Unique IPv4-Mapped Addresses
draft-thaler-6man-unique-v4mapped-00.txt

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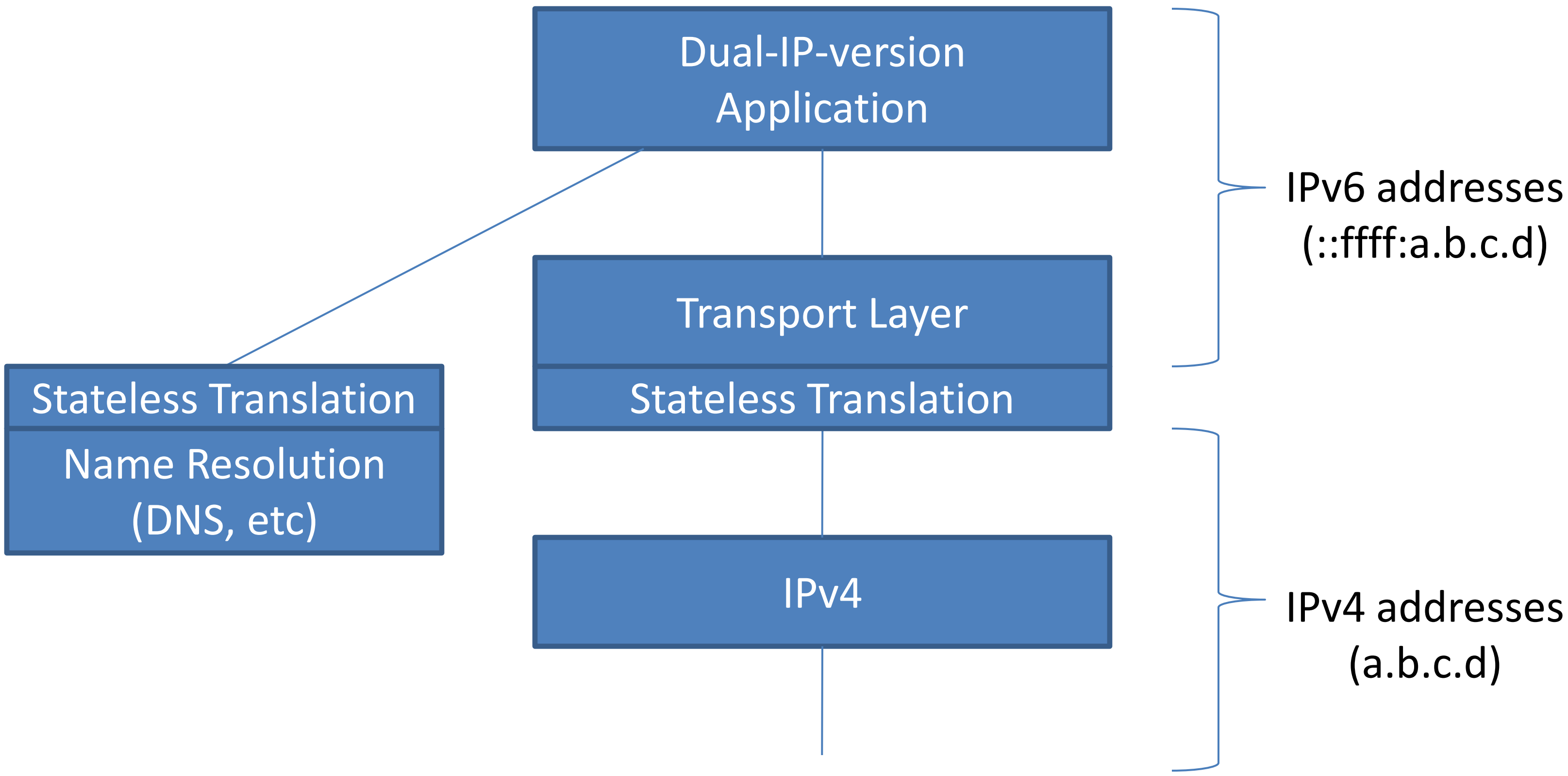
AF_INET6 sockets



- Uses well-known IPv6 prefix (::ffff:0:0/96), LIR IPv4 prefix
- Name resolution synthesizes IPv6 addresses only if IPv4-only response

IPv4-Mapped Addresses

- ::FFFF:x.y.x.w defined in IPv6 address architecture to hold IPv4 addresses
  - Used in APIs (e.g., RFC 3493, RFC 3542), e.g. to allow IP-version-agnostic apps to use same socket for both IPv4 and IPv6
- As implemented, addresses with this prefix tell TCP/IP to convert address to IPv4 and send to the IPv4 stack
- Supports all IPv4 addresses: global IPv4, RFC 1918 addresses, and link-local IPv4 (RFC 3927)

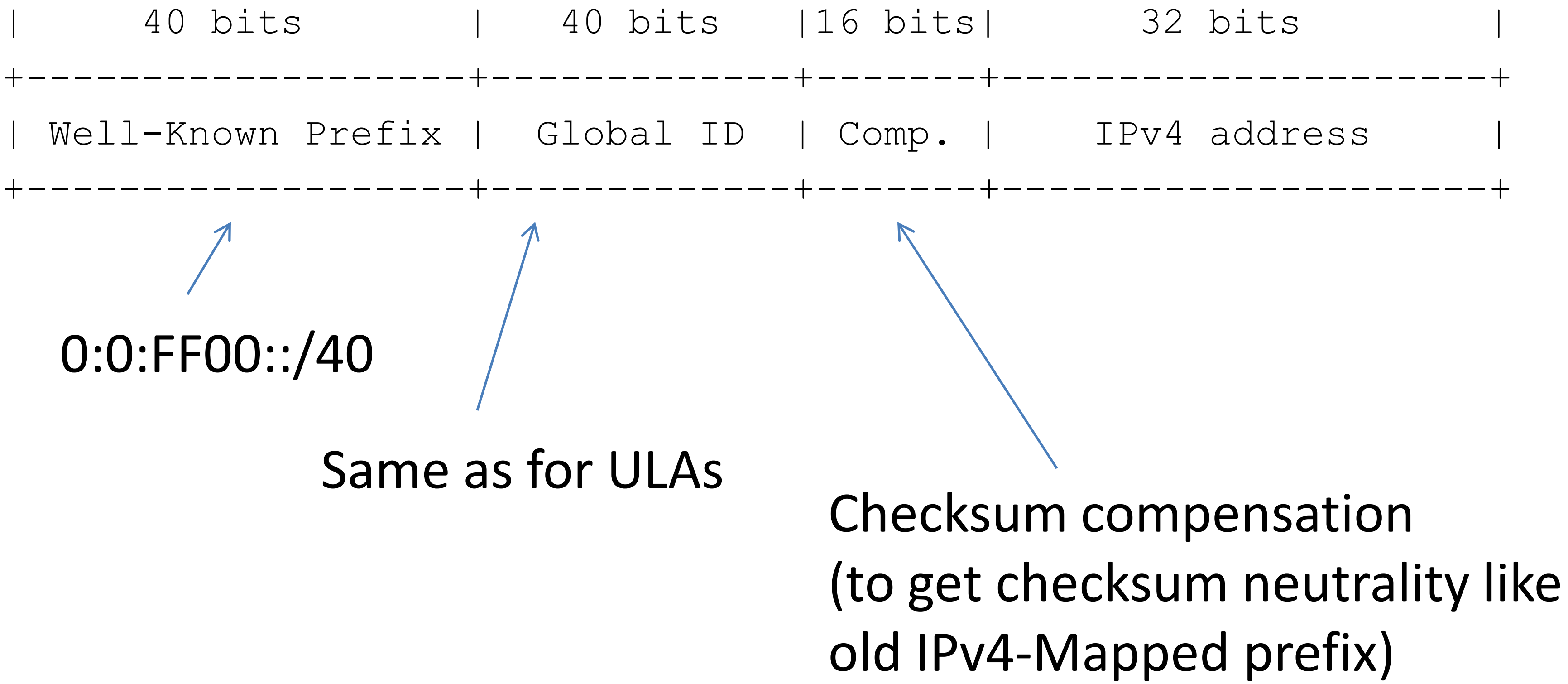
Scenario

- Non-global IPv4 addresses are ambiguous when you're multihomed
  - This will become much more common as IPv4 depletion progresses
  - Ambiguity in IPv4 never worked in IPv4 APIs before
- We already went through the IPv6 equivalent in the site-locals discussion
  - IPv6 APIs provide a scope ID, and so do IPv4-mapped addresses
  - So you might think "Hey, this provides an incentive for apps to change to use IPv6-capable APIs *even for IPv4 destinations*!"
  - But you'd be wrong, at least today…

Problems with IPv4-Mapped Addrs

- RFC 3484 requires IPv4-mapped addrs to be treated as globals (hence 0 scope id)
- Even if it were non-zero, same scope id problems arise that led to deprecation of site-locals
- Solution for site-locals was to deprecate and replace with Unique Local Addresses:
  - Embed the network id in the address, not the scope id

Unique IPv4-Mapped Addrs



```
|     40 bits        |   40 bits   |16 bits|      32 bits        |
+-------------------+-------------+-------+---------------------+
| Well-Known Prefix |  Global ID  | Comp. |    IPv4 address     |
+-------------------+-------------+-------+---------------------+
```

0:0:FF00::/40

Same as for ULAs

Checksum compensation
(to get checksum neutrality like
old IPv4-Mapped prefix)

Not yet covered in doc

- Impact on APIs that deal with IPv4-mapped addresses today
- Feedback/questions from 6man:
  - How generate Global ID if you don’t have a ULA
  - What happens if an address leaks to another host