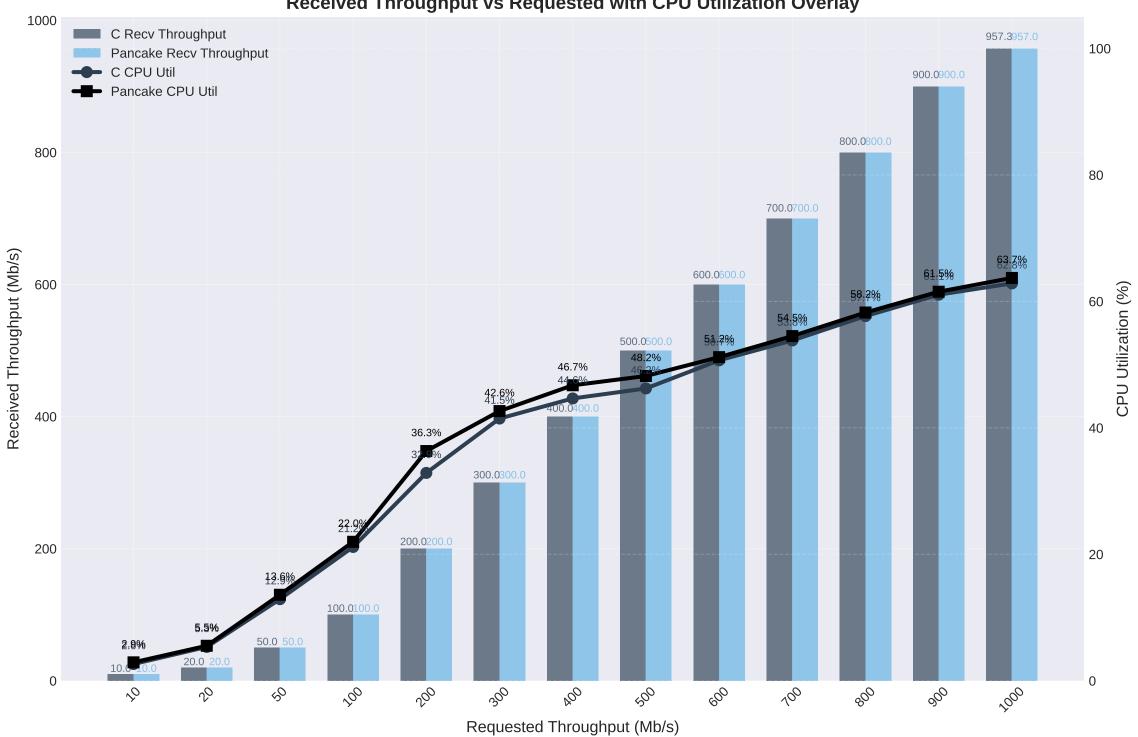
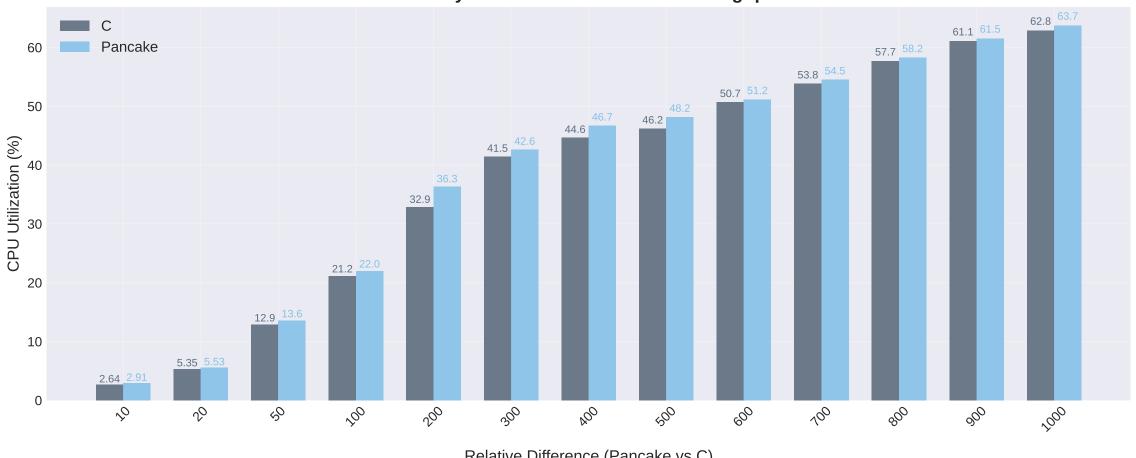
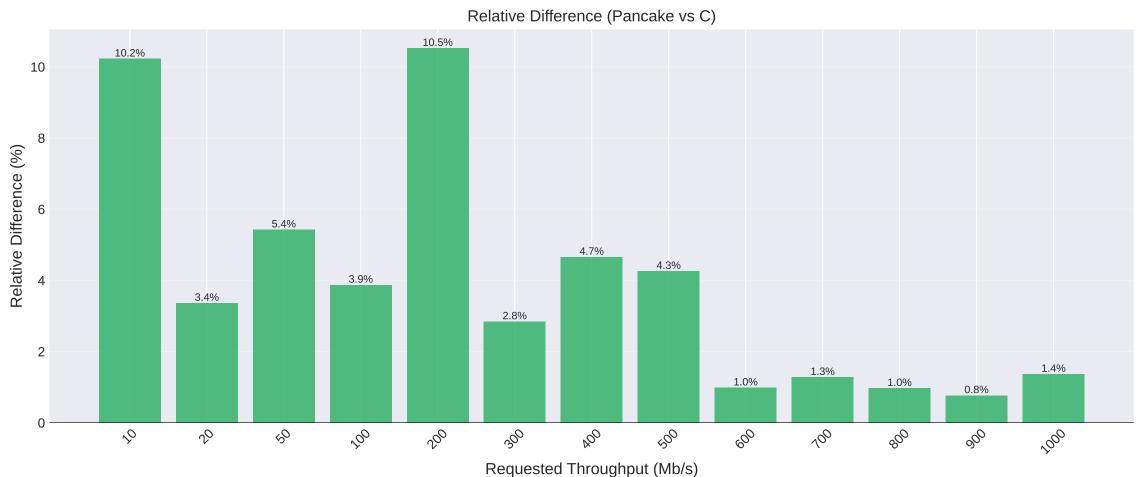
**Instructions per Second vs Throughput** 0.69 0.7 С 0.66 0.66 Pancake 0.6 0.56 0.56 Instructions per Second (Billions) 0.51 0.50 0.50 0.51 0.51 0.51 0.50 0.50 0.50 0.50 0.50 0.50 0.49 0.49 0.40 0.35 0.35 0.34 0.33 0.1 0.0 200 200 300 NO 500 600 700 900 900 2000 30 20 60 Relative Difference (Pancake vs C) 30 28.8% 25 Relative Difference (%) 5 -0.3% -0.1% -0.4% -0.3% -0.5% -1.1% -1.8% -2.4% -2.5% \$0 20 200 200 300 NOO 500 600 700 900 900 60 Requested Throughput (Mb/s)

**Received Throughput vs Requested with CPU Utilization Overlay** 

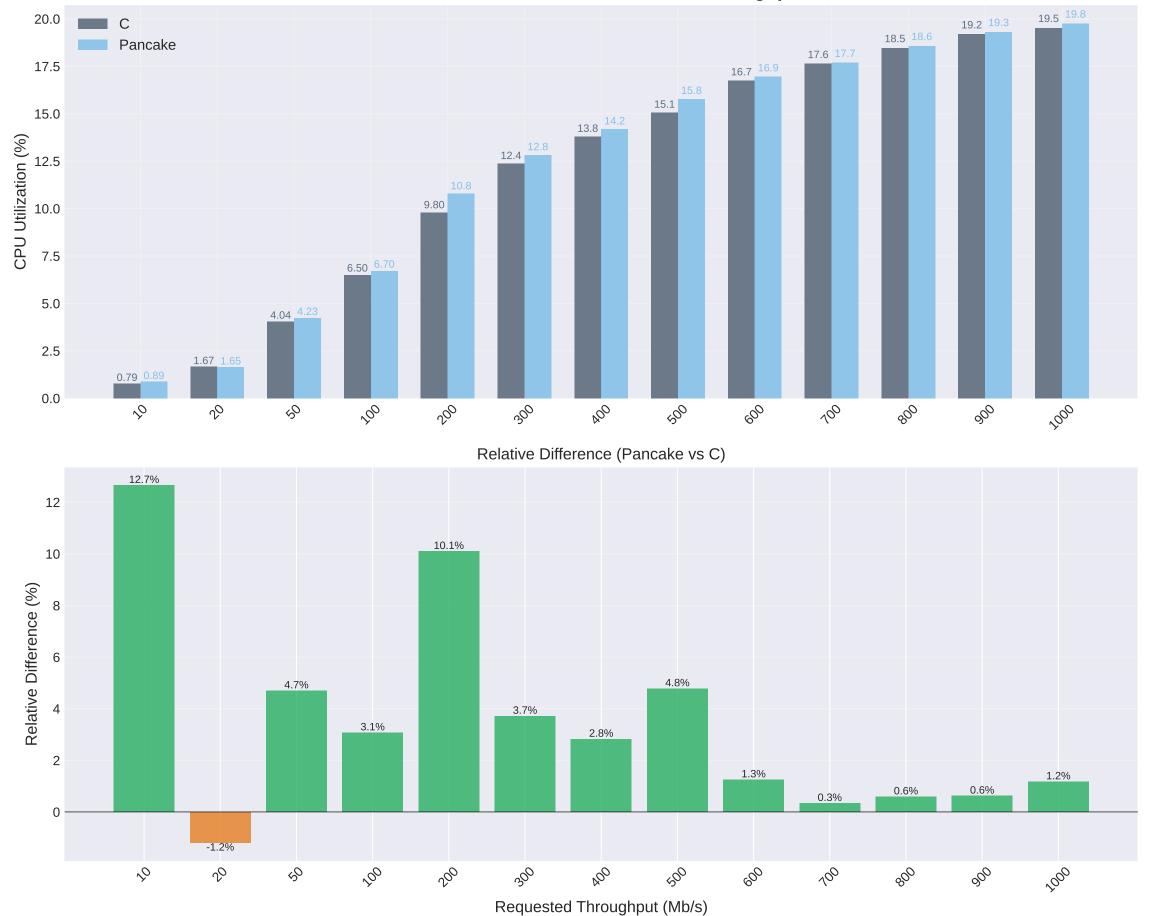


**Total System CPU Utilization vs Throughput** 

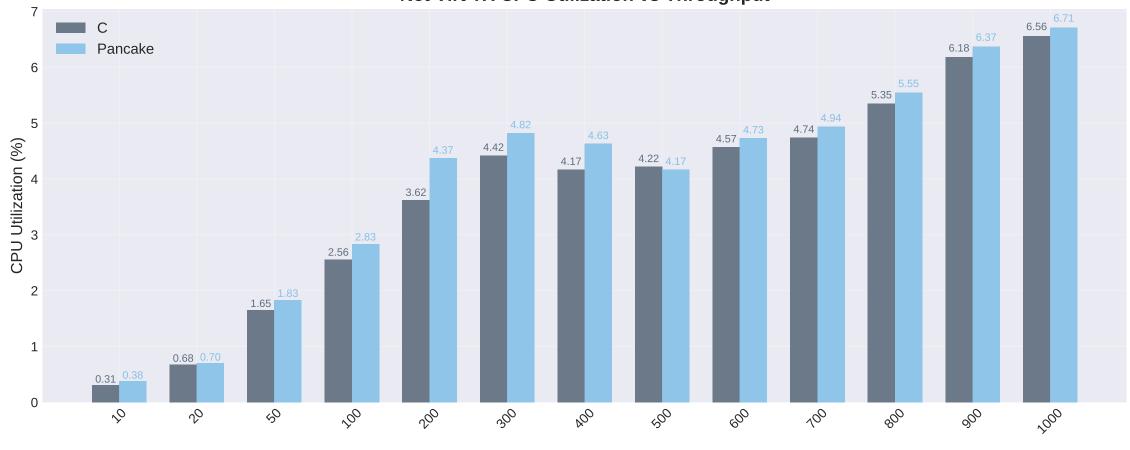


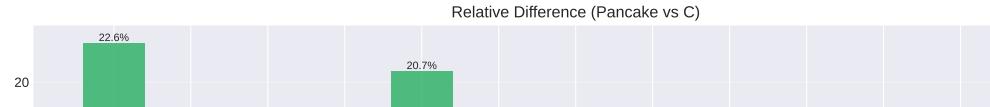


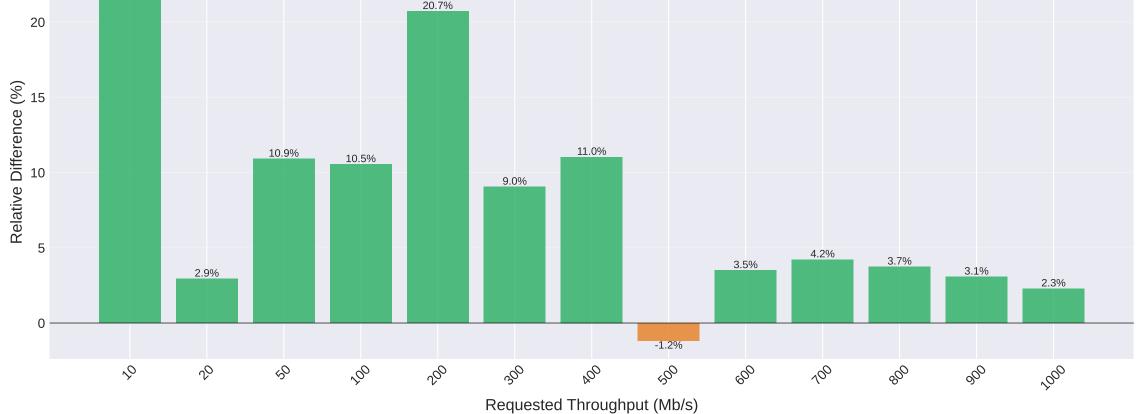
**Ethernet Driver CPU Utilization vs Throughput** 



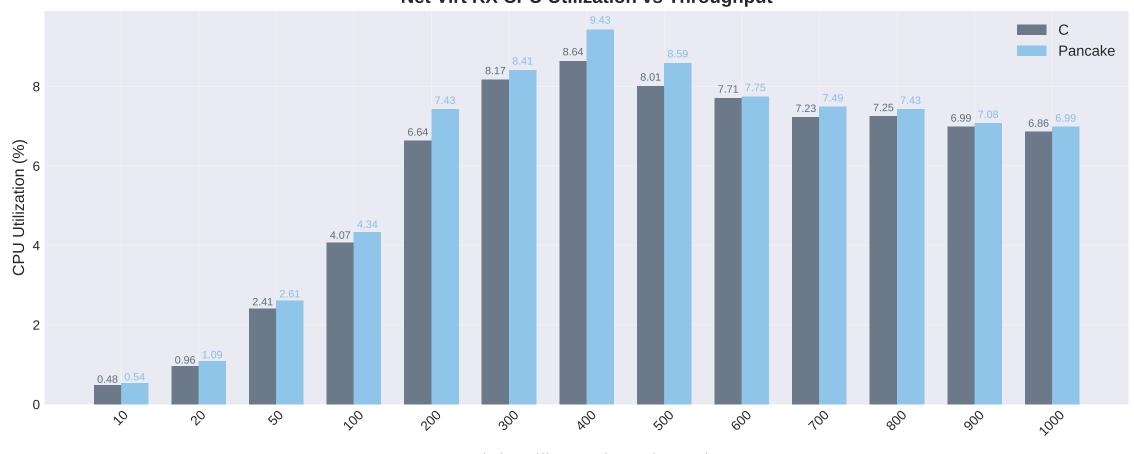


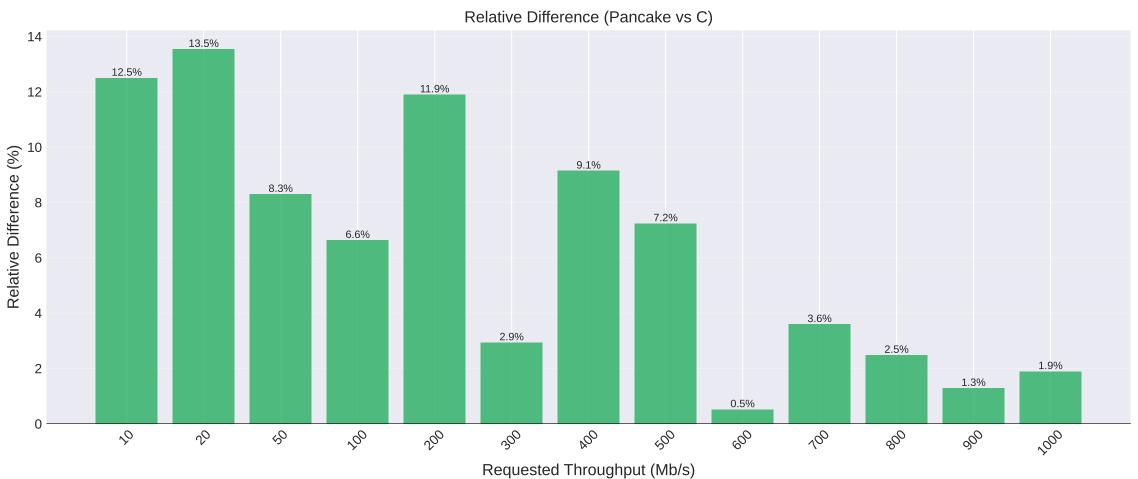




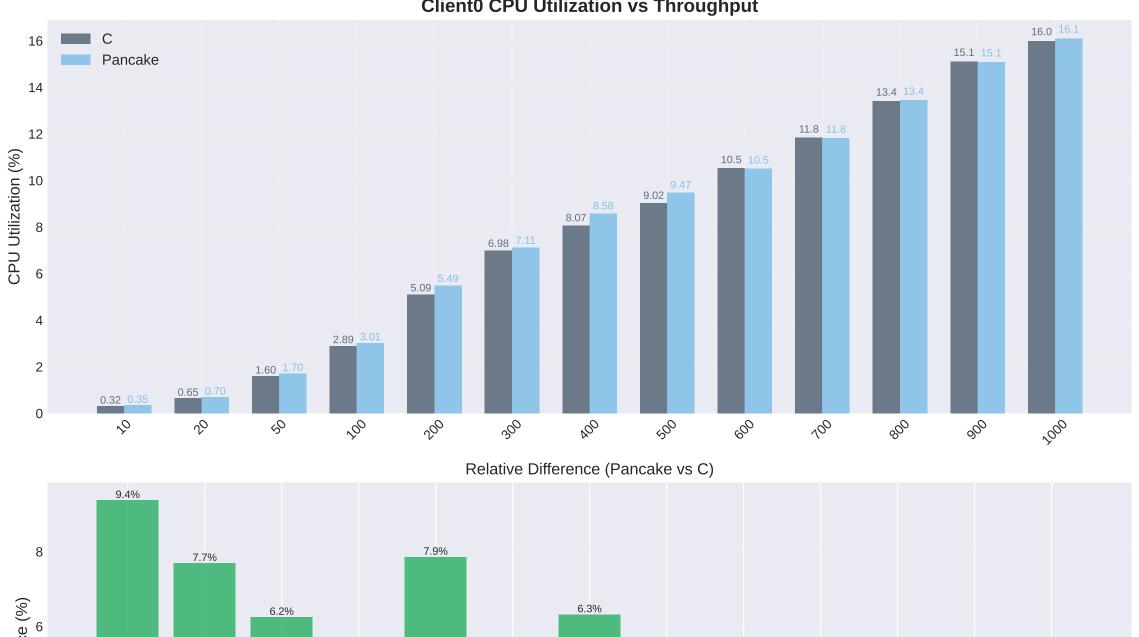


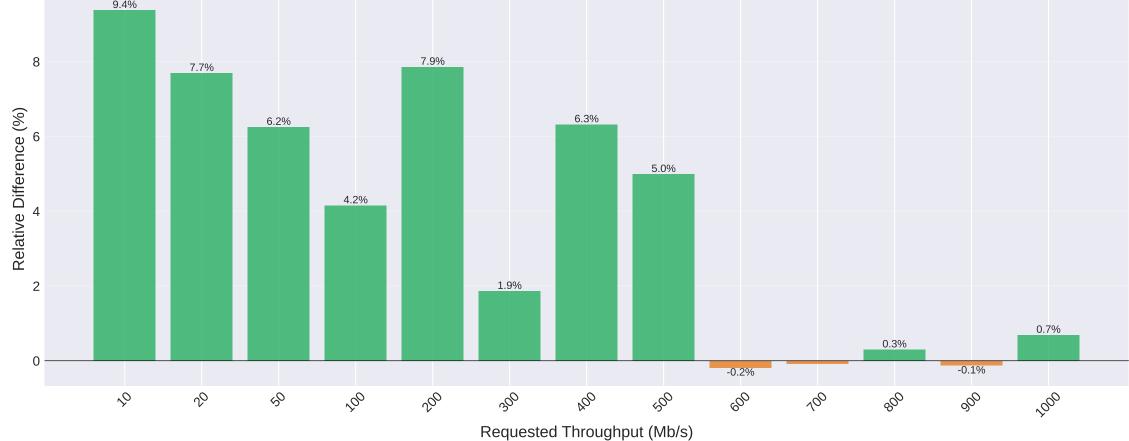
**Net Virt RX CPU Utilization vs Throughput** 



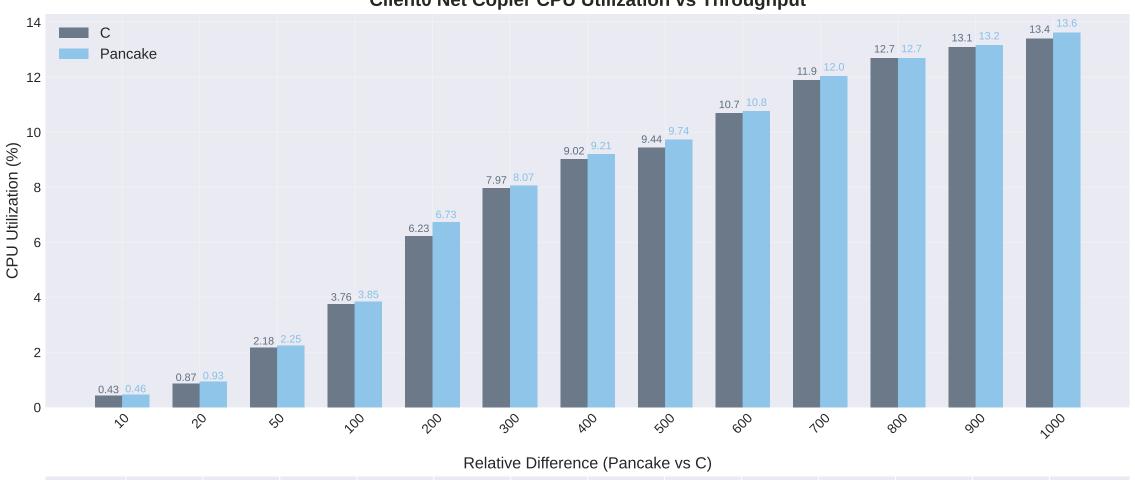


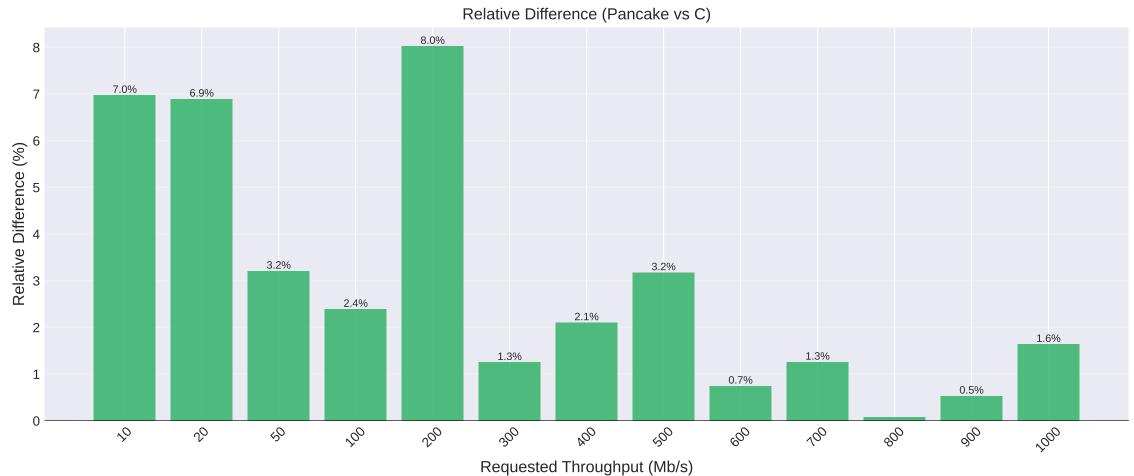
**Client0 CPU Utilization vs Throughput** 



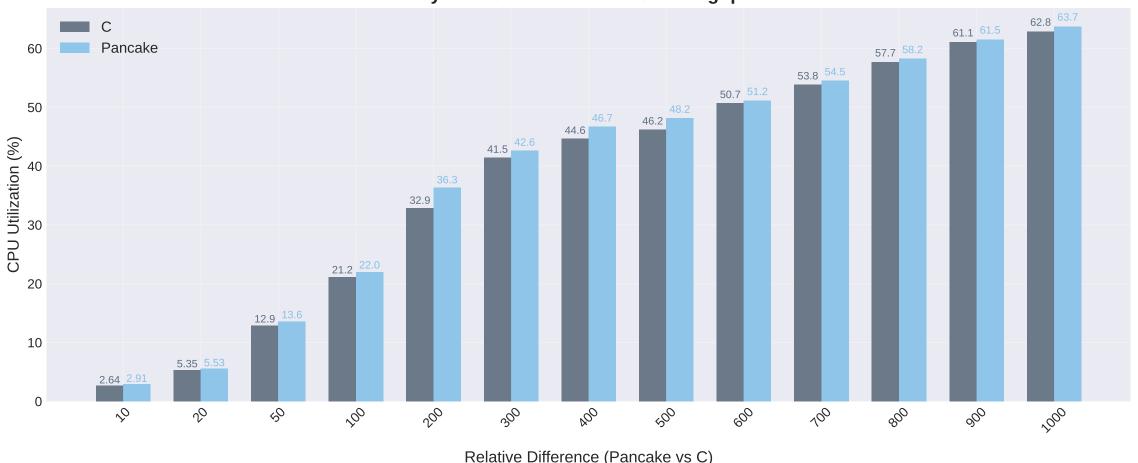


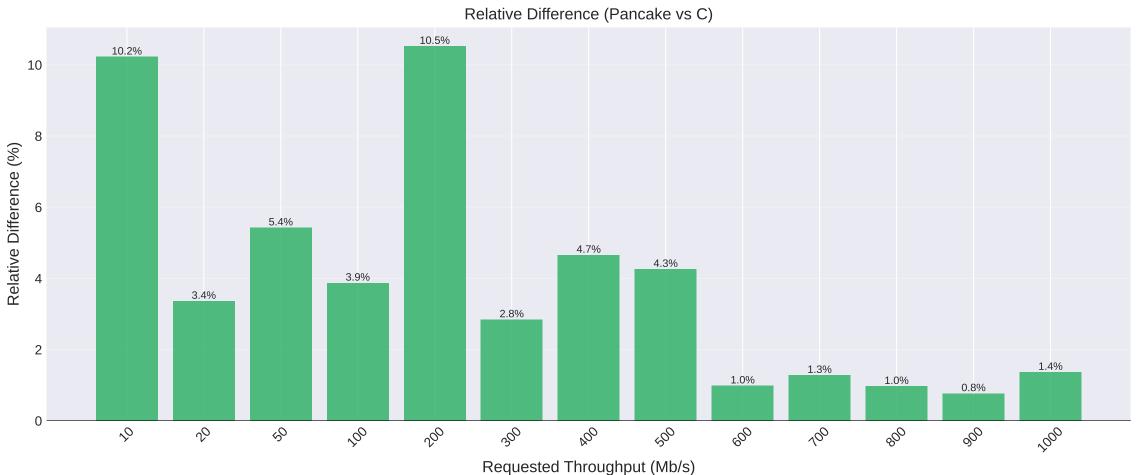
**Client0 Net Copier CPU Utilization vs Throughput** 

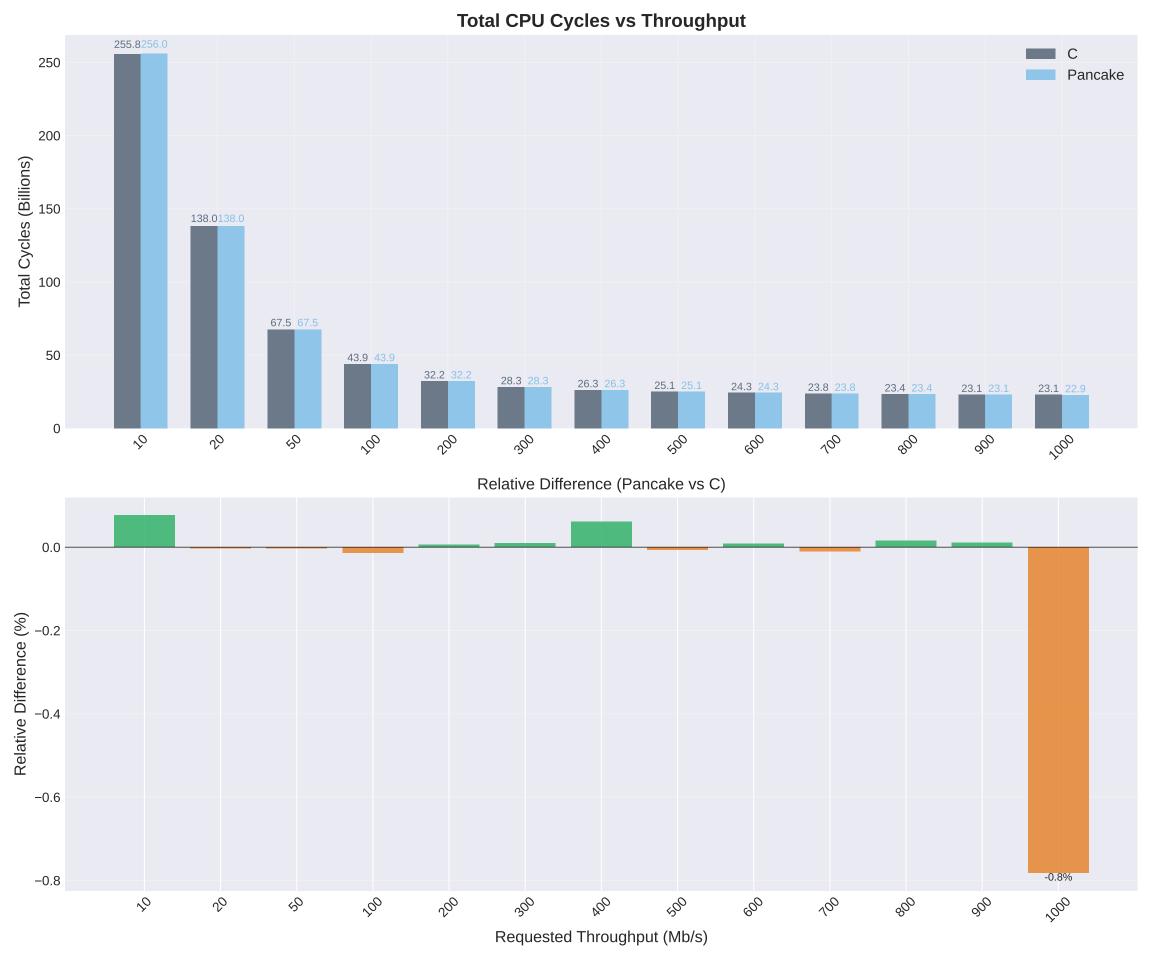




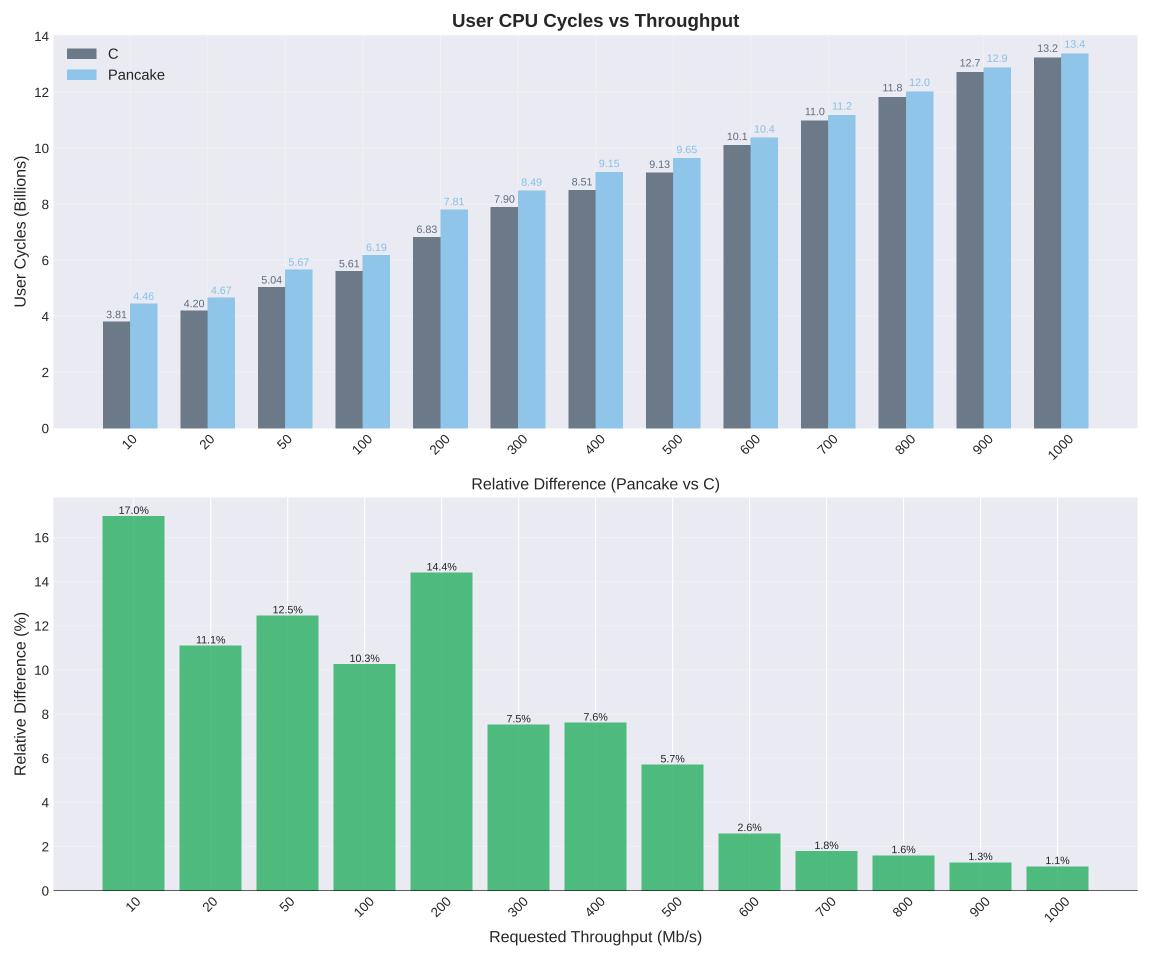
**System CPU Utilization vs Throughput** 





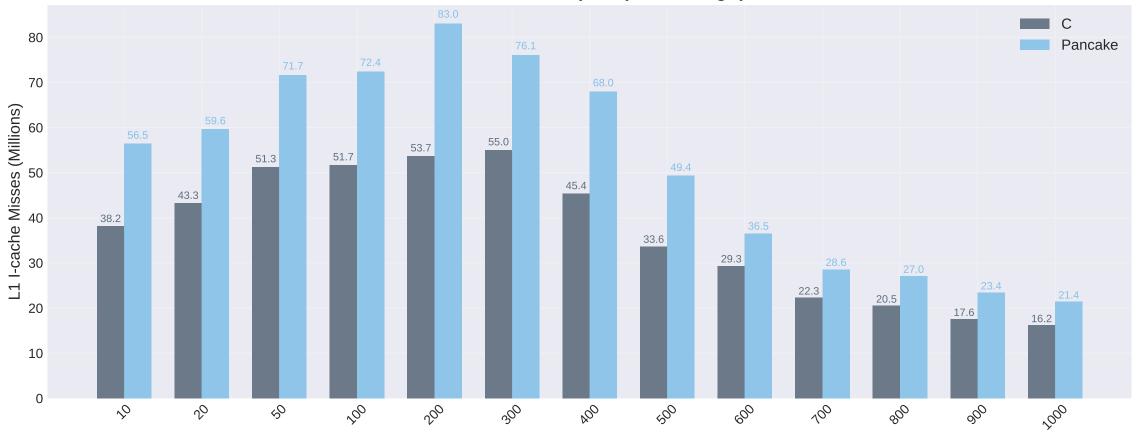


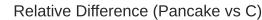
**Kernel CPU Cycles vs Throughput** 3.41 3.5 С 3.30 Pancake 3.10 3.02 2.99 2.96 3.0 2.52 Kernel Cycles (Billions) 2.36 2.34 2.26 2.30 2.10 1.73 1.69 1.55 1.27 1.15 0.5 0.0 200 \$0 700 300 NOO 400 600 700 900 900 2000 20 60 Relative Difference (Pancake vs C) 4 3.7% 2.0% 2 Relative Difference (%) -0.8% -0.8% -2.1% -3.7% -4.4% -4.4% -5.2% -5.3% -5.4% -6 -6.3% -6.8% \$ 20 60 200 200 300 NOO 400 600 700 900 Requested Throughput (Mb/s)

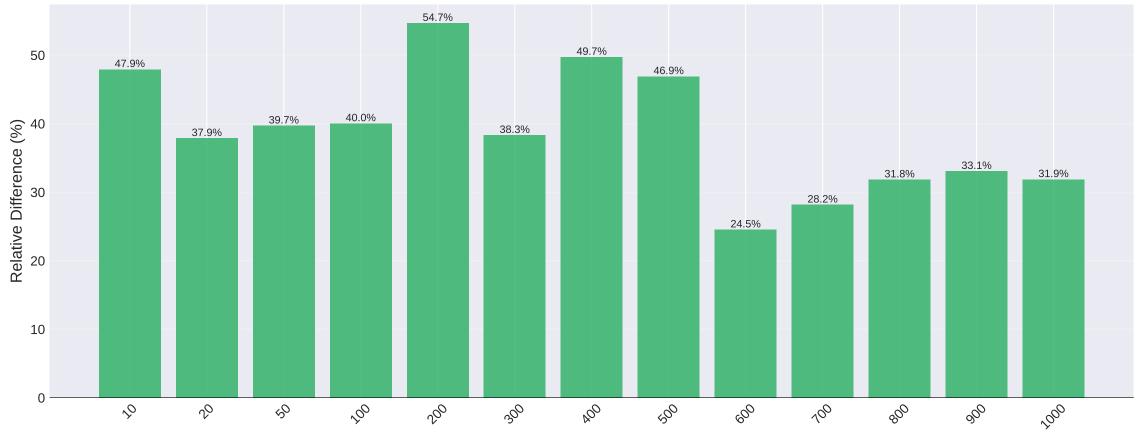


Idle CPU Cycles vs Throughput 249.0248.5 250 \_\_\_\_ C Pancake 200 Idle Cycles (Billions) 130.6130.4 58.8 58.4 50 34.6 34.3 21.6 20.5 16.6 16.2 14.5 14.0 13.5 13.0 12.0 11.9 11.0 10.8 9.90 9.77 8.57 8.30 0 \$0 200 200 300 NOO 400 600 700 800 900 2000 20 50 Relative Difference (Pancake vs C) 0 -0.2% -0.2% -0.8% -1 -1.0% -1.1% -1.2% -1.3% -1.5% Relative Difference (%) -2.0% -3.1% -3.7% -3.7% -4 -5 -5.1% 30 20 SO 200 200 300 NOO 400 600 100 900

# L1 I-cache Misses (Total) vs Throughput

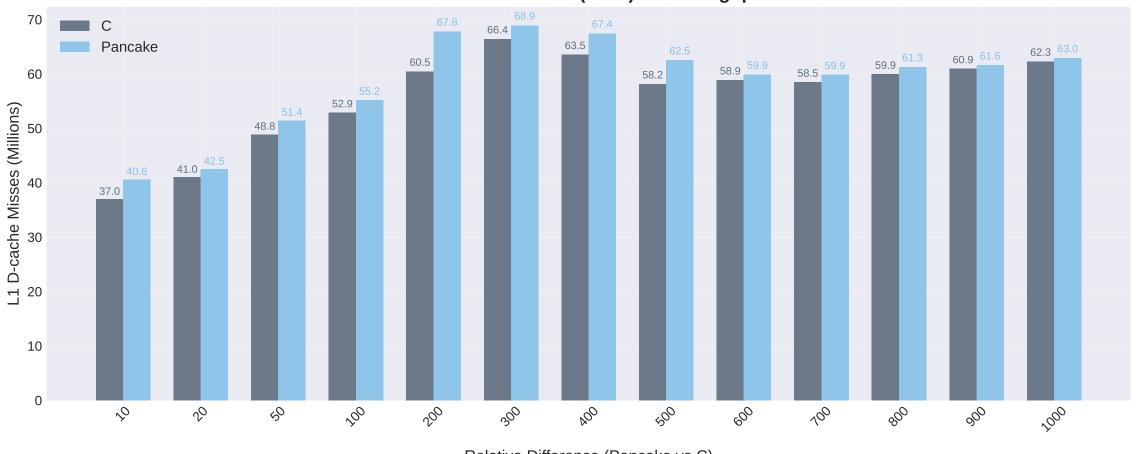


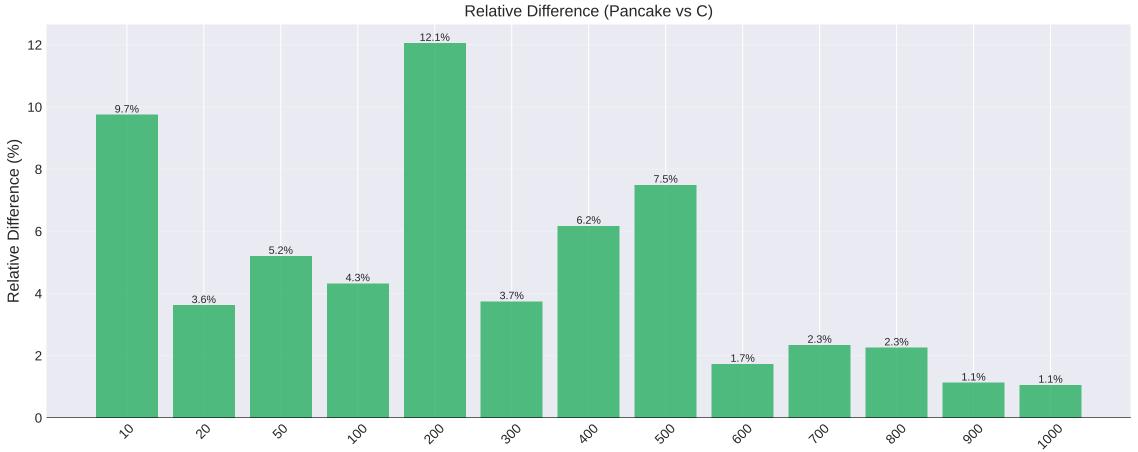




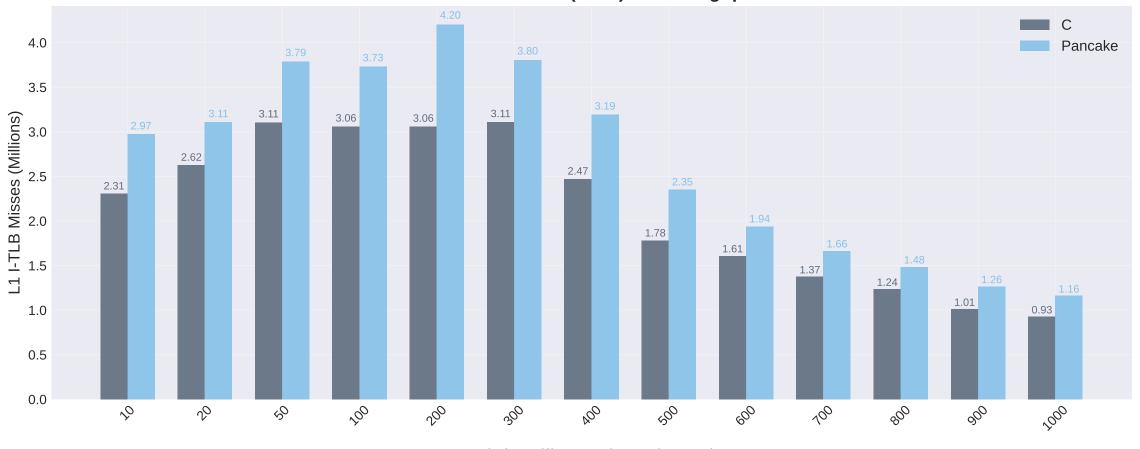
Requested Throughput (Mb/s)

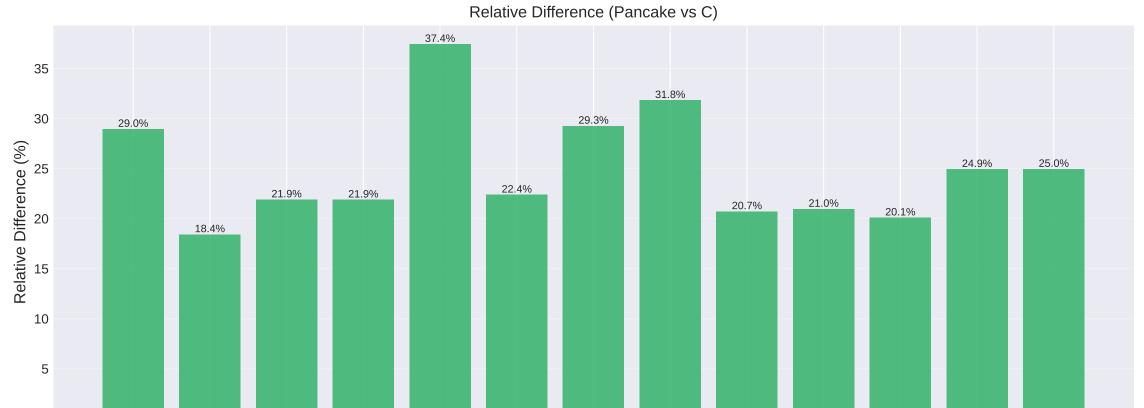
# L1 D-cache Misses (Total) vs Throughput





# L1 I-TLB Misses (Total) vs Throughput



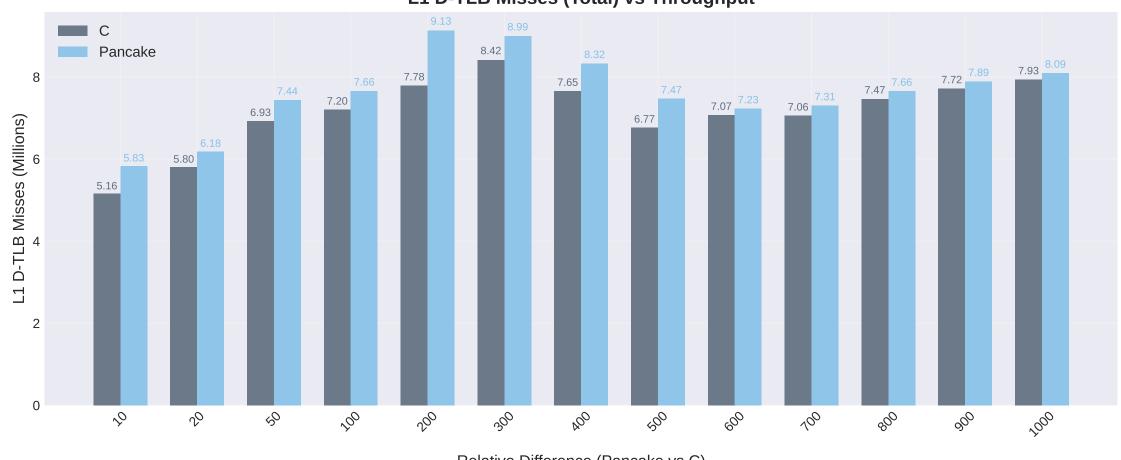


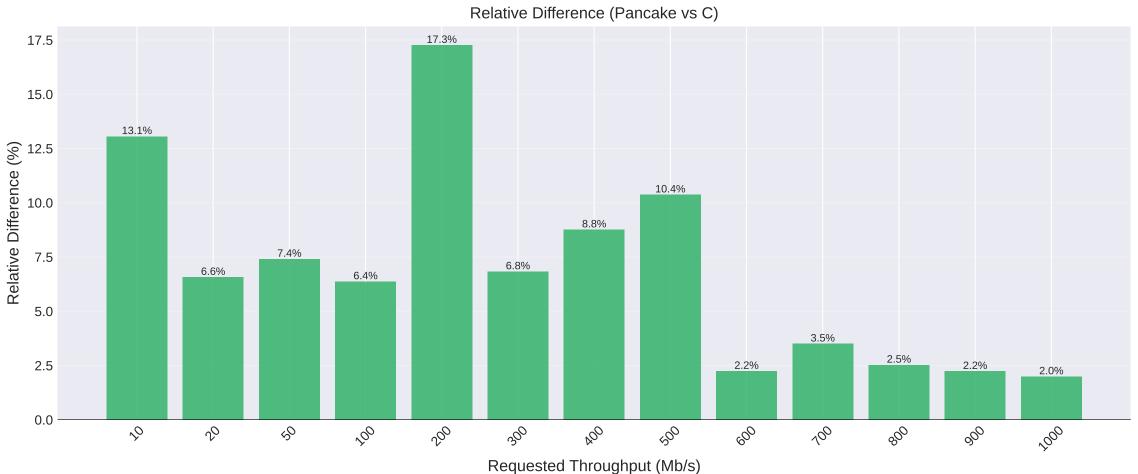
NOO

Requested Throughput (Mb/s)

\$0

L1 D-TLB Misses (Total) vs Throughput





**Instructions (Total) vs Throughput** 183002.2 178510.0 С 175000 Pancake 150000 Instructions (Millions) 125000 100000 94224.8200.9 75000 50000 3882136673.5 25000 21772.0696.9 12982.<mark>0</mark> <u>12781.5552.9</u> <u>12152.4161.6</u> <u>11897.0865.9</u> <u>11580.2566.1</u> <u>11382.9372.2</u> <u>11353.5224.9</u> 9840.<del>5</del>790.8 8826.8614.1 0 100 200 300 NOO 400 600 700 900 900 2000 30 20 SO Relative Difference (Pancake vs C) 30 28.8% 25 Relative Difference (%) 5 0 -0.3% -0.1% -0.4% -0.3% -0.5% -1.1% -1.8% -2.4% -2.5%

Requested Throughput (Mb/s)

NOO

500

600

700

900

900

30

20

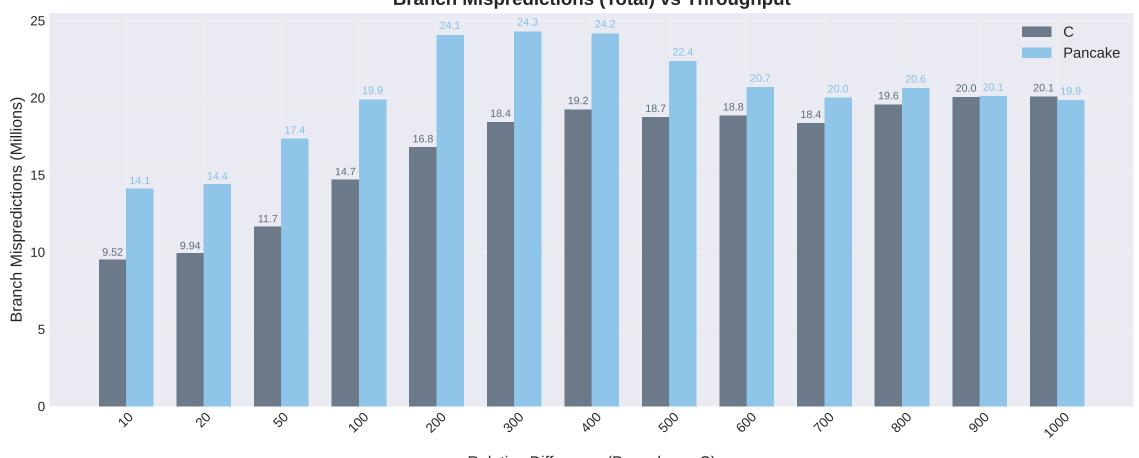
50

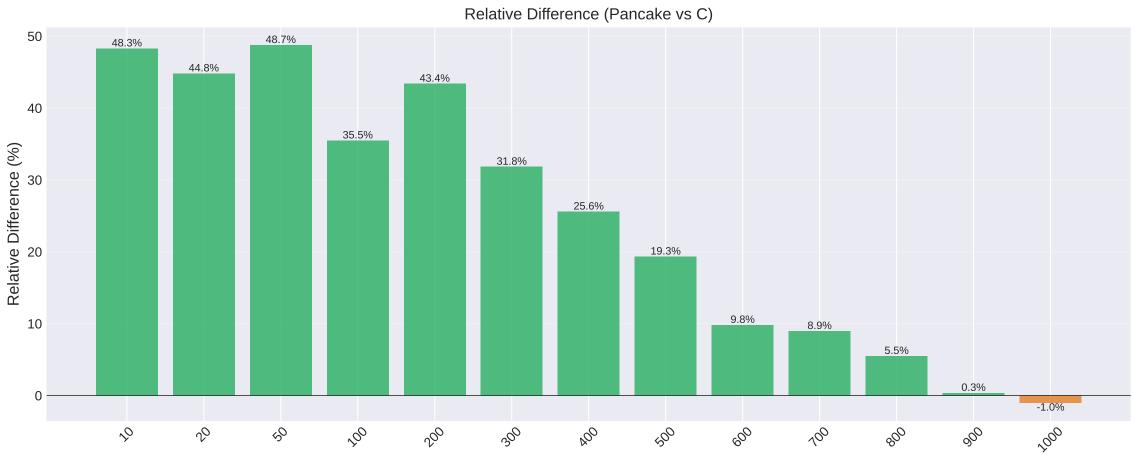
200

200

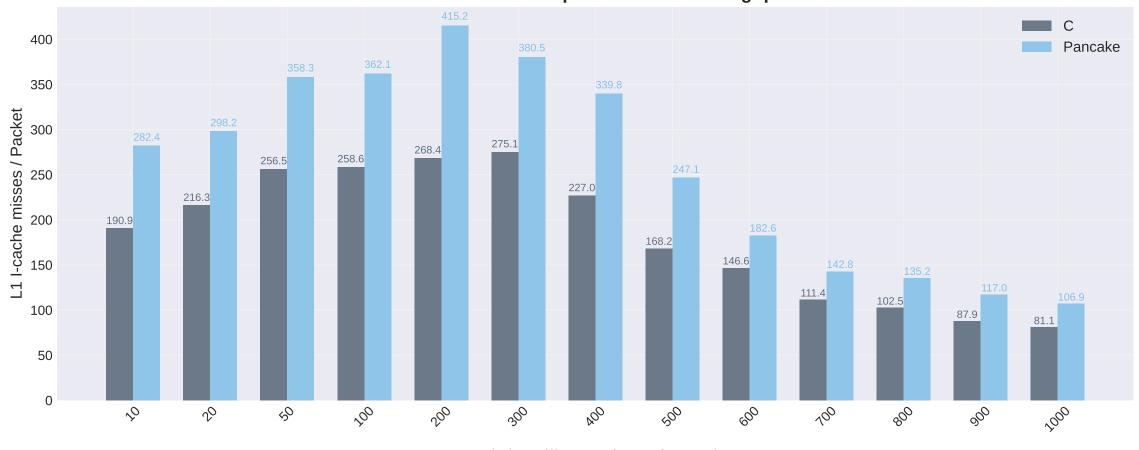
300

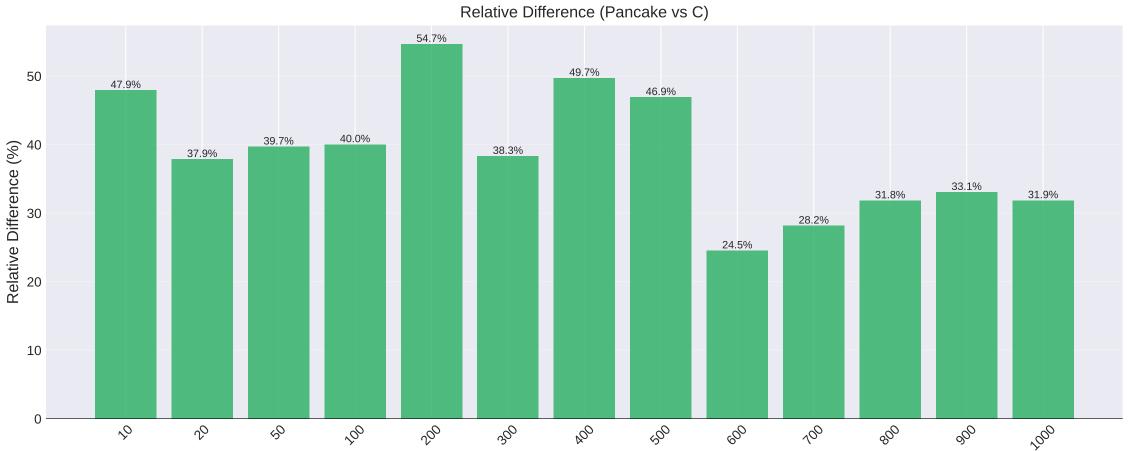
Branch Mispredictions (Total) vs Throughput



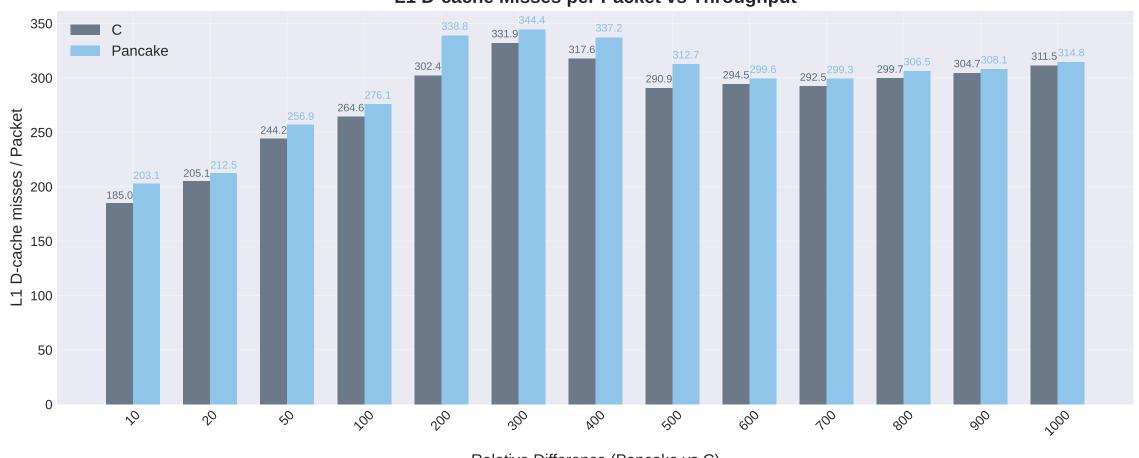


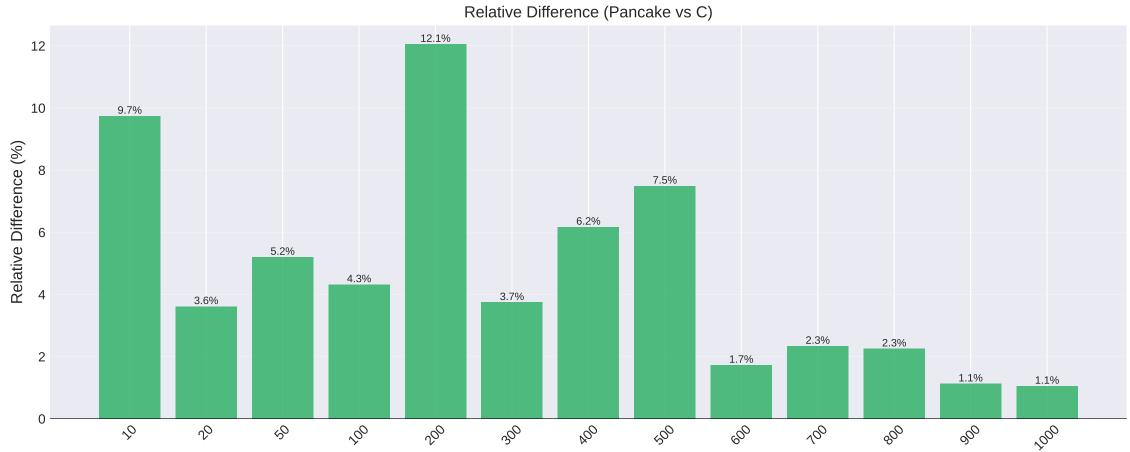
**L1** I-cache Misses per Packet vs Throughput



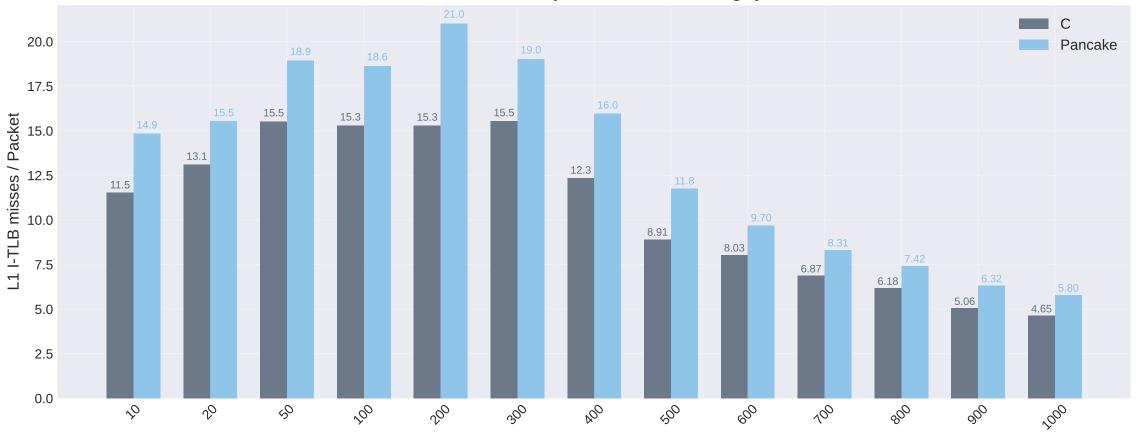


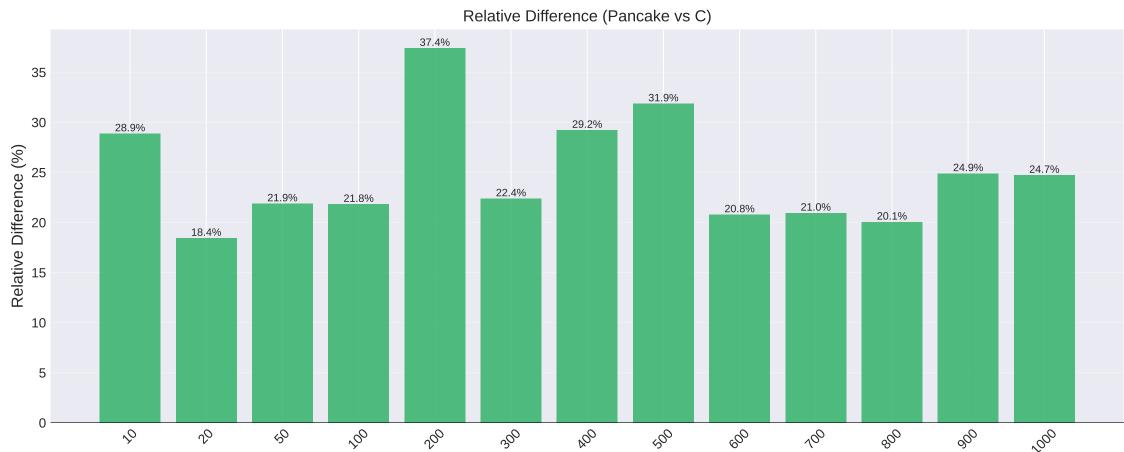
# **L1 D-cache Misses per Packet vs Throughput**



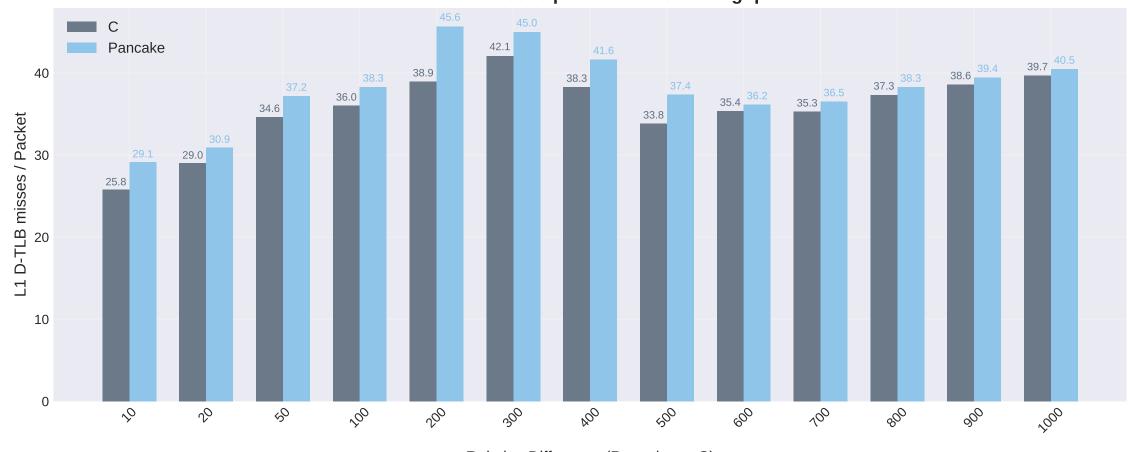


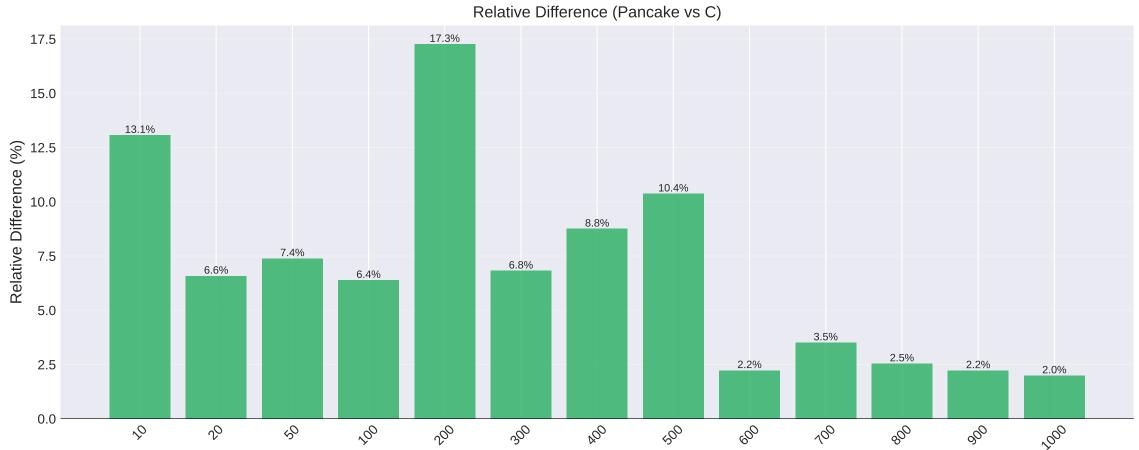
## **L1 I-TLB Misses per Packet vs Throughput**





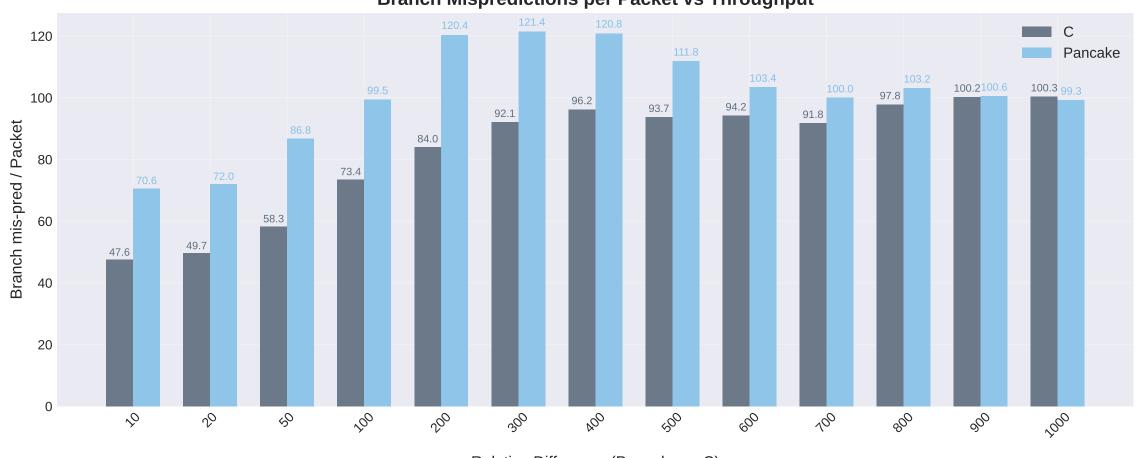
# **L1 D-TLB Misses per Packet vs Throughput**

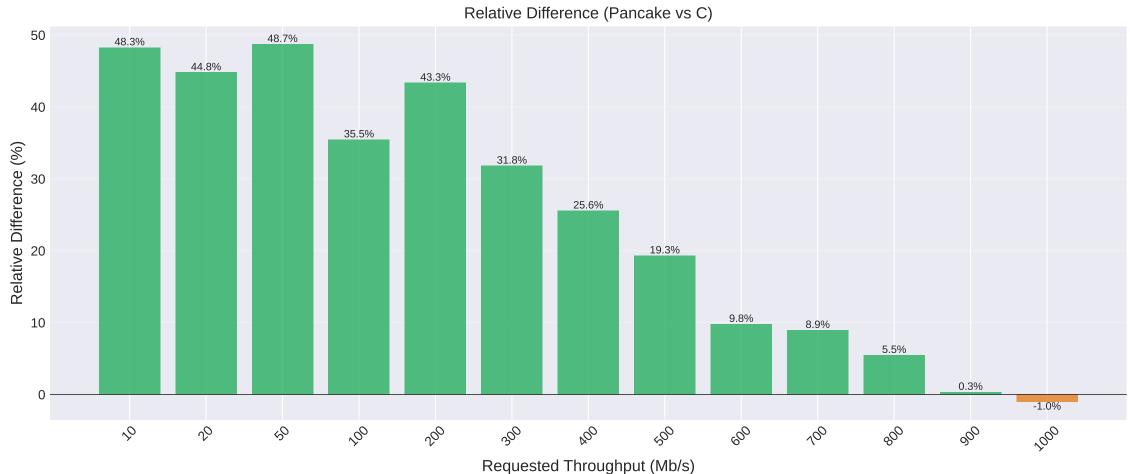


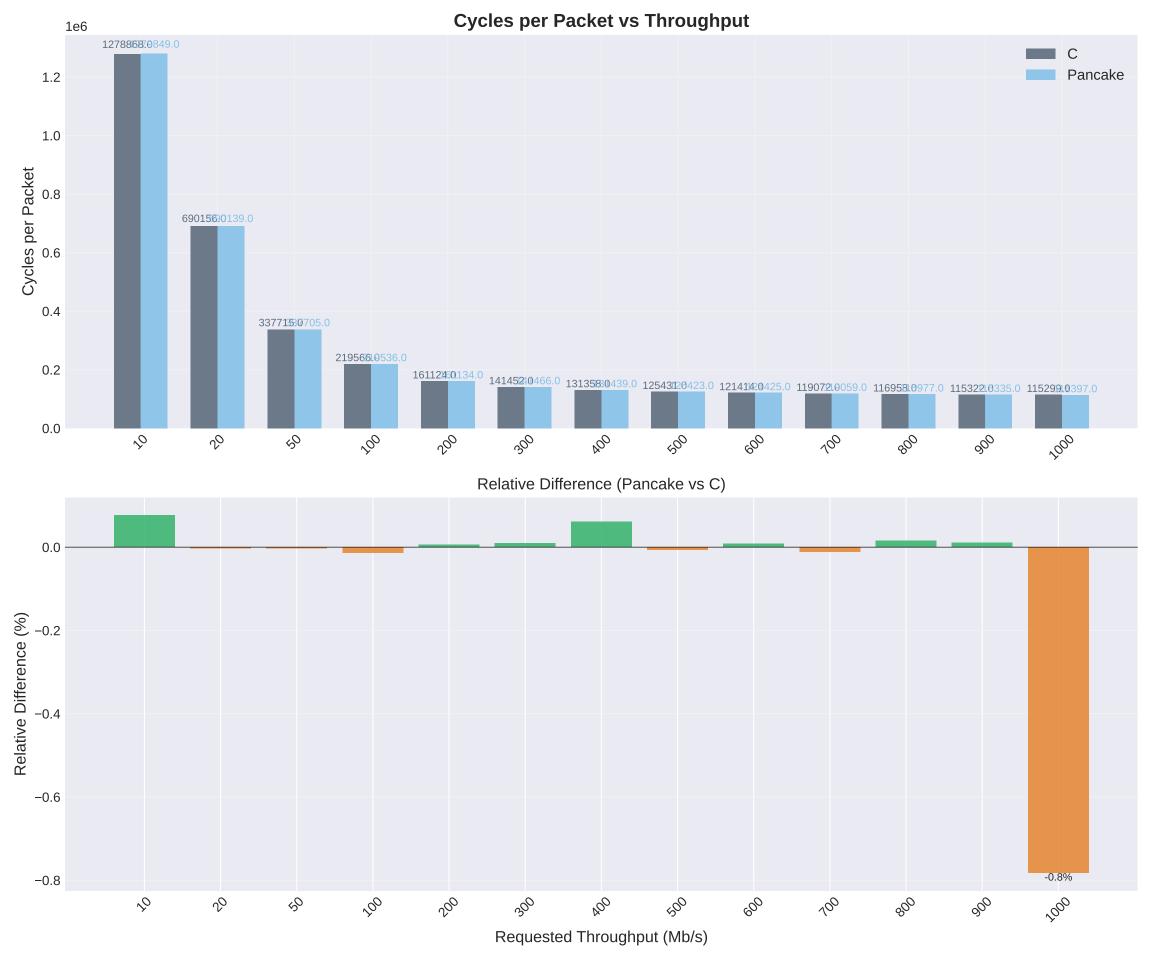


**Instructions per Packet vs Throughput** 915010.0 С Pancake 800000 instructions / Packet 600000 4711237.0004.0 400000 19410799367.0 200000 108859.0484.0 64910.<mark>0</mark>  $6390760764.0 \quad 6076160808.0 \quad 5948460329.0 \quad 5790160830.0 \quad 5691460861.0 \quad 5676760124.0 \quad 50761608161.0 \quad 5076160124.0 \quad 507$ 4920240953.0 4413140070.0 0 2000 goo 200 200 300 NOO 400 600 100 900 \$ 20 SO Relative Difference (Pancake vs C) 30 28.8% 25 Relative Difference (%) 5 0 -0.3% -0.1% -0.4% -0.3% -0.5% -1.1% -1.8% -2.4% -2.5% 30 20 200 200 300 NOO 500 600 900 80 100

Branch Mispredictions per Packet vs Throughput







**Instructions per Packet vs Throughput** 915010.0 С Pancake 800000 Instructions per Packet 600000 4711237.0004.0 400000 19410799367.0 200000 108859.0484.0 64910.<mark>0</mark>  $6390760764.0 \quad 6076160808.0 \quad 5948460329.0 \quad 5790160830.0 \quad 5691460861.0 \quad 5676760124.0 \quad 50761608161.0 \quad 5076160124.0 \quad 507$ 4920240953.0 4413140070.0 0 2000 600 200 200 300 NOO 400 100 900 900 \$ 20 SO Relative Difference (Pancake vs C) 30 28.8% 25 Relative Difference (%) 5 0 -0.3% -0.1% -0.4% -0.3% -0.5% -1.1% -1.8% -2.4% -2.5%

Requested Throughput (Mb/s)

NOO

500

600

100

900

30

20

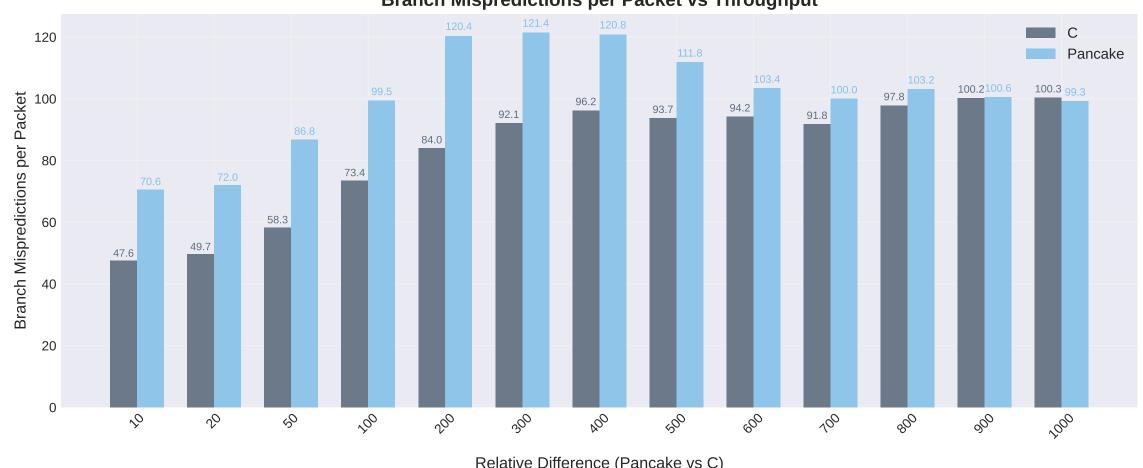
80

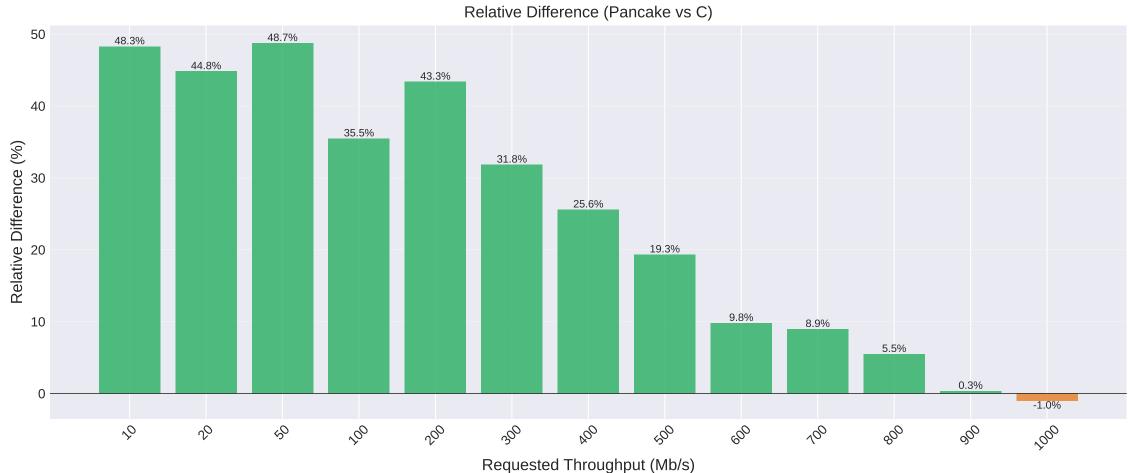
200

200

300

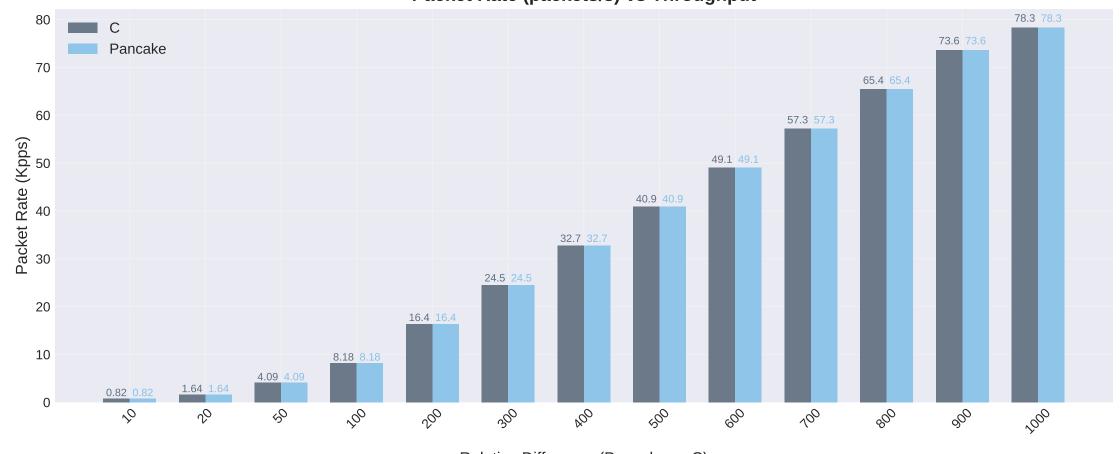
Branch Mispredictions per Packet vs Throughput

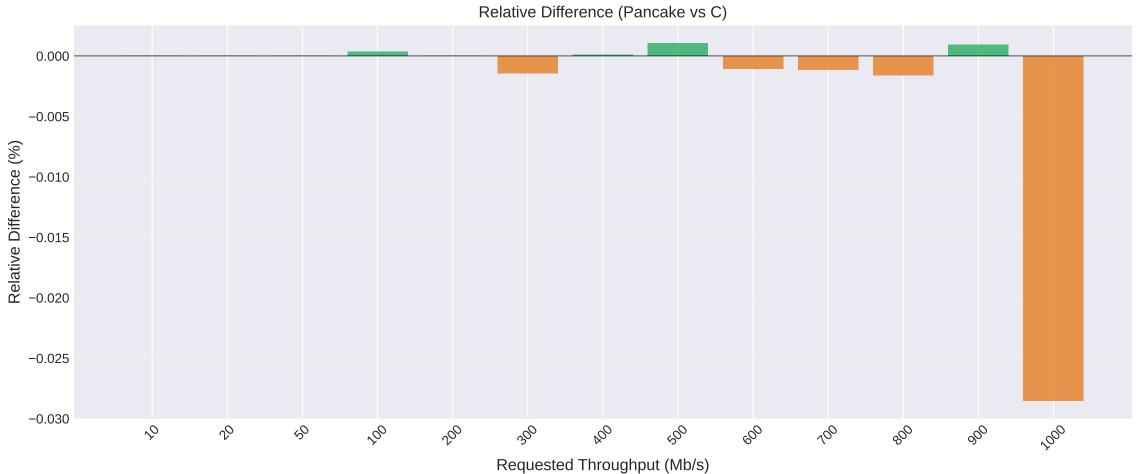


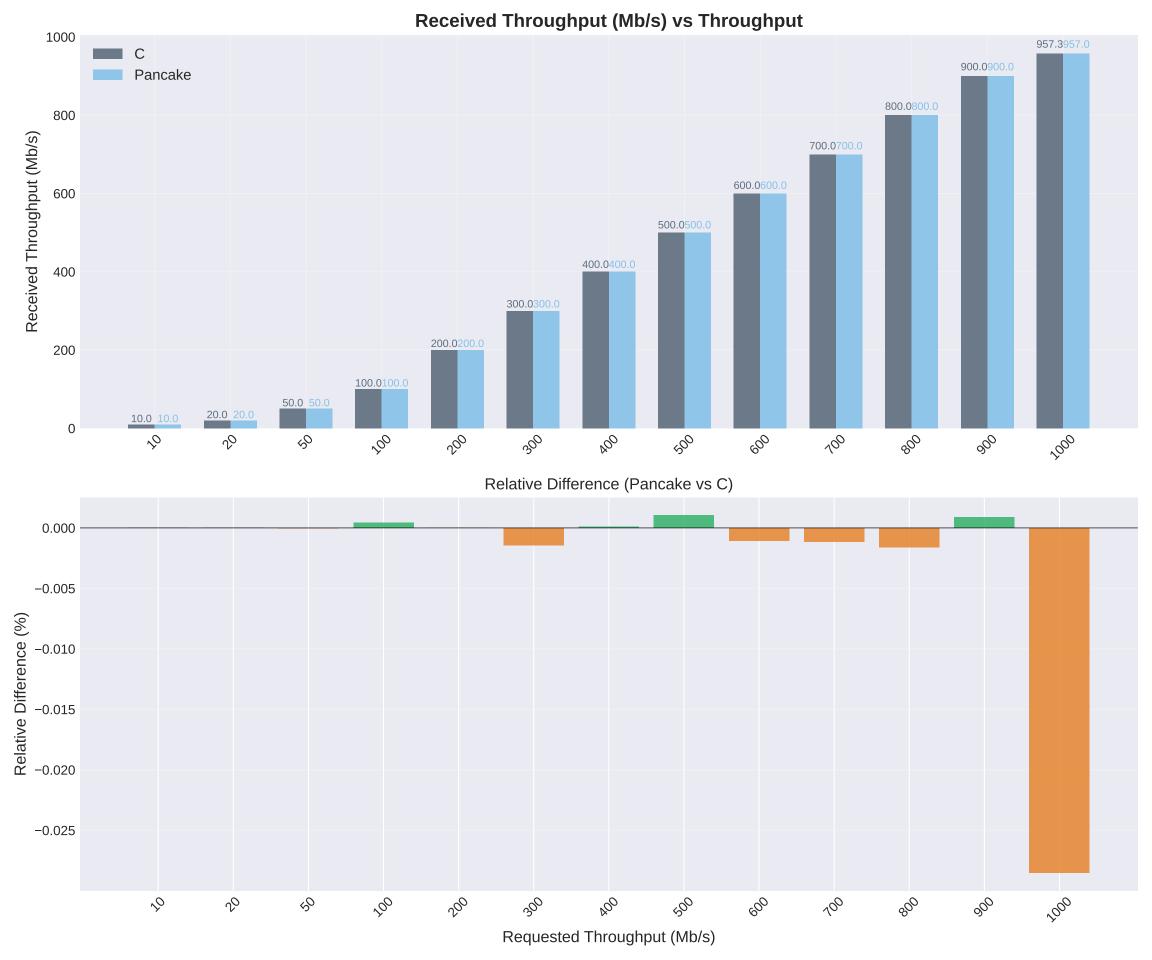












Sent Throughput (Mb/s) vs Throughput 1000.0000.0 1000 С Pancake 900.0900.0 800.0800.0 800 Sent Throughput (Mb/s) 700.0700.0 600.0600.0 600 500.0500.0 400.0400.0 400 300.0300.0 200.0200.0 200 100.0100.0 50.0 50.0 20.0 20.0 10.0 10.0 0 7000 900 \$ 200 200 300 NOO 400 600 700 900 20 50 Relative Difference (Pancake vs C) 0.0004 0.0002 Relative Difference (%) 0.0000 -0.0002 -0.0004-0.0006\$ 20 200 200 300 NOO 400 600 100 900 80