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Mobile IP Extensions Rationalization (MIER)

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Abstract

It is in the interest of the Mobile IP WG to conserve the usage of the type field since we see many drafts proposing new extensions for Mobile IP. Therefore there is a real need to find ways to limit the usage of the type field in the extensions structure. MIER describes a new extension structure to Mobile IP to make the extensions far more extensible.

1.0 Introduction

The type field in the Mobile IP extension structure can support upto 255 (skippable and not skippable) uniquely identifiable extensions. With new developments/additions to Mobile IP there is a strong possibility that the available space will run out.

Mobile IP Extensions Rationalization (MIER) describes a new extension structure to solve this problem. MIER strategy is to initially aggregate certain types of extensions (e.g, NAI) and sub types to identify the precise extension (example MN/User NAI, HA NAI etc). This will greatly reduce the usage of the type field.

MIER proposal is a natural evolution to the existing extension structure. It does not impact extensions that have been already defined.

1.1 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](#) [[Bradner97](#)].

SA - Security Association [[Perkins96](#)]

MN - Mobile Node [[Perkins96](#)]

HA - Home Agent [[Perkins96](#)]

FA - Foreign Agent [[Perkins96](#)]

AAA - Authentication, Authorization, and Accounting.

SPI - Security Parameters Index is a 32 bit number to index a SA in a database [[Perkins96](#)].

2.0 Mobile IP Extension formats

The extension structure proposed in this draft [Sec 2.2] is applicable to new extensions that are proposed to enhance Mobile IP. It does not apply to the extensions that have already been defined and standardised.

2.1 Existing Mobile IP Extension format

According to [Perkins96] : Mobile IP defines a general Extension mechanism to allow optional information to be carried by Mobile IP control messages. Each of these Extensions is encoded in the following Type-Length-Value format:

```

      0               1               2
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
+---+---+---+---+---+---+---+---+---+---+---+---+---+
|   Type   |   Length   |   Data ...
+---+---+---+---+---+---+---+---+---+---+---+---+

```

Type Indicates the particular type of Extension.

Length Indicates the length (in bytes) of the data field within this Extension. The length does NOT include the Type and Length bytes.

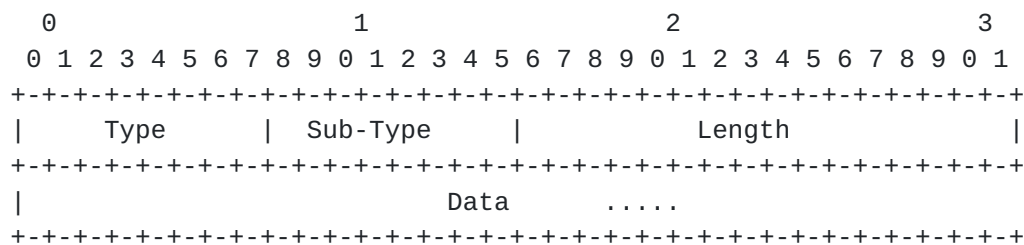
Data The particular data associated with this Extension. This field may be zero or more bytes in length. The format and length of the data field is determined by the type and length fields.

2.2 New Mobile IP Extension format

This draft proposes the following two structures for Mobile IP extensions to be carried in the Mobile IP control messages. Since the new extension structures will cause an efficient usage of the extension type space, it is strongly recommended that all the new proposals for the Mobile IP WG that have new extensions SHOULD follow this format.

2.2.1 Long Extension Format

This format is applicable for non-skippable extensions which carry information more than 256 bytes. It should be applicable to any future standardization which consider non-skippable extensions which accommodate up to 64 KBytes of data.



The proposed general structure of the Long Extension consists of the following fields:

Type is the type which describe a collection of extensions which has a common data type (see A.1, A.3).

Sub-Type is a unique number given to each member in the aggregated type. Sub-Type values between of 200 through 255 are reserved for future use and standardization.

Length indicates the length (in bytes) of the data field within this Extension. It does NOT include the Type, Length and Sub-Type bytes.

Data is the data associated with this extension. This data MAY be represented in many ways (see A.1, A.3)

Two bytes for the length field is suggested to enable providing a sufficiently large space for the extension data (maximum 64Kbytes).

[Perkins99] Perkins, "Mobile IP Challenge/Response Extensions"
[draft-ietf-mobileip-challenge-06.txt](#)

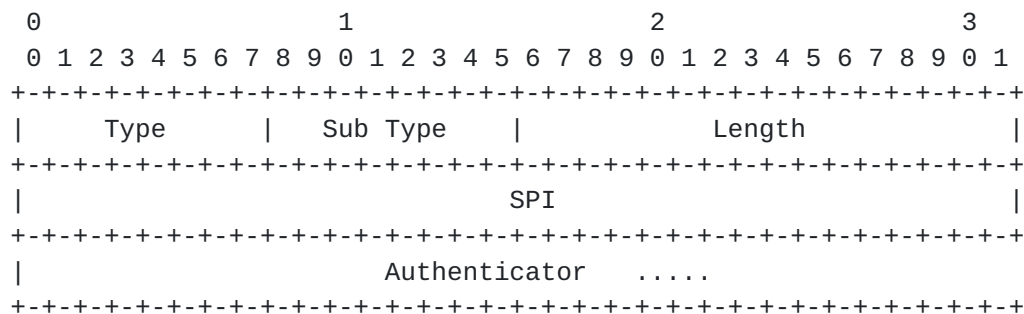
[Bradner97] Bradner, "Key words for use in RFCs to Indicate
Requirement Levels", [RFC 2119](#), Mar 97

A APPENDIX

The following are some exmples where we could use the concept of the proposed extensions' structure.

A.1 General Authentication Extension

This section defines a generic authentication extensions.



Type	Authentication Extension type (TBD)
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Sub-Type this field describes the type of the entity which owns the Authentication Extension. The following types are defined:

1 MN-AAA Authentication Extension

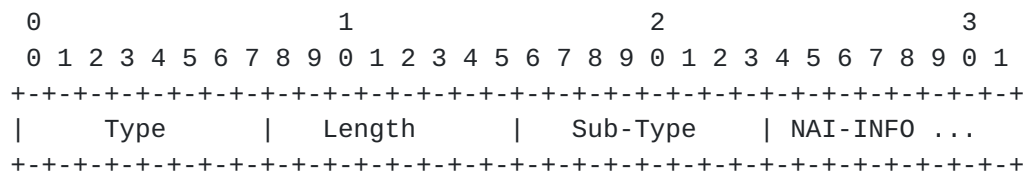
length	The length of the Authenticator field.
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SPI Security Parameters Index

Authenticator	The variable length Authenticator field consists random value of at least 128 bits.
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A.2 General NAI Extension

This section defines a general purpose NAI extension for different types of entities such MN, HA, FA etc.



Type	NAI Aggregate type (TBD)
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length The length of the NAI-INFO field.

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Security Information

The necessary information (including the key, algorithm etc) required by the mobile node to create a Mobility Security Association between itself and another entity such as HA and FA.

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