

WizFi360

Application – Throughput

Version 1.2

WIZnet Co.,Ltd

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History

Ver	Date	Description
1.0	Aug.2019	Initial version
1.1	Sep.2019	Add command mode throughput test result
1.2	Oct.2019	Modify contents about command mode

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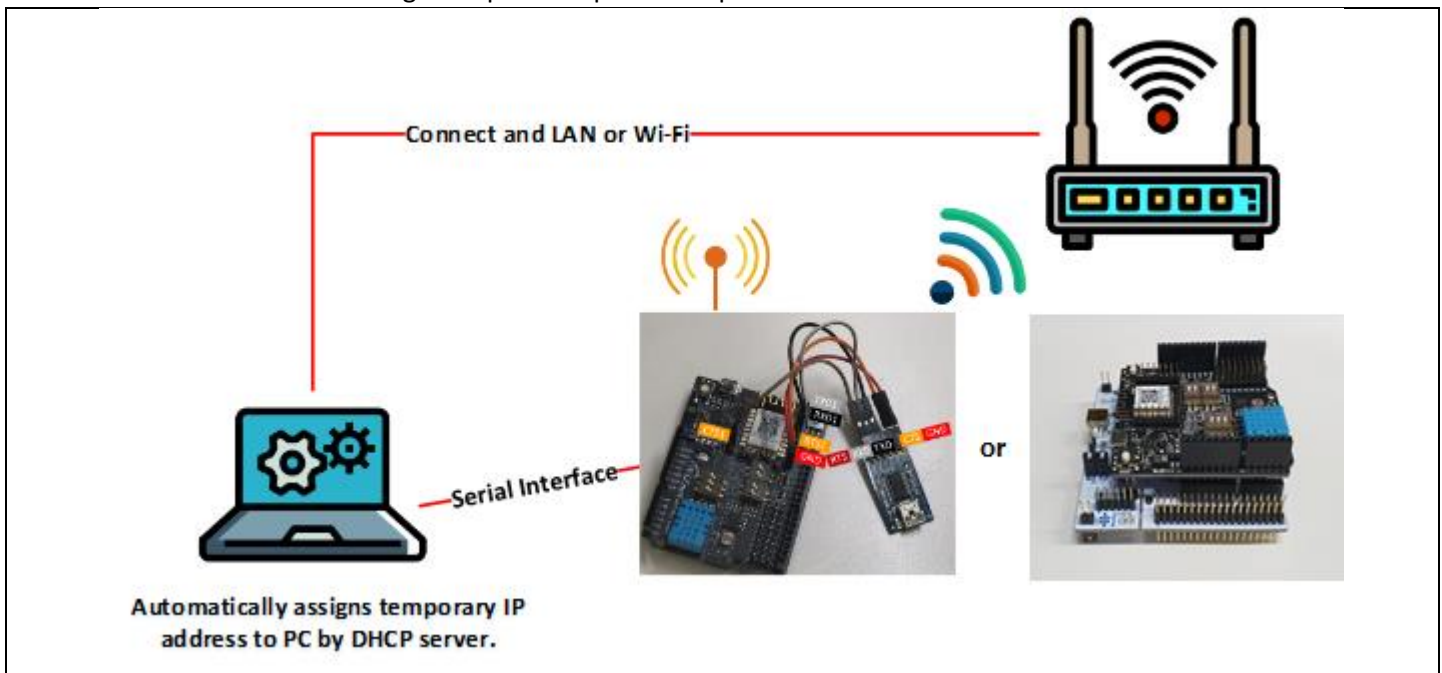
1. Test environment

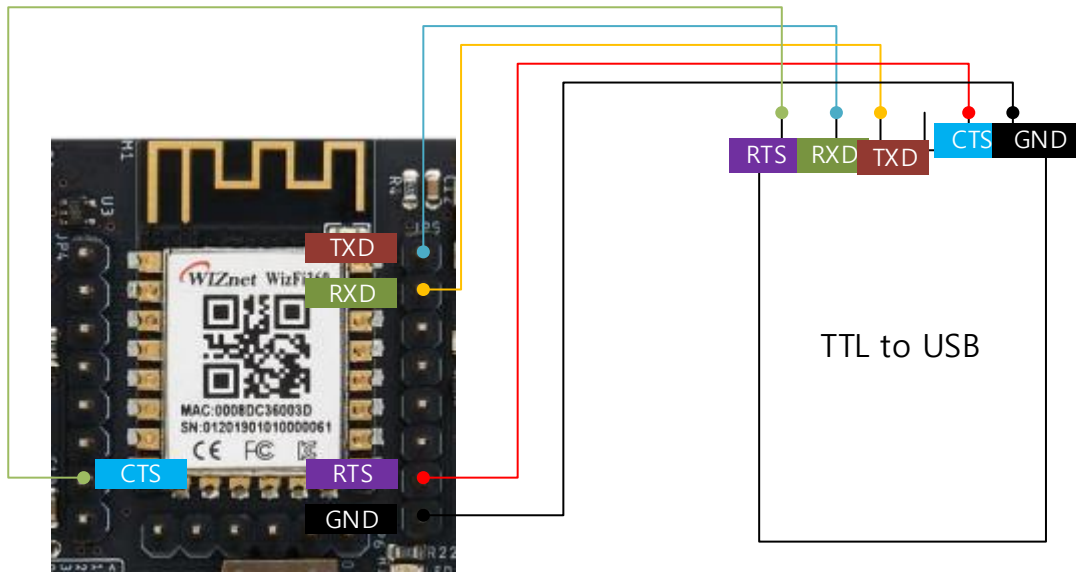
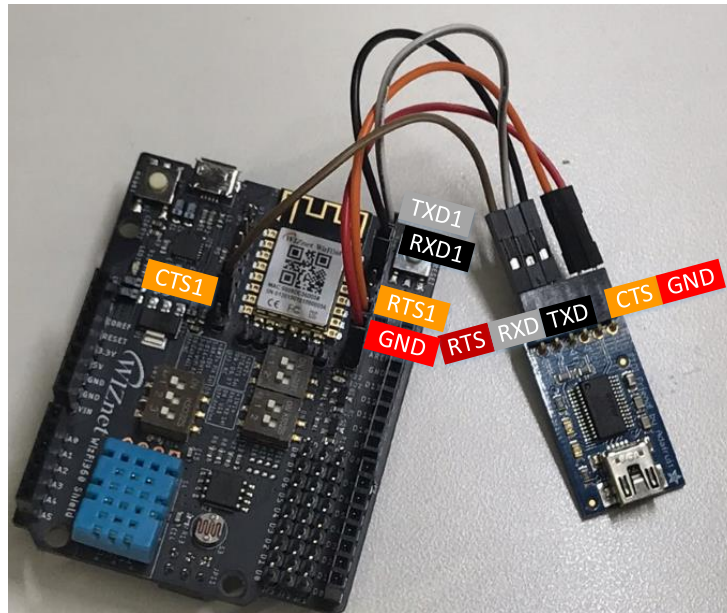
To UART throughput test, it controls using CTS / RTS and WizFi360 control software are required.

- WizFi360 EVB or WizFi360io
- STM32Fxxx EVB(NUCLEO-F401RE)
- PC
- Serial Tool
 - o YAT Serial Tool(Data Mode)
- WizFi360 Control Software(Command Mode)
- 1Mbyte data file
- WiFi Router(exclude when it use in softAP mode)

When data mode uses, it sets RTS/CTS in flow control the using the YAT Serial Tool and it sets DTR as Data Read signal.

When command mode uses, it sets the AT+CIPSENBUF=2048 as maximum length of the data to be transmitted and it sends data of 2048 length. Repeat the previous operation.





2. Using Serial command

- Station Mode

AT command	Terminal
AT AT+CWMODE_CUR=1 AT+CWDHCP_CUR=1,1 AT+CWLAP AT+CWJAP_CUR="wizms1","maker0701" AT+CIPSTA_CUR?	<pre> AT<CR><LF> <CR><LF> OK<CR><LF> AT+CWMODE_CUR=1<CR><LF> <CR><LF> OK<CR><LF> AT+CWDHCP_CUR=1,1<CR><LF> <CR><LF> OK<CR><LF> AT+CWLAP<CR><LF> +CWLAP:(4,"DIR-815_Wiznet",-59,"[redacted]",1)<CR><LF> +CWLAP:(0,"ESP_574935",-71,"[redacted]",1)<CR><LF> +CWLAP:(3,"#WIZnet_irina",-46,"[redacted]",1)<CR><LF> +CWLAP:(3,"Matthew2.4",-63,"[redacted]",2)<CR><LF> +CWLAP:(3,"rena",-46,"[redacted]",3)<CR><LF> +CWLAP:(0,"iptime",-67,"[redacted]",4)<CR><LF> +CWLAP:(3,"Dap",-63,"[redacted]",5)<CR><LF> +CWLAP:(0,"ESP_577CC7",-67,"[redacted]",6)<CR><LF> +CWLAP:(3,"wizms1",-63,"[redacted]",6)<CR><LF> +CWLAP:(0,"Wizfi360",-69,"[redacted]",6)<CR><LF> +CWLAP:(4,"DLINK-IPv6",-55,"[redacted]",10)<CR><LF> +CWLAP:(0,"iptime",-59,"[redacted]",11)<CR><LF> +CWLAP:(3,"WIZnet_Scott",-51,"[redacted]",11)<CR><LF> +CWLAP:(0,"WizFi360_A1B2D1",-69,"[redacted]",11)<CR><LF> +CWLAP:(3,"Teddy_AP",-57,"[redacted]",13)<CR><LF> <CR><LF> OK<CR><LF> AT+CWJAP_CUR="wizms1","maker0701"<CR><LF> WIFI_DISCONNECT<CR><LF> WIFI_CONNECTED<CR><LF> WIFI_GOT_IP<CR><LF> <CR><LF> OK<CR><LF> AT+CIPSTA_CUR?<CR><LF> +CIPSTA_CUR:ip:"192.168.1.120"<CR><LF> +CIPSTA_CUR:gateway:"192.168.1.1"<CR><LF> +CIPSTA_CUR:netmask:"255.255.255.0"<CR><LF> <CR><LF> OK<CR><LF> </pre>

- UART CTS/RTS Setting

AT command	Terminal
AT+CWUART_CUR = 115200,8,1,0,1	<pre> AT+UART_CUR=115200,8,1,0,1<CR><LF> <CR><LF> OK<CR><LF> </pre>
Terminal Setting	

<ol style="list-style-type: none"> Pressing Ctrl+Shift+S and Open the Terminal Settings window You have to change the Hardware(RFR/CTS) in Flow Control 	
<ol style="list-style-type: none"> If you can see under the terminal window that the CTS/DTR is green 	

- TCP Client /Data mode

AT command	Terminal
AT+CIPSTART="TCP","192.168.100.27",5001 AT+CIPMODE=1 AT+CIPSEND	<pre> AT+CIPSTART="TCP", "192.168.100.27", 5001<CR><LF> CONNECT<CR><LF> <CR><LF> OK<CR><LF> AT+CIPMODE=1<CR><LF> <CR><LF> OK<CR><LF> AT+CIPSEND<CR><LF> <CR><LF> > </pre>
Terminal Setting	
<ol style="list-style-type: none"> When DTR is red, it sends the 1M.txt If you click the DTR, it changes the DTR is green and it is sending the data through Serial 	

- TCP Client / Command mode

AT command	Example Code
AT+CIPSTART="TCP","192.168.100.27",5001 AT+CIPMODE=0 AT+CIPSENDERBUF=2048 Send the 1Mbyte.txt	<pre> int8_t deviceTestThroughput_WizFi360(char *data, int len) { int8_t ret = RET_NOK; int cnt; int segid = 0; for(cnt = 0; cnt < (len / 4); cnt++) // 2k * 512 = 1M { if(ATCmdParser_send("AT+CIPSENDERBUF=%d", len)&& ATCmdParser_rcv("OK") && ATCmdParser_rcv(">")) { if(ATCmdParser_send("%s", data) && ATCmdParser_rcv("%d,SEND OK", &segid)) { ret = RET_OK; } else { printf("Write data : failed\r\n"); } } else { printf("Set buffer : failed\r\n"); } } return ret; } </pre>

3. The result of UART Throughput

PC sends the 1Mbyte through serial of WizFi360(UART1) and WizFi360 send the data to TCP Server.

Baud rate	Data mode		Command mode	
	Time	Speed(bit/s)	Time	Speed(bit/s)
115200	123s	66K	93.9s	87.2K
921600	16.3s	502K	14.0s	585.1K
1000000	14.9s	550K	13.0s	630.2K
1250000	12.7s	645K	11.0s	744.7K
1500000	10.5s	780K	10.0s	819.2K
2000000	9.7s	845K	8.0s	1.0M

We measured the time from the start of data transfer to the end of data transfer using the wireshark tool, see Appendix 1.

Appendix 1

Baud rate	Data mode	Command mode
115200	123s : 66Kbit/s <small>3823 122.868987 192.168.100.27 192.168.100.28 TCP 54 5001 + 52161 [ACK] Seq=1023025 Win=65535 Len=0 3824 122.865190 192.168.100.28 192.168.100.27 TCP 490 52161 + 5001 [PSH, ACK] Seq=1023025 Ack=1 Win=6144 Len=436 [TCP segment of wlen 436 len 436 3825 122.906828 192.168.100.27 192.168.100.28 TCP 54 5001 + 52161 [ACK] Seq=1023461 Ack=1 Win=65899 Len=0 3826 122.912979 192.168.100.28 192.168.100.27 TCP 594 52161 + 5001 [PSH, ACK] Seq=1023461 Ack=1 Win=6144 Len=540 [TCP segment of wlen 540 len 540 3827 122.950838 192.168.100.27 192.168.100.28 TCP 54 5001 + 52161 [ACK] Seq=1024801 Win=64559 Len=0</small>	11.0s : 744.7Kbit/s <small>3 3.351673 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [ACK] Seq=1 Ack=2 Win=6144 Len=1024 4 3.351673 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=1025 Ack=2 Win=6144 Len=1024 5 3.351752 192.168.0.4 192.168.0.2 TCP 54 8000 + 57187 [ACK] Seq=2 Ack=2049 Win=64512 Len=0 6 3.372523 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [ACK] Seq=2049 Ack=2 Win=6144 Len=1024 7 3.372524 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=3073 Ack=2 Win=6144 Len=1024 1534 14.330917 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=1045505 Ack=2 Win=6144 Len=1024 1535 14.330917 192.168.0.4 192.168.0.2 TCP 54 8000 + 57187 [ACK] Seq=2 Ack=1046529 Win=64512 Len=0 1536 14.351216 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [ACK] Seq=1046529 Ack=2 Win=6144 Len=1024 1537 14.351217 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=1047553 Ack=2 Win=6144 Len=1024 1538 14.351273 192.168.0.4 192.168.0.2 TCP 54 8000 + 57187 [ACK] Seq=2 Ack=1048577 Win=64512 Len=0</small>
921600	16.3s : 502Kbit/s <small>2547 16.217322 192.168.100.28 192.168.100.27 TCP 1078 52165 + 5001 [ACK] Seq=1022161 Ack=1 Win=6144 Len=1024 [TCP segment of wlen 1024 len 1024 2548 16.217860 192.168.100.27 192.168.100.28 TCP 54 5001 + 52165 [ACK] Seq=1023185 Win=65535 Len=0 2549 16.317138 192.168.100.28 192.168.100.27 TCP 870 52165 + 5001 [PSH, ACK] Seq=1023185 Ack=1 Win=6144 Len=816 [TCP segment of wlen 816 len 816 2550 16.357729 192.168.100.27 192.168.100.28 TCP 54 5001 + 52165 [ACK] Seq=1024801 Win=64719 Len=0</small>	10.0s : 819.2Kbit/s <small>3 1.958013 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [ACK] Seq=1 Ack=2 Win=6144 Len=1024 4 1.958012 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=1025 Ack=2 Win=6144 Len=1024 5 1.958189 192.168.0.4 192.168.0.2 TCP 54 8000 + 60368 [ACK] Seq=2 Ack=2049 Win=64512 Len=0 6 1.979981 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [ACK] Seq=2049 Ack=2 Win=6144 Len=1024 7 1.979981 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=3073 Ack=2 Win=6144 Len=1024 1537 11.937349 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=1045505 Ack=2 Win=6144 Len=1024 1538 11.937412 192.168.0.4 192.168.0.2 TCP 54 8000 + 60368 [ACK] Seq=2 Ack=1046529 Win=64512 Len=0 1539 11.955972 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [ACK] Seq=1046529 Ack=2 Win=6144 Len=1024 1540 11.955972 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=1047553 Ack=2 Win=6144 Len=1024 1541 11.956032 192.168.0.4 192.168.0.2 TCP 54 8000 + 60368 [ACK] Seq=2 Ack=1048577 Win=64512 Len=0</small>
1000000	14.9s : 550Kbit/s <small>3860 14.774231 192.168.100.28 192.168.100.27 TCP 490 58128 + 5001 [PSH, ACK] Seq=1023125 Ack=1 Win=6144 Len=436 [TCP segment of wlen 436 len 436 3861 14.815213 192.168.100.27 192.168.100.28 TCP 54 5001 + 58128 [ACK] Seq=1023561 Win=65899 Len=0 3870 14.819495 192.168.100.28 192.168.100.27 TCP 494 58128 + 5001 [PSH, ACK] Seq=1023561 Ack=1 Win=6144 Len=440 [TCP segment of wlen 440 len 440 3871 14.859281 192.168.100.27 192.168.100.28 TCP 54 5001 + 58128 [ACK] Seq=1024801 Win=64659 Len=0</small>	8.0s : 1.0Mbit/s <small>3 2.489693 192.168.0.2 192.168.0.4 TCP 1078 63635 + 8000 [ACK] Seq=1 Ack=2 Win=6144 Len=1024 4 2.489680 192.168.0.2 192.168.0.4 TCP 1078 63635 + 8000 [PSH, ACK] Seq=1025 Ack=2 Win=6144 Len=1024 5 2.496929 192.168.0.4 192.168.0.2 TCP 54 8000 + 63635 [ACK] Seq=2 Ack=2049 Win=64512 Len=0 6 2.506899 192.168.0.2 192.168.0.4 TCP 1078 63635 + 8000 [ACK] Seq=2049 Ack=2 Win=6144 Len=1024 7 2.507544 192.168.0.2 192.168.0.4 TCP 1078 63635 + 8000 [PSH, ACK] Seq=3073 Ack=2 Win=6144 Len=1024 1533 10.402843 192.168.0.2 192.168.0.4 TCP 1078 63635 + 8000 [PSH, ACK] Seq=1045505 Ack=2 Win=6144 Len=1024 1534 10.474080 192.168.0.4 192.168.0.2 TCP 54 8000 + 63635 [ACK] Seq=2 Ack=1046529 Win=64512 Len=0 1535 10.485628 192.168.0.2 192.168.0.4 TCP 1078 63635 + 8000 [ACK] Seq=1046529 Ack=2 Win=6144 Len=1024 1536 10.485628 192.168.0.2 192.168.0.4 TCP 1078 63635 + 8000 [PSH, ACK] Seq=1047553 Ack=2 Win=6144 Len=1024 1537 10.485664 192.168.0.4 192.168.0.2 TCP 54 8000 + 63635 [ACK] Seq=2 Ack=1048577 Win=64512 Len=0</small>
1250000	12.7s : 645Kbit/s <small>2863 12.591480 192.168.100.28 192.168.100.27 TCP 490 58136 + 5001 [PSH, ACK] Seq=1023185 Ack=1 Win=6144 Len=436 [TCP segment of wlen 436 len 436 2864 12.631883 192.168.100.27 192.168.100.28 TCP 54 5001 + 58136 [ACK] Seq=1023621 Win=65999 Len=0 2865 12.633959 192.168.100.28 192.168.100.27 TCP 434 58136 + 5001 [PSH, ACK] Seq=1023621 Ack=1 Win=6144 Len=436 [TCP segment of wlen 436 len 436 2866 12.674856 192.168.100.27 192.168.100.28 TCP 54 5001 + 58136 [ACK] Seq=1024801 Win=64719 Len=0</small>	11.0s : 744.7Kbit/s <small>3 3.351673 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [ACK] Seq=1 Ack=2 Win=6144 Len=1024 4 3.351673 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=1025 Ack=2 Win=6144 Len=1024 5 3.351752 192.168.0.4 192.168.0.2 TCP 54 8000 + 57187 [ACK] Seq=2 Ack=2049 Win=64512 Len=0 6 3.372523 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [ACK] Seq=2049 Ack=2 Win=6144 Len=1024 7 3.372524 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=3073 Ack=2 Win=6144 Len=1024 1534 14.330917 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=1045505 Ack=2 Win=6144 Len=1024 1535 14.330917 192.168.0.4 192.168.0.2 TCP 54 8000 + 57187 [ACK] Seq=2 Ack=1046529 Win=64512 Len=0 1536 14.351216 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [ACK] Seq=1046529 Ack=2 Win=6144 Len=1024 1537 14.351217 192.168.0.2 192.168.0.4 TCP 1078 57187 + 8000 [PSH, ACK] Seq=1047553 Ack=2 Win=6144 Len=1024 1538 14.351273 192.168.0.4 192.168.0.2 TCP 54 8000 + 57187 [ACK] Seq=2 Ack=1048577 Win=64512 Len=0</small>
1500000	10.5s : 780Kbit/s <small>2242 10.389973 192.168.100.28 192.168.100.27 TCP 490 65021 + 5001 [PSH, ACK] Seq=1023874 Ack=1 Win=6144 Len=436 [TCP segment of wlen 436 len 436 2244 10.438942 192.168.100.27 192.168.100.28 TCP 54 5001 + 65021 [ACK] Seq=1023510 Win=65999 Len=0 2245 10.445897 192.168.100.28 192.168.100.27 TCP 545 65021 + 5001 [PSH, ACK] Seq=1023510 Ack=1 Win=6144 Len=545 [TCP segment of wlen 545 len 545 2247 10.486915 192.168.100.27 192.168.100.28 TCP 54 5001 + 65021 [ACK] Seq=1024801 Win=64688 Len=0</small>	10.0s : 819.2Kbit/s <small>4 3.358011 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [ACK] Seq=1 Ack=2 Win=6144 Len=1024 4 1.958012 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=1025 Ack=2 Win=6144 Len=1024 5 1.958189 192.168.0.4 192.168.0.2 TCP 54 8000 + 60368 [ACK] Seq=2 Ack=2049 Win=64512 Len=0 6 1.979981 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [ACK] Seq=2049 Ack=2 Win=6144 Len=1024 7 1.979981 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=3073 Ack=2 Win=6144 Len=1024 1537 11.937349 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=1045505 Ack=2 Win=6144 Len=1024 1538 11.937412 192.168.0.4 192.168.0.2 TCP 54 8000 + 60368 [ACK] Seq=2 Ack=1046529 Win=64512 Len=0 1539 11.955972 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [ACK] Seq=1046529 Ack=2 Win=6144 Len=1024 1540 11.955972 192.168.0.2 192.168.0.4 TCP 1078 60368 + 8000 [PSH, ACK] Seq=1047553 Ack=2 Win=6144 Len=1024 1541 11.956032 192.168.0.4 192.168.0.2 TCP 54 8000 + 60368 [ACK] Seq=2 Ack=1048577 Win=64512 Len=0</small>

2000000	9.7s : 845Kbit/s				8.0s : 1.0Mbit/s					
	6316 9.646387	192.168.100.28	192.168.100.27	TCP	490 65831 → 5801 [PSH, ACK] Seq=1023245 Ack=1 Win=0 Len=0	443 2.492951	192.168.0.2	192.168.0.4	TCP	1078 63635 → 8000 [ACK] Seq=1 Ack=2 Win=6144 Len=1024
	6317 9.686546	192.168.100.27	192.168.100.28	TCP	54 5801 → 65831 [ACK] Seq=1 Ack=1023681 Win=65899 Len=0	4 2.496860	192.168.0.2	192.168.0.4	TCP	1078 63635 → 8000 [PSH, ACK] Seq=1025 Ack=2 Win=6144 Len=1024
	6318 9.690489	192.168.100.28	192.168.100.27	TCP	374 65831 → 5801 [PSH, ACK] Seq=1023681 Ack=1 Win=0 Len=0	5 2.496929	192.168.0.4	192.168.0.2	TCP	54 8000 → 63635 [ACK] Seq=2 Ack=2049 Win=64512 Len=0
	6319 9.731538	192.168.100.27	192.168.100.28	TCP	54 5801 → 65831 [ACK] Seq=1 Ack=1024001 Win=64779 Len=0	6 2.500699	192.168.0.2	192.168.0.4	TCP	1078 63635 → 8000 [ACK] Seq=2049 Ack=2 Win=6144 Len=1024
					7 2.507544	192.168.0.2	192.168.0.4	TCP	1078 63635 → 8000 [PSH, ACK] Seq=3073 Ack=2 Win=6144 Len=1024	
					1533 10.470341	192.168.0.2	192.168.0.4	TCP	1078 63635 → 8000 [PSH, ACK] Seq=1045505 Ack=2 Win=6144 Len=1024	
					1534 10.470400	192.168.0.4	192.168.0.2	TCP	54 8000 → 63635 [ACK] Seq=2 Ack=1046529 Win=64512 Len=0	
					1535 10.485628	192.168.0.2	192.168.0.4	TCP	1078 63635 → 8000 [ACK] Seq=104529 Ack=2 Win=6144 Len=1024	
					1536 10.485628	192.168.0.2	192.168.0.4	TCP	1078 63635 → 8000 [PSH, ACK] Seq=1047553 Ack=2 Win=6144 Len=1024	
					1537 10.485604	192.168.0.4	192.168.0.2	TCP	54 8000 → 63635 [ACK] Seq=2 Ack=1048577 Win=64512 Len=0	