Architectural Framework of IPv6-based Geographical Forwarding for ITS
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Abstract

For IPv6-based ITS applications, ITS data packets are required to be delivered based on the geographical location information of the destination ITS node or area. In this draft, we describe the architecture of the IPv6-based Geographical Forwarding System (IGFS).

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1. Requirements notation

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].

2. Introduction

For the support of IPv6-based ITS (Intelligent Transportation System) applications, ITS data packets are required to be delivered based on the geographical location (longitude and latitude) information of the destination ITS node or area.

From the considerations in [Geo-Problem], in this draft, we describe the architecture of the IPv6-based Geographical Forwarding System (IGFS).

3. Terminology

IPv6-based Geographical Forwarding System (IGFS)
The conceptual system consisting of ITS nodes, Location Databases (LDBs), Geographical Forwarding DHCPs (G-DHCPs), etc.

ITS node
A vehicle or a device (e.g., roadside unit (RSU)) that may generate ITS-related data in the form of IPv6 datagrams.

Geographical Location (Geo-location)
The location of an ITS node represented in the form of longitude and latitude. The geo-location information is represented in the form of the World Geodetic System 1984 (WGS84) [WGS-84] formatted coordinates.

Geographical Forwarding
IPv6 datagram forwarding based on the geo-location information of the source and the destination ITS node or area.

Geographical Forwarding Address (Geo-Address)
An IPv6 address for geographical forwarding that belongs to a geographical forwarding address range assigned by IANA. An ITS node should have a geo-address to be involved in geographical forwarding of IPv6 datagrams.

Geographical Forwarding DHCP (G-DHCP) Server
A DHCP server with geo-addresses to be assigned to ITS nodes.
Location Database (LDB)
The database with geo-location information of ITS nodes; that is, the database with mapping information of geo-locations and geo-addresses of its associated ITS nodes; there can be more than one LDBs which may form a hierarchy.

Destination Area
The rectangular area in which this IPv6 datagram needs to be forwarded; that is, all the ITS nodes in the destination area are supposed to receive this IPv6 datagram.

4. IPv6-based Geographical Forwarding System

The main entities of the IPv6-based Geographical Forwarding System (IGFS) are ITS nodes, Location Databases (LDBs), Geographical Forwarding DHCP (G-DHCP) servers (TBD more, if needed).

If a node wishes to involve in geographical forwarding of IPv6 datagrams, it SHOULD get a geographical forwarding address (geo-address) from a G-DHCP server with the IPv6 addresses for geographical forwarding.

An ITS node SHOULD register its geo-address in the LDB that it is associated with. The association with an LDB is to be defined later.

When an ITS node has ITS data to send by geographical forwarding, the geographical location information of the destination ITS node or area can be obtained by referring to one or more LDBs or from the upper layer (e.g., the coordinate information from a map in the application layer).

5. Other Considerations

TBD.

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