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L. Yeh, Ed.
Huawei Technologies
M. Boucadair
France Telecom
T. Lemon
Nominum, Inc
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RADIUS Option for DHCPv6 Relay Agents on Broadband Access Server
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Abstract

The DHCPv6 RADIUS option provides a communication mechanism between relay agent and the server. This mechanism can help the centralized DHCPv6 server to select the right configuration for the client based on the authorization information received from a separate RADIUS server which is not located at the same place of DHCPv6 server in the cases where the NAS acts as DHCPv6 relay agent and RADIUS client simultaneously.

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Table of Contents

| | | |
|-----------------------|------------------------------------|-------------------|
| 1. | Introduction | 3 |
| 2. | Terminology and Language | 3 |
| 3. | Network Scenarios | 4 |
| 4. | OPTION_RADIUS | 6 |
| 5. | Relay Agent Behavior | 6 |
| 6. | Server Behavior | 7 |
| 7. | Client Behavior | 7 |
| 8. | Security Considerations | 7 |
| 9. | IANA Considerations | 7 |
| 10. | Acknowledgements | 7 |
| 11. | References | 7 |
| 11.1. | Normative References | 7 |
| 11.2. | Informative References | 8 |
| | Authors' Addresses | 8 |

1. Introduction

DHCPv6 provides a mechanism that allows the server to assign or delegate both stateful and stateless configuration parameters to the clients. The stateful configuration parameters include IPv6 address [[RFC3315](#)], IPv6 prefix [[RFC3633](#)], and etc. The stateless configuration parameters [[RFC3736](#)] include, for example, DNS [[RFC3646](#)]. The DHCPv6 server is typically deployed in the central part of an ISP network.

RADIUS [[RFC2865](#)], an essentially stateless protocol, is used widely as the centralized authentication, authorization and user management mechanism for the service provision in Broadband access network. [[RFC3162](#)], [[RFC4818](#)] and [[ietf-radext-ipv6-access-06](#)] specify attributes that supports the provision of service for IPv6 access. RADIUS authorizes that the NAS assigns an IPv6 address or prefix from the indicated pool, or assigns an IPv6 address or prefix with an explicitly indicated value in the attributes for the subscribers.

These mechanisms work well in the deployment scenario where the NAS acts as the distributed DHCPv6 server. In this case the NAS responds as the indication conveyed by the attributes in the Access-Accept message from the RADIUS server. These mechanisms also work in the scenario where the centralized DHCPv6 server is co-located with the RADIUS server, where they can share the same database of the users. But when the NAS acts as the relay agent and RADIUS client simultaneously, and the centralized DHCPv6 server is not located in the same place as the RADIUS server, a new communication mechanism is needed for the relay agent to transfer the authorization information indicated by the RADIUS attributes to the DHCPv6 server.

2. Terminology and Language

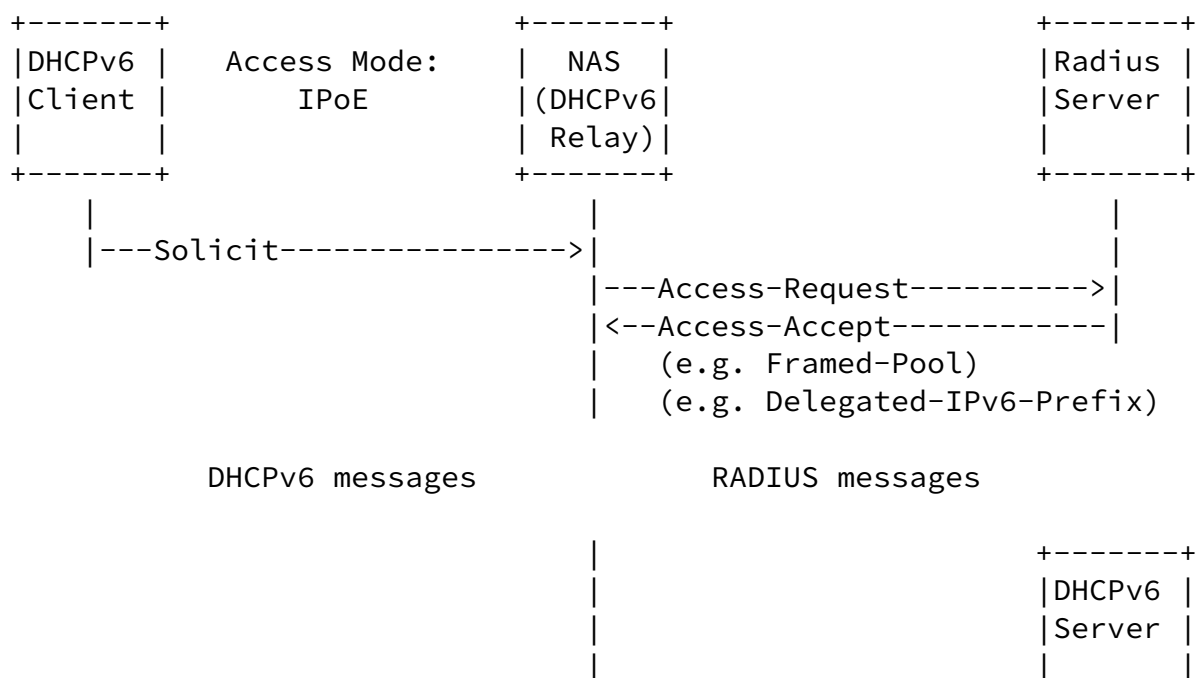
This document specifies a DHCPv6 option for the distributed Relay Agent to transfer the authorization information of RADIUS attributes

received in the Access-Accept message to the centralized DHCPv6 server. This document should be read in conjunction with the following specifications: [RFC2865], [RFC2869], [RFC3315] and [RFC4818]. These specifications will help the reader to understand how DHCPv6 and RADIUS work together to provide IPv6 service. Definitions for terms and acronyms not specified in this document are defined in [RFC2865], [RFC2869], [RFC3315] and [RFC4818].

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in BCP 14, [RFC2119].

3. Network Scenarios

Figure 1 and Figure 2 shows the typical network scenarios where the communication mechanism introduced in this document is necessary. In these scenarios, the centralized DHCPv6 server is not co-located with the RADIUS server, but both of them are in the same administrative domain. The NAS acts as the relay agent and the RADIUS client simultaneously. Figure 1 shows the sequence of DHCPv6 and RADIUS messages for IPoE access mode. Figure 2 shows the sequence of DHCPv6 and RADIUS messages for PPPoE access mode.



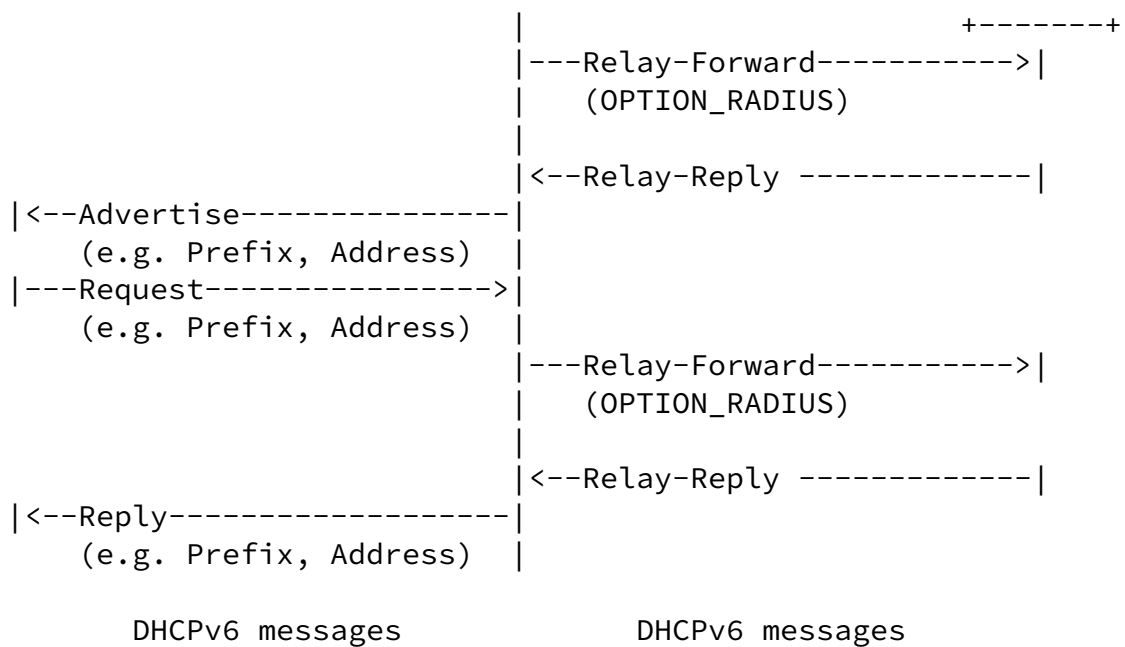
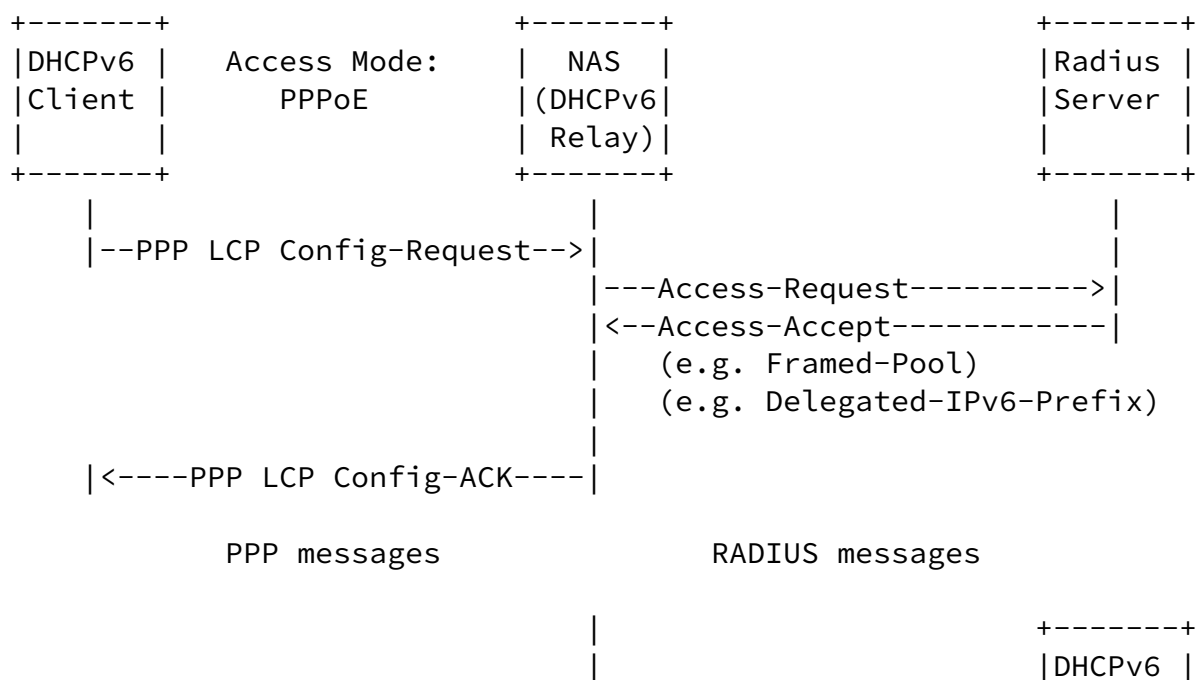


Figure 1: Network scenario and message sequence when employing DHCPv6

RADIUS option in IPoE access



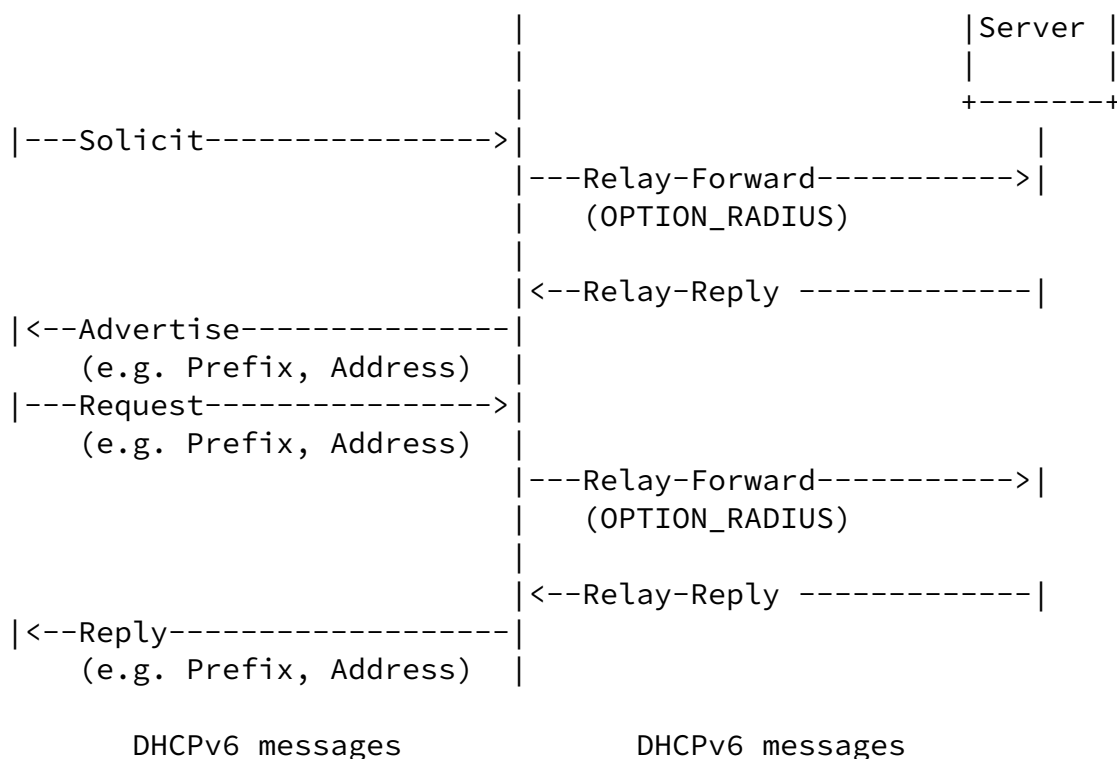


Figure 2: Network scenario and message sequence when employing DHCPv6 RADIUS option in PPPoE access

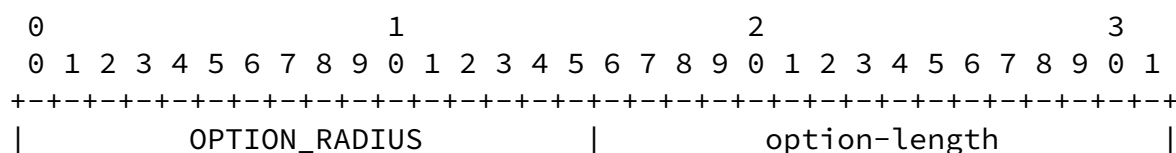
If the authorization through RADIUS fails, the associated message sequences will stop. The DHCPv6 relay will not forward the message

from the client to the server.

4. OPTION_RADIUS

The OPTION_RADIUS is a stateless DHCPv6 option, and is used by the relay agent to carry the authorization information of RADIUS attributes received in the Access-Accept message.

The format of the OPTION_RADIUS option is defined as follows:



```

+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|
|                                     RADIUS Attributes...
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

```

option-code      TBD
option-length    Length of the option-data in Octets
option-data      One or a list of RADIUS Attributes

```

The option-data of OPTION_RADIUS is one or a list of RADIUS attributes received in the Access-Accept message from the RADIUS server. As the same method in [\[RFC4014\]](#), only the attributes listed in the table below may be included in the OPTION_RADIUS.

| Type Code | Attribute | Reference |
|-----------|-----------------------|--|
| 26 | Vendor-Specific | [RFC2865] |
| 88 | Framed-Pool | [RFC2869] |
| 123 | Delegated-IPv6-Prefix | [RFC4818] |
| [TBD] | Framed-IPv6-Address | [ietf-radext-ipv6-access-06] |

Note: The above table might have more attributes in the future.

5. Relay Agent Behavior

The DHCPv6 relay agent may include OPTION_RADIUS in the RELAY-FORW message. When the value in the attributes of Framed-Pool (88), (or Stateful-IPv6-Address-Pool, Delegated-IPv6-Prefix-Pool,) Delegated-IPv6-Prefix (123) and Framed-IPv6-Address in the Access-Accept message replied from RADIUS server are valid, the relay agent that supports OPTION_RADIUS SHOULD include these RADIUS attributes in the container option, OPTION_RADIUS. The relay agent MUST ignore OPTION_RADIUS if received.

6. Server Behavior

Upon receipt of the RELAY-FORW message with OPTION_RADIUS from a relay agent, the DHCPv6 server SHOULD extract and interpret the RADIUS attributes in the OPTION_RADIUS, and use that information in selecting configuration parameters for the requesting client. If the DHCPv6 server does not support OPTION_RADIUS, the DHCPv6 server SHOULD ignore this option. The DHCPv6 server MUST NOT include

OPTION_RADIUS in RELAY-REPL messages.

7. Client Behavior

OPTION_RADIUS option is only exchanged between the relay agents and the servers. DHCPv6 clients are not aware of the usage of OPTION_RADIUS. DHCPv6 Client MUST NOT send OPTION_RADIUS, and MUST ignore OPTION_RADIUS if received.

8. Security Considerations

Known security vulnerabilities of the DHCPv6 and RADIUS protocol may apply to its options. Security issues related with DHCPv6 are described in [section 23 of \[RFC3315\]](#). Security issues related with RADIUS are described in [section 8 of \[RFC2865\]](#), [section 5 of \[RFC3162\]](#).

9. IANA Considerations

The authors of this document request to assign a new DHCPv6 option code for OPTION_RADIUS.

10. Acknowledgements

Expert comments from Bernie Volz and Tomek Mrugalski for the discussion on the technology selection in the mailing list are appreciated.

11. References

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Authors' Addresses

Leaf Y. Yeh (editor)
Huawei Technologies
P. R. China

Email: leaf.y.yeh@huawei.com

Mohamed Boucadair
France Telecom
France

Email: mohamed.boucadair@orange.com

Ted Lemon
Nominum, Inc
USA

Email: Ted.Lemon@nominum.com

