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Unified Routing Requirements for IPng

Status of this Memo

This memo provides information for the Internet community. This memo does not specify an Internet standard of any kind. Distribution of this memo is unlimited.

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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