DHCP Based Configuration of Mobile Node from Home Network

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Basic Considerations

- providing the host configuration parameters needed for network service from home network based on DHCPINFORM.

- HA may or may not support DHCP Relay function.

- Assumption：
  - Mobile node has obtained a network address through some other means.
  - Mobile node may or may not know the address of DHCP server before sending DHCPINFORM
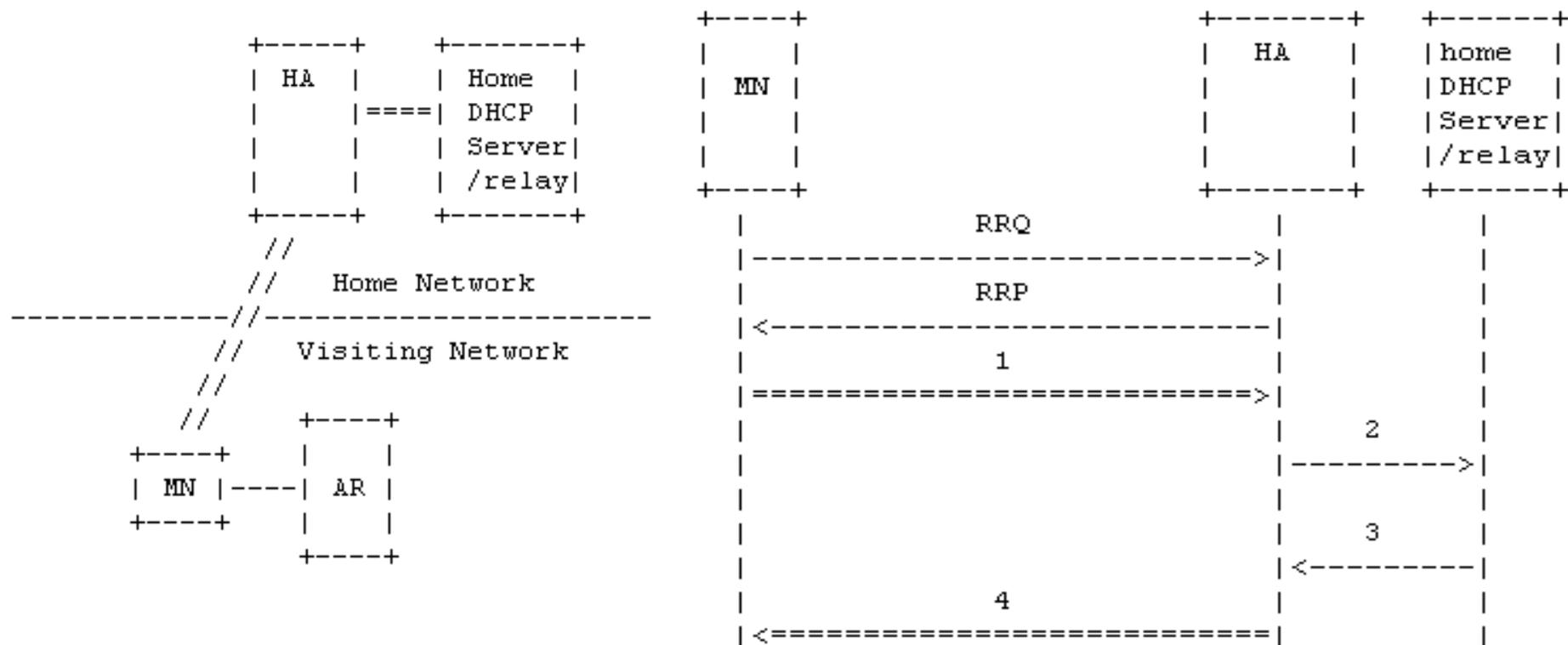
v01 Changes compared with v00

- The cases are added while DHCP relay is not supported by HA.
  - Co-CoA case while DHCP server's address is unknown in MN
  - FA-CoA case while DHCP server's address is unkonwn in MN
  - DHCP server's address is known in MN
- In the cases of HA with DHCP relay function
  - After DHCP server receives the DHCPINFORM message relayed by HA, it will send the DHCPACK message directly to MN's HoA, which can be retrieved in *__ciaddr__* of DHCPINFORM message relayed by HA.
- Fixed some bugs and typos.

Three Scenarios while DHCP relay is not supported by HA

- Co-CoA case

- FA-CoA Case

- Home DHCP server address known

MIP4 Co-CoA case (No DHCP relay in HA)

```
+-----+      +-------+
| HA  |      | Home  |
|     |====| DHCP   |
|     |      | Server|
|     |      | /relay|
+-----+      +-------+
    //
   //    Home Network
----------//-----------------------
   //     Visiting Network
  //
 //    +----+
+----+  |    |
| MN |----| AR |
+----+  |    |
        +----+
```

```
+-----+                                    +-------+   +------+
|     |                                    |  HA   |   |home  |
| MN  |                                    |       |   |DHCP  |
|     |                                    |       |   |Server|
|     |                                    |       |   |/relay|
+-----+                                    +-------+   +------+
   |                   RRQ                      |          |
   |----------------------------------------->|          |
   |                   RRP                      |          |
   |<-----------------------------------------|          |
   |                    1                       |          |
   |=========================================>|          |
   |                                            |    2     |
   |                                            |--------->|
   |                                            |          |
   |                                            |    3     |
   |                                            |<---------|
   |                    4                       |          |
   |<=========================================|          |
```

Message 1

IP fields (encapsulating header):

    Source Address   = mobile node's home address

    Destination Address = home agent's address

    Protocol field: 4 (IP in IP)

IP fields (original header):

    Source Address   = mobile node's home address

    Destination Address = broadcast address (all 1)

UDP Src Port: bootpc(68), Dst Port: bootps(67)

    Bootstrap Protocol:

    field:

ciaddr = mobile node's home address

chaddr = mobile node's MAC address

    options:

    option 53: DHCP Message Type = DHCPINFORM

    option 61: Client Identifier = mobile node's MAC address

    option 55: Parameter request List (Domain Name Server,... et al.)

Message 2

DHCPINFORM Packet format forwarded by the home agent:

    IP fields:
      Source Address   = MN's home address
      Destination Address = broadcast address (all 1)
    UDP Src Port: bootps(68), Dst Port: bootps(67)
    Bootstrap Protocol:
     field:
      giaddr = 0
      ciaddr = mobile node's home address
     ……

Message 3

IP fields:
    Source Address   = DHCP server's address
    Destination Address = HoA of MN
          (from 'ciaddr' of DHCPINFORM)
 UDP Src Port: bootps(67), Dst Port: bootps(68)
 Bootstrap Protocol:
 field:
  op   = BOOTREPLY
  xid   = same as "xid" field of DHCPINFORM message
  ciaddr = mobile node's home address (from 'ciaddr' of DHCPINFORM)
  giaddr = from 'giaddr' of DHCPINFORM received by DHCP server
  chaddr = mobile node's MAC address (from 'chaddr' of DHCPINFORM)
 options:
  option 53: DHCP Message Type = DHCPACK
  option 61: Server Identifier = DHCP server's MAC address
  option 6: Domain Name Server

Message 4

DHCPACK Packet format forwarded by the home agent:

IP fields (encapsulating header):

    Source Address   = home agent's address

    Destination Address = mobile node's care-of-address

    Protocol field: 4 (IP in IP)
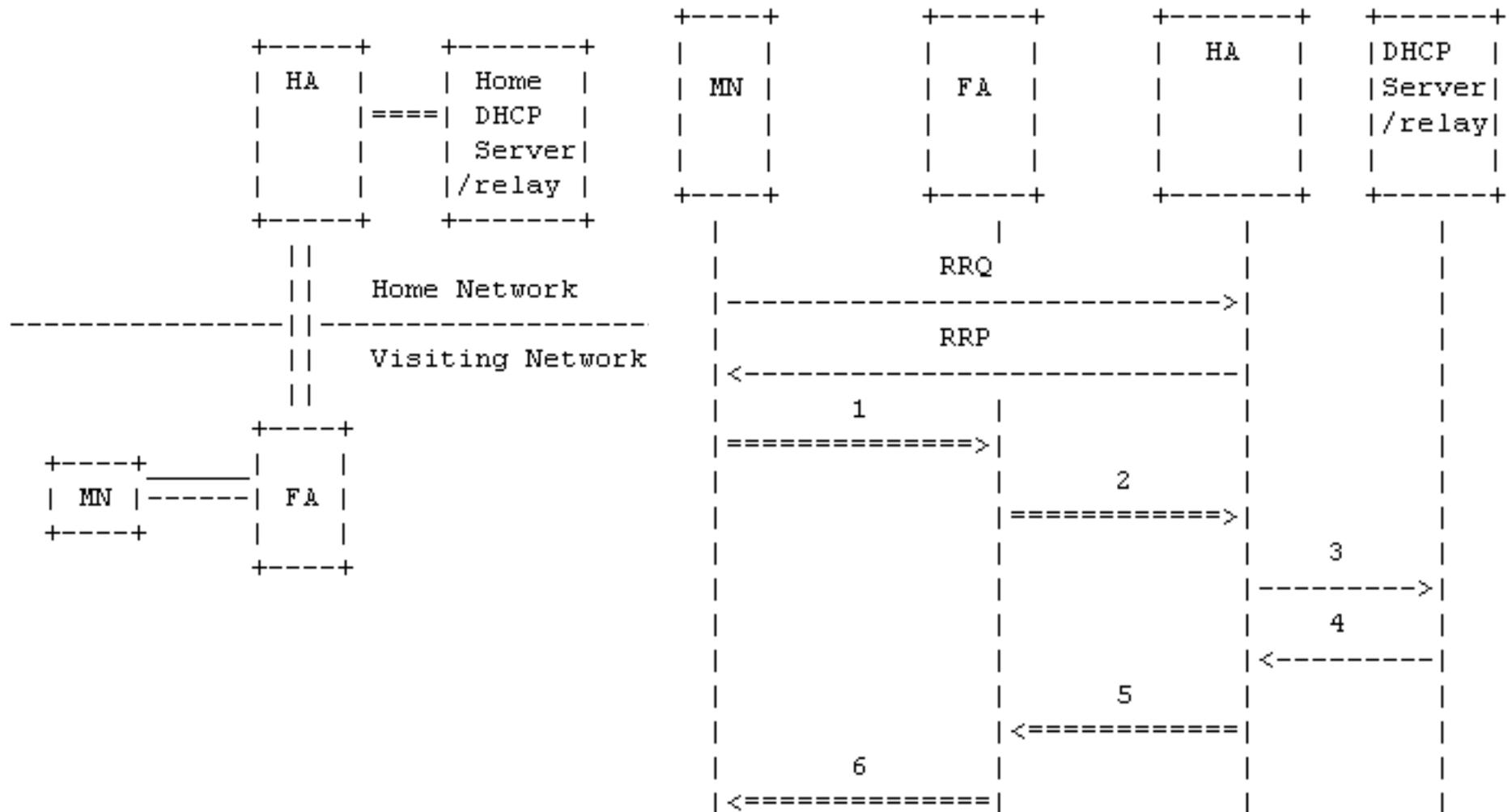
IP fields (original header):

    Source Address   = DHCP server's address

    Destination Address = mobile node's home address

 UDP Src Port: bootps(67), Dst Port: bootpc(68)

    Bootstrap Protocol

MIP4 FA-CoA case and sequence

Message 1

IP fields (encapsulating header):

    Source Address   = mobile node's home address

    Destination Address = foreign agent's address

    Protocol field: 4 (IP in IP)

  IP fields (original header):

    Source Address   = mobile node's home address

    Destination Address = broadcast address (all 1)

UDP Src Port: bootpc(68), Dst Port: bootps(67)

 Bootstrap Protocol:

 field:

  op   = BOOTREQUEST

 ciaddr = mobile node's home address

  chaddr = mobile node's MAC address

 options:

 option 53: DHCP Message Type = DHCPINFORM

 option 61: Client Identifier = mobile node's MAC address

Message 2

IP fields (encapsulating header):

    Source Address   = foreign agent's care-of-address

    Destination Address = home agent's address

    Protocol field: 4 (IP in IP)

IP fields (original header):

    Source Address   = mobile node's home address

    Destination Address = broadcast address

  UDP Src Port: bootpc(68), Dst Port: bootps(67)

    Bootstrap Protocol

Message 3

IP fields:

    Source Address   = MN's home address

    Destination Address = broadcast address (all 1)

UDP Src Port: bootps(68), Dst Port: bootps(67)

 Bootstrap Protocol:

    field:

    giaddr = 0

Message 4

IP fields:

    Source Address   = DHCP server's address

    Destination Address = MN's home address

               (from 'ciaddr' of DHCPINFORM)

 UDP Src Port: bootps(67), Dst Port: bootps(68)

 Bootstrap Protocol:

 field:

  op   = BOOTREPLY

  xid   = same as "xid" field of DHCPINFORM message

  ciaddr = mobile node's home address (from 'ciaddr' of DHCPINFORM)

  giaddr = from 'giaddr' of DHCPINFORM received by DHCP server

  chaddr = mobile node's MAC address (from 'chaddr' of DHCPINFORM)

options:

  option 53: DHCP Message Type = DHCPACK

Message 5

IP fields (encapsulating header):

    Source Address   = home agent's address

    Destination Address = foreign agent's care-of-address

    Protocol field: 4 (IP in IP)

IP fields (original header):

    Source Address   = DHCP server's address

    Destination Address = mobile node's home address

UDP Src Port: bootps(67), Dst Port: bootpc(68)

    Bootstrap Protocol

Message 6

IP fields (encapsulating header):

    Source Address   = foreign agent's address

    Destination Address = mobile node's home address

    Protocol field: 4 (IP in IP)

IP fields (original header):

    Source Address   = DHCP server's address

    Destination Address = mobile node's home address

UDP Src Port: bootps(67), Dst Port: bootpc(68)

    Bootstrap Protocol

Message 3 of Co-CoA case while HA has
DHCP relay function
(DHCPACK from DHCP server to MN)

IP fields:

    Source Address   = DHCP server's address

Destination Address = MN's home address

   (from 'ciaddr' of DHCPINFORM)

  UDP Src Port: bootps(67), Dst Port: bootps(68)

  Bootstrap Protocol:

  field:

   op   = BOOTREPLY

   xid   = same as "xid" field of DHCPINFORM message

   ciaddr = mobile node's home address (from 'ciaddr' of DHCPINFORM)

giaddr = home agent's address (from 'giaddr' of DHCPINFORM)

   chaddr = mobile node's MAC address (from 'chaddr' of DHCPINFORM)

  options:

   option 53: DHCP Message Type = DHCPACK

   option 61: Server Identifier = DHCP server's MAC address

   option 6: Domain Name Server

Message 4 of FA-CoA case while HA has DHCP relay function

(DHCPACK from DHCP server to MN)

IP fields:

    Source Address   = DHCP server's address

    Destination Address = MN's home address

                (from 'ciaddr' of DHCPINFORM)

  UDP Src Port: bootps(67), Dst Port: bootps(68)

  Bootstrap Protocol:

  field:

   op   = BOOTREPLY

   xid   = same as "xid" field of DHCPINFORM message

  ciaddr = mobile node's home address (from 'ciaddr' of DHCPINFORM)

  giaddr = home agent's address (from 'giaddr' of DHCPINFORM)

  chaddr = mobile node's MAC address (from 'chaddr' of DHCPINFORM)

  options:

   option 53: DHCP Message Type = DHCPACK

- Comments?
- Work item?