

Internet Protocol Version 4, Src: 192.168.1.69, Dst: 40.64.134.10

```
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
✓ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  0000 00.. = Differentiated Services Codepoint: Default (0)
  .... ..00 = Explicit Congestion Notification: Not ECN-Capable Transport (0)
Total Length: 109
Identification: 0x2d5f (11615)
✓ 010. .... = Flags: 0x2, Don't fragment
  0... .... = Reserved bit: Not set
  .1.. .... = Don't fragment: Set
  ..0. .... = More fragments: Not set
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 128
Protocol: TCP (6)
Header Checksum: 0x5cf4 [correct]
[Header checksum status: Good]
[Calculated Checksum: 0x5cf4]
Source Address: 192.168.1.69
Destination Address: 40.64.134.10
```

#### Version (4 bits):

- **Calculation:** This field is set to 4 to indicate that the packet is an IPv4 packet.

#### Header Length (IHL) (4 bits):

- **Calculation:** This field specifies the length of the IP header in 32-bit words. The minimum value is 5, indicating a 20-byte header ( $5 * 4$  bytes). If there are additional options, this value increases accordingly.

#### Type of Service (ToS) (8 bits):

- **Calculation:** This field can be used for Quality of Service (QoS). It includes the Differentiated Services Code Point (DSCP) and Explicit Congestion Notification (ECN). The exact value is set based on the desired priority and handling of the packet.

#### Total Length (16 bits):

- **Calculation:** This field represents the entire length of the IP packet, including the header and the data. It is calculated as the sum of the header length and the payload length.

#### Identification (16 bits):

- **Calculation:** This field is used to identify fragments of an original IP datagram. Each datagram sent by a source is assigned a unique identification number, which helps in reassembling the fragments at the destination.

#### **Flags (3 bits):**

- **Calculation:** This field consists of three flags:
  - The first bit is reserved and always set to 0.
  - The second bit is the DF (Don't Fragment) flag, which is set to 1 if the packet should not be fragmented.
  - The third bit is the MF (More Fragments) flag, which is set to 1 if there are more fragments to follow.

#### **Fragment Offset (13 bits):**

- **Calculation:** This field indicates the position of a fragment within the original datagram. The offset is measured in 8-byte units. If the packet is fragmented, this value helps reassemble the fragments in the correct order.

#### **Time to Live (TTL) (8 bits):**

- **Calculation:** This field is set to a value that specifies the maximum number of hops (routers) the packet can traverse. It is decremented by one at each hop, and if it reaches zero, the packet is discarded.

#### **Protocol (8 bits):**

- **Calculation:** This field indicates the protocol used in the data portion of the IP datagram. Common values include 6 for TCP, 17 for UDP, and 1 for ICMP.

#### **Header Checksum (16 bits):**

- **Calculation:** This field is a checksum for the IP header only. It is calculated by treating the header as a sequence of 16-bit words, summing them using one's complement arithmetic, and then taking the one's complement of the sum.

#### **Source Address (32 bits):**

- **Calculation:** This field contains the IP address of the sender.

#### **Destination Address (32 bits):**

- **Calculation:** This field contains the IP address of the recipient.