INTERNET-DRAFT
"Internet Protocol Five Fields - Dynamic Host Configuration Protocol",
Alexey Eromenko, 2016-09-29,
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Dynamic Host Configuration Protocol

Required modifications for
Internet Protocol "Five Fields"
PROTOCOL SPECIFICATION draft

Abstract

   This document describes the changes needed from DHCPv4, as defined in
   RFC-2131, to bring DHCP to IP-FF.

Introduction

   DHCP in IPv4 works remarkably well, and so a good idea is to keep it
   almost unchanged in IP-FF. Instead of publishing a full RFC, I focus
   only on changes required from DHCPv4.

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1. Format of a DHCP-FF message

```
     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
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   4|Version| Hops  |      op       |     htype     |     hlen      |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   8|                   Transaction ID - xid (4)                    |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
  12|         secs          |            ciaddr                     |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+                                      +
  16|                       client IP address                      |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
  20|         flags         |            yiaddr                     |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+                                      +
  24|                  'your' (client) IP address                  |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
  28|        Reserved       |            siaddr                     |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+                                      +
  32|        IP address of next server to use in bootstrap         |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
  36|        Reserved       |            giaddr                     |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+                                      +
  40|                     Relay agent IP address                   |
    +--------------------------------------------------------------+
    |                                                              |
    |                                                              |
    |                        chaddr  (16-bytes)                    |
    |                   Client hardware address                    |
    |                                                              |
    +--------------------------------------------------------------+
```

```
   |                                                               |
   |                     servername   (up to 128-bytes)           |
   +---------------------------------------------------------------+
   |                                                               |
   |                      bootfile   (up to 255-bytes)            |
   +---------------------------------------------------------------+
   |                                                               |
   |                        options (variable)                    |
   +---------------------------------------------------------------+
 (bytes)
```

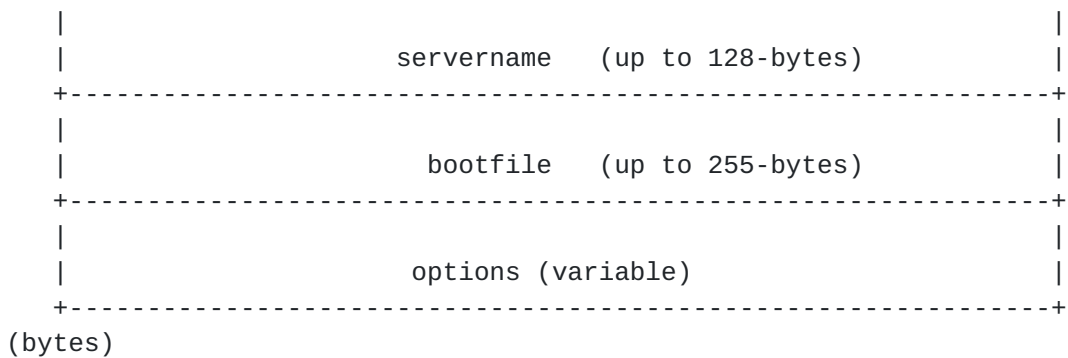   Figure 1: Format of a DHCP message

2. Changes from DHCPv4, as defined in [RFC-2131](#)

```
   FIELD        BITS        DESCRIPTION
   -----        ------      -----------

   Version        4   Versioning was added to simplify future evolution.
                         = 1

   Hops           4   Hops field shrinked from 8 bits to 4 bits.
                      (if you design a network with a  DHCP server over 15 hops
                      away from your clients, you're doing it wrong.)

   servername   128   Bytes. It was extended from 64 bytes, mainly for
                      Unicode compatibility reasons.
                      A single Unicode character can take 2-3 bytes.

   file         255   Bytes. It was extended from 128 bytes, mainly for
                      Unicode compatibility reasons.
                      A single Unicode character can take 2-3 bytes.
```

   'Seconds' and 'flags' fields were shrinked from 16-bits to 14-bits.

   All address fields were extended to 50-bits; forced change.

3. Booting IP-FF via DHCP

   In general case, booting IP-FF via DHCP is similar to IPv4.
   That is using an unspecified IP-FF address as source (0.0.0.0.0) and
   a physical MAC address (on Ethernet) or other Data-Link Layer
   address.

   The destination multicast address for DHCP servers is   99.9.0.0.3
   The destination multicast address for DHCP clients is   99.9.0.0.4

[**4**](#). **Throttling / Delayed replies on High usage (recommendation)**

   If a DHCP server is also the default gateway, it MAY
   artificially *delay* giving IP-FF addresses, if CPU or network
   usage is high, allowing for another DHCP server to answer DHCP,
   and allowing them becoming default gateways, providing a per-node
   load-balancing (as opposed to per-session or per-packet
   load-balancing).

   Reasonable value is 10 ms delay per 1% CPU or (WAN/external) network
   bandwidth usage, with delays starting only after 25% usage.

   This feature MAY be implemented in quality "Enterprise-grade" DHCP
   servers, but not required.

Acknowledgments

   Based on the hard work of "Ralph Droms", DHCP [[RFC-2131](#)].

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