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Special-Use IPv6 Addresses

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Abstract

This document describes the global and other specialized IPv6 address blocks. It does not address IPv6 address space assigned to operators and users through the Regional Internet Registries. These descriptions are useful for route and IP filtering, for documentation and other purposes.

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1. Introduction

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This document describes the global and other specialized IPv6 address blocks. It does not address IPv6 address space assigned to operators and users through the Regional Internet Registries. These descriptions are useful for route and IP filtering, for documentation and other purposes.

The document is structured by address types. The document format is similar to [\[RFC3330\] \(IANA, "Special-Use IPv4 Addresses," September 2002.\)](#).

Some tips about filtering are given, but are not mandatory to implement.

The addresses listed in this document must not be hard coded into implementations.

2. Address Blocks

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2.1. Node-scoped Unicast

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::1/128 is the loopback address [\[RFC4291\] \(Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture," February 2006.\)](#).

::/128 is the unspecified address [\[RFC4291\] \(Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture," February 2006.\)](#).

Addresses within this block should not appear on the public Internet.

2.2. IPv4-Mapped Addresses

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::FFFF:0:0/96 are the IPv4-mapped addresses [\[RFC4291\] \(Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture," February 2006.\)](#).

Addresses within this block should not appear on the public Internet.

2.3. IPv4-compatible Addresses

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::ipv4-address/96 are the IPv4-compatible addresses [\[RFC4291\] \(Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture," February 2006.\)](#). These addresses are deprecated and should not appear on the public Internet.

2.4. Link-scoped Unicast

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fe80::/10 are the link-local unicast [\[RFC4291\] \(Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture," February 2006.\)](#) addresses. Addresses within this block should not appear on the public Internet.

2.5. Unique-Local

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fc00::/7 are the unique-local addresses [\[RFC4193\] \(Hinden, R. and B. Haberman, "Unique Local IPv6 Unicast Addresses," October 2005.\)](#). Addresses within this block should not appear by default on the public Internet. Procedure for advertising these addresses are further described in [\[RFC4193\] \(Hinden, R. and B. Haberman, "Unique Local IPv6 Unicast Addresses," October 2005.\)](#).

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2.6. Documentation Prefix

The 2001:db8::/32 are the documentation addresses [\[RFC3849\]](#) (Huston, G., Lord, A., and P. Smith, "IPv6 Address Prefix Reserved for Documentation," July 2004.). They are used for documentation purposes such as user manuals, RFCs, etc. Addresses within this block should not appear on the public Internet.

2.7. 6to4

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2002::/16 are the 6to4 addresses [\[RFC3056\]](#) (Carpenter, B. and K. Moore, "Connection of IPv6 Domains via IPv4 Clouds," February 2001.). The 6to4 addresses may be advertised when the site is running a 6to4 relay or offering a 6to4 transit service. However, the provider of this service should be aware of the implications of running such service [\[RFC3964\]](#) (Savola, P. and C. Patel, "Security Considerations for 6to4," December 2004.), which include some specific filtering rules for 6to4. IPv4 addresses disallowed in 6to4 prefixes are listed in section 5.3.1 of [\[RFC3964\]](#) (Savola, P. and C. Patel, "Security Considerations for 6to4," December 2004.).

2.8. Teredo

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2001::/32 are the Teredo addresses [\[RFC4380\]](#) (Huitema, C., "Teredo: Tunneling IPv6 over UDP through Network Address Translations (NATs)," February 2006.). The Teredo addresses may be advertised when the site is running a Teredo relay or offering a Teredo transit service.

2.9. 6bone

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5f00::/8 were the addresses of the first instance of the 6bone experimental network [\[RFC1897\]](#) (Hinden, R. and J. Postel, "IPv6 Testing Address Allocation," January 1996.).

3ffe::/16 were the addresses of the second instance of the 6bone experimental network [\[RFC2471\]](#) (Hinden, R., Fink, R., and J. Postel, "IPv6 Testing Address Allocation," December 1998.).

Both 5f00::/8 and 3ffe::/16 were returned to IANA [\[RFC3701\]](#) (Fink, R. and R. Hinden, "6bone (IPv6 Testing Address Allocation) Phaseout," March 2004.). These addresses are subject to future allocation, similar to current unallocated address space. Addresses within this block should not appear on the public Internet until they are reallocated.

2.10. ORCHID

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2001:10::/28 are ORCHID addresses [\[RFC4843\] \(Nikander, P., Laganier, J., and F. Dupont, "An IPv6 Prefix for Overlay Routable Cryptographic Hash Identifiers \(ORCHID\)," April 2007.\)](#). These addresses are used as identifiers and are not routable at the IP layer. Addresses within this block should not appear on the public Internet.

2.11. Default Route

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::/0 is the default unicast route address.

2.12. IANA Special Purpose IPv6 Address Block

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An IANA registry (iana-ipv6-special-registry) is set [\[RFC4773\] \(Huston, G., "Administration of the IANA Special Purpose IPv6 Address Block," December 2006.\)](#) for Special Purpose IPv6 address blocks assignments used for experiments and other purposes. Addresses within this registry should be reviewed for Internet routing considerations.

2.13. Multicast

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ff00::/8 are multicast addresses [\[RFC4291\] \(Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture," February 2006.\)](#). They have a 4 bits scope in the address field where only some value are of global scope [\[RFC4291\] \(Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture," February 2006.\)](#). Only addresses with global scope in this block may appear on the public Internet. Multicast routes must not appear in unicast routing tables.

3. Security Considerations

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This document lists addresses and guidelines associated with them. The guidelines should improve the security of networks by the filtering of invalid routing prefixes.

4. IANA Considerations

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To ensure consistency and to provide cross-referencing for the benefit of the community, IANA is requested to insert the following paragraph in the header of the iana-ipv6-special registry.

"Other special IPv6 addresses requiring specific considerations for global routing are listed in RFCXXXX."

NOTE TO RFC EDITOR and IANA: replace RFCXXXX by the assigned RFC number of this document.

5. Acknowledgements

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6. References

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6.1. Normative References

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| [RFC4291] | Hinden, R. and S. Deering, " IP Version 6 Addressing Architecture ," RFC 4291, February 2006 (TXT). |
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6.2. Informative References

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| [RFC2471] | Hinden, R. , Fink, R. , and J. Postel, " IPv6 Testing Address Allocation ," RFC 2471, December 1998 (TXT , HTML , XML). |
| [RFC3056] | Carpenter, B. and K. Moore, " Connection of IPv6 Domains via IPv4 Clouds ," RFC 3056, February 2001 (TXT). |
| [RFC3330] | |

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| | IANA, " Special-Use IPv4 Addresses ," RFC 3330, September 2002 (TXT). |
| [RFC3701] | Fink, R. and R. Hinden, " 6bone (IPv6 Testing Address Allocation) Phaseout ," RFC 3701, March 2004 (TXT). |
| [RFC3849] | Huston, G., Lord, A., and P. Smith, " IPv6 Address Prefix Reserved for Documentation ," RFC 3849, July 2004 (TXT). |
| [RFC3964] | Savola, P. and C. Patel, " Security Considerations for 6to4 ," RFC 3964, December 2004 (TXT). |
| [RFC4193] | Hinden, R. and B. Haberman, " Unique Local IPv6 Unicast Addresses ," RFC 4193, October 2005 (TXT). |
| [RFC4380] | Huitema, C., " Teredo: Tunneling IPv6 over UDP through Network Address Translations (NATs) ," RFC 4380, February 2006 (TXT). |
| [RFC4773] | Huston, G., " Administration of the IANA Special Purpose IPv6 Address Block ," RFC 4773, December 2006 (TXT). |
| [RFC4843] | Nikander, P., Laganier, J., and F. Dupont, " An IPv6 Prefix for Overlay Routable Cryptographic Hash Identifiers (ORCHID) ," RFC 4843, April 2007 (TXT). |

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