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Special Use IPv4 Addresses

Abstract

This document obsoletes RFC 3330. It describes the global and other specialized IPv4 address blocks that have been assigned by the Internet Assigned Numbers Authority (IANA). It does not address IPv4 address space assigned to operators and users through the Regional Internet Registries, nor does it address IPv4 address space assigned directly by IANA prior to the creation of the Regional Internet Registries. It also does not address allocations or assignments of IPv6 addresses or autonomous system numbers.

Status of This Memo

This memo documents an Internet Best Current Practice.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on BCPs is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc5735.

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1. Introduction

Throughout its history, the Internet has employed a central Internet Assigned Numbers Authority (IANA) responsible for the allocation and assignment of various identifiers needed for the operation of the Internet [RFC1174]. In the case of the IPv4 address space, the IANA allocates parts of the address space to Regional Internet Registries (RIRs) according to their established needs. These RIRs are responsible for the registration of IPv4 addresses to operators and users of the Internet within their regions.

On an ongoing basis, the IANA has been designated by the IETF to make assignments in support of the Internet Standards Process [RFC2860]. Section 4 of that document describes that assignment process.

Small portions of the IPv4 address space have been allocated or assigned directly by the IANA for global or other specialized purposes. These allocations and assignments have been documented in a variety of RFCs and other documents. This document is intended to collect these scattered references and provide a current list of special use IPv4 addresses.

This document is a revision of RFC 3330 [RFC3330], which it obsoletes; its primary purpose is to reflect the changes to the list of special IPv4 assignments since the publication of RFC 3330. It is a companion to [RFC5156], which describes special IPv6 addresses.

2. Terminology

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 BCP 14, [RFC2119].

3. Global and Other Specialized Address Blocks

0.0.0.0/8 - Addresses in this block refer to source hosts on "this" network. Address 0.0.0.0/32 may be used as a source address for this host on this network; other addresses within 0.0.0.0/8 may be used to refer to specified hosts on this network ([RFC1122], Section 3.2.1.3).

10.0.0.0/8 - This block is set aside for use in private networks. Its intended use is documented in [RFC1918]. As described in that RFC, addresses within this block do not legitimately appear on the public Internet. These addresses can be used without any coordination with IANA or an Internet registry.

127.0.0.0/8 - This block is assigned for use as the Internet host loopback address. A datagram sent by a higher-level protocol to an address anywhere within this block loops back inside the host. This is ordinarily implemented using only 127.0.0.1/32 for loopback. As described in [RFC1122], Section 3.2.1.3, addresses within the entire 127.0.0.0/8 block do not legitimately appear on any network anywhere.

169.254.0.0/16 - This is the "link local" block. As described in [RFC3927], it is allocated for communication between hosts on a single link. Hosts obtain these addresses by auto-configuration, such as when a DHCP server cannot be found.

172.16.0.0/12 - This block is set aside for use in private networks. Its intended use is documented in [RFC1918]. As described in that RFC, addresses within this block do not legitimately appear on the public Internet. These addresses can be used without any coordination with IANA or an Internet registry.

192.0.0.0/24 - This block is reserved for IETF protocol assignments. At the time of writing this document, there are no current assignments. Allocation policy for future assignments is given in [RFC5736].

192.0.2.0/24 - This block is assigned as "TEST-NET-1" for use in documentation and example code. It is often used in conjunction with domain names example.com or example.net in vendor and protocol documentation. As described in [RFC5737], addresses within this block do not legitimately appear on the public Internet and can be used without any coordination with IANA or an Internet registry. See [RFC1166].

192.88.99.0/24 - This block is allocated for use as 6to4 relay anycast addresses, in [RFC3068]. In contrast with previously described blocks, packets destined to addresses from this block do appear in the public Internet. [RFC3068], Section 7, describes operational practices to prevent the malicious use of this block in routing protocols.

192.168.0.0/16 - This block is set aside for use in private networks. Its intended use is documented in [RFC1918]. As described in that RFC, addresses within this block do not legitimately appear on the public Internet. These addresses can be used without any coordination with IANA or an Internet registry.

198.18.0.0/15 - This block has been allocated for use in benchmark tests of network interconnect devices. [RFC2544] explains that this range was assigned to minimize the chance of conflict in case a

testing device were to be accidentally connected to part of the Internet. Packets with source addresses from this range are not meant to be forwarded across the Internet.

198.51.100.0/24 - This block is assigned as "TEST-NET-2" for use in documentation and example code. It is often used in conjunction with domain names example.com or example.net in vendor and protocol documentation. As described in [RFC5737], addresses within this block do not legitimately appear on the public Internet and can be used without any coordination with IANA or an Internet registry.

203.0.113.0/24 - This block is assigned as "TEST-NET-3" for use in documentation and example code. It is often used in conjunction with domain names example.com or example.net in vendor and protocol documentation. As described in [RFC5737], addresses within this block do not legitimately appear on the public Internet and can be used without any coordination with IANA or an Internet registry.

224.0.0.0/4 - This block, formerly known as the Class D address space, is allocated for use in IPv4 multicast address assignments. The IANA guidelines for assignments from this space are described in [RFC3171].

240.0.0.0/4 - This block, formerly known as the Class E address space, is reserved for future use; see [RFC1112], Section 4.

The one exception to this is the "limited broadcast" destination address 255.255.255.255. As described in [RFC0919] and [RFC0922], packets with this destination address are not forwarded at the IP layer.

4. Summary Table

Address Block	Present Use	Reference
0.0.0.0/8	"This" Network	RFC 1122, Section 3.2.1.3
10.0.0.0/8	Private-Use Networks	RFC 1918
127.0.0.0/8	Loopback	RFC 1122, Section 3.2.1.3
169.254.0.0/16	Link Local	RFC 3927
172.16.0.0/12	Private-Use Networks	RFC 1918
192.0.0.0/24	IETF Protocol Assignments	RFC 5736
192.0.2.0/24	TEST-NET-1	RFC 5737
192.88.99.0/24	6to4 Relay Anycast	RFC 3068
192.168.0.0/16	Private-Use Networks	RFC 1918
198.18.0.0/15	Network Interconnect Device Benchmark Testing	RFC 2544
198.51.100.0/24	TEST-NET-2	RFC 5737
203.0.113.0/24	TEST-NET-3	RFC 5737
224.0.0.0/4	Multicast	RFC 3171
240.0.0.0/4	Reserved for Future Use	RFC 1112, Section 4
255.255.255.255/32	Limited Broadcast	RFC 919, Section 7 RFC 922, Section 7

5. Assignments of IPv4 Blocks for New Specialized Uses

The IANA has responsibility for making assignments of protocol parameters used in the Internet according to the requirements of the "Memorandum of Understanding Concerning the Technical Work of the Internet Assigned Numbers Authority" [RFC2860]. Among other things, [RFC2860] requires that protocol parameters be assigned according to the criteria and procedures specified in RFCs, including Proposed, Draft, and full Internet Standards and Best Current Practice documents, and any other RFC that calls for IANA assignment.

The domain name and IP address spaces involve policy issues (in addition to technical issues) so that the requirements of [RFC2860] do not apply generally to those spaces. Nonetheless, the IANA is responsible for ensuring assignments of IPv4 addresses as needed in support of the Internet Standards Process. When a portion of the IPv4 address space is specifically required by an RFC, the technical requirements (e.g., size, prefix length) for the portion should be described [RFC5226]. Immediately before the RFC is published, the IANA will, in consultation with the Regional Internet Registries, make the necessary assignment and notify the RFC Editor of the particulars for inclusion in the RFC as published.

As required by [RFC2860], the IANA will also make necessary experimental assignments of IPv4 addresses, also in consultation with the Regional Internet Registries.

6. IANA Considerations

This document describes the IANA's past and current practices and does not create any new requirements for assignments or allocations by the IANA.

7. Security Considerations

The particular assigned values of special use IPv4 addresses cataloged in this document do not directly raise security issues. However, the Internet does not inherently protect against abuse of these addresses. If you expect (for instance) that all packets from a private address space such as the 10.0.0.0/8 block or the link local block 169.254.0.0/16 originate within your subnet, all routers at the border of your network should filter such packets that originate from outside your network. Attacks have been mounted that depend on the unexpected use of some of these addresses.

It should also be noted that some of these address spaces may be used legitimately outside a single administrative domain, and may appear on the global Internet. Security policy SHOULD NOT blindly filter all of these address spaces without due consideration, and network operators are encouraged to review this document, and references contained therein, and determine what security policies should be associated with each of these address blocks within their specific operating environments.

8. Acknowledgments

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9. References

9.1. Normative References

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9.2. Informative References

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[RFC5156] Blanchet, M., "Special-Use IPv6 Addresses", RFC 5156, April 2008.

[RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 5226, May 2008.

[RFC5736] Huston, G., Cotton, M., and L. Vegoda, "IANA IPv4 Special Purpose Address Registry", RFC 5736, January 2010.

[RFC5737] Arkko, J., Cotton, M., and L. Vegoda, "IPv4 Address Blocks Reserved for Documentation", RFC 5737, January 2010.

Appendix A. Differences between This Document and RFC 3330

Address blocks that were reserved for a special purpose in RFC 3330 but are no longer reserved for any special purpose and are available for allocation are no longer listed in Sections 4 or 5. The following blocks have become available:

- 14.0.0.0/8 is no longer set aside for assignments to the international system of Public Data Networks [RFC1700], page 181. It is now available for allocation to RIRs in the normal way.

- 24.0.0.0/8 is no longer listed as the addresses in that block have been managed by the American Registry for Internet Numbers (ARIN) in the normal way since 2001.

- 39.0.0.0/8 is no longer listed as it has been subject to allocation to an RIR for assignment in the normal manner since 2001.

- 128.0.0.0/16 is not reserved and is subject to future allocation by a Regional Internet Registry for assignment in the normal manner.

- 191.255.0.0/16 is not reserved and is subject to future allocation by a RIR for assignment in the normal manner.

- 198.51.100.0/24 is assigned as "TEST-NET-2" for use in documentation and example code.

- 203.0.113.0/24 is assigned as "TEST-NET-3" for use in documentation and example code.

- 223.255.255.0/24 is not reserved and is subject to future allocation by an RIR for assignment in the normal manner.

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