The total datagram may be up to 64 bytes long.

Each of them is 32 bits long. The header has at least 5 words, each of them consists of a header part and a data part.

Reading

http://opneil.org/home/knight

LIS 556 Lecture 5
IP datagram header word 3

- what is the maximum length (all fragments added)?
- what is the maximum number of fragments
  - fragment offset (13 bits)
    - more bits flag (fragment size < 576 bytes)
      - don't fragment flag
      - unused bit
    - identifier (16 bits)

IP datagram header word 2

- total length of data in words (16 bits)
  - remainder not used
  - flags D, T, R (3 bits)
  - precedence field (3 bits)
  - type of service (8 byte)
- what is minimum value?
  - minimum value
- IHL, header length in 32 bit words (4 bits)
- version number (4 bits)

The IP datagram header word 1
the routing table is much more complicated.

On a router, the header of a packet usually contains the next hop IP address. This next hop address is usually the IP address of a router. The routing table of a router contains a list of IP addresses and their corresponding next hop addresses. Each entry in the routing table is of the form:

- **Destination**: The IP address of the destination network or host.
- **Next Hop**: The IP address of the next router or host to which the packet should be sent.
- **Next Hop Metric**: A metric indicating the cost or distance to the next hop.

Here is an example of a routing table:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Next Hop</th>
<th>Next Hop Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.1.0</td>
<td>10.0.0.1</td>
<td>1</td>
</tr>
<tr>
<td>10.0.0.0</td>
<td>192.168.1.2</td>
<td>2</td>
</tr>
</tbody>
</table>

Routing on the Internet

There are more than 160 RFCs written on the topic of routing, thus it is very complicated.

Packets are routed by using the routing table to determine the next hop. The process of choosing a path over which to send
To get there:

Each network, and then adds one to the number of hops required
ask the neighbors' routing tables. Looks for the shortest path to
I hop away.

When a new router comes along, it knows that its neighbors are

Distance vector routing

We only look at the former here.

Link state routing

Distance vector routing

Ccsds

For dynamic updating between routers, there are two basic pro-

They can be build by hand, but it is a pain in the ass.

Protocols for building routing tables

If the delivery is to a small-packet network, fragment the packet.
Else send to the default route.
Else if there is an entry for it in the network table, send it to its
Else if the router is connected to it, send to the destination

N decrement TTL

Extract IP address from datagram and compute network part

Routing algorithm
used in the traceroute utility

- time exceeded is type 11
used in the ping utility to find out if a host is reachable.
- echo reply is type 0
- echo request is type 8

Examples

datagram causing the error.
All error messages also contain the first 64 data bits of the
Then comes a 16-bit checksum.
more information about the type.
Header starts with 8-bit "type", then an 8-bit "code" that has
datagram.
Guess what, it has a header and a body, both wrapped in an IP

ICMP message

data router that may be at fault.
It can only report the problem to the sender, not to an Internet-
take action to avoid making the problem worse.
Tell the sender that there is a problem, in the hope that they
Problem.
ICMP allows to deliver error messages when there is a network

Internet Control Message Protocol