                       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

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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
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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

   Many people have made comments on draft versions of this document.
   The authors would especially like to thank Scott Bradner, Randy Bush,
   Harald Alvestrand, Peter Koch, Alfred Hoenes, and Jari Arkko for
   their constructive feedback and comments. They would also like to
   offer a special note of thanks to APNIC, which nominated
   198.51.100.0/24 and 203.0.113.0/24.

9. References

9.1. Normative References

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              Requirement Levels", BCP 14, RFC 2119, March 1997.

9.2. Informative References

   [RFC0919] Mogul, J., "Broadcasting Internet Datagrams", STD 5,
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   [RFC0922]   Mogul, J., "Broadcasting Internet datagrams in the
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   [RFC1112]   Deering, S., "Host extensions for IP multicasting", STD 5,
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   [RFC1122]   Braden, R., "Requirements for Internet Hosts -
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   [RFC3171]   Albanna, Z., Almeroth, K., Meyer, D., and M. Schipper,
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               Configuration of IPv4 Link-Local Addresses", RFC 3927,
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   [RFC5156]   Blanchet, M., "Special-Use IPv6 Addresses", RFC 5156,
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   [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.

Authors' Addresses

   Michelle Cotton
   Internet Corporation for Assigned Names and Numbers
   4676 Admiralty Way, Suite 330
   Marina del Rey, CA 90292
   USA

   Phone: +1-310-823-9358
   EMail: michelle.cotton@icann.org
   URI: http://www.iana.org/

   Leo Vegoda
   Internet Corporation for Assigned Names and Numbers
   4676 Admiralty Way, Suite 330
   Marina del Rey, CA 90292
   USA

   Phone: +1-310-823-9358
   EMail: leo.vegoda@icann.org
   URI: http://www.iana.org/