                     RIP Version 2 Protocol Analysis

Status of this Memo

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

Abstract

   As required by Routing Protocol Criteria (RFC 1264), this report
   documents the key features of the RIP-2 protocol and the current
   implementation experience.

Acknowledgements

   The RIP-2 protocol owes much to those who participated in the RIP-2
   Working Group of the Internet Engineering Task Force (IETF). A
   special thanks goes to Fred Baker for his help on the MIB, and to
   Jeffrey Honig for the implementation experience.

1. Protocol Documents

   The RIP-2 protocol description is defined in RFC 1388 [1]. This memo
   suggests an update to the "Routing Information Protocol" (RFC 1058)
   [3]. The RIP-2 MIB description is defined in RFC 1389 [2].

2. Key Features

   While RIP-2 shares the same basic algorithms as RIP-1, it supports
   several new features. They are: routing domains, external route
   tags, subnet masks, next hop addresses, and authentication.

2.1 Routing Domains

   Routing domains allow multiple RIP "clouds" to exist over the same
   physical network. This is a feature requested by several members of
   the working group. It allows simple policies to be constructed by
   grouping routers into domains which share routing information.

2.2 External Route Tags

   The route tag field may be used to propagate information acquired
   from an EGP. The definition of the contents of this field are beyond
   the scope of this protocol. However, it may be used, for example, to
   propagate an EGP AS number.

2.3 Subnet Masks

   Inclusion of subnet masks was the original intent of opening the RIP
   protocol for improvement. Subnet mask information makes RIP more
   useful in a variety of environments and allows the use of variable
   subnet masks on the network. Subnet masks are also necessary for
   implementation of "classless" addressing, as the CIDR work proposes.

2.4 Next Hop Addresses

   Support for next hop addresses allows for optimization of routes in
   an environment which uses multiple routing protocols. For example,
   if RIP-2 were being run on a network along with another IGP, and one
   router ran both protocols, then that router could indicate to the
   other RIP-2 routers that a better next hop than itself exists for a
   given destination.

2.5 Authentication

   One significant improvement RIP-2 offers over RIP-1, is the addition
   of an authentication mechanism. Essentially, it is the same
   extensible mechanism provided by OSPF. Currently, only a plain-text
   password is defined for authentication. However, more sophisticated
   authentication schemes can easily be incorporated as they are
   defined.

2.6 Multicasting

   RIP-2 packets may be multicast instead of being broadcast. The use
   of an IP multicast address reduces the load on hosts which do not
   support routing protocols. It also allows RIP-2 routers to share
   information which RIP-1 routers cannot hear. This is useful since a
   RIP-1 router may misinterpret route information because it cannot
   apply the supplied subnet mask.

3. RIP-2 MIB

   The MIB for RIP-2 allows for monitoring and control of RIP's
   operation within the router. In addition to global and per-interface
   counters and controls, there is are per-peer counters which provide
   the status of RIP-2 "neighbors".

4. Implementations

   Currently, there is one nearly complete implementation of RIP-2. A
   "gated" implementation is now available with RIP-2, written by
   Jeffrey Honig at Cornell University. It may be acquired by anonymous
   FTP from gated.cornell.edu as pub/gated/gated-alpha.tar.Z. It
   implements multicasting, subnet masks, limited authentication, next-
   hop, and limited routing domain support. A RIP-2 version of ripquery
   is also available. The "gated" implementation does not yet support
   full subsumption rules, full authentication, full routing domains,
   and the MIB. It has been tested against itself and various RIP-1
   implementations.

   A second, complete implementation is under development by a vendor
   who's identity cannot be disclosed at this time.

5. References

   [1] Malkin, G., "RIP Version 2 - Carrying Additional Information",
       RFC 1388, Xylogics, Inc., January 1993.

   [2] Malkin, G., and F. Baker, "RIP Version 2 MIB Extension", RFC
       1389, Xylogics, Inc., Advanced Computer Communications, January
       1993.

   [3] Hedrick, C., "Routing Information Protocol", RFC 1058, Rutgers
       University, June 1988.

6. Security Considerations

      Security issues are discussed in section 2.5.

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