Hybrid Type Prefix for IPv4-Embedded IPv6 Addresses

draft-xu-behave-hybrid-type-prefix-00

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Problem Statement

- Redundancy and load-balancing in the IPv6 network to IPv4 Internet scenario.
  - With WKP (64:FF9B::/96), to achieve hot standby and load-balancing functions, all NAT64 devices of the IPv6 network have to belong to a single redundancy group. State synchronization would become a big challenge if the amounts of state and NAT64 devices for the IPv6 network are much large.
  - With NSP, some extra works (see draft-wing-behave-dns64-config) need to be done to avoid traversing the NAT64 when dual-stack hosts are involved.
Problem Statement (con’t)

- NAT64 avoidance in the IPv6 Internet to IPv4 network communications when dual-stack hosts are involved.
  - NSP MUST be used in this scenario. However, IPv6 addresses synthesized with NSP are hard to be distinguished from native ones.

```
+---------------------------+
|                          |
+---------------------------+
| IPv6 Internet             |
| Dual-stack                |
| +---+                    |
| | H1                      |
| | +---+                   |
| | IPv4 Internet           |
```

Figure 1. Dual-stack Hosts Communicating to IPv4-only Hosts
Hybrid Type Prefix

- Hybrid Type Prefix (HTP) integrates the benefits of both WKP and NSP.
  - Distinguish synthesized IPv6 addresses from native ones easily.
  - Topologically aggregatable in provider networks.

![Diagram of Hybrid Type Prefix](image)

- **64::/16 (HTP Block)**
- **64:FF9B::/80 (WKP Block)**
- **64:FF9B::/96 (Strong WKP)**

Strong WKP (a.k.a, the WKP defined in [address-format])
Load-balancing using WKP

Can be used to identify different redundancy groups.

States for the whole IPv6 network are distributed among different redundancy groups.
HTP Allocation for IPv6 Internet to IPv4 Network Scenario

**Network Specific Part**

- IPv4 network
- NAT64
- IPv6 Tier-2 ISP#m
  - (64:0001::/32)
  - 64:0001::01/96
  - 64:0001::02/96

-HAVP Allocation
- IPv6 Tier-2 ISP#n
  - (64:0002::/32)
  - 64:0002::01/96
  - 64:0002::02/96

- IPv6 Tier-1 ISP #x
  - (64::/24)

- IPv6 Tier
  - 64::/16 (exclude 64:FF9B::/80)

- HTPs are allocated in the same hierarchy as that for NSPs.
Next-Step

- Comments?
- Adopt it as a new charter item?