



# RIP, RIP v2, and RIPng Protocol Reference

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### **About the Author**

Benoît H. Dicaire is the founder and Information Security Strategist for INFRAX.

With nearly two decades of experience providing key strategies and technology solutions for managing information security risks, Dicaire now focuses his work on Security Posture Assessment and Enterprise Architecture for organizations in Canada and around the world.

A trusted advisor, Dicaire is frequently consulted by leaders of private and government organizations.

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INFRAX is an independent Information Security consulting firm dedicated to providing our clients with top-level security solutions, advice and protection. Furthermore, unbiased in-depth INFRAX structure analysis helps organizations make smarter enterprise architecture decisions adapted to today's increasingly complex environments.

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits

Command	Version	Must Be Zero
Address Family Identifier		Must Be Zero
IP Address		
Must Be Zero		
Must Be Zero		
Metric		

May be repeated up to 25 times

## RIP Packet Fields

- Command:** Specifies the purpose of the RIP message. Values are:
- 1 = Request (RFC 1058)
  - 2 = Response (RFC 1058)
  - 3 = Traceon (obsolete)
  - 4 = Traceoff (obsolete)
  - 5 = Reserved (RFC 1058)
  - 9 = Update Request (RFC 2091)
  - 10 = Update Response (RFC 2091)
  - 11 = Update Acknowledge
- Version:** RIP protocol version (1)
- Address Family ID:** Identifies the type of address specified in the entries. For IP, AFI=2.
- IP Address:** Internet address (32 bits).
- Metric:** A value from 1-15 specifying the current metric for the destination. Metric = 16 means the destination is not reachable.

## Update Headers (RFC2091)

To support triggered updates, an update Header is added after the normal RIP or RIPv2 header, and before any routing entries. If authentication is used in RIPv2, the authentication information immediately follows the update Header.

Command	Version	Must be zero
Update Header		
Address Family Identifier		Zero (RIP) or Route Tag (RIPv2)
RIP Entries		

## Update Request Header

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits

Version	Must be zero
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## Update Response and Acknowledge Headers

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits

Version	Flush	Sequence Number
---------	-------	-----------------

## Version: Update header version (1)

- Flush:** For update Response, Flush = 1 if the peer is required to start timing out its entries; otherwise Flush = 0.
- Sequence number:** Incremented everytime a new update Response packet is sent on the WAN.

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits

Command	Version	Must Be Zero
Address Family Identifier		Route Tag
IP Address		
Subnet Mask		
Next Hop		
Metric		

May be repeated up to 25 times

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits

Command	Version	Must be zero
FFFFH		Authentication Type
Authetication (16 octets)		
RIP Entries (24 maximum)		

<b>Authentication Type:</b>	Simple password (Type=2)
<b>Authentication:</b>	Plaintex password.

## RIPv2 Packet Fields

**Command:** Specifies the purpose of the RIP message. Values are:  
 1 = Request (RFC 1058)  
 2 = Response (RFC 1058)  
 3 = Traceon ( obsolete)  
 4 = Traceoff (obsolete)  
 5 = Reserved (RFC 1058)  
 9 = Update Request (RFC 2091)  
 10 = Update Response (RFC 2091)  
 11 = Update Acknowledge (RFC 2091)

**Version:** RIP protocol version (2) for any message that use authentication or RIPv2 - specific fields.

**Address Family ID:** Identifies the type of address specified in the entries. For IP, AFI=2.

**Route Tag:** Attribute assigned to the route.

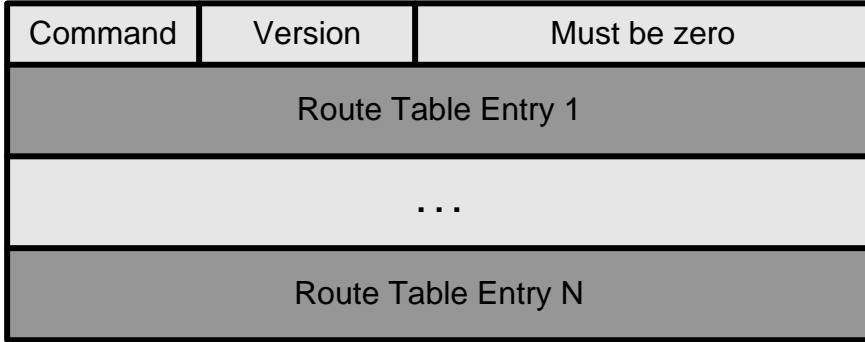
**IP Address:** Internet address (32 bits).

**Subnet Mask:** The subnet mask wich is applied to the IP address to yield the non-host protion of the address.

**Next Hop:** The immediate next hop IP address to wich packets to the destination specified by this route entry should be forwarded.

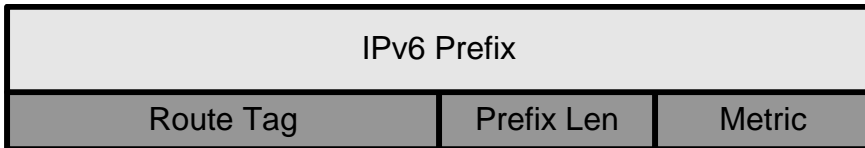
**Metric:** A value from 1-15 specifying the current metric for the destination. Metric = 16 means the destination is not reachable.

1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits



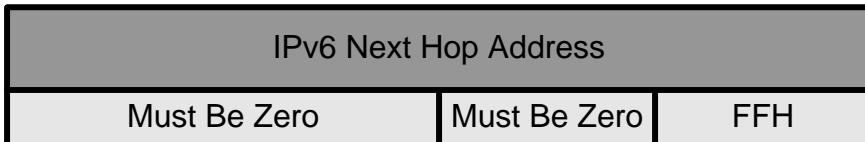
**RIPng Packet Format**

1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits



**RIPng Route Table Entry Format**

1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 3 3  
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 Bits



**RIPng Next Hop RTE Format**

RIP Protocol Reference Guide	
Request for Comments Documents	
RFC	Subject
1058	Routing Information Protocol
1581	Protocol analysis for Demand Circuit Extensions
1582	RIP Extensions for Demand Circuit
1721	RIPv2 Protocol Analysis
1722	RIPv2 Protocol Applicability Statement
1724	RIPv2 MIB Extension
2080	RIPng for IPv6
2091	Triggered Extensions to RIP
2092	Protocol Analysis for Triggered RIP
2453	RIP version 2

## RIPng Packet Fields

**Command:** Request (1) or Response.  
**Version:** RIPng protocol version (1).  
**RTE:** Route Table Entry.  
**IPv6 Prefix:** IPv6 address prefix (128 bits).  
**Route Tag:** Attribute assigned to the route.

**Prefix Len:** Lenhth, in bits, of the significant part of the address prefix.  
**Metric:** A value from 1-15 specifying the current metric for the destination. Metric = 255 (FF hex) identifies the next hop RTE.