INTERNET-DRAFT
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IPv6 Globally Unique Site-Local Addresses

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Status of this Memo

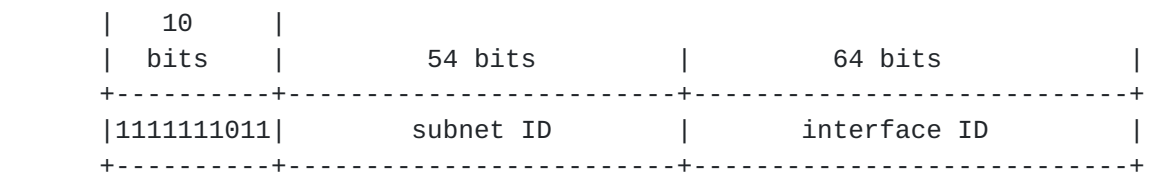
Abstract

This internet draft describes a proposal for IPv6 Globally Unique Site-Local Addresses.

1.0 Introduction

This internet draft describes a proposal for IPv6 Globally Unique Site-Local Addresses.

The IP Version 6 Addressing Architecture [ADDARCH] defines site-local addresses as:



This document proposes an approach to allocating IPv6 Site-Local address so they are globally unique and routable only inside of a site.

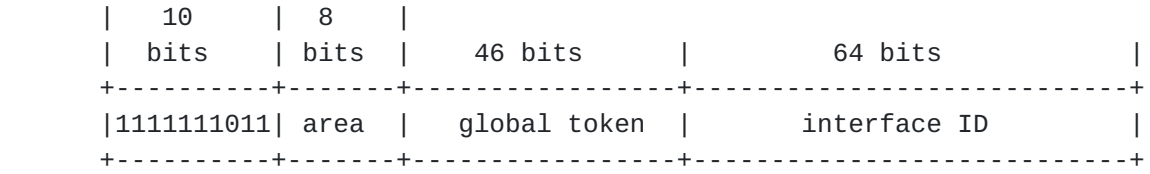
The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119].

2.0 Acknowledgments

The underlying idea of using global tokens based on EUI-48 addresses as a way of numbering subnets has been proposed a number of times by a variety of people. The author of this draft does not claim exclusive credit. Credit goes to Christian Huitema, Aidan Williams, Andrew White, Michel Py, Charlie Perkins, xxxx, yyyy, and many others. The author would also like to thank xxxx, yyyy, zzzz, <your name here>, and zzzz for their comments and suggestions on this draft.

3.0 Proposal

The key to creating globally unique site-local addresses is to assign the subnet ID in a manner that each one is unique on a global scale. This document proposes to use global tokens based EUI-48 addresses for globally unique site-local subnet assignment. The format is:



Where:

1111111011	is the binary /10 prefix for IPv6 site-local addresses as defined in [ADDARCH]
area	Manually configured area. Default value is zero.

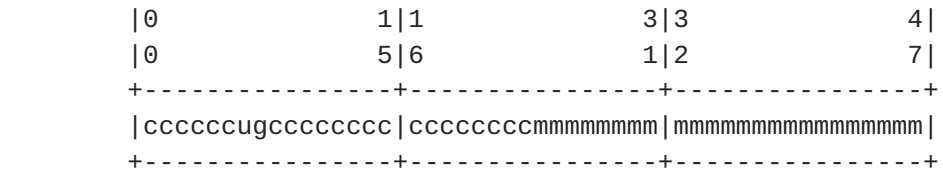
global token	Based on EUI-48 as defined in section 3.1
interface ID	As defined in [ADDARCH].

Each /64 identifies a single subnet.

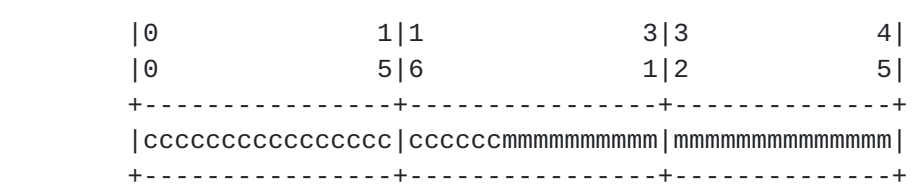
3.1 Global Token

EUI-48 addresses commonly used in Local Area Networks devices have the property of being reasonably globally unique. They are a good choice for creating a global token for IPv6 site-local subnet assignment.

EUI-48 addresses as defined in [EUI48] have the following format:



written in Internet standard bit-order , where "u" is the universal/local bit, "g" is the individual/group bit, "c" are the bits of the company_id, and "m" are the bits of the manufacturer-selected extension identifier. To create the global token used the this proposal, the "u" and "g" bits are not needed. The resulting global token is:



The global token is globally unique and when used to identify IPv6 site-local subnets results in globally unique site-local subnet prefixes.

3.2 Assignment

The globally unique site-local prefixes defined in this document are intended to be manually assigned to router interfaces in a site. The global token used in each prefix would be created from an EUI-48 address found in an interface on the subnet.

The area is designed to allow sites to manually assign prefix to

separate areas to facilitate route aggregation at the /18 level in the site.

The prefixes defined in document are also designed to allow automatic assignment to subnets in small sites. It would be expected this would be in the default area (e.g., area = 0). The details of automatic subnet assignment are beyond the scope of this document.

3.3 Routing

Inside of each area the globally unique site-local prefixes are designed to be routed in a flat manner (i.e., without any route aggregation). Each /64 prefix in the area would occupy an entry in a routers forwarding table.

The area field allows the assignment of site-local prefixes to area to allow large sites to aggregate their intra-site routing around the areas.

The use of flat routing of /64 prefixes is also designed to reduce the possibility of these prefixes being advertised in the global internet as each site would have many /64 prefixes and they would all have to be advertised independently.

3.4 Renumbering and Site Merging

The use of site-local addresses in a site results in making communication using site-local address independent of renumbering a site's provider based global addresses. This is true for the Site-Local addresses defined in [ADDARCH] and the global site-local addresses defined in this document.

The renumbering that occurs when two organizations merge their sites is different from the previous case. If the sites are only using the default zone of zero, then the sites can be combined without any need to renumber any of the global site-local addresses.

If the sites had been using manually configured areas to aggregate their inter-area site routes, the areas that are duplicate in each site will have to be renumbered. One way around this is to change the route advertisements from /18 to /64 in the areas that are duplicated. That will result in there being a unique prefix for each subnet. This will increase the amount of routing overhead, but will allow operations to continue with out any disruption to ongoing communication. The areas could be renumbered at a later time when it is convenient to do so.

3.5 Site Border Router Filtering

It is important to keep any packets with site-local source or destination addresses from leaking outside of the site and to keep any site prefixes from being advertised outside of their site.

Site border routers MUST install a black hole route for the Site-Local prefix FEC0::/10. This will insure that packets with Site-Local destination addresses will not be forwarded outside of the site.

Site boarder routers MUST NOT forward any packets with site-local source or destination addresses outside of the site.

If BGP is being used at the site border with an ISP, filters MUST be installed in the BGP configuration to keep any site-local prefixes from being advertised outside of the site or for site-local prefixes to be learned from another site.

3.6 DNS Naming Issues

Site-Local addresses MUST NOT be installed in the global DNS. They may be installed in a naming system local to the site or kept separate from the global DNS using techniques such as "two-faced" DNS.

For future study names with site-local address may be resolved inside of the site using dynamic naming systems such as Multicast DNS.

4.0 Advantages

The proposal has the following advantages:

- Provides globally unique site-local prefixes per subnet based on EUI-48 global tokens.
- The prefixes are designed to allow for automatic generation without manual configuration.
- Sites using the default area of zero can be merged without any renumbering of the site-local addresses.
- Large sites may create areas to allow aggregation of routes inside of the site.
- The allocation strategy (i.e., /64 per subnet) helps insure that the prefixes will not be routed outside of the site because there would be too many new routes introduced in the global internet.

5.0 Disadvantages

- No default aggregation of site-local prefixes inside of the site.
- If areas are used and the site is merged with another site, the areas that are duplicated will have to be advertised as /64 prefixes (with the loss of aggregation) and later renumbered.

6.0 Security Considerations

TBD

REFERENCES

[ADDARCH] Hinden, R., S. Deering, S., "IP Version 6 Addressing Architecture", Internet Draft, <draft-ietf-ipngwg-addr-arch-v3-11.txt>, October 2002.

[IPV6] Deering, S., R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC2460, December 1998.

[RFC2026] Bradner, S., "The Internet Standards Process -- Revision 3", RFC2026, BCP00009, October 1996.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", RFC2119, BCP14, March 1997.

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