Network Working Group
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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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