Integrated OAM Protocol

draft-mirmin-bfd-extended

Greg Mirsky
Xiao Min

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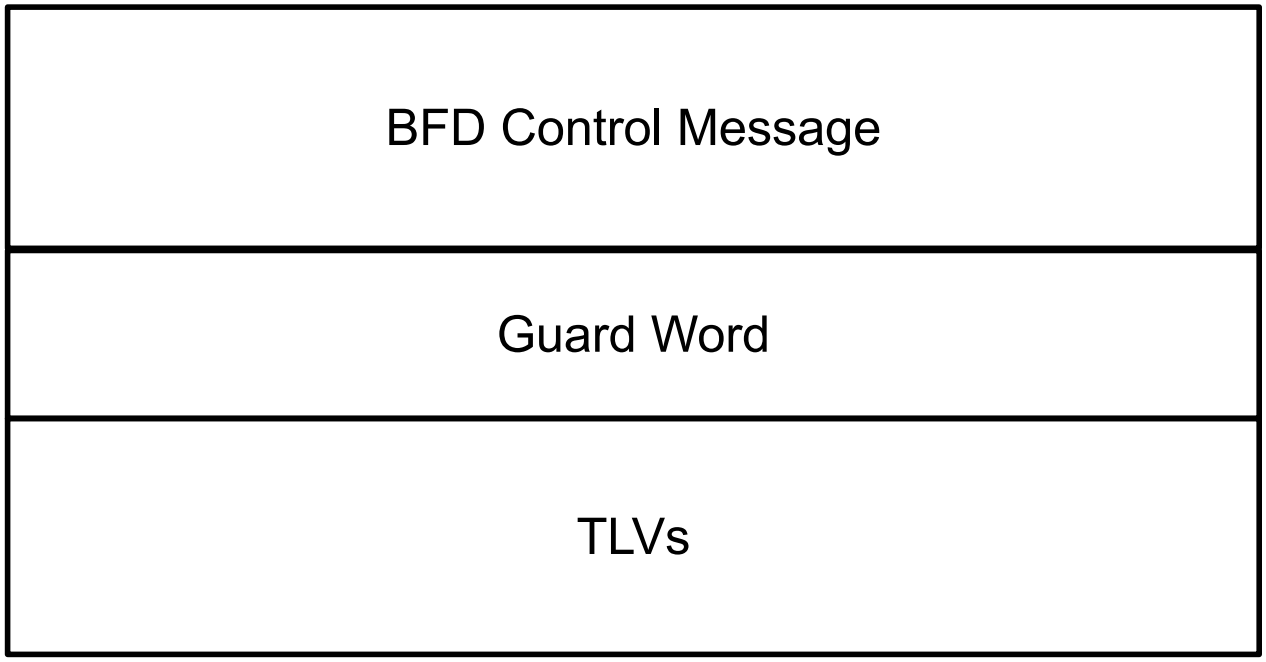
Motivation

- Observed proposals to monitor:
  - quality of a BFD session;
  - performance;
  - path MTU
- Extend BFD beyond continuity checking/connectivity verification to:
  - ensure backward compatibility;
  - Extensibility
- Intermittent authentication for a BFD session

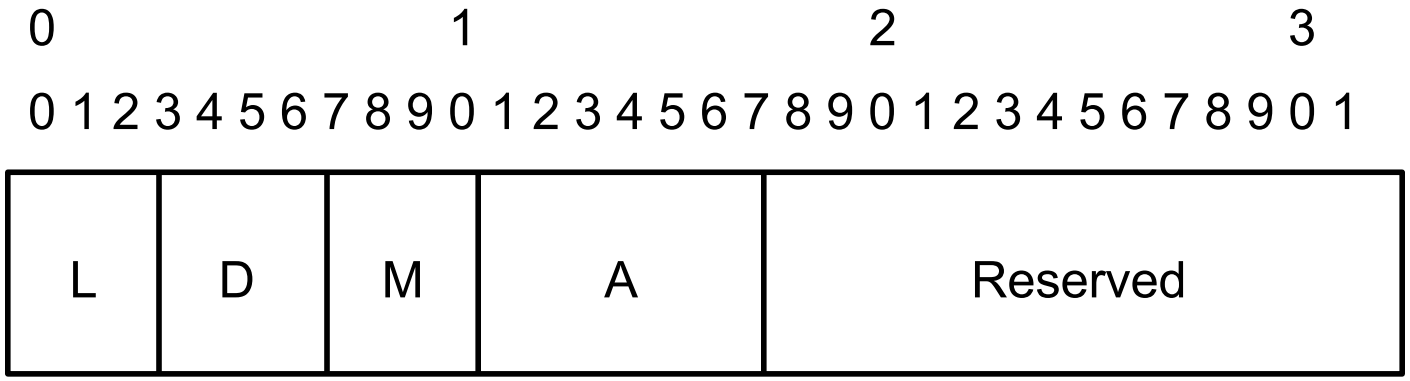
Extended BFD Control Message Format



- BFD Control Message as defined in RFC 5880
- Guard Word – unique four octets long word to identify Sender and Responder
- TLVs – optional
- Use Length field in UDP header to detect if a BFD packet includes a TLV, i.e, is an Extended BFD packet

Capability Negotiation

- No Extended BFD by default
- Capability negotiation using the Poll sequence and the Capability TLV



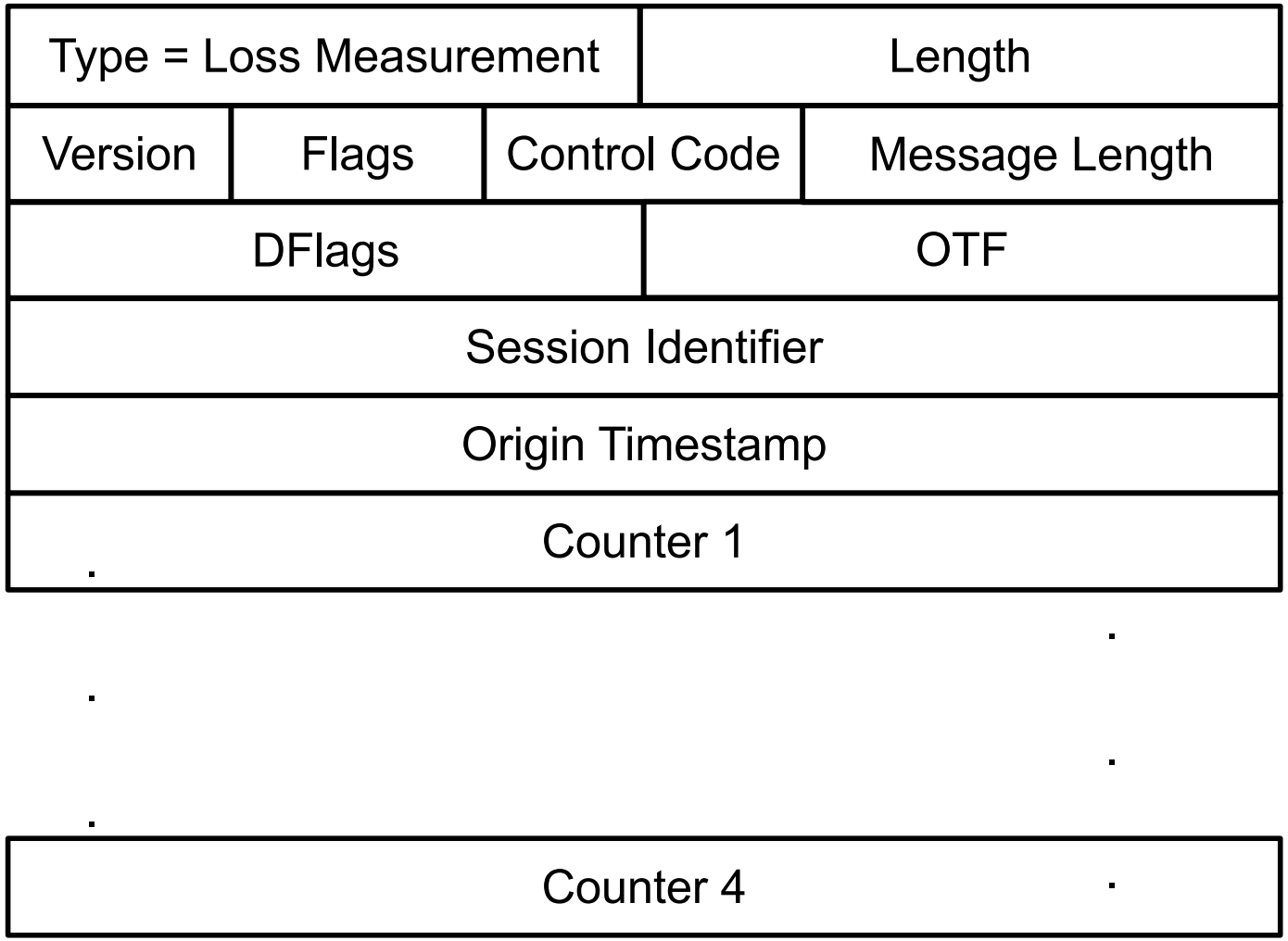
L – Loss Measurement, bit flags Periodic and Poll
D – Delay Measurement, bit flags Periodic and Poll
M – Path MTU Discovery/Monitoring, bit flags for Periodic and Poll
A – Lightweight Authentication, variable length field

- If LM, DM, or PMTU Discovery/Monitoring are proposed in the Periodic mode, e.g., Asynchronous, the standard timer negotiation procedures, as defined in RFC 5880, may be used by the remote BFD system

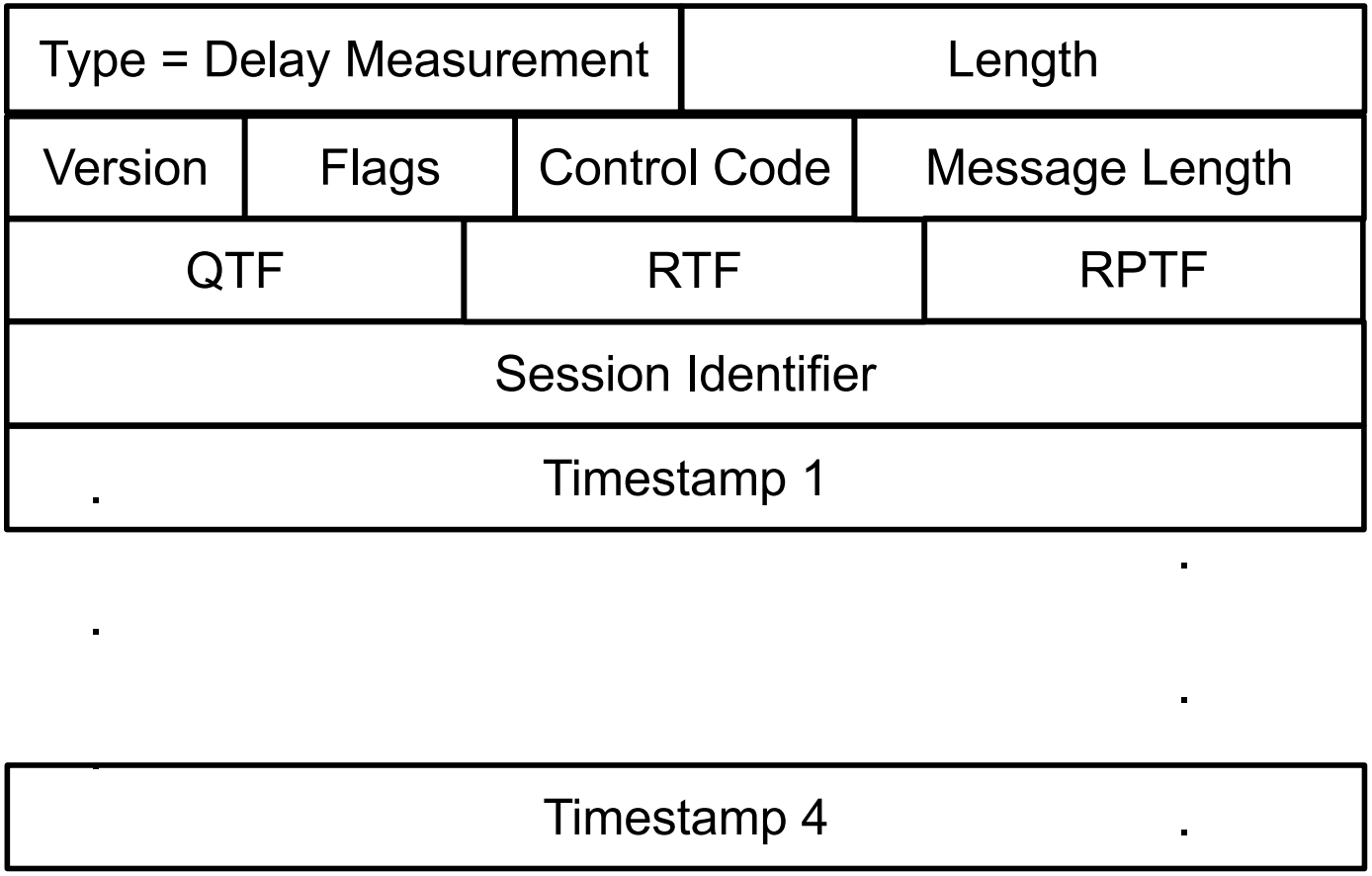
Performance Measurement

- Use Loss and Delay messages defined in RFC 6374:
  - Loss Measurement
    - Direct mode
    - Inferred, a.k.a. synthetic, mode
  - Delay Measurement
    - Explicit timestamp format of a Sender and Responder
  - Combined Loss/Delay Measurement
    - All of the above
- Telemetry query/collection in support of
  - one-way PM
  - direct LM

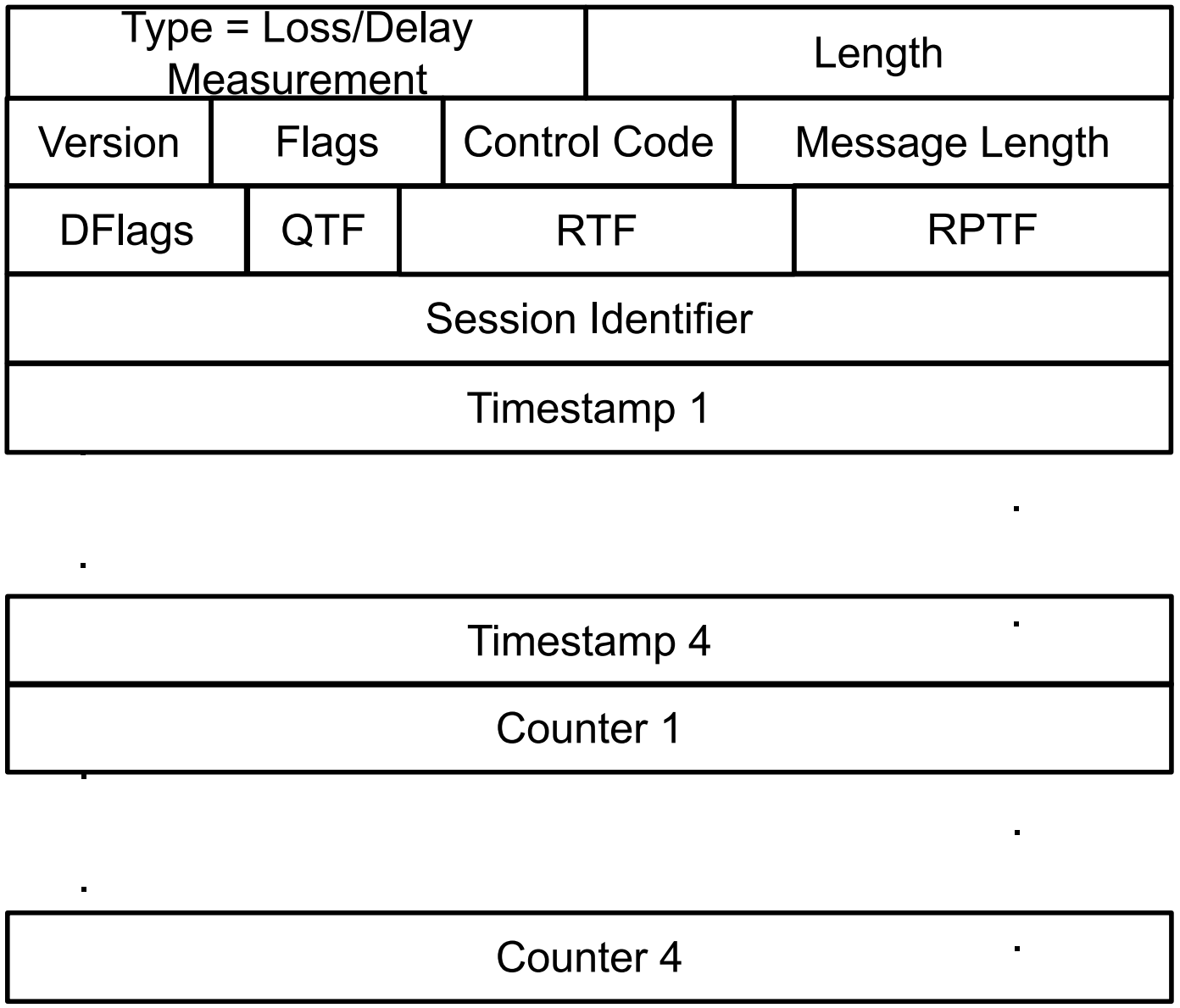
Loss Measurement



Delay Measurement

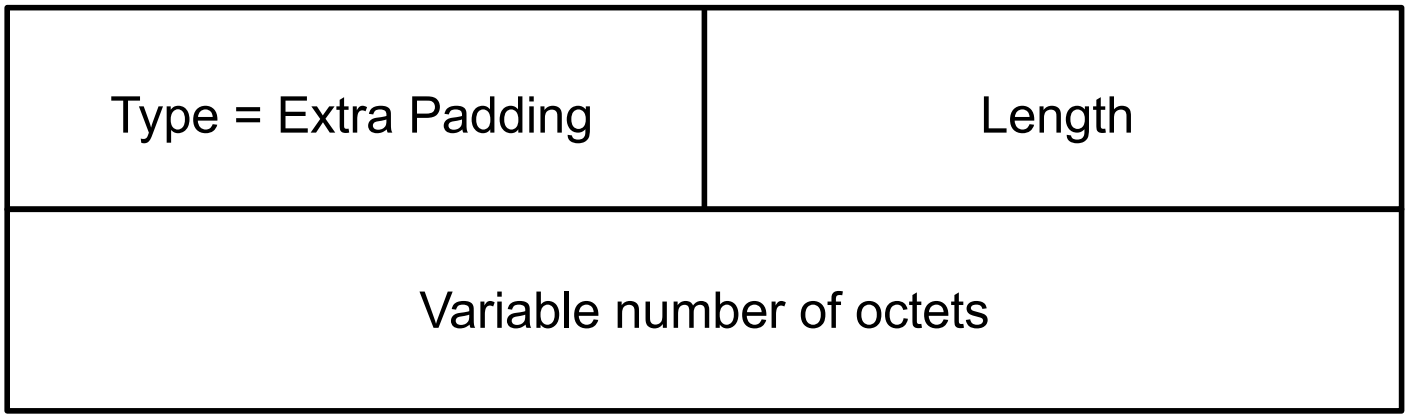


Combined Loss/Delay Measurement

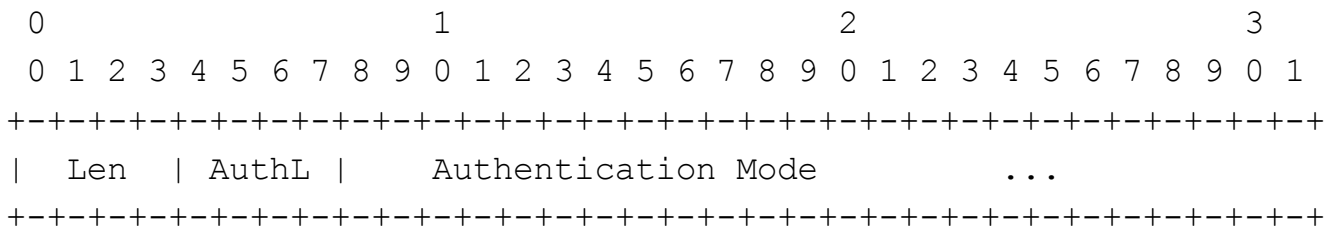


Path MTU Monitoring

- Use the Extra Padding TLV



Authentication Capability

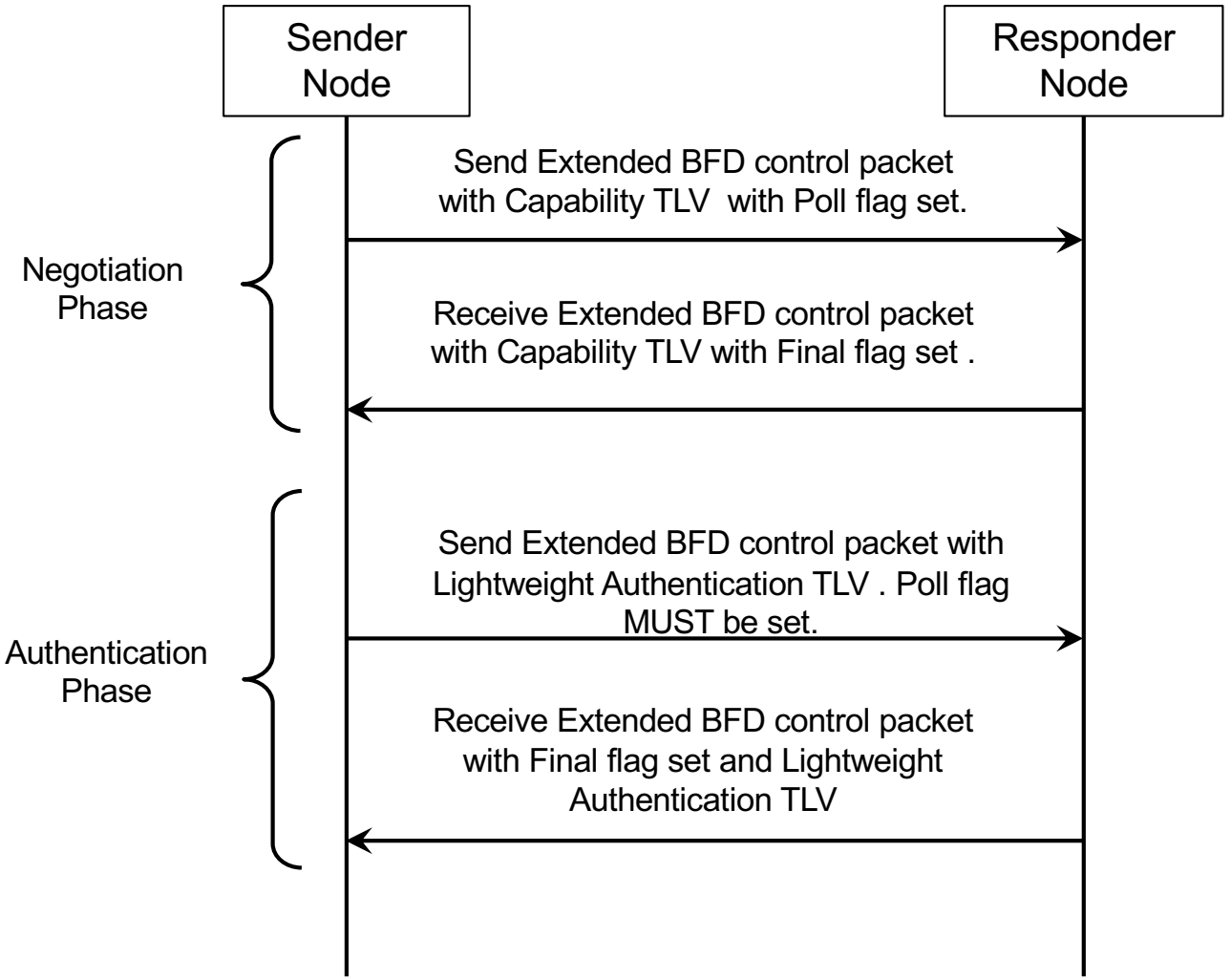


- Len (Length) - four-bits long field. The value of the Length field is equal to the length of the Authentication field, including the Length, in octets.
- AuthL (Authentication Length) – four bits size field. The value of the field is, in four octets long words, the longest authentication signature the BFD system is capable of supporting for any of the methods advertised in the Authentication Mode field.
- Authentication Mode - variable-length field. It is a bit-coded field that a BFD system uses to list modes of lightweight authentication it supports.

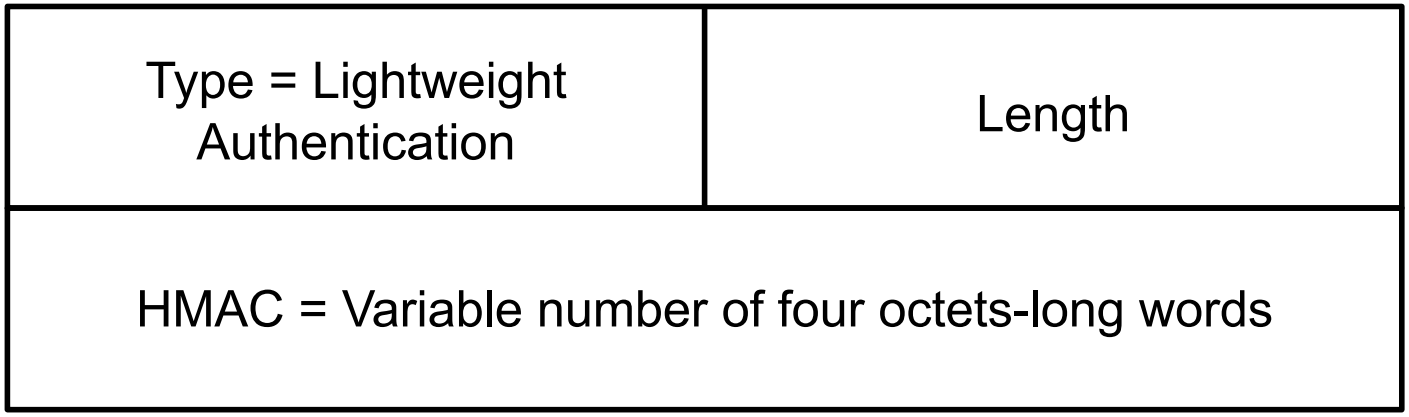
Bit Position	Value	Description	Reference
0	0x1	Keyed SHA-1	This document
1	0x2	Meticulous Keyed SHA-1	This document
2	0x4	SHA-256	This document

Lightweight Authentication

Lightweight Authentication is on-demand authentication of a BFD session using the Poll sequence mechanism



Lightweight Authentication



Type - allocated by IANA
Length - two octets long field equals length on the HMAC (Hashed Message Authentication Code) field in octets. The value of the Length field MUST be a multiple of 4.
HMAC (Hashed Message Authentication Code) - the hash value calculated on the preceding Extended BFD control packet data.

Value	Description	Reference
0	None	This document
1	One or more TLVs was not understood	This document
2	Lightweight Authentication failed	This document

Next Steps

- Continue adding details
- Discuss, discuss, discuss
  - A new Integrated OAM protocol
- Welcome comments, suggestions, and cooperation