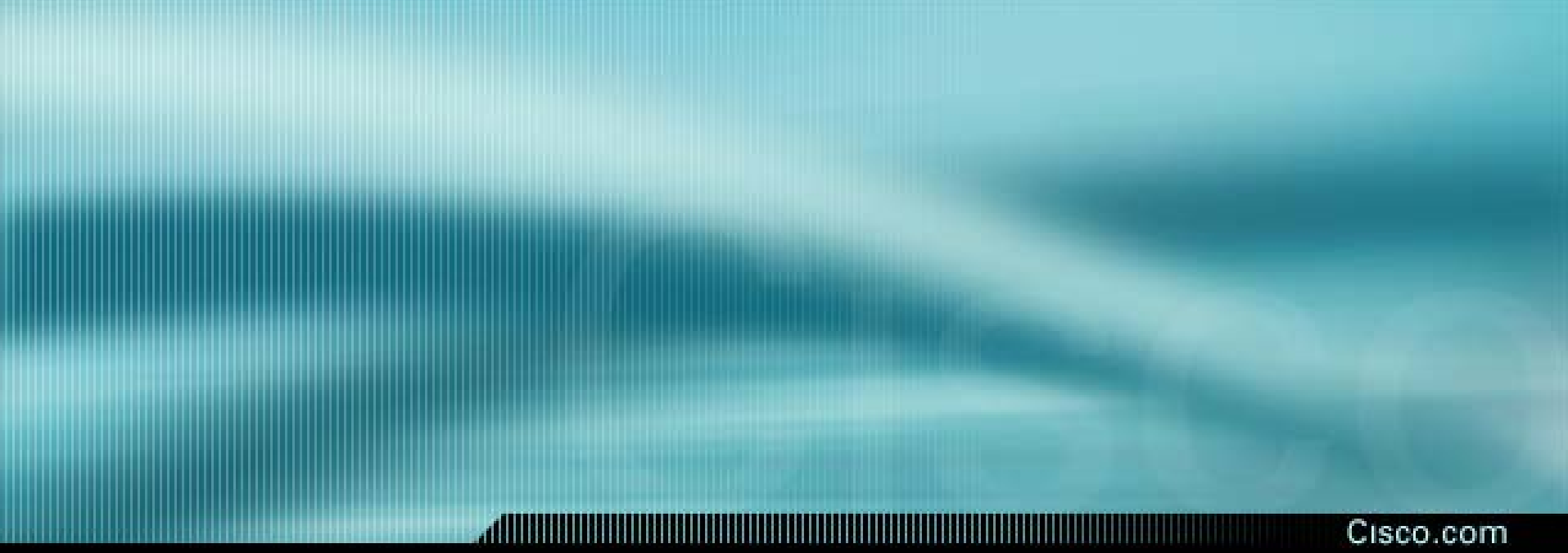

IETF and IPv6

Status update

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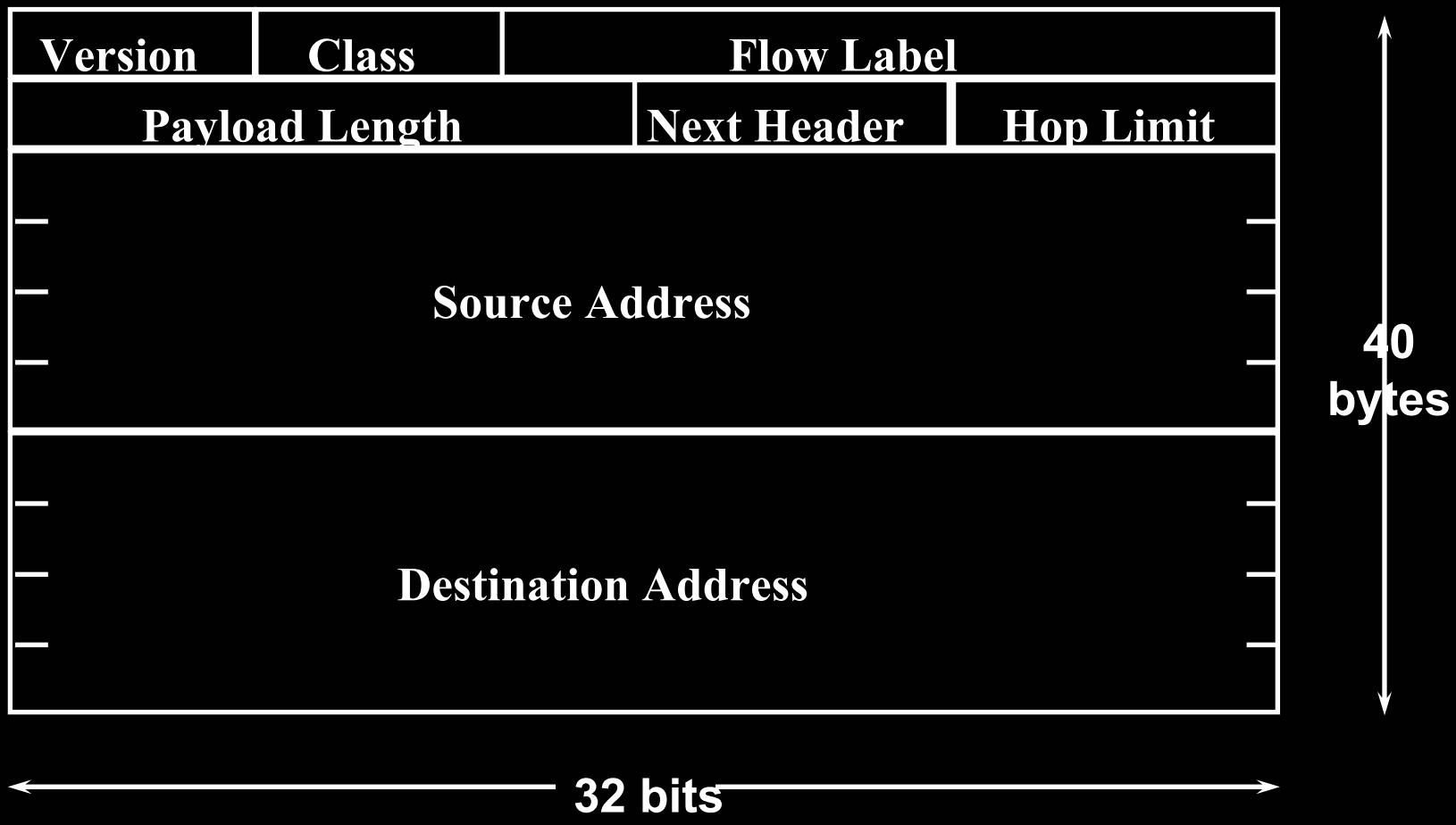
Overview of this talk

- 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 <link>, Routing Protocols, Tunneling, MIBs, Header Compression, MLD etc.
- You can build a network out of that!

Stuff that's just about done

- **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

- **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

- 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....

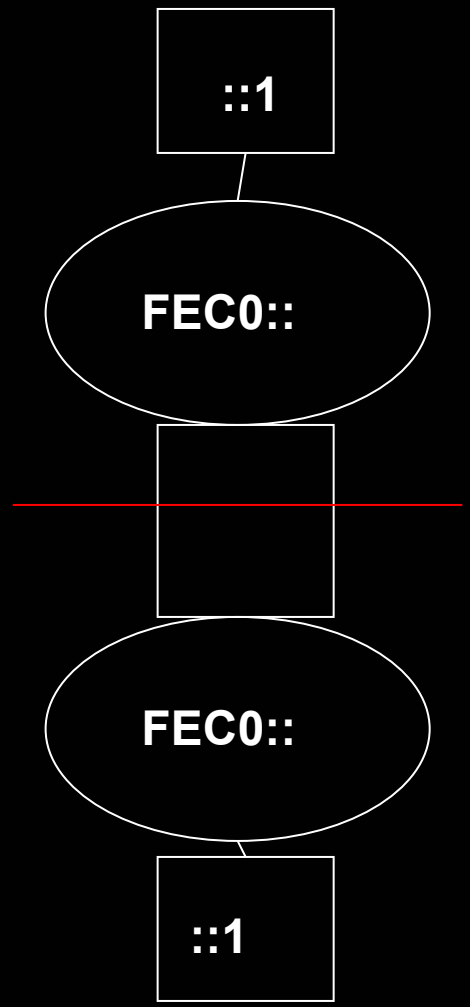
- There is stuff in the IPv6 specifications that doesn't have wide community acceptance
- Some of this stuff needs to be changed
- The process ain't pretty

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!)

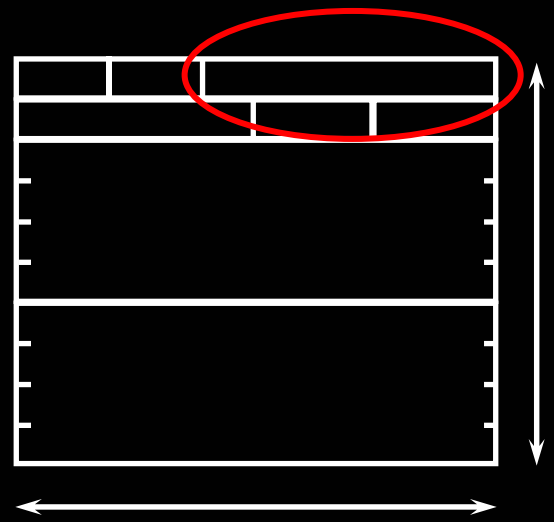


Site-local: Rubber meets road

- 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

- 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

- 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

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

IPv6 did not create these problems....

Summary

- 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!