Rules For Designing Protocols Using the RFC 5444 Generalized Packet/Message Format
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History & Target (1/2)

RFC 5444 was spun-off from OLSRv2.

Mandated for use on MANET protocol/port by RFC 5498.

Used by NHDP, OLSRv2, SMF, now AODVv2.

This document is reflecting *lessons learned* from designing protocols:

- Improving extensibility
- Enabling creation of generic RFC 5444 parsing software

History & Target (2/2)

Enabling creation of generic RFC 5444 parsing software

- Does not imply “an API”, but a way of structuring (and, of not structuring) RFC5444 protocol elements in a RFC5444 message.
- Why not an API?
  - For one thing, among the authors of this document, at least two significantly different (yet, perfectly interoperable) approaches to “an RFC5444 parser/generator API” have been implemented
  - Not needed for interoperability
  - There is more than one way to represent data (and more than one computer language, with different assumptions)
  - The IETF is not in the business of specifying APIs

Information Representation

Just one model – there are implementations that take a different approach.

Information in a message can be represented by two maps:

- Message: (extended type -> length, value)
- Address: (address, extended type -> length, value)

Examples of two different approaches that could represent different APIs are in the draft.

RFC 5444 Feature Overview

Designed for MANET routing protocols.

Multi-message packet controlled by RFC 5444 multiplexer.

- Packet may carry messages from multiple protocols.
- Packet is designed to travel a single hop.
- Messages may be forwarded in new packets.

Message carries addresses – for example of neighbours.

- Address block allows address compression.
- Associates attributes with those addresses using TLVs.
- Associates attributes with whole message using TLVs.
- Minimal header to allow processing/forwarding decisions.

Information is Carried in TLVs

This specification adds rules already used in RFCs and in various drafts:

- Addresses do not carry information merely by their presence in a message.
- Address ordering is not used to carry information.
- Division into address blocks is not used to carry information.

Why?

- Hard to design backwards compatible extensions without these rules.
- For example suppose NHDP used presence of an address to indicate “this is a neighbour”.
- How could you add the (hypothetical) extension “this address is blacklisted”? In a way such that a “legacy” (non-extended) implementation would not see the blacklisted address as “a neighbor”?

Other RFC5444-Related Documents to Consider

Security of RFC 5444 packets and messages

- RFC 7182.

Some rules currently applying to NHDP/OLSRv2 that allow more efficient messages:

- RFC 7188.

Message Efficiency

To create the most efficient messages representing information, consider:

- Addresses: how to block, and how to compress.
- Address Block TLVs:
  - Consider ordering addresses for efficiency (not for meaning).
  - Consider using RFC 7188 UNSPECIFIED values.
  - Consider single valued and multivalued TLVs.