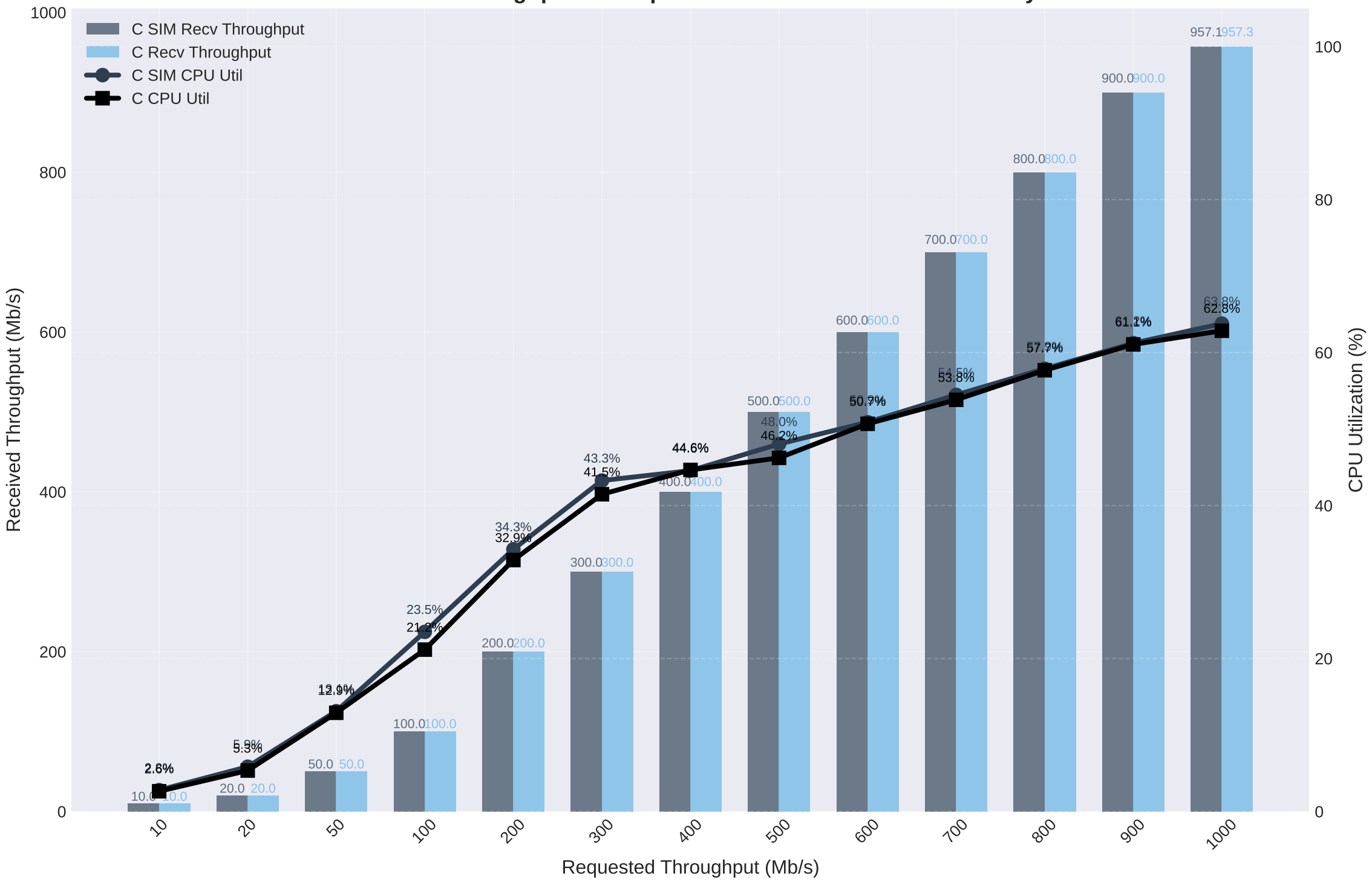
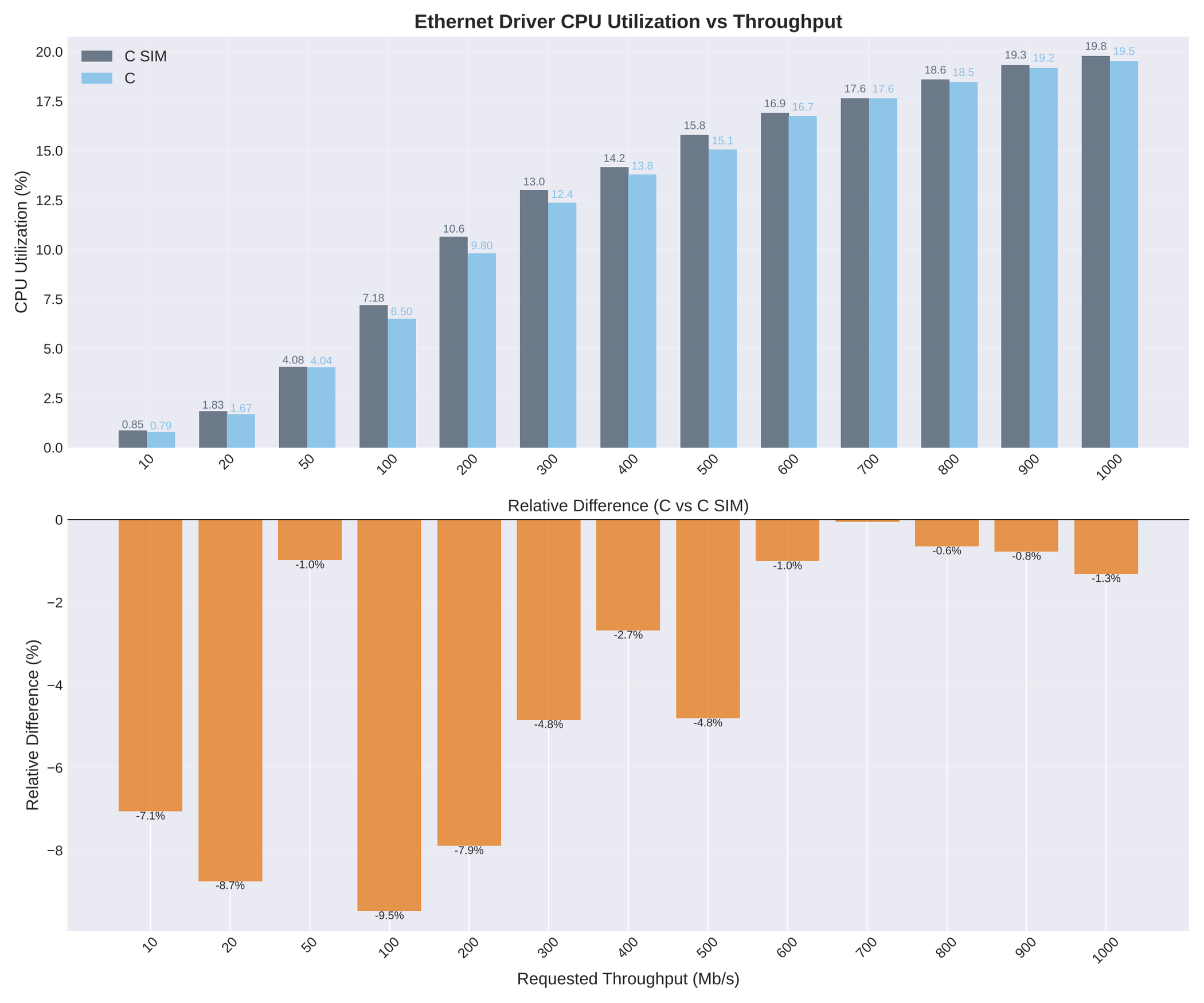
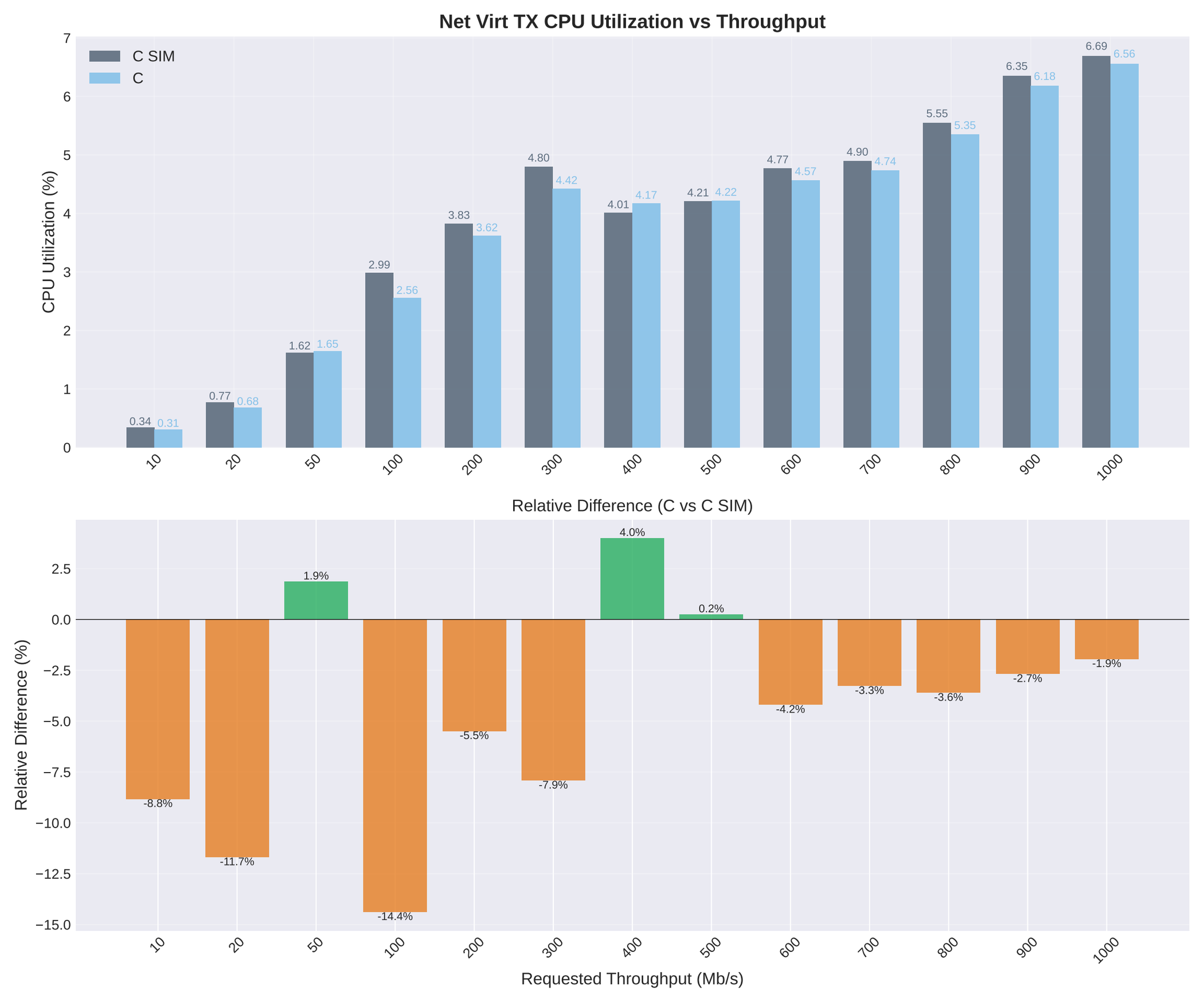
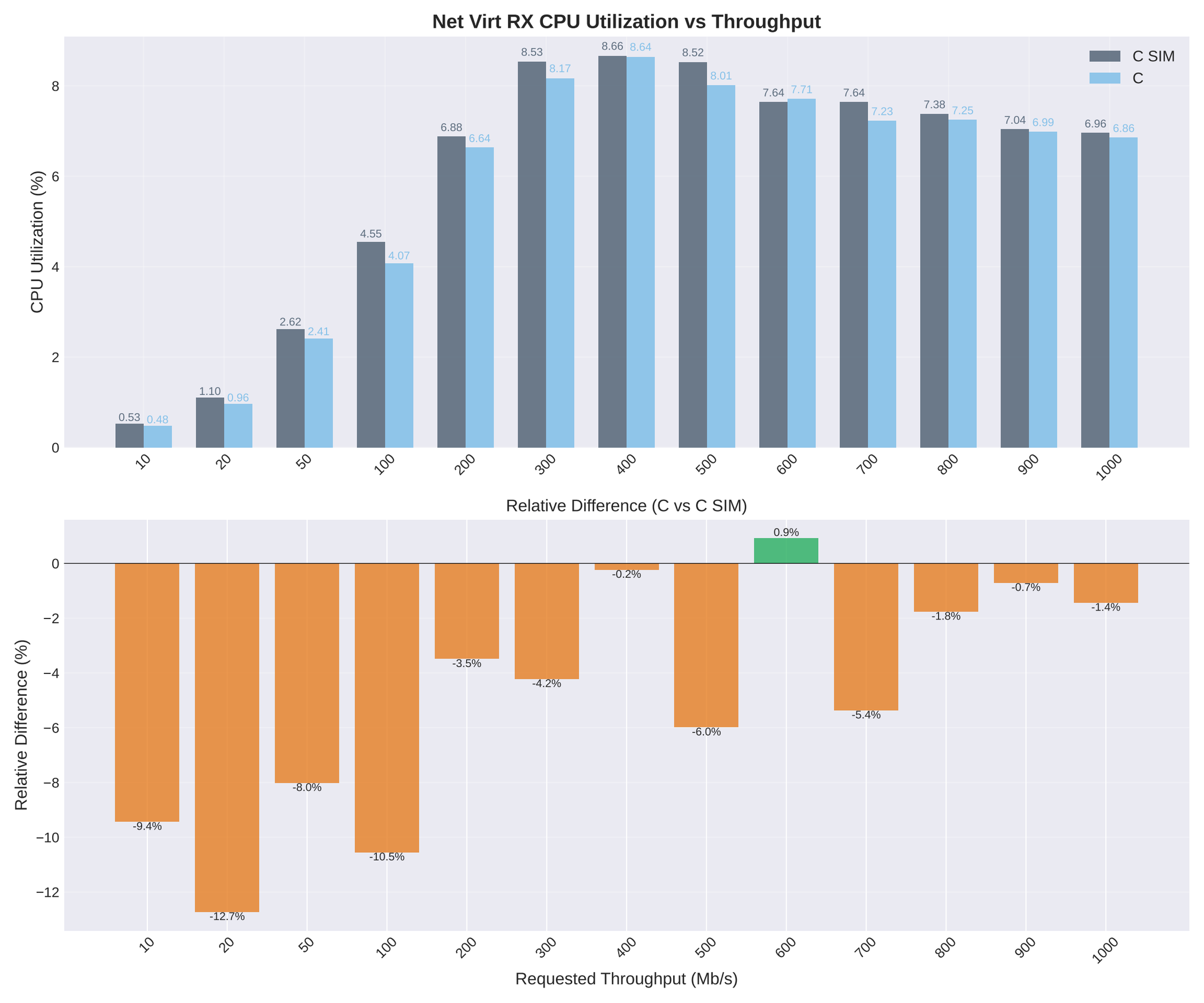

Instructions per Second vs Throughput
C SIM
C
Instructions per Second (Billions)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.66 0.69
0.66 0.66
0.57 0.56
0.49 0.49
0.41 0.40
0.51 0.35
0.36 0.34
0.52 0.51
0.52 0.50
0.51 0.51
0.51 0.50
0.51 0.50
0.50 0.50
10 20 50 100 200 300 400 500 600 700 800 900 1000
Relative Difference (C vs C SIM)
Relative Difference (%)
5
0
−5
−10
−15
−20
−25
−30
4.7%
-1.1%
0.3%
-2.0%
-31.6%
-5.0%
-0.4%
-2.2%
-1.3%
-1.8%
-1.6%
0.1%
10 20 50 100 200 300 400 500 600 700 800 900 1000
Requested Throughput (Mb/s)


Received Throughput vs Requested with CPU Utilization Overlay
C SIM Recv Throughput
C Recv Throughput
C SIM CPU Util
C CPU Util
Received Throughput (Mb/s)
CPU Utilization (%)
Requested Throughput (Mb/s)
0
200
400
600
800
1000
0
20
40
60
80
100
10
20
50
100
200
300
400
500
600
700
800
900
1000
10.0
20.0
50.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
957.1
957.3
2.6%
5.3%
12.9%
21.2%
32.9%
41.5%
44.6%
46.2%
50.7%
53.8%
57.7%
61.2%
62.8%

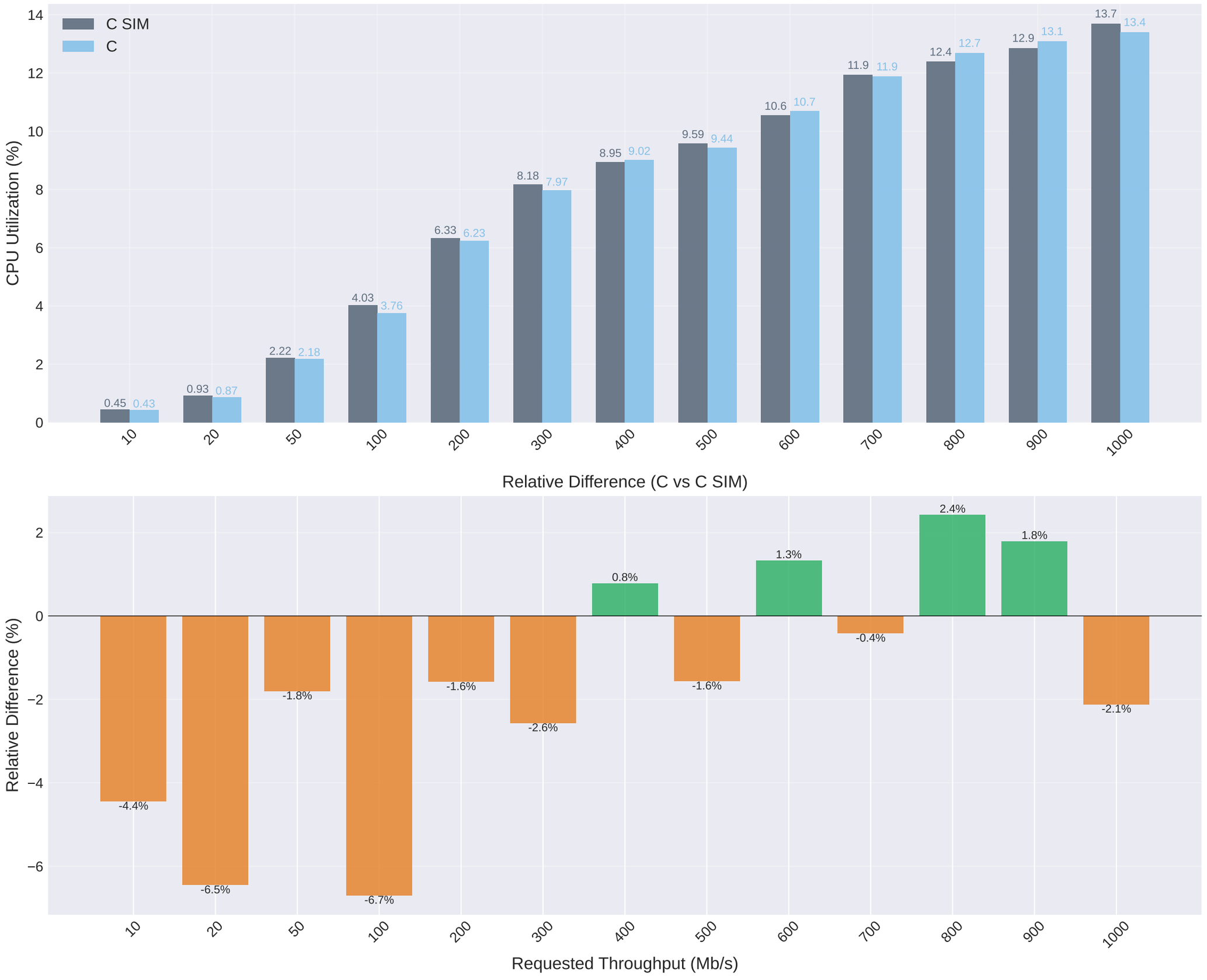

Total System CPU Utilization vs Throughput
C SIM
C
CPU Utilization (%)
0
10
20
30
40
50
60
2.79
2.64
5.85
5.35
13.1
12.9
23.5
21.2
34.3
32.9
43.3
41.5
44.6
44.6
48.0
46.2
50.9
50.7
54.5
53.8
57.9
57.7
61.2
61.1
63.8
62.8
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
−10
-5.4%
-8.5%
-1.6%
-9.9%
-4.1%
-4.1%
0.2%
-3.8%
-0.4%
-1.2%
-0.3%
-0.3%
-1.5%
Requested Throughput (Mb/s)


Ethernet Driver CPU Utilization vs Throughput
C SIM
C
CPU Utilization (%)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
0.85
0.79
1.83
1.67
4.08
4.04
7.18
6.50
10.6
9.80
13.0
12.4
14.2
13.8
15.8
15.1
16.9
16.7
17.6
17.6
18.6
18.5
19.3
19.2
19.8
19.5
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
-7.1%
-8.7%
-1.0%
-9.5%
-7.9%
-4.8%
-2.7%
-4.8%
-1.0%
-0.6%
-0.8%
-1.3%
Requested Throughput (Mb/s)

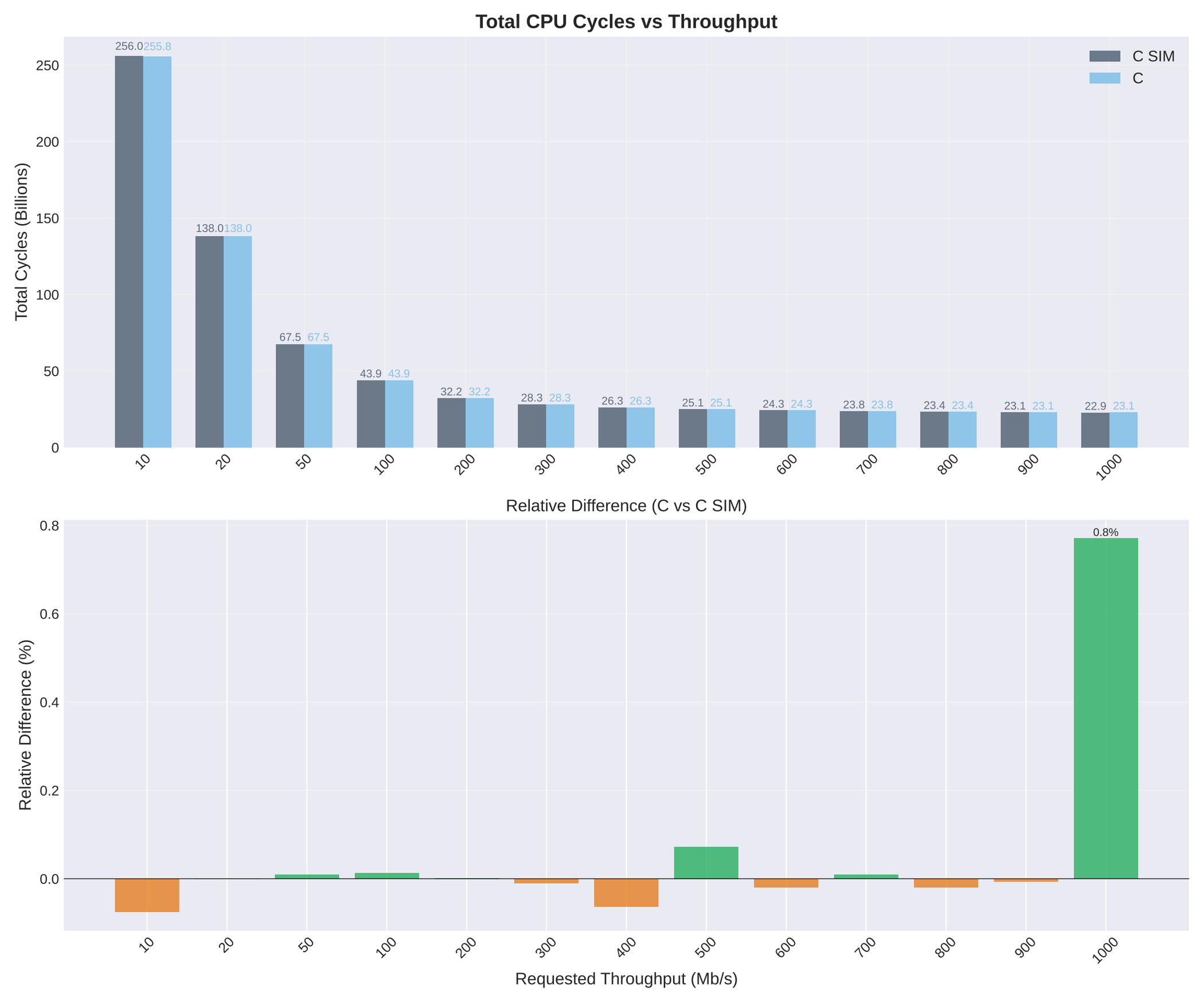

Net Virt TX CPU Utilization vs Throughput
C SIM
C
CPU Utilization (%)
0
1
2
3
4
5
6
7
0.34
0.31
0.77
0.68
1.62
1.65
2.99
2.56
3.83
3.62
4.80
4.42
4.01
4.17
4.21
4.22
4.77
4.57
4.90
4.74
5.55
5.35
6.35
6.18
6.69
6.56
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−12.5
−15.0
-8.8%
-11.7%
1.9%
-14.4%
-5.5%
-7.9%
4.0%
0.2%
-4.2%
-3.3%
-3.6%
-2.7%
-1.9%
10
20
50
100
200
300
400
500
600
700
800
900
1000
Requested Throughput (Mb/s)

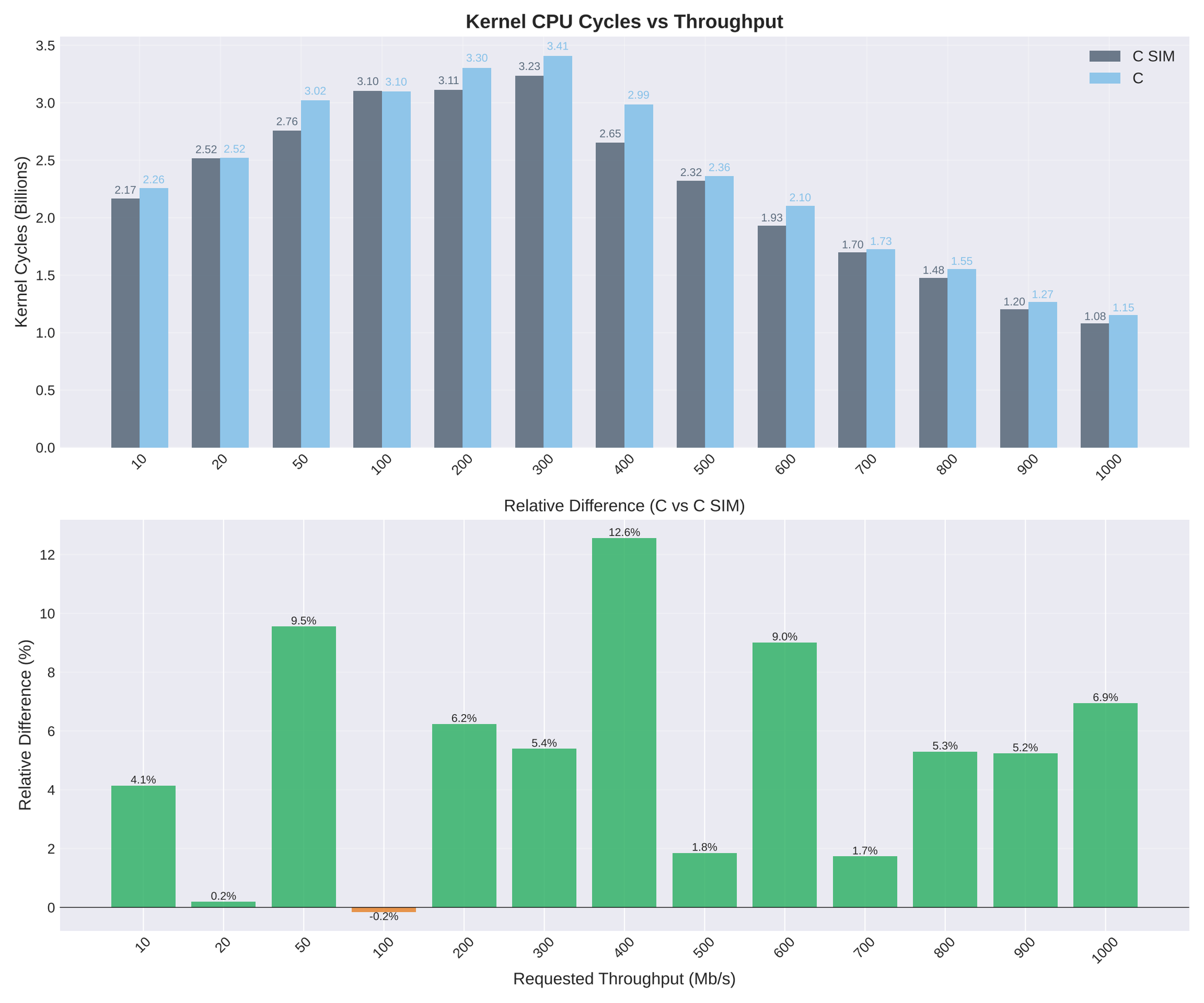

Net Virt RX CPU Utilization vs Throughput
CPU Utilization (%)
C SIM
C
0.53
0.48
1.10
0.96
2.62
2.41
4.55
4.07
6.88
6.64
8.53
8.17
8.66
8.64
8.52
8.01
7.64
7.71
7.64
7.23
7.38
7.25
7.04
6.99
6.96
6.86
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
-9.4%
-12.7%
-8.0%
-10.5%
-3.5%
-4.2%
-0.2%
-6.0%
0.9%
-5.4%
-1.8%
-0.7%
-1.4%
Requested Throughput (Mb/s)

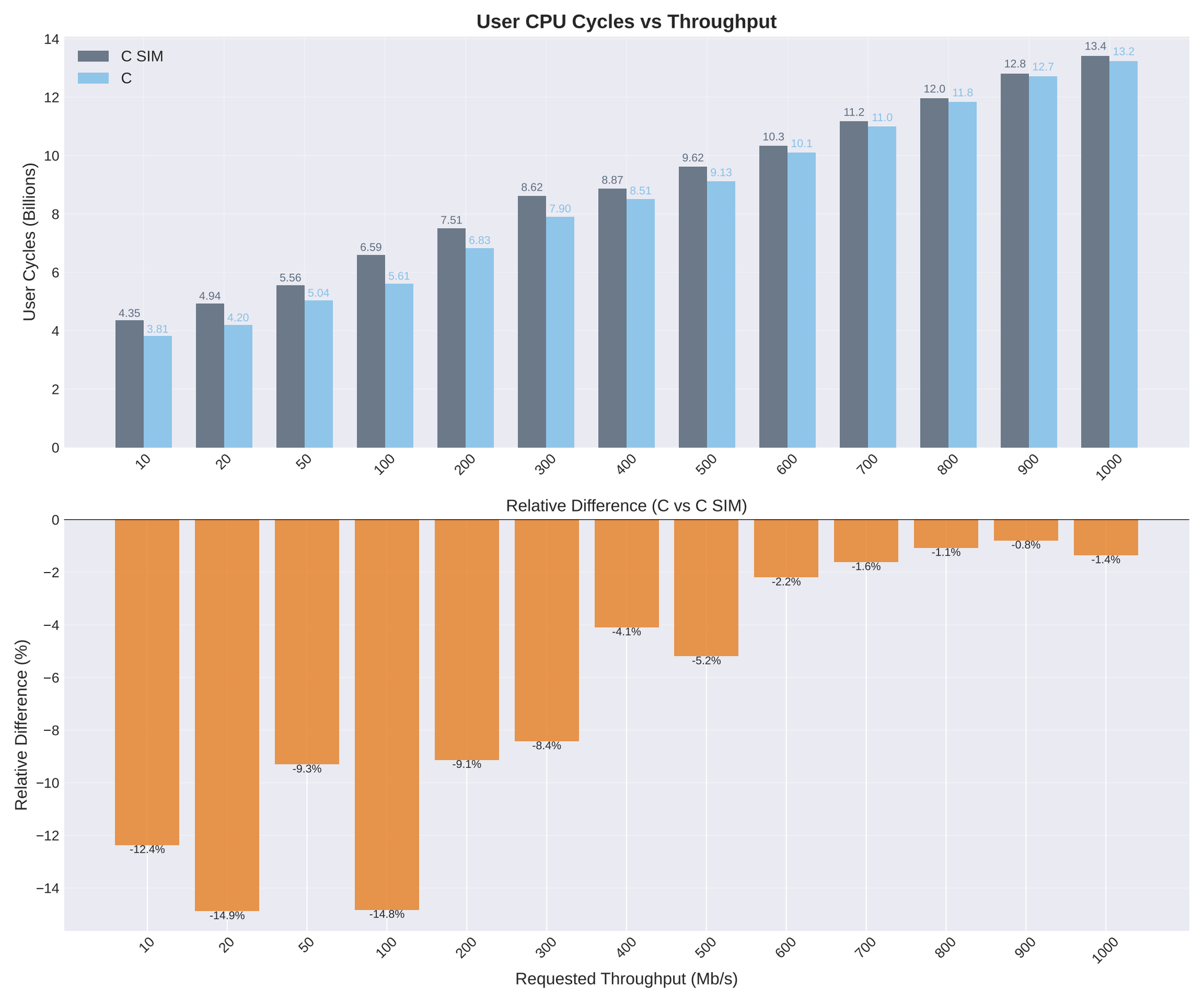

Client0 CPU Utilization vs Throughput
C SIM
C
CPU Utilization (%)
0
2
4
6
8
10
12
14
16
0.35
0.32
0.73
0.65
1.71
1.60
3.28
2.89
5.23
5.09
7.33
6.98
7.97
8.07
9.44
9.02
10.6
10.5
11.8
11.8
13.4
13.4
15.1
15.1
16.1
16.0
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
−12
−10
−8
−6
−4
−2
0
-8.6%
-11.0%
-6.4%
-11.9%
-2.7%
-4.8%
1.3%
-4.4%
0.2%
-0.3%
-0.9%
Requested Throughput (Mb/s)

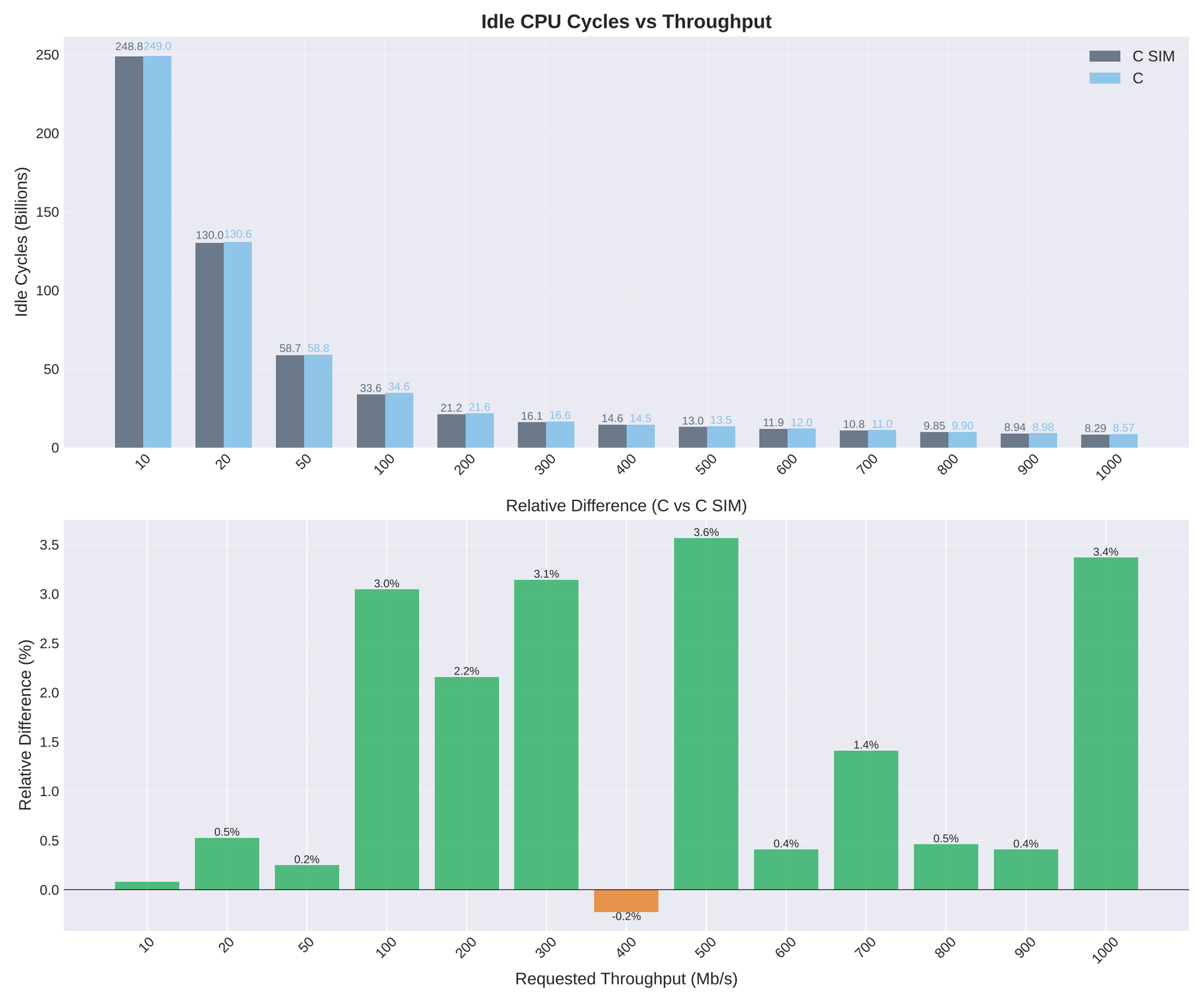

Client0 Net Copier CPU Utilization vs Throughput
C SIM
C
CPU Utilization (%)
0
2
4
6
8
10
12
14
0.45
0.43
0.93
0.87
2.22
2.18
4.03
3.76
6.33
6.23
8.18
7.97
8.95
9.02
9.59
9.44
10.6
10.7
11.9
11.9
12.4
12.7
12.9
13.1
13.7
13.4
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
−6
−4
−2
0
2
-4.4%
-6.5%
-1.8%
-6.7%
-1.6%
-2.6%
0.8%
-1.6%
1.3%
-0.4%
2.4%
1.8%
-2.1%
10
20
50
100
200
300
400
500
600
700
800
900
1000
Requested Throughput (Mb/s)

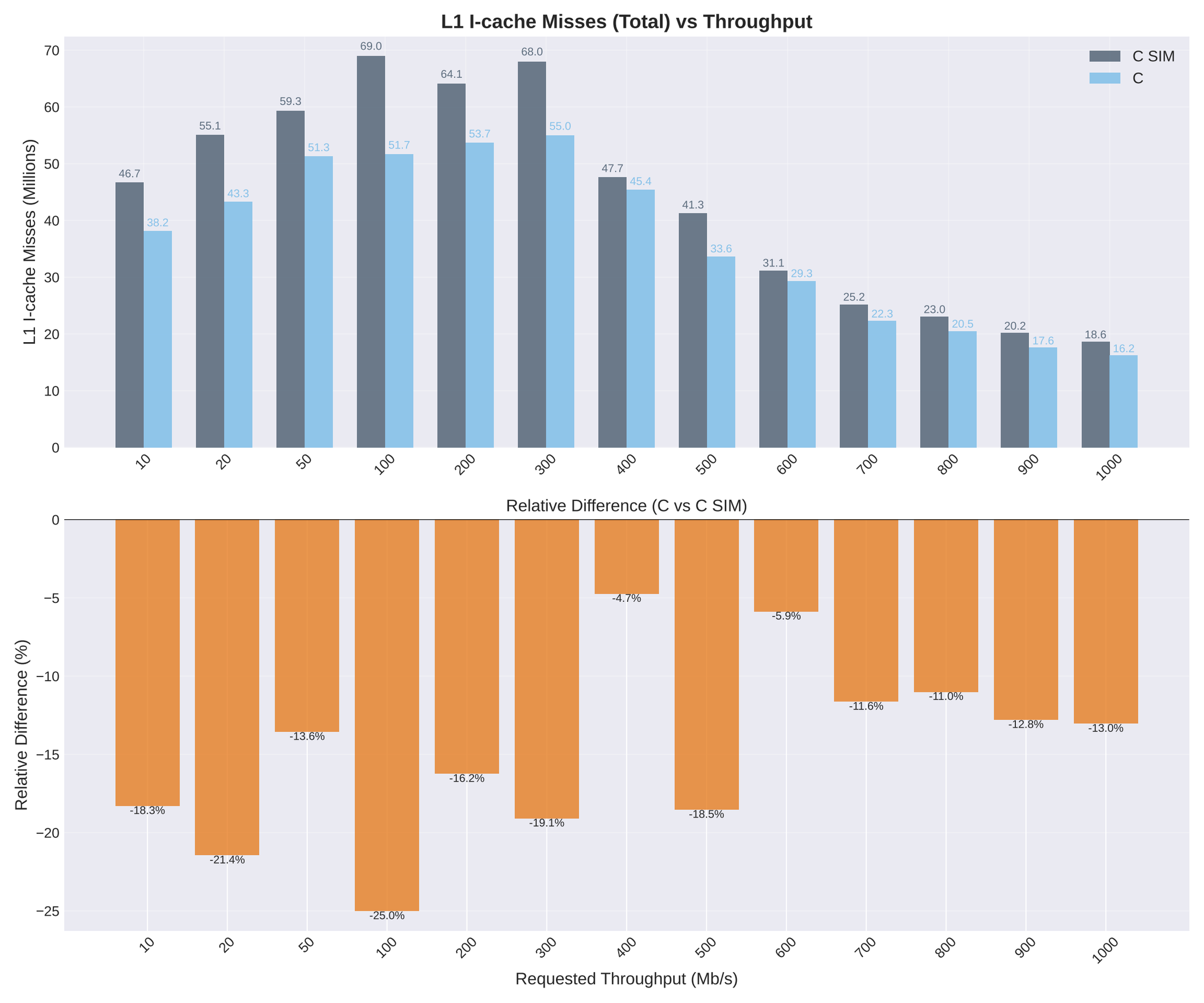

System CPU Utilization vs Throughput
C SIM
C
CPU Utilization (%)
0
10
20
30
40
50
60
2.79
2.64
5.85
5.35
13.1
12.9
23.5
21.2
34.3
32.9
43.3
41.5
44.6
44.6
48.0
46.2
50.9
50.7
54.5
53.8
57.9
57.7
61.2
61.1
63.8
62.8
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
−10
-5.4%
-8.5%
-1.6%
-9.9%
-4.1%
-4.1%
0.2%
-3.8%
-0.4%
-1.2%
-0.3%
-0.3%
-1.5%
Requested Throughput (Mb/s)

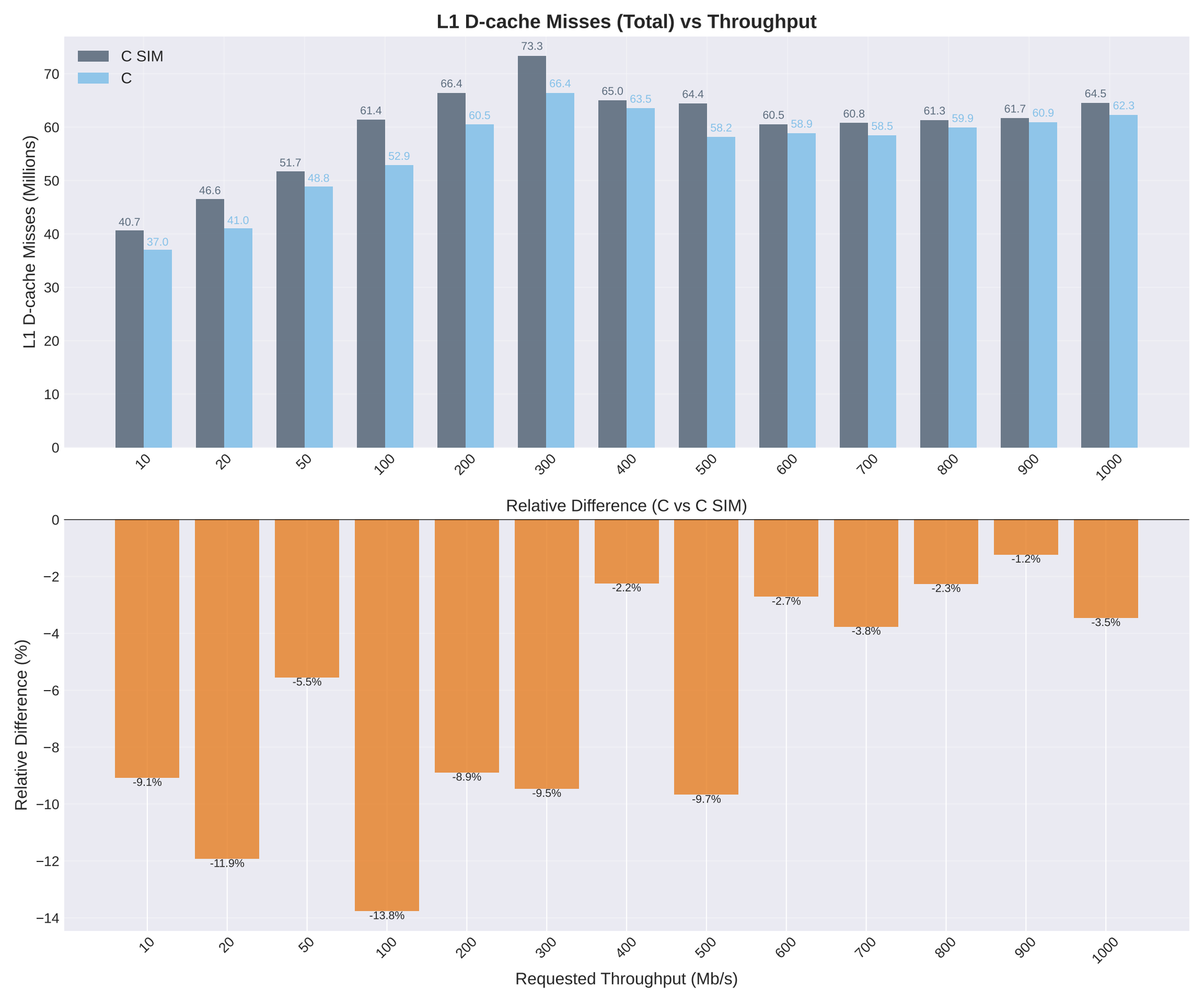

Total CPU Cycles vs Throughput
C SIM
C
Total Cycles (Billions)
0
50
100
150
200
250
256.0 255.8
138.0 138.0
67.5 67.5
43.9 43.9
32.2 32.2
28.3 28.3
26.3 26.3
25.1 25.1
24.3 24.3
23.8 23.8
23.4 23.4
23.1 23.1
22.9 23.1
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0.0
0.2
0.4
0.6
0.8
0.8%
Requested Throughput (Mb/s)

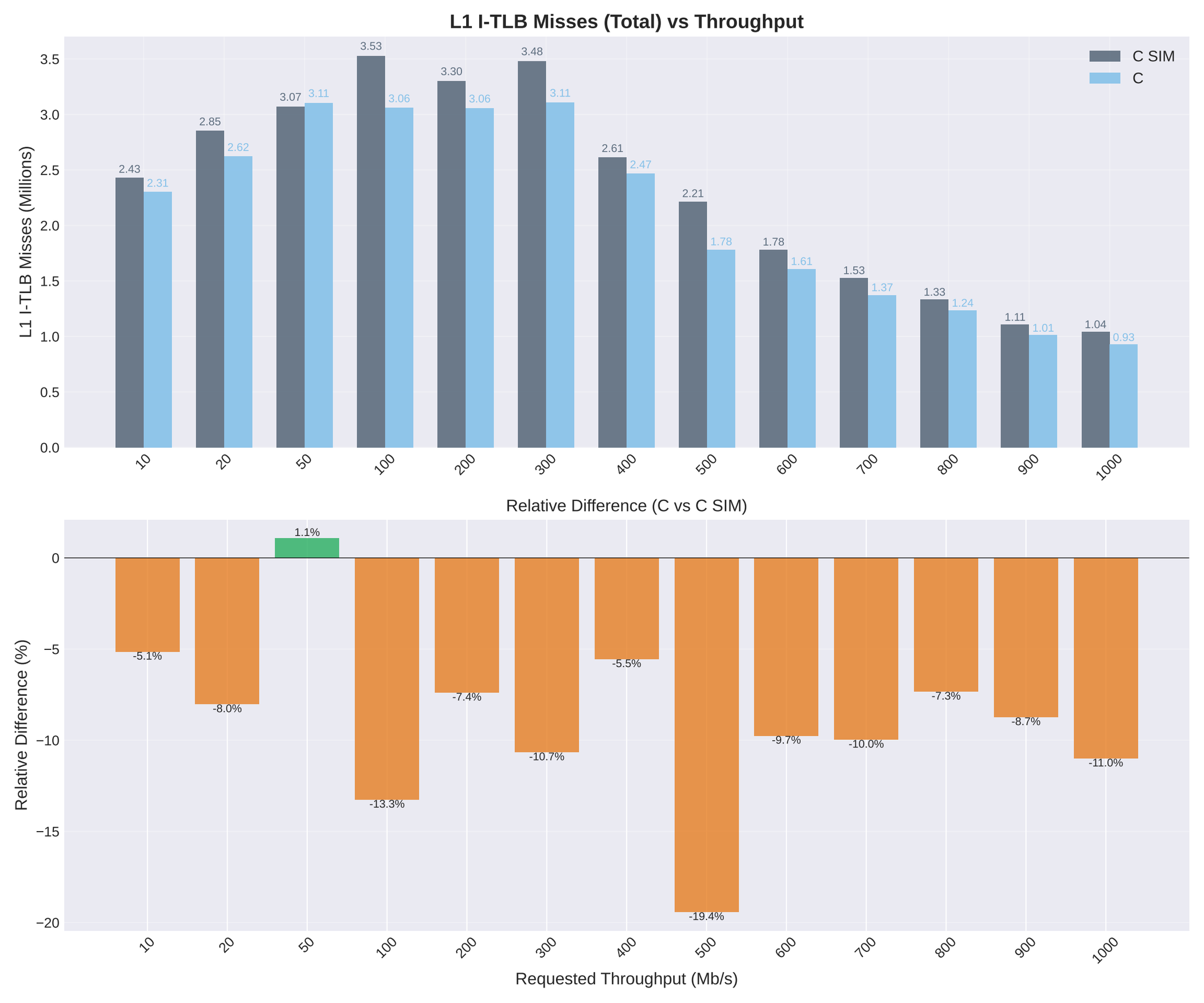

Kernel CPU Cycles vs Throughput
Kernel Cycles (Billions)
C SIM
C
2.17
2.26
2.52
2.52
2.76
3.02
3.10
3.10
3.11
3.30
3.23
3.41
2.65
2.99
2.32
2.36
1.93
2.10
1.70
1.73
1.48
1.55
1.20
1.27
1.08
1.15
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
4.1%
0.2%
9.5%
-0.2%
6.2%
5.4%
12.6%
1.8%
9.0%
1.7%
5.3%
5.2%
6.9%
Requested Throughput (Mb/s)

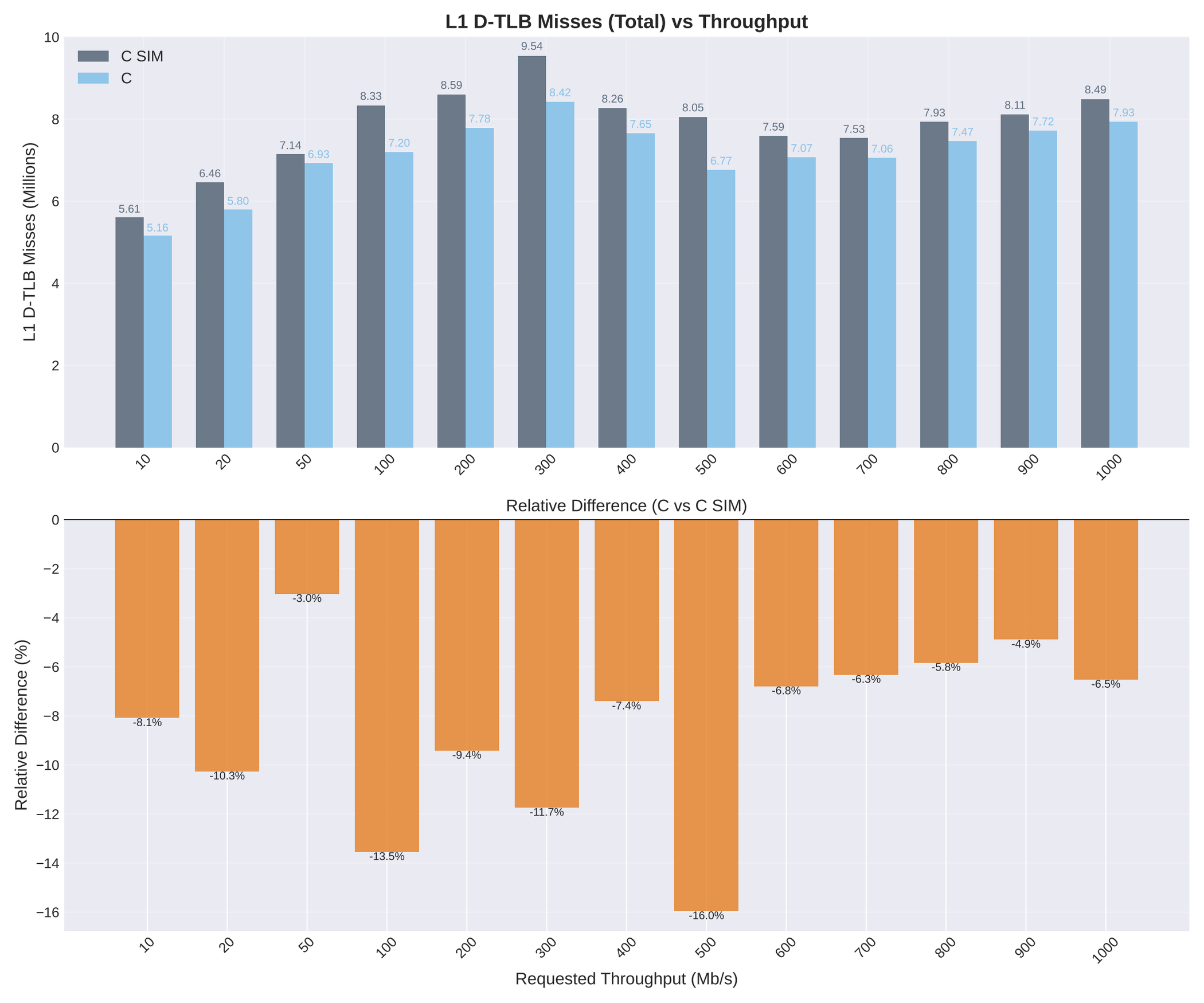

User CPU Cycles vs Throughput
C SIM
C
User Cycles (Billions)
0
2
4
6
8
10
12
14
4.35
3.81
4.94
4.20
5.56
5.04
6.59
5.61
7.51
6.83
8.62
7.90
8.87
8.51
9.62
9.13
10.3
10.1
11.2
11.0
12.0
11.8
12.8
12.7
13.4
13.2
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
−10
−12
−14
-12.4%
-14.9%
-9.3%
-14.8%
-9.1%
-8.4%
-4.1%
-5.2%
-2.2%
-1.6%
-1.1%
-0.8%
-1.4%
Requested Throughput (Mb/s)

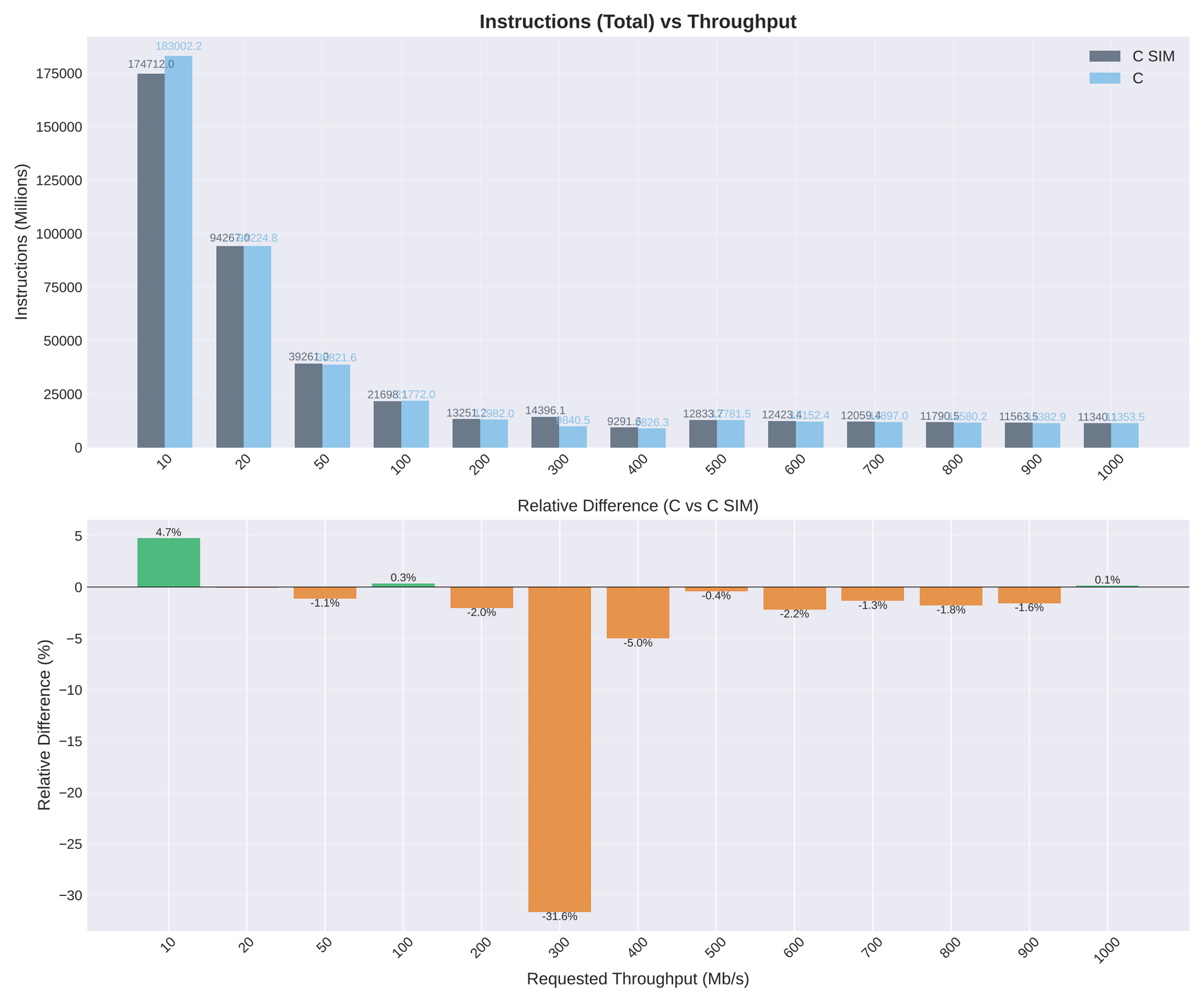

Idle CPU Cycles vs Throughput
C SIM
C
Idle Cycles (Billions)
0
50
100
150
200
250
248.8 249.0
130.0 130.6
58.7 58.8
33.6 34.6
21.2 21.6
16.1 16.6
14.6 14.5
13.0 13.5
11.9 12.0
10.8 11.0
9.85 9.90
8.94 8.98
8.29 8.57
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0.5%
0.2%
3.0%
2.2%
3.1%
-0.2%
3.6%
0.4%
1.4%
0.5%
0.4%
3.4%
Requested Throughput (Mb/s)

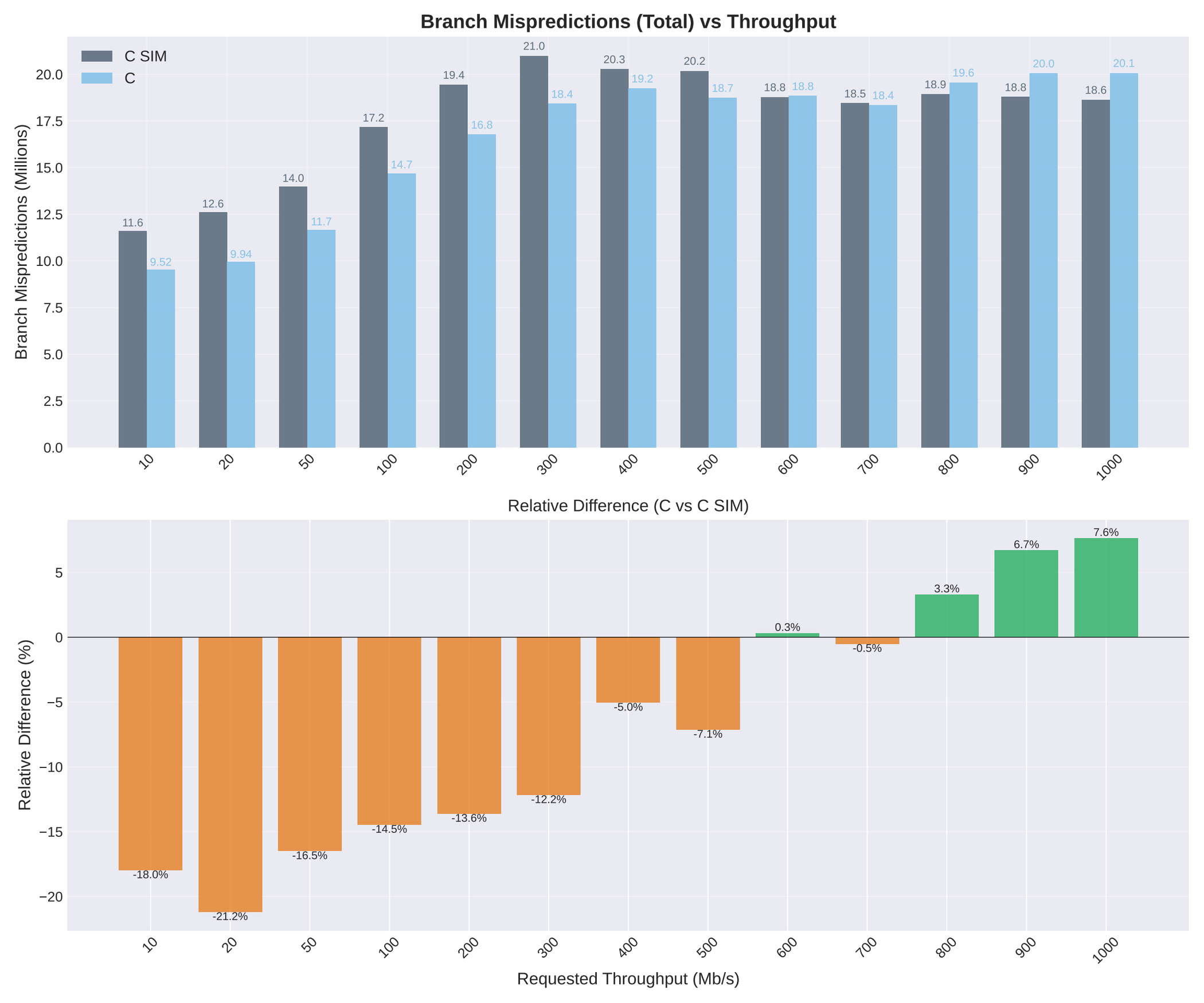

L1 I-cache Misses (Total) vs Throughput
L1 I-cache Misses (Millions)
C SIM
C
46.7
38.2
55.1
43.3
59.3
51.3
69.0
51.7
64.1
53.7
68.0
55.0
47.7
45.4
41.3
33.6
31.1
29.3
25.2
22.3
23.0
20.5
20.2
17.6
18.6
16.2
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
-18.3%
-21.4%
-13.6%
-25.0%
-16.2%
-19.1%
-4.7%
-18.5%
-5.9%
-11.6%
-11.0%
-12.8%
-13.0%
Requested Throughput (Mb/s)

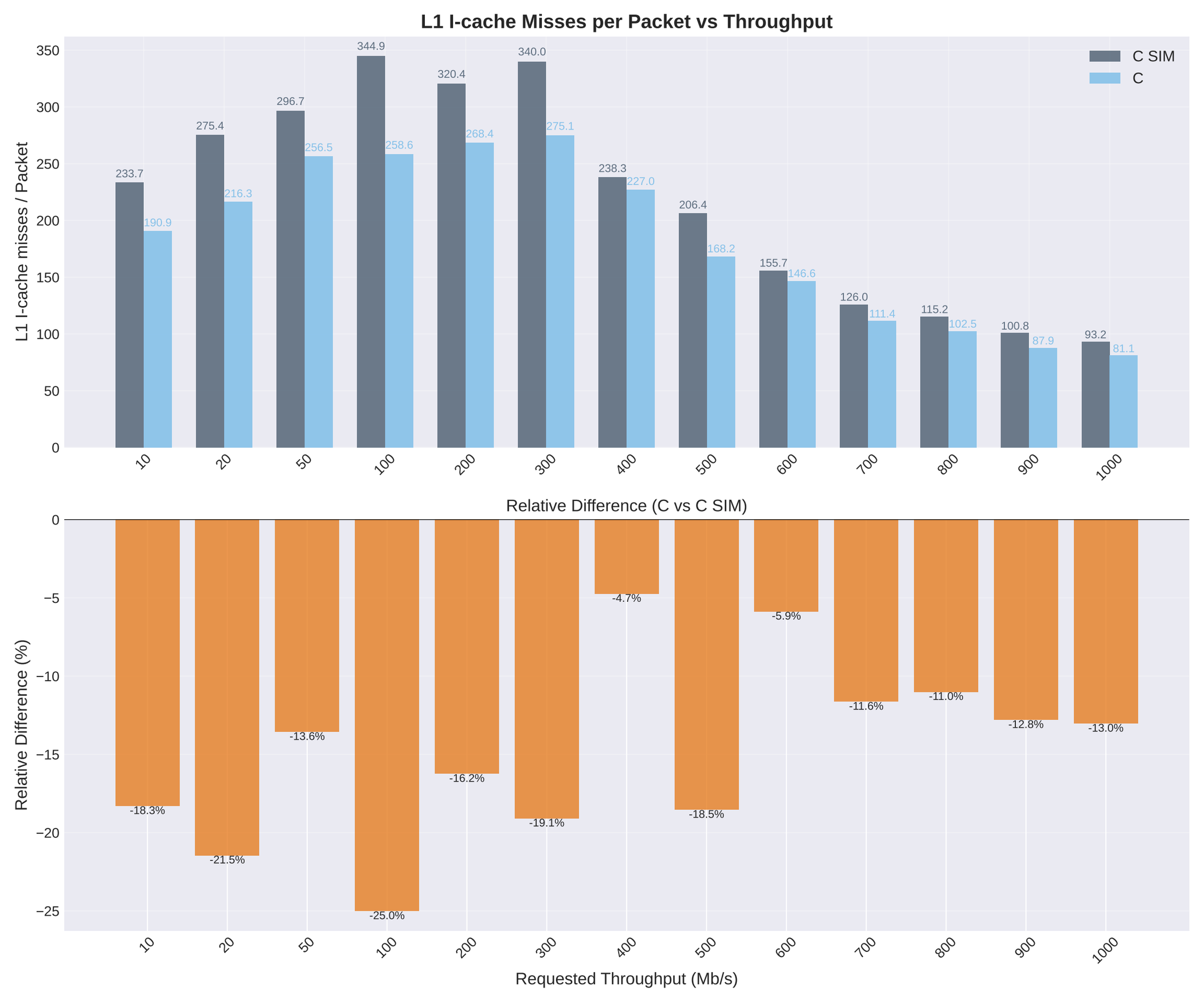

L1 D-cache Misses (Total) vs Throughput
C SIM
C
L1 D-cache Misses (Millions)
0
10
20
30
40
50
60
70
40.7
37.0
46.6
41.0
51.7
48.8
61.4
52.9
66.4
60.5
73.3
66.4
65.0
63.5
64.4
58.2
60.5
58.9
60.8
58.5
61.3
59.9
61.7
60.9
64.5
62.3
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
−10
−12
−14
-9.1%
-11.9%
-5.5%
-13.8%
-8.9%
-9.5%
-2.2%
-9.7%
-2.7%
-3.8%
-2.3%
-1.2%
-3.5%
Requested Throughput (Mb/s)

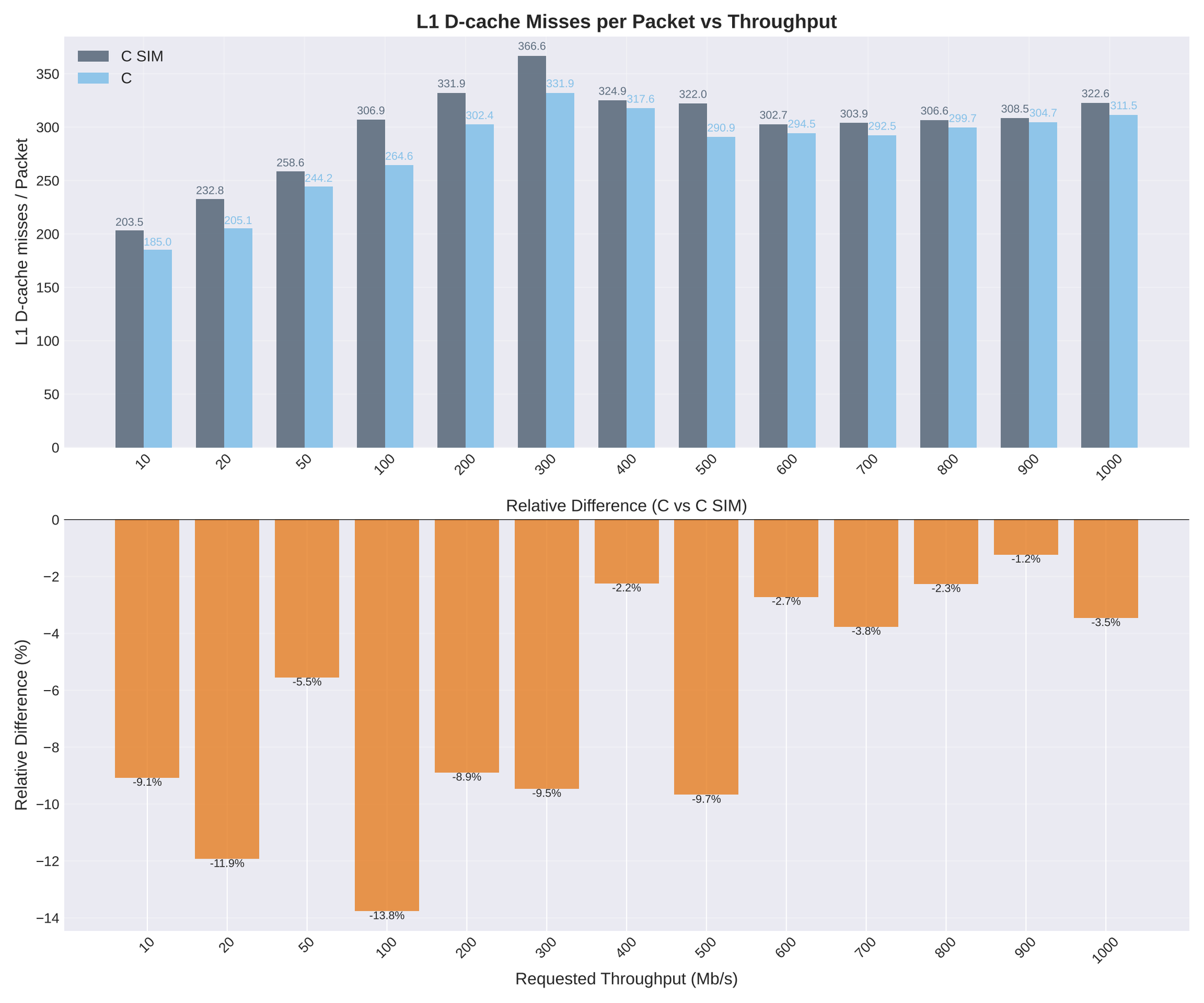

L1 I-TLB Misses (Total) vs Throughput
C SIM
C
L1 I-TLB Misses (Millions)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
2.43
2.31
2.85
2.62
3.07
3.11
3.53
3.06
3.30
3.06
3.48
3.11
2.61
2.47
2.21
1.78
1.78
1.61
1.53
1.37
1.33
1.24
1.11
1.01
1.04
0.93
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−5
−10
−15
−20
1.1%
-5.1%
-8.0%
-13.3%
-7.4%
-10.7%
-5.5%
-19.4%
-9.7%
-10.0%
-7.3%
-8.7%
-11.0%
Requested Throughput (Mb/s)

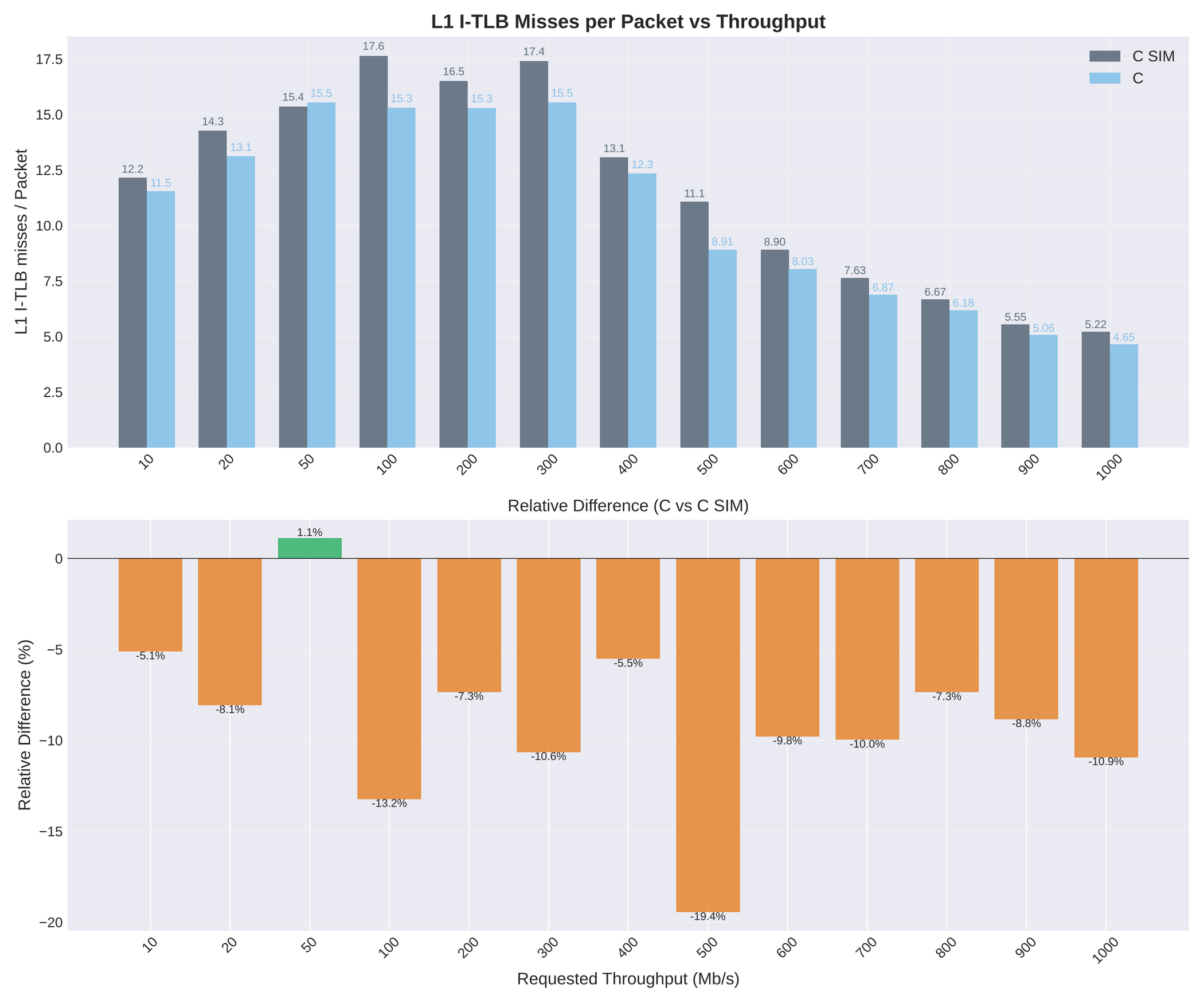

L1 D-TLB Misses (Total) vs Throughput
C SIM
C
L1 D-TLB Misses (Millions)
0
2
4
6
8
10
5.61
5.16
6.46
5.80
7.14
6.93
8.33
7.20
8.59
7.78
9.54
8.42
8.26
7.65
8.05
6.77
7.59
7.07
7.53
7.06
7.93
7.47
8.11
7.72
8.49
7.93
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
−10
−12
−14
−16
-8.1%
-10.3%
-3.0%
-13.5%
-9.4%
-11.7%
-7.4%
-16.0%
-6.8%
-6.3%
-5.8%
-4.9%
-6.5%
Requested Throughput (Mb/s)

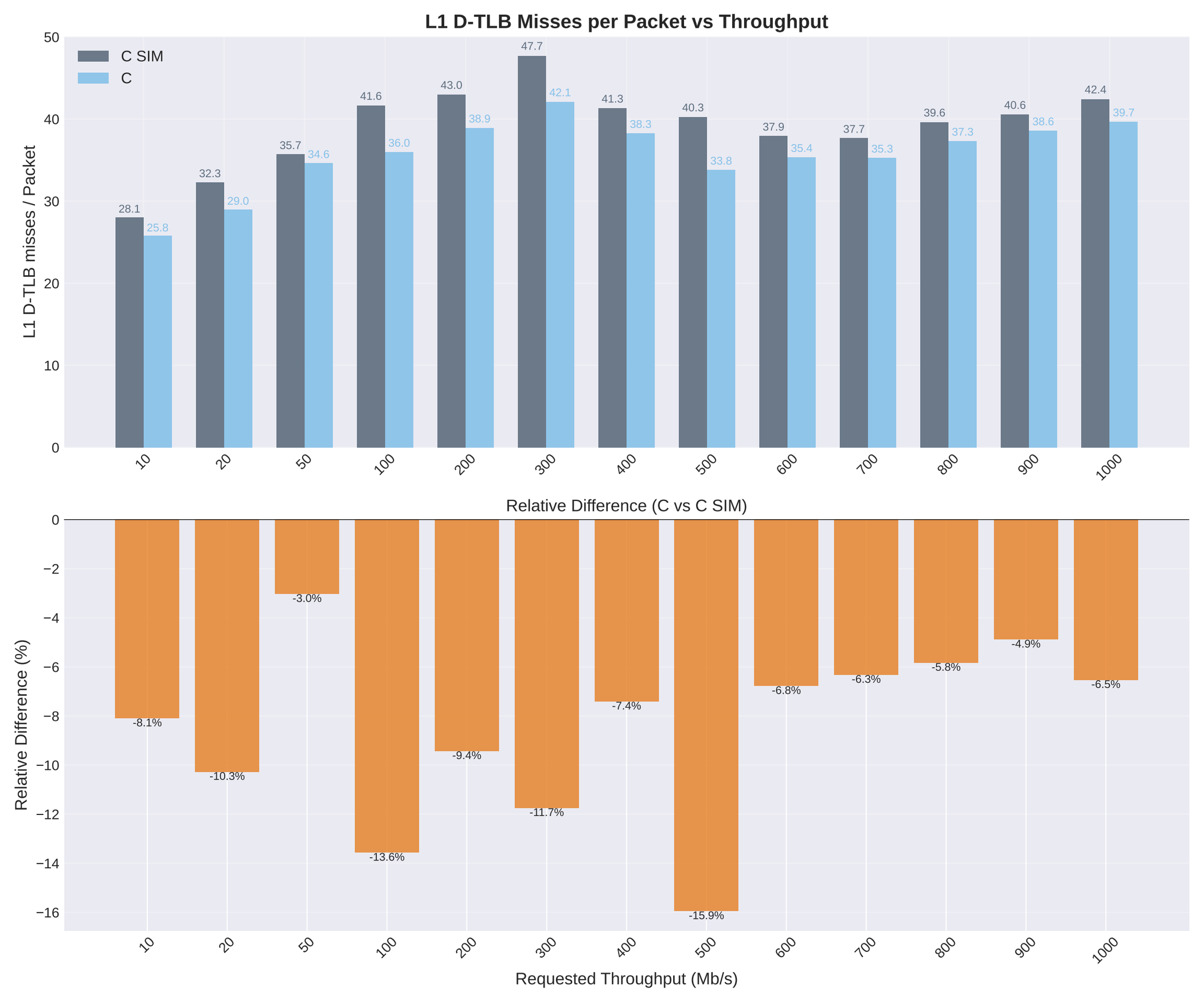

Instructions (Total) vs Throughput
C SIM
C
Instructions (Millions)
183002.2
174712.0
94267.0
39261.0
21698.1
13251.2
14396.1
9291.6
12833.7
12423.4
11790.5
11563.5
11340.1
Relative Difference (C vs C SIM)
4.7%
-1.1%
0.3%
-2.0%
-31.6%
-5.0%
-0.4%
-2.2%
-1.3%
-1.8%
-1.6%
0.1%
Relative Difference (%)
Requested Throughput (Mb/s)

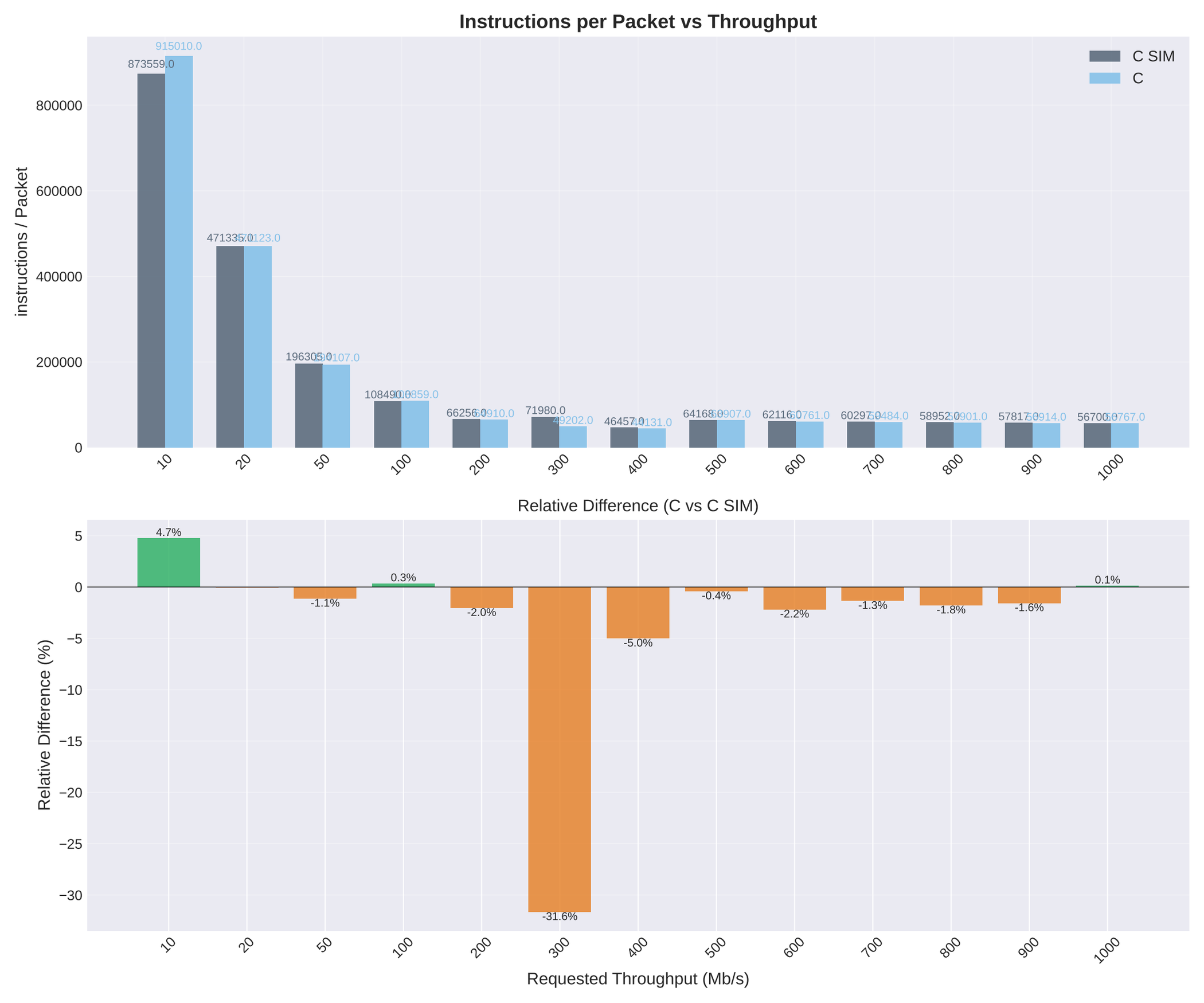

Branch Mispredictions (Total) vs Throughput
C SIM
C
Branch Mispredictions (Millions)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
11.6
9.52
12.6
9.94
14.0
11.7
17.2
14.7
19.4
16.8
21.0
18.4
20.3
19.2
20.2
18.7
18.8
18.8
18.5
18.4
18.9
19.6
18.8
20.0
18.6
20.1
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
5
0
−5
−10
−15
−20
-18.0%
-21.2%
-16.5%
-14.5%
-13.6%
-12.2%
-5.0%
-7.1%
0.3%
-0.5%
3.3%
6.7%
7.6%
10
20
50
100
200
300
400
500
600
700
800
900
1000
Requested Throughput (Mb/s)

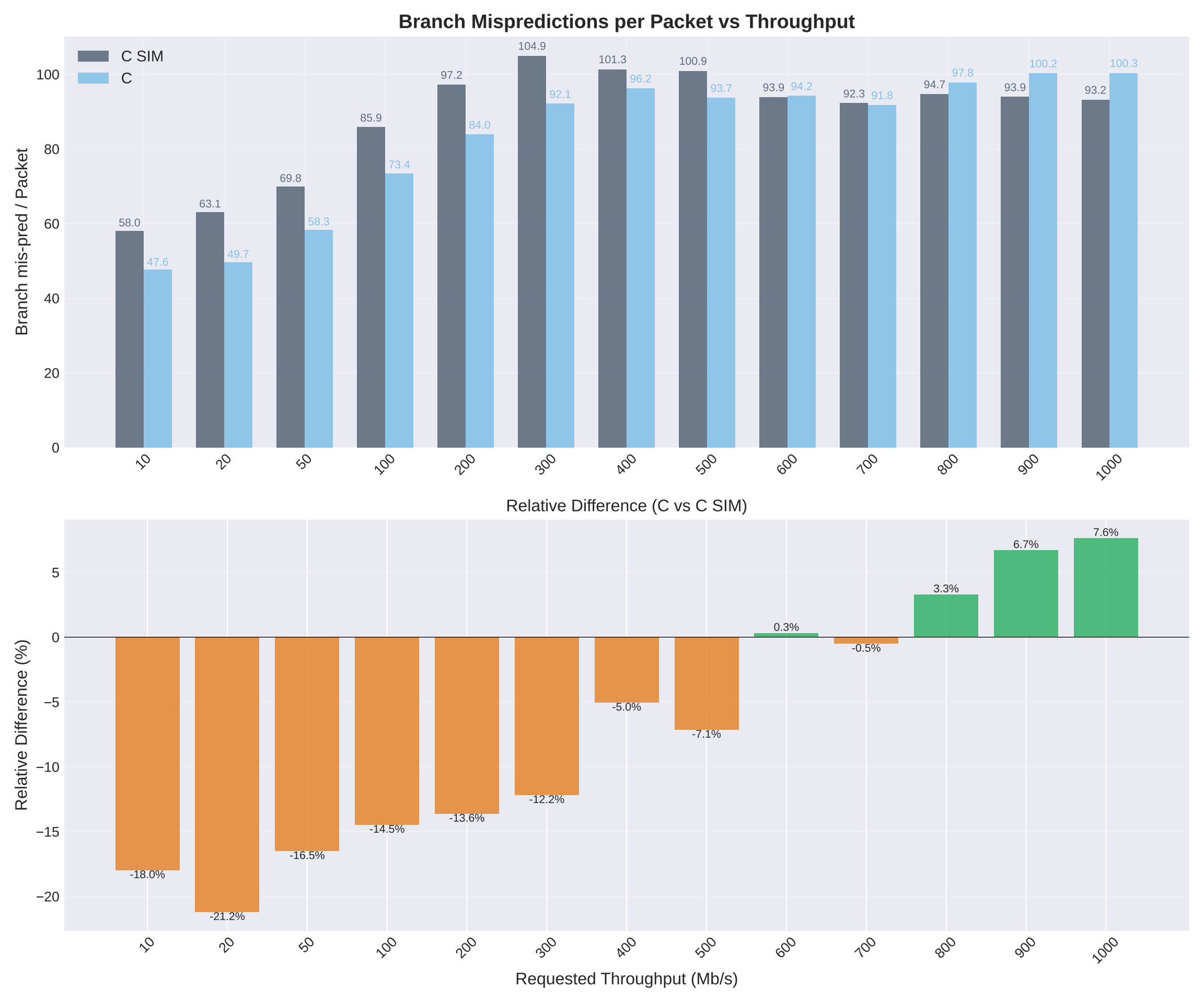

L1 I-cache Misses per Packet vs Throughput
L1 I-cache misses / Packet
C SIM
C
233.7
190.9
275.4
216.3
296.7
256.5
344.9
258.6
320.4
268.4
340.0
275.1
238.3
227.0
206.4
168.2
155.7
146.6
126.0
111.4
115.2
102.5
100.8
87.9
93.2
81.1
Relative Difference (C vs C SIM)
Relative Difference (%)
-18.3%
-21.5%
-13.6%
-25.0%
-16.2%
-19.1%
-4.7%
-18.5%
-5.9%
-11.6%
-11.0%
-12.8%
-13.0%
Requested Throughput (Mb/s)

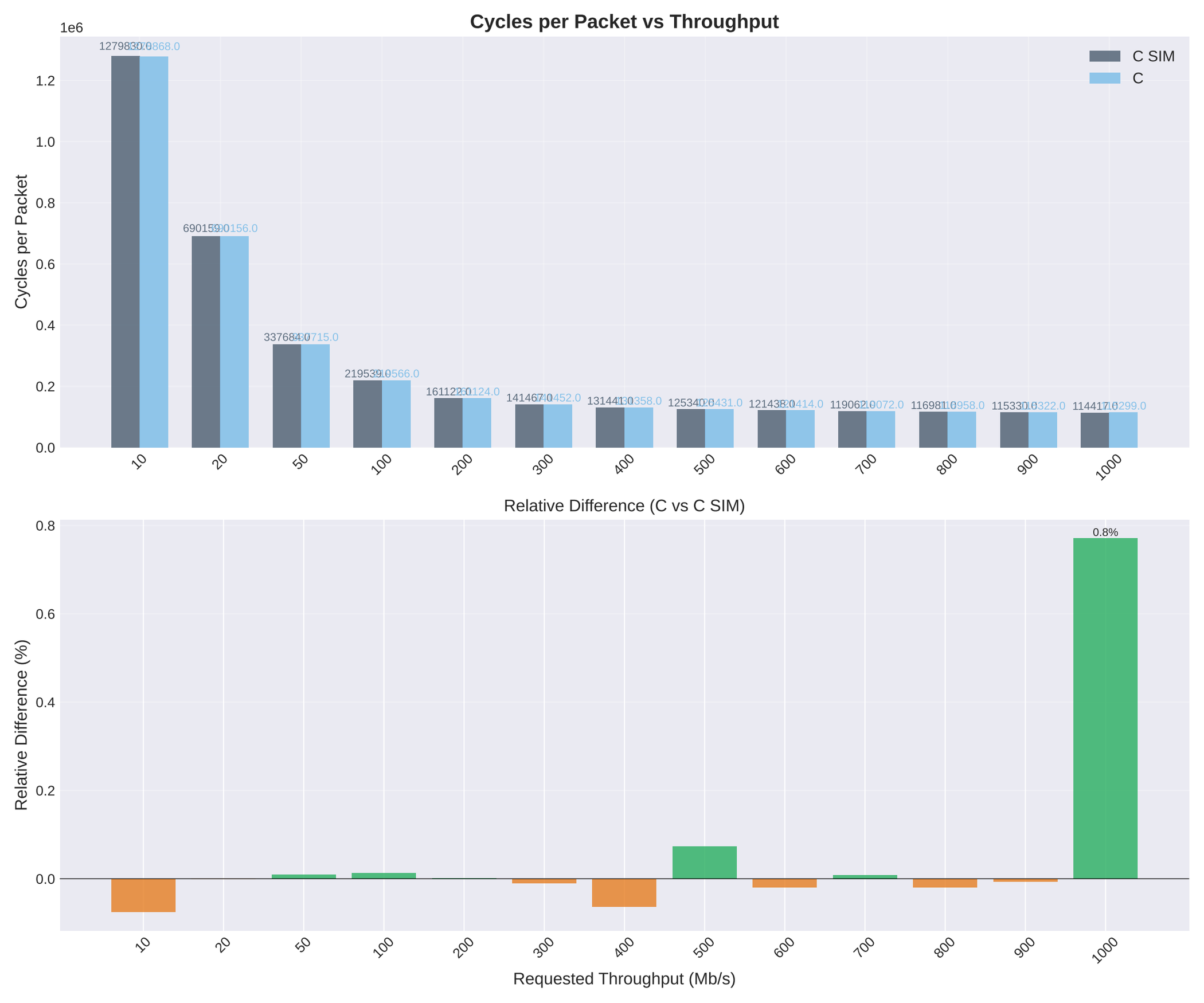

L1 D-cache Misses per Packet vs Throughput
C SIM
C
L1 D-cache misses / Packet
0
50
100
150
200
250
300
350
203.5
185.0
232.8
205.1
258.6
244.2
306.9
264.6
331.9
302.4
366.6
331.9
324.9
317.6
322.0
290.9
302.7
294.5
303.9
292.5
306.6
299.7
308.5
304.7
322.6
311.5
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
−10
−12
−14
-9.1%
-11.9%
-5.5%
-13.8%
-8.9%
-9.5%
-2.2%
-9.7%
-2.7%
-3.8%
-2.3%
-1.2%
-3.5%
Requested Throughput (Mb/s)

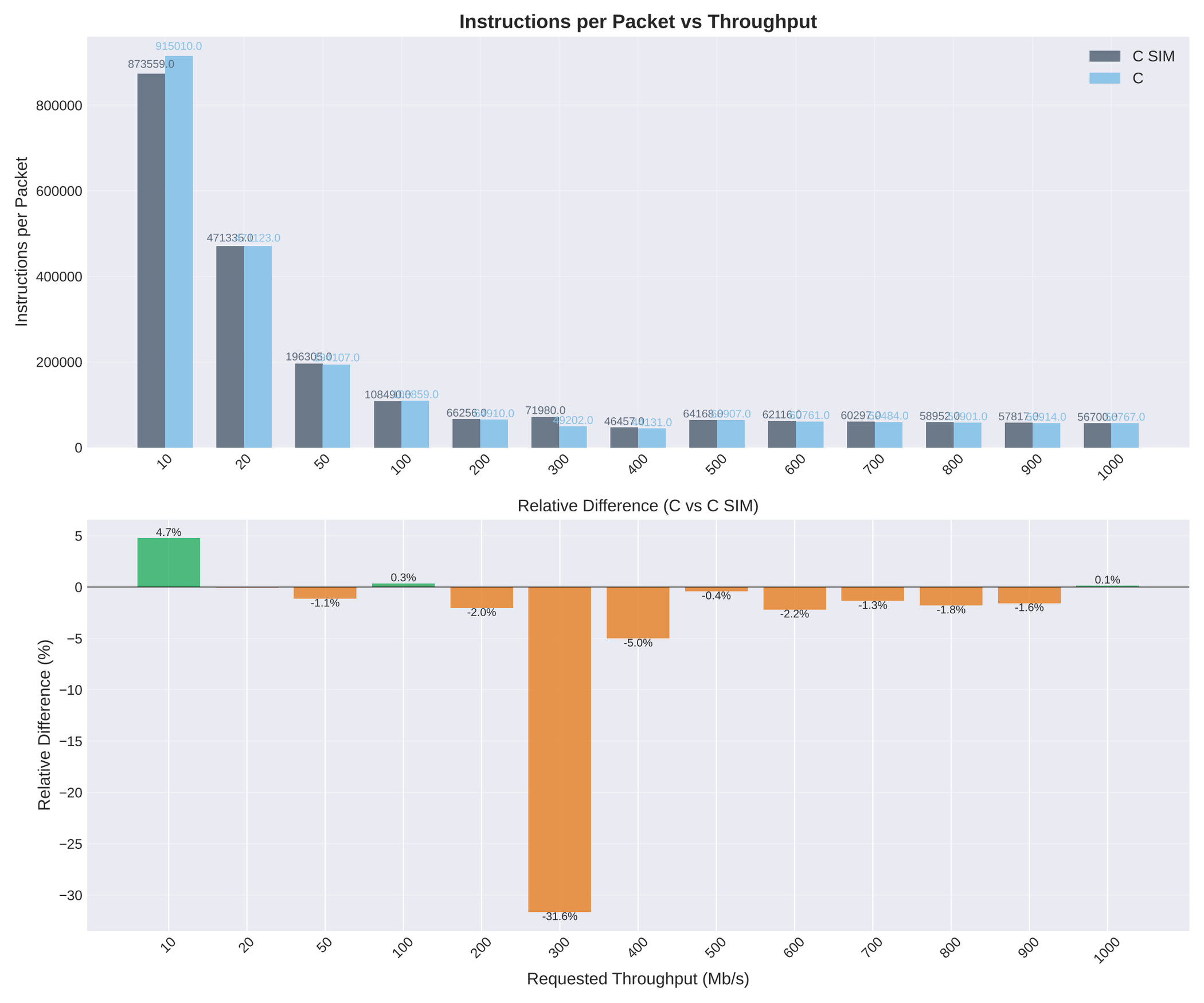

L1 I-TLB Misses per Packet vs Throughput
L1 I-TLB misses / Packet
C SIM
C
12.2
11.5
14.3
13.1
15.4
15.5
17.6
15.3
16.5
15.3
17.4
15.5
13.1
12.3
11.1
8.91
8.90
8.03
7.63
6.87
6.67
6.18
5.55
5.06
5.22
4.65
Relative Difference (C vs C SIM)
Relative Difference (%)
-5.1%
-8.1%
1.1%
-13.2%
-7.3%
-10.6%
-5.5%
-19.4%
-9.8%
-10.0%
-7.3%
-8.8%
-10.9%
Requested Throughput (Mb/s)

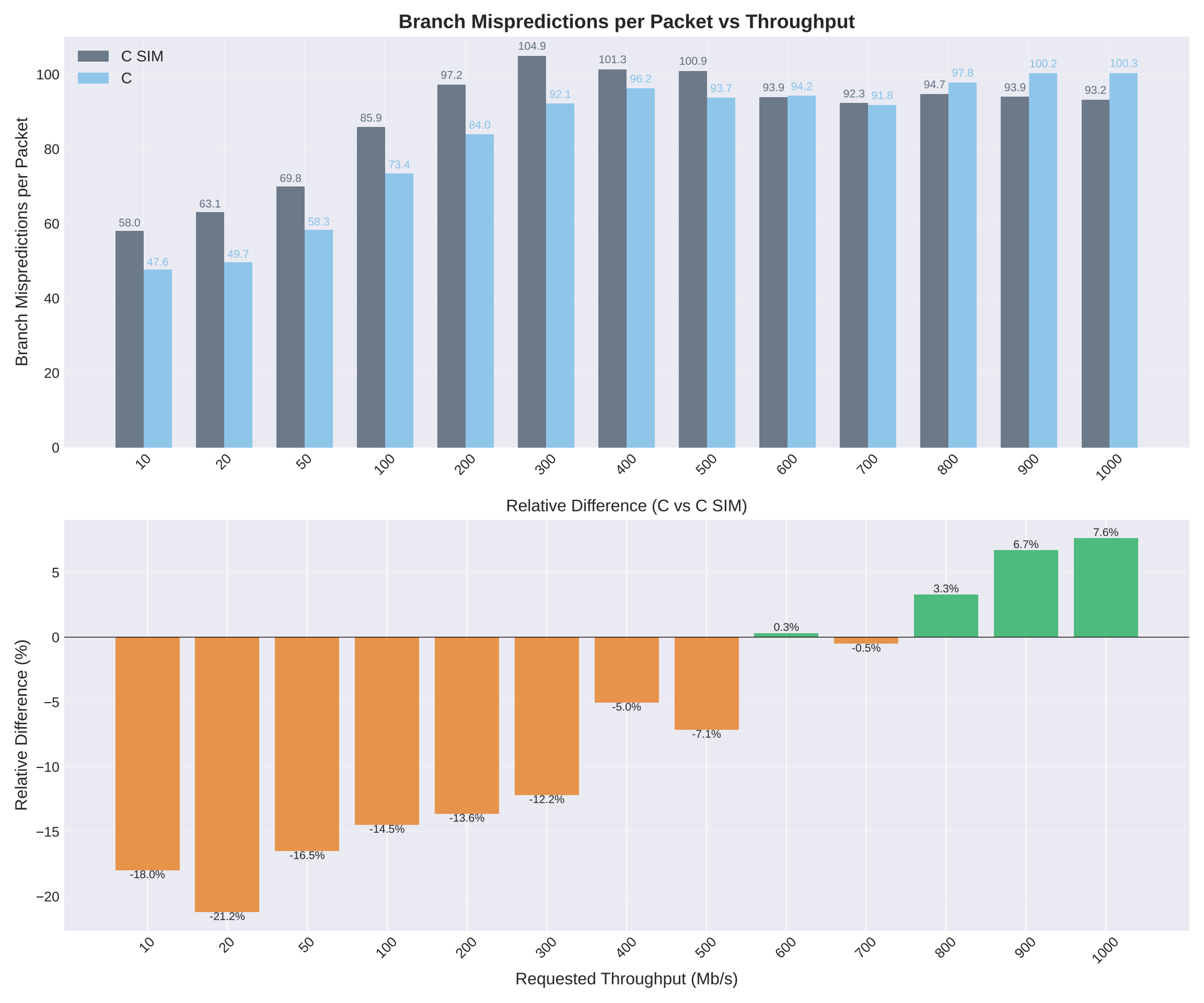

L1 D-TLB Misses per Packet vs Throughput
C SIM
C
L1 D-TLB misses / Packet
0
10
20
30
40
50
28.1
25.8
32.3
29.0
35.7
34.6
41.6
36.0
43.0
38.9
47.7
42.1
41.3
38.3
40.3
33.8
37.9
35.4
37.7
35.3
39.6
37.3
40.6
38.6
42.4
39.7
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0
−2
−4
−6
−8
−10
−12
−14
−16
-8.1%
-10.3%
-3.0%
-13.6%
-9.4%
-11.7%
-7.4%
-15.9%
-6.8%
-6.3%
-5.8%
-4.9%
-6.5%
Requested Throughput (Mb/s)


Instructions per Packet vs Throughput
C SIM
C
instructions / Packet
0
200000
400000
600000
800000
873559.0
915010.0
471335.0
493123.0
196305.0
205107.0
108490.0
113859.0
66256.0
69910.0
71980.0
49202.0
46457.0
48131.0
64168.0
66907.0
62116.0
64761.0
60297.0
62484.0
58952.0
60901.0
57817.0
59914.0
56700.0
58767.0
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
5
0
−5
−10
−15
−20
−25
−30
4.7%
-1.1%
0.3%
-2.0%
-31.6%
-5.0%
-0.4%
-2.2%
-1.3%
-1.8%
-1.6%
0.1%
Requested Throughput (Mb/s)

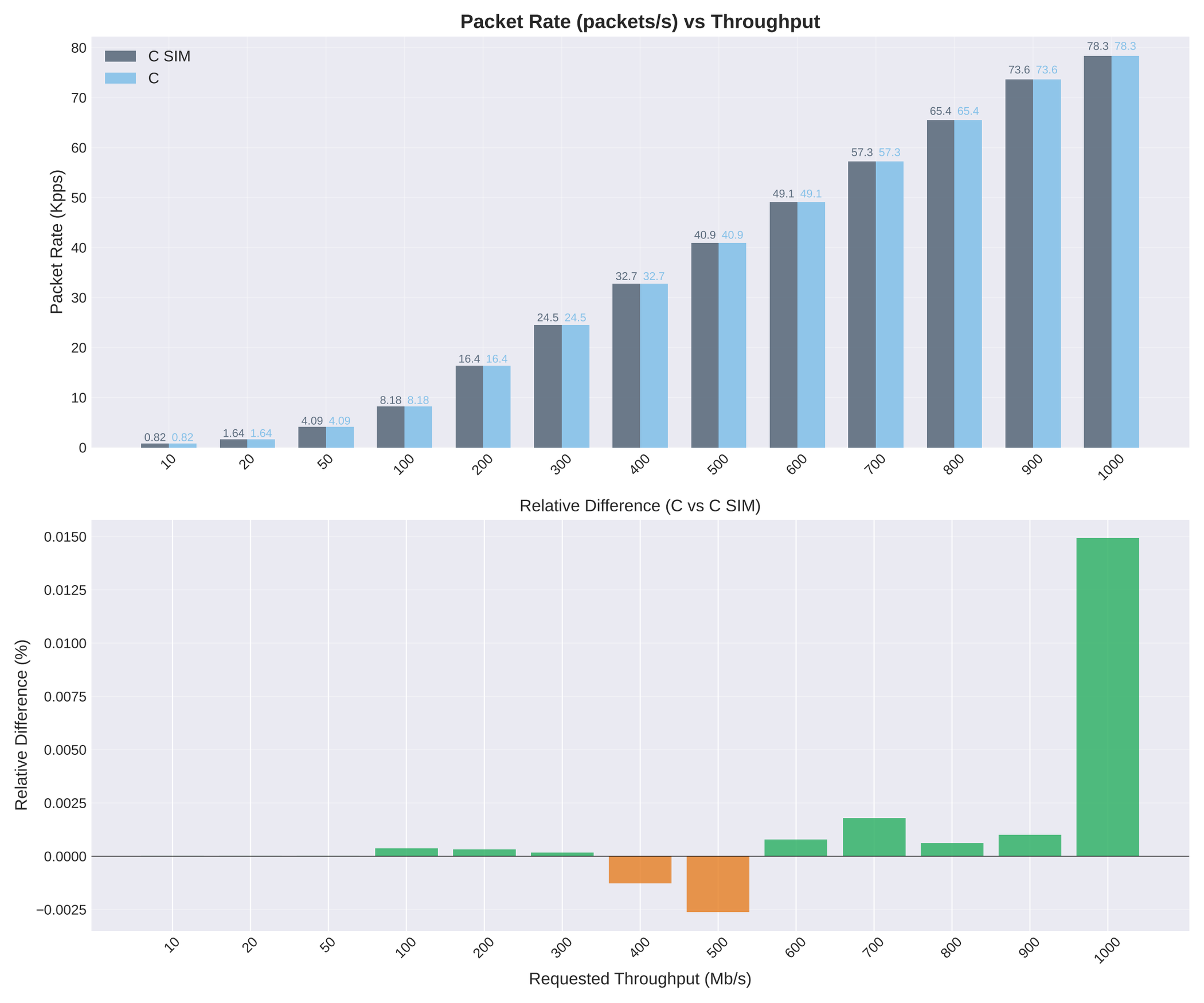

Branch Mispredictions per Packet vs Throughput
C SIM
C
Branch mis-pred / Packet
0
20
40
60
80
100
58.0
47.6
63.1
49.7
69.8
58.3
85.9
73.4
97.2
84.0
104.9
92.1
101.3
96.2
100.9
93.7
93.9
94.2
92.3
91.8
94.7
97.8
93.9
100.2
93.2
100.3
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
−20
−15
−10
−5
0
5
-18.0%
-21.2%
-16.5%
-14.5%
-13.6%
-12.2%
-5.0%
-7.1%
0.3%
-0.5%
3.3%
6.7%
7.6%
Requested Throughput (Mb/s)

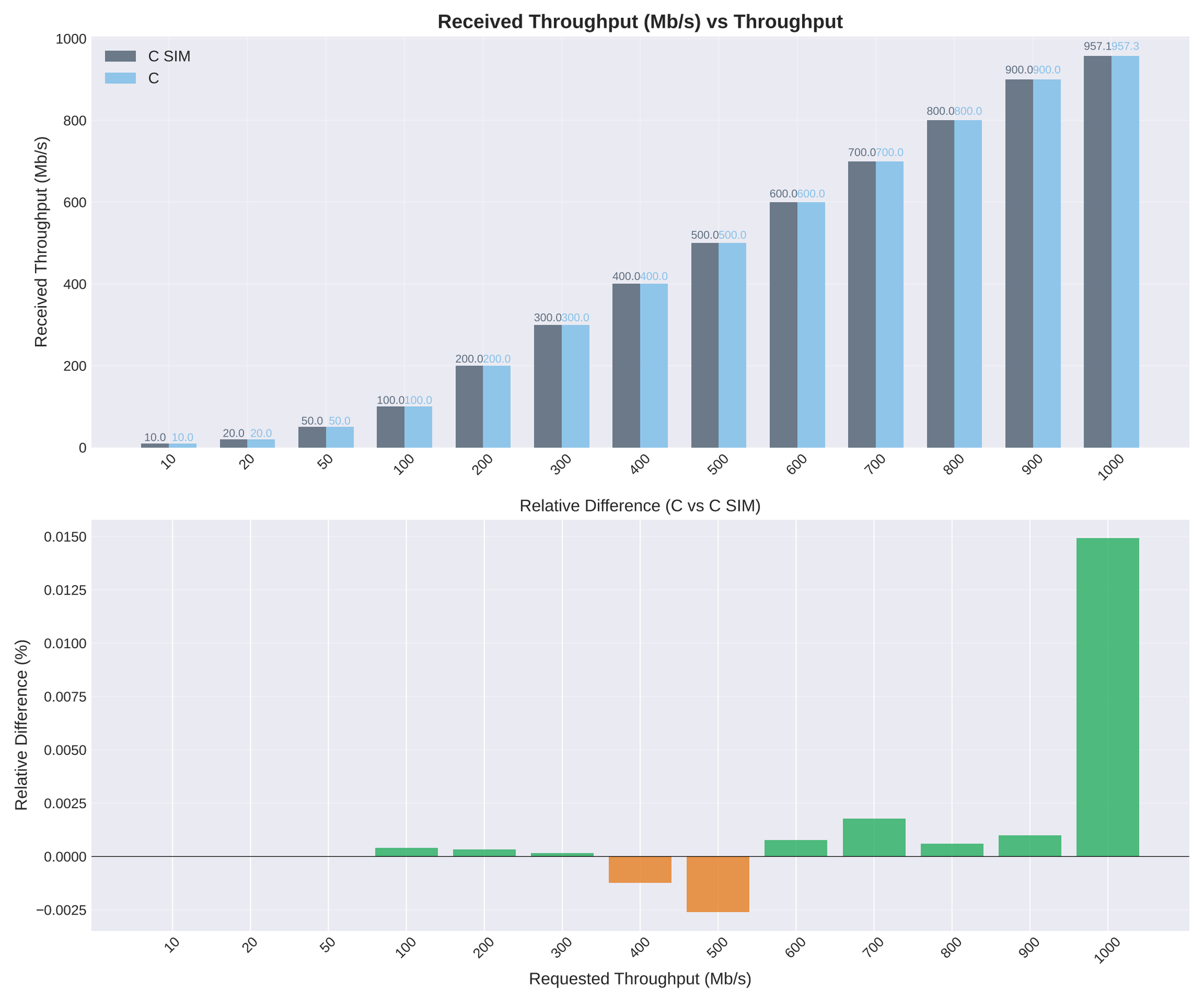

Cycles per Packet vs Throughput
1e6
C SIM
C
Cycles per Packet
1.2
1.0
0.8
0.6
0.4
0.2
0.0
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0.8
0.6
0.4
0.2
0.0
0.8%
Requested Throughput (Mb/s)


Instructions per Packet vs Throughput
C SIM
C
Instructions per Packet
0
200000
400000
600000
800000
873559.0
915010.0
471335.0
493123.0
196305.0
205107.0
108490.0
113859.0
66256.0
69910.0
71980.0
49202.0
46457.0
48131.0
64168.0
66907.0
62116.0
64761.0
60297.0
62484.0
58952.0
60901.0
57817.0
59914.0
56700.0
58767.0
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
5
0
−5
−10
−15
−20
−25
−30
4.7%
-1.1%
0.3%
-2.0%
-31.6%
-5.0%
-0.4%
-2.2%
-1.3%
-1.8%
-1.6%
0.1%
Requested Throughput (Mb/s)


Branch Mispredictions per Packet vs Throughput
C SIM
C
Branch Mispredictions per Packet
0
20
40
60
80
100
58.0
47.6
63.1
49.7
69.8
58.3
85.9
73.4
97.2
84.0
104.9
92.1
101.3
96.2
100.9
93.7
93.9
94.2
92.3
91.8
94.7
97.8
93.9
100.2
93.2
100.3
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
−20
−15
−10
−5
0
5
-18.0%
-21.2%
-16.5%
-14.5%
-13.6%
-12.2%
-5.0%
-7.1%
0.3%
-0.5%
3.3%
6.7%
7.6%
Requested Throughput (Mb/s)


Mean Round-Trip Time (µs) vs Throughput
C SIM
C
Mean Round-Trip Time (µs)
1400
1200
1000
800
600
400
200
138.0
133.0
144.0
184.0
212.0
283.0
371.0
553.0
747.0
759.0
758.0
769.0
1363.0
456.0
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
10
5
0
−5
−10
−15
2.2%
10.5%
-5.6%
-4.9%
-0.5%
-4.9%
-2.7%
-17.5%
-2.8%
1.1%
0.3%
0.9%
-0.3%
Requested Throughput (Mb/s)


Packet Rate (packets/s) vs Throughput
C SIM
C
Packet Rate (Kpps)
0
10
20
30
40
50
60
70
80
0.82 0.82
1.64 1.64
4.09 4.09
8.18 8.18
16.4 16.4
24.5 24.5
32.7 32.7
40.9 40.9
49.1 49.1
57.3 57.3
65.4 65.4
73.6 73.6
78.3 78.3
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
−0.0025
10
20
50
100
200
300
400
500
600
700
800
900
1000
Requested Throughput (Mb/s)


Received Throughput (Mb/s) vs Throughput
C SIM
C
Received Throughput (Mb/s)
0
200
400
600
800
1000
10.0 10.0
20.0 20.0
50.0 50.0
100.0 100.0
200.0 200.0
300.0 300.0
400.0 400.0
500.0 500.0
600.0 600.0
700.0 700.0
800.0 800.0
900.0 900.0
957.1 957.3
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
−0.0025
Requested Throughput (Mb/s)


Sent Throughput (Mb/s) vs Throughput
C SIM
C
Sent Throughput (Mb/s)
0
200
400
600
800
1000
10.0 10.0
20.0 20.0
50.0 50.0
100.0 100.0
200.0 200.0
300.0 300.0
400.0 400.0
500.0 500.0
600.0 600.0
700.0 700.0
800.0 800.0
900.0 900.0
1000.0 1000.0
10
20
50
100
200
300
400
500
600
700
800
900
1000
Relative Difference (C vs C SIM)
Relative Difference (%)
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
−0.0002
Requested Throughput (Mb/s)