Don't be afraid of IPv6

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28 January 2009

IPv6 isn't so scary

- What is scary.

- Changes in IPv6.

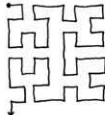- Planning and using IPv6.

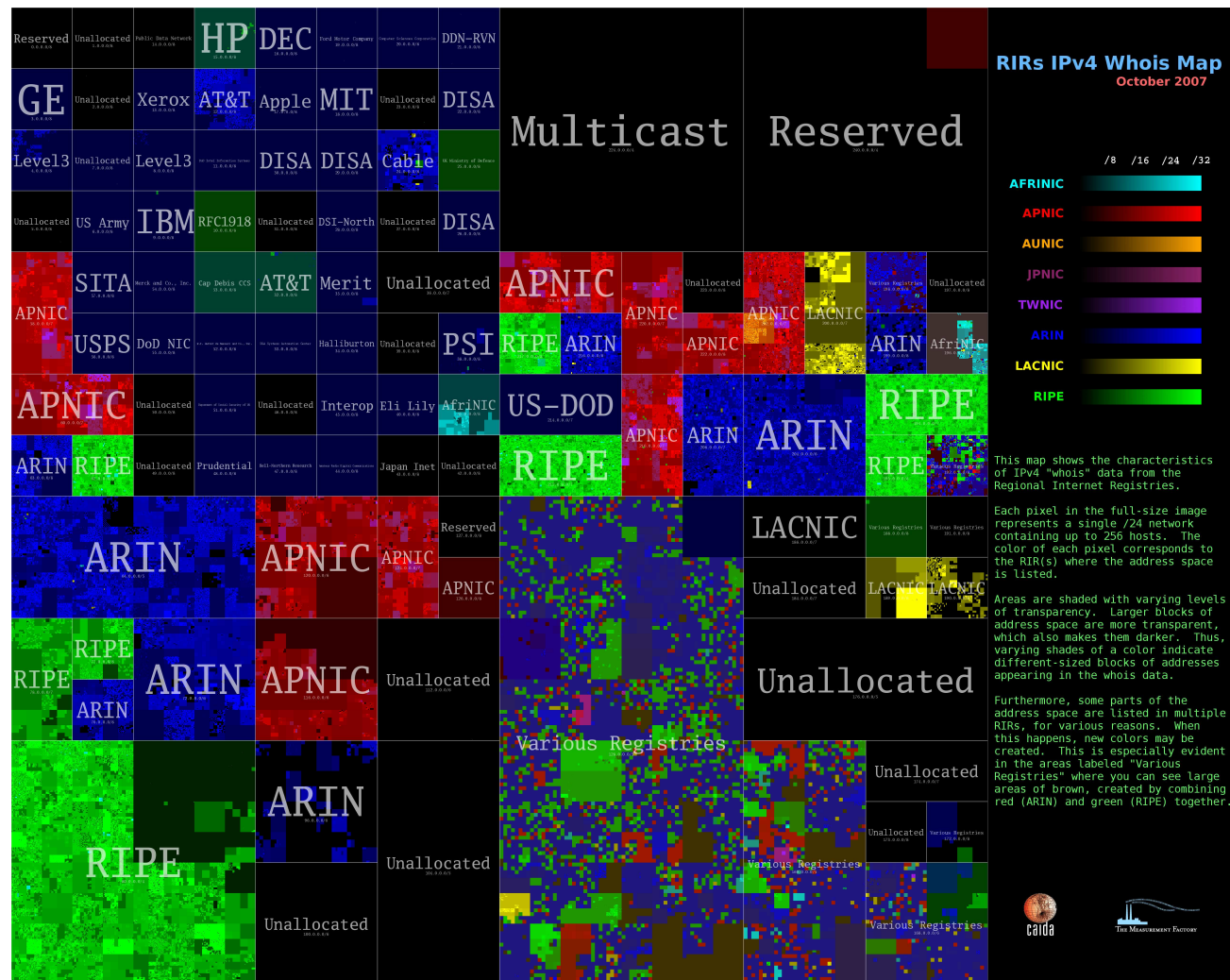- What to expect.

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 IPs WILL TRANSLATE TO A SINGLE COMPACT, CONTIGUOUS REGION ON THE MAP. EACH OF THE 256 NUMBERED BLOCKS REPRESENTS ONE /8 SUBNET (CONTAINING ALL IPs 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.

= UNALLOCATED BLOCK

RIRs IPv4 Whois Map
October 2007

This map shows the characteristics of IPv4 "whois" data from the Regional Internet Registries.

Each pixel in the full-size image represents a single /24 network containing up to 256 hosts. The color of each pixel corresponds to the RIR(s) where the address space is listed.

Areas are shaded with varying levels of transparency. Larger blocks of address space are more transparent, which also makes them darker. Thus, varying shades of a color indicate different-sized blocks of addresses appearing in the whois data.

Furthermore, some parts of the address space are listed in multiple RIRs, for various reasons. When this happens, new colors may be created. This is especially evident in the areas labeled "Various Registries" where you can see large areas of brown, created by combining red (ARIN) and green (RIPE) together.
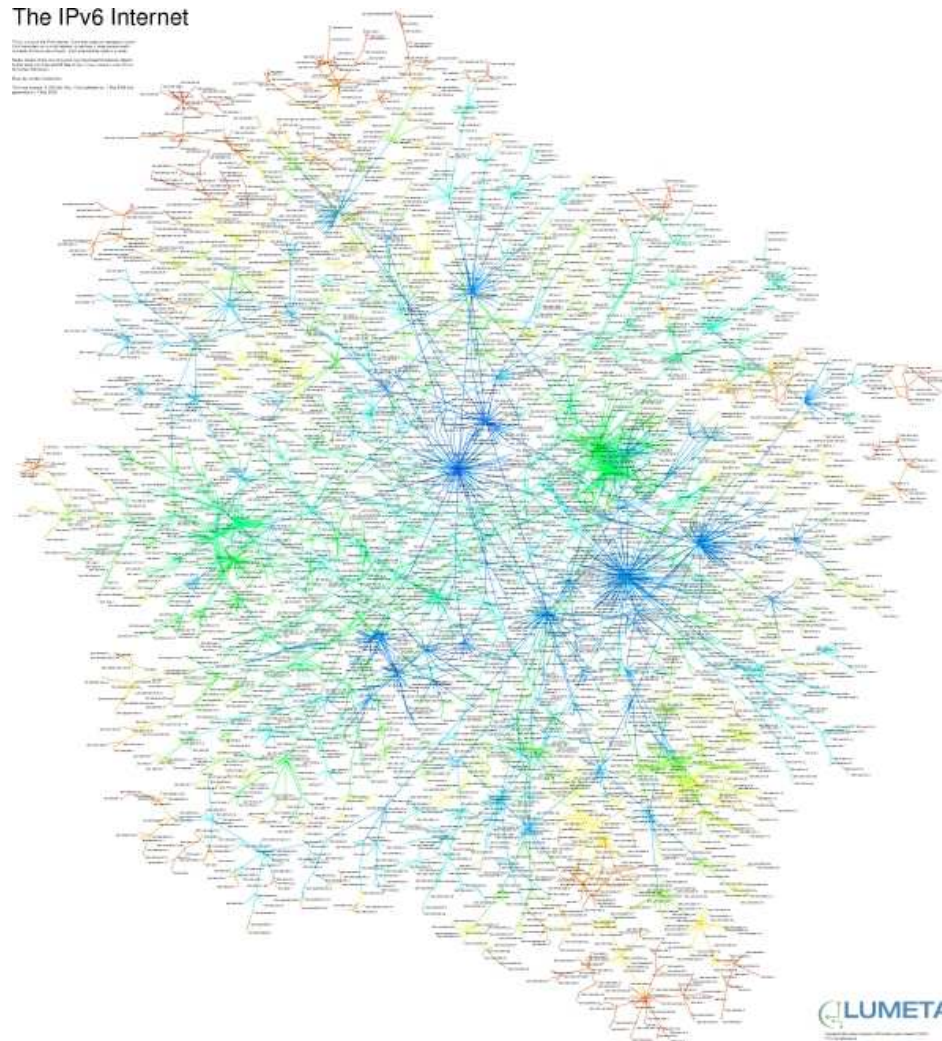
http://www.caida.org/

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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

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!