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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 and to allow networks to indicate the type of mobility service associated with the allocated IP prefix in return.

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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This Internet-Draft will expire on August 9, 2018.

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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 continuity after an event of the host moving between 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]) and [RFC3633] in the form of a new DHCP option that specifies the type of mobility services associated with an IPv6 prefix. 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 in return.

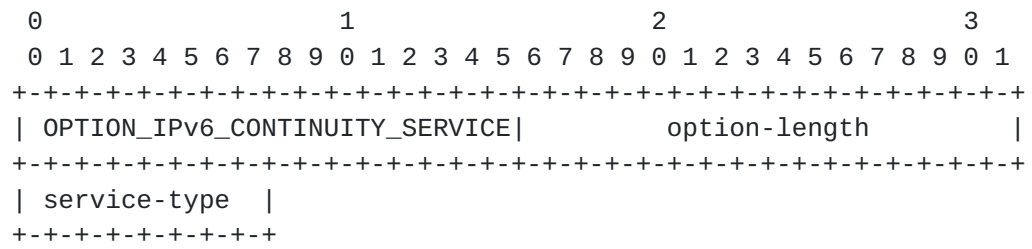
2. Notational Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 , [RFC2119] [RFC8174] when, they appear in all capitals, as shown here.

3. IPv6 Continuity Service Option

The IPv6 Continuity Service option is used to specify the type of continuity service associated with a source IPv6 prefix. The IPv6 Continuity Service option MUST be encapsulated in the IAprefix-options field of the IA_PD prefix option.

The format of the IPv6 Continuity Service option is:



option-code OPTION_IPv6_CONTINUITY_SERVICE (TBD)

option-len 1

service-type one of the following values:

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

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

Fixed - a fixed IP prefix (3)

Graceful-replacement - a graceful-replacement IP prefix (4)

Anytype - Anyone of the above (0)

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

All other values (5-255) are reserved for future use. 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.

When a message is 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 a message is 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' SHOULD 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 is 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 receives a request to assign an IPv6 prefix with a specified IPv6 Continuity service, but cannot fulfill the request, it MUST reply with the NoPrefixAvail status.

A server that does not support this option will ignore it and respond without taking into account the desired session continuity service. The response will not include the Continuity Service option encapsulated in the IAprefix-options field of the IA_PD prefix option.

The missing Continuity Service option in the response serves as an indication to the client that this feature is not supported by the server. It MAY use the allocated prefix knowing it does not necessarily support the desired Continuity service, or perform any other action.

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. Correlation between Session Continuity Service and Lifetime Values

The values to be used in the Preferred-lifetime and Valid-lifetime fields in the IA Prefix Option are out of the scope of this specification and left to implementation. It is RECOMMENDED to provide longer lifetime values for Fixed and Session-lasting prefixes compared to the lifetime values of Non-persistent and Graceful-replacement prefixes because the network has guaranteed their validity regardless of the link to which the host is attached.

For clients using Graceful-replacement services, the network MAY obsolete a Prefix and allocate a new one from time to time especially in a mobility-related event. On such occasions, the network SHOULD provide a graceful period (lifetime) in which the obsoleted prefix can still be used and a new (longer) lifetime with the new prefix.

It is NOT RECOMMENDED using 0xFFFFFFFFFF (infinity) values for the lifetime of Fixed prefixes. Even though they are fixed, it is still safer to Rebind periodically. The lifetime value can be relatively long to reduce message exchange overhead.

Section 18.2 - Client Behavior of [I-D.ietf-dhc-rfc3315bis] specifies that when a client detects that it may have moved to a new link, it uses Rebind if it has delegated prefixes. It is worth clarifying that a client does not HAVE to Rebind the prefixes if they are Fixed or Session-lasting prefixes.

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, <https://www.rfc-editor.org/info/rfc2119>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

7.2. Informative References

[I-D.ietf-dhc-rfc3315bis]
Mrugalski, T., Siodelski, M., Volz, B., Yourtchenko, A., Richardson, M., Jiang, S., Lemon, T., and T. Winters, "Dynamic Host Configuration Protocol for IPv6 (DHCPv6) bis", draft-ietf-dhc-rfc3315bis-10 (work in progress), September 2017.

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Chan, A., Wei, X., Lee, J., Jeon, S., Petrescu, A., and F. Templin, "Distributed Mobility Anchoring", draft-ietf-dmm-distributed-mobility-anchoring-07 (work in progress), November 2017.

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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, <https://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, <https://www.rfc-editor.org/info/rfc3633>.

[RFC7934] Colitti, L., Cerf, V., Cheshire, S., and D. Schinazi, "Host Address Availability Recommendations", BCP 204, RFC 7934, DOI 10.17487/RFC7934, July 2016, <https://www.rfc-editor.org/info/rfc7934>.

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