

IETF and IPv6

Status update
Harald Tveit Alvestrand

Harald@alvestrand.no

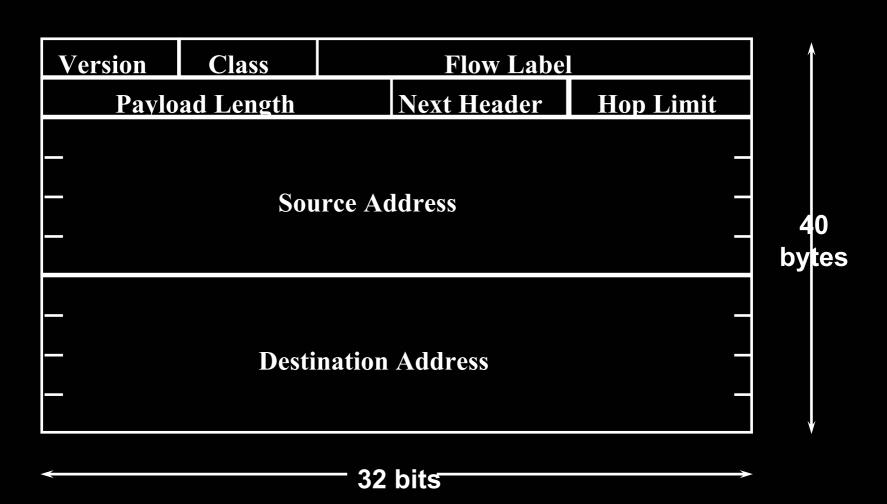
Overview of this talk

- IPv6 is solid, stable and useful
- Lots of application-type things rolling out
- A number of controversies

IPv6 is pretty solid

- It's IPv4 with bigger addresses
- Most of what has worked still works
- Most of the rest is easy if you think about it and write down what you find out

IPv6 Header Format



Stuff that works aready

- IPv6 Protocol, Addressing Architecture, ICMP, DNS, Security, Transition Mechanisms, Neighbor Discovery, Address Auto-configuration, IPv6 over k>, Routing Protocols, Tunneling, MIBs, Header Compression, MLD etc.
- You can build a network out of that!

Stuff that's just about done

Cisco.com

DHCPv6

Essential for autoconfiguration – of everything BUT the IPv6 address!

Mobile IPv6

Same principles as Mobile IPv4, but a little cleaner (and a little more secure)

IPv6 in other IETF contexts

Cisco.com

Most other WGs now accept IPv6 as a fact of life

Specs are written with IPv6 support in the "basic package"

Requirements docs are being written

The 3GPP requirements on IPv6 (3314)

The V6Ops "scenarios" work

IPv6 in the Real World

Cisco.com

- Major vendors (Cisco, Microsoft, Apple, IBM, Sun, Linux, *BSD....) now routinely ship IPv6
- ThreeDegrees largest IPv6-only experiment so far

http://www.threedegrees.com/

 IPv6 addresses readily available through normal channels (IANA->RIR->LIR) (no more 6bone)

And now for the blood on the floor....

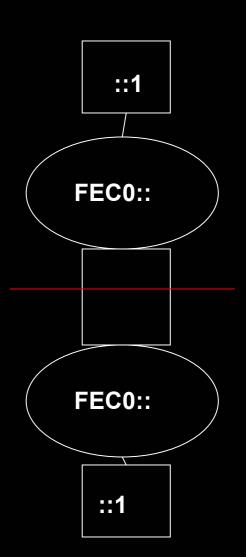
- There is stuff in the IPv6 specifications that doesn't have wide community acceptance
- Some of this stuff needs to be changed
- The process ain't pretty

Details that just needed fixing

- Address architecture republished (3513)
 - Removes TLA/NLA flawed concept
 - Controversy over the /64 boundary and some of its implications
- DNS decision to go with AAAA documented (3363)

Site-Local: What it was

- Address range for non-global, uncoordinated per-site usage (FEC0::)
- Touted for access control, disconnected operation and many other purposes
- Pushed address selection into applications – need for topology info increased
- Caused need for more configuration at edges (define site!)



Site-local: Rubber meets road

- When implications became clear, reaction was strong in various communities
- Rough consensus (March): Deprecate it. Not useful.
- No current document describing status.
- Still a lot of shouting going on.

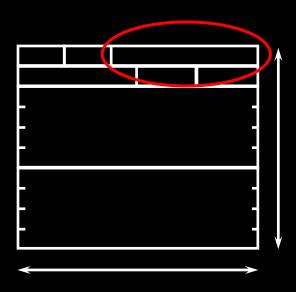
Flow Labels – draft-ietf-ipv6-flow-label-07

Cisco.com

- Part of the original IPv6 spec
- Never clear how to use it "something to do with flow & QoS"
- Back and forth between very ambitious specification and very small one

Current spec is on the "small" side

- Most important statement: 120 seconds – lifetime of flow state
- WG requested publication May 1



Transition Mechanisms – v6ops

Cisco.com

- Plethora of mechanisms proposed ISATAP, TEREDO, DSTM, 6to4, 6over4.....
- Stepping back and trying to figure out what's needed:
 Scenario description

ISP scenario

Enterprise scenario

Home/Unmanaged scenario

Cellular (3GPP/UMTS) scenario

- Putting publication of mechanisms on hold even while they are being shipped in volume
- The work is not yet finished...

Security is not Obscurity: SEND

- ARP is insecure. But can't be changed.
- Neighbour Discovery is insecure
- Neither attack is critical usually
- We shouldn't require people to leave security doors open
- The SEND WG is looking at the problem

The Multihoming Problem

- Simple problem: What do I do if my service provider goes down?
- Simple answer: Multihome
 But this kills Internet routing's scaling
- IPv6 seems to provide the hope of a new look
- Multi6 WG set up to investigate possibilities

Multi6 current status

- Long time no result
 Chairs recently replaced
- Several families of solutions proposed
 Geo-based addressing (and hope for IX)
 Replace the TCP layer (rebind connections)
 Replace the IP layer (id/loc separation)
- Meetings in Vienna

Outstanding architectural issues

Cisco.com

- What is identity?
- What is security, and who pays?
- Who protects the commons?
- Who negotiates tradeoffs?

IPv6 did not create these problems....

- IPv6 is ready to be deployed
- IPv6 solves the lack of addresses
- IPv6 does not solve everything
- IPv6 allows us to attack some old problems
- Go use it!