IPv4 Address Allocation and Assignment Policies for the RIPE NCC Service Region

Author: RIPE
Document ID: ripe-604
Obsoletes: ripe-599
Date: February 2014

Abstract

This document describes the RIPE community's current IPv4 address allocation and assignment policies. They were developed through a bottom-up, consensus driven, open policy development process in the RIPE Address Policy Working Group (AP WG). The RIPE Network Coordination Centre (RIPE NCC) facilitates and supports this process. These policies apply to the RIPE NCC and the Local Internet Registries (LIRs) within the RIPE NCC service region.

Information on the Address Policy WG is available at:

http://www.ripe.net/ripe/groups/wg/ap

Contents

1.0 Introduction

The RIPE NCC is an independent association and serves as one of five Regional Internet Registries (RIRs). Its service region incorporates Europe, the Middle East, and Central Asia. The RIPE NCC is responsible for the allocation and assignment of Internet Protocol (IP) address space, Autonomous System Numbers (ASNs) and the management of reverse domain names within this region. The distribution of IP space follows the hierarchical scheme described in the document "Internet Registry System".

1.1 Scope

This document describes the policies for the responsible management of globally unique IPv4 Internet address space in the RIPE NCC service region. The policies documented here apply to all IPv4 address space allocated and assigned by the RIPE NCC. These policies must be implemented by all RIPE NCC member LIRs.

This document does not describe policies related to AS Numbers, IPv6, Multicast, or private address space. Nor does it describe address distribution policies used by other RIRs. The RIPE community's policies for ASN assignment and IPv6 are published in the RIPE Document Store at:
http://www.ripe.net/ripe/docs/policy

2.0 IPv4 Address Space

For the purposes of this document, IP addresses are 32-bit binary numbers used as addresses in the IPv4 protocol. There are three main types of IPv4 addresses:

1. Public IP addresses are distributed to be globally unique according to the goals described in Section 3 of this document. The two types of IPv4 address described in this documents are Provider Aggregatable (PA) and Provider Independent (PI).

2. Some address ranges are set aside for the operation of private IP networks. Anyone may use these addresses in their private networks without registration or co-ordination. Hosts using these addresses cannot directly be reached from the Internet. Such connectivity is enabled by using the technique known as Network Address Translation (NAT). Private addresses restrict a network so that its hosts only have partial Internet connectivity. Where full Internet connectivity is needed, unique, public addresses should be used.

   For a detailed description of "Address Allocation for Private Internets" and the actual ranges of addresses set aside for that purpose, please refer to RFC 1918 found at: ftp://ftp.ripe.net/rfc/rfc1918.txt

For information on the "Architectural Implications of NAT", please refer to RFC 2993, found at: ftp://ftp.ripe.net/rfc/rfc2993.txt

3. Some address ranges are reserved for special use purposes. These are described in RFC 3330 and are beyond the scope of this document. RFC 3330 can be found at: ftp://ftp.ripe.net/rfc/rfc3330.txt

3.0 Goals of the Internet Registry System

Public IPv4 address assignments should be made with the following goals in mind:

1. Uniqueness: Each public IPv4 address worldwide must be unique. This is an absolute requirement guaranteeing that every host on the Internet can be uniquely identified.

2. Aggregation: Distributing IPv4 addresses in an hierarchical manner permits the aggregation of routing information. This helps to ensure proper operation of Internet routing.

3. Fairness: Public IPv4 address space must be fairly distributed to the End Users operating networks.

4. Registration: The provision of a public registry documenting address space allocations and assignments must exist. This is necessary to ensure uniqueness and to provide information for Internet troubleshooting at all levels.

3.1 Confidentiality

Internet Registries (IRs) have a duty of confidentiality to their registrants. Information passed to an IR must be securely stored and should not be distributed wider than necessary within the IR. When necessary, the information may be passed to a higher-level IR under the same conditions of confidentiality.

3.2 Language

Please note that all communication with the RIPE NCC must be in English.

4.0 Registration Requirements

All assignments and allocations must be registered in the RIPE Database. This is necessary to ensure uniqueness and to support network operations.

Only allocations and assignments registered in the RIPE Database are considered valid. Registration of objects in the database is the final step in making an allocation or assignment. Registration data (range, contact information, status etc.) must be correct at all times (i.e. they have to be maintained).

5.0 Policies and Guidelines for Allocations

An allocation is a block of IPv4 addresses from which assignments are taken.

All LIRs receiving address space from the RIPE NCC must adopt a set of policies that are consistent with the policies formulated by the RIPE community and described in this document.

5.1 Allocations made by the RIPE NCC to LIRs

The RIPE NCC's minimum allocation size is /22.

Details of how to join the RIPE NCC can be found in the RIPE Document "Procedure for Becoming a Member of the RIPE NCC"

On application for IPv4 resources LIRs will receive IPv4 addresses according to the following:

1. The size of the allocation made will be exactly one /22.

2. The sum of all allocations made to a single LIR by the RIPE NCC after the 14th of September 2012 is limited to a maximum of 1024 IPv4 addresses (a single /22 or the equivalent thereof).

3. The LIR must confirm it will make assignment(s) from the allocation.

4. Allocations will only be made to LIRs if they have already received an IPv6 allocation from an upstream LIR or the RIPE NCC.

In case an allocation of a single /22 as per clause 1 can no longer be made, multiple allocations up to an equivalent of a /22 in address space will be made to fulfill a request.

5.2 Unforeseen circumstances

A /16 will be held in reserve for some future uses, as yet unforeseen. The Internet is a disruptive technology and we cannot predict what might happen. Therefore it is prudent to keep a /16 in reserve, just in case some future requirement makes a demand of it.

In the event that this /16 remains unused at the time the remaining addresses covered by this policy have been distributed, it returns to the pool to be distributed as per section 5.1, and this section is to be automatically deleted from the policy document.

5.3 Address Recycling

Any address space that is returned to the RIPE NCC will be covered by the same rules as the address space intended in section 5.1.

This section only applies to address space that is returned to the RIPE NCC and that will not be returned to the IANA but re-issued by the RIPE NCC itself.

5.4 Sub-allocations

Sub-allocations are intended to aid the goal of routing aggregation and can only be made from allocations with a status of "ALLOCATED PA". LIRs holding "ALLOCATED PI" or "ALLOCATED UNSPECIFIED" allocations may be able to convert them to PA allocations if there are no ASSIGNED PI networks within it. The meanings of the various "status:" attribute values are described in Section 7.0.

LIRs wishing to convert their allocations to PA status should contact the RIPE NCC by email at lir-help@ripe.net.

The minimum size of a sub-allocation is /24. This is the smallest prefix length that can be reverse delegated and allows for a reasonable number of small assignments to be made by a downstream network operator.

LIRs may make sub-allocations to multiple downstream network operators.

The LIR is contractually responsible for ensuring the address space allocated to it is used in accordance with the RIPE community's policies. It is recommended that LIRs have contracts requiring downstream network operators to follow the RIPE community's policies when those operators have sub-allocations.

Sub-allocations form part of an LIR's aggregatable address space. As such, an LIR may want to ensure that the address space is not retained by a downstream

network if the downstream network operator ceases to receive connectivity from the LIR's network. LIRs not wishing to lose address space in this way are responsible for ensuring that the status of the sub-allocation is clear in any contracts between the LIR and the downstream network operator.

5.5 Transfers of Allocations

Any LIR is allowed to re-allocate complete or partial blocks of IPv4 address space that were previously allocated to them by either the RIPE NCC or the IANA.

Address space may only be re-allocated to another LIR that is also a member of the RIPE NCC. The block that is to be re-allocated must not be smaller than the minimum allocation block size at the time of re-allocation.

Re-allocation must be reflected in the RIPE Database. This re-allocation may be on either a permanent or non-permanent basis.

LIRs that receive a re-allocation from another LIR cannot re-allocate complete or partial blocks of the same address space to another LIR within 24 months of receiving the re-allocation.

The RIPE NCC will record the change of allocation after the transfer.

The RIPE NCC will publish a list of all allocations transferred under this section. The publication shall occur on monthly basis or more frequently if the RIPE NCC so chooses.
The list will contain information about approved and non-approved transfers. The following information will be published for approved transfers:

- the name of the transferring party,
- the block originally held by the transferring party,
- the name(s) of the receiving party or parties,
- each subdivided prefix (each partial block derived from that original block) transferred,
- the date each prefix was transferred.
- Non-approved transfers will be published in an aggregate statistics. In the statistics the following information will be published
- the number of requested transfers not approved after the RIPE NCC’s evaluation,
- the sum of the number of addresses included in the requested transfers.
- Neither the blocks nor the organizations involved will be identified in these statistics.

Please note that the LIR always remains responsible for the entire allocation it receives from the RIPE NCC until the transfer of address space to another LIR is

completed or the address space is returned. The LIR must ensure that all policies are applied.

Re-allocated blocks are no different from the allocations made directly by the RIPE NCC and so they must be used by the receiving LIR according to the policies described in this document.

6.0 Policies and Guidelines for Assignments

6.1. Assignments to Internet Exchange Points

A /16 will be held in reserve for exclusive use by Internet Exchange Points (IXPs). On application for IPv4 resources, an IXP will receive one number resource (/24 to /22) according to the following:

- This space will be used to run an IXP peering LAN; other uses are forbidden.
- Organisations receiving space under this policy must be IXPs and must meet the definition as described in section two of the RIPE document "IPv6 Address Space for Internet Exchange Points".
- IXPs holding other PI IPv4 space for their peering LAN (i.e. they are seeking a larger assignment), must return their old peering LAN resources back to this pool within 180 days of assignment.
- New IXPs will be assigned a /24. Should they require a larger assignment, they must return their current assignment (or existing PI used as an IXP peering LAN) and receive a replacement /23 or /22. After one year the utilisation of the new assignment must be at least 50%, unless special circumstances are defined.
- IP space returned by IXPs will be added to the reserved pool maintained for IXP use.
- Assignments will only be made to IXPs who have already applied for, or received an IPv6 assignment for their peering LAN.

6.2 Network Infrastructure and End User Networks

IP addresses used solely for the connection of an End User to a service provider (e.g. point-to-point links) are considered part of the service provider's infrastructure. These addresses do not have to be registered with the End User's contact details but can be registered as part of the service provider's internal infrastructure. When an End User has a network using public address space this must be registered separately with the contact details of the End User. Where the End User is an individual rather than an organisation, the contact information of the service provider may be substituted for the End Users.

An explanation of how to register objects in the database can be found in the

"RIPE Database User Manual: Getting Started" found at:
http://www.ripe.net/data-tools/support/documentation/getting-started

6.3 Validity of an Assignment

All assignments are valid as long as the original criteria on which the assignment was based are still valid and the assignment is properly registered in the RIPE Database. If an assignment is made for a specific purpose and that purpose no longer exists, the assignment is no longer valid. If an assignment is based on information that turns out to be invalid, the assignment is no longer valid.

7.0 Types of Address Space

LIRs are allocated Provider Aggregatable (PA) address space. They sub-allocate and assign this to downstream networks. If a downstream network or End User changes its service provider, the address space assigned or sub-allocated by the previous service provider must be returned and the network renumbered.

Clear contractual arrangements are mandatory for PA space. End Users requesting PA space should be given this or a similar warning:

Assignment of this IP space is valid as long as the criteria for the original assignment are met and only for the duration of the service agreement between yourself and us. We have the right to reassign the address space to another user upon termination of this agreement or an agreed period thereafter. This means that you will have to re-configure the addresses of all equipment using this IP space if you continue to require global uniqueness of those addresses.

LIRs will register the type of any assigned address space using the "status:" attribute of the inetnum object in the RIPE Database. The possible values of this attribute are:

- ALLOCATED PA: This address space has been allocated to an LIR and no assignments or sub-allocations made from it are portable. Assignments and sub-allocations cannot be kept when moving to another provider.
- ALLOCATED PI: This address space has been allocated to an LIR or RIR and all assignments made from it are portable. Assignments can be kept as long as the criteria for the original assignment are met. Sub-allocations cannot be made from this type of address space.
- ALLOCATED UNSPECIFIED: This address space has been allocated to an LIR or RIR. Assignments may be PA or PI. This status is intended to document past allocations where assignments of both types exist. It is avoided for new allocations. Sub-allocations cannot be made from this type of address space.
- SUB-ALLOCATED PA: This address space has been sub-allocated by an LIR

to a downstream network operator that will make assignments from it. All assignments made from it are PA. They cannot be kept when moving to a service provided by another provider.

- LIR-PARTITIONED PA: This allows an LIR to document distribution and delegate management of allocated space within their organisation. Address space with a status of LIR-PARTITIONED is not considered used. When the addresses are used, a more specific **inetnum** should be registered.
- LIR-PARTITIONED PI: This allows an LIR to document distribution and delegate management of allocated space within their organisation. Address space with a status of LIR-PARTITIONED is not considered used. When the addresses are used, a more specific **inetnum** should be registered.
- EARLY-REGISTRATION: This is used by the RIPE Database administration when transferring pre-RIR registrations from the ARIN Database. The value can be changed by database users (except for ALLOCATED PA). Only the RIPE Database administrators can create objects with this value.
- NOT-SET: This indicates that the registration was made before the "status:" attributes became mandatory for inetnum objects. The object has not been updated since then. New objects cannot be created with this value. The value can be changed by database users.
- ASSIGNED PA: This address space has been assigned to an End User for use with services provided by the issuing LIR. It cannot be kept when terminating services provided by the LIR.
- ASSIGNED PI: This address space has been assigned to an End User and can be kept as long as the criteria for the original assignment are met. It cannot be re-assigned or further assigned to other parties.
- ASSIGNED ANYCAST: This address space has been assigned for use in TLD anycast networks. It cannot be kept when no longer used for TLD anycast services.

The creation of an inetnum object with a status of "ASSIGNED PA" or "ASSIGNED PI" is only possible if there is no less specific or more specific inetnum object with an "ASSIGNED" status.

Address space without an explicit type in the "status:" attribute is assumed to be PI. LIRs must clearly mark all new assignments in the RIPE Database with either "PA" or "PI" as appropriate.

In the past, some LIRs assigned address space that was de facto aggregated but not formally PA because there were no clear contractual arrangements for termination of the assignment. LIRs must ask leaving customers to voluntarily release this address space upon termination of service. Where possible, LIRs should work to make contractual arrangements to convert PI addresses into PA addresses.

The RIPE NCC no longer allocates or assigns PI address space, except for assignments to Internet Exchange Points as described in section 6.1.

8.0 LIR Audit

The RIPE community asked the RIPE NCC to audit LIR operations and ensure consistent and fair implementation of the community's policies. Details of this activity are described in the RIPE Document "RIPE NCC Audit Activity" found at: http://www.ripe.net/ripe/docs/audit

9.0 Closing an LIR by the RIPE NCC

The RIPE NCC may close an LIR for any of the following reasons:

- the LIR does not pay money owed to the RIPE NCC
- the LIR cannot be contacted by the RIPE NCC for a significant period of time
- the LIR consistently violates the RIPE community's policies

The RIPE NCC takes on responsibility for address space held by closing LIRs.