Prefix Pool Option for DHCPv6 Relay Agents on Provider Edge Routers

draft-yeh-dhc-dhcpv6-prefix-pool-opt-07/08

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Problem Statement

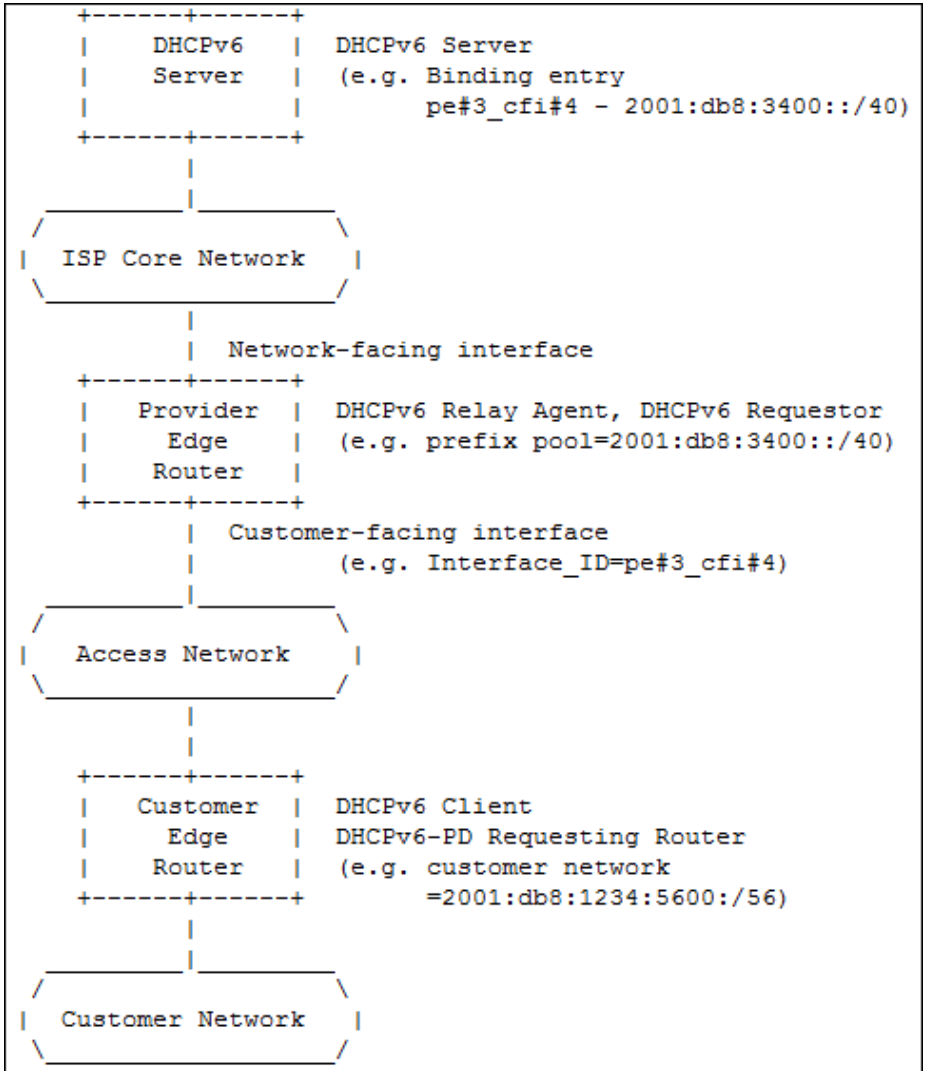
- DHCPv6 Prefix Delegation [RFC3633] is used as the mechanism for the automated delegation of IPv6 prefix to the customer network, when a CE (or Routed-RG/CPE) router is employed in the customer network.

- In order to make the customer network to be reachable in the IPv6 network, the PE routers always need to add or remove the route entry directing to each customer network in its routing table as per the PD messages between DHCPv6 Server and the Requesting Router (DHCPv6 Client, CE). (Referring to the Section 6.2 of BBF TR-177)

- When the routing protocol is enabled on the network-facing interface of the PE router, all the routes directing to the customer networks are advertised in the ISP core network. This will make the number of entries in the routing table on the ISP core router to be unacceptable huge. For example, if there are 1M active subscribers in the ISP network, then the number of the route entries in the core router could be 1M.

Network Scenario & Requirements

- Centralized DHCPv6 server in the network of deployment, while PE acting as the relay agent;
- Provide automatic mechanism of the route aggregation for the PD customer networks based on the information of prefix pools;



Proposed New mechanism with OPTION_PREFIX_POOL - 1

- Design for the route aggregation on PE acting as DHCPv6 Relay Agent

- No new DHCPv6 message, but one new DHCPv6 option, OPTION_PREFIX_POOL
- Work closely with DHCPv6-PD processes, including a. DHCPv6 server (Delegating router) solicitation, b. DHCPv6 client (Requesting router) initiated configuration exchange (prefix delegation), c. DHCPv6 server initiated configuration exchange (Prefix delegation reconfiguration) defined in the RFC3315 & RF3633
- The status of Prefix Pool can be determined by the delegated prefixes within the associated prefix pool
- Prefix Pool presented as a short prefix (e.g., a /40 prefix) out of the longer prefixes (e.g., /56 prefixes) delegated to customer networks
- Build a table of prefix pools associated with the PE#(+CFI#) and its status (Active or Released) on the server
- Build a table of prefix pools associated with its lease on the relay
- The status of prefix pool can be re-set by the server

Proposed New mechanism with OPTION_PREFIX_POOL - 2

- Design for the route aggregation on PE acting as DHCPv6 Relay Agent

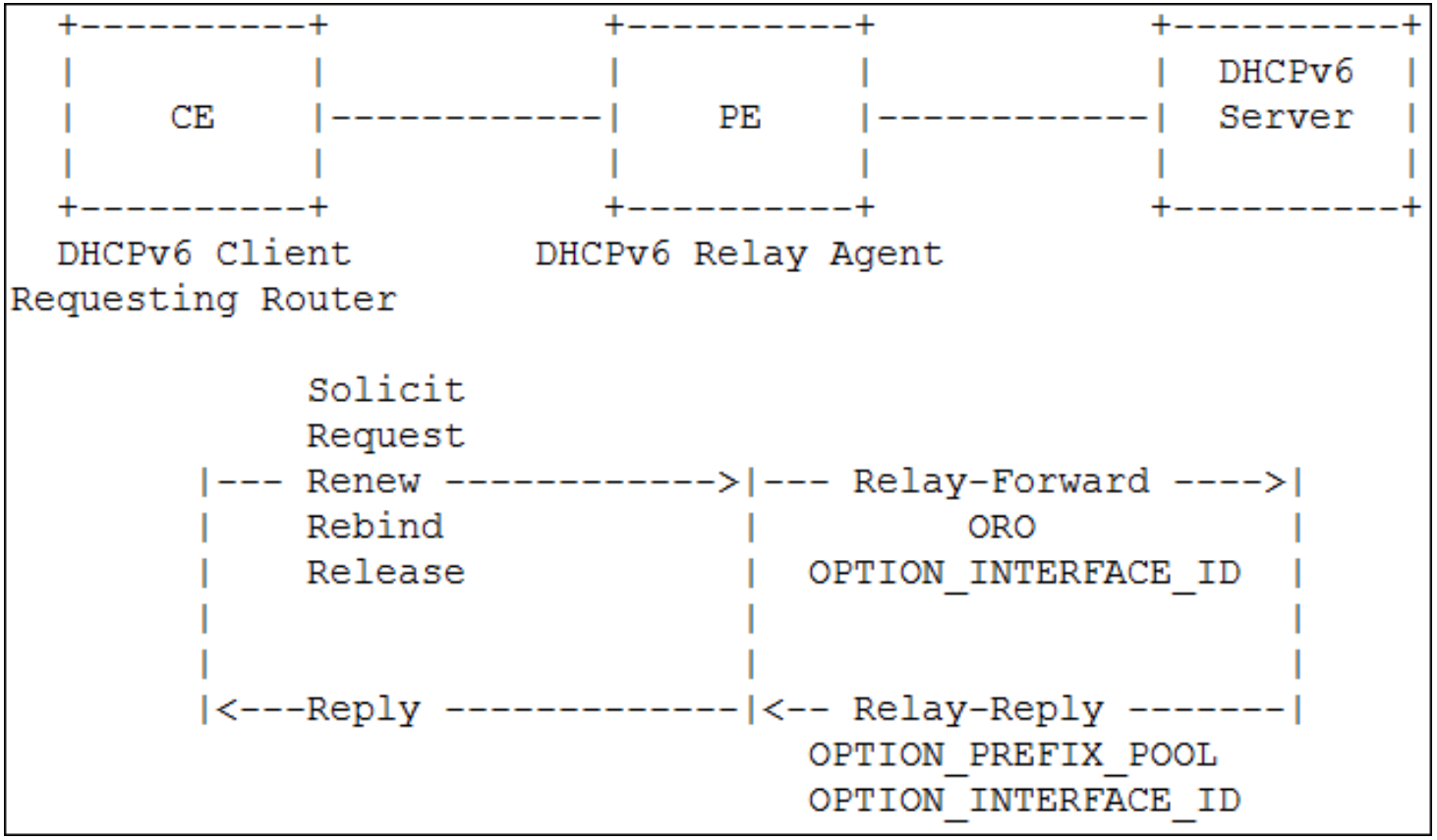


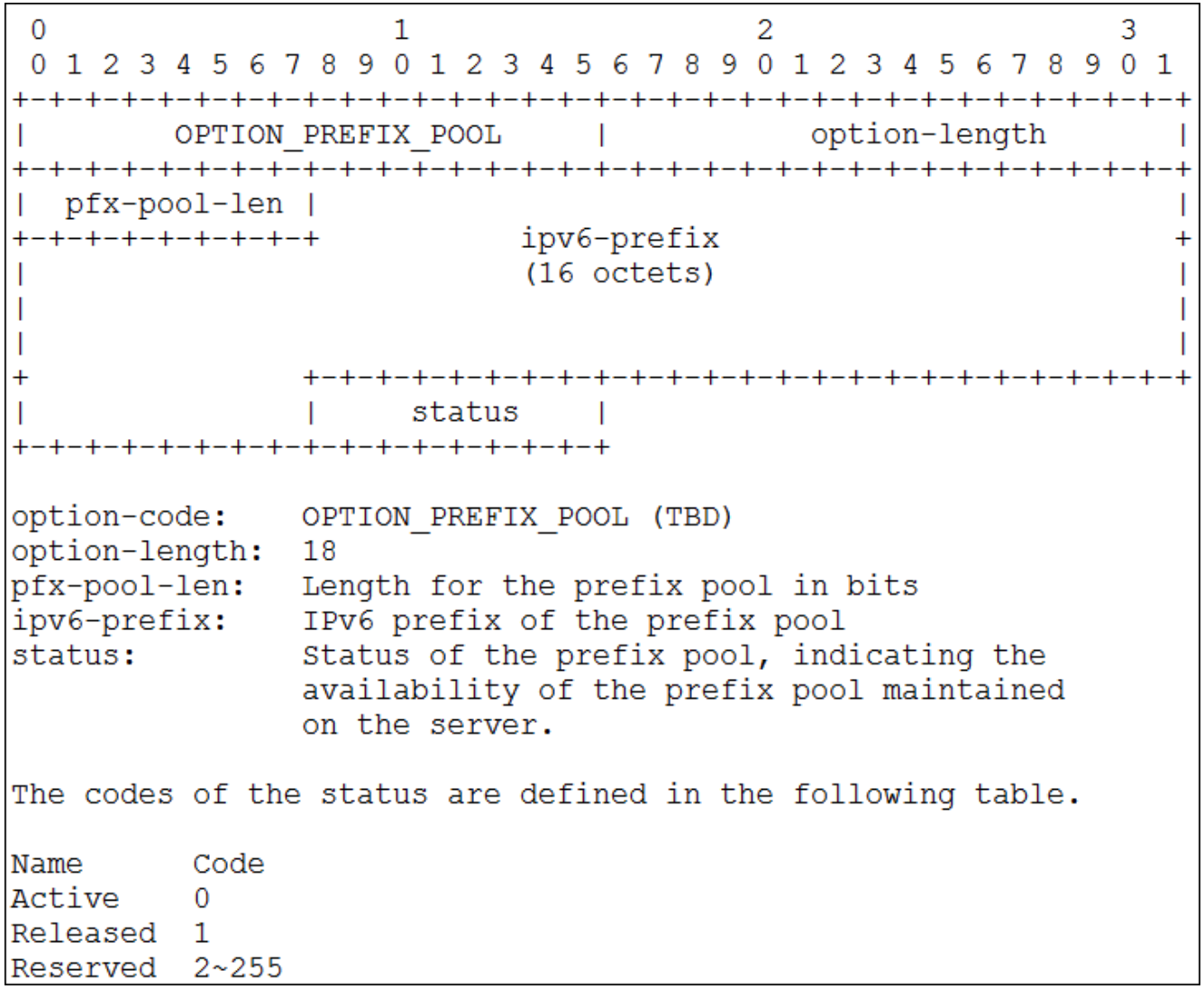
Table of Prefix Pool @ Relay Agent

ID-CFI#	Prefix Pool	Lease
eg.		
-	2001:db8:1230::/44	0
or		
cfi#4	2001:db8:3400::/40	Max. of the deleagated customer prefix

Table of Prefix Pool @ Server

ID-PE#CFI#	Prefix Pool	Status
eg.		
pe#1	2001:db8:1230::/44	Released
and		
pe#3_cfi#4	2001:db8:3400::/40	Active

Option Design - OPTION_PREFIX_POOL



option-code: OPTION_PREFIX_POOL (TBD)
option-length: 18
pfx-pool-len: Length for the prefix pool in bits
ipv6-prefix: IPv6 prefix of the prefix pool
status: Status of the prefix pool, indicating the availability of the prefix pool maintained on the server.

The codes of the status are defined in the following table.

Name	Code
Active	0
Released	1
Reserved	2~255

Proposal for Next Step

- Another new WG item?

Q & A ?!