Network Working Group Internet-Draft Intended status: Standards Track Expires: June 6, 2009

# Reserved IPv6 Interface Identifiers draft-ietf-6man-reserved-iids-03

Status of this Memo

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with <u>Section 6 of BCP 79</u>.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at <a href="http://www.ietf.org/ietf/lid-abstracts.txt">http://www.ietf.org/ietf/lid-abstracts.txt</a>.

The list of Internet-Draft Shadow Directories can be accessed at <a href="http://www.ietf.org/shadow.html">http://www.ietf.org/shadow.html</a>.

This Internet-Draft will expire on June 6, 2009.

#### Abstract

Interface Identifiers in IPv6 unicast addresses are used to identify interfaces on a link. They are required to be unique within a subnet. Several RFCs have specified interface identifiers or identifier ranges that have a special meaning attached to them. An IPv6 node autoconfiguring an interface identifier in these ranges will encounter unexpected consequences. Since there is no centralized repository for such reserved identifiers, this document aims to create one.

#### Table of Contents

$\underline{1}$ . Requirements notation	<u>3</u>
$\underline{2}$ . Introduction	<u>4</u>
<u>2.1</u> . Applicability	<u>4</u>
$\underline{3}$ . Issues with reusing reserved Interface Identifiers	<u>5</u>
<u>3.1</u> . Possible solutions	<u>5</u>
$\underline{4}$ . IANA Considerations	<u>6</u>
5. Acknowledgements	7
<u>6</u> . Security Considerations	<u>8</u>
<u>7</u> . References	<u>9</u>
7.1. Normative References	<u>9</u>
7.2. Informative References	<u>9</u>
Appendix A. List of potentially affected RFCs	10
Author's Address	11
Intellectual Property and Copyright Statements	12

Expires June 6, 2009

[Page 2]

# **<u>1</u>**. Requirements notation

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 [<u>RFC2119</u>].

Internet-Draft Reserved IPv6 Interface Identifiers December 2008

#### **<u>2</u>**. Introduction

An IPv6 unicast address is composed of two parts : A subnet prefix and an interface identifier (IID) that identifies an unique interface within the subnet prefix. The structure of an IPv6 unicast address is depicted in the IPv6 Addressing Architecture [<u>RFC4291</u>] and is replicated here for clarity.

1	n bits		128-n bits	I
+		+		+
I	subnet prefix	I	interface ID	
+		+		+

Figure 1: IPv6 Unicast Address Format

For all unicast addresses, except those that start with the binary value 000, Interface IDs are required to be 64 bits long and to be constructed in Modified EUI-64 format. Examples of mechanisms that generate interface identifiers without an unique token include Cryptographically Generated Addresses [RFC3972], Privacy Addresses [RFC4941], Hash Based Addresses [HBA] etc. Non-unique interface identifiers can also be allocated using managed address assignment mechanisms like DHCPv6 [RFC3315].

# **<u>2.1</u>**. Applicability

This document applies only to interface identifiers that are formed in the modified EUI-64 format as defined in <u>Appendix A of [RFC4291]</u>. All other types of interface identifiers are out of scope.

Expires June 6, 2009 [Page 4]

Internet-Draft Reserved IPv6 Interface Identifiers December 2008

#### 3. Issues with reusing reserved Interface Identifiers

Let us assume a node comes up with an interface identifier that has been reserved for use in some other capacity. e.g. An IPv6 node that uses temporary IPv6 addresses [RFC4941] comes up with an IID of fdff: ffff:ffff:fff . This node will receive requests from all nodes that are requesting a service from a MobileIPv6 home agent since the above mentioned interface identifier has been reserved in [RFC2526] to serve as a MIPv6 home agents anycast address. At best this is an annoyance to the node that came up with this address. In the worst case scenario another node on the link would be denied service and may not look for other methods of acquiring a home agent. Thus, such reserved interface identifiers MUST NOT be used for autonomous autoconfiguration or for managed address configuration.

#### <u>3.1</u>. Possible solutions

There are two possible ways to go about avoiding usage of these reserved interface identifiers. One of them would be to add normative reference to each specification that reserves an interface identifier. The other one would be to create an IANA registry for such interface identifiers. There are two disadvantages to the normative reference approach. Firstly, this approach does not scale well. This is because the number of such specifications that need to be updated is large. Secondly, the maturity level of the document reserving the IID might be lower than the one prohibited from using it. This will cause a downward reference problem. Therefore the better solution is to create an IANA registry for this purpose.

Expires June 6, 2009

[Page 5]

#### 4. IANA Considerations

This document requests the creation of an IANA registry for reserved IPv6 Interface Identifiers. Initial values for the reserved IPv6 Interface Identifiers are given below.

Interface Identifier Range   Description   +
0000:0000:0000   Subnet-Router Anycast     [ <u>RFC4291</u> ]
FDFF:FFFF:FFFF:FFFF:FFFF   Reserved Subnet Anycast       Addresses[RFC2526]

Table 1: Current Assignments

It is possible that implementations might predate a specific assignment from this registry and hence not be cognizant of the reserved nature of the interface identifier. Hence, future assignments from this registry are discouraged. Future assignments, if any, are to be made through Standards Action [<u>RFC5226</u>]. Assignments consist of a single interface identifier or a range of interface identifiers.

NOTE: Please note that the address :: (all zeros in the interface identifier field) is used as the unspecified address and ::/0 is used as a default route indicator, as specified in [RFC5156]. These uses do not conflict with the reserved interface identifiers defined here, since the reserved identifiers defined in this document are used for avoiding conflicts with stateless address autoconfiguration that utilizes a 64 bit prefix length.

Expires June 6, 2009

[Page 6]

# 5. Acknowledgements

The author would like to thank Alain Durand, Alex Petrescu, Bernie Volz, Bob Hinden, Christian Huitema, Fred Templin, Jordi Palet Martinez, Pekka Savola, Remi Denis-Courmount, Tim Enos, Alex Petrescu, Ed Jankiewicz, Brian Carpenter, Alfred Hoenes, Jari Arkko, Pasi Eronen, Tim Polk, Lars Eggert, Derek Atkins and Robert Sparks for reviewing this document and suggesting changes.

# <u>6</u>. Security Considerations

By utilizing one of the reserved interface identifiers, an IPv6 node might receive requests that it is not authorized to receive. Information that creates or updates a registration in this registry needs to be authenticated and authorized by the IANA based on the instructions set forth by [RFC5226].

Internet-Draft Reserved IPv6 Interface Identifiers December 2008

#### 7. References

#### 7.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", <u>BCP 14</u>, <u>RFC 2119</u>, March 1997.
- [RFC2526] Johnson, D. and S. Deering, "Reserved IPv6 Subnet Anycast Addresses", <u>RFC 2526</u>, March 1999.
- [RFC4291] Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture", <u>RFC 4291</u>, February 2006.
- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", <u>BCP 26</u>, <u>RFC 5226</u>, May 2008.

#### <u>7.2</u>. Informative References

- [HBA] Bagnulo, M., "Hash Based Addresses (HBA)", draft-ietf-shim6-hba-05 (work in progress), October 2006.
- [RFC3315] Droms, R., Bound, J., Volz, B., Lemon, T., Perkins, C., and M. Carney, "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", <u>RFC 3315</u>, July 2003.
- [RFC3972] Aura, T., "Cryptographically Generated Addresses (CGA)", <u>RFC 3972</u>, March 2005.
- [RFC4941] Narten, T., Draves, R., and S. Krishnan, "Privacy Extensions for Stateless Address Autoconfiguration in IPv6", <u>RFC 4941</u>, September 2007.
- [RFC5156] Blanchet, M., "Special-Use IPv6 Addresses", <u>RFC 5156</u>, April 2008.

Expires June 6, 2009

[Page 9]

#### Appendix A. List of potentially affected RFCs

The following RFCs that generate interface identifiers need to be updated if they wish to avoid conflicts with the reserved interface identifier ranges.

- o <u>RFC2590</u> Transmission of IPv6 Packets over Frame Relay Networks
- o <u>RFC3315</u> Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
- o <u>RFC3972</u> Cryptographically Generated Addresses (CGA)
- o <u>RFC4489</u> A Method for Generating Link-Scoped IPv6 Multicast Addresses
- o <u>RFC4862</u> IPv6 Stateless Address Autoconfiguration
- o <u>RFC4941</u> Privacy Extensions for Stateless Address Autoconfiguration in IPv6
- o RFC5072 IP Version 6 over PPP
- o <u>RFC4982</u> Support for Multiple Hash Algorithms in CGAs

Expires June 6, 2009 [Page 10]

Author's Address

Suresh Krishnan Ericsson 8400 Decarie Blvd. Town of Mount Royal, QC Canada

Phone: +1 514 345 7900 x42871 Email: suresh.krishnan@ericsson.com Full Copyright Statement

Copyright (C) The IETF Trust (2008).

This document is subject to the rights, licenses and restrictions contained in  $\frac{BCP}{78}$ , 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, THE IETF TRUST 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 <u>BCP 78</u> and <u>BCP 79</u>.

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.

Expires June 6, 2009

[Page 12]