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Mobile IPv4 Message String Extension
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Abstract

This document specifies a new extension for use in Mobile IPv4. This extension can be added by the Home Agent and the Foreign Agent to Registration Reply messages. This extension carries a text string that is intended for the user of the Mobile Node.

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1. Introduction

This document specifies a new skippable extension that can be added by the Foreign Agent and Home Agent in any registration message targeted for the Mobile Node. Such a message may be either a Registration Reply or Registration Revocation (i.e. co-located Care-of Address mode). For the Registration Reply message, this extension can be added regardless of whether the registration has succeeded or failed.

The content of the text string in this extension and its usage by the Mobile Node is implementation specific. The text string in this extension is intended for the user of the Mobile Node. For example, this message can be displayed on the Mobile Node's user interface, logged, or handled in any other implementation dependent way, depending on the form of the Mobile Node.

Typical contents of the text string will indicate a registration failure reason, or give a welcome message on successful registration. This is important as the failure reason code gives very limited information for interpretation by the user of the Mobile Node. For example, a string like "registration failed : Prepaid Quota for the user is exhausted" can give a human readable description of the result of Mobile IP registration.

2. Terminology

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].

3. Mobile IPv4 Message String Extension Format

The Message String Extension conforms to the Short Extension format specified for Mobile IPv4 [RFC3344]. The Message String Extension is a skippable 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      |    Sub-Type   |    Text ....
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Type:

To be assigned by IANA. An 8-bit identifier of the type mobility option.

Length:

8-bit unsigned integer. Length of the extension, in bytes, excluding the extension Type and the extension Length fields. This field MUST be set to 1 plus the total length of the Text field.

Sub-Type:

1:

Extension comes from the Home Agent

2:

Extension comes from the Foreign Agent

Text:

The Text field is one or more octets, and its contents are implementation dependent. It is intended to be human readable, and MUST NOT affect operation of the protocol. The message MUST be in UTF-8 encoded ISO-10646 [RFC3629] characters. The number of octets in the encoded representation of the message is always exactly the value of the Length field minus one. (In the UTF-8 case, the number of unicode characters represented by this octet sequence may be smaller than the number of octets.)

4. Operation and Use of the Message String Extension

The Message String Extension is only valid for use within Mobile IPv4 Registration Reply and Registration Revocation messages. The Message String Extension is a skippable extension. Either the Home Agent or Foreign Agent or both can add the Message String Extension to registration messages. The usage of Text field of the Message String Extension is implementation dependent. For example, the message can be displayed on the Mobile Node's user interface, logged, or handled in an implementation dependent way, depending on the form of the Mobile Node. The Mobile Node may throttle how often the user is notified of the message.

As an example, the Home Agent may reject the first Registration Request due to prepaid quota for the user is reached and may attach a Message String Extension with the text "Prepaid quota reached. Please contact www.paymore.example.com to update balance". The Mobile Node could display this on the user interface. As a response, the user of the Mobile Node may take the required action to update the prepaid account and retry the registration process. The Home Agent may accept this Registration Request and attach a Message String Extension with the text "Welcome to www.serviceprovider.example.com". The Mobile Node could display this on the user interface thus confirming successful creation of binding on Home Agent.

In the case that the message is not originated by the Home Agent itself, but for instance is received from a RADIUS server [RFC2865], it could be received in some other encoding than UTF-8. If so, the Home Agent MUST convert the message to UTF-8 encoded ISO-10646 [RFC3629] characters.

5. Security Considerations

The Message String Extension can be added by the Home Agent or Foreign Agent or both. The protection of the extension is based on the ordering method specified for message authentication in RFC 3344 [RFC3344] and emphasized below.

If the extension is added by the Home Agent (extension with subtype 1) to a Registration Reply or Registration Revocation message, it MUST appear before Mobile-Home Authentication Extension [RFC3344].

If the extension is added by the Foreign Agent (extension with subtype 2) to a Registration Reply message, it MUST appear after Mobile-Home Authentication Extension [RFC3344] whenever present. Also the extension MUST appear before the Mobile-Foreign Authentication Extension whenever present. However, since security association between the Mobile Node and Foreign Agent is optional, it is possible that the extension is not authenticated in this case.

There is no confidentiality provided by the extension; the message is transferred unencrypted, and if sensitive information is sent for display purposes, it may need to be protected by other means.

6. IANA Considerations

This specification reserves one number for the Message String Extension in Section 3 from the space of numbers for skippable mobility extensions (i.e., 128-255) defined for Mobile IPv4 [RFC3344] at http://www.iana.org/assignments/mobileip-numbers.

The value 145 is suggested for this extension.

This specification also creates a new subtype space for the type number of this extension. The subtype values 1 and 2 are defined in this specification. The subtype value 1 is reserved for use by Home Agent and subtype value 2 is reserved for use by Foreign Agent. Similar to the procedures specified for Mobile IPv4 [RFC3344] number spaces, future allocations from this number space require expert review [RFC2434].

7. Acknowledgements

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8. Normative References

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

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[RFC3344] Perkins, C., "IP Mobility Support for IPv4", RFC 3344, August 2002.

[RFC3629] Yergeau, F., "UTF-8, a transformation format of ISO 10646", STD 63, RFC 3629, November 2003.

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