

# Results

## Average Results

Configuration	Avg Throughput	Avg Delay
With ack filter	3099613.25	0.0064028
Without ack filter	1632804.25	0.0010145

## Detailed Results

### Results With Ack Filter

TCP throughput with ack filter

TraceMetrics - a trace analyzer for Network Simulator 3		
File Tools Help		
Simulation Nodes Throughput / Goodput Little's Result Streams		
Node	Throughput	Goodput
0	4531156.36032793	3865307.2122944253
1	3848857.94624815	3175928.031988713
2	3847091.0511377687	3174161.1368783317
3	171349.26835378777	0.0

## TCP Delay with ack filter

### TCP ALL:

#### ----- Stream 0 -----

IPs: 10.1.3.2 --> 10.1.1.1  
Ports: 60000 --> 49153  
Number of packets: 295  
Average Delay: 0.006167964579660985  
Delay variance: 1.115864778354636E-4  
Average PDV: 0.00615996457966109  
PDV variance: 1.1120821858856477E-4  
Average IPDV: -1.6107482993197914E-6  
IPDV variance: 9.174889497463886E-6

#### ----- Stream 1 -----

IPs: 10.1.3.2 --> 10.1.1.1  
Ports: 60001 --> 49154  
Number of packets: 257  
Average Delay: 0.007526175112840455  
Delay variance: 1.490120118237513E-4  
Average PDV: 0.007518175112840472  
PDV variance: 1.4843219854817252E-4  
Average IPDV: -3.5980234374999624E-6  
IPDV variance: 5.241471838198452E-6

#### ----- Stream 2 -----

IPs: 10.1.3.2 --> 10.1.1.1  
Ports: 60002 --> 49155  
Number of packets: 205  
Average Delay: 0.010418475229268236  
Delay variance: 2.0616461461099374E-4  
Average PDV: 0.010410475229268353  
PDV variance: 2.051589335641131E-4  
Average IPDV: -6.7236862745097585E-6  
IPDV variance: 8.392710560751262E-6

#### ----- Stream 3 -----

IPs: 10.1.3.2 --> 10.1.1.1  
Ports: 60003 --> 49156  
Number of packets: 204  
Average Delay: 0.011459820127450983  
Delay variance: 2.469139970999465E-4  
Average PDV: 0.011451820127451037

PDV variance: 2.4570363436906395E-4  
Average IPDV: -8.961408866994889E-6  
IPDV variance: 1.0333351964827938E-5

----- Stream 4 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49153 --> 60000  
Number of packets: 592  
Average Delay: 0.003937408697635104  
Delay variance: 1.379101872910195E-5  
Average PDV: 0.003905728697635178  
PDV variance: 1.3767723089356907E-5  
Average IPDV: 1.0147884940775548E-7  
IPDV variance: 1.5187886323330084E-7

----- Stream 5 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49154 --> 60001  
Number of packets: 580  
Average Delay: 0.0035575764137930413  
Delay variance: 2.0591098901728248E-5  
Average PDV: 0.003525892413793121  
PDV variance: 2.055559700706997E-5  
Average IPDV: 9.462521588948567E-8  
IPDV variance: 2.997420067395371E-7

----- Stream 6 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49155 --> 60002  
Number of packets: 584  
Average Delay: 0.003892680373287614  
Delay variance: 2.5038806236968236E-5  
Average PDV: 0.0038610003732877213  
PDV variance: 2.499593156875405E-5  
Average IPDV: 8.165008576336007E-8  
IPDV variance: 3.613819107098012E-7

----- Stream 7 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49156 --> 60003  
Number of packets: 581  
Average Delay: 0.004272848354561038  
Delay variance: 3.005910568563507E-5

Average PDV: 0.004241168354561149  
PDV variance: 3.0007368842802688E-5  
Average IPDV: 7.140689655179117E-8  
IPDV variance: 4.335732528403928E-7

## Results without Ack Filter

TCP throughput without ack filter

File Tools Help		
Simulation	Nodes	Throughput / Goodput
Little's Result		
Streams		
Node	Throughput	Goodput
0	2076064.9264641567	1350164.5653450624
1	2175794.774394282	1349890.6646340701
2	2175794.774394282	1349890.6646340701
3	103565.95734046408	0.0

## TCP Delay

TCP ALL:

----- Stream 0 -----

IPs: 10.1.3.2 --> 10.1.1.1

Ports: 60000 --> 49153

Number of packets: 1630

Average Delay: 0.0011233843871165693

Delay variance: 2.5765749536984133E-5

Average PDV: 0.0011233843871165693

PDV variance: 2.5749942328679237E-5

Average IPDV: -2.9009208103126727E-7  
IPDV variance: 1.6558902854233309E-6

----- Stream 1 -----

IPs: 10.1.3.2 --> 10.1.1.1  
Ports: 60001 --> 49154  
Number of packets: 2235  
Average Delay: 8.73082328411627E-4  
Delay variance: 2.2829405619444524E-5  
Average PDV: 8.73082328411627E-4  
PDV variance: 2.2819191120285935E-5  
Average IPDV: -4.123070725158366E-7  
IPDV variance: 6.006527318365723E-7

----- Stream 2 -----

IPs: 10.1.3.2 --> 10.1.1.1  
Ports: 60002 --> 49155  
Number of packets: 1480  
Average Delay: 0.0014512732581080908  
Delay variance: 4.1374158750221174E-5  
Average PDV: 0.0014512732581080908  
PDV variance: 4.134620323755211E-5  
Average IPDV: -6.285544286681266E-7  
IPDV variance: 1.1577651943828118E-6

----- Stream 3 -----

IPs: 10.1.3.2 --> 10.1.1.1  
Ports: 60003 --> 49156  
Number of packets: 2235  
Average Delay: 0.001053894991498869  
Delay variance: 3.331786775994651E-5  
Average PDV: 0.001053894991498869  
PDV variance: 3.3302960436563986E-5  
Average IPDV: -8.138612354520741E-7  
IPDV variance: 9.39000125521605E-7

----- Stream 4 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49153 --> 60000  
Number of packets: 2885  
Average Delay: 0.0014684554415944281  
Delay variance: 7.604466998445518E-6  
Average PDV: 0.0014684554415944281

PDV variance: 7.601831134667893E-6  
Average IPDV: -1.3959778085308478E-9  
IPDV variance: 4.129454863084407E-8

----- Stream 5 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49154 --> 60001  
Number of packets: 4467  
Average Delay: 0.0012715581643160411  
Delay variance: 7.989065271195854E-6  
Average PDV: 0.0012715581643160411  
PDV variance: 7.987276807960752E-6  
Average IPDV: -2.286609941738245E-9  
IPDV variance: 5.6012628316875245E-8

----- Stream 6 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49155 --> 60002  
Number of packets: 2595  
Average Delay: 0.0014395746967244463  
Delay variance: 9.268689175656207E-6  
Average PDV: 0.0014395746967244463  
PDV variance: 9.265117426455568E-6  
Average IPDV: -6.3215111797406056E-9  
IPDV variance: 1.2503655425091163E-7

----- Stream 7 -----

IPs: 10.1.1.1 --> 10.1.3.2  
Ports: 49156 --> 60003  
Number of packets: 4466  
Average Delay: 9.036105897895161E-4  
Delay variance: 5.623439748393179E-6  
Average PDV: 8.736105897893137E-4  
PDV variance: 5.622180581409668E-6  
Average IPDV: -5.058006718880869E-9  
IPDV variance: 5.8683432360711405E-8