



HF Routing Information Protocol – HF-RIP (S5066-APP12)

5th July 2023

Version: 1.0

Status: Experimental

1 Purpose

This protocol specifies an IP routing protocol for use with HF Networks. It is a distance vector protocol modelled on the well known RIP protocol family. It is specifically designed to be used in conjunction with RIP-2 (RFC 2453) for IPv4 and RIP-NG (RFC 2080) for IPv6.

It is designed to provide full IP routing functionality, while optimizing traffic over the HF Channel.

It can be used where multiple HF nodes share a channel using either CSMA (Annex K) or WTRP (Annex L). It can also be used between pairs of nodes communicating using the ALE 1:1 mode specified by STANAG 5066.

2 HF-RIP Model

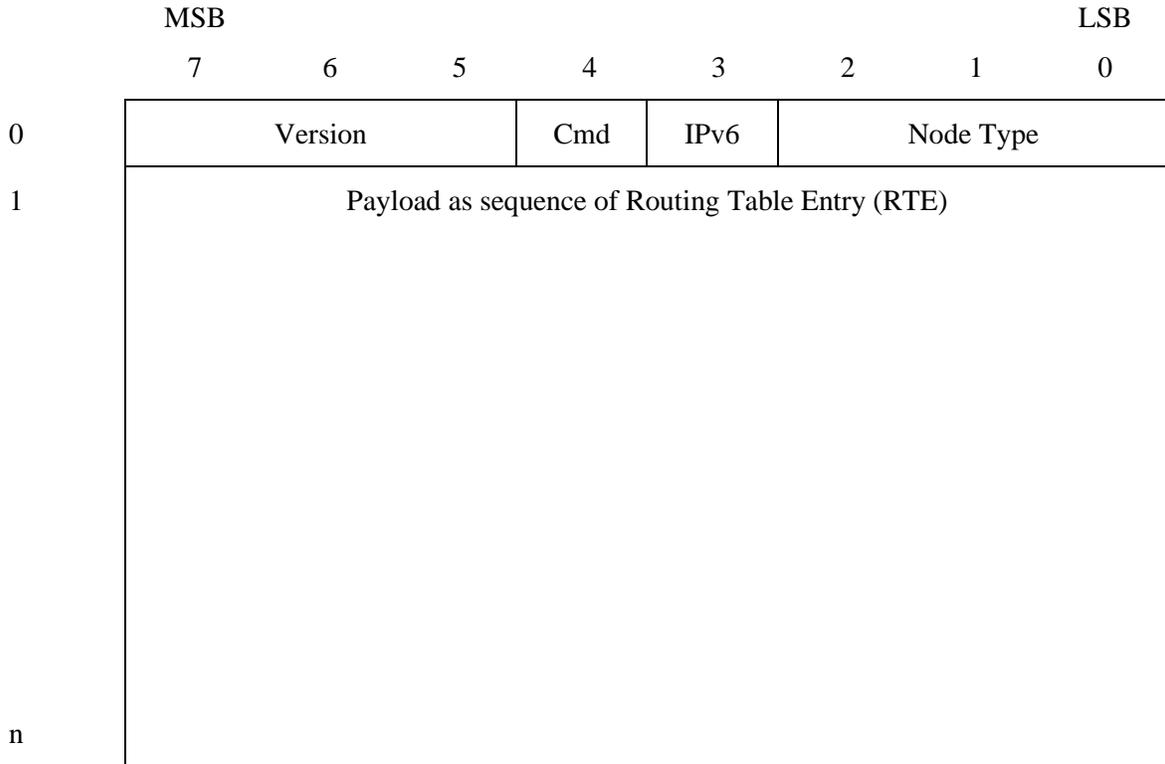
HF-RIP defines three types of HF Node:

1. “Shore”. An HF node with connection to strategic networks that other HF nodes can use as a default route all IP networks. A shore node does not share routing information.
2. “MU” (Mobile Unit). An HF node without further connections. An MU node will have a very stable set of IP Networks, which means that other nodes can cache the routing information for an extended period of time.
3. “Relay”. An HF node that has dynamic IP connectivity and may support local and remote IP networks that will vary more rapidly.

All nodes will share their existence with other nodes at appropriate intervals. MU and Relay nodes will also share a list of IP Networks to which the node can route traffic.

3 HF-RIP Protocol

The HF-RIP Protocol is defined



Version is set to 1 for this version of the HF-RIP Protocol.

The Cmd bit is interpreted as in the following table.

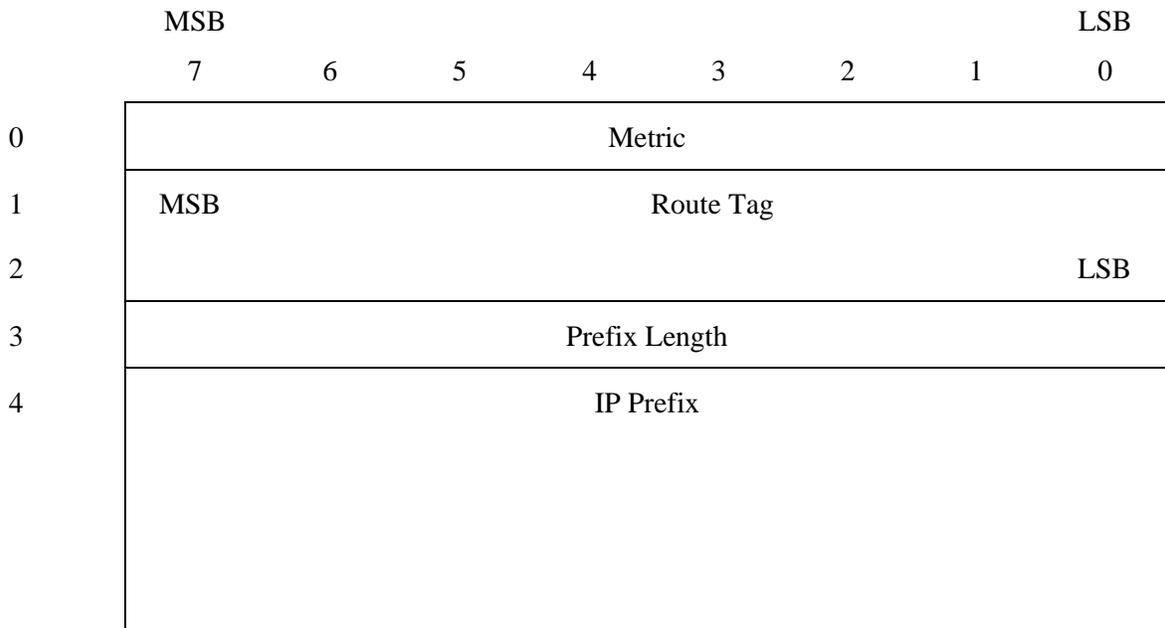
Type	Encoding	Description
Information Request	0	Request for Information. There is no payload with an information request.
Information	1	Routing Table Entry (RTE) information is encoded as a set of RTE values in the payload.

If IPv6 bit is set to 1, IPv6 information is supplied or requested. Otherwise IPv4.

The Node Type integer specified the node type of the node sending the PDU and is interpreted as in the following table.

Type	Encoding	Description
Shore	0	An HF node with connection to strategic networks that other HF nodes can use as a default route all IP networks. A shore node does not share routing information.
MU	1	An HF node without further connections. An MU node will have a very stable set of IP Networks, which means that other nodes can cache the routing information for an extended period of time.
Relay	2	An HF node that has dynamic IP connectivity and may support local and remote IP networks that will vary more rapidly.

Routing Table Entries are encoded as follows:



Metric is an integer 1-15 as used in RIP. 1 identifies a directly connected network and higher values indicate number of hops or other weighting.

Route Tag is a two byte value included for compatibility with RIP-2 and RIP-NG. This value will generally be taken from network information obtained using RIP. It can be used by an IP router to make routing choices.

Prefix length identifies the length of the subnet. It is range 1-32 for IPv4 and 1-128 for IPv6.

IP Prefix is the IP Address of the subnetwork. 4 bytes for IPv4 and 16 bytes for IPv6.

4 Mapping onto STANAG 5066

The HF-RIP PDU is transferred over STANAG 5066 using SLEP (S5066-APP3). This enables support of PDUs larger than 2048 bytes and provides extended addressing. Two modes are provided.

1. Unreliable Datagram, to be sent to a broadcast address
2. Reliable Datagram, to be sent to a single peer.

For ALE networks, each node will communicate 1:1 with each configured peer using reliable datagram.

For CSMA and WTRP networks, a node may use broadcast with unreliable datagram or 1:1 communication using reliable datagram for each peer.

In normal operation a node will send out status information when there are changes and at appropriate intervals if there is no change.

Requests **may** be sent 1:1 or broadcast. Responses **shall** respond using the same mechanism as the request. This will typically be done when a node believe that its IP routing information may be out of date.

Note that if two nodes identify as shore, then relay and MU nodes **may** route to either node.

5 Recommended SAP ID

Prior to an official assignment, it is recommended to run this protocol over SAP ID 13.