



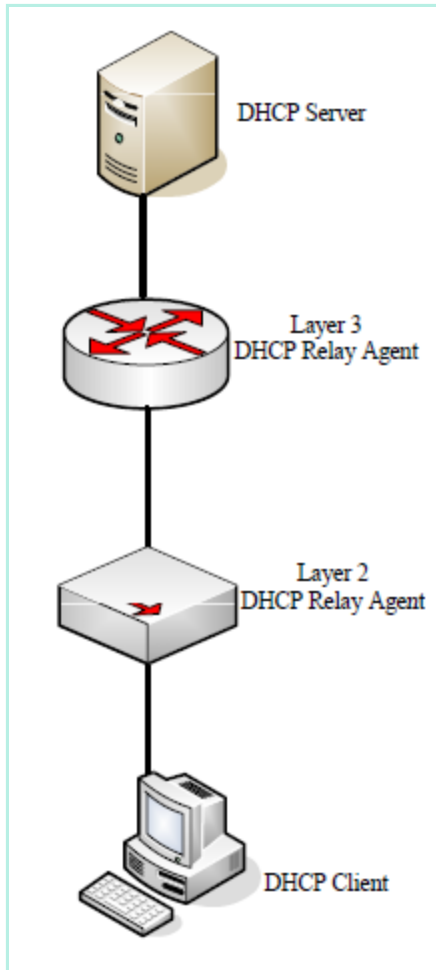
中国2010年上海世博会全球合作伙伴
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Progress of Relay Agent Encapsulation for DHCPv4

Nov.2011



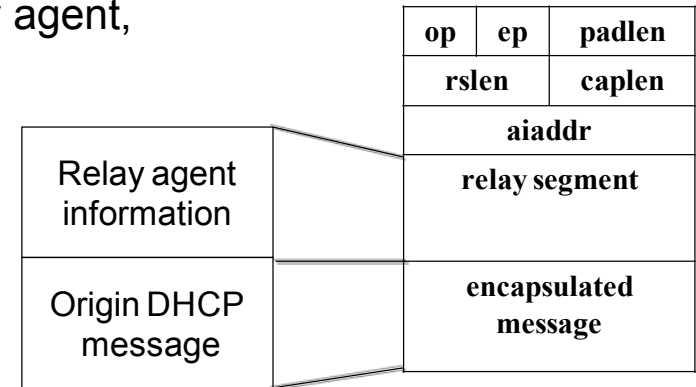
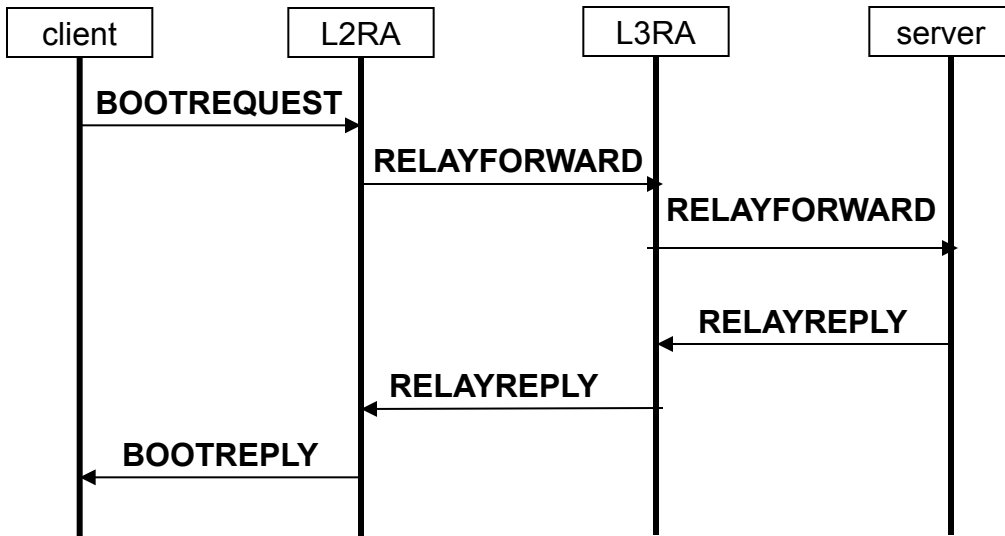
Status of current version



- draft-ietf-dhc-dhcpv4-relay-encapsulation-01
 - Define new messages to convey relay agent information:
RELAYFORWARD, RELAYREPLY
 - Define relay agent behavior, including L2 relay agent and L3 relay agent
 - Define DHCP server behavior
 - No change on DHCP client behavior

Brief description of mechanism

(1) When DHCP message toward server go through a relay agent, RA encapsulate it into a new message, RELAYFORWARD message, and add its information in at the same time

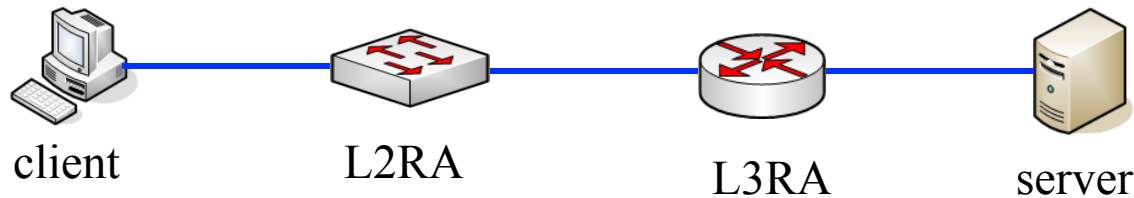


(2) DHCP server decapsulate RELAYFORWARD message and response a RELAYREPLY message

(3) When RELAYREPLY message go through a relay agent, RA decapsulate it to get the relative RA info and send a new RELAYREPLY message or a normal DHCP message if it's the closest RA to client

Implementation of Relay Agent Encapsulation for DHCPv4

- We build four hosts in **VMware Workstation**:



- We modify and run **isc dhcp-4.2.0** version based on “draft-ietf-dhc-dhcpv4-relay-encapsulation-01” in three hosts for our experiment

- **L2RA**

- Encapsulate message into a new message
- Add some sub-options into relay segment, such as Circuit ID, Link selection, and SUBOPT_L2AS if the L2RA is close to the client
- Decapsulate RELAYREPLY message

- **L3RA**

- Encapsulate message into a new message
- Add some sub-options into relay segment, such as Circuit ID, Link selection.
- Decapsulate RELAYREPLY message

- **Server**

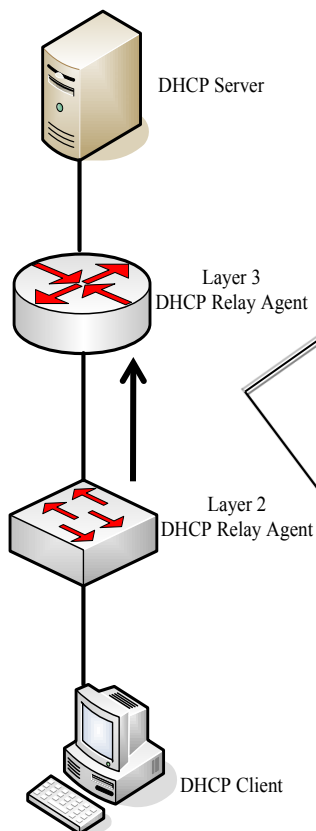
- Decapsulate RELAYFORWARD message
- Construct RELAYREPLY message and send to relay agent

Implementation of Relay Agent Encapsulation for DHCPv4



■ Experiment result (1)

L2RA constructs the RELAYFORWARD message by adding fixed-length header and relay segment.



```
▶ User Datagram Protocol, Src Port: bootps (67), Dst Port: bootps (67)
  ▼ Bootstrap Protocol
    Message type: Relay Forward (3)
    Does end option prior to encapsulation ? : True
    The length of padding option: 0
    The length of relay segment: 28
    The length of encapsulated message: 300
    Relay Agent IP address: 0.0.0.0 (0.0.0.0)
  ▼ relay segment: 01046574683905040a04040101000c29c21d3d010901000c...
    ▶ Sub option: (t=1,l=4) Circuit id = "eth9"
```

Fixed-length header and relay segment

```
0000 ff ff ff ff ff ff 00 0c 29 c2 1d 33 08 00 45 10 ..... )..3..E.
0010 01 70 00 00 00 00 80 11 39 6e 00 00 00 00 ff ff .p..... 9n.....
0020 ff ff 00 43 00 43 01 5c 25 50 03 01 00 00 1c 00 ...C.C.\ %P.....
0030 2c 01 00 00 00 00 01 04 65 74 68 39 05 04 0a 04 ..... eth9....
0040 04 01 01 00 0c 29 c2 1d 3d 01 09 01 00 0c 29 b3 ..... ).. =.....)
0050 ca d4 01 01 06 01 fd 95 a7 24 00 00 00 00 00 00 ..... $......
0060 00 00 00 00 00 00 00 00 00 00 0a 04 04 01 00 0c ..... ).....
0070 29 b3 ca d4 00 00 00 00 00 00 00 00 00 00 00 00 ..... ).....
0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....

```

Implementation of Relay Agent Encapsulation for DHCPv4

■ Experiment result (2)

DHCP server could decapsulate RELAYFORWARD message and print all relay agents' information

The relay agents information on the path of DHCP discover

```
root@wang-desktop: ~/dhcp-4.2.0_12.15/server
文件(F) 编辑(E) 查看(V) 终端(T) 帮助(H)
Internet Systems Consortium DHCP Server 4.2.0
Copyright 2004-2010 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/
Wrote 0 class decls to leases file.
Wrote 0 deleted host decls to leases file.
Wrote 0 new dynamic host decls to leases file.
Wrote 16 leases to leases file.
Listening on LPF/eth0/00:0c:29:bb:dc:d4/10.2.2.0/24
Sending on LPF/eth0/00:0c:29:bb:dc:d4/10.2.2.0/24
Sending on Socket/fallback/fallback-net
The relay agents information is:
the agent is 10.4.4.1 on interface eth2
the agent is 0.0.0.0 on interface eth9
DHCPCDISCOVER from 00:0c:29:b3:ca:d4 via 10.4.4.1
DHCPCPOFFER on 10.4.4.101 to 00:0c:29:b3:ca:d4 (wang-desktop) via 10.4.4.1
The relay agents information is:
the agent is 10.4.4.1 on interface eth2
the agent is 0.0.0.0 on interface eth9
DHCPCPREREQUEST for 10.4.4.101 (10.2.2.1) from 00:0c:29:b3:ca:d4 (wang-desktop) via
10.4.4.1
DHCPCPACK on 10.4.4.101 to 00:0c:29:b3:ca:d4 (wang-desktop) via 10.4.4.1
■
```


Request comments and fulfillment

- Please kindly help to review:
draft-ietf-dhc-dhcpv4-relay-encapsulation-01
- Last time, there are two reviews suggested. Forget..
- Would any people or research entities like to fulfill this draft and make interoperation test with our demo? That will be helpful to find potential errors and push the work forward.



Thank You