DHC
Internet Draft
Intended status: Standards Track
Expires: April 23, 2026

W. Cheng
R. Han
China Mobile
C. Lin
New H3C Technologies
F. Yang
China Mobile

October 20, 2025

Distribute ARN6 ID by DHCP
draft-cheng-dhc-distribute-arn-dhcp-00

Abstract

This document describes a method for assigning ARN6 ID through DHCPv6.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on April 23, 2026.

Copyright Notice

Table of Contents

1. Introduction

[I-D.draft-yang-rtgwg-arn-framework] proposes a new framework called Application Responsive Network (ARN), by encapsulating more network functions into ARN Service identifiers (ARN ID), thus it opens up interfaces to applications. This document describes a method for assigning IPv6 ARN ID(ARN6 ID) 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

[I-D.draft-yang-rtgwg-arn-framework] proposes a new framework called ARN, which abstracts and represents personalized network services based on user demand awareness, provided through ARN IDs. Network services can be encapsulated by ARN IDs, thus it can be called by user. The vision is to enable applications to access network resources like they access an operating system.

The application here can be network service implemented on a gateway or software that can program the ARN ID.

This document describes a method for assigning IPv6 ARN ID(ARN6 ID) through DHCPv6.

4. DHCPv6 Extensions

4.1. Identity Association for ARN6

The Identity Association for ARN6 (IA_ARN6) option is used to carry an IA ARN6, the parameters associated with the IA_ARN6, and the ARN6 ID associated with the IA_ARN6.

The IA_ARN6 option can be carried in DHCPv6 Solicit, Advertise, Request, Reply, Renew, and Release messages.

The format of the IA_ARN6 option is:

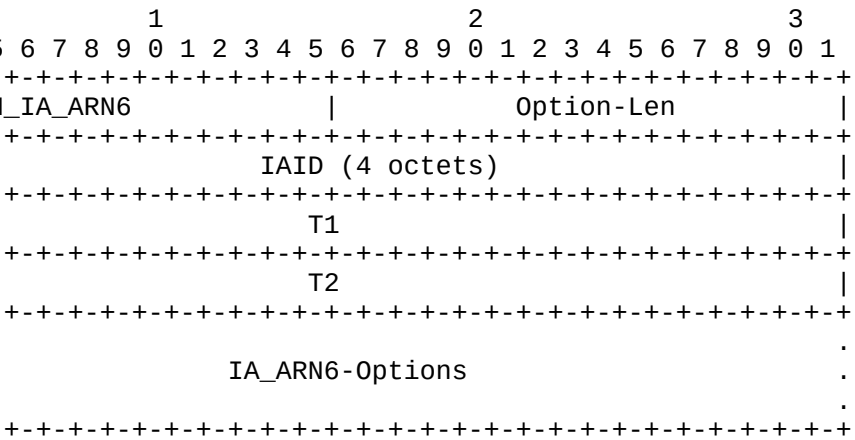

Figure 2: Identity Association for ARN6 Option Format

Where:

- Option-Code: OPTION_IA_ARN6, the option code for the Identity Association for ARN6.

- Option-Len: 12 + length of IA_ARN6-Options field.

- IAID: The unique identifier for this IA_ARN6.

- T1: The time interval after which the client should contact the server from which the ARN6 in the IA_ARN6 were obtained to extend the lifetimes of the ARN6 to the IA_ ARN6. 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 ARN6 assigned to the IA_ ARN6. 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_ ARN6 Options: Options associated with this IA_ARN6.

The IA_ARN6-Options field encapsulates those options that are specific to this IA ARN6.

4.2. IA ARN6 ID Option

The IA ARN6 ID option is used to specify an ARN6 associated with an IA_ARN6. The IA ARN6 option MUST be encapsulated in the IA_ARN6-Options field of an IA_ARN6 option (see Section 4.1).

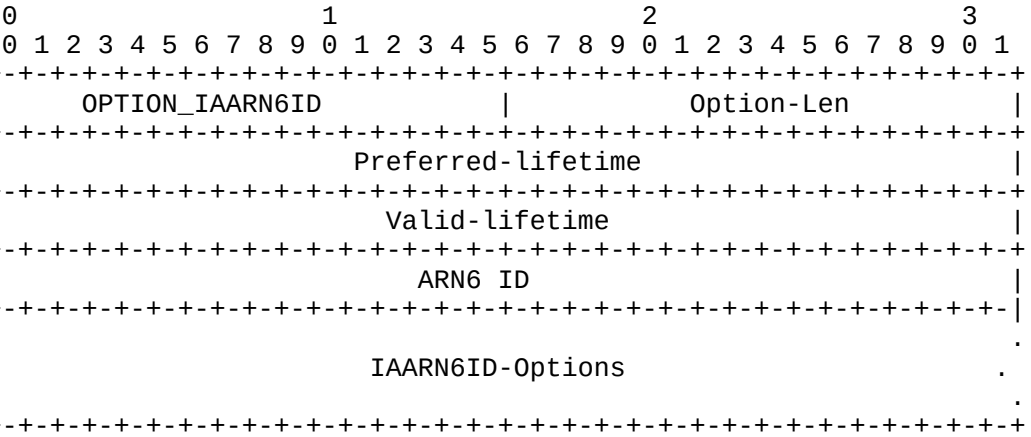

Figure 3: IA ARN6 ID Option Format

Where:

- Option-code: OPTION_IAARN6ID, the option code for IA_ARN6 option.

- Option-Len: 12 + length of IAARN6ID-Options field.

- Preferred-lifetime: The preferred lifetime for the ARN6 ID 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 ARN6 ID in the option, expressed in units of seconds. A value of 0xffffffff represents "infinity". A 4-octet field containing an unsigned integer.

- ARN6 ID: 4 octets. This field encodes the ARN6 ID.

- IAARN6ID-Options: Options associated with this ARN6.

5. 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
TBD	OPTION_IA_ARN6	NO	No	[This Document]
TBD	OPTION_IAARN6ID	NO	No	[This Document]

Table 1

6. 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].

7. Privacy Considerations

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

8. Acknowledgements

9. References

9.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC7227] Hankins, D., Mrugalski, T., Siodelski, M., Jiang, S., and S. Krishnan, "Guidelines for Creating New DHCPv6 Options", BCP 187, RFC 7227, DOI 10.17487/RFC7227, May 2014, <https://www.rfc-editor.org/info/rfc7227>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, May 2017.

[I-D.ietf-dhc-rfc8415bis] Mrugalski, T., Volz, B., Richardson, M., Jiang, S., and Winters, T., " Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", draft-ietf-dhc-rfc8415bis-12, work-in-progress, June 2025.

[I-D.draft-yang-rtgwg-arn-framework] YANG F., and Lin, C., " Application-Responsive Network Framework", draft-yang-rtgwg-arn-framework, work-in-progress, June 2025.

Contributors

Authors' Addresses

Weiqiang Cheng
China Mobile
China
Email: chengweiqiang@chinamobile.com

Ruibo Han
China Mobile
China
Email: hanruibo@chinamobile.com

Changwang Lin
New H3C Technologies
China
Email: linchangwang.04414@h3c.com

Feng Yang
China Mobile
Beijing
China
Email: yangfeng@chinamobile.com