

DHCPv4 over DHCPv6 Implementation by Tsinghua University

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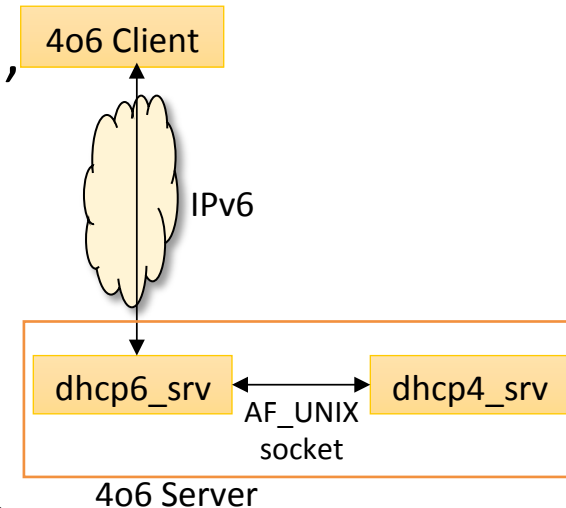
IETF 89

Introduction

- DHCPv4 over DHCPv6 Transport
 - draft-ietf-dhc-dhcpv4-over-dhcpv6
 - Carry DHCPv4 messages over DHCPv6 transport
- Early implementation on Linux
 - Client: *thclient*, a lite DHCPv4 client
 - Server: modified ISC *bind10-1.1.0* (“Kea”), added 150 lines of C++ code on both v6/v4 server engine
 - Thanks to Tomek and Marcin for the guide on isc-bind10/Kea

Implementation

- Client: Do encapsulation before socket send, do decapsulation after socket recv
- Server: Support new messages & DHCPv4 message option
 - Run both dhcp6_srv and dhcp4_srv
 - Use AF_UNIX socket to communicate between 6/4 server processes
 - dhcp6_srv acts as a “relay”: send DHCPv4 message to dhcp4_srv, store original DHCPv6 packet states in memory, wait for response from dhcpv4_srv
 - AF_UNIX sockets are added into select() list
- Normal DHCPv4/v6 server functions are not affected
 - All 3 functions (dhcp4,dhcp6,dhcp4o6) can run at the same time



Resources

- Source code URL:
 - Client - <https://github.com/gnocuil/thudhcp>
 - Server - <https://github.com/gnocuil/DHCPv4oDHCPv6>
packet capture data by wireshark

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe80::a00:27ff:fe45:ce18	ff02::1:2	DHCPv6	343	DHCPv4-query XID: 0x0
4	0.001679000	fe80::a00:27ff:fe4c:806	fe80::a00:27ff:fe45:ce18	DHCPv6	362	DHCPv4-response XID: 0x0
5	0.002044000	fe80::a00:27ff:fe45:ce18	ff02::1:2	DHCPv6	361	DHCPv4-query XID: 0x0
6	0.003174000	fe80::a00:27ff:fe4c:806	fe80::a00:27ff:fe45:ce18	DHCPv6	362	DHCPv4-response XID: 0x0

▶ Frame 6: 362 bytes on wire (2896 bits), 362 bytes captured (2896 bits) on interface 0
▶ Ethernet II, Src: 08:00:27:fc:08:06 (08:00:27:fc:08:06), Dst: 08:00:27:45:ce:18 (08:00:27:45:ce:18)
▶ Internet Protocol Version 6, Src: fe80::a00:27ff:fe4c:806 (fe80::a00:27ff:fe4c:806), Dst: fe80::a00:27ff:fe45:ce18 (fe80::a00:27ff:fe45:ce18)
▶ User Datagram Protocol, Src Port: dhcpv6-server (547), Dst Port: dhcpv6-client (546)
▼ DHCPv6
 Message type: DHCPv4-response (246)
 Transaction ID: 0x000000
 ▶ Server Identifier
 ▼ DHCPv4 Message Option
 Option: DHCPv4 Message Option (54321)
 Length: 274
 Value: 020106003d89be05000000000000000000000000a00003100000000...

dhcpv4 message

Conclusion

- It works
- Require modifications on both v4 & v6 part
- Modifications are lightweight
- No conflict with normal DHCPv4/DHCPv6 functions