DMM Working Group   D. Moses
Internet-Draft   Intel
Intended status: Standards Track   A. Yegin
Expires: December 2, 2016   May 31, 2016

                DHCPv6 Extension for On Demand Mobility exposure
                    draft-moses-dmm-dhcp-ondemand-mobility-03

Abstract

   Applications differ with respect to whether or not they need IP
   session continuity and/or IP address reachability. Networks
   providing the same type of service to any mobile host and any
   application running on the host yields inefficiencies. This document
   describes extensions to the DHCPv6 protocol to enable mobile hosts to
   indicate the required mobility service type associated with a
   requested IP address, and networks to indicate the type of mobility
   service associated with the allocated IP address in return.

Status of This Memo

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

   Internet-Drafts are working documents of the Internet Engineering
   Task Force (IETF). Note that other groups may also distribute
   working documents as Internet-Drafts. The list of current Internet-
   Drafts is at http://datatracker.ietf.org/drafts/current/.

   Internet-Drafts are draft documents valid for a maximum of six months
   and may be updated, replaced, or obsoleted by other documents at any
   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on December 2, 2016.

Table of Contents

1. Introduction

    [I-D.ietf-dmm-ondemand-mobility] defines different types of mobility-
    associated services provided by access networks to mobile hosts with
    regards to maintaining IPv6 address continuity after an event of the
    host moving to different locations with different points of
    attachments within the IP network topology. It further specifies
    means for applications to convey to the IP stack in the mobile host,
    their requirements regarding these services.

    This document defines extensions to the DHCPv6 protocol ([RFC3315])
    in the form of a new DHCP option that specifies the type of mobility
    services associated with an IPv6 address. The IP stack in a mobile
    host uses the DHCP client to communicate the type of mobility service
    it wishes to receive from the network. The DHCP server in the
    network uses this option to convey the type of service that is
    guaranteed with the assigned IPv6 address in return.

    This new option also extends the ability of mobile routers to specify
    desired mobility service in a request for IPv6 proxies (as specified
    in [RFC3633]), and delegating routers to convey the type of mobility
    service that is committed with the allocated IPv6 proxies in return.

    In a distributed mobility management environment, there are multiple
    Mobility Anchors (as specified in [TBD reference to the Distributed
    Mobility Management architecture RFC]). In some use-cases, mobile
    hosts may wish to indicate to the network, preference of the serving
    Mobility Anchor. This document specifies a new DHCPv6 option that is
    used by DHCPv6 clients to convey this preference.

2. Notational 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 [RFC2119].

3. IPv6 Continuity Service Option

The IPv6 Continuity Service option is used to specify the type of
continuity service associated with a source IPv6 address or IPv6
prefix. The IPv6 Continuity Service option must be encapsulated in
the IAaddr-options field of the IA Address option when associated
with an IPv6 address, and in the IAprefix-options field of the IA_PD
prefix option when associated with an IPv6 prefix.

The format of the IPv6 Continuity Service option is:

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| OPTION_IPv6_CONTINUITY_SERVICE|         option-length         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| service-type  |
+-+-+-+-+-+-+-+-+
```

option-code   OPTION_IPv6_CONTINUITY_SERVICE (TBD)

option-len   1

service-type   one of the following values:

Nomadic -   a nomadic address or prefix (1)

Sustained -   a sustained address or prefix (2)

Fixed -   a fixed address or prefix (3)

Anytype -   Anyone of the above (0)

This option can appear in one of two contexts: (1) As part of a
request to assign a source IPv6 address of the specified mobility
service type, and (2) As part of a request to assign an IPv6 prefix
of the specified mobility service type.

3.1. Source IPv6 Address Type Specification

   In this context, the IPv6 Continuity Service option is encapsulated
   in the IAaddr-options field of the IA Address option.

   When in a message sent from a client to a server, the value of the
   IPv6 Continuity Service option indicates the type of continuity
   service required for the IPv6 address requested by the client.

   When in a message sent from a server to a client, the value of the
   IPv6 Continuity Service option indicates the type of IP continuity
   service committed by the network for the associated IPv6 address.
   The value 'AnyType' cannot appear in a message sent from the server.

   Once an IPv6 address type was requested and provided, any subsequent
   messages involving this address (lease renewal - for example) must
   include the IPv6 Continuity Service option with the same service type
   that was assigned by the server during the initial allocation.

   If a server received a request to assign an IPv6 address with a
   specified IPv6 Continuity service, but cannot fulfill the request, it
   must reply with the [TBD] status.

   A server that does not support this option will discard it as well as
   the IA Address option that had this option encapsulated in one of its
   IAaddr-options field.

   If a client does not receive the requested address, it must resent
   the request without the desired IPv6 Continuity Service option since
   it is not supported by the server. In that case, the host of the
   client cannot assume any IP continuity service behaviour for that
   address.

   A server must not include the IPv6 Continuity Service option in the
   IAaddr-options field of an IA Address option, if not specifically
   requested previously by the client to which it is sending a message.

   If a client receives an IA Address option from a server with the IPv6
   Continuity Service option in the IAaddr-options field, without
   initially requesting a specific service using this option, it must
   discard the received IPv6 address.

   If the mobile host has no preference regarding the type of continuity
   service it uses the 'AnyType' value as the specified type of
   continuity service. The Server will allocate an IPv6 address with
   some continuity service and must specify the type in IPv6 Continuity
   Service option encapsulated in the IAaddr-options field of the IA

Address option. The method for selecting the type of continuity
service is outside the scope of this specification.

3.2. IPv6 Prefix Type Specification

In this context, the IPv6 Continuity Service option is encapsulated
in the IAprefix-options field of the IA_PD prefix option.

When in a message sent from a client to a server, the value of the
IPv6 Continuity Service option indicates the type of continuity
service required for the IPv6 prefix requested by the client.

When in a message sent from a server to a client, the value of the
IPv6 Continuity Service option indicates the type of continuity
service committed by the network for the associated IPv6 prefix. The
value 'AnyType' cannot appear in a message sent from the server.

Once an IPv6 prefix type was requested and provided, any subsequent
messages involving this prefix (lease renewal - for example) must
include the IPv6 Continuity Service option with the same service type
that was assigned by the server during the initial allocation.

If a server received a request to assign an IPv6 prefix with a
specified IPv6 Continuity service, but cannot fulfill the request, it
must reply with the [TBD] status.

A server that does not support this option will discard it as well as
the IA_PD Prefix option that had this option encapsulated in one of
its IAprefix-options field.

If a client does not receive the requested prefix, it must resent the
request without the desired IPv6 Continuity Service option since it
is not supported by the server. In that case, the mobile router of
the client cannot assume any IP continuity service behaviour for that
prefix.

A server must not include the IPv6 Continuity Service option in the
IAprefix-options field of an IA_PD Prefix option, if not specifically
requested previously by the client to which it is sending a message.

If a client receives an IA_PD Prefix option from a server with the
IPv6 Continuity Service option in the IAprefix-options field, without
initially requesting a specific service using this option, it must
discard the received IPv6 prefix.

If the mobile router has no preference regarding the type of
continuity service it uses the 'AnyType' value as the specified type
of continuity service. The Server will allocate an IPv6 prefix with

   some continuity service and must specify the type in IPv6 Continuity
   Service option encapsulated in the IAprefix-options field of the
   IA_PD Prefix option. The method for selecting the type of continuity
   service is outside the scope of this specification.

4. **Anchor Preference Option**

   In a distributed mobility management environment that deploys
   multiple Mobility Anchors, each Mobility Anchor may have a set of
   IPv6 prefixes that is being used when assigning Sustained or Fixed
   source IPv6 addresses to hosts.

   The selection of the Mobility Anchor that will serve a mobile host is
   performed by the network at various events like, the event of initial
   attachment of a mobile host to a network.

   The Anchor Preference option enables a host to express its desire to
   receive a source IPv6 address with a specific IPv6 prefix. This is
   useful when the mobile host wishes to indicate to the network which
   Mobility Anchor should be used for anchoring its traffic and ensuring
   service continuity in the event of handoff between LANs with
   different IPv6 prefixes.

   The network MAY respect this request but is not required to do so.

   The format of the Anchor Preference option is:

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| OPTION_ANCHOR_PREFERENCE      |         option-length         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       preferred-lifetime                      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| prefix-length |                                               |
+-+-+-+-+-+-+-+-+           IPv6 prefix                         |
|                          (16 octets)                         |
|                                                              |
|                                                              |
|                  +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|               |                                              |
+-+-+-+-+-+-+-+-+                                               |
|                  IAanchor_preference-options                 |
|                                                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

   option-code   OPTION_ANCHOR_PREFERENCE (TBD)

option-len   25 + length of anchor_preference-options field

preferred-lifetime The preferred lifetime of the IPv6 address whose
                    prefix is requested, expressed in units of seconds

prefix-length The length of this prefix in bits

IPv6 prefix   The requested prefix

IAanchor_preference-option Options associated with this request

This option is used by the client in a request for a new IPv6 source
address. The server replies with an IPv6 address that may or may not
have the desired prefix. Subsequent interactions between the client
and server regarding this address, must use the the IA address
option.

An IPv6 prefix is requested only when the mobile host wishes to be
anchored by a specific mobility anchor. The client must also
indicate the type of mobility service it requires using the IPv6
Continuity Service option encapsulated in the IAanchor_preference-
options field of the IA Address option.

When requesting an IPv6 prefix, only the 'Sustained' and 'fixed'
types are legal.

The server must assign the IPv6 address of the requested type to the
client, even if it does not fulfill the request for the specified
prefix.

If a server received a request to use a specific IPv6 prefix and an
IPv6 address type, but cannot assign an IPv6 address with that
specified IPv6 Continuity it must reply with the [TBD] status.

A server that does not support this option will discard it.

If a client does not receive any address, it must assume that the the
option is not supported by the server and use the IA Address option
in subsequent requests.

5. Security Considerations

There are no specific security considerations for this option.

6. IANA Considerations

TBD

7. References

7.1. Normative References

[RFC2119]   Bradner, S., "Key words for use in RFCs to Indicate
            Requirement Levels", BCP 14, RFC 2119,
            DOI 10.17487/RFC2119, March 1997,
            <http://www.rfc-editor.org/info/rfc2119>.

7.2. Informative References

[I-D.ietf-dmm-ondemand-mobility]
            Yegin, A., Kweon, K., Lee, J., Park, J., and D. Moses, "On
            Demand Mobility Management", draft-ietf-dmm-ondemand-
            mobility-03 (work in progress), May 2016.

[RFC3315]   Droms, R., Ed., Bound, J., Volz, B., Lemon, T., Perkins,
            C., and M. Carney, "Dynamic Host Configuration Protocol
            for IPv6 (DHCPv6)", RFC 3315, DOI 10.17487/RFC3315, July
            2003, <http://www.rfc-editor.org/info/rfc3315>.

[RFC3633]   Troan, O. and R. Droms, "IPv6 Prefix Options for Dynamic
            Host Configuration Protocol (DHCP) version 6", RFC 3633,
            DOI 10.17487/RFC3633, December 2003,
            <http://www.rfc-editor.org/info/rfc3633>.

Authors' Addresses

   Danny Moses
   Intel
   Petah Tikva
   Israel

   Email: danny.moses@intel.com

   Alper Yegin
   Istanbul
   Turkey

   Email: alper.yegin@yegin.org