

Design Guidelines for IPv6 Networks

draft-matthews-v6ops-design-guidelines-01

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What?

- Draft gives advice to designers of IPv6-only and dual-stack networks. Discusses choices that often arise.
 - Eg: “Use LLAs or GUAs for eBGP sessions?”
- For each choice: List options, give pros/cons.
- Goal: Allow designers to make an informed choice.
- Lower level than existing docs on “Deploying IPv6 in <foo>-type networks”.

- Tremendous feedback on -00 version. Lots and lots of comments and additional pros and cons on the choices.
- -01 version is almost complete rewrite.
 - If I somehow missed your comment, please resend !!
- Plan to add more design choices in a future version.

Mix IPv4 and IPv6 traffic?

Should one:

- (a) Mix IPv4 and IPv6 on same layer 2 connection, OR
- (b) Separate IPv4 and IPv6 using VLANs or two different links?

Draft now recommends option (a) wherever possible

- Fewer L3 interfaces; Fewer physical ports; Easier QoS design; Conceptually simpler; Better aimed at future where IPv4 is gradually phased out.

Sometimes one has to do (b), usually to work around limitations in network equipment

- Big example is generally poor support for separately measuring IPv4 and IPv6 traffic in option (a).

**For WG: Above reflects discussion in Vancouver and via email.
Any additional comments?**

LLA Next-Hop for Static Route?

Should the next-hop for a static route:

- (a) Point to a link-local address, OR
- (b) Point to a global/ULA address?

Pros for option (a):

- Consistent with OSPF and ISIS next-hops
- RFC 4861 (Neighbor Discovery) seems to mandate this so that Redirects work.

Cons for option (a):

- Doesn't work for an indirect (multi-hop) static route
- Causes problems if static route redistributed into another protocol
- If LLAs are not manually configured, then they are often dependent on an underlying MAC address. This can cause problems if hardware is swapped out.

Today, most operators do (b)

For WG: Above reflects discussion in Vancouver and via e-mail.

Any final comments?

One or Two eBGP sessions?

When doing dual-stack peering, should one:

- (a) Use a single BGP session to carry both v4 and v6 routes, OR
- (b) Use two sessions: v4 routes over v4 transport, and v6 over v6?

Pros for option (a):

- Half as many BGP sessions

Cons for option (a):

- Adding or removing an address family generally causes a BGP session reset. [Until draft-ietf-idr-dynamic-cap is widely deployed]
- What address family does one use for transport? Initially v4 transport is the obvious choice, but later this will seem less appropriate.
- Carrying, e.g. v6 routes over v4 means that, if there is a v4 connectivity problem, then v6 goes down as well.
- Carrying e.g. v6 routes over v4 gives next-hop which is a v4-mapped address. Must fix, either through route policy, or by configuring v4-mapped addresses on interfaces.

Most operators choose option (b).

For WG: Any other pros or cons?

Should doc recommend option (b) in all cases?

New Topic:

Separate RRs for v4 and v6?

Does one have:

- (a) Single set of Route Reflectors for v4 and v6 routes? For vpn-v4 and vpn-v6 routes?
- (b) Separate sets of RRs for v4 and v6 routes, and for vpn-v4 and vpn-v6 routes?

Pros for option (a):

- Simpler design

Pros for option (b):

- If your hardware is borderline, might give better scalability?
- ??

Q for WG: Other pros and cons?

Poll: What do operators in room do?

- Any interest in adopting as WG item?