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The DHCPv4 Relay Agent Identifier Suboption
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Abstract

This document defines a new Relay Agent Identifier suboption for the Dynamic Host Configuration Protocol's (DHCP) Relay Agent Information option. The suboption carries a value that uniquely identifies the relay agent device within the administrative domain. The value is normally administratively-configured in the relay agent. The suboption allows a DHCP relay agent to include the identifier in the DHCP messages it sends.

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1. Introduction

The Dynamic Host Configuration Protocol for IPv4 (DHCPv4) [[RFC2131](#)] provides IP addresses and configuration information for IPv4 clients. It includes a relay agent capability, in which network elements receive broadcast messages from clients and forward them to DHCP servers as unicast messages. In many network environments, relay agents add information to the DHCP messages before forwarding them, using the Relay Agent Information option [[RFC3046](#)]. Servers that recognize the relay agent information option echo it back in their replies.

This specification introduces a Relay Agent Identifier (Relay-Id) suboption for the Relay Agent Information option. The Relay-Id suboption carries a sequence of octets that is intended to uniquely identify the relay agent within the administrative domain. In this document, an administrative domain consist of all DHCP servers and relay agents that communicate with each other.

2. Terminology

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 [[RFC2119](#)].

DHCPv4 terminology is defined in [[RFC2131](#)], and the DHCPv4 Relay Agent Information Option in [[RFC3046](#)].

3. Example Use-Cases

3.1. Bulk Leasequery

There has been quite a bit of recent interest in extending the DHCP Leasequery protocol [[RFC4388](#)] to accommodate some additional

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.

Where:

SUBOPT_RELAY_ID [TBA]

length the number of octets in the suboption
(excluding the suboption ID and length fields);
the minimum length is one.

identifier the identifying data.

5. Identifier Stability

If the relay identifier is to be meaningful it has to be stable. A relay agent SHOULD use a single identifier value consistently. The

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identifier used by a relay device SHOULD be committed to stable storage, unless the relay device can regenerate the value upon reboot.

If the relay-id configured in a relay agent is not unique within its administrative domain, resource allocation problems may occur as the DHCP server attempts to allocate the same resource to devices behind two different relay agents. Therefore, relay-id configured in a relay agent MUST be unique within its administrative domain. To aid in ensuring uniqueness of relay-ids, relay agents SHOULD make their relay identifiers visible to their administrators via their user interface, through a log entry, through a MIB field, or through some other mechanism.

Implementors of relay agents should note that the identifier needs to be present in all DHCP message types where its value is being used by the DHCP server. The relay agent may not be able to add the Relay Agent Information option to all messages - such as RENEW messages sent as IP unicasts. In some deployments that might mean that the server has to be willing to continue to associate the relay identifier it has last seen with a lease that is being RENEWed. Other deployments may prefer to use the Server Identifier Override

suboption [[RFC5107](#)] to permit the relay device to insert the Relay Agent Information option into all relayed messages.

Handling situations where a relay agent device is replaced is another aspect of stability. One of the use-cases for the relay identifier is to permit a server to associate clients' lease bindings with the relay device connected to the clients. If the relay device is replaced, because it has failed or been upgraded, it may be desirable for the new device to continue to provide the same relay identifier as the old device. Therefore if a relay agent supports relay-id, the relay-id should be administratively configurable.

DISCUSSION:

Administrators should take special care to ensure that relay-ids configured in their relay agents are not duplicated. Some implementation advice is offered to administrators with regard to configuration of relay-ids, detection and consequences of duplicate relay-ids.

Configuration of Relay-IDs:

Various strategies may be used to configure relay-ids. Any proposed strategy should be evaluated in terms of whether it can ensure unique relay-ids in the administrative domain. It should

be noted that relay-ids configured using the strategy must also satisfy requirements as stated in the rest of this document (especially [Section 5](#)). One strategy that may be used is relay-id on a relay agent may re-use an existing identifier or set of identifiers that are already guaranteed to be unique (e.g., UUID [[RFC4122](#)] or IP address).

Consequences and Detection of Duplication of Relay-IDs:

This document only defines relay-id suboption but not its use-cases. Consequences of duplication of relay-ids depend on how relay-ids are used. Administrators should create mechanisms to detect duplication of relay-ids.

Some mechanisms to detect duplication can be created based on

use-cases of relay-id. For example, DHCP servers use various decision criteria during allocation of IP addresses and other resources. If relay-id is part of the decision criteria, DHCP server will attempt, but fail, to allocate the same resource (typically an IP address) to two devices on the opposite side of the two relay agents with duplicate IDs. In most cases this won't happen, because the DHCP server isn't configured that way; in the cases where it does happen, DHCP server should log the failure.

It should be emphasized that these mechanisms may not be fool-proof at indicating duplication of relay-ids as the cause (the failures may be caused because of other reasons as well.) But they serve as a first step in the analysis towards detection of duplication relay-ids.

In contrast, the following approach is suggested as a general mechanism to detect duplication of relay-ids. Network management systems collect various types of information from the devices under their control. As part of this, they should also collect relay-id configured for each relay-agent (it becomes easy to do if relay-id is exposed as a MIB field). At the network management subsystem that has visibility into the entire administrative domain, it should have back-end tools to check for duplicate relay ids in the collected information.

6. Security Considerations

Security issues with the Relay Agent Information option and its use by servers in address assignment are discussed in [[RFC3046](#)] and [[RFC4030](#)]. The DHCP Relay Agent Information option depends on a trusted relationship between the DHCP relay agent and the DHCP

server, as described in [Section 5 of RFC 3046](#). While the introduction of fraudulent DHCP relay agent information options can be prevented by a perimeter defense that blocks these options unless the DHCP relay agent is trusted, a deeper defense using the authentication suboption for DHCP relay agent information option [[RFC4030](#)] SHOULD be deployed as well. It also helps in avoiding duplication of relay identifiers by malicious entities. However, implementation of authentication suboption for DHCP relay agent

information option [[RFC4030](#)] is not a must to support relay-id suboption.

7. IANA Considerations

We request that IANA assign a new suboption code from the registry of DHCP Agent Sub-Option Codes maintained in <http://www.iana.org/assignments/bootp-dhcp-parameters>.

Relay Agent Identifier Suboption [TBA]

8. Acknowledgments

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