Authorization Option for DHCPv6 Relay Agents on Broadband Access Server
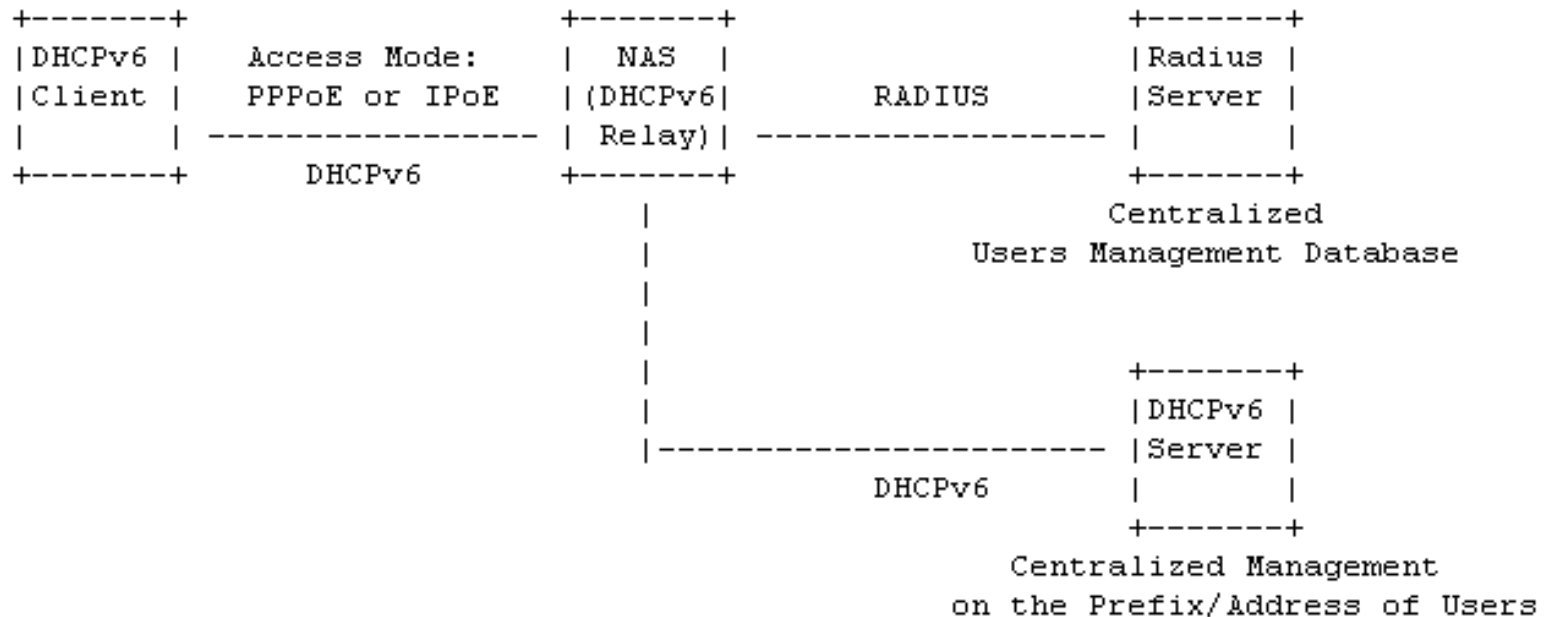
draft-yeh-dhc-dhcpv6-authorization-opt-00

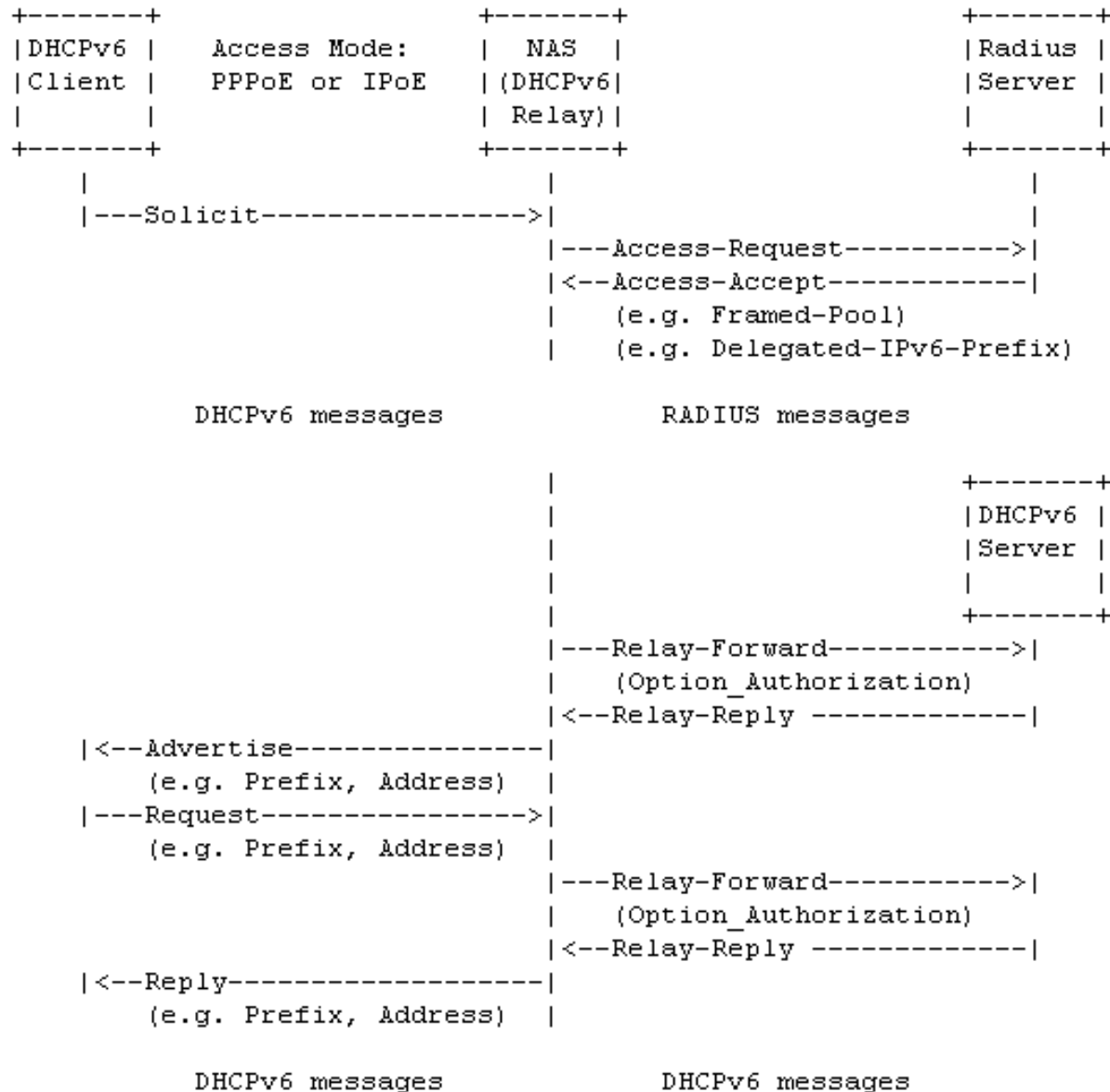IETF 83 – DHC
Mar. 29th, 2012

Leaf Yeh

Network Scenario & Requirements & Solution Space

- Centralized RADIUS Server, which is associated with the User Management database on AAA;

- Centralized DHCPv6 Server, which is only responsible (or take care) for the prefix/address assignment for users;

- DHCPv6 Server are not necessary to locate at the same place to share the same user database with RADIUS server.

```
+-------+                        +-------+                  +-------+
|DHCPv6 |    Access Mode:        |  NAS  |                  |Radius |
|Client |    PPPoE or IPoE       |(DHCPv6|     RADIUS       |Server |
|       |   ----------------- | Relay)| ----------------- |       |
+-------+        DHCPv6          +-------+                  +-------+
                                     |                     Centralized
                                     |              Users Management Database
                                     |
                                     |
                                     |                     +-------+
                                     |                     |DHCPv6 |
                                     |--------------------- |Server |
                                                DHCPv6      |       |
                                                            +-------+
                                                    Centralized Management
                                                 on the Prefix/Address of Users
```

Option Design

- Do we need a new DHCPv6 option for this case?
  - If yes, then how?
  - Stateless option?

- Container Option - Option_Authorization

  - carry the information got from the RADDIUS attributes：
    - Framed-Pool (88) defined in [RFC2869]
    - Delegated-IPv6-Prefix (123) defined in [RFC4818]
    - Framed-IPv6-Address, Stateful-IPv6-Address-Pool, Delegated-IPv6-Prefix-Pool defined in [ietf-radext-ipv6-access-06]

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Option_Authorization      |          option-length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|           Authorization-options or RADIUS Attributes...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Message Sequences in the case of IPoE

```
+-------+                      +-------+                      +-------+
|DHCPv6 |    Access Mode:      |  NAS  |                      |Radius |
|Client |    PPPoE or IPoE     |(DHCPv6|                      |Server |
|       |                      | Relay)|                      |       |
+-------+                      +-------+                      +-------+
    |                              |                              |
    |---Solicit---------------->|                              |
                                   |---Access-Request---------->|
                                   |<--Access-Accept------------|
                                   |    (e.g. Framed-Pool)
                                   |    (e.g. Delegated-IPv6-Prefix)


         DHCPv6 messages                  RADIUS messages


                                   |                          +-------+
                                   |                          |DHCPv6 |
                                   |                          |Server |
                                   |                          |       |
                                   |                          +-------+
                                   |---Relay-Forward---------->|
                                   |    (Option_Authorization)
                                   |<--Relay-Reply -------------|
    |<--Advertise---------------|
         (e.g. Prefix, Address)  |
    |---Request---------------->|
         (e.g. Prefix, Address)  |
                                   |---Relay-Forward---------->|
                                   |    (Option_Authorization)
                                   |<--Relay-Reply -------------|
    |<--Reply-------------------|
         (e.g. Prefix, Address)  |

         DHCPv6 messages                  DHCPv6 messages
```

Message Sequences in the case of PPPoE

```
+-------+                      +-------+                        +-------+
|DHCPv6 |   Access Mode:       |  NAS  |                        |Radius |
|Client |   PPPoE or IPoE      |(DHCPv6|                        |Server |
|       |                      | Relay)|                        |       |
+-------+                      +-------+                        +-------+
    |                              |                                |
    |--PPP LCP Config-Request-->|                                |
                                   |---Access-Request----------->|
                                   |<--Access-Accept------------|
                                   |    (e.g. Framed-Pool)
                                   |    (e.g. Delegated-IPv6-Prefix)
                                   |
    |<----PPP LCP Config-ACK----|

        PPP messages                    RADIUS messages


                                   |                        +-------+
                                   |                        |DHCPv6 |
                                   |                        |Server |
                                   |                        |       |
                                   |                        +-------+
                                   |                            |
    |---Solicit---------------->|                            |
                                   |---Relay-Forward----------->|
                                   |    (Option_Authorization)
                                   |<--Relay-Reply -------------|
    |<--Advertise---------------|
        (e.g. Prefix, Address)  |
    |---Request---------------->|
        (e.g. Prefix, Address)  |
                                   |---Relay-Forward----------->|
                                   |    (Option_Authorization)
                                   |<--Relay-Reply -------------|
    |<--Reply-------------------|
        (e.g. Prefix, Address)  |

        DHCPv6 messages                 DHCPv6 messages
```

Sub-Option Design

- Discussion on the Alternatives:

  - Design-1: Sub-option as option-data of Option_Authorization (Refer to the details of draft-yeh)

    - Pros:
      - define the new sub-option to meet the new requirement as usual, new requirement today is limited for the address & prefix assignment;
      - develop its own option within the DHCPv6 protocol; no much dependence on the development progress of RADIUS;
    - Cons: but need new parser for each new option.

  - Design-2: RADIUS attributes as option-data of Option_Authorization (Same method of [RFC4014])

    - Pros: reuse the parser codes of RADIUS attributes;
    - Cons: but need DHCPv6 server to support the parser codes of RADIUS for a list of attributes associated with DHCPv6.

Proposal for Next Step

- Deserved a new WG item?

Q & A ?!