Abstract

This document extends the DHCP and DHCPv6 protocols for the UDP transport from server to client and allows the port to be any valid number on the DHCP relay system.

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1. Introduction

RFC 2131 [RFC2131] and RFC 3315 [RFC3315] specify the DHCP transport protocol as UDP. They also define both the server side and client side port numbers. The DHCP server port is UDP number (67) and the client port is UDP number (68); for DHCPv6 the server port is (546) and the client port is (547).

This client and server port definition is unusual in the normal Internet client/server protocols, as most of the protocols only have the server transport port number definition and leave the client port range to vary. The main reason for the fixed DHCP client port number is due to the fact that the client may not have an IP address, so the client needs to listen on the well-known port for the DHCP server reply messages.

Some implementations, including some open source DHCP implementations, do not allow this client port behavior to be changed by user configuration. Some implementations allow the port number to be changed, but the client port is always the next number to the server port.

This fixed client port number of DHCP protocol scheme creates problems in certain DHCP relay environments. For instance, in a large scale DHCP relay implementation on a single switch node, the DHCP relay functionality may be distributed among multiple processes running under different CPUs. All those DHCP relay processes share the same IP address of the switch node. If the UDP source port has to be a fixed number, the transport socket operation of DHCP packets needs to go through a central location or process which defeats the purpose of distributed DHCP relay functionality.
This document proposes to relax the fixed client port requirement for the DHCP client or relay. This extension requires the DHCP server or relay agent to remember the inbound packet’s UDP port number along with the IP/IPv6 address and the MAC address. The DHCP server MUST use the UDP port number the client or relay agent uses instead of blindly setting the port number to (68/546).

1.1. Requirements Language

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. Changes to DHCP and DHCPv6 Specifications

2.1. Changes to DHCP in RFC 2131

Section 4.1 of RFC 2131 [RFC2131] asserts that: DHCP uses UDP as its transport protocol. DHCP messages from a client to a server are sent to the ‘DHCP server’ port (67), and DHCP messages from a server to a client are sent to the ‘DHCP client’ port (68).

This specification updates the above paragraph text in the below paragraph.

DHCP uses UDP as its transport protocol. DHCP messages from a client to a server are sent to the ‘DHCP server’ port (67), and the client can use any UDP port available on the client system, including the well-known UDP port (68). The destination UDP port of the DHCP message from a server to a client simply reflects back the source UDP port the client uses in the inbound UDP packet.

2.2. Changes to DHCPv6 in RFC 3315

Section 5.2 of RFC 3315 [RFC3315] asserts that: Clients listen for DHCP messages on UDP port 546. Servers and relay agents listen for DHCP messages on UDP port 547.

This specification updates the above paragraph text in the below paragraph.

Servers and relay agents listen for DHCP messages on UDP port 547. Clients listen for DHCP message on the port which has the UDP socket opened for the server, and it can be any port on the system, including the well-known UDP port (546).
3. Compatibility

With this extension of DHCP client number generalization, the server behavior is compatible with the client that does not have an IP address. The DHCP server will reflect back the UDP well-known port number (68/546) the client uses when broadcasting the request.

When the DHCP server is implemented with this extension, it will be compatible with the previous DHCP behavior, and the server will use the port of (68/546) to send back to the client. When upgrading DHCP software in the network, it is recommended to upgrade the server side first.

The implementation is advised to allow the configuration for specifying a fixed DHCP client port number. This is for the case where the DHCP client is upgraded with this extension before the server side upgrade.

4. IANA Considerations

There is no IANA consideration for this draft.

5. Security Considerations

If the network uses firewall to block or allow DHCP packets with both static UDP source and destination port numbers, that may no longer match the packets from new DHCP client and server software. The firewall rules need to be modified only to match the DHCP server side of UDP port number, and if necessary, IP addresses and other attributes.

6. Acknowledgments

TBD.

7. Document Change Log

- Initial version of the draft is published in June 2016.

8. Normative References


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