

## **Instructions for Seamoby and Experimental Mobility Protocol IANA Allocations**

### Status of This Memo

This memo defines an Experimental Protocol for the Internet community. It does not specify an Internet standard of any kind. Discussion and suggestions for improvement are requested. Distribution of this memo is unlimited.

### Copyright Notice

Copyright (C) The Internet Society (2005).

### Abstract

The Seamoby Candidate Access Router Discovery (CARD) protocol and the Context Transfer Protocol (CXTTP) are experimental protocols designed to accelerate IP handover between wireless access routers. These protocols require IANA allocations for ICMP type and options, Stream Control Transmission Protocol (SCTP) Payload Protocol Identifiers, port numbers, and registries for certain formatted message options. This document contains instructions to IANA about which allocations are required for the Seamoby protocols. The ICMP subtype extension format for Seamoby has been additionally designed so that it can be utilized by other experimental mobility protocols, and the SCTP port number is also available for other experimental mobility protocols.

## Table of Contents

|                     |   |                   |
|---------------------|---|-------------------|
| <a href="#">1.</a>  | Introduction.....   | <a href="#">2</a> |
| <a href="#">2.</a>  | Common IPv4 and IPv6 Allocations.....                                       | <a href="#">2</a> |
| <a href="#">3.</a>  | IPv4 Allocations.....   | <a href="#">3</a> |
| <a href="#">4.</a>  | IPv6 Allocations.....   | <a href="#">3</a> |
| <a href="#">5.</a>  | Candidate Access Router Discovery Protocol Registries.....                  | <a href="#">3</a> |
| <a href="#">6.</a>  | Context Transfer Profile Type Registry.....                                 | <a href="#">5</a> |
| <a href="#">7.</a>  | Context Transfer Protocol Authorization Token Calculation<br>Algorithm..... | <a href="#">5</a> |
| <a href="#">8.</a>  | ICMP Experimental Mobility Subtype Format and Registry.....                 | <a href="#">5</a> |
| <a href="#">9.</a>  | Utilization by Other Experimental Mobility Protocols.....                   | <a href="#">6</a> |
| <a href="#">10.</a> | Normative References.....   | <a href="#">6</a> |
| <a href="#">11.</a> | Security Considerations.....  | <a href="#">7</a> |
| <a href="#">12.</a> | IANA Considerations.....  | <a href="#">7</a> |

## [1.](#) Introduction

The Seamoby Candidate Access Router Discovery (CARD) protocol [[RFC4066](#)] and the Context Transfer Protocol (CTXP) [[RFC4067](#)] are experimental protocols designed to accelerate IP handover between wireless access routers. These protocols require IANA allocations for ICMP options and type, SCTP Payload Protocol Identifiers, port numbers, and the establishment of registries for certain formatted message options. Because the protocols are experimental, there is no guarantee that they will ever see widespread deployment in their current form. Consequently, it is prudent to conserve Internet numbering resources that might be needed for other protocols that could see wider deployment. This document contains instructions to IANA for the Seamoby protocols. Additionally, the ICMP subtype extension format has been designed so that it could be used by other experimental mobility protocols.

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](#)]. Allocation policy names Specification Required, IETF Consensus Action, and Designated Expert are to be interpreted as described in [RFC 2434](#) [[RFC2434](#)].

## [2.](#) Common IPv4 and IPv6 Allocations

IANA has assigned SCTP port numbers 5090 for use by [[RFC4066](#)] and 5091 for use of [[RFC4067](#)]. See [Section 5.2.1 of \[RFC4066\]](#) for a description of the inter-access router CARD protocol use of SCTP, and [Section 3.1 of \[RFC4067\]](#) for a description of the inter-access router CXP use of SCTP.



### 3. IPv4 Allocations

IANA has assigned ICMP type 41 for IPv4 identifying ICMP messages utilized by experimental mobility protocols such as Seamoby. See [Section 5.1.1 of \[RFC4066\]](#) for a description of experimental mobility CARD ICMP messages and [Section 3.2 of \[RFC4067\]](#) for the CXTIP ICMP messages, specified by Seamoby. See [Section 9](#) of this document for a description of the experimental mobility protocol ICMP subtype format and initial allocations.

IANA has assigned Mobile IPv4 Foreign Agent Discovery [[RFC3344](#)] option type codes for the following:

| Code | Purpose                     | Reference                                    |
|------|-----------------------------|--|
| 137  | CARD MN-AR signature option | <a href="#">Section 6.4 of [RFC4066]</a>     |
| 138  | CARD Request option         | <a href="#">Section 5.1.2.1 of [RFC4066]</a> |
| 139  | CARD Reply option           | <a href="#">Section 5.1.2.2 of [RFC4066]</a> |

### 4. IPv6 Allocations

IANA has assigned ICMP type code 150 for IPv6 identifying ICMP messages utilized by experimental mobility protocols such as Seamoby. See [Section 5.1.1 of \[RFC4066\]](#) for a description of experimental mobility CARD ICMP messages and [Section 3.2 of \[RFC4067\]](#) for the CXTIP ICMP messages, specified by Seamoby. See [Section 9](#) of this document for a description of the experimental mobility protocol subtype format and initial allocations.

IANA has assigned IPv6 [RFC 2461](#) Neighbor Discovery [[RFC2461](#)] option type codes for the following:

| Code | Purpose             | Reference                                    |
|------|---------------------|--|
| 138  | CARD Request option | <a href="#">Section 5.1.2.1 of [RFC4066]</a> |
| 139  | CARD Reply option   | <a href="#">Section 5.1.2.2 of [RFC4066]</a> |

### 5. Candidate Access Router Discovery Protocol Registries

For CARD, two new registries are created that IANA is to maintain, named:

- 1) The AVP Type Registry,
- 2) The Layer 2 Access Technology Identifier Registry.

These are described in the following subsections.



### 5.1. AVP Type Registry

The AVP Type Registry allows for future expansion of the CARD AVP type space to include new AVPs. AVP Type codes are 16 bit unsigned integers. See [Section 5.1.4 of \[RFC4066\]](#) for a description of AVPs.

The registry SHALL be initially populated with the following table:

| AVP Name | Type Code |
|----------|-----------|
| -----    | -----     |
| RESERVED | 0x00      |

Future allocations of AVP type codes will be made through Expert Review, as defined in [RFC 2434](#).

### 5.2. Layer 2 Access Technology Identifier Registry

The Layer 2 Access Technology Identifier registry allows the registration of type codes to uniquely identify specific access technologies in the L2-Type field of the CARD L2 ID sub-option. L2 ID codes are 16 bit unsigned integers. See [Section 5.1.3.1 of \[RFC4066\]](#) for a description of the CARD L2 ID sub-option.

The registry SHALL initially be populated with the following table:

| Layer 2 Access Technology | Type Code |
|---------------------------|-----------|
| -----                     | -----     |
| RESERVED                  | 0x00      |
| IEEE 802.3 (Ethernet)     | 0x01      |
| IEEE 802.11a              | 0x02      |
| IEEE 802.11b              | 0x03      |
| IEEE 802.11g              | 0x04      |
| IEEE 802.15.1(Bluetooth)  | 0x05      |
| IEEE 802.15.3             | 0x06      |
| IEEE 802.15.4             | 0x07      |
| IEEE 802.16               | 0x08      |

Future allocation of Layer 2 Access Technology identifiers will be made by the method of Specification Required, as defined in [RFC 2434](#). All requests for allocations MUST be accompanied by a reference to a technical document in which the design of the Layer 2 access technology is described.



## 6. Context Transfer Profile Type Registry

CXTP requires IANA to maintain a registry named the Context Transfer Profile Type Registry, which is a registry of context Feature Profile Type identifiers. Feature Profile Type identifiers are 16 bit unsigned integers that identify particular types of feature contexts. See [Section 2.4 of \[RFC4067\]](#) for a description of how contexts are carried in CXTP.

The registry SHALL initially be populated with the following table:

| Context Profile                 | Type Code |
|---------------------------------|-----------|
| -----                           | -----     |
| RESERVED                        | 0x00      |
| IPv6 Multicast Listener Context | 0x01      |

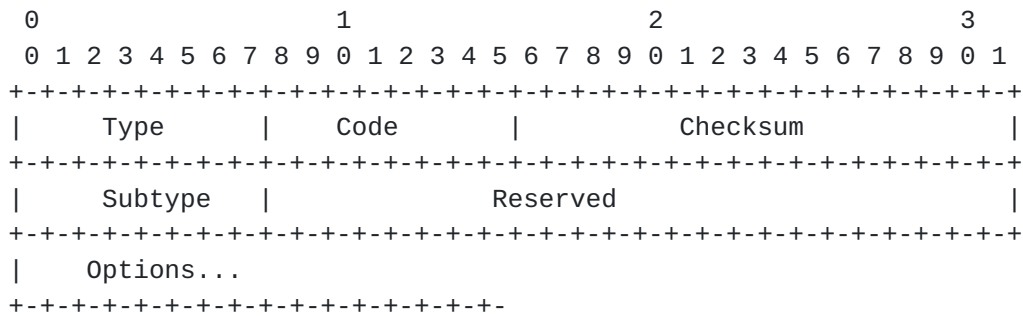
Future allocations of Feature Profile Type codes will be made through Expert Review, as defined in [RFC 2434](#).

## 7. Context Transfer Protocol Authorization Token Calculation Algorithm

In [Section 2.5.4 of \[RFC4067\]](#), CXTP requires an authorization token calculation algorithm indicator. Currently, the only indicator defined is 0x1, for HMAC\_SHA1. Additional algorithms may be added by the method of Specification Required [\[RFC2434\]](#).

## 8. ICMP Experimental Mobility Subtype Format and Registry

The ICMP Experimental Mobility Type is utilized by CARD and CXTP in the following way. The interpretation of the Code field is as defined by the relevant ICMP standard for IPv4 and IPv6, and does not change. The protocols are free to utilize the Code for their own purposes. The ICMP Experimental Mobility Type defines a one octet subtype field within the ICMP Reserved field that identifies the specific protocol. The ICMP header for the Experimental Mobility Type is:



Type                      For IPv4, 41; for IPv6 150





|          |  |
|----------|--|
| Code     | As defined by the relevant ICMP specification and free for use by the Experimental Mobility protocol.                  |
| Checksum | ICMP checksum  |
| Subtype  | One octet subtype code identifying the Experimental Mobility protocol  |
| Reserved | Unless otherwise defined by the Experimental Mobility protocol, set to zero by the sender and ignored by the receiver. |
| Options  | As defined by the Experimental Mobility protocol.  |

IANA SHALL maintain a registry of one octet unsigned integer subtype codes for the Experimental Mobility protocols called the Experimental Mobility Protocol Subtype Registry.

Initial allocations in the registry SHALL be established as follows:

| Protocol/Message | Subtype | Reference                                  |
|------------------|---------|--|
| -----            |         |  |
| CARD             | 0       | <a href="#">Section 5.1.1 of [RFC4066]</a> |
| CXTP             | 1       | <a href="#">Section 3.2 of [RFC4067]</a>   |

Subsequent allocations of subtype codes SHALL be made by the method of Specification Required and IESG Review as defined in [RFC 2434](#).

## 9. Usage by Other Experimental Mobility Protocols

The ICMP Experimental Mobility type code is available for other experimental mobility protocols to use. Other experimental mobility protocols MAY define additional ICMP messages that use code points under the Experimental Mobility ICMP type.

## 10. Normative References

- [RFC2434] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 2434](#), October 1998.
- [RFC2461] Narten, T., Nordmark, E., and W. Simpson, "Neighbor Discovery for IP Version 6 (IPv6)", [RFC 2461](#), December 1998.
- [RFC3344] Perkins, C., "IP Mobility Support for IPv4", [RFC 3344](#), August 2002.



[RFC4066] Liebsch, M., Ed., Singh, A., Ed., Chaskar, H., Funato, D., and E. Shim, "Candidate Access Router Discovery (CARD)", [RFC 4066](#), July 2005.

[RFC4067] Loughney, J., Ed., Nahkjiri, M., Perkins, C., and R. Koodli, "Context Transfer Protocol", [RFC 4067](#), July 2005.

## **11. Security Considerations**

There are no security considerations associated with this document.

## **12. IANA Considerations**

This entire document is about IANA considerations.

### Author's Address

James Kempf  
DoCoMo Labs USA  
181 Metro Drive  
Suite 300  
San Jose, CA  
95110

Phone: +1 408 451 4711

EMail: [kempf@docomolabs-usa.com](mailto:kempf@docomolabs-usa.com)



## Full Copyright Statement

Copyright (C) The Internet Society (2005).

This document is subject to the rights, licenses and restrictions contained in [BCP 78](#), and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

## Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in [BCP 78](#) and [BCP 79](#).

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at <http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at [ietf-ipr@ietf.org](mailto:ietf-ipr@ietf.org).

## Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

