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**DHCPv6 Extension for On Demand Mobility exposure  
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**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 prefix (or address), and networks to indicate the type of mobility service associated with the allocated IP prefix (or address) in return.

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## [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 prefix (or 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 prefix (or 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 prefix (or address) in return.

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

It is important to note that although this document specifies extensions to both IPv6 address and IPv6 prefix assignments, host must follow the recommendations and guidelines listed in [\[RFC7934\]](#)



and attempt to obtain IPv6 prefixes (rather than addresses) from the network.

In a distributed mobility management environment, there are multiple Mobility Anchors (as specified in [\[I-D.ietf-dmm-distributed-mobility-anchoring\]](#)). In some use-cases, mobile hosts may wish to indicate to the network, their 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:

Non-Persistent - a non-persistent IP address or  
                  prefix (1)

Session-Lasting - a session-lasting IP address or prefix (2)

Fixed - a fixed IP address or prefix (3)

Anytype - Anyone of the above (0)

The definition of these service types is available in [\[I-D.ietf-dmm-ondemand-mobility\]](#).

All other values (4-255) are reserved for future usage and should not be used. If the `OPTION_IPv6_CONTINUITY_SERVICE` option is received and its service-type is equal to one of the reserved values, the option should be ignored.

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' can only appear in the message sent from the client to the server to indicate that the client has no specific preference. However, it 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 `NoAddrsAvail` status (refer to [section 22.13](#) - Status Code Option in [\[RFC3315\]](#)).



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 resend 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' can only appear in the message sent from the client to the server to indicate that the client has no specific preference. However, it 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 NoAddrsAvail 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 resend the request without the desired IPv6 Continuity Service option since it is not supported by the server. In that case, the requesting device (host or router) 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 device (host or 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 Session-lasting or Fixed source IPv6 prefixes (or addresses) to hosts.

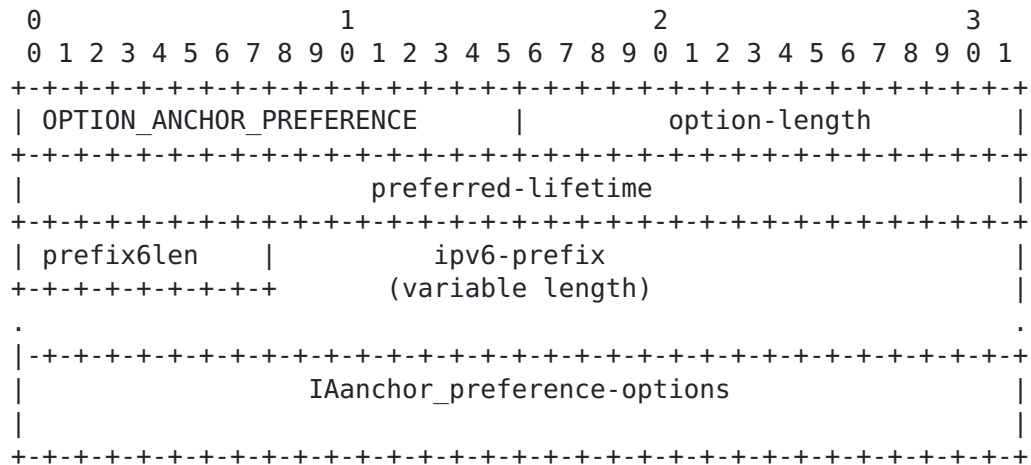
The selection of the Mobility Anchor that will serve a mobile host is performed by the network at various events like, the event of initial attachment of a mobile host to a network.

The Anchor Preference option enables a host to express its desire to receive a specific source IPv6 prefix (or a source IP address with that specific 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:



option-code      OPTION\_ANCHOR\_PREFERENCE (TBD)

option-len      5 + length of ipv6-prefix field + 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 in bits of the ipv6-prefix. Typically  
                         allowed values are 0 to 128.

IPv6 prefix      This is a variable length field that specifies the  
                         desired ipv6 prefix. The length is (prefix6len + 7) /  
                         8. This field is padded with 0 bits up to the nearest  
                         octet boundary when prefix6len is not divisible by 8.

IAAnchor\_preference-option    Options associated with this request

An IPv6 prefix (or address) 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\_PD Prefix Option (or IA Address option - in the case of requesting an IP address).

When requesting a specific IPv6 prefix, only the 'Session-Lasting' and 'Fixed' types are legal. Non-Persistent prefixes do not require anchoring and there is no motivation to request a specific anchor.



If a server received a request to use a specific IPv6 prefix and an IPv6 Continuity Service type, but cannot assign an IPv6 prefix (or address) with that specified IPv6 Continuity Service it must reply with the NoAddrsAvail status.

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

A server is not required to respect the prefix request. It can assign a different prefix (or address) as long as it fulfills the IP Continuity Service request.

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-distributed-mobility-anchoring]  
Chan, A., Wei, X., Lee, J., Jeon, S., Petrescu, A., and F. Templin, "Distributed Mobility Anchoring", [draft-ietf-dmm-distributed-mobility-anchoring-03](#) (work in progress), December 2016.

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- [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>>.
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