

SPRING
Internet-Draft
Intended status: Standards Track
Expires: 18 April 2026

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15 October 2025

Distribute SRv6 Locator by DHCP
draft-ietf-spring-dhc-distribute-srv6-locator-dhcp-11

Abstract

In an SRv6 network, each SRv6 Segment Endpoint Node must be assigned an SRv6 Locator, and segment IDs are generated within the address space of this SRv6 Locator. This document describes a method for assigning SRv6 Locators to SRv6 Segment Endpoint Nodes through DHCPv6.

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Table of Contents

1. Introduction	2
1.1. Requirements Language	3
2. Terminology	3
3. Motivation	3
4. DHCPv6 Extensions	5
4.1. Identity Association for SRv6 Locator Option	5
4.2. IA Locator Option	8
5. Process of Assigning SRv6 Locator	10
5.1. Procedure of SRv6 Locator	10
5.2. Advertisement of SRv6 Locator Route	12
5.3. DHCP Client Behavior	12
5.4. DHCP Server Behavior	14
5.5. DHCP Relay Agent Behavior	15
6. Implementation Status	15
6.1. New H3C Technologies	16
6.2. Raisecom Corporation	16
7. IANA Considerations	17
8. Security Considerations	17
9. Privacy Considerations	18
10. Acknowledgements	18
11. References	18
11.1. Normative References	19
11.2. Informative References	20
Contributors	20
Authors' Addresses	20

1. Introduction

The Segment Routing (SR) architecture [RFC8402] specifies how a node can steer a packet using an ordered list of instructions called segments. These segments are identified using Segment Identifiers (SIDs).

SR can be instantiated on the IPv6 data plane through the use of the Segment Routing Header (SRH) defined in [RFC8754]. SR instantiation on the IPv6 data plane is referred to as SRv6.

The network programming paradigm for SRv6 is specified in [RFC8986]. It describes how any behavior can be bound to a SID and how any network program can be expressed as a combination of SIDs. It also describes several well-known behaviors that can be bound to SRv6 SIDs.

In an SRv6 network, each SRv6 Segment Endpoint Node must be assigned an SRv6 Locator, and segment IDs are generated within the address space of this SRv6 Locator. This document describes a method for assigning SRv6 Locators to SRv6 Segment Endpoint Nodes through DHCPv6.

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. Terminology

This document leverages the terms defined in [I-D.ietf-dhc-rfc8415bis] and [RFC8986]. The reader is assumed to be familiar with this terminology.

3. Motivation

Telecom providers can use its IP Metro and Backbone networks to establish connectivity between access users who are located in different regions.

As shown in Figure 1, in the IP backbone network, access network devices are deployed for access users in different regions. This deployment assumes that all of the relevant components in Figure 1 are part of a single trusted SR domain. The IP network customer provider edge (CPE) must be managed by the operator providing services or by a trusted partner.

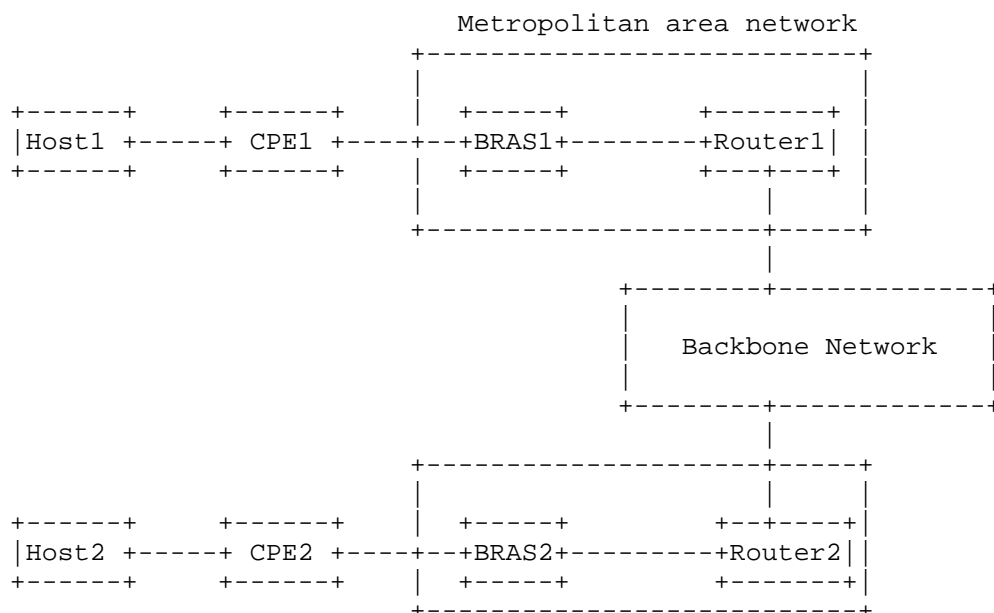


Figure 1: Telecom IPv6 Network

CPEs for access users are connected to the local metropolitan area network (MAN) in various ways. CPEs are responsible for assigning addresses to access users by requesting DHCPv6 Prefix Delegation (PD) from a DHCPv6 server, as specified in Section 6.3 of [I-D.ietf-dhc-rfc8415bis]. The DHCPv6 server is usually enabled on or relayed by the BRAS(Broadband Remote Access Server).

After the DHCPv6 server allocates PD, BRAS will add a network route corresponding to PD to local routing table and distribute the network route to the upstream routers.

In this network, operators hope to achieve interconnection between access users through End-to-End SRv6 tunnels. Taking the service traffic from Host1 to Host2 as an example, CPE1 is the SRv6 ingress node and CPE2 is the SRv6 egress node. The SRv6 Locator should be configured on CPE. Other devices in the network learn the SRv6 Locator route of the CPE.

At the same time, SRv6 policies needs to be configured on CPEs to steer the service traffic between CPEs to the specified SRv6 forwarding path. The SRv6 policy can be manually configured statically or issued through the controller, and its specific configuration method is out of the scope of this document.

However, due to the following reasons, it is difficult to achieve these requirements currently.

- * The configuration is very complex.

In Metro network, the number of CPEs is very large and widely distributed geographically. Moreover, the mobility requirements of CPE are relatively high, and the access location of the same CPE often changes, so its IPv6 address cannot be fixed.

At present, an SRv6 Locator can only be configured on each CPE through a controller or the Command Line Interface (CLI), which increases the configuration complexity.

- * SRv6 Locator routes cannot be dynamically distributed.

CPE can be connected to the BRAS of local MAN through various types of networks, such as leased line, optical fiber, etc. Due to the diversity of connections, IGP is usually only enabled within the MAN, that is, IGP will not be deployed between CPE and BRAS.

As a result, the SRv6 Locator route of CPE could not be distributed to the BRAS node through IGP, and the static route can only be configured manually on the BRAS or the controller. However, CPE and BRAS often belong to different administration domains. Configuring routes to CPE on BRAS increases the cost and workload of communication and coordination.

To solve these difficulties this document proposes a method to allocate SRv6 Locators to CPE through DHCPv6 and distribute SRv6 Locator routes by using the workflow of DHCPv6.

4. DHCPv6 Extensions

4.1. Identity Association for SRv6 Locator Option

The Identity Association for SRv6 Locator (IA_SRV6_LOCATOR) option is used to carry an IA_SRV6_LOCATOR, the parameters associated with the IA_SRV6_LOCATOR, and the SRv6 Locator associated with the IA_SRV6_LOCATOR.

The IA_SRV6_LOCATOR option can be carried in DHCPv6 Solicit, Advertise, Request, Reply, Renew, and Release messages.

The format of the IA_SRV6_LOCATOR option is:

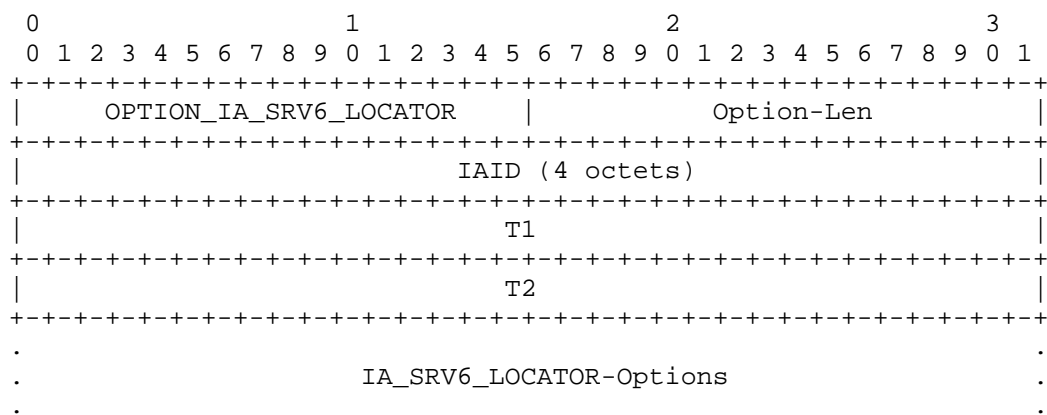


Figure 2: Identity Association for SRv6 Locator Option Format

Where:

- Option-Code: OPTION_IA_SRV6_LOCATOR, the option code for the Identity Association for SRv6 Locator. The current value early assigned by IANA is 149.
- Option-Len: 12 + length of IA_SRV6_LOCATOR-Options field.
- IAID: The unique identifier for this IA_SRV6_LOCATOR. The IAID MUST be unique among the identifiers for all of this client's IA_SRV6_LOCATORS. The number space for IA_SRV6_LOCATOR IAIDs is separate from the number space for other IA option types (i.e., IA_TA, IA_NA and IA_PD). A 4-octet field containing an unsigned integer.
- T1: The time interval after which the client should contact the server from which the SRv6 Locators in the IA_SRV6_LOCATOR were obtained to extend the lifetimes of the SRv6 Locators to the IA_SRV6_LOCATOR. T1 is a time duration relative to the message reception time expressed in units of seconds. A 4-octet field containing an unsigned integer.
- T2: The time interval after which the client should contact any available server to extend the lifetimes of the SRv6 Locators assigned to the IA_SRV6_LOCATOR. T2 is a time duration relative to the message reception time expressed in units of seconds. A 4-octet field containing an unsigned integer.
- IA_SRV6_LOCATOR-Options: Options associated with this IA_SRV6_LOCATOR. A variable-length field (12 octets less than the value in the Option-Len field).

The IA_SRV6_LOCATOR-Options field encapsulates those options that are specific to this IA_SRV6_LOCATOR. For example, all of the IA Locator options (see Section 4.2) carrying the SRv6 Locators associated with this IA_SRV6_LOCATOR are in the IA_SRV6_LOCATOR- Options field.

An IA_SRV6_LOCATOR option may only appear in the options area of a DHCP message. A DHCP message may contain multiple IA_SRV6_LOCATOR Options (though each must have a unique IAID).

The status of any operations involving this IA_SRV6_LOCATOR is indicated in a Status Code option (see Section 21.13 of [I-D.ietf-dhc-rfc8415bis]) in the IA_SRV6_LOCATOR-Options field.

Note that an IA_SRV6_LOCATOR has no explicit "lifetime" or "lease length" of its own. When the valid lifetimes of all of the SRv6 Locators in an IA_SRV6_LOCATOR have expired, the IA_SRV6_LOCATOR can be considered as having expired. T1 and T2 fields are included to give the server explicit control over when a client should contact the server about a specific IA_SRV6_LOCATOR.

In a message sent by a client to a server, the T1 and T2 fields SHOULD be set to 0. The server MUST ignore any values in these fields in messages received from a client.

In a message sent by a server to a client, the client MUST use the values in the T1 and T2 fields for the T1 and T2 timers, unless values in those fields are 0. The values in the T1 and T2 fields are the number of seconds until T1 and T2.

The server selects the T1 and T2 times to allow the client to extend the lifetimes of any SRv6 Locators in the IA_SRV6_LOCATOR before the lifetimes expire, even if the server is unavailable for some short period of time. Recommended values for T1 and T2 are 0.5 and 0.8 times the shortest preferred lifetime of the SRv6 Locators in the IA_SRV6_LOCATOR that the server is willing to extend, respectively. If the time at which the SRv6 Locators in an IA_SRV6_LOCATOR are to be renewed is to be left to the discretion of the client, the server sets T1 and T2 to 0. The client MUST follow the rules defined in Section 14.2 of [I-D.ietf-dhc-rfc8415bis].

If a client receives an IA_SRV6_LOCATOR with T1 greater than T2 and both T1 and T2 are greater than 0, the client discards the IA_SRV6_LOCATOR option and processes the remainder of the message as though the server had not included the IA_SRV6_LOCATOR option.

4.2. IA Locator Option

The IA Locator option is used to specify an SRv6 Locator associated with an IA_SRV6_LOCATOR. The IA Locator option MUST be encapsulated in the IA_SRV6_LOCATOR-Options field of an IA_SRV6_LOCATOR option (see Section 4.1). The terms Locator Block and Locator Node correspond to the B and N parts, respectively, of the SRv6 Locator that is defined in Section 3.1 of [RFC8986].

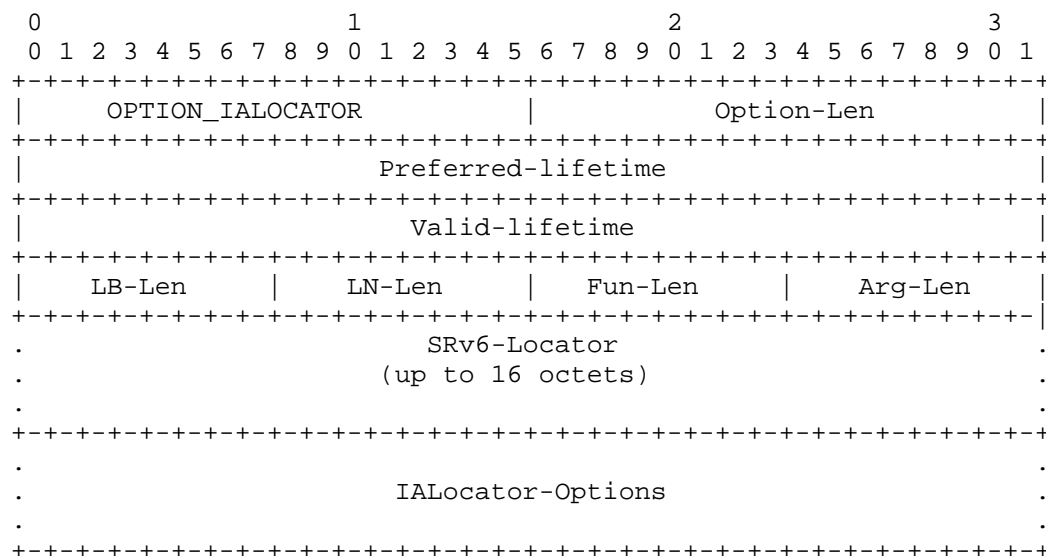


Figure 3: IA Locator Option Format

Where:

- Option-code: OPTION_IALOCATOR, the option code for IA_SRV6_Locator option. The current value early assigned by IANA is 150.
- Option-Len: 28 + length of IALocator-Options field.
- Preferred-lifetime: The preferred lifetime for the SRv6 Locator in the option, expressed in units of seconds. A value of 0xffffffff represents "infinity" (see Section 7.7 of [I-D.ietf-dhc-rfc8415bis]). A 4-octet field containing an unsigned integer.
- Valid-lifetime: The valid lifetime for the SRv6 Locator in the option, expressed in units of seconds. A value of 0xffffffff represents "infinity". A 4-octet field containing an unsigned integer.

- LB-Len: SRv6 SID Locator Block (LB) length in bits. A 1-octet unsigned integer.
- LN-Len: SRv6 SID locator Node (LN) length in bits. A 1-octet unsigned integer.
- Fun-Len: SRv6 SID function (FUNCT) length in bits. A 1-octet unsigned integer.
- Arg-Len: SRv6 SID arguments (ARG) length in bits. A 1-octet unsigned integer.
- SRv6-Locator: 0-16 octets. This field encodes the SRv6 Locator. The SRv6 Locator is encoded in the minimal number of octets for the given number of bits. Trailing bits MUST be set to zero and ignored when received.
- IALocator-Options: Options associated with this SRv6 Locator. A variable-length field (determined by subtracting the length of the SRv6-Locator from the Option-Len minus 12). The Status code "NoSRv6LocatorAvail" indicate the server has no locators available to assign to the IA_SRv6_Locator(s).

The SRv6 SID Locator length (LOC-Len) is LB-Len plus LN-Len.

The sum of LB-Len, LN-Len, Fun-Len, and Arg-Len MUST NOT exceed 128 bits. If the sum exceeds 128 bits, the IA_SRv6_LOCATOR option MUST be marked as invalid, and the remainder of the message SHOULD be processed as if the packet did not include this option.

The values in the preferred-lifetime and valid-lifetime fields are the number of seconds remaining in each lifetime. The value of 0xffffffff for the preferred lifetime or the valid lifetime is taken to mean "infinity" and should be used carefully. The details about the use of lifetime values for assigned SRv6 Locators are the same as the ones specified for prefix delegation in Section 18.2.10.1 of [I-D.ietf-dhc-rfc8415bis].

An IA Locator option may appear only in an IA_SRv6_LOCATOR option. More than one IA Locator option can appear in a single IA_SRv6_LOCATOR option.

The status of any operations involving this IA_SRv6_Locator option is indicated in a Status Code option (see Section 21.13 of [I-D.ietf-dhc-rfc8415bis]) in the IALocator-Options field.

5. Process of Assigning SRv6 Locator

This document assumes that a single transaction for all of the IA options required on an interface is used, as recommended in Section 18.1 of [I-D.ietf-dhc-rfc8415bis].

5.1. Procedure of SRv6 Locator

Consistent with Prefix Delegation mechanism [I-D.ietf-dhc-rfc8415bis], the CPE obtains an SRv6 Locator via DHCPv6. The key message exchanges involved are Solicit, Request, Advertise, and Reply. Once the DHCPv6 Server assigns an SRv6 Locator to the CPE, it automatically adds the associated SRv6 Locator routes.

Figure 2 illustrates the process of SRv6 Locator allocation through DHCPv6.

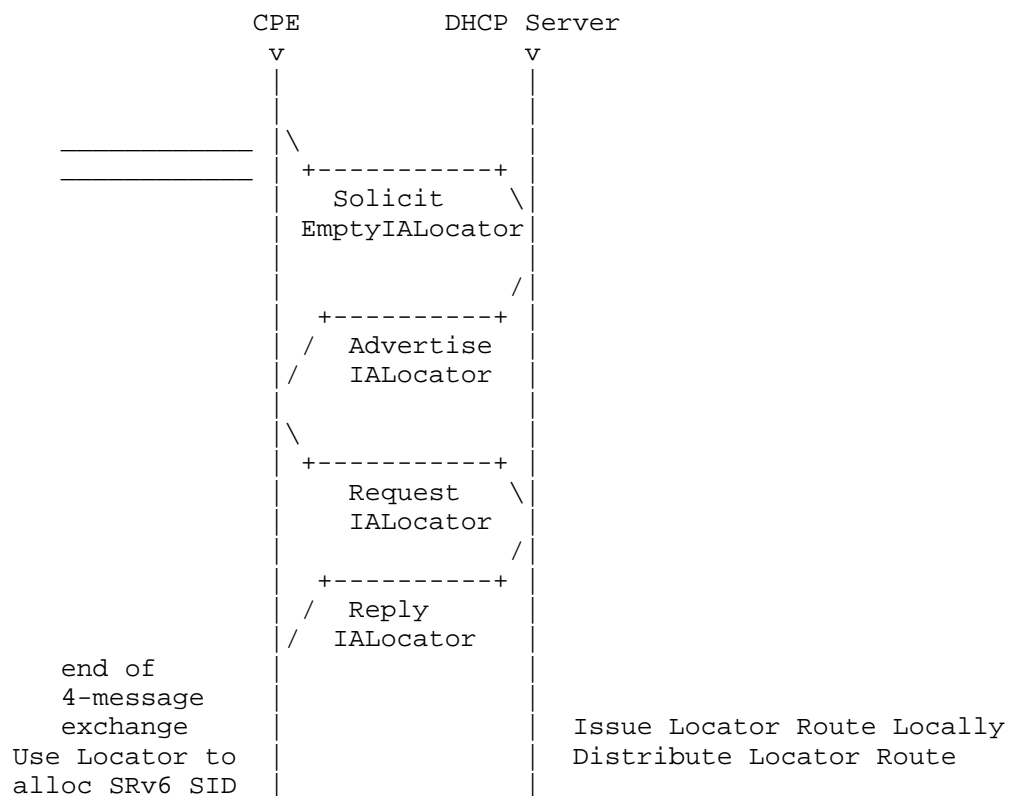


Figure 4: SRv6 Locator Exchange

As specified in Sections 18.2.1 of [I-D.ietf-dhc-rfc8415bis], DHCP client sends a Solicit message containing an IA_SRV6_LOCATOR option to request a locator. The client may include its preferred locator value within the IA_SRV6_LOCATOR option.

DHCP Server processes the Solicit message, assigns a locator to the client, and returns the allocated locator in an Advertise message with the IA_SRV6_LOCATOR option.

As specified in Sections 18.2.2 of [I-D.ietf-dhc-rfc8415bis], upon receiving the Advertise message, client accepts the assigned locator and sends a Request message with the IA_SRV6_LOCATOR option to confirm the requested locator.

The server processes the Request message, confirms the locator assignment, and responds with a Reply message containing the IA_SRV6_LOCATOR option with the allocated locator.

As described in Sections 18.2.4 of [I-D.ietf-dhc-rfc8415bis], client periodically sends a Renew message with the IA_SRV6_LOCATOR option to refresh the lease. The server processes the Renew message, updates the lease, and replies with a Reply message containing the IA_SRV6_LOCATOR option.

As described in Sections 18.2.5 of [I-D.ietf-dhc-rfc8415bis], if the client does not receive a Reply message before the T2 timer expires, it sends a Rebind message with the IA_SRV6_LOCATOR option to attempt lease renewal.

If the server responds with a Reply message, the client retains its allocated locator.

If no response is received, the client considers the lease expired and restarts the process by sending a new Solicit message.

As described in Sections 18.2.7 of [I-D.ietf-dhc-rfc8415bis], if the client is about to go offline, it sends a Release message with the IA_SRV6_LOCATOR option to relinquish the locator.

Upon receiving the Release message, the server MUST remove the lease and free the locator, making it available for allocation to other clients.

For the advertisement of SRv6 locator routes, if the DHCP Relay or DHCP Server device that assigns SRv6 Locators to CPEs is also a BRAS device, it MAY locally advertise the CPE's SRv6 Locator route via the IGP protocol, enabling other SRv6 nodes to obtain the CPE's SRv6 Locator route.

5.2. Advertisement of SRv6 Locator Route

This section describes the processing of SRv6 Locator routes.

As shown in Figure 5, when a BRAS device (functioning as a DHCP relay or DHCP server) receives an SRv6 Locator allocation request from a client, it MAY assign an SRv6 Locator to the client and install a corresponding SRv6 Locator route locally. The next hop of this route SHOULD point to the requesting client. The BRAS MAY then advertise this route via traditional routing protocols (e.g., an IGP) to allow other routers to learn it.

Upon receiving an SRv6 Locator release request from the client, the BRAS MUST release the allocated SRv6 Locator, remove the local SRv6 Locator route, and withdraw the previously advertised SRv6 Locator route via the IGP.

```
Client-----BRAS(Relay/Server)-----Router
Alloc Locator --> Add SRv6 locator route
                  Advertise SRv6 Locator route -->
Release Locator--> Del SRv6 locator route
                  Withdraw SRv6 Locator route -->
```

Figure 5: Advertisement of SRv6 Locator Route

5.3. DHCP Client Behavior

A client uses the Solicit message to discover DHCPv6 servers configured to assign leases or return other configuration parameters on the link to which the client is attached.

A client uses Request, Renew, Rebind, Release and Decline messages during the normal lifecycle of SRv6 Locator assignment.

In a message sent by a client to a server, the preferred-lifetime and valid-lifetime fields SHOULD be set to 0. The server MUST ignore any received values in these lifetime fields.

The client SHOULD NOT send an IA_SRv6_Locator option with 0 in the "LB-Len" and "LN-Len" fields (and an unspecified value (::) in the "SRv6-Locator" field). The client MAY send non-zero values in the "LB-Len" and "LN-Len" fields, and the unspecified value (::) in the "SRv6-Locator" field to indicate a preference for the size of the SRv6 Locator to be assigned. The LOC-Len (LB-Len + LN-Len) hint provided by a client is similar to the prefix-length hint in an IA_PD. Clients and servers are expected to follow the guidance provided in [RFC8168].

The client MUST discard any SRv6 Locators for which the preferred lifetime is greater than the valid lifetime.

The process of requesting an SRv6 Locator is the same as that of requesting prefixes. When requesting an SRv6 Locator, the DHCPv6 client sends a request message carrying the IA_SRV6_LOCATOR option to the DHCPv6 server.

Upon the receipt of a valid Reply message with IA_SRV6_LOCATOR option in response to a Solicit with a Rapid Commit option, Request, Renew, or Rebind message, the client MUST process the Reply message according to the requirements of Section 18.2.10 of [I-D.ietf-dhc-rfc8415bis], and configure the assigned SRv6 Locator in the client device automatically.

After obtaining the SRv6 Locator assigned by the DHCPv6 server, how to assign local SRv6 SIDs based on this SRv6 Locator, how to use multiple assigned SRv6 Locators, and how to advertise these SRv6 SIDs to the rest of the network are not within the scope of this document. If the client uses the assigned SRv6 Locator to configure local SRv6 SIDs, the preferred and valid lifetimes of those SRv6 Locators MUST NOT be longer than the remaining preferred and valid lifetimes respectively for the assigned SRv6 Locator at any time.

To extend the preferred and valid lifetimes for the assigned SRv6 Locators or obtain new assigned SRv6 Locators, the client sends a Renew/Rebind message to the server with IA_SRV6_LOCATOR option as specified in Sections 18.2.4 and 18.2.5 of [I-D.ietf-dhc-rfc8415bis].

If the client no longer uses the SRv6 Locator, the client can actively send a Release message to notify the server to reclaim SRv6 Locator and delete the corresponding SRv6 Locator. The client MUST include options containing the IAs for the SRv6 Locators it is releasing in the IA_SRV6_LOCATOR-options of IA_SRV6_LOCATOR option.

A client can explicitly request multiple SRv6 Locator prefixes by sending multiple IA_SRV6_LOCATOR options. A client can send multiple IA_SRV6_LOCATOR options in its initial transmissions. Alternatively, it can send an extra Request message with additional new IA_SRV6_LOCATOR options (or include them in a Renew message).

DHCP allows a client to request new SRv6 Locators to be assigned by sending additional new IA_SRV6_LOCATOR options. However, a typical operator usually prefers to assign a single, larger prefix. In most deployments, it is recommended that the client request a larger SRv6 Locator in its initial transmissions rather than request additional SRv6 Locators later on.

5.4. DHCP Server Behavior

When the server receives a valid Request message or a valid Solicit message with a Rapid Commit option, the server creates the bindings for that client according to the server's policy and configuration information and records the IAs and other information requested by the client.

The DHCPv6 server treats the SRv6 Locator as the prefix of prefix pool. Upon the receipt of the IA_SRV6_LOCATOR option, the server searches SRv6 Locator prefix pool and allocates appropriate SRv6 Locators for the client.

If there is an assignable SRv6 Locator, the server creates the SRv6 Locator binding entry for that client according to the server's policy and configuration information and constructs a Reply message that includes an IA_SRV6_LOCATOR option with the SRv6 Locator information (including LB-Len, LN-Len, Fun-Len, and Arg-Len) assigned to the client.

When operating as a BRAS device, the DHCPv6 server MAY install a local SRv6 Locator route pointing to the CPE and advertise this route via an IGP upon assigning an SRv6 Locator to the CPE.

The IA_SRV6_LOCATOR option is filled with the SRv6 Locator information assigned to the client. The IA_SRV6_LOCATOR option populates the SRv6 Locator block length, locator node length, function length, and arguments length.

Upon receiving the Release message from the client or when the SRv6 Locator lease expires, the server reclaims the SRv6 Locator prefix resource and deletes the SRv6 Locator binding entry. If the DHCPv6 server functions as a BRAS device, the server also MAY delete the corresponding SRv6 Locator route locally.

For any IA_SRV6_LOCATOR option in the Request message to which the server cannot assign any SRv6 Locators, the server MUST return the IA_SRV6_LOCATOR option in the Reply message with no SRv6 Locator prefixes in the IA_SRV6_LOCATOR and with a Status Code option containing status code NoSRv6LocatorAvail in the IA_SRV6_LOCATOR.

After receiving a DHCP message with multiple IA_SRV6_LOCATOR options at the same time, whether the server can assign multiple SRv6 Locators to the client depends on the server policy, which is out of scope for this document. Note that the configuration behavior of the server and client SHOULD be consistent (e.g., "Clients and Servers SHOULD assign a single locator unless explicitly configured").

5.5. DHCP Relay Agent Behavior

For the scenario described in Section 2, if an external DHCPv6 server is deployed to allocate SRv6 Locators, the DHCPv6 relay agent service needs to be enabled on the layer 3 network nodes close to the CPE. As shown in the figure below, the DHCP relay function is enabled on the router directly connected to the CPE. This deployment assumes that all of the relevant components in Figure 6 are part of a single trusted SR domain.

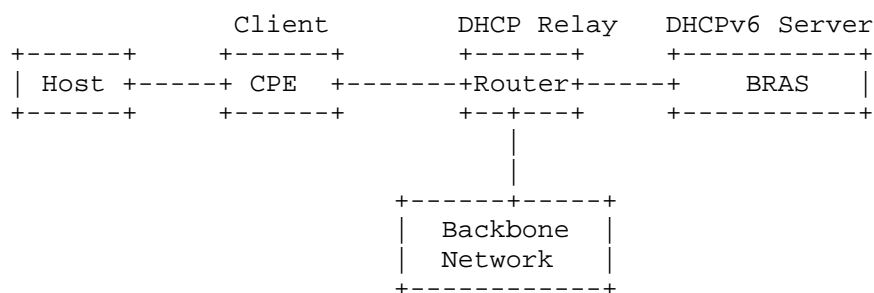


Figure 6: CPE accessed through DHCP relay

When the last DHCPv6 relay agent in the return path to the client receives DHCPv6 Relay-Reply messages, it extracts the IA_SRV6_LOCATOR option from the Reply message, and obtains the SRv6 Locator assigned by the DHCPv6 server according to IA_SRV6_Locator option. The first DHCPv6 relay agent needs to record the SRv6 Locator assigned by the DHCPv6 server, including SRv6 Locator information, lifetime, etc. If the DHCPv6 Relay is directly connected to the CPE device, a corresponding SRv6 Locator route MAY also be added locally and advertised via IGP.. The outgoing interface of the route is the access interface connecting the client.

After receiving the DHCPv6 Release or Decline messages from the client, or the valid lifetime of SRv6 Locator prefix expires, If the DHCPv6 relay is a BRAS device, the DHCPv6 relay agent MAY delete the SRv6 Locator route locally.

6. Implementation Status

[Note to the RFC Editor - remove this section before publication, as well as remove the reference to [RFC7942].

This section records the status of known implementations of the protocol defined by this specification at the time of posting of this Internet-Draft, and is based on a proposal described in [RFC7942]. The description of implementations in this section is intended to assist the IETF in its decision processes in progressing drafts to

RFCs. Please note that the listing of any individual implementation here does not imply endorsement by the IETF. Furthermore, no effort has been spent to verify the information presented here that was supplied by IETF contributors. This is not intended as, and must not be construed to be, a catalog of available implementations or their features. Readers are advised to note that other implementations may exist.

According to [RFC7942], "this will allow reviewers and working groups to assign due consideration to documents that have the benefit of running code, which may serve as evidence of valuable experimentation and feedback that have made the implemented protocols more mature. It is up to the individual working groups to use this information as they see fit".

6.1. New H3C Technologies

- * Organization: New H3C Technologies.
- * Implementation: H3C CR16000, CR19000 series routers implementation of Distribute SRv6 Locator by DHCP.
- * Description: All sections including all the "MUST" and "SHOULD" clauses have been implemented in above-mentioned New H3C Products (running Version 7.1.099 and above).
- * Maturity Level: Product
- * Coverage: All sections.
- * Version: Draft-04
- * Licensing: N/A
- * Implementation experience: Nothing specific.
- * Contact: linchangwang.04414@h3c.com
- * Last updated: October 22, 2024

6.2. Raisecom Corporation

- * Organization: Raisecom Corporation.
- * Implementation: Raisecom's RaizSec-VNF RaizSec-VNF Series SD-WAN Gateway implementation of Distribute SRv6 Locator by DHCP

- * Description: All sections including all the "MUST" and "SHOULD" clauses have been implemented in Raisecom RaizSec-VNF series SD-WAN Gateway.
- * Maturity Level: GA
- * Coverage: ALL
- * Version: Draft-04
- * Licensing: N/A
- * Implementation experience: Nothing specific.
- * Contact: jiarongbin@raisecom.com
- * Last updated: October 10, 2024

7. IANA Considerations

IANA has early assigned the following new DHCPv6 Option Codes in the "Option Codes" registry maintained at <https://www.iana.org/assignments/dhcpv6-parameters>.

Value	Description	Client ORO	Singleton Option	Reference
149	OPTION_IA_SRV6_LOCATOR	NO	No	[This Document]
150	OPTION_IALOCATOR	NO	No	[This Document]

Table 1

IANA is requested to assign a value for the following new DHCPv6 Status code in the registry maintained in <http://www.iana.org/assignments/dhcpv6-parameters>:

- * NoSRv6LocatorAvail (TBD)

8. Security Considerations

See Section 23 of [I-D.ietf-dhc-rfc8415bis] and Section 23 of [RFC7227] for the DHCP security considerations. See [RFC8200] for the IPv6 security considerations.

As discussed in Section 23 of [I-D.ietf-dhc-rfc8415bis]: DHCP lacks end-to-end encryption between clients and servers; thus, hijacking, tampering, and eavesdropping attacks are all possible as a result.

In some network environments, it is possible to secure them, as discussed later in Section 23 of [I-D.ietf-dhc-rfc8415bis].

If not all parties use this mechanism to obtain an SRv6 Locator from the DHCPv6 server, there is the possibility of the same SRv6 Locator being used by more than one device. Note that this issue would exist on these networks even if DHCP were not used to obtain the SRv6 Locator.

Server implementations SHOULD consider configuration options to limit the maximum number of SRv6 Locators to allocate (both in a single request and in total) to a client. However, note that this does not prevent a bad client actor from pretending to be many different clients and consuming all available SRv6 Locators.

9. Privacy Considerations

See Section 24 of [I-D.ietf-dhc-rfc8415bis] for the DHCP privacy considerations.

The SR domain is a trusted domain, as defined in [RFC8402], Sections 2 and 8.2. Having such a well-defined trust boundary is necessary in order to operate SRv6-based services for internal traffic while preventing any external traffic from accessing or exploiting the SRv6-based services. Care and rigor in IPv6 address allocation for use for SRv6 SID allocations and network infrastructure addresses, as distinct from IPv6 addresses allocated for end users and systems (as illustrated in Section 5.1 of [RFC8754]), can provide the clear distinction between internal and external address space that is required to maintain the integrity and security of the SRv6 Domain.

When assigning SRv6 Locators to SRv6 Segment Endpoint Nodes using DHCPv6 as specified in this document, CPEs and BRAS devices MUST operate within a single trusted SR domain.

10. Acknowledgements

The authors would like to thank Chongfeng Xie, Joel Halpern, Robert Raszuk, Aihua Liu, Cheng Li, Xuwei Wang, Hao Li, Junjie Wang, Mengxiao Chen, Fang Gao, Aijun Wang, Xinxin Yi, Shenchao Xu, Yisong Liu, Xueshun Wang, Min Xiao, Liyan Gong, Linda Dunbar, Quan Xiong, Adrian Farrel and Bernie Volz for their comments to this document.

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