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Address Selection for DMM
draft-liu-dmm-address-selection-01

Abstract

In DMM scenario, it is possible for the MN to have multiple mobility anchor points and corresponding prefixes. In that case, MN needs to know the type of the addresses then it can select the right one for application to use. This document describes a mechnism to extend RA message to carry a flag which can be used to identify the nature of the prefix.

Requirements Language

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].

Status of this Memo

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

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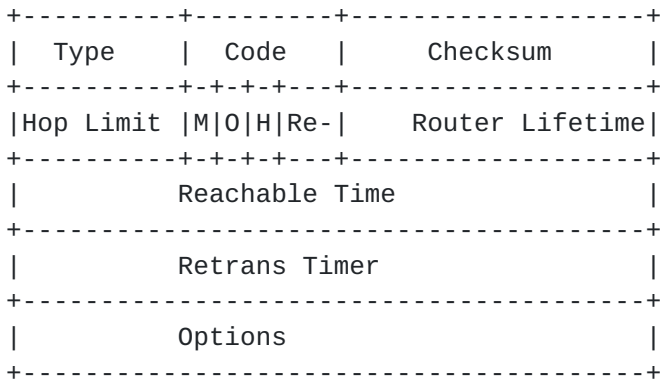
1. Problem of address selection for DMM

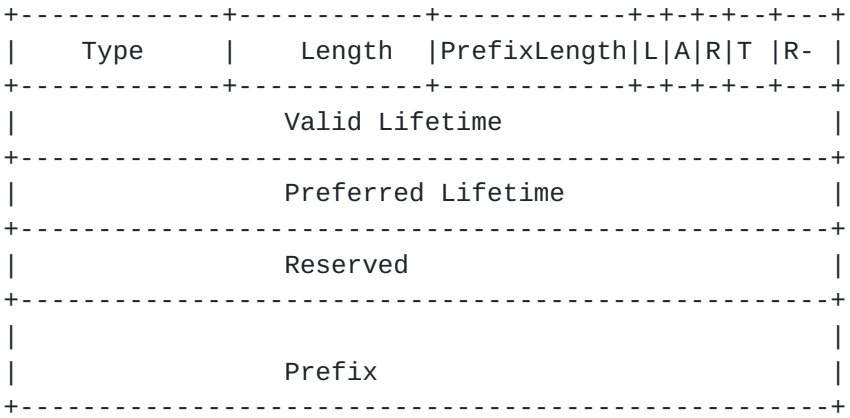
As draft-liu-dmm-dynamic-anchor-discussion-00 introduced, there is a address selection problem for DMM dynamic anchor solution. The difficulty of this problem is: the MN does not know the difference between the multiple prefixes. There is no way for the network to tell the MN the nature of the different prefixes and there is no standard mechnism for the MN to select the right prefix.

2. Extension to Router Advertisment

Mobile IPv6 [RFC3775] extend IPv6 router advertisement message for movement detection and home agent information broadcasting. This document proposes to further extend the IPv6 router advertisement message to carry a flag to identify the nature of the prefix that it is advertising.



The H bit is used for indentify that the router advertisment is sent by a home agent.



This document proposes to extend the prefix information option to add a 'T' flag, its definition is as follows:

T (Type):

Type flag. This is a 2 bits flag indentifies the types of the advertising prefix. The value of this flag could be:

00: Local home network prefix. It means that this prefix is allocated and advertised by current router which the MN attaches to.

01 : Remote home network prefix. It means that this prefix is allocated by another router instead of the router that the MN currently attaches to.

10: Reserved.

11: Reserved.

The mechanism that used for the router to identify the types of the prefix is out the scope of this document. As an example, the router can query the policy server to know which router allocates a particular prefix.

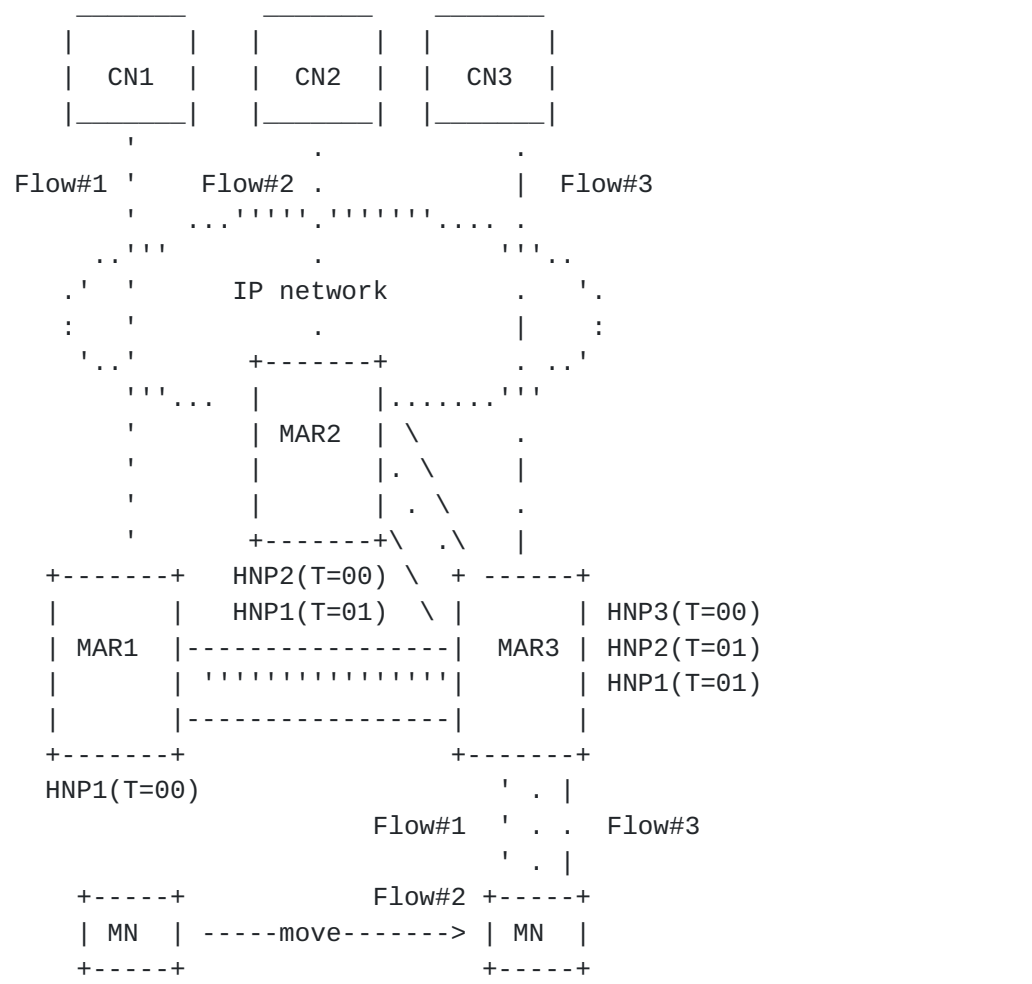
3. Mobile Node Operation

The mobile node knows the types of the prefixes from the T flag of the router advertisment message. The applications on the mobile node can use this information to select the right IP address. For example, for on-going session, application always choose to use the prefix that it used before it handovers to a new location. For the newly initiate application, it will use the prefix that allocated by current router, e.g. local home network prefix. The mobile node can use advanced socket API to select the proper prefix, for example, extension to RFC 5014.The detail mechanism is out the scope of this document.

4. An Example of How This Draft Works

This section describes how the T flag specified above solves the source address selection. Two different use cases are presented below.

4.1. MN Handoffs From MAR to a Next MAR



T=00: Local home network prefix
using common IP forwarding and routing mechanisms

T=01:Remote home network prefix
using mobility anchoring and tunneling to maintain communications

Figure 1: Source address selection in DMM

As shown in figure1, flow#1, flow#2 and flow#3 are initiated and anchored at MAR1, MAR2 and MAR3 respectively.

When MN attaches to MAR1, MAR1 sends Router Advertisement messages(RA) containing MN's home network prefix(HNP1) in Prefix Information option with the Type flag (T) bit set to 00 as specified in section 2. This indicates that HNP1 is local home network prefix which is allocated and advertised by current router(MAR1). MN can initiate a session with CN1 (i.e. flow#1 in figure1) by using IPv6

addresses derived from HNP1. Common IPv6 routing mechanism will be applied for flow#1 as long as MN remains attached to MAR1.

When MN handoffs to MAR2(flow#1 continues while MN handoffs), MAR2 sends RA messages containing MN's new prefix(HNP2) in Prefix Information option with the Type flag (T) bit set to 00 together with old prefix (i.e. HNP1) with the Type flag (T) bit set to 01. MN will learn that HNP2 is local home network prefix and HNP1 is remote home network prefix. At this moment, MN can initiate a new sessions with CN2 (i.e. flow#2 in the figure1) by using IPv6 addresses derived from HNP2 as its source address. Because this IPv6 address is derived from a local home network prefix (i.e. HNP2), common IPv6 routing mechanism will be applied for flow#2. For flow#1, MAR1 plays role of LMA and MAR2 plays role of MAG.

When MN handoffs to MAR3(flow#1 and flow#2 continue while MN handoffs), MAR3 sends RA messages containing MN's new prefix(HNP3) and previous prefixes (HNP1 and HNP2) in Prefix Information option with the Type flag (T) bit set to 00 for HNP3 and 01 for HNP1 and HNP2. This indicates HNP3 is local home network prefix, and HNP1 and HNP2 are remote home network prefixes. At this moment, MN can initiates new sessions with CN3 (i.e. flow#3 in figure1) by using IPv6 addresses derived from HNP3 as its source address. And Common IPv6 routing mechanism will be applied for flow#3.

4.2. MN Handoffs From MAR Back to Its Previous MAR

MN could also handoff back from MAR3 to MAR2 again (assuming flow#1, flow#2 and flow#3 continue while MN handoffs).

In this case, as described above, MAR2 will send RA messages containing HNP1, HNP2 and HNP3 in Prefix Information option with the Type flag (T) bit set to 00 for HNP2 and 01 for HNP1 and HNP3. This indicates HNP2 is local home network prefix, HNP1 and HNP3 are remote home network prefixes.

Assuming that MN initiates a new sessions with a new communication node (e.g. with CN4 which is not shown in figure1) by using IPv6 addresses derived from HNP2 as its source address. Because this IPv6 address is derived from a local home network prefix (i.e. HNP2), common IPv6 routing mechanism will be applied for this session.

5. IANA Considerations

This document makes no request of IANA.

Note to RFC Editor: this section may be removed on publication as an

RFC.

6. Security Considerations

TBD

7. Acknowledgements

TBD

8. References

8.1. Normative References

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

8.2. Informative References

[I-D.draft-seite-dmm-dma-00] Seite, P. and P. Bertin, "Distributed Mobility Anchoring, draft-seite-dmm-dma-00", February 2012.

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