

Network Working Group  
Internet-Draft  
Intended status: Standards Track  
Expires: May 9, 2008

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November 6, 2007

Reserved IPv6 Interface Identifiers  
draft-krishnan-ipv6-reserved-iids-02

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Internet-Draft

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November 2007

## 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.

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## 1. 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 [[RFC2119](#)].

## 2. 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 [[RFC4291](#)] and is replicated here for clarity.

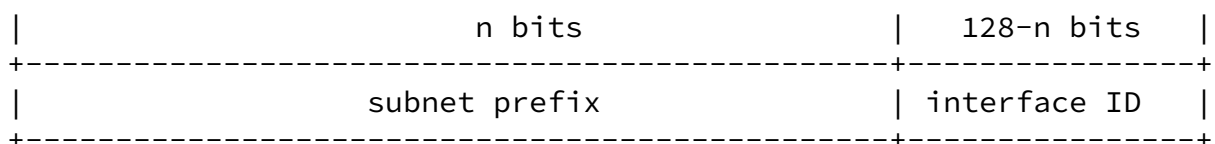


Figure 1: IPv6 Unicast Address Format

For all unicast addresses, except those that start with binary value 000, Interface identifiers are required to be 64 bits long (i.e.  $n=64$ ). If the interface identifiers are generated from an unique token like an ethernet MAC address, they need to set bit 6 of the first octet to one. If they are not generated from an unique token they need to set bit 6 to zero. Examples of mechanisms that generate interface identifiers without an unique token include Cryptographically Generated Addresses [[RFC3972](#)], Privacy Addresses [[PRIVACY](#)], Hash Based Addresses [[HBA](#)] etc. Non-unique interface identifiers can also be allocated using managed address assignment mechanisms like DHCPv6 [[RFC3315](#)].

### [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 [[PRIVACY](#)] comes up with an IID of fdff:ffff:ffff:fffe . This node will receive requests from all nodes that are requesting a service from a MobileIPv6 home agent. 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 auto-configuration or for managed address configuration.

#### [3.1.](#) 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 can 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. e.g. Reserving certain identifiers may be useful in certain protocols such as PMIP in order to avoid duplicate address detection on point to point links, but PMIP will be at a lower standardization level than the address sutoconfiguration standards and hence not referable from them.

#### [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  |
|---|--|
| 0000:0000:0000:0000-0000:0000:0000:0000 | Subnet Router Anycast<br><a href="#">[RFC4291]</a>   |
| fdff:ffff:ffff:ff80-fdff:ffff:ffff:fffd | Reserved Subnet Anycast<br><a href="#">[RFC2526]</a> |

|   |                                     |  |
|---|-------------------------------------|--|
| fddf:ffff:ffff:fffe-fddf:ffff:ffff:fffe | MobileIPv6 Home Agents              |  |
|   | Anycast [ <a href="#">RFC2526</a> ] |  |
| fddf:ffff:ffff:ffff-fddf:ffff:ffff:ffff | Reserved Subnet Anycast             |  |
|   | [ <a href="#">RFC2526</a> ]         |  |
| +-----+-----+                           |                                     |  |

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 but in exceptional circumstances are to be made through Standards Action [[IANABIS](#)]. Assignments consist of a single interface identifier or a range of interface identifiers.

## [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 and Tim Enos for reviewing this document and suggesting changes.

## [6.](#) Security Considerations



Information that creates or updates a registration needs to be authenticated and authorized. By utilizing one of the reserved interface identifiers an IPv6 node might receive requests that it is not authorized to receive.

## [7.](#) References

### [7.1.](#) Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2526] Johnson, D. and S. Deering, "Reserved IPv6 Subnet Anycast Addresses", [RFC 2526](#), March 1999.
- [RFC4291] Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture", [RFC 4291](#), February 2006.

### [7.2.](#) Informative References

- [HBA] Bagnulo, M., "Hash Based Addresses (HBA)", [draft-ietf-shim6-hba-02](#) (work in progress), October 2006.
- [IANABIS] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [draft-narten-iana-considerations-rfc2434bis-05](#) (work in progress), September 2006.
- [PRIVACY] Narten, T., Draves, R., and S. Krishnan, "Privacy Extensions for Stateless Address Autoconfiguration in IPv6", [draft-ietf-ipv6-privacy-addr-v2-05](#) (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)", [RFC 3315](#), July 2003.
- [RFC3972] Aura, T., "Cryptographically Generated Addresses (CGA)", [RFC 3972](#), March 2005.

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November 2007

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November 2007

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#### Acknowledgment

Funding for the RFC Editor function is provided by the IETF Administrative Support Activity (IASA).