IPv6 Address Allocation and Assignment Policy

Version 1.0

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1 Introduction / Purpose of Document

This document describes the CANARIE IPv6 address allocation and assignment policy. It is based on, and fully compliant with, the Regional Internet Registries' (ARIN, APNIC and RIPE) jointly developed “IPv6 Address Allocation and Assignment Policy” [RIRv6-policies], and with RFC3177, “IAB/IESG Recommendations on IPv6 Address Allocation to Sites” [RFC3177].

CANARIE , acting as a Local Internet Registry, delegates IPv6 address space to CANARIE GigaPoP Operators/Regional Advanced Networks. In turn, the GigaPoP Operators assign address space to their connected institutions.

This document is intended for CANARIE engineering staff and GigaPoP Operators. This document will be updated as RIR policies and Internet best practices evolve.

2 CANARIE Address Space

ARIN allocated the Top-Level Aggregation (TLA) address block 2001:410::/35 to Viagénie on behalf of the Canadian Research and Education community in March 2000. Subsequent to this, new RIR allocation policies resulted in the /35 allocation expanding to a /32, and, CANARIE assumed direct responsibility of the 2001:410::/32 block.

It should be noted that assignment and routing of this IPv6 address space is bound by ARIN policy and in no case are allocated or assigned IPv6 address blocks to be considered property. All IPv6 address space is licensed for use, rather than owned.

3 Allocations

3.1 Allocation Scheme

CANARIE allocates IPv6 address space to CANARIE GigaPoP Operators/RANs for the purpose of subsequent assignment to CANARIE connected institutions. The term sub-allocation is used to describe this additional level of allocation hierarchy.

The allocation scheme uses the “leftmost bit” algorithm of "A Flexible Method for Managing the Assignment of Bits of an IPv6 Address Block" [RFC3531]. It provides maximal flexibility for subsequent allocations to GigaPoP Operators to be contiguous, in the face of an undefined number of downstream aggregators and an undefined number of sub-allocation blocks required by each downstream, over a relatively long period.

The sub-allocation size is /40, table 1 shows the currently allocated IPv6 address space. The GigaPoP Operators can develop and implement long-term address assignment plans.

3.2 GigaPoP Operator Sub-Allocations

CANARIE GigaPoP Operators can request a /40 address block to the CANARIE NOC.

3.3 Subsequent sub-allocations

GigaPoP Operators may request additional /40 sub-allocations. Such requests will be evaluated based on the utilization of previously allocated address space, as defined by the HD-ratio[RFC3194]. An HD ratio of 0.8, translating to 33% or 84 /48s assigned, should result in approval of the request.

3.4 Registration

All /40 sub-allocations to GigaPoP Operators will be registered with ARIN by CANARIE network operators, as per ARIN policy, and in CANARIE Routing Registry (CRR).

For the CRR each "inet6num" object describing the /40 sub-allocations will have the “mnt-lower” attribute set to the GigaPoP Operator maintainer object. This will permit GigaPoP Operator maintainers to create more specific objects, i.e. /48 "inet6num" objects that reflect assignments to end-user institutions.

4 Assignments

4.1 Assignment size

GigaPoP Operators/RANs assign IPv6 address space to their CANARIE connected end-users.

GigaPoP Operators can develop their own address assignment scheme: however, address space assignments must comply with existing guidelines [RIRv6-policies, RFC3177]. In general, /48s should be assigned to end-user institutions. Exceptions may include very large end-user networks where multiple /48s are required, or when only one subnet (/64) or one device (/128) is needed by design.

4.2 Subsequent assignments

There is no common policy for the assignment of multiple /48s to a same end-user site. End-user institutions should be able to request additional blocks by providing the necessary justification.

4.3 Registration

GigaPoP Operators are to register assigned /48s in the CRR. CANARIE will use the registered data to calculate overall address space usage and the HD-ratio at the time RAN applies for subsequent /40 allocations.

5 Reverse lookup

GigaPoP Operators receiving CANARIE IPv6 address space allocations are responsible for the proper management of the corresponding reverse lookup zone.

GigaPoP Operators assigning IPv6 address space must also delegate responsibility for the proper management of the corresponding reverse lookup zone to the end-user institution.

6 Routing

The goal of this allocation policy is to maximize the aggregatability of CANARIE IPv6 address space.
The CANARIE IPv6 routing policy is described in companion document [CANARIE Routing Policy].

References

[RIRs-on-48] http://www.arin.net/policy/ipv6reassign.html,
[RIRv6-policies] RIPE-246, http://www.ripe.net/ripe/docs/ripe-246.html
http://www.arin.net/policy/ipv6.html
[RFC2374] "An IPv6 Aggregatable Global Unicast Address Format", R. Hinden, M. O'Dell, S. Deering. July 1998, RFC 2374.
[RFC3194] "The H-Density Ratio for Address Assignment Efficiency An Update on the H ratio", A. Durand, C. Huitema. November 2001, RFC 3194.
[RFC3177] "IAB/IESG Recommendations on IPv6 Address". IAB, IESG. September 2001, RFC 3177.
[RFC3531] "A Flexible Method for Managing the Assignment of Bits of an IPv6 Address Block", M. Blancher, April 2003, RFC 3531.

Appendix A – CANARIE IPv6 address space

For up to date allocations visit: http://www.canarie.ca/en/network/policies/network-policies.

Organisation	/40 block allocation
CANARIE	2001:410:100::/40
CANARIE backbone	2001:410:101::/48
CANARIE Office	2001:410:102::/48
BCNET	2001:410:1000::/40
MRNET	2001:410:2000::/40
NB GigaPoP	2001:410:4000::/40
Cybera	2001:410:6000::/40
ORION	2001:410:8000::/40
Federal GigaPoP	2001:410:9000::/40
ACORN-NS	2001:410:a000::/40
ACORN-NL	2001:410:c000::/40
PEI GigaPoP	2001:410:e000::/40

Table 1: IPv6 address space currently allocated to CANARIE GigaPoPs

Appendix B – “leftmost bit” algorithm for address space allocations

1	2001:410:8000::/40
2	2001:410:4000::/40
3	2001:410:c000::/40
4	2001:410:2000::/40
5	2001:410:a000::/40
6	2001:410:6000::/40
7	2001:410:e000::/40
8	2001:410:1000::/40
9	2001:410:9000::/40
10	2001:410:5000::/40
11	2001:410:d000::/40
12	2001:410:3000::/40
13	2001:410:b000::/40
14	2001:410:7000::/40
15	2001:410:f000::/40
16	2001:410:800::/40

Table 2: First 16 sub-allocations of the “leftmost bit” allocation scheme