Rules For Designing Protocols Using the RFC 5444 Generalized Packet/Message Format
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Clausen, Dearlove, Herberg, Rogge
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.