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INTERNET DRAFT                                          Yves T'Joens
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           Dynamic host configuration : DHCP reconfigure extension


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Abstract

   This draft  defines  extensions  to  DHCP  [DHCP]  to  allow  dynamic
   reconfiguration  of a single host triggered by the DHCP server (eg. a
   new IP address). This is  achieved  by  introducing  a  unicast  DHCP
   FORCERENEW message which forces the client to the RENEW state.

## 1. Introduction

The procedures as described within this draft allow the dynamic reconfiguration of individual hosts.

## 1.1 Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

## 2. DHCP force renew

This section describes the DHCP force renew extension.

## 2.1 Terminology

DHCP client : host to be reconfigured using DHCP.

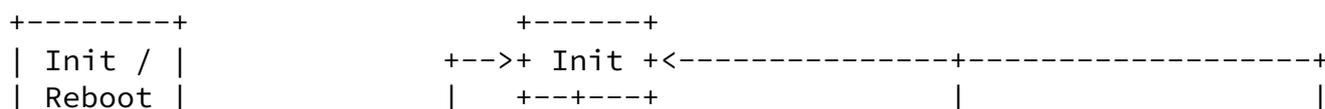DHCP server : server which configured the DHCP client.

## 2.2 Force renew procedures

The DHCP server sends a force renew message to the client. The client will change its state to the RENEW state. The client will then try to renew its lease according to normal DHCP procedures. If the server wants to assign a new IP address to the client, it will reply to the DHCP REQUEST with a DHCP NAK. The client will then go back to the init state and broadcast a DHCP DISCOVER message. The server can now assign a new IP address to the client by replying with a DHCP OFFER. If the force renew message is lost, the DHCP server will not receive a DHCP REQUEST from the client and it should retransmit the DHCP FORCERENEW message using an exponential backoff algorithm. Depending on the bandwidth of the network between server and client, the server should choose a delay. This delay grows exponentially as retransmissions fail. The amount of retransmissions should be limited.

## 2.3 Rationale

This approach has a number of advantages. It does not require new states to be added to the DHCP client implementation. This minimizes the amount of code to be changed. It also allows lease RENEWAL to be driven by the server, which can be used to optimize network usage or DHCP server load.

## 3. Extended DHCP state diagram

```
+--------+                   +------+
| Init / |             +-->+ Init +<---------------+-------------------+
| Reboot |             |    +--+---+                |                   |
```

```
   +---+----+          DHCPNAK/ -/Send DHCPDISCOVER     |                |
   |        |           Restart   |     (broadcast)     |                |
   |        |                  |   v   v-------------+   |                |
 -/Send DHCPREQUEST            |  +----+------+       DHCPOFFER/DHCPDECLINE |
   |   (broadcast)             |  | Selecting |----------+  |                |
   v                           |  +----+------+          |  |                |
+---+----+                     |  DHCPOFFER/DHCPREQUEST   |  |                |
| Reboot +-------------+  (broadcast)                     |  |                |
+---+----+                                v               |  |                |
   |                           +----+-------+          DHCPNAK /halt network  |
   |                           + Requesting |          |      lease expired   |
 DHCPACK/                      +----+-------+          |                |
 Record lease                      |                    |                |
 set timers                   DHCPACK/Record lease       |                |
   |                           v   Set T1 & T2           |                |
   |                         +--+----+DHCPFORCE  +---+---+          +---+---+
    +--------------------->+ Bound +--------->+ Renew +---------->+ Rebind |
                           +--+-+--+T1 expires +-+-+--- T2 expires+--+--+--+
                            ^     /DHCPREQUEST | |     /broadcast          |
                         DHCPACK     to leasing | |     DHCPREQUEST         |
                            |         server   | |                        |
                           +------------------------------------------------+


4. Message layout

   Field       DHCPFORCERENEW
   -----       --------------
   'op'        BOOTREPLY
   'htype'     (From "Assigned Numbers" RFC)
   'hlen'      (Hardware address length in octets)
   'hops'      0
   'xid'       selected by server
   'secs'      0
   'ciaddr'    0
   'yiaddr'    0
   'siaddr'    0
   'flags'     0
   'giaddr'    0
   'chaddr'    client's hardware address
   'sname'     0
   'file'      0
   'options'   options

   DHCP  option  53  (DHCP  message type) is extended with a new value :
   DHCPFORCERENEW (TBD)

5. Failover Considerations

   A DHCP server should only send a DHCPFORCERENEW when it's fully aware
   of  the  current  state of the DHCP client. In practice this means it
```

should only send a DHCPFORCERENEW when in "PARTNER DOWN", "COMMUNICATIONS INTERRUPTED" or "NORMAL" state, and only for DHCP clients of which the state is synchronised. (see [DHCP-FAILOVER])

6. IANA Considerations

The new value for DHCP option 53 (DHCP message type) to indicate a DHCPFORCERENEW message is TBD.

7. Security Considerations

As in some network environments DHCPFORCERENEW can be used to snoop and spoof traffic, the DHCPFORCERENEW message MUST be authenticated using a shared secret based mechanism as described in [DHCP-AUTH].

8. References

[DHCP] R.Droms, "Dynamic Host Configuration Protocol", RFC 2131, March 1997.

[DHCP-AUTH] R. Droms, "Authentication for DHCP Messages", draft-ietf-dhc-authentication-12, October 1999, Work in progress.

[DHCP-FAILOVER] R. Droms, K. Kinnear, M. Stapp, B. Volz, S. Gonczi, G. Rabil, M. Dooley, A. Kapur, "DHCP Failover Protocol", draft-ietf-dhc-failover-06.txt, March 2000, Work in progress.

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