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Mobile IPv6 Extension for Configuration Options
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Abstract

This document describes the mechanism for providing the host configuration information during Mobile IPv6 Binding Update procedure. The Configuration Options extension may be included in the Mobile IPv6 Binding Update message for requesting the home agent to include configuration parameters needed for network service usage (e.g. DNS). The requested information is provided by the Home Agent in one or more Configuration Options extensions.

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1. Introduction

Currently, there is no mechanism defined for the dynamic configuration of the interface parameters in [[RFC3775](#)]. This information is available to the Mobile Node either by manual configuration or it can be obtained by some other means like the use of DHCP.

The proposed extension in this document enables carrying the interface parameters essential for the dynamic configuration at the Mobile Node. In this proposal, the configuration parameters are assigned by the Home Agent and this information is passed to the Mobile Node after successful Mobile IPv6 Binding Update procedure. This mechanism is more generic and does not rely on the use of any specific link layer. Note that the scope of this document is to emphasize on the mechanism by which the configuration information is relayed to the Mobile Node. It does not include discussion of how this configuration information is obtained by the Home Agent.

1.1. Glossary of Terms

DNS - Domain Name System [[RFC1035](#)]

DHCPv6 - Dynamic Host Configuration Protocol for IPv6 [[RFC3315](#)]

1.2. Conventions used in this document

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](#)].

2. Configuration Options Extension

The following Figure 1 shows the format of the Configuration Options extension. This extension may be included in the Mobile IPv6 Binding Update or Mobile IPv6 Binding Acknowledgement by the Mobile Agents, the Mobile Node and the Home Agent respectively.

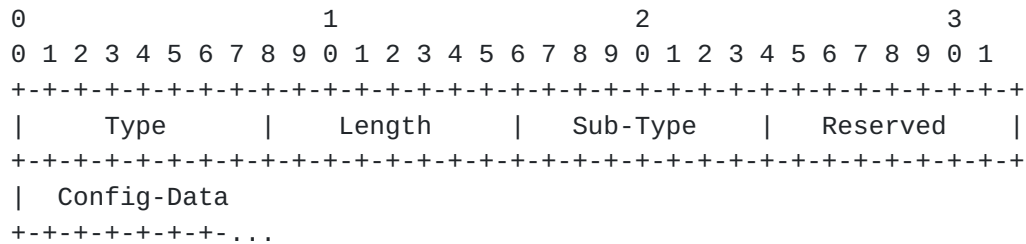


Figure 1: Message Format

Type

IPV6-CONF-OPTIONS-EXT-TYPE. This extension value will be assigned by IANA from the numbering space defined for Mobile IPv6 Binding Acknowledgement Sub-Options in [\[RFC3775\]](#).

Length

Indicates the length (in bytes) of the data field within this Extension. The length does NOT include the Type and Length bytes. This field MUST be set to 2 plus the total length of the Config-Data field.

Sub-Type

At this time the following values are defined:

0: Reserved.

1: DHCP Options.

All other values are reserved for future use.

Config-Data

The configuration parameters are packed in DHCP-based formats in the Config-Data field. Since the size of the Config-Data field is limited to 253 bytes, the Mobility Agent needs to add multiple extensions with this subtype when the configuration information exceeds the boundary. The DHCP option must be

contained within one extension and never split up across multiple extensions.

3. Processing of Configuration Options

This draft provides a mechanism to convey configuration information from the Home Agent to the Mobile Node. The Mobile Node may request values for specific configuration parameters from the Home Agent by including a "Parameter Request List" option in the Mobile IPv6 Binding Update. The list of requested parameters list is specified as a string of octets, describing the DHCPv6 opcodes. The DHCPv6 is defined in [[RFC3315](#)].

If this extension is included in the Mobile IPv6 Binding Update, the Home Agent should provide the value of requested information in the Mobile IPv6 Binding Acknowledgement. If there is no Configuration Option extension in the Mobile IPv6 Binding Update, it is up to the the Home Agent to decide which configuration parameter(s) to include in the Configuration Options extension.

The Configuration Options extension must appear prior to any authentication extensions added by the Mobile Node in the Mobile IPv6 Binding Update and also by the Home Agent in the Mobile IPv6 Binding Acknowledgement.

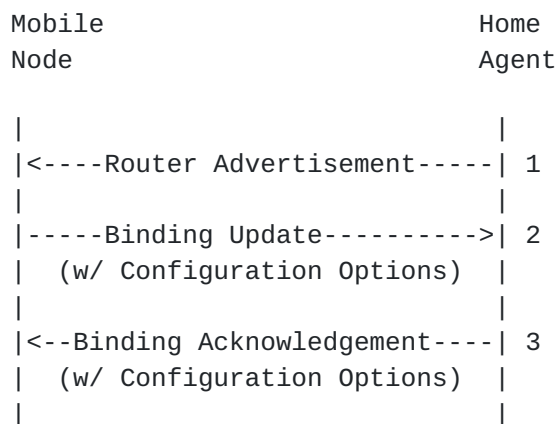


Figure 2: Exchanges of Configuration Information

The message flow of the solution is shown in Figure 2. Upon successful Mobile IPv6 Binding Update, the Home Agent may append requested configuration information in the Binding Acknowledgement using the Configuration Options extention.

The following are the steps involved in the exchange of the Configuration Options extension:

1. As per procedure defined in [[RFC3775](#)], the Router Advertisement is sent to the Mobile Node.
2. The Mobile Node sends a Binding Update to the Home Agent. Optionally, the Configuration Options extension (discussed in [Section 2](#)) is included by the Mobile Node with the "Parameter Request List" option. In this case, it is recommended that the Mobile Node should set 'A' bit in the Binding Update message requesting the Binding Acknowledgement from the Home Agent.
3. The Home Agent appends Mobile IPv6 Binding Acknowledgement with the Configuration Options (discussed in [Section 2](#)) for the requested configuration options.

Example:

Mobile Node wants to obtain the DNS servers' IPv6 addresses [[RFC3646](#)] and NIS servers' IPv6 address [[RFC3898](#)] from its Home Agent during registration. The Binding Update contains the following values in the Configuration Options Exchange Extension:

```

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
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|   <Type>       |   <Length>=10 | <Sub-Type>=1 | <Reserved>=0 |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|   <OPTION_ORO>=6 |   <option-len>=4 |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|<requested-option-code-1>=23 |<requested-option-code-2>= 27 |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

Figure 3: Example Requested Configuration Parameters

The Home Agent responds back to the Mobile Node with a Binding Acknowledgement including the following values in the Configuration Options Exchange Extension.


```

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
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|   <Type>       |   <Length>=42 | <Sub-Type>=1 | <Reserved>=0 |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| <OPTION_DNS_SERVERS>=23      |   <option-len>=16      |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|
|           DNS-recursive-name-server (IPv6 address)
|
|
|
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| <OPTION_NIS_SERVERS>=27      |   <option-len>=16      |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|
|           NIS server (IPv6 address)
|
|
|
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

Figure 4: Example Configuration Values in Response

4. IANA Considerations

This draft defines a new Mobile IPv6 Sub-Options of type IPV6-CONF-OPTIONS-EXT-TYPE as defined in [Section 2](#) of this document. The value will be defined by IANA from the numbering space of Binding Acknowledgement Sub-Options defined in [[RFC3775](#)].

5. Security Considerations

There are no additional security aspects imposed in this document in addition to the one defined in [[RFC3775](#)].

6. Normative References

- [RFC1035] Mockapetris, P., "Domain names - implementation and specification", STD 13, [RFC 1035](#), November 1987.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC3315] Droms, R., Bound, J., Volz, B., Lemon, T., Perkins, C., and M. Carney, "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", [RFC 3315](#), July 2003.
- [RFC3646] Droms, R., "DNS Configuration options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", [RFC 3646](#), December 2003.
- [RFC3775] Johnson, D., Perkins, C., and J. Arkko, "Mobility Support in IPv6", [RFC 3775](#), June 2004.
- [RFC3898] Kalusivalingam, V., "Network Information Service (NIS) Configuration Options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", [RFC 3898](#), October 2004.

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