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**DHCP Option for Home Agent Discovery in MIPv6**  
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Abstract

This draft defines a DHCP-based scheme to enable dynamic discovery of Mobile IPv6 home agent address and home subnet. New DHCP options are defined to carry the information from a DHCP server to the DHCP client running on the mobile node.

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## **1. Introduction**

Before a mobile node can engage in Mobile IPv6 signaling with a home agent, it should either know the IP address of the home agent via preconfiguration, or dynamically discover it. Mobile IPv6 specification [2] describes how home agents can be dynamically discovered by mobile nodes that know the home subnet prefix. This scheme does not work when prefix information is not already available to the mobile node. This problem can be solved by delivering one or more home subnet prefix information to the mobile node by means of DHCP. Subsequently, the mobile node can engage dynamic home agent discovery using the prefix information. In addition to delivering the prefix information, DHCP can also be used to directly provide the IP addresses or FQDNs of the home agents that are available to the mobile node.

The solution involves defining new DHCP options to carry home subnet prefix, home agent IP address and FQDN information. A similar solution has already been defined for Mobile IPv4 home agents [3].

As part of configuring the initial TCP/IP parameters, a mobile node can obtain home network information for the subnet it is directly attached to, other subnets in the visited domain, or a subnet from its home domain. Mobile node can convey the target home subnet's identity in order to receive corresponding information. For example the mobile node can provide realm portion of its user NAI and expect that a home agent information from its home domain is returned. The availability of the requested information depends on the DHCP server having prior knowledge or dynamically discovering it. While the specific details are outside the scope of this document, use of static tables and AAA-assisted discovery are possible options [8].

The mobile node may or may not be connected to the "home" subnet when it attempts to learn Mobile IPv6 home network information. This allows operators to centrally deploy home agents while being able to bootstrap mobile nodes that are already roaming. This scenario occurs when HMIP [7] is used, where the mobile node is required to discover the MAP (a special home agent) that is located multiple hops away from the mobile node's attachment point.



## **2. Terminology**

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](#) [[1](#)].

Most of terms used in this draft are defined in Mobile IPv6 [[2](#)] and [RFC3315](#) [[4](#)].

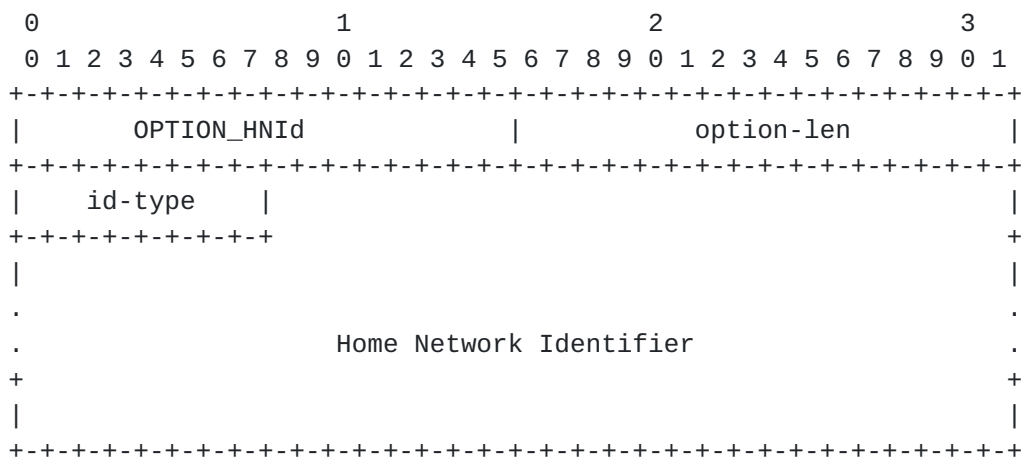
### 3. DHCP options for HA Dynamic Discovery

This section introduces two DHCP options used for dynamic home agent discovery in Mobile IPv6.

#### 3.1. Home Network Identifier Option

This option is used to carry the identifier of the target home network. This identification allows mobile node to request information for a home subnet within the visited domain, or from a specific domain. It is assumed that the DHCP server has some mechanism to know or retrieve the requested Mobile IPv6 information. The specifics of these mechanisms are outside the scope of this draft.

The mobile node MUST include this option along with its Option Request option in its request.



option-code

OPTION\_HNId (TBD)

option-len

Total length of the option

id-type

The type of Home Network Identifier:

0      Local (visited) domain



## 1 Network realm

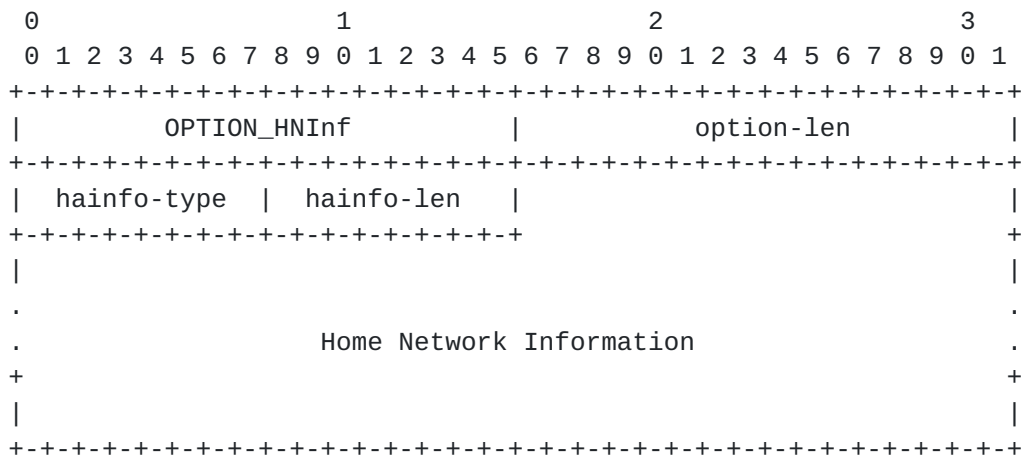
Id-type 0 indicates the mobile node is interested in learning the home network information that pertains to the immediately connected (visited) network. In that case, Home Network Identifier field is not used. This type can be used to discover local home agents in a visited network.

Id-type 1 indicates the format of Home Network Identifier field is a network realm as defined in [5]. In this case, the mobile node is interested in learning home network information that pertains to the given realm. This type can be used to discover home agents that are hosted by a user's home domain (as indicated by his/her NAI-based username -- user@HomeRealm).

### 3.2. Home Network Information Option

This option is used to carry home network information in the form of one or more of home subnet prefix(es), home agent address(es), and FQDN(s) to a mobile node.

The server MUST provide all of the matching home subnet prefix(es), home agent address(es) and FQDN(s) in a Home Network Information option. If the server has no information to provide, it MUST set the option-len field to zero in this option.





option-code

OPTION\_HNInf (TBD)

option-len

Total length of the option

hainfo-type

The type of following Home Network Information field.  
Possible values are:

- 0      Home subnet prefix
- 1      Complete IPv6 address of the home agent
- 2      FQDN of the home agent

hainfo-len

8-bit unsigned integer. Length of the home agent  
information field plus 1.

Home Network Information

A home subnet prefix, home agent IP address or FQDN.

When hninfo-type is set to 0, the data field MUST  
contain 8-bit prefix length information followed  
by a 128-bit IPv6 address.

When hninfo-type is set to 1, the data field MUST  
contain a 128-bit IPv6 address.

When hninfo-type is set to 2, the data field MUST  
contain a FQDN as described in [RFC1035](#) [6].

Single option can carry multiple information preceded by hninfo-type  
and hninfo-len fields. The length fields help identify the  
information boundaries.



## **4. Option Usage**

The requesting and sending of this option follows the rules for DHCP options in [4].

### **4.1. DHCP Server - Home Agent Relation**

The DHCP server does not have to be co-located with a home agent, or even be on the home subnet of the mobile node. Its location with respect to home network does not matter as long as it possesses the requested information.

### **4.2. Mobile Node Considerations**

When a Mobile IPv6 Mobile Node finds itself with neither a home subnet prefix nor a home agent address, it may request the needed information with Option Request option. For instance, a mobile node connecting to a network for the first time may acquire a DHCP address and solicit for home network information at the same time.

A mobile node MUST identify the desired information with Home Network Identifier option. For example, a DHCP server may have information about home agents from several domains (and subnets). It relies on the mobile node to select the domain for determining which ones it should provide in response to the client's request.

When the mobile node gets more than one home agent address, it MUST have a selection mechanism to determine which one to use for establishing a Mobile IPv6 session. In case it retrieves only home subnet prefix(es), it needs to perform dynamic home agent discovery to learn the IP addresses of the home agents. Similarly, if FQDN of a home agent is retrieved, the mobile node can use DNS to resolve it to IPv6 address(es).

### **4.3. DHCP Server Considerations**

It is assumed that the DHCP server has access to home network information for its clients for this option to be useful. The DHCP server can rely on pre-configuration, or some dynamic discovery mechanisms for obtaining this information. In case it does not have any information, or it cannot locate matching information based on Home Network Identifier, it returns a Home Network Information option with 0-length data.



## **5. Security Considerations**

Secure delivery of home agent and home link information from a DHCP server to the mobile node (DHCP client) relies on the overall DHCP security. The particular option defined in this draft does not have additional impact on the DHCP security.

Aside from the DHCP client to server interaction, an operator must also ensure secure delivery of mobile IP information to the DHCP server. This is outside the scope of DHCP and the newly defined option.

## **6. IANA Consideration**

This document introduces two new DHCPv6 options, Home Agent Request option and Home Agent Reply option. The type numbers for new DHCP options are currently TBD. An appropriate request will be made to IANA if this Internet draft gets accepted as an RFC.

## **7. Normative References**

- [1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
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- [8] Chowdhury, K. and A. Lior, "RADIUS Attributes for Mobile IPv6 bootstrapping", [draft-chowdhury-mip6-bootstrap-radius-01](#) (work in progress), November 2004.



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