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

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IPv4-Mapped Addresses

• ::FFFF:x.y.z.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 Addr

| 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
  – getaddrinfo() with AI_V4MAPPED
  – IPV6_V6ONLYsockopt
  – IN6_IS_ADDR_V4MAPPED() macro

• Open question: Should old format be deprecated or retained?