

Experimental Message, Extension and Error Codes for Mobile IPv4
[draft-ietf-mip4-experimental-messages-00.txt](#)

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Abstract

Mobile IPv4 message types range from 0 to 255. This document reserves a message type for use by an individual, company, or organization for experimental purpose, to evaluate enhancements to Mobile IPv4 messages before formal standards proposal.

Mobile IPv4 defines a general Extension mechanism to allow optional information to be carried by Mobile IP control messages. Extensions are not skippable, if defined in range [0-127] and skippable, if defined in range [128-255]. This document reserves extension types in both the skippable and non-skippable range for experimental use.

Also, Mobile IPv4 defines error codes for use by FA [64-127] and HA [128-192]. This document reserves an error code in both these ranges for experimental use.

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[1. Introduction](#)

Mobile IPv4 message types range from 0 to 255. This document reserves a message type for experimental purpose, to evaluate enhancements to Mobile IPv4 messages before formal standards proposal.

Without experimental message capability, one would have to select a type value from the range defined for IANA assignment, which may result in collision.

Also, Mobile IP defines a general Extension mechanism to allow optional information to be carried by Mobile IP control messages. Extensions are not skippable, if defined in range [0-127] and skippable, if defined in range [128-255]. This document reserves extension types in both the skippable and non-skippable range for experimental use.

Mobile IPv4 defines error codes for use by FA [64-127] and HA [128-192]. This document reserves an error code in both these ranges for experimental use.

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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 [\[1\]](#).

EXP-MSG-TYPE: A message in the range [0-255] to be assigned by IANA for experimental use.

EXP-SKIP-EXT-TYPE: Extension in the range [128-255] to be assigned by IANA for experimental use.

EXP-NONSKIP-EXT-TYPE: Extension in the range [0-127] to be assigned by IANA for experimental use.

EXP-HA-ERROR-CODE: Error code in the range [128-192] for use by HA in reply messages to indicate error condition.

EXP-FA-ERROR-CODE: Error code in the range [64-127] for use by FA in reply messages to indicate error condition.

3. Experimental Message

Since the nature and purpose of an experimental message cannot be known in advance, the structure is defined as opaque payload. Entities implementing the message can interpret the message as per their implementation. One suggestion is to interpret based on extensions present in the message.

These messages will be used between the mobility entities (Home Agent, Foreign Agent, and Mobile Node). Experimental messages SHOULD be authenticated using any of the authentication mechanism defined for Mobile IP ([\[2\]](#), [\[5\]](#)).

This message MAY contain extensions defined in Mobile IP, including vendor specific extensions [\[4\]](#).

IP fields:

Source Address Typically the interface address from which the message is sent.

Destination Address The address of the agent or the Mobile Node.

UDP fields:

Source Port variable

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Destination Port 434

Mobile IP fields shown below follow the UDP header:

```

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      |                               Opaque...
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

Type EXP-MSG-TYPE (To be assigned by IANA)

Opaque The Opaque is zero or more octets.

Once an experimental message has been tested and shown to be useful, a permanent number could be obtained through the normal assignment procedures.

A single experimental message type is recommended since this message can contain extensions based on which the message can be interpreted.

[4. Experimental Extensions](#)

This document reserves extensions in both skippable and non-skippable range for experimental purposes. The long extension format (for non-skippable extensions) and short extension format (for skippable extensions), as defined [\[2\]](#) are used for experimental extensions.

[4.1 Non-skippable Experimental Extension](#)

This format is applicable for non-skippable extensions, which carry information more than 256 bytes.

```

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      | Sub-Type      |           Length           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|
|                               Opaque à

```

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Type	EXP-NONSKIP-EXT-TYPE (to be assigned by IANA) is the type, which describes an experimental extension.
------	---

Sub-Type is a unique number given to each member in the aggregated type.

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

Opaque The Opaque is zero or more octets.

Since the length field is 16 bits wide, the extension data can exceed 256 bytes in length.

4.2 Skippable Experimental Extension

This format is applicable for skippable extensions, which carry information less than 256 bytes.

[illegible]

Type EXP-SKIP-EXT-TYPE (to be assigned by IANA) is the type, which describes an experimental extension.

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

Sub-Type is a unique number given to each member in the aggregated type.

Opaque The Opaque is zero or more octets.

Since the length field is 8 bits wide, the extension data cannot exceed 256 bytes in length.

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5. Experimental Error Codes

This document reserves reply error code EXP-FA-ERROR-CODE, in the range [64-127], for use by FA. This document also reserves reply error code EXP-HA-ERROR-CODE, in the range [128-192], for use by HA.

These experimental error codes may be included in registration reply messages.

It is recommended that experimental error code must be included in experimental messages or messages containing at-least one experimental extension.

6. Mobility Entity Considerations

Mobility entities can send and receive experimental messages. Implementations that don't understand the message type SHOULD silently discard the message.

Experimental extensions can be carried in experimental messages and standards defined messages. In the later case, it is suggested that experimental extensions MUST not be used in deployed products and usage be restricted to experimentations only.

7. IANA Considerations

IANA services are required for this draft. Since a new message type is needed to be reserved as experimental, a value must be assigned for EXP-MSG-TYPE from Mobile IP control message space.

Also, values for EXP-NONSKIP-EXT-TYPE and EXP-SKIP-EXT-TYPE must be assigned for experimental extensions.

Also, values for EXP-HA-ERROR-CODE and EXP-FA-ERROR-CODE must be assigned for experimental error code.

8. Security Considerations

Like all Mobile IP control messages, the experimental messages SHOULD be authenticated with at least one authenticator. Messages without a valid authenticator SHOULD be discarded.

9. Backward Compatibility Considerations

Mobility entities that don't understand the experimental message MUST silently discard it.

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Mobility entities that don't understand the experimental skippable extensions MUST ignore them. Mobility entities that don't understand the non-skippable experimental extensions MUST silently discard the message containing them.

FA and HA SHOULD include experimental error code in reply message only if they have a general indication that the receiving entity would be able to parse it. An indication of this is if the request message was of type EXP-MSG-TYPE or contained at-least one experimental extension.

10. Intellectual Property Rights

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12. References

[1] Bradner, S., "Key words for use in RFCs to Indicate Requirement

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Levels", [BCP 14](#), [RFC 2119](#), March 1997.

- [2] Perkins, C., "IP Mobility Support", [RFC 3344](#), August 2002.
- [3] Reynolds, J. and J. Postel, "Assigned Numbers", STD 2, [RFC 1700](#), October 1994.
- [4] G. Dommety, K. Leung, "Mobile IP Vendor/Organization-Specific Extensions" [RFC 3115](#), April 2001
- [5] C. Perkins, P. Calhoun, "Mobile IPv4 Challenge/Response Extensions", [RFC 3012](#), November 2000

13. Contact Information

Questions and comments about this draft should be directed at the Mobile IPv4 working group:

mip4@ietf.org

Questions and comments about this draft may also be directed to the authors:

Alpesh Patel
Cisco Systems
170 W. Tasman Drive,
San Jose, CA 95134
USA
Email: alpesh@cisco.com
Phone: +1 408-853-9580

Kent Leung
Cisco Systems
170 W. Tasman Drive,
San Jose, CA 95134
USA
Email: kleung@cisco.com
Phone: +1 408-526-5030

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