Network Working Group
Internet-Draft
Intended status: Informational
Expires: August 29, 2013

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February 25, 2013

LISP EID Block Management Guidelines
draft-iannone-lisp-eid-block-mgmnt-01.txt

Abstract

This document proposes an allocation framework for the management of the LISP EID address prefix (requested in a separate document). Such framework relies on hierarchical distribution of the address space to RIRs (Regional Internet Registries), who will allocate on a temporary basis sub-prefixes to requesting organizations.

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1. Introduction

The Locator/ID Separation Protocol (LISP - [RFC6830]) and related mechanisms ([RFC6831], [RFC6832], [RFC6833], [RFC6834], [RFC6835], [RFC6836], [RFC6837]) separates the IP addressing space in two logical spaces, the End-point IDentifier (EID) space and the Routing LOCator (RLOC) space. The first is used to identify communication end-points, while the second is used to locate them in the Internet routing infrastructure topology.

More particularly, for IPv6, an address block has been requested to IANA to be reserved for exclusive use for EID prefix allocation and assignment [I-D.ietf-lisp-eid-block].

This document proposes an allocation framework for the EID address block based on allocation of sub parts of the block to the different RIR, which in turn will grant temporary allocation to requesting organizations.

Rationale, Intent, size, and usage of the EID address block is described in [I-D.ietf-lisp-eid-block].

2. Definition of Terms

LISP operates on two name spaces and introduces several new network elements. This section provides high-level definitions of the LISP name spaces and network elements and as such, it must not be considered as an authoritative source. The reference to the authoritative document for each term is included in every term description.

Legacy Internet: The portion of the Internet that does not run LISP and does not participate in LISP+ALT or any other mapping system.

LISP site: A LISP site is a set of routers in an edge network that are under a single technical administration. LISP routers that reside in the edge network are the demarcation points to separate the edge network from the core network. See [RFC6830] for more details.

Endpoint ID (EID): An EID is a 32-bit (for IPv4) or 128-bit (for IPv6) value used in the source and destination address fields of the first (most inner) LISP header of a packet. A packet that is emitted by a system contains EIDs in its headers and LISP headers are prepended only when the packet reaches an Ingress Tunnel Router (ITR) on the data path to the destination EID. The source EID is obtained via existing mechanisms used to set a host's

"local" IP address. An EID is allocated to a host from an EID-prefix block associated with the site where the host is located. See [RFC6830] for more details.

EID-prefix: A power-of-two block of EIDs that are allocated to a site by an address allocation authority. See [RFC6830] for more details.

EID-Prefix Aggregate: A set of EID-prefixes said to be aggregatable in the [RFC4632] sense. That is, an EID-Prefix aggregate is defined to be a single contiguous power-of-two EID-prefix block. A prefix and a length characterize such a block. See [RFC6830] for more details.

Routing LOCator (RLOC): A RLOC is an IPv4 or IPv6 address of an egress tunnel router (ETR). A RLOC is the output of an EID-to-RLOC mapping lookup. An EID maps to one or more RLOCs. Typically, RLOCs are numbered from topologically aggregatable blocks that are assigned to a site at each point to which it attaches to the global Internet; where the topology is defined by the connectivity of provider networks, RLOCs can be thought of as Provider Aggregatable (PA) addresses. See [RFC6830] for more details.

EID-to-RLOC Mapping: A binding between an EID-Prefix and the RLOC-set that can be used to reach the EID-Prefix. The general term "mapping" always refers to an EID-to-RLOC mapping. See [RFC6830] for more details.

Ingress Tunnel Router (ITR): An Ingress Tunnel Router (ITR) is a router that accepts receives IP packets from site end-systems on one side and sends LISP-encapsulated IP packets toward the Internet on the other side. The router treats the "inner" IP destination address as an EID and performs an EID-to-RLOC mapping lookup. The router then prepends an "outer" IP header with one of its globally routable RLOCs in the source address field and the result of the mapping lookup in the destination address field. See [RFC6830] for more details.

Egress Tunnel Router (ETR): An Egress Tunnel Router (ETR) receives LISP-encapsulated IP packets from the Internet on one side and sends decapsulated IP packets to site end-systems on the other side. An ETR router accepts an IP packet where the destination address in the "outer" IP header is one of its own RLOCs. The router strips the "outer" header and forwards the packet based on the next IP header found. See [RFC6830] for more details.

Proxy ITR (PITR): A Proxy-ITR (PITR) acts like an ITR but does so on behalf of non-LISP sites which send packets to destinations at LISP sites. See [RFC6832] for more details.

Proxy ETR (PETR): A Proxy-ETR (PETR) acts like an ETR but does so on behalf of LISP sites which send packets to destinations at non-LISP sites. See [RFC6832] for more details.

Map Server (MS): A network infrastructure component that learns EID-to-RLOC mapping entries from an authoritative source (typically an ETR). A Map Server publishes these mappings in the distributed mapping system. See [RFC6833] for more details.

Map Resolver (MR): A network infrastructure component that accepts LISP Encapsulated Map-Requests, typically from an ITR, quickly determines whether or not the destination IP address is part of the EID namespace; if it is not, a Negative Map-Reply is immediately returned. Otherwise, the Map Resolver finds the appropriate EID-to-RLOC mapping by consulting the distributed mapping database system. See [RFC6833] for more details.

The LISP Alternative Logical Topology (ALT): The virtual overlay network made up of tunnels between LISP+ALT Routers. The Border Gateway Protocol (BGP) runs between ALT Routers and is used to carry reachability information for EID-prefixes. The ALT provides a way to forward Map-Requests toward the ETR that "owns" an EID-prefix. See [RFC6836] for more details.

ALT Router: The device on which runs the ALT. The ALT is a static network built using tunnels between ALT Routers. These routers are deployed in a roughly-hierarchical mesh in which routers at each level in the topology are responsible for aggregating EID-Prefixes learned from those logically "below" them and advertising summary prefixes to those logically "above" them. Prefix learning and propagation between ALT Routers is done using BGP. When an ALT Router receives an ALT Datagram, it looks up the destination EID in its forwarding table (composed of EID-Prefix routes it learned from neighboring ALT Routers) and forwards it to the logical next-hop on the overlay network. The primary function of LISP+ALT routers is to provide a lightweight forwarding infrastructure for LISP control-plane messages (Map-Request and Map-Reply), and to transport data packets when the packet has the same destination address in both the inner (encapsulating) destination and outer destination addresses ((i.e., a Data Probe packet). See [RFC6830] for more details.

3. EID Block Allocation Policy

IANA will allocate EID prefix space to the different RIR according to the allocation forecast provided by the RIR. To bootstrap the process it is suggested to allocate a /24 to every RIR.

RIRs make available EID addressing prefixes in the reserved space on a temporary basis and for experimental uses. The requester of the experimental prefix has to provide a short description of the intended use or experiment that will be carried out. If the prefix will be used for activities not documented in the original description, the RIR issuing the allocation reserves the right to revoke the allocation.

EID prefixes are allocated on a lease/license basis for a limited period of time (which can be renewed). The details of the allocation request and the allocated prefix will be published by RIRs according to their current existing policy (e.g., public RIR database).

The size of the minimum allocated prefix will follow existing RIR minimum allocation policy.

When (and if) the LISP technology will change status, not being "experimental" anymore, and following the policies outlined in [RFC5226], the EID block will change status as well and converted in a permanent allocation. RIRs will accept request to convert existing temporary allocations (without renumbering) in permanent allocation. The request will respect with RIRs policy for new IPv6 address allocations. New (not previously existing) allocations in the EID block space will as well follow RIRs policy for normal IPv6 address allocation request.

4. RIRs and Internet Experiments

The Regional Internet Registries have already policies dealing Internet Experiments:

- RIPE NCC [RIPE]: Allocations and assignments of Internet resources for Internet experiments are available. Such allocations or assignments are temporary. They are intended to support experimental Internet activities.

- AfriNIC [AfriNIC]: Allocations and assignments of Internet resources for Internet experiments are available. Such allocations or assignments are temporary. They are intended to support experimental Internet activities. Results of experiments should be made freely available to the public.

- ARIN [ARIN]: Allocations and assignments of Internet resources for Internet experiments are available. Such allocations or assignments are temporary. They are intended to support experimental Internet activities. Results of experiments should be made freely available to the public.

- APNIC [APNIC]: Allocations and assignments of Internet resources for Internet experiments are available. Such allocations or assignments are temporary for a duration of one year, which can be extended according to the proposed experiment. They are intended to support experimental Internet activities. Results of experiments should be made freely available to the public. APNIC reserves the right to publish archives of all experiments that receive an allocation.

- LACNIC [LACNIC]: Allocations and assignments of Internet resources for Internet experiments are available. Such allocations or assignments are temporary for a duration of one year, renwable for the same duration. They are intended to support experimental Internet activities. Results of experiments should be made freely available to the public. LACNIC reserves the right ot public archives of all experiments that receive an allocation.

The policy proposed in Section 3 is compatible with the existing RIRs policy.

5. Next Steps

The document aims at starting discussion in order to address the concerns raised during the IETF Review of [I-D.ietf-lisp-eid-block], more specifically the lack of guidelines about the EID Block allocation and management.

Discussion will be started with the different RIRs to verify compatibility of the proposed policy and agree on the process for EID prefix allocation and managament.

6. Security Considerations

This document does not introduce new security threats in the LISP architecture nor in the Legacy Internet architecture.

7. IANA Considerations

This document provides only management guidelines for the reserved

LISP EID prefix and does not make any direct request to IANA.

8. References

8.1. Normative References

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