6to4 or Teredo.
- Isolated or internal networks can use ULAs.
- Services hosted? Just worry about end host.
- Outsourced? Ask your consultant/provider/...

Doing

- Like any other project.
- Working connectivity unlikely to break things.
- Gradual roll out for maximum comfort.
- Test before announce.

2000/08/09 I harass Dave Wilson re IPv6 address.

2001/03/29 CS/Maths routing TCD IPv6 space.

2002/02/06 DNS/addresses allocated by HEAnet.

2002/06/04 AAAA added to production names.

2002/12/20 Natively over Gigabit Ethernet.

2003/07/21 AAAA glue in .ie zone.

2004/09/06 IPv6 capable .ie server.

2005/03/14 Google get a block of IPv6 addresses.

2008/03/11 Google announce `ipv6.google.com`.

Common Gotchas

- Something just doesn't support IPv6.
- A switch/NIC doesn't do multicast.
- Overzealous firewall blocks PMTU.
- Broken DNS servers don't do AAAA.

Now What?

- Enjoy world without NAT.
- Enjoy having lots of addresses.
- Enjoy having lots of subnets.
- Marketing?
- Try some of the IPv6 only services.

Interesting Events

- Protocol redundancy during SQLslammer!
- Etherchannel problems, IPv6 unaffected.
- Recovered correctly after network merge.
- Weirdness with old statically linked apps.
- Delay when IPv6 is down/unconfigured.

Conclusion

- IPv6 not all that hard.
- Need to build familiarity.
- Need to roll out.
- After that, very like IPv4.
- Buy now and avoid the rush!