Network Working Group
Request for Comments: 1721
Obsoletes: 1387
Category: Informational

G. Malkin
Xylogics, Inc.

November 1994

RIP Version 2 Protocol Analysis

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

As required by Routing Protocol Criteria (RFC 1264), this report documents the key features of the RIP-2 protocol and the current implementation experience. This report is a prerequisite to advancing RIP-2 on the standards track.

Acknowledgements

The RIP-2 protocol owes much to those who participated in the RIP-2 working group. A special thanks goes to Fred Baker, for his help on the MIB, and to Jeffrey Honig, for all his comments.

1. Protocol Documents

The RIP-2 applicability statement is defined in RFC 1722 [1].

The RIP-2 protocol description is defined in RFC 1723 [2]. This memo obsoletes RFC 1388, which specifies an update to the "Routing Information Protocol" RFC 1058 (STD 34).

The RIP-2 MIB description is defined in RFC 1724 [3]. This memo obsoletes RFC 1389.

2. Key Features

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

The significant change from RFC 1388 is the removal of the domain field. There was no clear agreement as to how the field would be used, so it was determined to leave the field reserved for future expansion.

2.1 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.

2.2 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.

2.3 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.

2.4 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.

2.5 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 are per-peer counters which provide the status of RIP-2 "neighbors".

The MIB was modified to deprecate the domain, which was removed from the protocol. It has also been converted into version 2 format.

4. Implementations

Currently, there are three complete implementations of RIP-2: GATED, written by Jeffrey Honig at Cornell University; Xylogics's Annex Communication server; and an implementation for NOS, written by Jeff White. The GATED implementation is available by anonymous FTP from gated.cornell.edu as pub/gated/gated-alpha.tar.Z. The implementation for NOS is available by anonymous FTP from ucsd.edu as /hamradio/packet/tcpip/incoming/rip2.zip.

Additionally, Midnight Networks has produced a test suite which verifies an implementation's conformance to RFC 1388 implemented over RFC 1058.

The author has conducted interoperability testing between the GATED and Xylogics implementations and found no incompatibilities. This testing includes verification of protection provided by the authentication mechanism described in section 2.4.

5. Operational experience

Xylogics has been running RIP-2 on its production systems for five months. The topology includes seven subnets in a class B address and various, unregistered class C addresses used for dial-up access. Six systems, in conjunction with three routers from other vendors and dozens of host systems, operate on those subnets.

The only problem which has appeared is the reaction of some routers to Version 2 RIP packets. Contrary to RFC 1058, these routers discard Version 2 packets rather than ignoring the fields not defined for Version 1.

6. References

[1] Malkin, G., "RIP Version 2 Protocol Applicability Statement", RFC 1722, Xylogics, Inc., November 1994.

[2] Malkin, G., "RIP Version 2 - Carrying Additional Information", RFC 1723, Xylogics, Inc., November 1994.

[3] Malkin, G., and F. Baker, "RIP Version 2 MIB Extension", RFC 1724, Xylogics, Inc., Cisco Systems, November 1994.

7. Security Considerations

Security issues are discussed in sections 2.4 and 4.

8. Author's Address

Gary Scott Malkin
Xylogics, Inc.
53 Third Avenue
Burlington, MA 01803

Phone: (617) 272-8140
EMail: gmalkin@Xylogics.COM