Exposing Source IP Address Type Requirements with DHCPv6

draft-moses-dmm-dhcp-ondemand-mobility-01

D. Moses, A. Yegin

Agenda

- Introduction
- Quick reminder about DHCPv6 options
- Proposed new options
- Discussion

Changes Since rev 0

- Added support for Prefix Delegation
- Added support for Anchor Preference indication

All changes since previous revision are in Green

Purpose

Enhance DHCPv6 to enable:

- Mobile hosts to state the type of the required source IP address (in terms of continuity support), when requesting a new source IP address
- Mobile (requesting) routers to state the type of the required IPv6 prefixes (in terms of continuity support), when requesting a new IP prefix
- Networks to convey to the mobile hosts, the type of IP address that was assigned to them
- Delegating routers to convey to the requesting routers, the type of IP prefix that was assigned to them

When?

The DHCP client may be triggered to request an IP address when:

- The mobile host initially connects to a network
- After handoff to a different LAN (a LAN with a different IP prefix)
- After an application requests a specific type of source IP address (as specified in draft-ietf-dmm-ondemand-mobility-00) and the IP stack in the mobile host does not already have one
- When a mobile router requires a new IP prefix

Agenda

Introduction

Quick reminder about DHCPv6 options

Proposed new options

Discussion

How are IP addresses Communicated?

IP addresses are communicated in DHCPv6 using the IA Address Option which is encapsulated in either the IA_NA or IA_TA options (which may encapsulate several IA Address options in their IA_NA-options or IA_TA-options field).

The IA_NA (or IA_TA) options are carried in several DHCP messages such as:

- Request – when a client requests IP address(s)
- Reply – when a serer replies with the required address(s)
- Renew – when a client whishes to extend the lifetime of addresses

Likewise, IPv6 Prefixes are communicated using the IA_PD Prefix Option which is encapsulated in the IA_PD Option.

IA – Identity Association
IA_NA – IA for non-temporary addresses
IA_TA – IA for temporary addresses (RFC 3041)
IA_PD – IA for Prefix Delegation

The IA Address Option

The IA Address option carries an IP address that is associated with an IA.

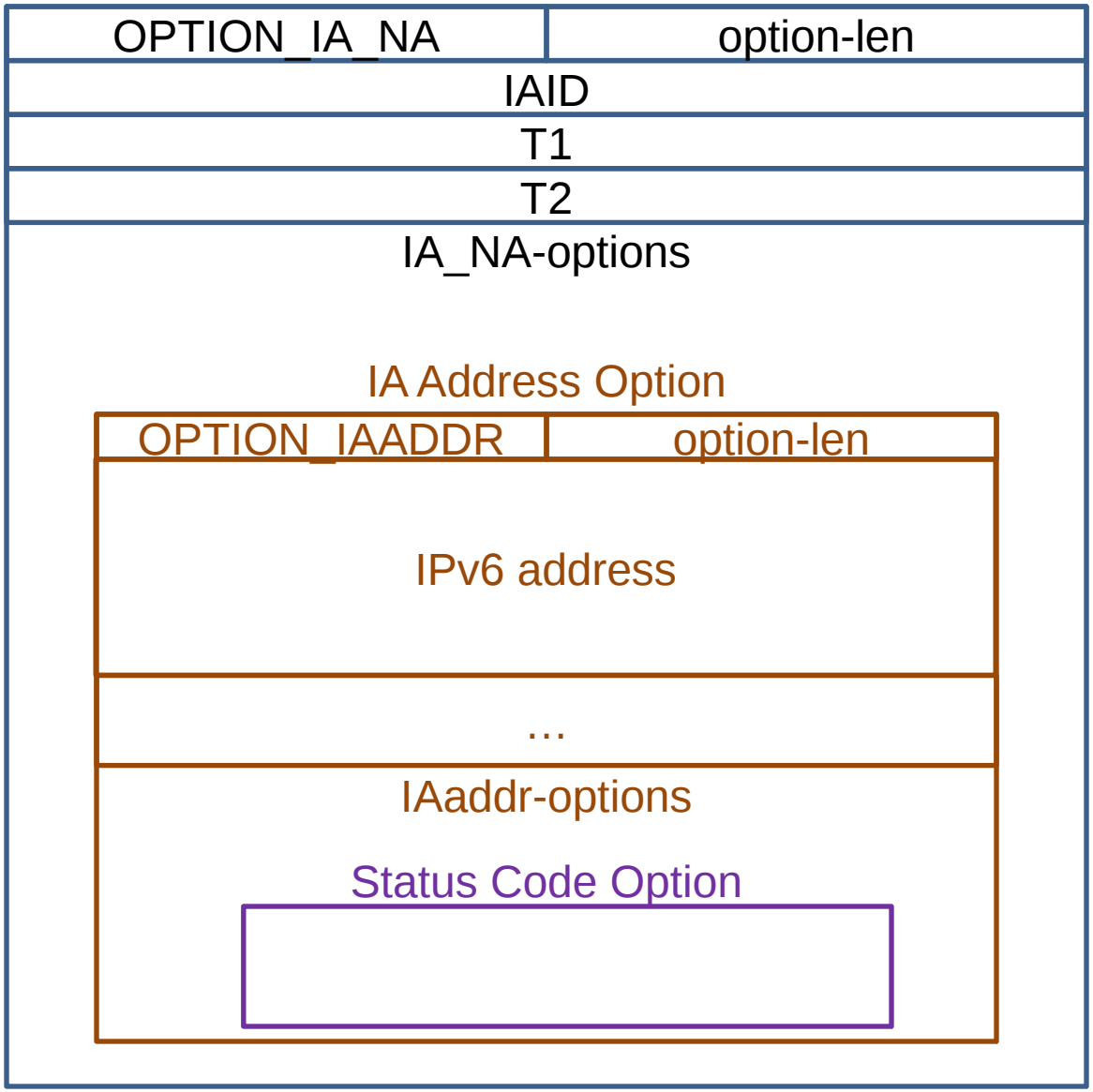
- When used by the client, it can ‘hint’ to the server its preferred address, or to specify which IP address’s lifetime to extend.
- When used by the server, it specifies the assigned source IP address

The IA Address Option (cont)

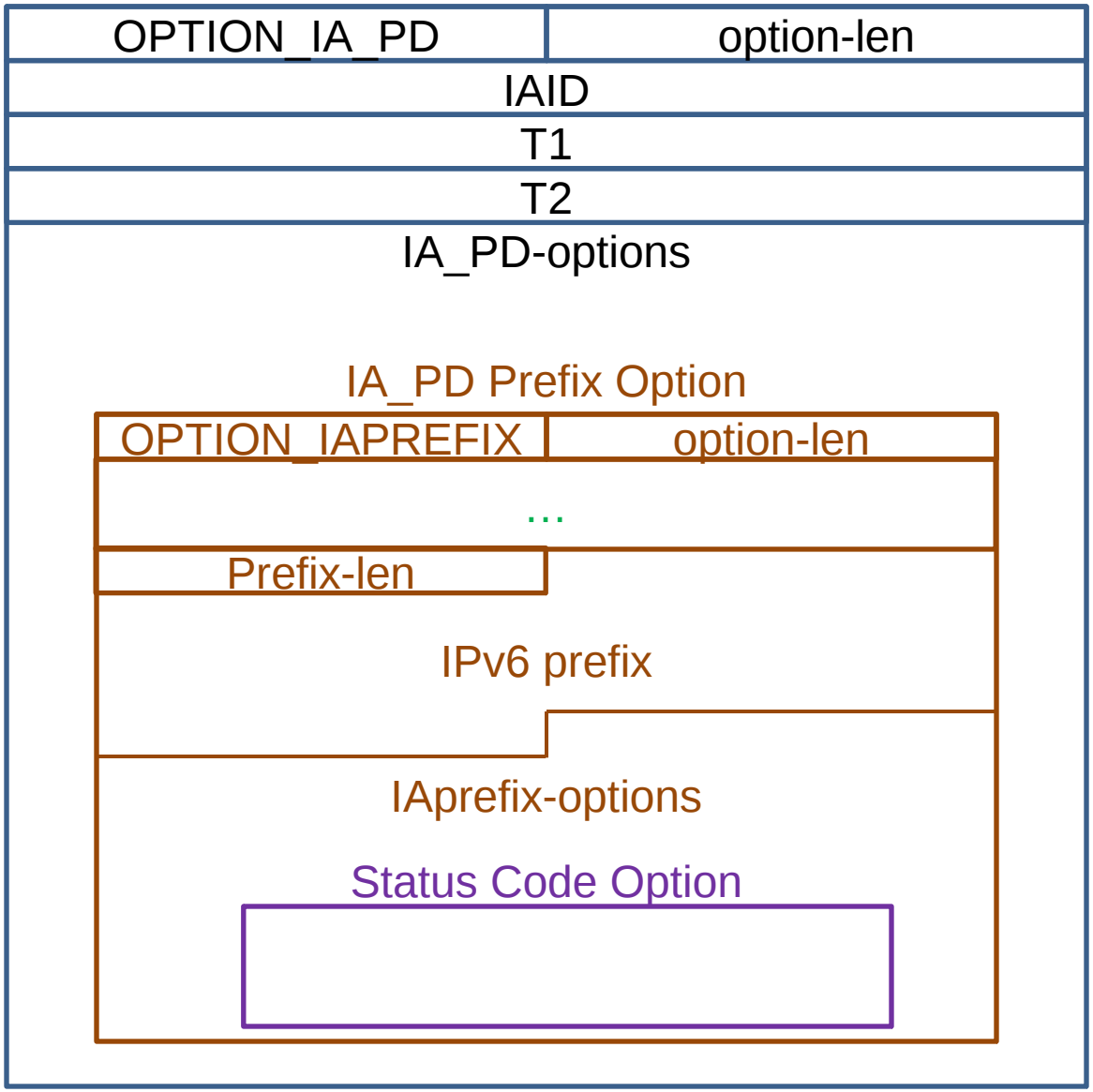
The IA Address Option includes an IAaddr-options field which encapsulates options that are associated with the specific IA Address.

the Status Code Option is an example of an option that can be encapsulated in the IAaddr-option field to convey status information associated with the IA Address.

IA_NA/IA_TA Option



IA_PD Option


OPTION_IA_PD
option-len
IAID
T1
T2
IA_PD-options
IA_PD Prefix Option
OPTION_IAPREFIX
option-len
...
Prefix-len
IPv6 prefix
IAprefix-options
Status Code Option

Agenda

Introduction

Quick reminder about DHCPv6 options

Proposed new options

Discussion

New Options

The draft-moses-dmm-dhcp-ondemand-mobility draft proposes the following new options:

- IPv6 Continuity Service Option
- Anchor Preference Option

The IPv6 Continuity Service Option

The IPv6 Continuity Service Option describes the type of continuity service associated with the IA Address.

When used by the DHCP client in a Request, it indicates the type of continuity service the client desires.

When used by the DHCP server in a reply, it indicates the type of continuity service committed by the network with the associated IA address.

The IPv6 Continuity Service Option (Cont)

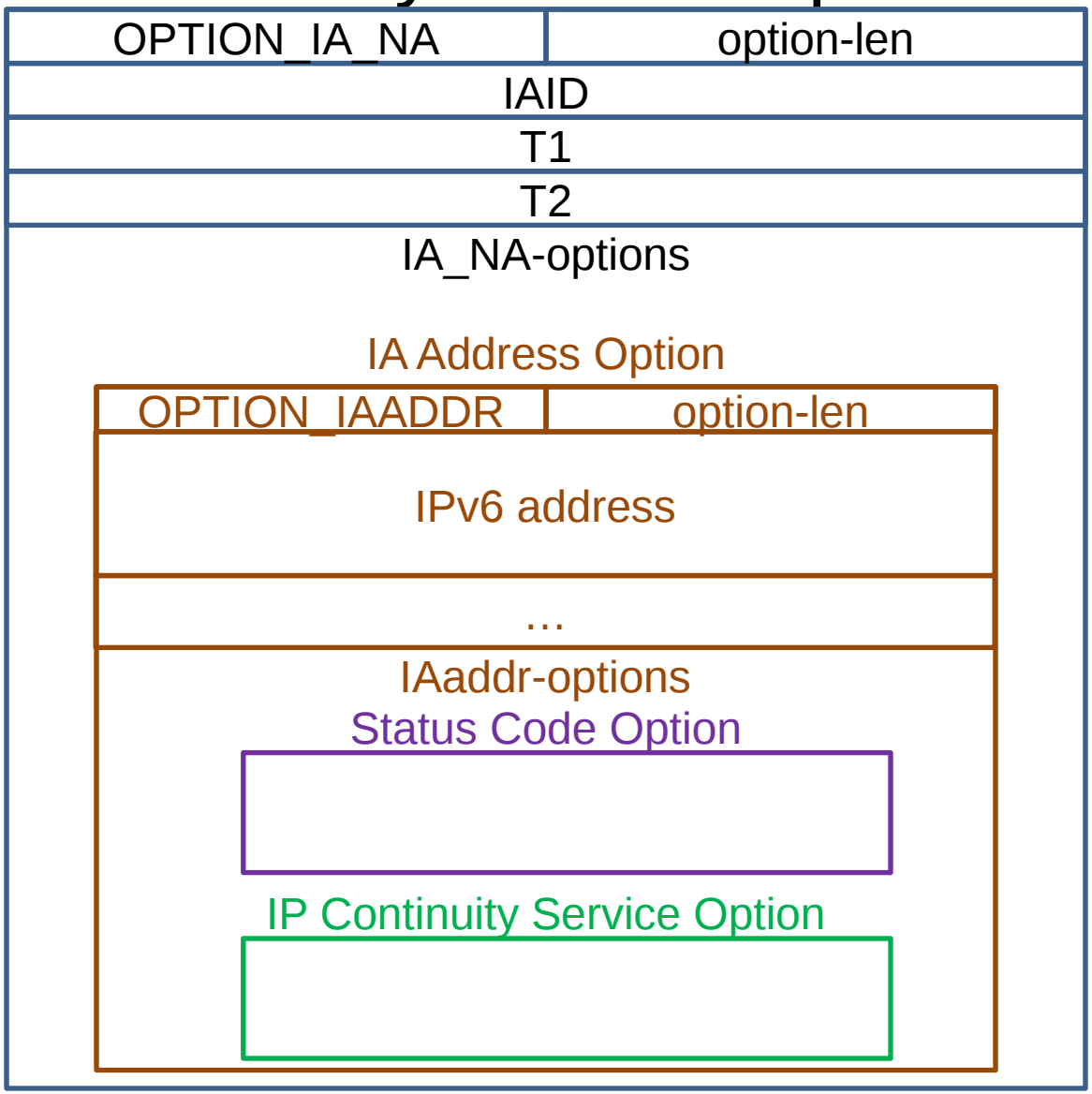
The IPv6 Continuity Service Option must be encapsulated in either:

- The IAaddr-options field of the IA Address Option it is associated with.
- The IAprefix-options field of the IA_PD Prefix Option it is associated with

Possible values represent:

- Nomadic address/prefix – not valid after a handoff to a LAN with a different IP prefix
- Sustained address/prefix – Valid throughout the IP session
- Fixed address/prefix – Valid as long as the IP address is defined
- AnyType – no guarantee of the continuity service

IA_NA Option with an encapsulated IP Continuity Service Option



IPv6 Continuity Service Option Usage Rules

- The server MUST never encapsulate an IPv6 Continuity Service Option in an IA Address Option if the client had not used it first.
- Once the IPv6 Continuity Service Option was encapsulated in an IA Address Option, in both requests and replies, it MUST be used in all subsequent usages of that specific IA Address in any message with the same value that was initially used by the server.
- The same rules apply when the IPv6 Continuity Service Option is used with the IA_PD Prefix Option

Backwards Compatibility

- If a client uses the IPv6 Continuity Service Option in an IA Address option, but receives no reply from the server after the specified retry attempts –
  - It SHOULD assume that the server does not support the IPv6 Continuity Service Option and retry without it
  - It MAY record this knowledge about the server and avoid using the IPv6 Continuity Service Option in subsequent communication with that server.
  - If stopping the usage of the IPv6 Continuity Service Option when communicating with a specific server, the client SHOULD try again after a period of time (in case the server was upgraded at some point of time)
- Both DHCPv6 clients and servers MUST support the legacy IA Address Option (with no encapsulated IPv6 Continuity Service Option)
- The same rules apply to the usage of the IPv6 Continuity Service Option within an IA_PD Prefix Option

The Anchor Preference Option

- Draft draft-aliahmad-dmm-anchor-selection-01 describes different scenarios for anchor selection.
- The Anchor Preference Option enables the mobile host to indicate to the network its Anchor preference, by specifying the IP prefix of the desired source address.
- The network may take this indication in account when selecting the Mobile Anchor for this mobile host

The Anchor Preference Option (Cont)

The Anchor Preference Option must be encapsulated in either:

- The IA_NA-options (or IA_TA-options) field of the IA_NA Option (or IA_TA Option) it is associated with.
- The IA_PD-options field of the IA_PD Option it is associated with

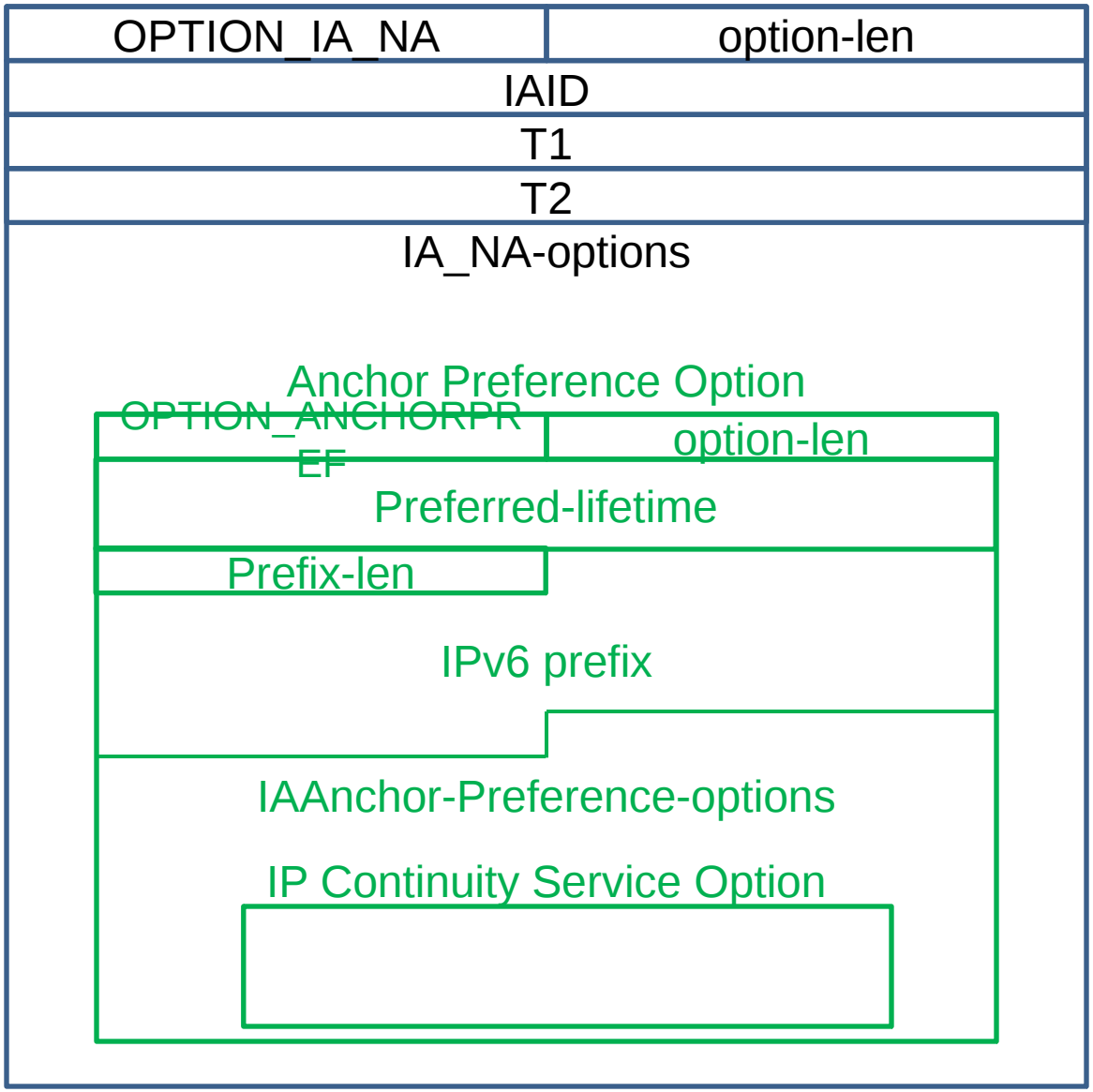
This option can only appear in the initial request from the client.

It will include the following fields:

- prefix length
- IP prefix (16 octets)
- Preferred lifetime (similar to an IA Address option)

This option is used only when either a ‘Sustained’ or ‘Fixed’ IP address is requested, and must encapsulate the IP Continuity Service Option to indicate the type of continuity service desired by the requester.

IA_NA Option with an encapsulated Anchor Preference Option



Agenda

Introduction

Quick reminder about DHCPv6 options

Proposed new options

Discussion

Summary

1. A new ‘IP Continuity Service Option’ –
   - Used by the client to convey the desired address type
   - Used by the server to inform the client of the type of address that was assigned to it
   - Used also to request convey the desired type of IP prefix in Prefix Delegation’
2. A new ‘Anchor Preference Option’ for a client to indicate its preference of a specific Mobility Anchor to service its traffic

Next steps

1. Complete the draft
2. Receive more comments from the group
3. Adopt as a WG draft
4. Present to the dhc WG for further work
5. Complete