

# Report

Features:

1. Three way handshake (SYN, SYN + ACK, ACK) in order to establish connection.
2. Four segment connection termination (FIN, ACK, FIN, ACK).
3. Sender maintains a single timer for timeout operation.
4. Sender is a simplified TCP sender (STP over UDP).
5. Receiver receives packets.
6. STP is a byte-stream oriented protocol, including sequence number and acknowledge number.
7. MMS counts the maximum number of bytes of data only.
8. MWS implemented.
9. PLD implemented.
10. Neither flow nor congestion control is implemented.
11. Header contains sequence number(32 bits) + ACK number(32 bits) + signal(1 bit) + length(32 bits) + check bit(1 bit) + data.

(a) Here is receiver's observation:

rcv	1.69	S	0	0	0
snd	1.72	SA	0	0	1
rcv	1.72	A	1	0	1
rcv	1.72	D	1	100	1
snd	1.73	A	1	0	101
rcv	1.73	D	101	100	1
snd	1.73	A	1	0	201
rcv	1.73	D	201	100	1
snd	1.73	A	1	0	301
rcv	1.73	D	301	100	1
snd	1.73	A	1	0	401
rcv	1.73	D	401	100	1
snd	1.73	A	1	0	501
rcv	1.73	D	501	100	1
snd	1.73	A	1	0	601
rcv	1.73	D	601	100	1
snd	1.73	A	1	0	701
rcv	1.73	D	701	100	1
snd	1.74	A	1	0	801
rcv	1.74	D	801	100	1
snd	1.74	A	1	0	901

rcv	1.74	D	901	100	1
snd	1.74	A	1	0	1001
rcv	1.74	D	1001	100	1
snd	1.74	A	1	0	1101
rcv	1.74	D	1101	100	1
snd	1.74	A	1	0	1201
rcv	1.74	D	1201	100	1
snd	1.74	A	1	0	1301
rcv	1.74	D	1301	100	1
snd	1.74	A	1	0	1401
rcv	1.75	D	1401	100	1
snd	1.75	A	1	0	1501
rcv	1.75	D	1501	100	1
snd	1.75	A	1	0	1601
rcv	1.75	D	1601	100	1
snd	1.75	A	1	0	1701
rcv	1.75	D	1701	100	1
snd	1.75	A	1	0	1801
rcv	1.75	D	1801	100	1
snd	1.75	A	1	0	1901
rcv	1.75	D	1901	100	1
snd	1.75	A	1	0	2001
rcv	1.75	D	2001	100	1
snd	1.75	A	1	0	2101
rcv	1.75	D	2101	100	1
snd	1.75	A	1	0	2201
rcv	1.75	D	2201	100	1
snd	1.75	A	1	0	2301
rcv	1.75	D	2301	100	1
snd	1.75	A	1	0	2401
rcv	1.76	D	2401	100	1
snd	1.76	A	1	0	2501

rcv	1.76	D	2501	100	1
snd	1.76	A	1	0	2601
rcv	1.76	D	2601	100	1
snd	1.76	A	1	0	2701
rcv	1.76	D	2701	100	1
snd	1.76	A	1	0	2801
rcv	1.76	D	2801	100	1
snd	1.76	A	1	0	2901
rcv	1.76	D	2901	100	1
snd	1.76	A	1	0	3001
rcv	1.76	D	3001	28	1
snd	1.76	A	1	0	3029
rcv	1.76	F	3029	0	1
snd	1.76	A	1	0	3030
snd	1.76	F	1	0	3030
rcv	1.76	A	3030	0	2

(b)

Time count:

real 0m2.060s

user 0m3.248s

sys 0m0.314s

Packets:

Amount of data received (bytes) 308203

Total Segments Received 6169

Data segments received 6165

(c)

The file is sent successfully.

Time:

real 0m5.050s

user 0m8.364s

sys 0m0.755s

Screen shots of sender (header on left, summary on right):

				Sender_log.txt			
snd	0.03 S		0	0	0		
recv	0.09 SA		0	0	1		
snd	0.09 A		1	0	1		
snd	0.28 D		1	50	1		
snd	0.28 D		51	50	1		
snd	0.28 D		101	50	1		
snd	0.28 D		151	50	1		
snd	0.28 D		201	50	1		
snd	0.28 D		251	50	1		
snd	0.28 D		301	50	1		
snd	0.28 D		351	50	1		
snd	0.28 D		401	50	1		
snd	0.28 D		451	50	1		
snd	0.28 D		501	50	1		
recv	0.29 A		1	0	51		
recv	0.30 A		1	0	101		
snd	0.30 D		551	50	1		
recv	0.30 A		1	0	151		
recv	0.30 A		1	0	201		
recv	0.30 A		1	0	251		
recv	0.30 A		1	0	301		
recv	0.30 A		1	0	351		
recv	0.30 A		1	0	401		
recv	0.30 A		1	0	451		
recv	0.30 A		1	0	501		
recv	0.30 A		1	0	551		
snd	0.30 D		601	50	1		
snd	0.30 D		651	50	1		
snd	0.30 D		701	50	1		
snd	0.30 D		751	50	1		
snd	0.30 D		801	50	1		
snd	0.31 D		851	50	1		
dup	0.31 D		851	50	1		
snd	0.31 D		901	50	1		
snd	0.31 D		951	50	1		
snd	0.31 D		1001	50	1		
snd	0.31 D		1051	50	1		
recv	0.30 A		1	0	601		
recv	0.31 A		1	0	651		
recv	0.31 A		1	0	701		
recv	0.31 A		1	0	751		
snd	0.31 D		1101	50	1		
recv	0.31 A		1	0	801		
snd	0.31 D		1151	50	1		
recv	0.31 A		1	0	851		
snd	0.31 D		1201	50	1		
dup	0.31 D		0	0	901		
snd	0.31 D		1251	50	1		
recv	0.31 A		1	0	951		
snd	0.31 D		1301	50	1		
dup	0.32 D		1301	50	1		
snd	0.32 D		1351	50	1		
dup	0.32 D		1351	50	1		
snd	0.32 D		1401	50	1		
snd	0.32 D		1451	50	1		
dup	0.32 D		1451	50	1		
recv	0.32 A		1	0	1001		
snd	0.32 D		1501	50	1		
recv	0.32 A		1	0	1051		
snd	0.32 D		1551	50	1		
recv	0.32 A		1	0	1101		
snd	0.32 D		1601	50	1		
recv	0.32 A		1	0	1151		
snd	0.32 D		1651	50	1		
recv	0.32 A		1	0	1201		
snd	0.32 D		1701	50	1		
recv	0.32 A		1	0	1251		
snd	0.32 D		1751	50	1		
recv	0.32 A		0	0	1301		
snd	0.32 D		1801	50	1		
recv	0.32 A		1	0	1351		
snd	0.33 D		1851	50	1		
dup	0.33 D		1851	50	1		
recv	0.33 A		1	0	1401		
recv	0.34 A		1	0	1451		
recv	0.34 A		1	0	1501		
recv	0.34 A		1	0	1551		
recv	0.34 A		1	0	1601		
recv	0.34 A		1	0	1651		
recv	0.34 A		1	0	1701		
recv	0.34 A		1	0	1751		
recv	0.34 A		1	0	1801		
recv	0.34 A		1	0	1851		
recv	0.34 A		1	0	1901		
recv	0.34 A		1	0	1951		
snd	0.34 D		1901	50	1		
snd	0.34 D		1951	50	1		
snd	0.34 D		2001	50	1		
snd	0.34 D		2051	50	1		
recv	0.34 A		1	0	2001		
recv	0.35 A		1	0	2051		
recv	0.35 A		1	0	2101		
recv	0.35 A		1	0	2151		
snd	0.35 D		2101	50	1		
recv	0.35 A		0	0	2201		
snd	0.35 D		2151	50	1		
recv	0.35 A		1	0	2251		
snd	0.35 D		2201	50	1		
recv	0.35 A		0	0	2301		
snd	0.35 D		2251	50	1		
snd	0.35 D		2301	50	1		
snd	0.35 D		2351	50	1		
snd	0.35 D		2401	50	1		

Sender Log.txt		
1603371	30	1
1603381	1	0 1603301
1603351	50	1
1603851	50	1
1603401	1	0 1603401
1603901	50	1
1603451	1	0 1603451
1603951	50	1
1604001	1	0 1603501
1604001	50	1
1603551	1	0 1603551
1604051	50	1
1603601	1	0 1603601
1604101	50	1
1603651	1	0 1603651
1604151	50	1
1603701	1	0 1603701
1604201	50	1
1603751	1	0 1603751
1604251	50	1
1603801	1	0 1603801
1604301	50	1
1603851	1	0 1603851
1603901	1	0 1603901
1604351	50	1
1603951	1	0 1603951
1604401	50	1
1604001	1	0 1604001
1604451	50	1
1604051	1	0 1604051
1604501	50	1
1604101	1	0 1604101
1604551	50	1
1604151	1	0 1604151
1604601	50	1
1604201	1	0 1604201
1604651	50	1
1604251	1	0 1604251
1604701	50	1
1604301	1	0 1604301
1604751	50	1
1604351	1	0 1604351
1604801	50	1
1604401	1	0 1604401
1604851	50	1
1604451	1	0 1604451
1604901	50	1
1604501	1	0 1604501
1604951	50	1
1604551	1	0 1604551
1605001	50	1
1604601	1	0 1604601
1605051	50	1
1604651	1	0 1604651
1605101	50	1
1604701	1	0 1604701
1605151	50	1
1604751	1	0 1604751
1605201	50	1
1604801	1	0 1604801
1605251	50	1
1604851	1	0 1604851
1605301	50	1
1604901	1	0 1604901
1605351	50	1
1604951	1	0 1604951
1605351	50	1
1605001	1	0 1605001
1605401	50	1
1605451	1	0 1605451
1605101	50	1
1605501	1	0 1605501
1605551	50	1
1605151	1	0 1605151
1605551	35	1
1605201	1	0 1605201
1605251	1	0 1605251
1605301	1	0 1605301
1605351	1	0 1605351
1605401	1	0 1605401
1605451	1	0 1605451
1605501	1	0 1605501
1605551	1	0 1605551
1605586	1	0 1605586
1605587	1	0 1605587
1605587	0	2
1605587	0	
=====		
Size of the filePath (in Bytes)	1605585	
Segments transmitted (including drop & RTX)	32112	
Number of Segments handled by PLDModule	32112	
Number of Segments dropped	0	
Number of Segments Corrupted	0	
Number of Segments Re-ordered	0	
Number of Segments Duplicated	3236	
Number of Segments Delayed	0	
Number of Retransmissions due to TIMEOUT	0	
Number of FAST RETRANSMISSION	0	
Number of DUP ACKS received	0	
=====		

Screen shots of receiver (header on left, summary on right):

rcv	1.74 S	0	0	0
snd	1.77 SA	0	0	1
rcv	1.77 A	1	0	1
rcv	1.96 D	1	50	1
snd	1.96 A	1	0	51
rcv	1.96 D	51	50	1
snd	1.97 A	1	0	101
rcv	1.97 D	101	50	1
snd	1.97 A	1	0	151
rcv	1.97 D	151	50	1
snd	1.97 A	1	0	201
rcv	1.97 D	201	50	1
snd	1.97 A	1	0	251
rcv	1.97 D	251	50	1
snd	1.97 A	1	0	301
rcv	1.97 D	301	50	1
snd	1.97 A	1	0	351
rcv	1.97 D	351	50	1
snd	1.97 A	1	0	401
rcv	1.97 D	401	50	1
snd	1.98 A	1	0	451
rcv	1.98 D	451	50	1
snd	1.98 A	1	0	501
rcv	1.99 D	501	50	1
snd	1.99 A	1	0	551
rcv	1.99 D	551	50	1
snd	1.99 A	1	0	601
rcv	1.99 D	601	50	1
snd	1.99 A	1	0	651
rcv	1.99 D	651	50	1
snd	1.99 A	1	0	701
rcv	1.99 D	701	50	1
snd	1.99 A	1	0	751
rcv	1.99 D	751	50	1
snd	1.99 A	1	0	801
rcv	1.99 D	801	50	1
snd	1.99 A	1	0	851
rcv	1.99 D	851	50	1
snd	2.00 A	1	0	901
rcv	2.00 D	851	50	1
snd	2.00 A	1	0	951
rcv	2.00 D	901	50	1
snd	2.00 A	1	0	951
rcv	2.00 D	951	50	1
snd	2.00 A	1	0	1001
rcv	2.00 D	1001	50	1
snd	2.01 A	1	0	1051
rcv	2.01 D	1051	50	1
snd	2.01 A	1	0	1101
rcv	2.01 D	1101	50	1
snd	2.01 A	1	0	1151
rcv	2.01 D	1151	50	1
snd	2.01 A	1	0	1201
rcv	2.01 D	1201	50	1
snd	2.01 A	1	0	1251
rcv	2.01 D	1251	50	1
snd	2.01 A	1	0	1301
rcv	2.01 D	1301	50	1
snd	2.01 A	1	0	1351
rcv	2.01 D	1351	50	1
snd	2.01 A	1	0	1401
rcv	2.01 D	1351	50	1
snd	2.01 A	1	0	1451
rcv	2.01 D	1401	50	1
snd	2.01 A	1	0	1501
rcv	2.01 D	1451	50	1
snd	2.01 A	1	0	1551
rcv	2.01 D	1501	50	1
snd	2.02 A	1	0	1601
rcv	2.02 D	1551	50	1
snd	2.02 A	1	0	1651
rcv	2.02 D	1601	50	1
snd	2.02 A	1	0	1701
rcv	2.02 D	1651	50	1
snd	2.02 A	1	0	1751
rcv	2.02 D	1701	50	1
snd	2.02 A	1	0	1801
rcv	2.02 D	1751	50	1
snd	2.02 A	1	0	1851
rcv	2.02 D	1801	50	1
snd	2.02 A	1	0	1901
rcv	2.02 D	1851	50	1
snd	2.02 A	1	0	1951
rcv	2.02 D	1901	50	1
snd	2.03 A	1	0	2001
rcv	2.03 D	1951	50	1
snd	2.03 A	1	0	2051
rcv	2.03 D	2001	50	1
snd	2.03 A	1	0	2101
rcv	2.03 D	2051	50	1
snd	2.03 A	1	0	2151
rcv	2.03 D	2101	50	1
snd	2.03 A	1	0	2201
rcv	2.03 D	2151	50	1
snd	2.03 A	1	0	2251
rcv	2.03 D	2201	50	1
snd	2.04 A	1	0	2301
rcv	2.04 D	2251	50	1
snd	2.04 A	1	0	2351
rcv	2.04 D	2301	50	1
snd	2.04 A	1	0	2351
rcv	2.04 D	2351	50	1

		Receiver_log.txt		
rcv	6.54 D	1603401	50	1
snd	6.54 A	1	0	1603451
rcv	6.54 D	1603451	50	1
snd	6.54 A	1	0	1603501
rcv	6.54 D	1603501	50	1
snd	6.54 A	1	0	1603551
rcv	6.54 D	1603551	50	1
snd	6.54 A	1	0	1603601
rcv	6.54 D	1603601	50	1
snd	6.54 A	1	0	1603651
rcv	6.54 D	1603651	50	1
snd	6.54 A	1	0	1603701
rcv	6.54 D	1603701	50	1
snd	6.54 A	1	0	1603751
rcv	6.54 D	1603751	50	1
snd	6.54 A	1	0	1603801
rcv	6.54 D	1603801	50	1
snd	6.54 A	1	0	1603851
rcv	6.54 D	1603851	50	1
snd	6.54 A	1	0	1603901
rcv	6.54 D	1603901	50	1
snd	6.54 A	1	0	1603951
rcv	6.54 D	1603951	50	1
snd	6.54 A	1	0	1604001
rcv	6.54 D	1604001	50	1
snd	6.54 A	1	0	1604051
rcv	6.54 D	1604051	50	1
snd	6.54 A	1	0	1604101
rcv	6.54 D	1604101	50	1
snd	6.54 A	1	0	1604151
rcv	6.54 D	1604151	50	1
snd	6.54 A	1	0	1604201
rcv	6.54 D	1604201	50	1
snd	6.54 A	1	0	1604251
rcv	6.54 D	1604251	50	1
snd	6.54 A	1	0	1604301
rcv	6.54 D	1604301	50	1
snd	6.54 A	1	0	1604351
rcv	6.54 D	1604351	50	1
snd	6.54 A	1	0	1604401
rcv	6.54 D	1604401	50	1
snd	6.54 A	1	0	1604451
rcv	6.54 D	1604451	50	1
snd	6.54 A	1	0	1604501
rcv	6.54 D	1604501	50	1
snd	6.54 A	1	0	1604551
rcv	6.54 D	1604551	50	1
snd	6.54 A	1	0	1604601
rcv	6.54 D	1604601	50	1
snd	6.54 A	1	0	1604651
rcv	6.54 D	1604651	50	1
snd	6.54 A	1	0	1604701
rcv	6.54 D	1604701	50	1
snd	6.54 A	1	0	1604751
rcv	6.54 D	1604751	50	1
snd	6.54 A	1	0	1604801
rcv	6.54 D	1604801	50	1
snd	6.54 A	1	0	1604851
rcv	6.54 D	1604851	50	1
snd	6.54 A	1	0	1604901
rcv	6.54 D	1604901	50	1
snd	6.54 A	1	0	1604951
rcv	6.54 D	1604951	50	1
snd	6.54 A	1	0	1605001
rcv	6.54 D	1605001	50	1
snd	6.54 A	1	0	1605051
rcv	6.54 D	1605051	50	1
snd	6.54 A	1	0	1605101
rcv	6.54 D	1605101	50	1
snd	6.54 A	1	0	1605151
rcv	6.54 D	1605151	50	1
snd	6.54 A	1	0	1605201
rcv	6.54 D	1605201	50	1
snd	6.54 A	1	0	1605251
rcv	6.54 D	1605251	50	1
snd	6.54 A	1	0	1605301
rcv	6.54 D	1605301	50	1
snd	6.54 A	1	0	1605351
rcv	6.54 D	1605351	50	1
snd	6.55 D	1605351	50	1
rcv	6.55 D	1605401	50	1
snd	6.55 A	1	0	1605451
rcv	6.55 D	1605451	50	1
snd	6.55 A	1	0	1605501
rcv	6.55 D	1605501	50	1
snd	6.55 A	1	0	1605551
rcv	6.55 D	1605551	35	1
snd	6.55 A	1	0	1605586
rcv	6.55 F	1605586	0	1
snd	6.55 A	1	0	1605587
rcv	6.55 F	1605587	0	2
=====				
Amount of data received (bytes)		1605585		
Total Segments Received		35352		
Data segments received		35348		
Data segments with Bit Errors		0		
Duplicate data segments received		3236		
Duplicate ACKs sent		0		
=====				