

# **Key and Sequence Extensions to GRE**

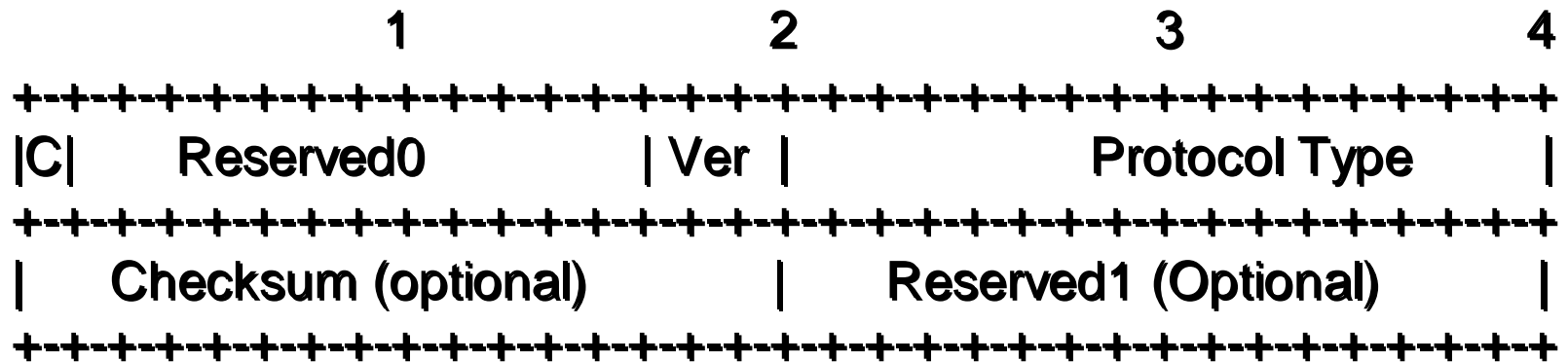
**draft-dommety-gre-ext-01.txt**

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# Background and Need for Extensions

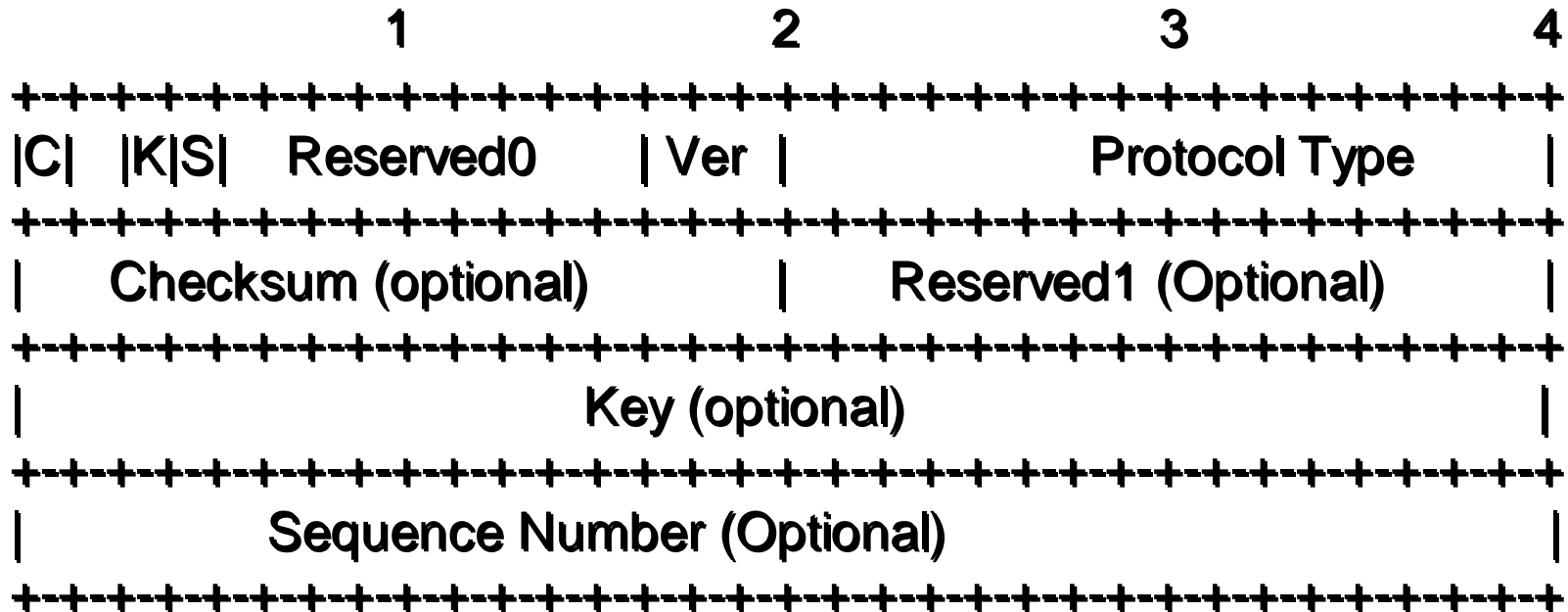
- **Draft-meyers updates GRE RFC1701**
- **Key and sequence number are not specified**
- **draft-ietf-mobileip-3gwireless-ext requires Key and Sequence Number**
- **Addendum to draft-meyers**
  - Need to specify syntax and semantics**
- **Discussed in [gre@ops.ietf.org](mailto:gre@ops.ietf.org)**

# GRE Header



- Header Format as specified in draft-meyers

# New Options



- K Bit ( Bit 2)

When K bit is set, Key field is included in the header by encapsulator.

Key field is intended to identify separate sub-tunnels within a GRE Tunnel.

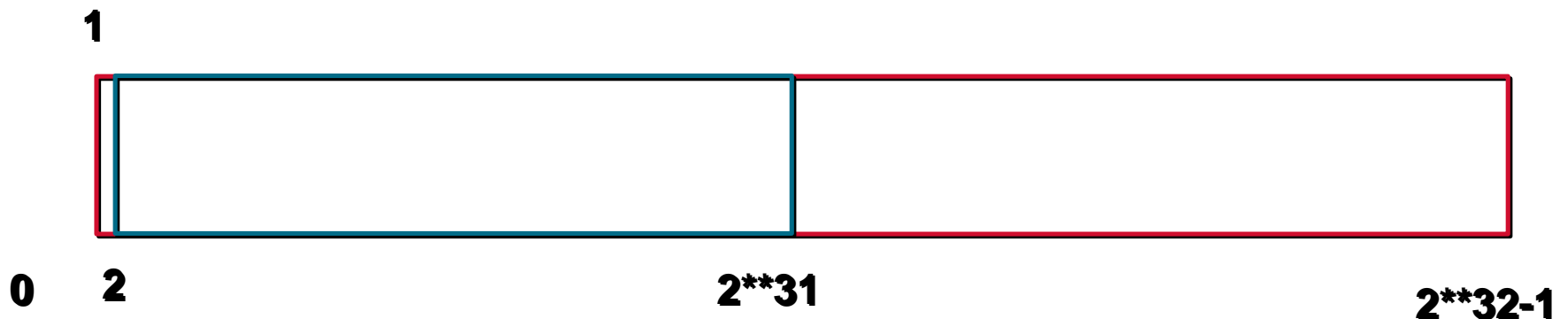
- S Bit (Bit 3)

- Consistent with RFC 1701

# Sequence Number

- **When S bit is set a four byte Sequence number is included in the header.**
- **The intended use of the Sequence Field is to provide unreliable and in-order delivery (use to detect out-of-order packets).**
- **Out-of sequence packet it SHOULD be silently discarded (re-ordering is outside the scope).**
- **When Key and sequence number are present, the sequence number corresponds to the sub-tunnel**

# Sequence Number



- The sequence number value ranges from 1 to  $2^{32}-1$
- Sequence number is a free running counter represented modulo  $2^{32}$  with rollover to 1
- Out-of-sequence packets is determined by the last successfully decap packet and the sequence number of the pkt
- Last received sequenced number and preceding  $2^{31}$  numbers are considered out-of-order

# Comments and Suggestions

- **Draft: draft-dommety-gre-ext-01.txt**

# Issues

- **Acknowledgement Field (to do flow control) is to be discussed separately**
- **Resetting or On/Off of sequence numbers can be done by the signaling used to setup the tunnel**
- **Loosing a large set of packets might degrade performance. Is this something we want to be concerned with**