

## HIGH SPEED EXPERIENCES : MORE PERFORMANCE MEASUREMENT

```
mininet@mininet-vm:~$ sudo python ./tcp_perf.py
*** Adding controller
*** Adding hosts
*** Adding switch
*** Creating links
(100.00Mbit 100ms delay 0% loss) (100.00Mbit 100ms delay 0% loss)
*** Starting network
*** Configuring hosts
h1 h2
*** Starting controller
*** Starting 1 switches
s3 (100.00Mbit 100ms delay 0% loss)
net.ipv4.tcp_sack = 1
net.ipv4.tcp_dsack = 1
*** Testing with TCP SACK enabled
*** Testing with MTU 512 Window 131072 Buffer 131072
monitoring output for 20 seconds
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60691 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60691
<h1>: [ ID] Interval    Transfer  Bandwidth
<h1>: [ 4] 0.0-10.4 sec 3.62 MBytes 2.92 Mb/s/sec
<h2>: [ ID] Interval    Transfer  Bandwidth
<h2>: [ 5] 0.0-10.4 sec 3.62 MBytes 2.91 Mb/s/sec
```

```
*** Testing with MTU 512 Window 131072 Buffer 16384
monitoring output for 20 seconds
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
```

<h1>: TCP window size: 256 KByte (WARNING: requested 128 KByte)  
<h1>: -----  
<h1>: [ 4] local 10.0.0.1 port 60692 connected with 10.0.0.2 port 5001  
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60692  
<h1>: [ ID] Interval    Transfer    Bandwidth  
<h1>: [ 4] 0.0-10.0 sec 3.45 MBytes 2.89 Mb/s/sec  
<h2>: [ ID] Interval    Transfer    Bandwidth  
<h2>: [ 5] 0.0-10.0 sec 3.45 MBytes 2.89 Mb/s/sec

### \*\*\* Testing with MTU 512 Window 131072 Buffer 1024

monitoring output for 20 seconds

<h2>: -----  
<h2>: Server listening on TCP port 5001  
<h2>: TCP window size: 256 KByte (WARNING: requested 128 KByte)  
<h2>: -----  
<h1>: -----  
<h1>: Client connecting to 10.0.0.2, TCP port 5001  
<h1>: TCP window size: 256 KByte (WARNING: requested 128 KByte)  
<h1>: -----  
<h1>: [ 4] local 10.0.0.1 port 60693 connected with 10.0.0.2 port 5001  
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60693  
<h1>: [ ID] Interval    Transfer    Bandwidth  
<h1>: [ 4] 0.0-10.0 sec 3.43 MBytes 2.87 Mb/s/sec  
<h2>: [ ID] Interval    Transfer    Bandwidth  
<h2>: [ 5] 0.0-10.0 sec 3.43 MBytes 2.87 Mb/s/sec

### \*\*\* Testing with MTU 512 Window 16384 Buffer 131072

monitoring output for 20 seconds

<h2>: -----  
<h2>: Server listening on TCP port 5001  
<h2>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)  
<h2>: -----  
<h1>: -----  
<h1>: Client connecting to 10.0.0.2, TCP port 5001  
<h1>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)  
<h1>: -----  
<h1>: [ 4] local 10.0.0.1 port 60694 connected with 10.0.0.2 port 5001  
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60694  
<h1>: [ ID] Interval    Transfer    Bandwidth  
<h1>: [ 4] 0.0-12.8 sec 768 KBytes 490 Kbits/sec  
<h2>: [ ID] Interval    Transfer    Bandwidth  
<h2>: [ 5] 0.0-12.8 sec 768 KBytes 490 Kbits/sec

### \*\*\* Testing with MTU 512 Window 16384 Buffer 16384

monitoring output for 20 seconds

```
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60695 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60695
<h1>: [ ID] Interval    Transfer    Bandwidth
<h1>: [ 4] 0.0-10.4 sec  608 KBytes  478 Kbits/sec
<h2>: [ ID] Interval    Transfer    Bandwidth
<h2>: [ 5] 0.0-10.4 sec  608 KBytes  477 Kbits/sec
```

### \*\*\* Testing with MTU 512 Window 16384 Buffer 1024

monitoring output for 20 seconds

```
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60696 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60696
<h1>: [ ID] Interval    Transfer    Bandwidth
<h1>: [ 4] 0.0-10.0 sec  578 KBytes  472 Kbits/sec
<h2>: [ ID] Interval    Transfer    Bandwidth
<h2>: [ 5] 0.0-10.0 sec  578 KBytes  472 Kbits/sec
```

### \*\*\* Testing with MTU 512 Window 1024 Buffer 131072

monitoring output for 20 seconds

```
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 2.20 KByte (WARNING: requested 1.00 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 2.00 KByte (WARNING: requested 1.00 KByte)
```

```

<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60697 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60697
*** Testing with MTU 512 Window 1024 Buffer 16384
monitoring output for 20 seconds
*** Testing with MTU 512 Window 1024 Buffer 1024
monitoring output for 20 seconds
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 2.20 KByte (WARNING: requested 1.00 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 2.00 KByte (WARNING: requested 1.00 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60699 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60699
<h1>: [ ID] Interval    Transfer    Bandwidth
<h1>: [ 4] 0.0-10.8 sec 18.0 KBytes 13.6 Kbits/sec
<h2>: [ ID] Interval    Transfer    Bandwidth
<h2>: [ 5] 0.0-10.8 sec 18.0 KBytes 13.6 Kbits/sec

```

### \*\*\* Testing with MTU 1500 Window 131072 Buffer 131072

```

monitoring output for 20 seconds
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60700 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60700
<h1>: [ ID] Interval    Transfer    Bandwidth
<h1>: [ 4] 0.0-10.4 sec 6.00 MBytes 4.82 Mbits/sec
<h2>: [ ID] Interval    Transfer    Bandwidth
<h2>: [ 5] 0.0-10.4 sec 6.00 MBytes 4.82 Mbits/sec

```

### \*\*\* Testing with MTU 1500 Window 131072 Buffer 16384

```

monitoring output for 20 seconds
<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 256 KByte (WARNING: requested 128 KByte)

```

```

<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60701 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60701
<h1>: [ ID] Interval    Transfer    Bandwidth
<h1>: [ 4] 0.0-10.0 sec 5.80 MBytes 4.84 Mbits/sec
<h2>: [ ID] Interval    Transfer    Bandwidth
<h2>: [ 5] 0.0-10.0 sec 5.80 MBytes 4.84 Mbits/sec

```

### \*\*\* Testing with MTU 1500 Window 131072 Buffer 1024

monitoring output for 20 seconds

```

<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 256 KByte (WARNING: requested 128 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60702 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60702
<h1>: [ ID] Interval    Transfer    Bandwidth
<h1>: [ 4] 0.0-10.0 sec 5.78 MBytes 4.83 Mbits/sec
<h2>: [ ID] Interval    Transfer    Bandwidth
<h2>: [ 5] 0.0-10.0 sec 5.78 MBytes 4.83 Mbits/sec

```

### \*\*\* Testing with MTU 1500 Window 16384 Buffer 131072

monitoring output for 20 seconds

```

<h2>: -----
<h2>: Server listening on TCP port 5001
<h2>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)
<h2>: -----
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60703 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60703
<h1>: [ ID] Interval    Transfer    Bandwidth
<h1>: [ 4] 0.0-12.4 sec 896 KBytes 590 Kbits/sec

```

<h2>: [ ID] Interval    Transfer    Bandwidth  
<h2>: [ 5] 0.0-12.6 sec 896 KBytes 581 Kbits/sec

**\*\*\* Testing with MTU 1500 Window 16384 Buffer 1024**

monitoring output for 20 seconds

<h2>: -----  
<h2>: Server listening on TCP port 5001  
<h2>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)  
<h2>: -----  
<h1>: -----  
<h1>: Client connecting to 10.0.0.2, TCP port 5001  
<h1>: TCP window size: 32.0 KByte (WARNING: requested 16.0 KByte)  
<h1>: -----  
<h1>: [ 4] local 10.0.0.1 port 60705 connected with 10.0.0.2 port 5001  
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60705  
<h1>: [ ID] Interval    Transfer    Bandwidth  
<h1>: [ 4] 0.0-10.0 sec 713 KBytes 583 Kbits/sec  
<h2>: [ ID] Interval    Transfer    Bandwidth  
<h2>: [ 5] 0.0-10.0 sec 713 KBytes 582 Kbits/sec

**\*\*\* Testing with MTU 1500 Window 1024 Buffer 131072**

monitoring output for 20 seconds

<h2>: -----  
<h2>: Server listening on TCP port 5001  
<h2>: TCP window size: 2.20 KByte (WARNING: requested 1.00 KByte)  
<h2>: -----  
<h1>: -----  
<h1>: Client connecting to 10.0.0.2, TCP port 5001  
<h1>: TCP window size: 2.00 KByte (WARNING: requested 1.00 KByte)  
<h1>: -----  
<h1>: [ 4] local 10.0.0.1 port 60706 connected with 10.0.0.2 port 5001  
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60706

**\*\*\* Testing with MTU 1500 Window 1024 Buffer 16384**

monitoring output for 20 seconds

**\*\*\* Testing with MTU 1500 Window 1024 Buffer 1024**

monitoring output for 20 seconds

<h2>: -----  
<h2>: Server listening on TCP port 5001  
<h2>: TCP window size: 2.20 KByte (WARNING: requested 1.00 KByte)  
<h2>: -----

```
<h1>: -----
<h1>: Client connecting to 10.0.0.2, TCP port 5001
<h1>: TCP window size: 2.00 KByte (WARNING: requested 1.00 KByte)
<h1>: -----
<h1>: [ 4] local 10.0.0.1 port 60708 connected with 10.0.0.2 port 5001
<h2>: [ 5] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 60708
<h1>: [ ID] Interval    Transfer  Bandwidth
<h1>: [ 4] 0.0-10.4 sec 26.0 KBytes 20.4 Kbits/sec
<h2>: [ ID] Interval    Transfer  Bandwidth
<h2>: [ 5] 0.0-10.4 sec 26.0 KBytes 20.4 Kbits/sec
*** Stopping network
*** Stopping 1 switches
s3 ..
*** Stopping 2 hosts
h1 h2
*** Stopping 1 controllers
c0
*** Done
mininet@mininet-vm:~$
```