

GRE-in-UDP Tunnels Discussion

Edward Crabbe

GRE in Network Environments Today

- Increasingly common tunneling protocol
- Increasingly high traffic volumes
- Many devices unable to make use of GRE
Key field for input to loadbalancing hash functions
- High volume GRE sources or GRE aggregator NEs problematic as a result

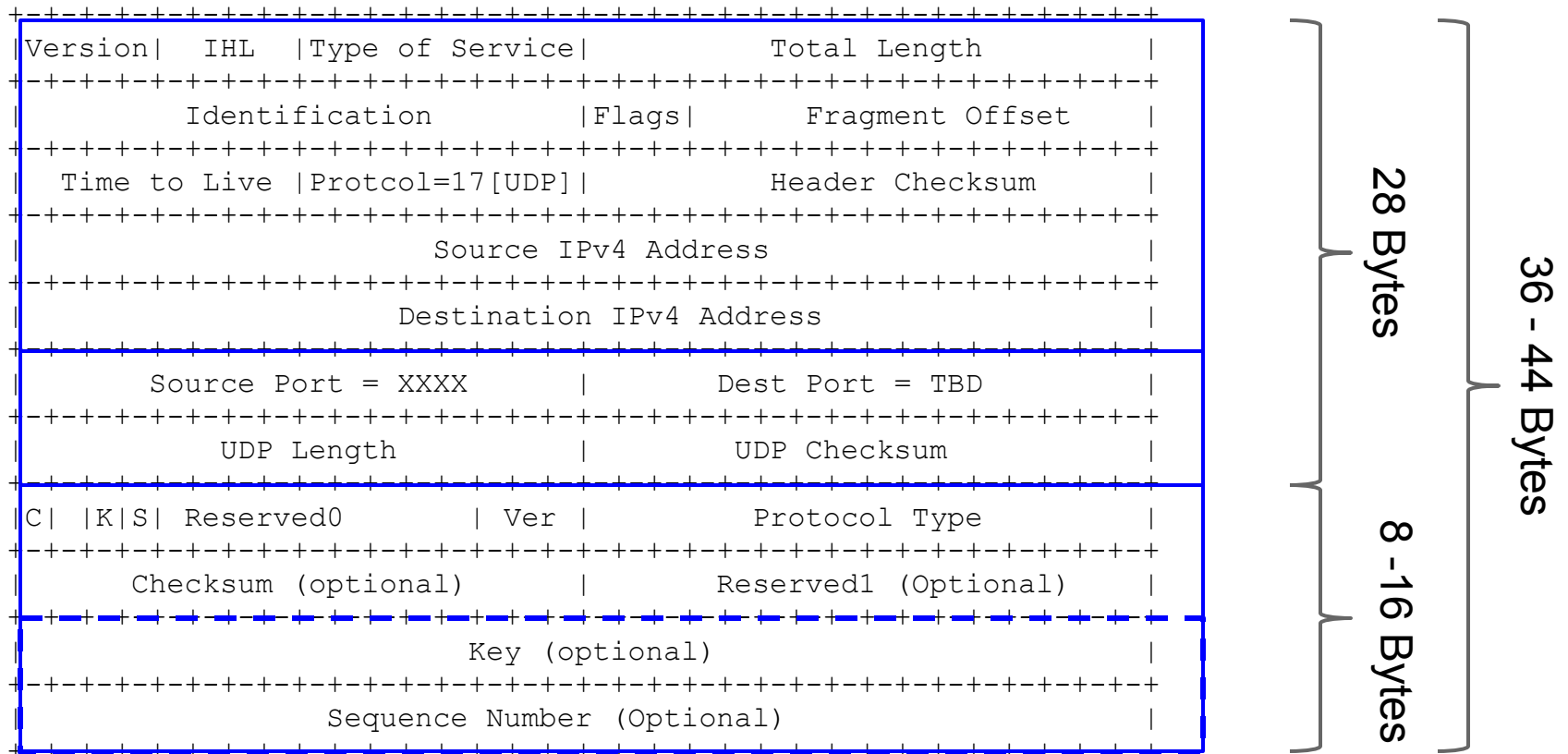
Goals

- Improve load-balancing for GRE encapsulated traffic
- Make use of lowest common denominator fields available as input across broad range of NE hash functions
- Provide a general purpose entropy-shim for use in a variety of environments
- minimize packet overhead
- conserve TCP ports
- Preserve GRE Key Field for other uses

Proposed Header

```
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|Version|  IHL  |Type of Service|                Total Length                |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|                Identification                |Flags|      Fragment Offset      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|  Time to Live |Protocol=17[UDP]|                Header Checksum                |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|                Source IPv4 Address                |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|                Destination IPv4 Address                |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|      Source Port = XXXX      |      Dest Port = TBD      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|      UDP Length      |      UDP Checksum      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|C| |K|S| Reserved0          | Ver |      Protocol Type      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|      Checksum (optional)      |      Reserved1 (Optional)      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|                Key (optional)                |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|                Sequence Number (Optional)                |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
```

Proposed Header



Advantages

- Works in most deployments
 - Almost all deployed NE's can use UDP source/dest as input to hash function
 - does not require support of additional encaps or signalling protocols in environments where they are otherwise not used
- Adds 16 bits of entropy
- Retains flexibility in use of GRE Key Field
- Minimal packet overhead introduction
- Preserves UDP Ports

Co-Authors

Editors

E. Crabbe

L. Yong

X. Xu

Co-Authors

J. Drake

A. Farrel

Vishwas Manral

Carlos Pignataro

Yongbing Fan

Contributors and Reviewers

Vivek Kumar

Ron Bonica

Joe Touch

Ruediger Geib

Gorry Fairhurst

Discussion