

Project 3

Header format

Type	Header length
Sequence Number	
Acknowledgment Number	
Extended Ack	
....	
....	
....	
Data	

The type consists of what type of data is contained in the packet for syn packets the type is set to 1. For ack packets or packets with payload, the type is set to 2. For fin the type is set to 3. Header length represents the length of the header which might vary as extended acks are used. The sequence number and Acknowledgement number is the same as in TCP. Extended acks are used if some packets are missing in which case the sequence number of packets that are received is sent back.

I have used UDP and built my protocol on top of UDP header. UDP provides a nice protocol that works with regular internet instead of developing everything from the ground. As our connection is simplex ie there is only one sender and one receiver I have used a two-way handshake instead of the three-way handshake. TCP assumes packet reordering and hence packets are only sent back either after receiving triple ack or after a timeout but in our case, all the packets will follow the same path because NASA will send packets to the rover over a secure channel and through a pre-determined path and hence will not generally be reordered. So if we receive an extended ack saying that the packets are missing we don't wait for three acks to be received instead we send the packet immediately as the possibility that the packet is has gone through a different path and will arrive sometime later is very slim where as the possibility that it was lost is very high.

I have used sequence number and cumulative acks just as TCP uses them. At the receiver cumulative acks are used to send back acks periodically to indicate the packets until the acknowledgement number that are received correctly , along with it extended acks are also sent if there is packet loss. We send the sequence number of all the packets that are received in extended acks in ascending order and the sender will then send the packets that are missing . This allows us to send only the packets that are missing instead of sending the entire buffer which happens in TCP if triple acks are not received within a specific time. Also, a timer is associated with every packet. If the timer goes out the packet is retransmitted. In the case of TCP the timer is associated with the last acknowledged packets and if the timer goes out the entire buffer is sent even though some of the packets may have been received

by the user. In our case the timer might go out for some packets leading to retransmission but if then ack arrives this will prevent the remaining unnecessary retransmission. For error checking I am relying on UDP's checksum.