                  Unified Routing Requirements for IPng

Status of this Memo

Abstract

   This document was submitted to the IETF IPng area in response to RFC
   1550. Publication of this document does not imply acceptance by the
   IPng area of any ideas expressed within. Comments should be
   submitted to the big-internet@munnari.oz.au mailing list.

1. IPng Requirements

   The following list provides requirements on the IPng from the
   perspective of the Unified Routing Architecture, as describe in RFC
   1322.

   1. To provide scalable routing, IPng addressing must provide support
      for topologically significant address assignment.

   2. Since it is hard to predict how routing information will be
      aggregated, the IPng addressing structure should impose as few
      preconditions as possible on the number of levels in the hierarchy.
      Specifically, the number of levels must be allowed to be different
      at different parts in the hierarchy. Further, the levels must not
      be statically tied to particular parts (fields) in the addressing
      information.

   3. Hop-by-hop forwarding algorithm requires IPng to carry enough
      information in the Network Layer header to unambiguously determine
      a particular next hop. Unless mechanisms to compute
      context-sensitive forwarding tables and provide consistent
      forwarding are defined, the requirement assumes the presence of
      full hierarchical addresses. Therefore, IPng packet format must
      provide efficient determination of the full hierarchical

destination address.

4. Hierarchical address assignment should not imply strictly
   hierarchical routing. Therefore, IPng should carry enough
   information to provide forwarding along both hierarchical and
   non-hierarchical routes.

5. The IPng packet header should accommodate a "routing label" or
   "route ID". This label will be used to identify a particular FIB
   to be used for packet forwarding by each router.

   Two types of routing labels should be supported: "strong" and
   "weak".

   When a packet carries a "strong" routing label and a router does
   not have a FIB with this label, the packet is discarded (and an
   error message is sent back to the source).

   When a packet carries a "weak" routing label and a router does not
   have a FIB with this label, the packet should be forwarded via a
   "default" FIB, i.e., according to the destination address. In
   addition, the packet should carry an indication that somewhere
   along the path the desired routing label was unavailable.

6. IPng should provide a source routing mechanism with the following
   capabilities (i.e., flexibility):

   - Specification of either individual routers or collections of
     routers as the entities in the source route.

   - The option to indicate that two consecutive entities in a
     source route must share a common subnet in order for the
     source route to be valid.

   - Specification of the default behavior when the route to
     the next entry in the source route is unavailable:

   - The packet is discarded, or

   - The source route is ignored and the packet is forwarded based
     only on the destination address (and the packet header will
     indicate this action).

   - A mechanism to verify the feasibility of a source route.

Security Considerations

   Security issues are not discussed in this memo.

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