

Workgroup: 6MAN WG

Internet-Draft:

draft-gundavelli-6man-nd-location-00

Published: 12 July 2023

Intended Status: Standards Track

Expires: 13 January 2024

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Civic Location and Geospatial Coordinate Support in IPv6 ND

Abstract

The physical location of a network device plays a crucial role in various applications, particularly in emergency calling, where precise caller location information is essential for prompt and effective emergency response.

RFC 4676 has standardized DHCP options for delivering the Civic Location of the client, while RFC 6225 has defined DHCP options for delivering the Geospatial coordinates of the client. However, these corresponding options are missing in IPv6 Neighbor Discovery protocols.

This proposal aims to address this gap by introducing the necessary options for IPv6 Neighbor Discovery to provide accurate location information.

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Table of Contents

- [1. Introduction](#)
- [2. Conventions and Terminology](#)
 - [2.1. Conventions](#)
 - [2.2. Terminology](#)
- [3. Overview](#)
- [4. IANA Considerations](#)
- [5. Security Considerations](#)
- [6. Acknowledgements](#)
- [7. References](#)
 - [7.1. Normative References](#)
 - [7.2. Informative References](#)
- [Author's Address](#)

1. Introduction

Accurate knowledge of the physical location of a network device serves a wide range of applications. In the context of emergency telephony, precise caller location information is vital for correctly directing the emergency dispatch personnel to the correct location. An endpoint can obtain the location information from the network and can include it in the SIP (Session Initiation Protocol) signaling messages.

[[RFC4676](#)] has standardized DHCP options for delivering the Civic Location of the client, while [[RFC6225](#)] has defined DHCP options for delivering the Geospatial coordinates of the client. However, these corresponding options are missing in IPv6 Neighbor Discovery protocols.

In the case of an IPv6-only client utilizing SLAAC (Stateless Address Autoconfiguration) for auto-address configuration and obtaining configuration parameters through Neighbor Discovery (ND), it should have the capability to acquire the same information from the first-hop router over IPv6 Neighbor discovery messages.

2. Conventions and Terminology

2.1. Conventions

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](#)].

2.2. Terminology

All the IPv6 terms used in this document are to be interpreted as defined in the IETF specifications.

3. Overview

Assuming there is agreement on supporting these options for IPv6 ND, we have few different paths to get there.

Approach-1: Replicate the Civic Location [[RFC4676](#)] and Geospatial coordinate options [[RFC6225](#)] from DHCP as IPv6 Router Advertisement options [[RFC4861](#)]. Standardize new options.

Approach-2: There was a proposal on defining a new Router Advertisement IPv6 ND message [[I-D.troan-6man-universal-ra-option](#)]. Its purpose is to use the Router Advertisement messages as opaque carriers for configuration information between an agent on a router and a host. However, this proposal did not receive much love from the working group at that time. Is it time now to bring that document back and revisit the decision?

Approach-3: With the realization of IPv6 coloring in the form of PVD [[RFC8801](#)], we now have the option to contain these options under a PVD scope. But the location is not a domain specific property and cannot see how it be localized under a given PVD scope. Keeping that discussion aside, should the location be retrieved as additional PVD information. If the "H" flag in the PVD option is set to a value of 1, and if PVD URI is provided, an endpoint can query the location information. For this, we need to define a JSON elements with string type, (e.g.) "Civic-Location-Country-Code", "Civic-Location-Street" following some ISO address conventions.

What is the best path for closing this gap? Is there another alternative?

4. IANA Considerations

TBD

5. Security Considerations

TBD

6. Acknowledgements

TBD

7. References

7.1. Normative References

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