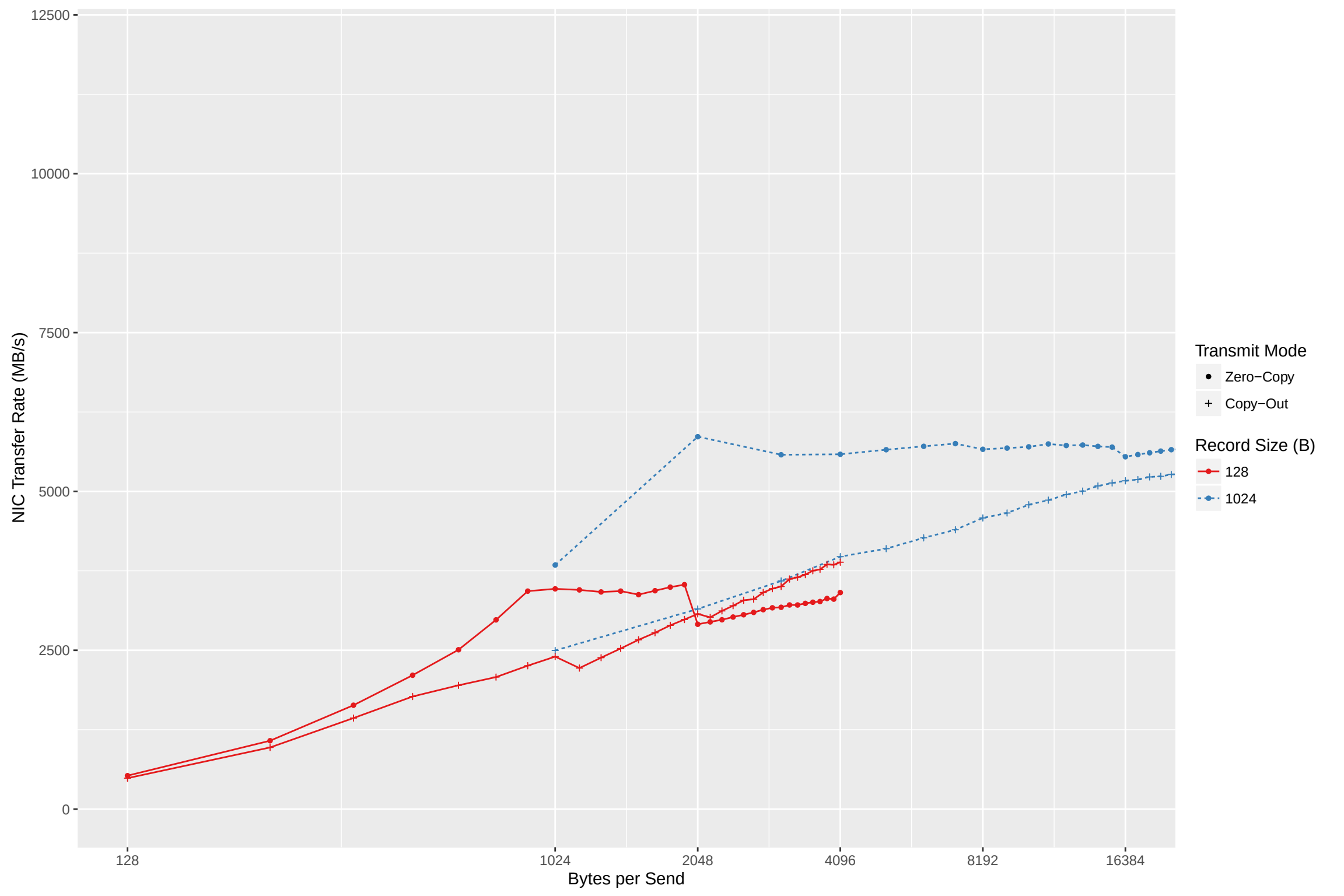
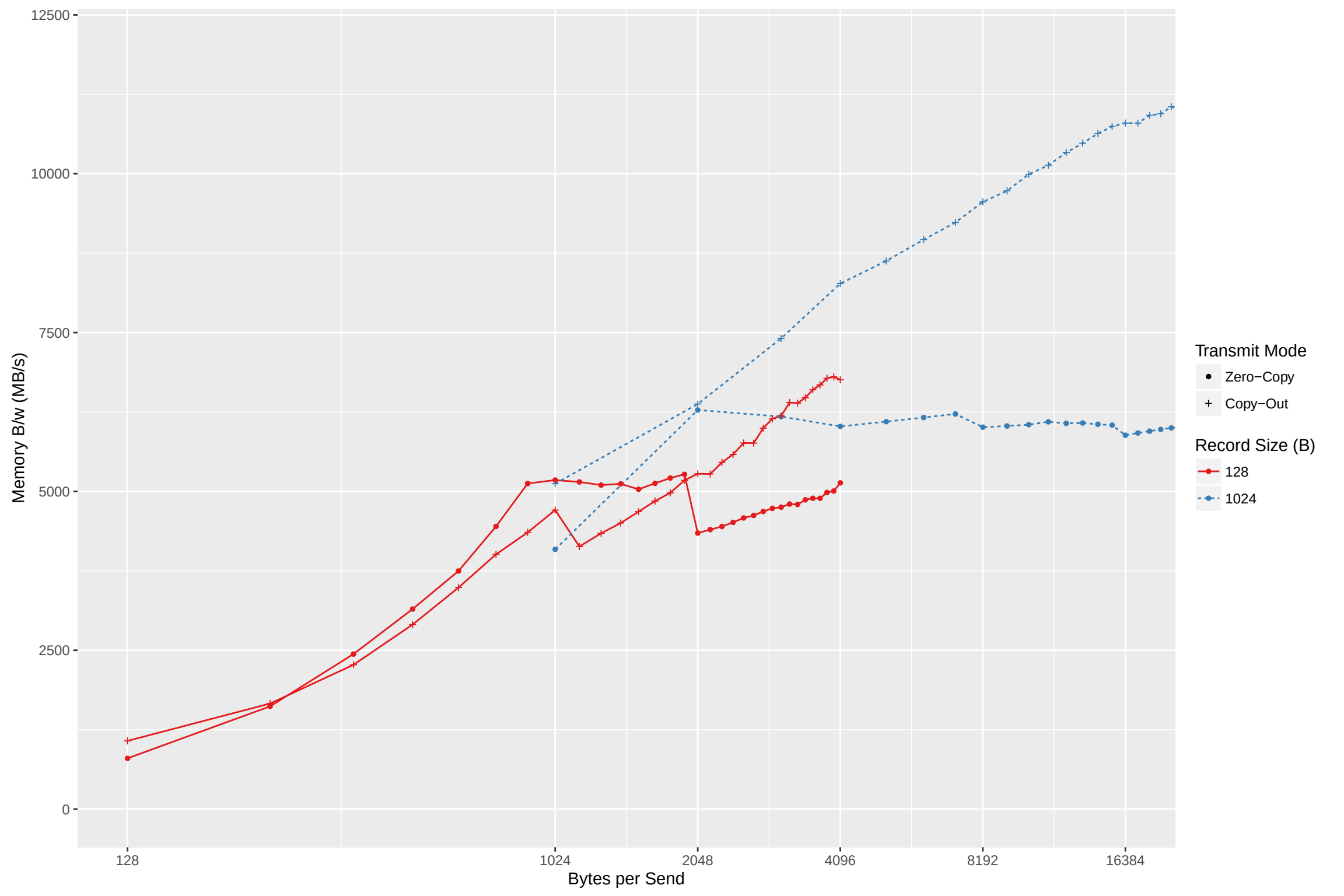
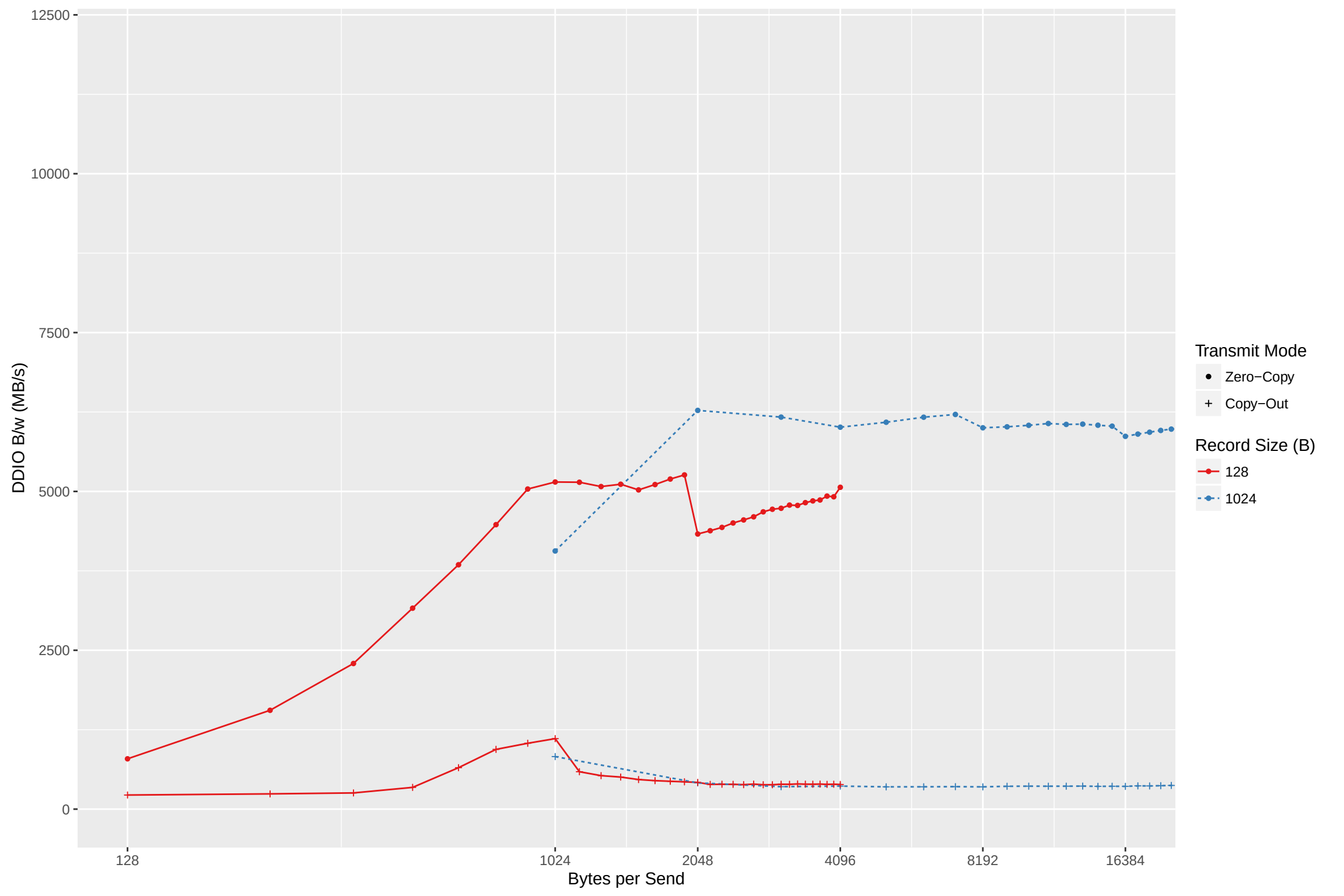
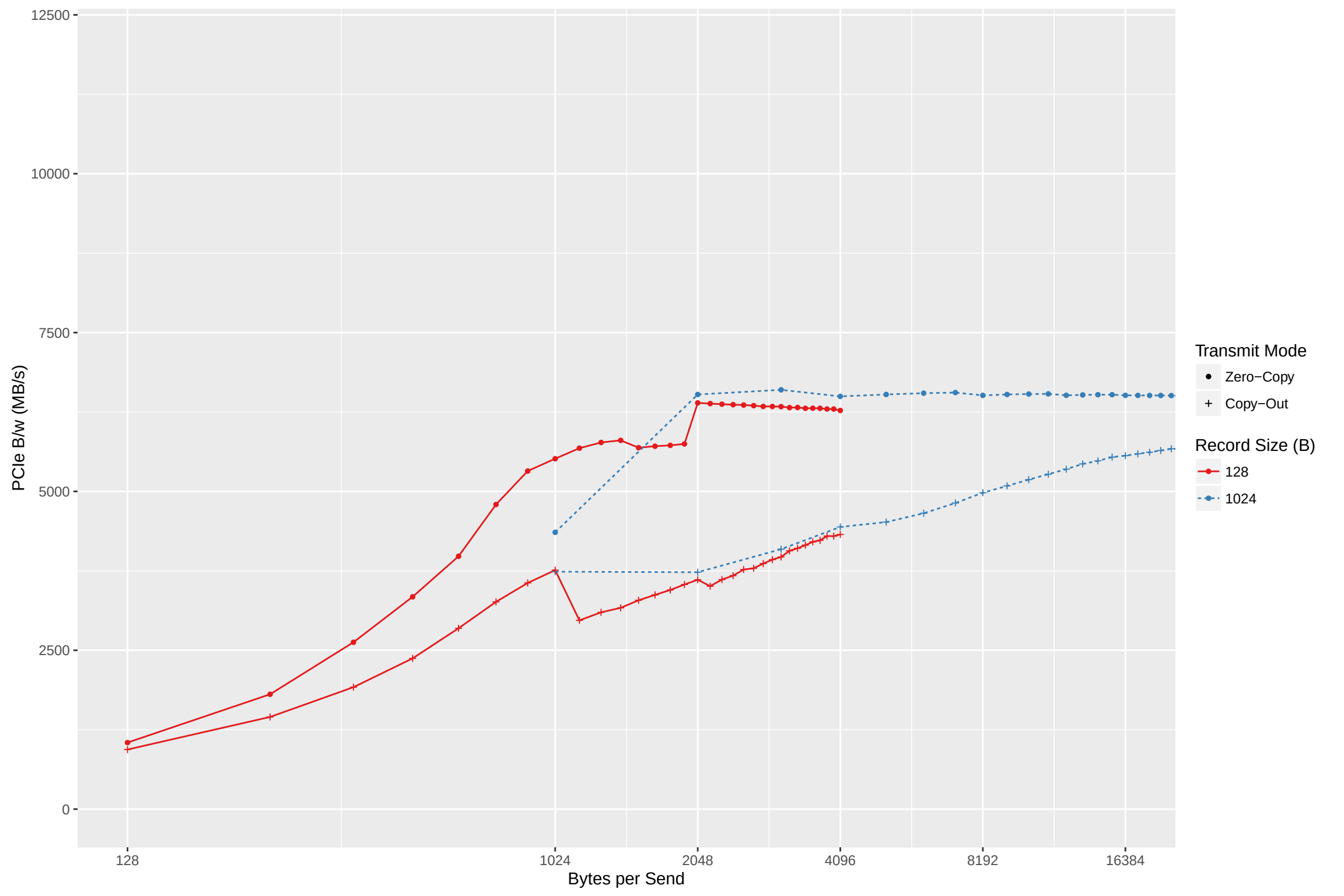
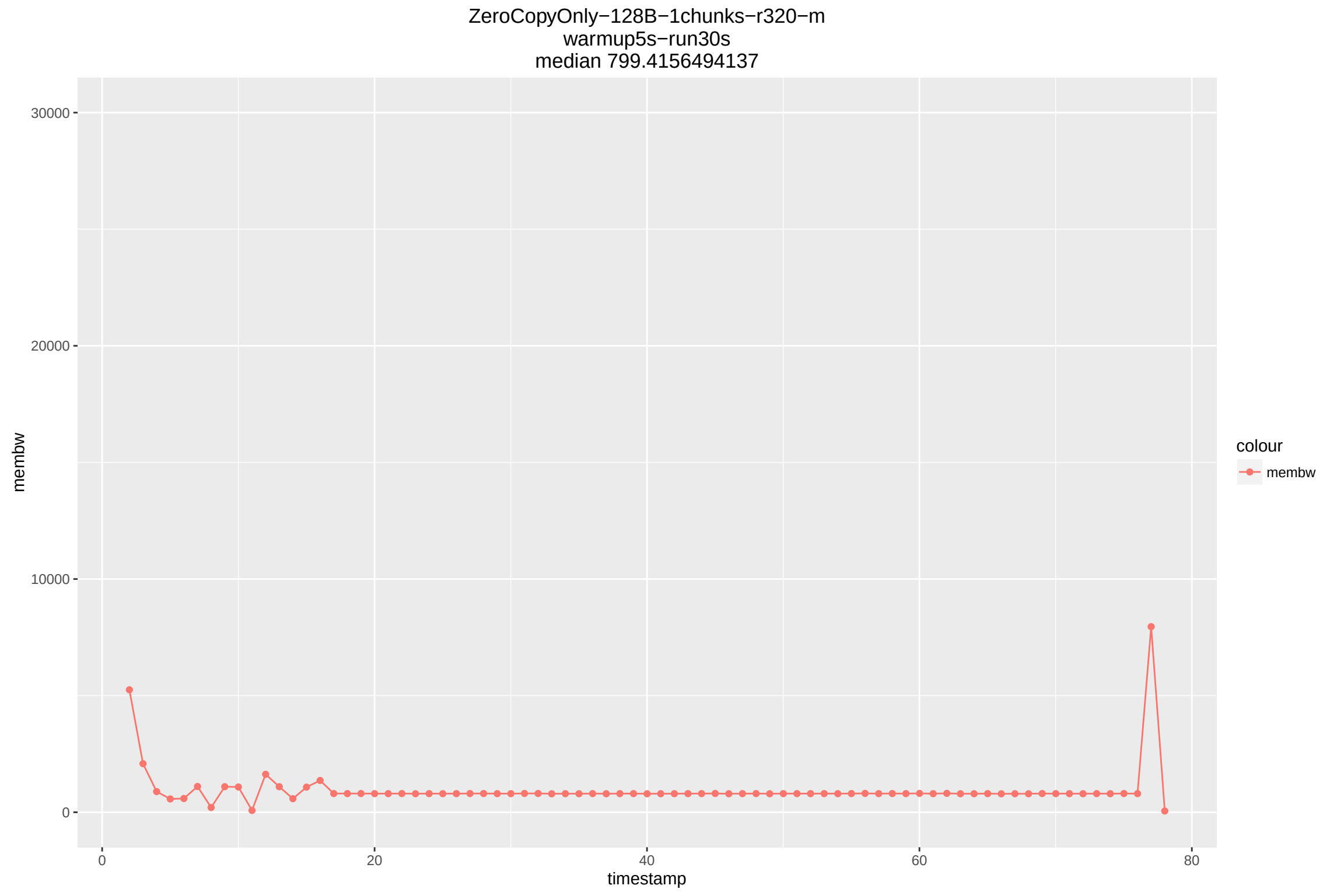
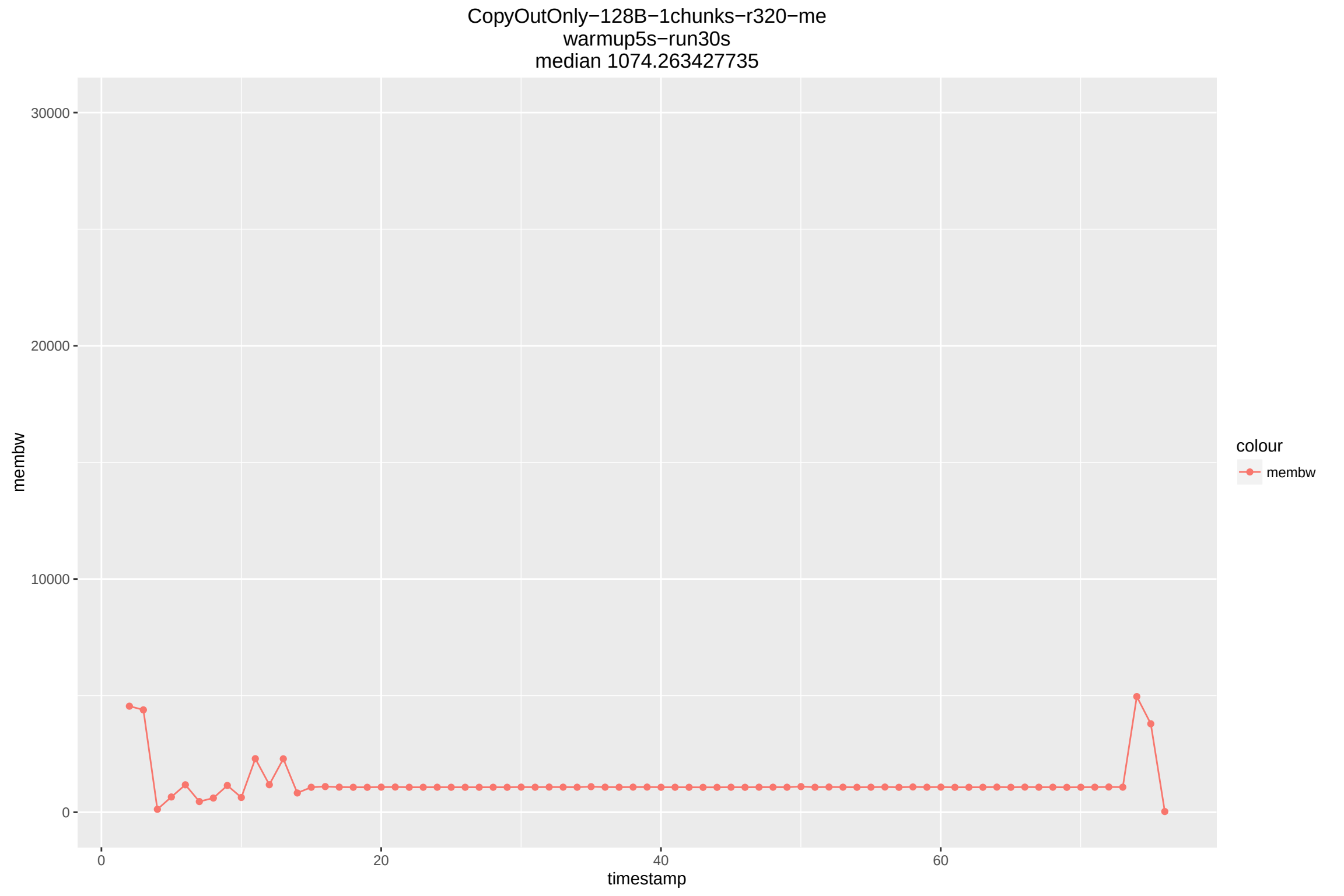

12500
10000
7500
5000
2500
0
NIC Transfer Rate (MB/s)
128
1024
2048
4096
8192
16384
Bytes per Send
Transmit Mode
Zero−Copy
Copy−Out
Record Size (B)
128
1024

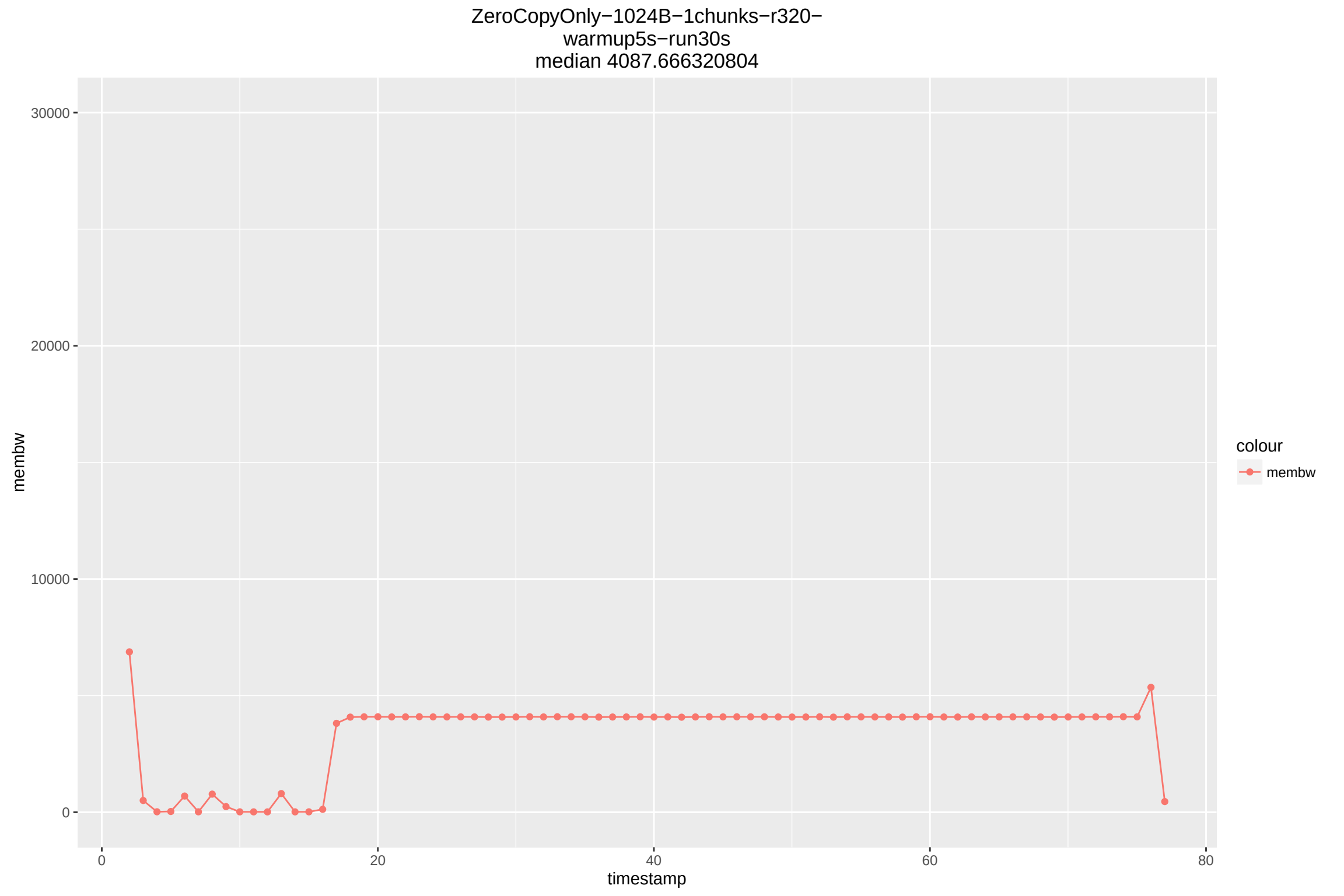

12500
10000
7500
5000
2500
0
Memory B/w (MB/s)
128
1024
2048
4096
8192
16384
Bytes per Send
Transmit Mode
Zero−Copy
Copy−Out
Record Size (B)
128
1024

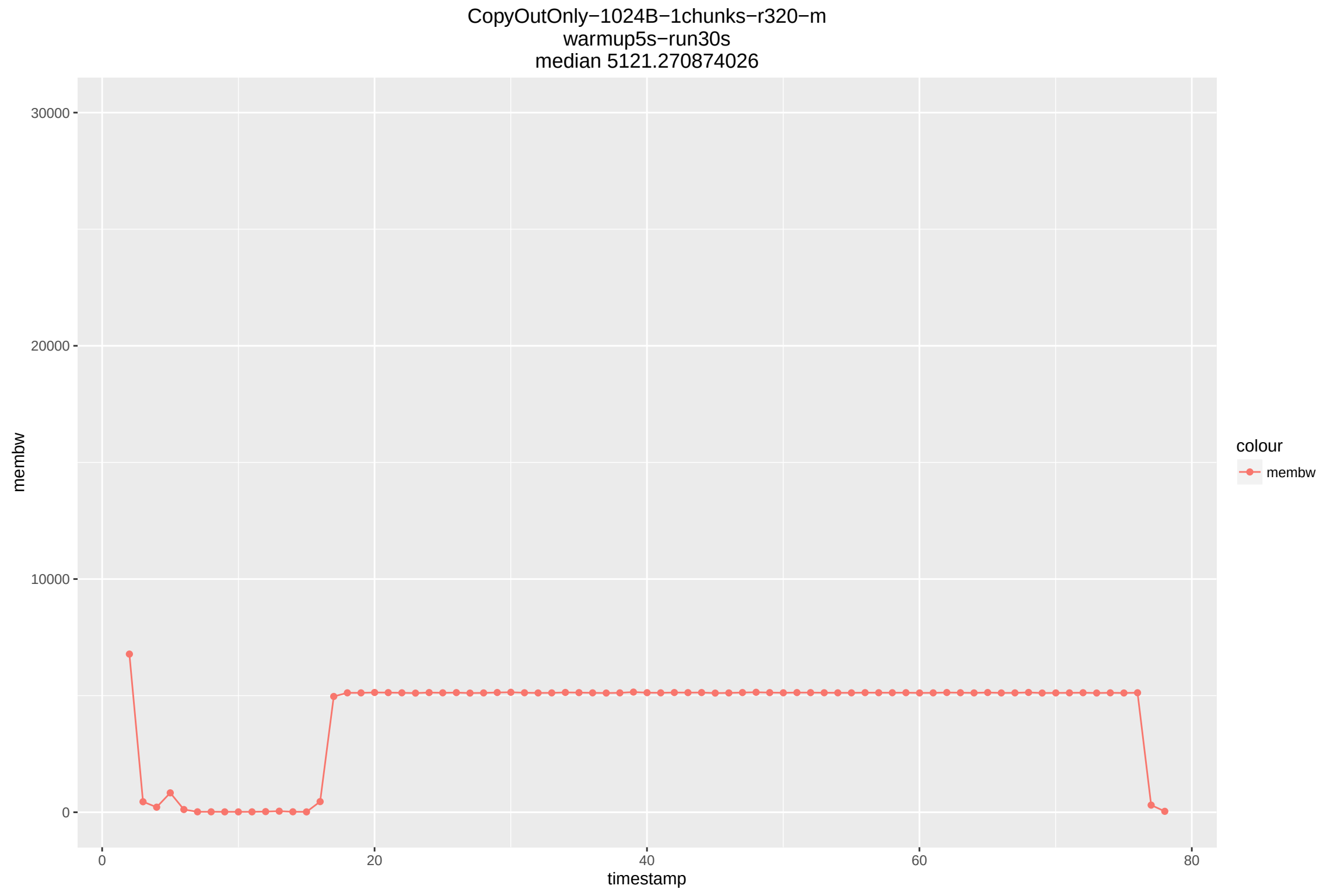

12500
10000
7500
5000
2500
0
DDIO B/w (MB/s)
128
1024
2048
4096
8192
16384
Bytes per Send
Transmit Mode
Zero−Copy
Copy−Out
Record Size (B)
128
1024

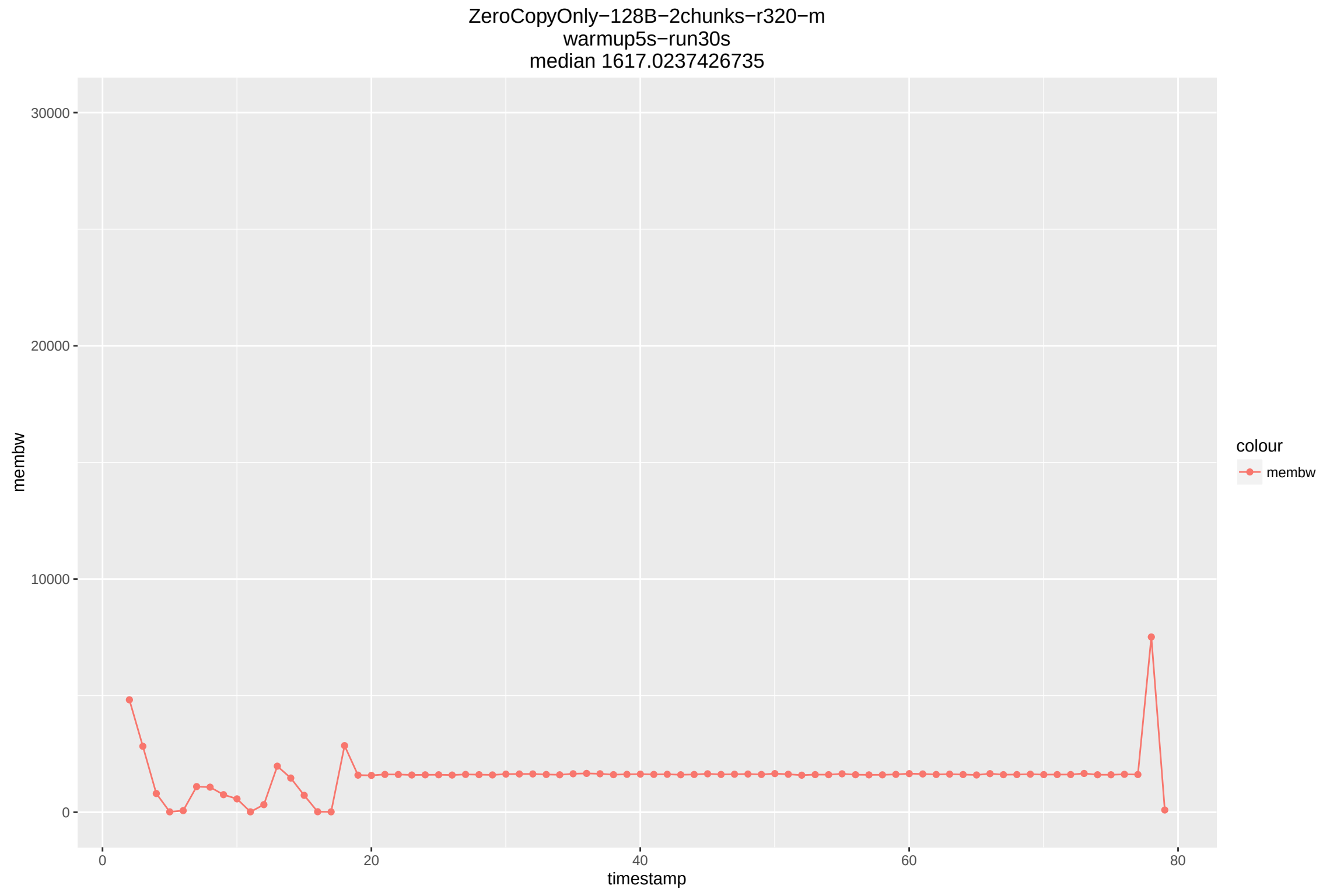

12500
10000
7500
5000
2500
0
PCIe B/w (MB/s)
128
1024
2048
4096
8192
16384
Bytes per Send
Transmit Mode
Zero−Copy
Copy−Out
Record Size (B)
128
1024

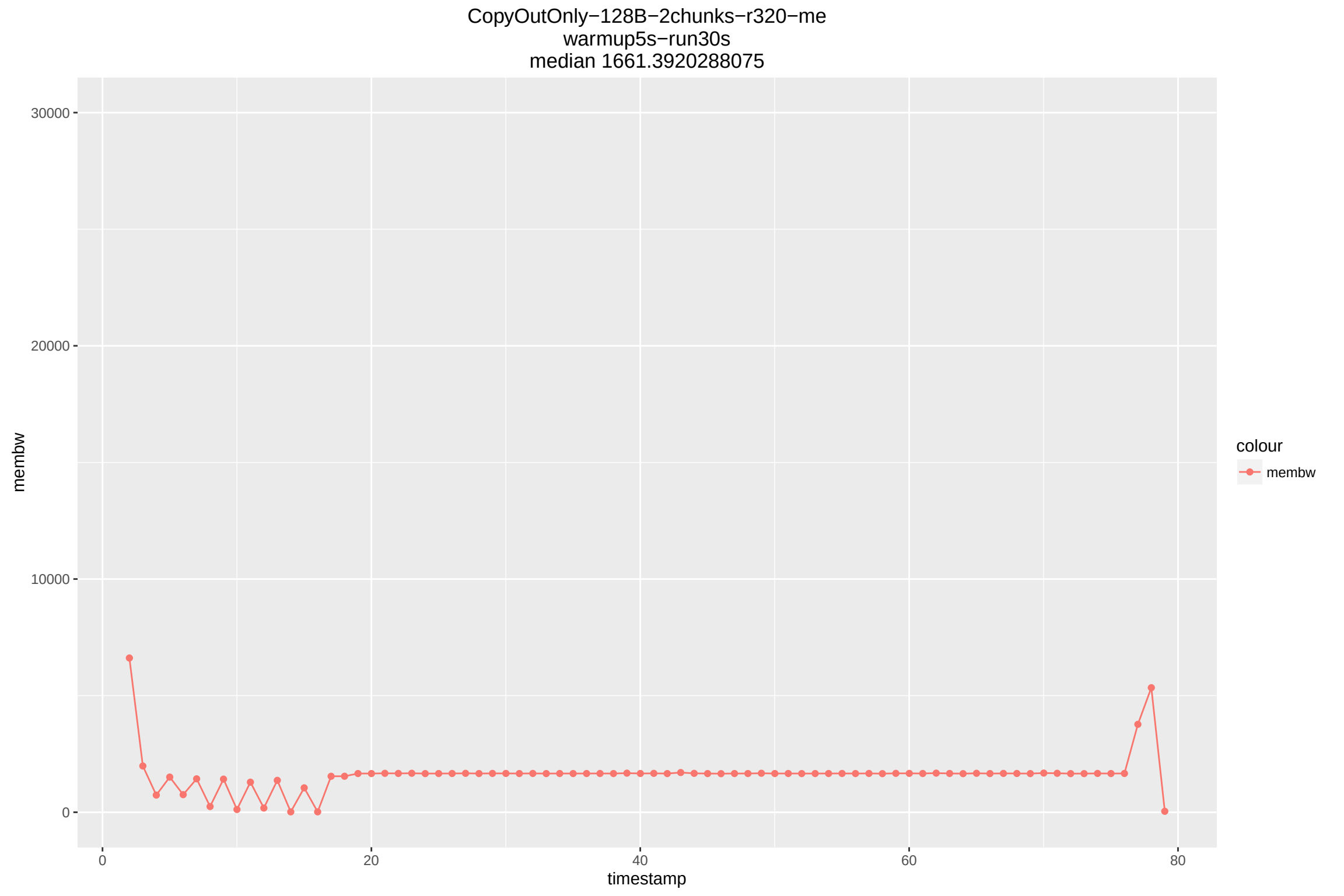

ZeroCopyOnly−128B−1chunks−r320−m
warmup5s−run30s
median 799.4156494137
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

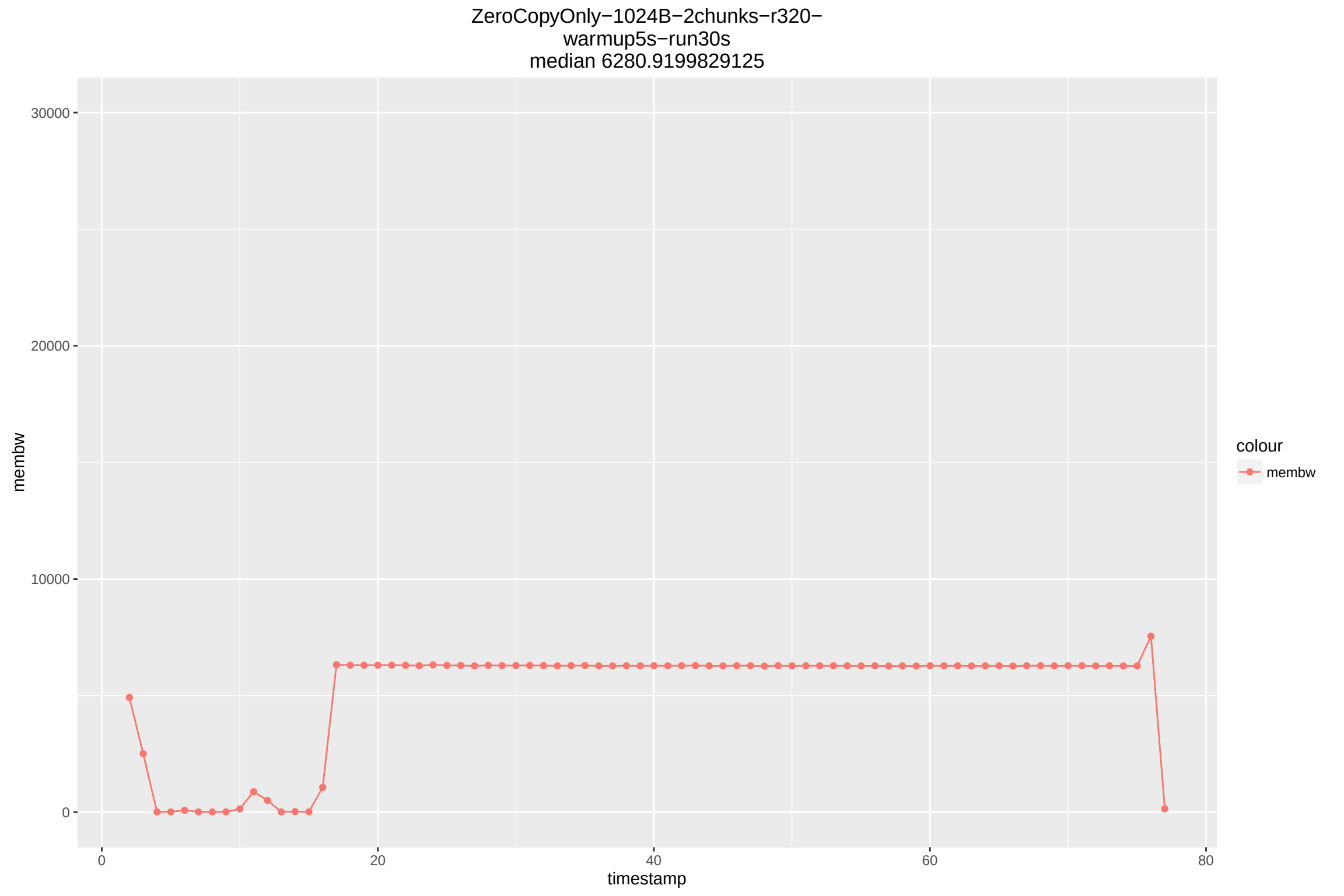

CopyOutOnly−128B−1chunks−r320−me
warmup5s−run30s
median 1074.263427735
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

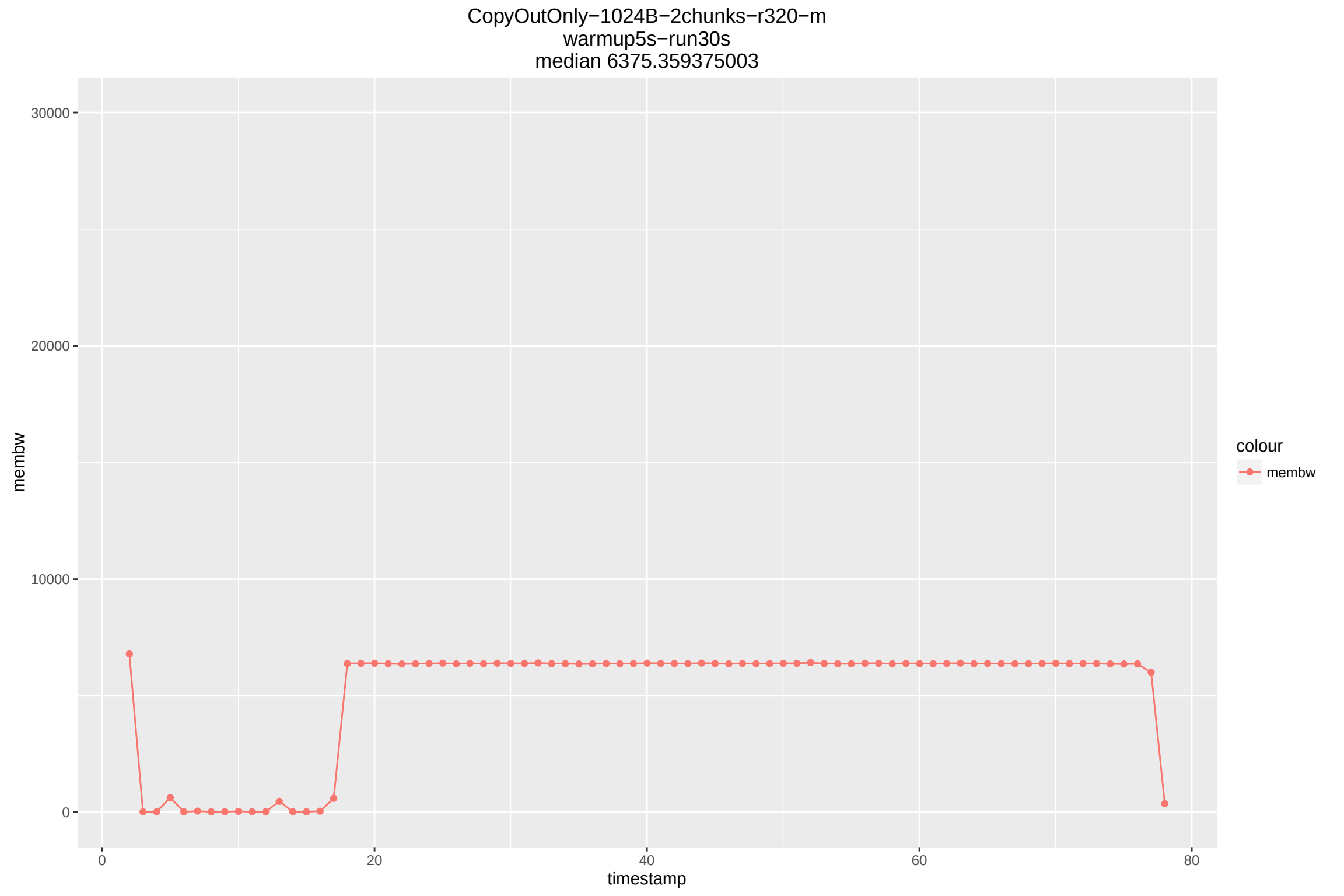

ZeroCopyOnly−1024B−1chunks−r320−
warmup5s−run30s
median 4087.666320804
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

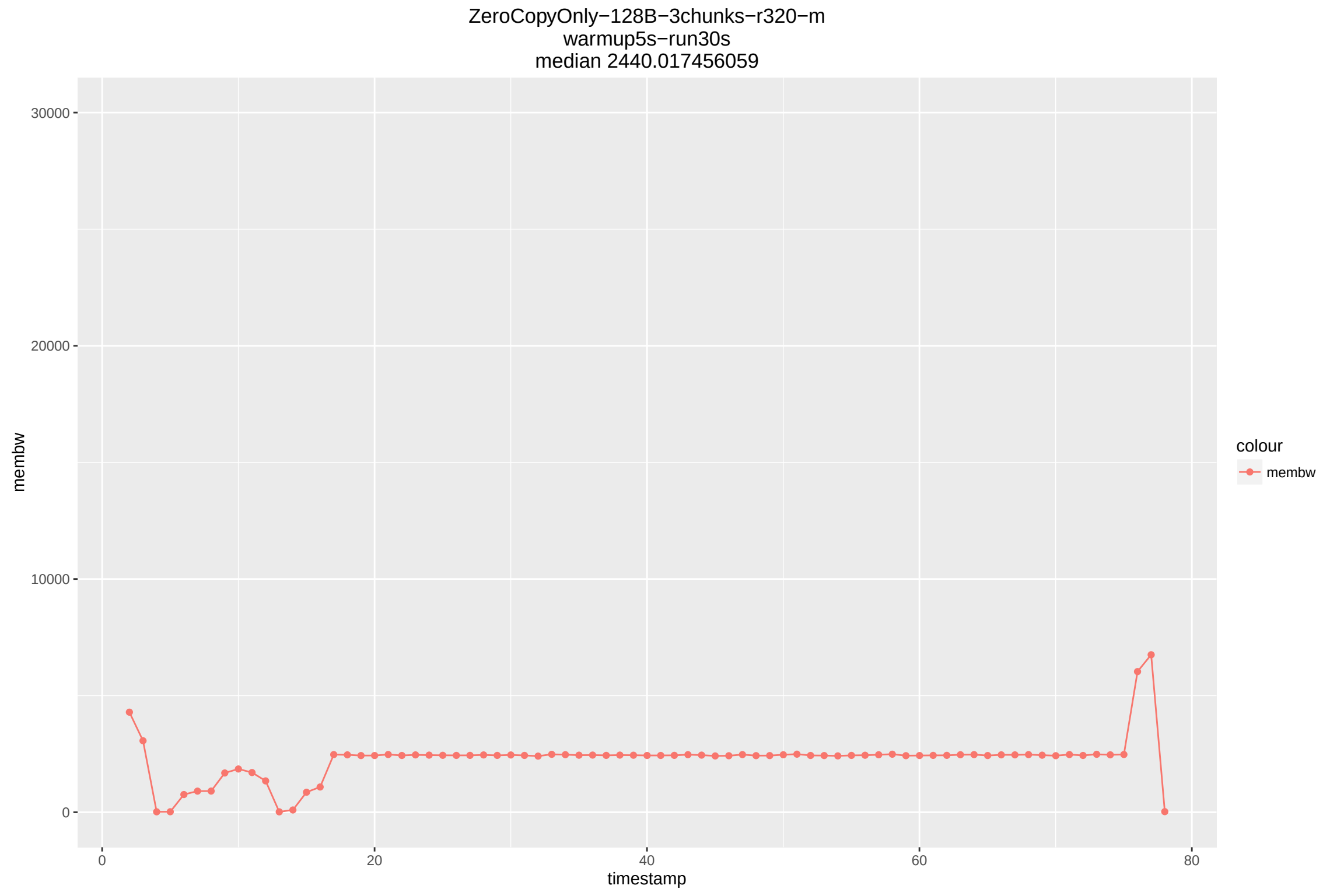

CopyOutOnly−1024B−1chunks−r320−m
warmup5s−run30s
median 5121.270874026
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

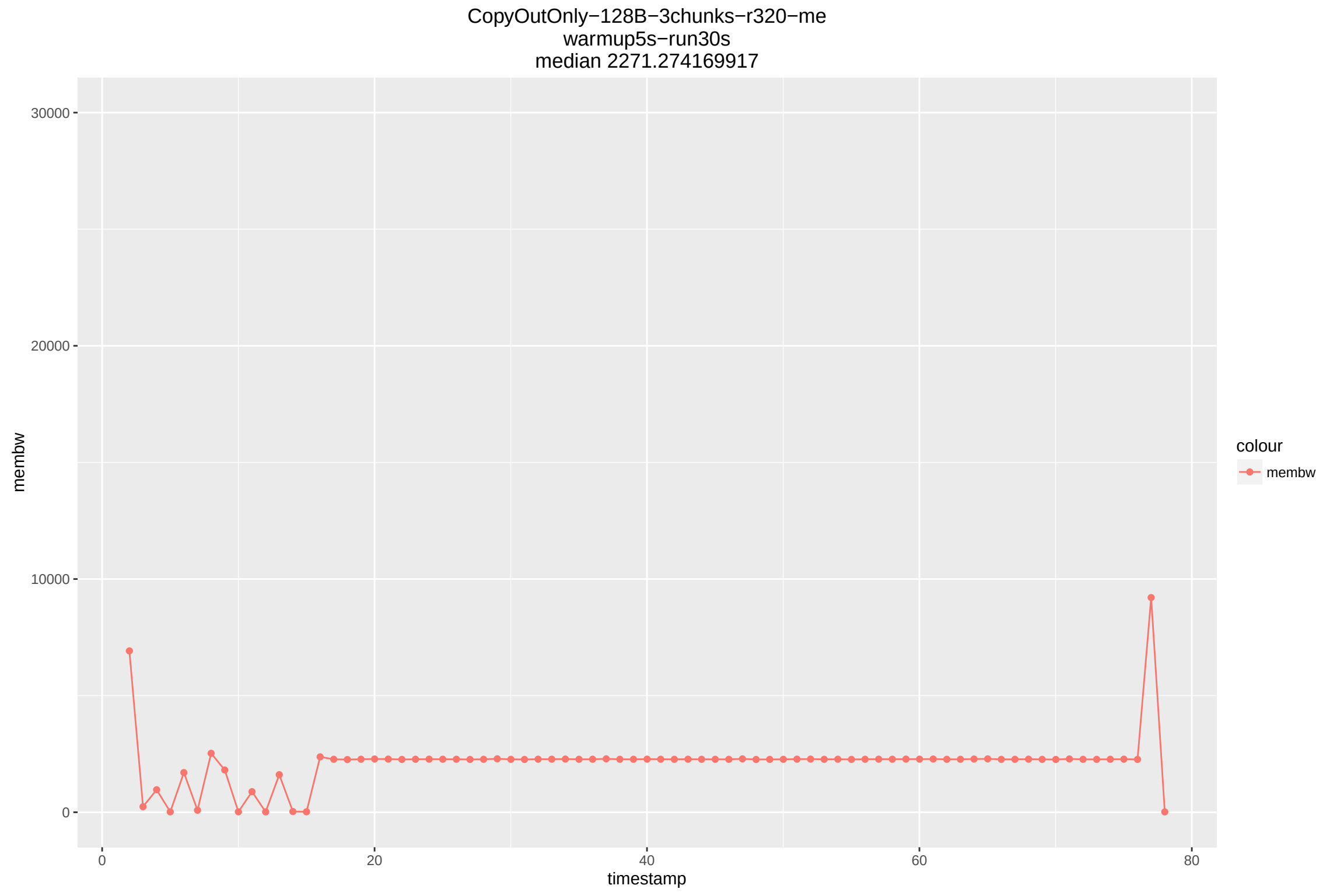

ZeroCopyOnly−128B−2chunks−r320−m
warmup5s−run30s
median 1617.0237426735
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

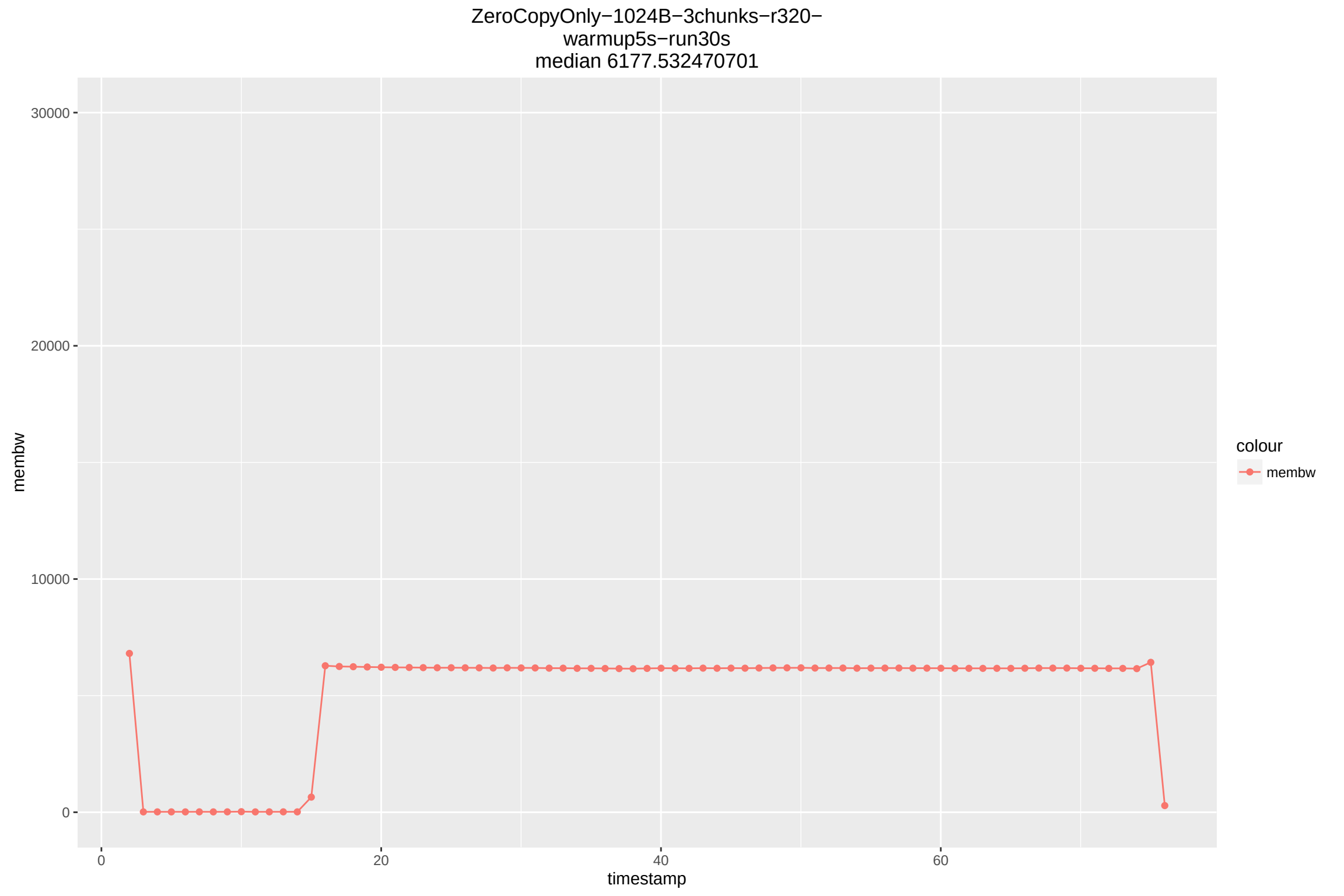

CopyOutOnly−128B−2chunks−r320−me
warmup5s−run30s
median 1661.3920288075
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

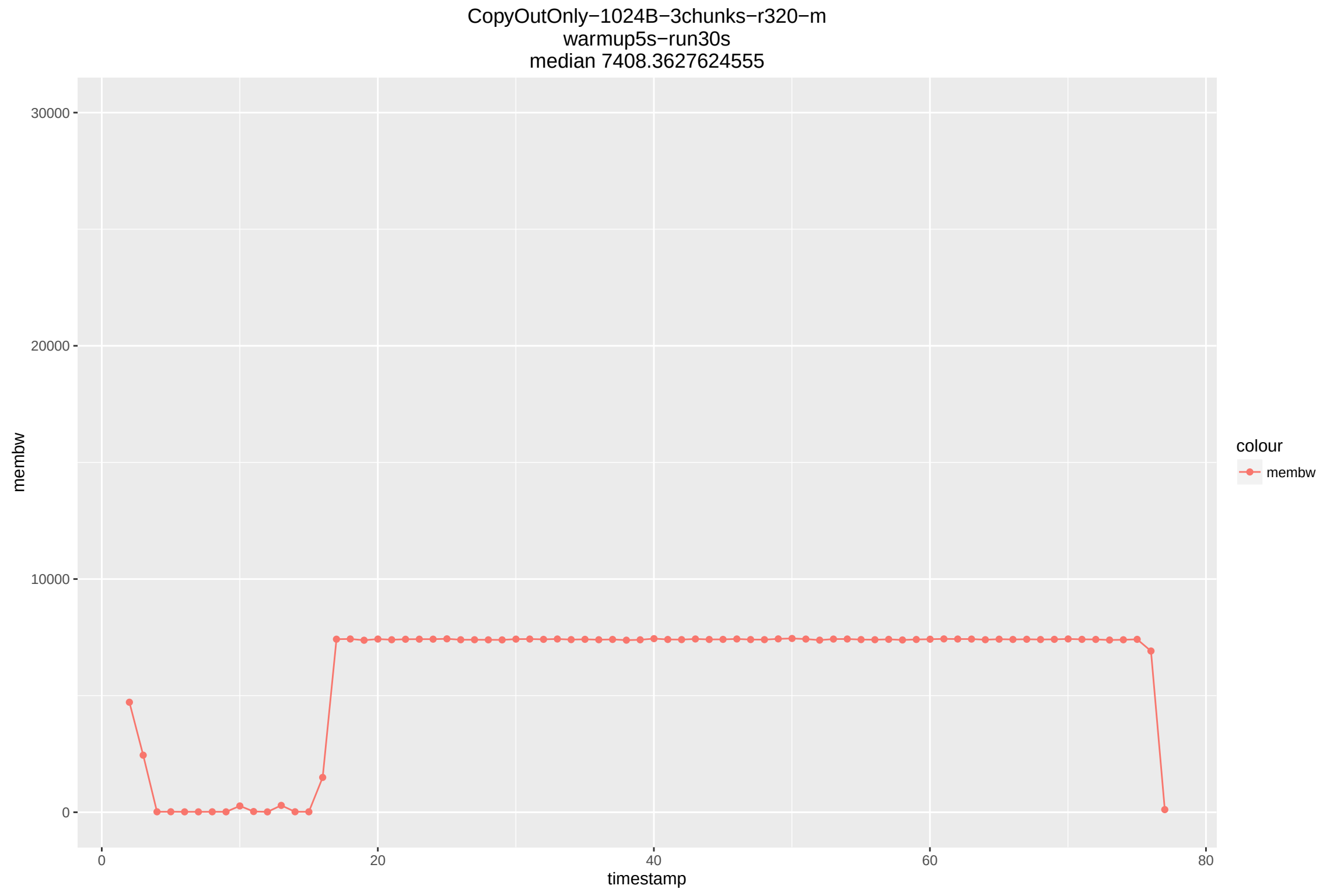

ZeroCopyOnly−1024B−2chunks−r320−
warmup5s−run30s
median 6280.9199829125
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

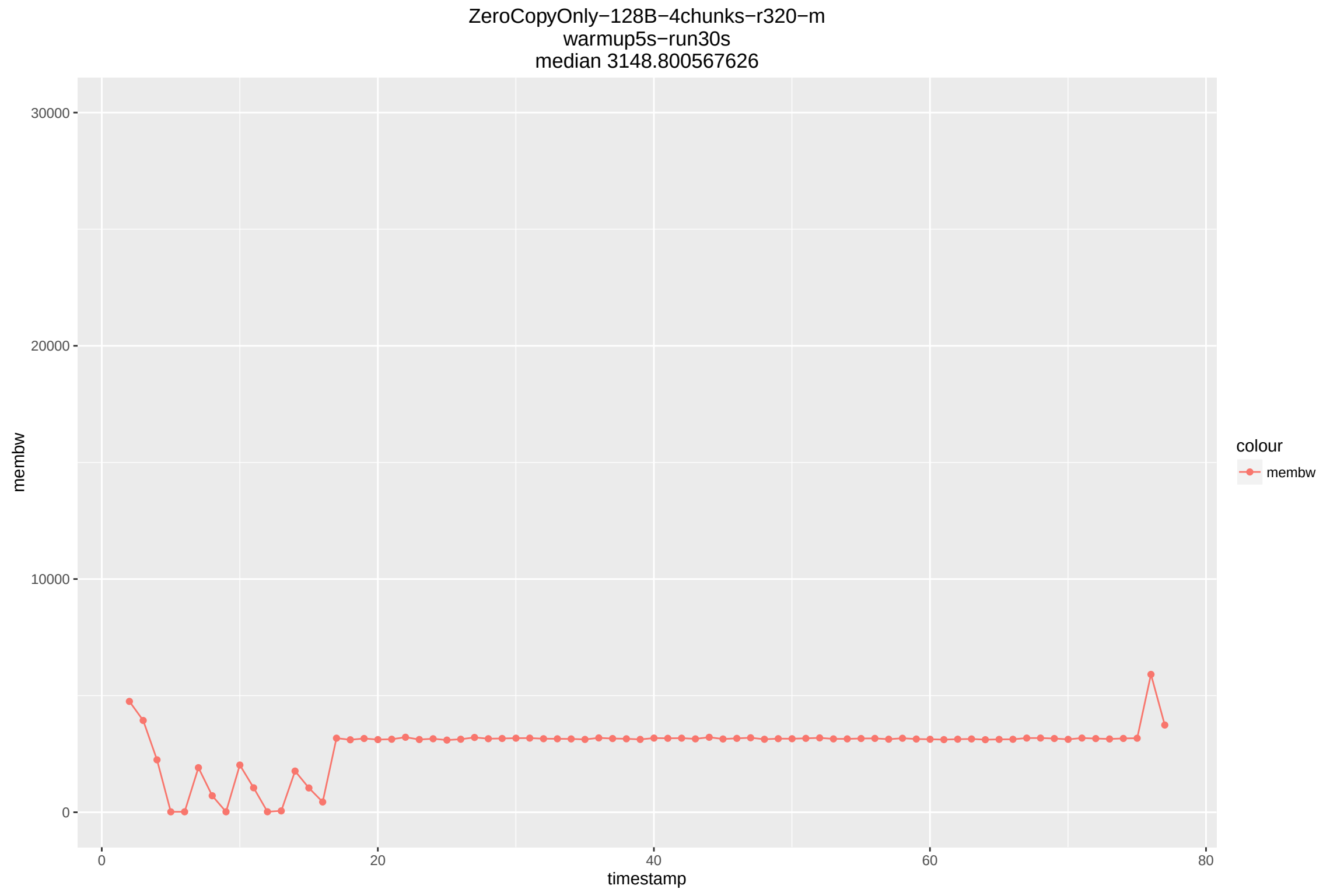

CopyOutOnly−1024B−2chunks−r320−m
warmup5s−run30s
median 6375.359375003
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

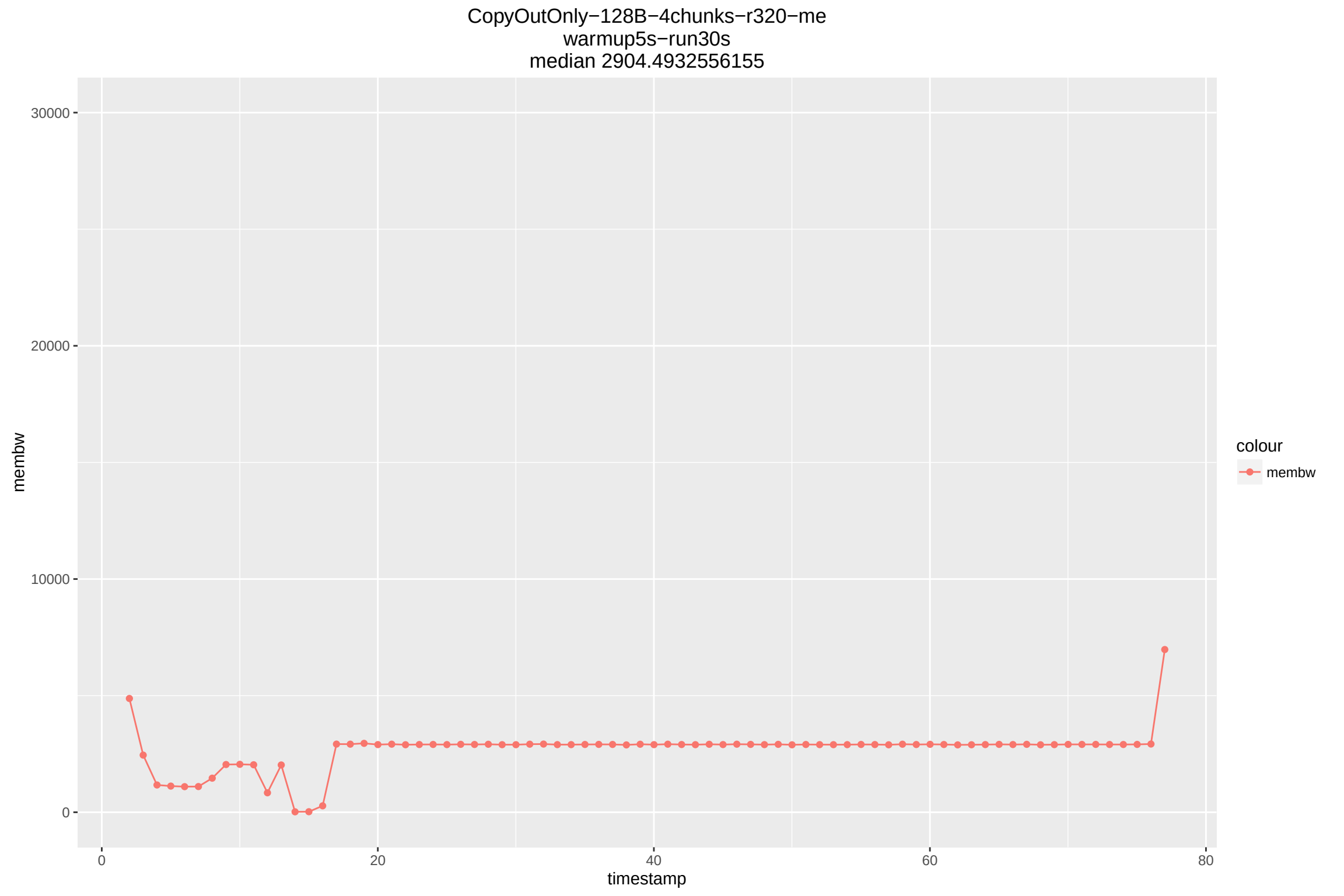

ZeroCopyOnly−128B−3chunks−r320−m
warmup5s−run30s
median 2440.017456059
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

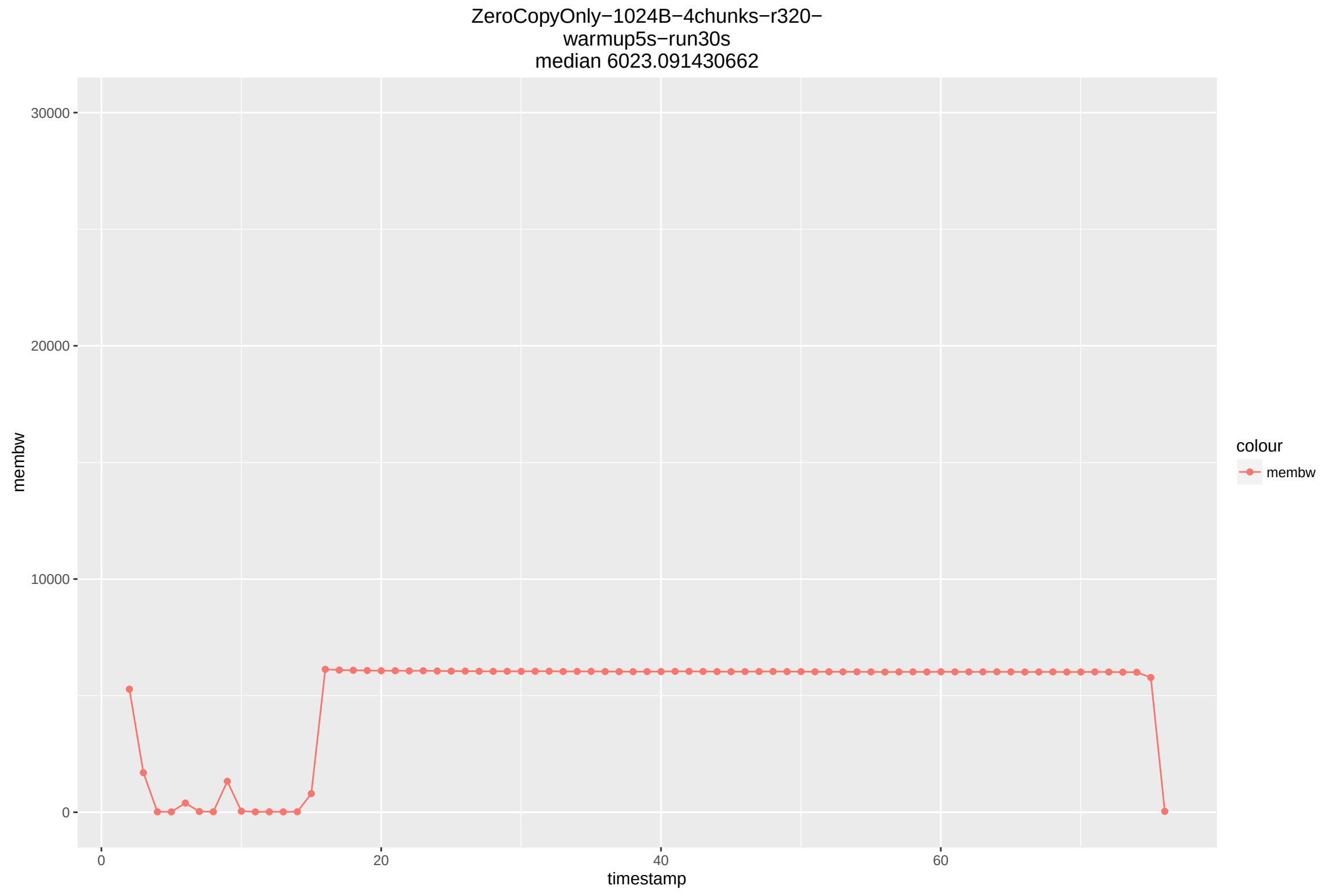

CopyOutOnly−128B−3chunks−r320−me
warmup5s−run30s
median 2271.274169917
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

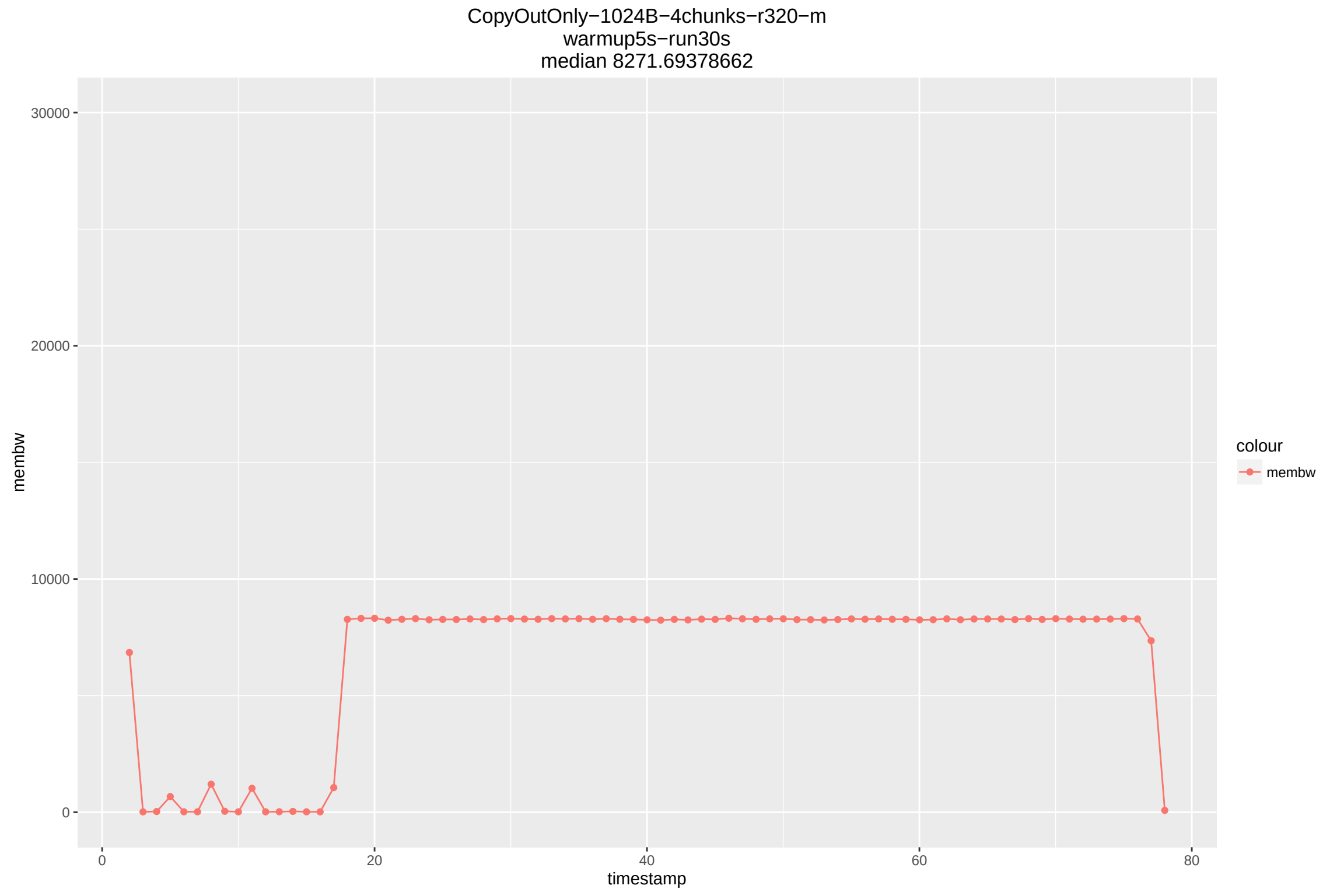

ZeroCopyOnly−1024B−3chunks−r320−
warmup5s−run30s
median 6177.532470701
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

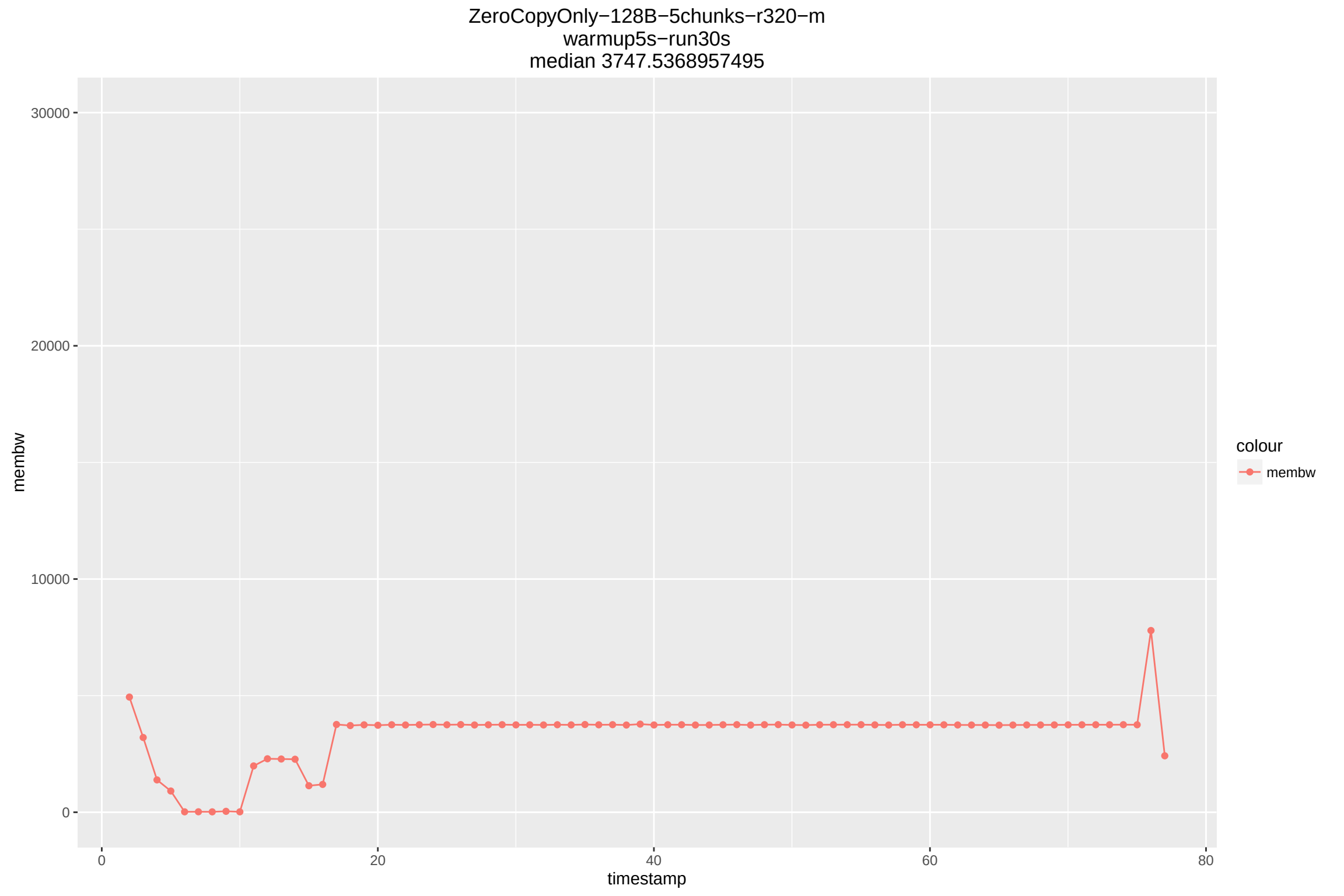

CopyOutOnly−1024B−3chunks−r320−m
warmup5s−run30s
median 7408.3627624555
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

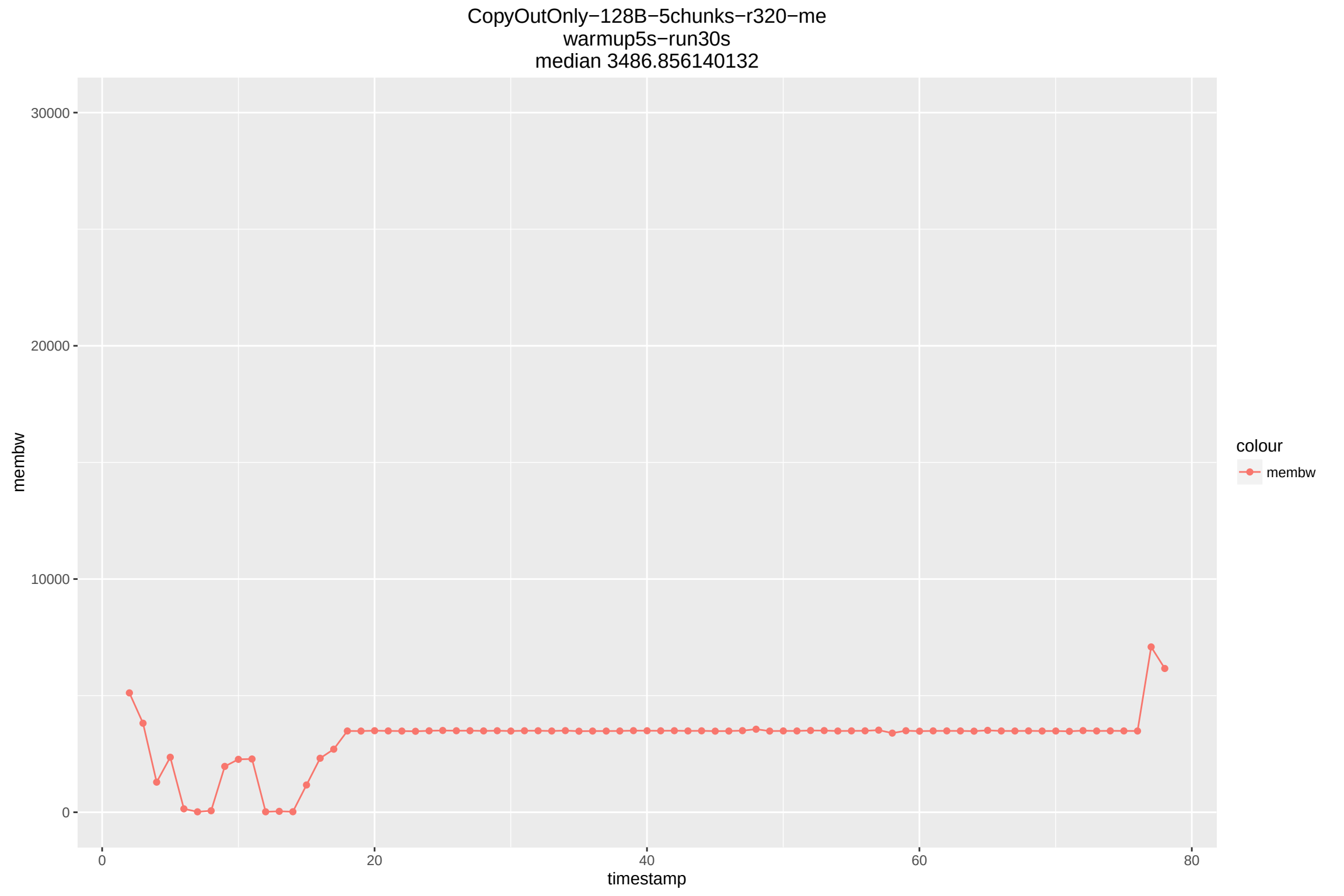

ZeroCopyOnly−128B−4chunks−r320−m
warmup5s−run30s
median 3148.800567626
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

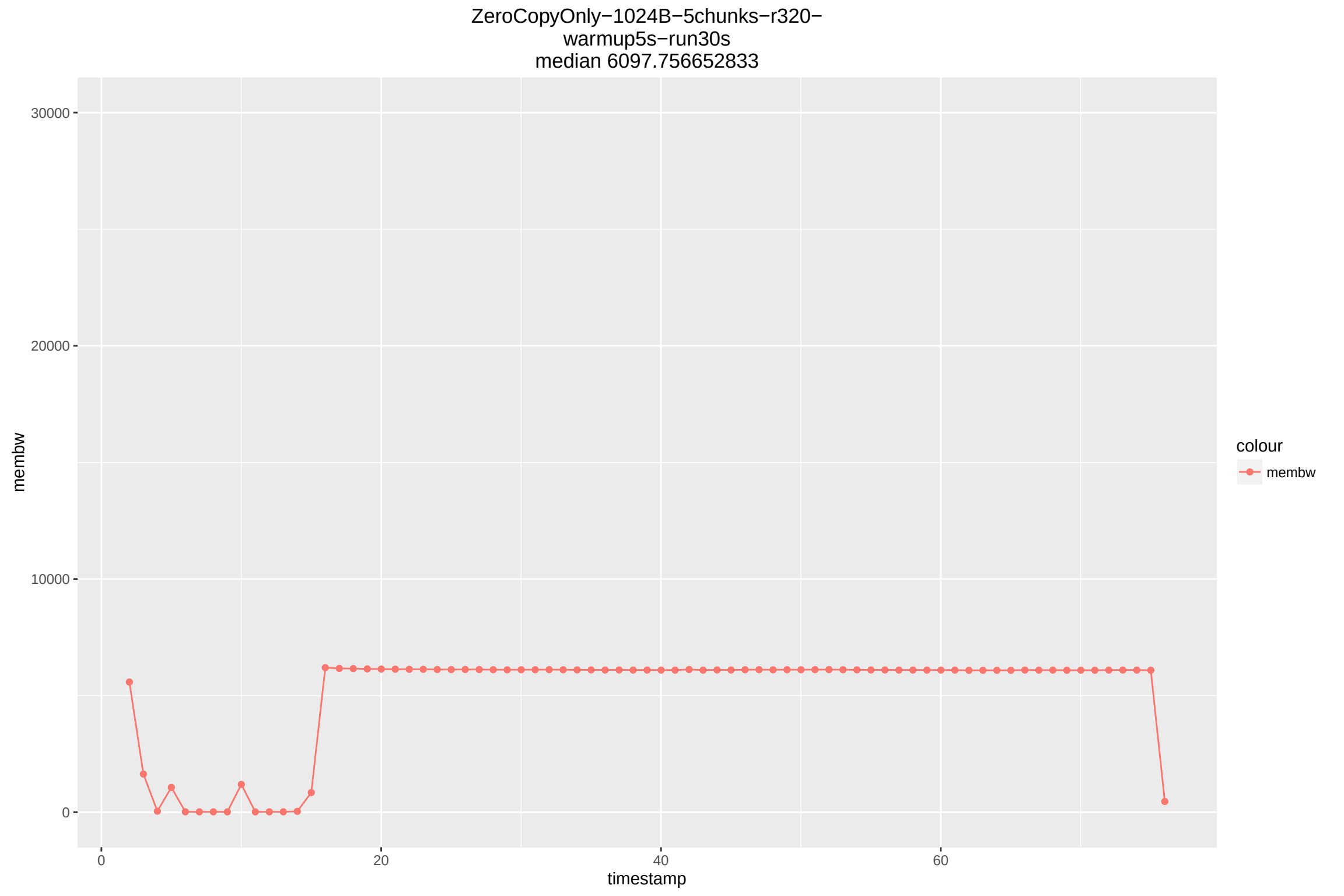

CopyOutOnly−128B−4chunks−r320−me
warmup5s−run30s
median 2904.4932556155
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

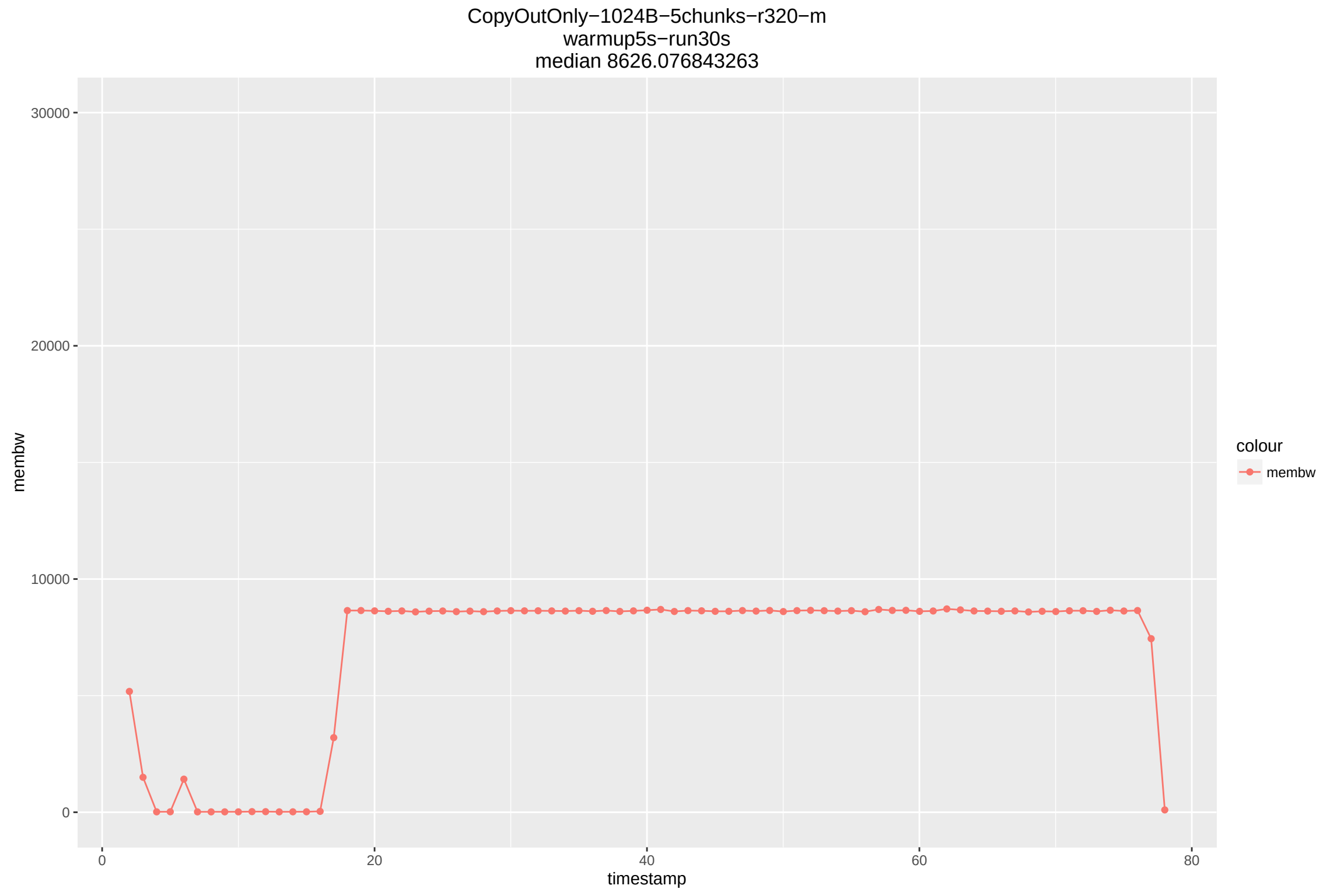

ZeroCopyOnly−1024B−4chunks−r320−
warmup5s−run30s
median 6023.091430662
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

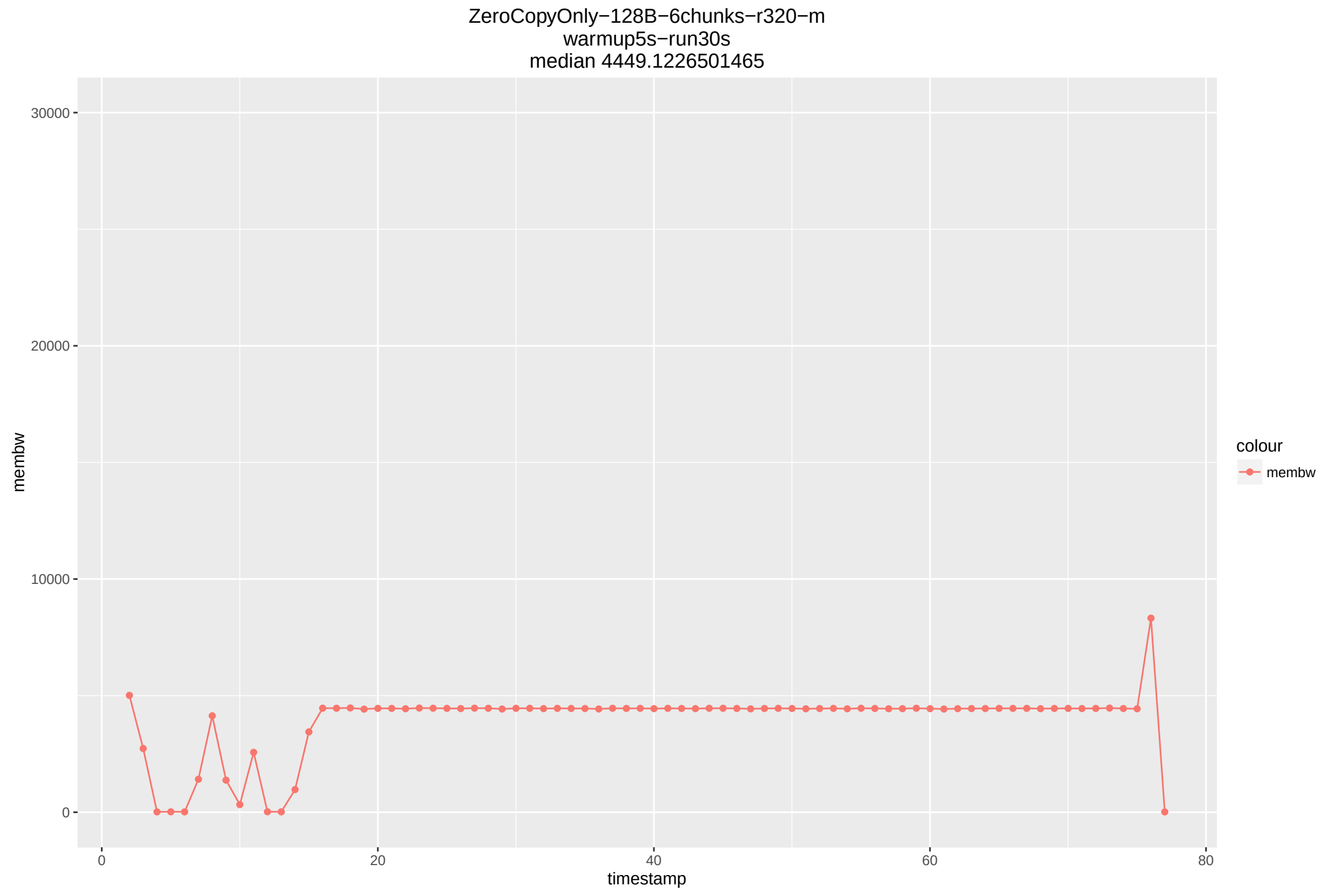

CopyOutOnly−1024B−4chunks−r320−m
warmup5s−run30s
median 8271.69378662
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

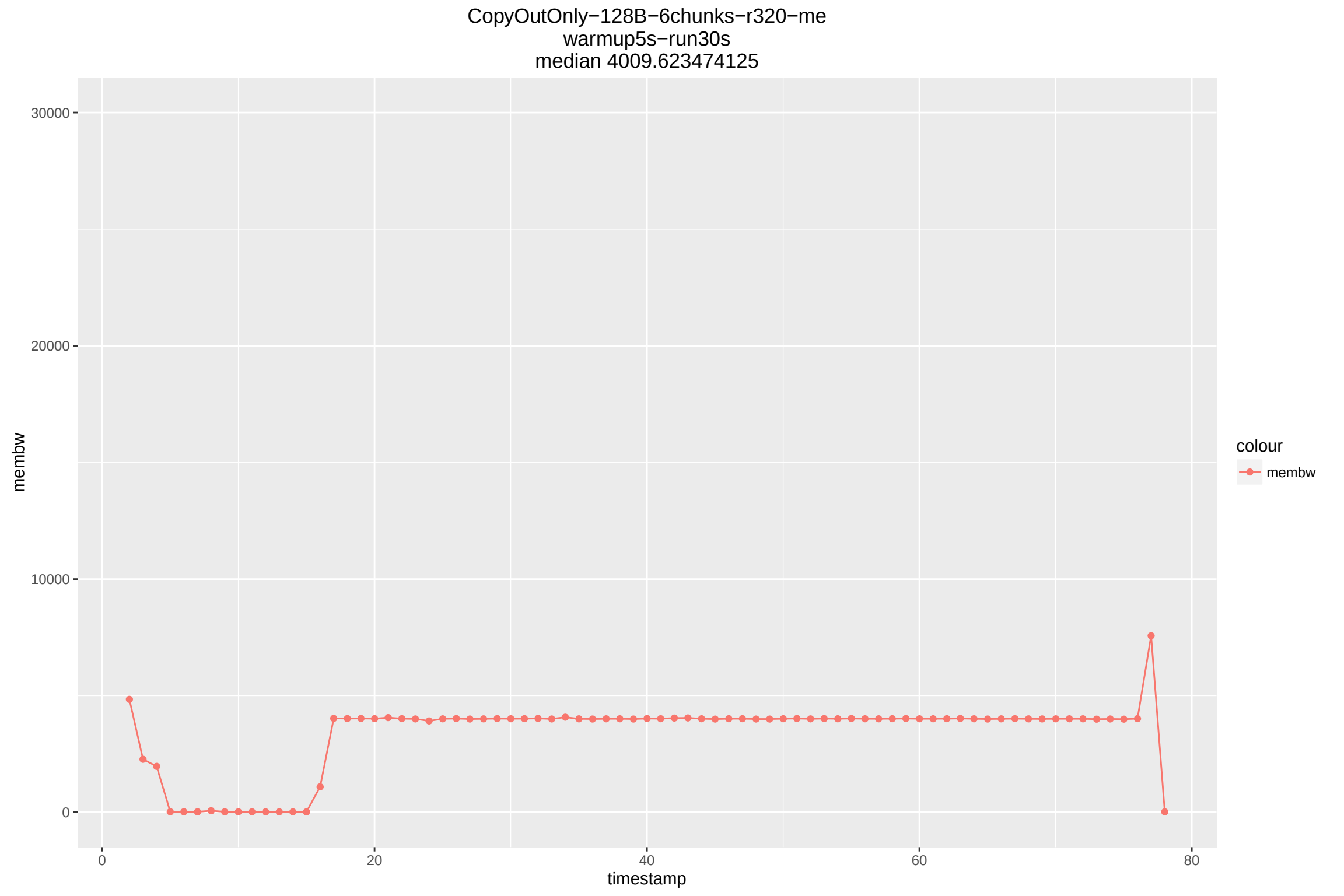

ZeroCopyOnly−128B−5chunks−r320−m
warmup5s−run30s
median 3747.5368957495
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

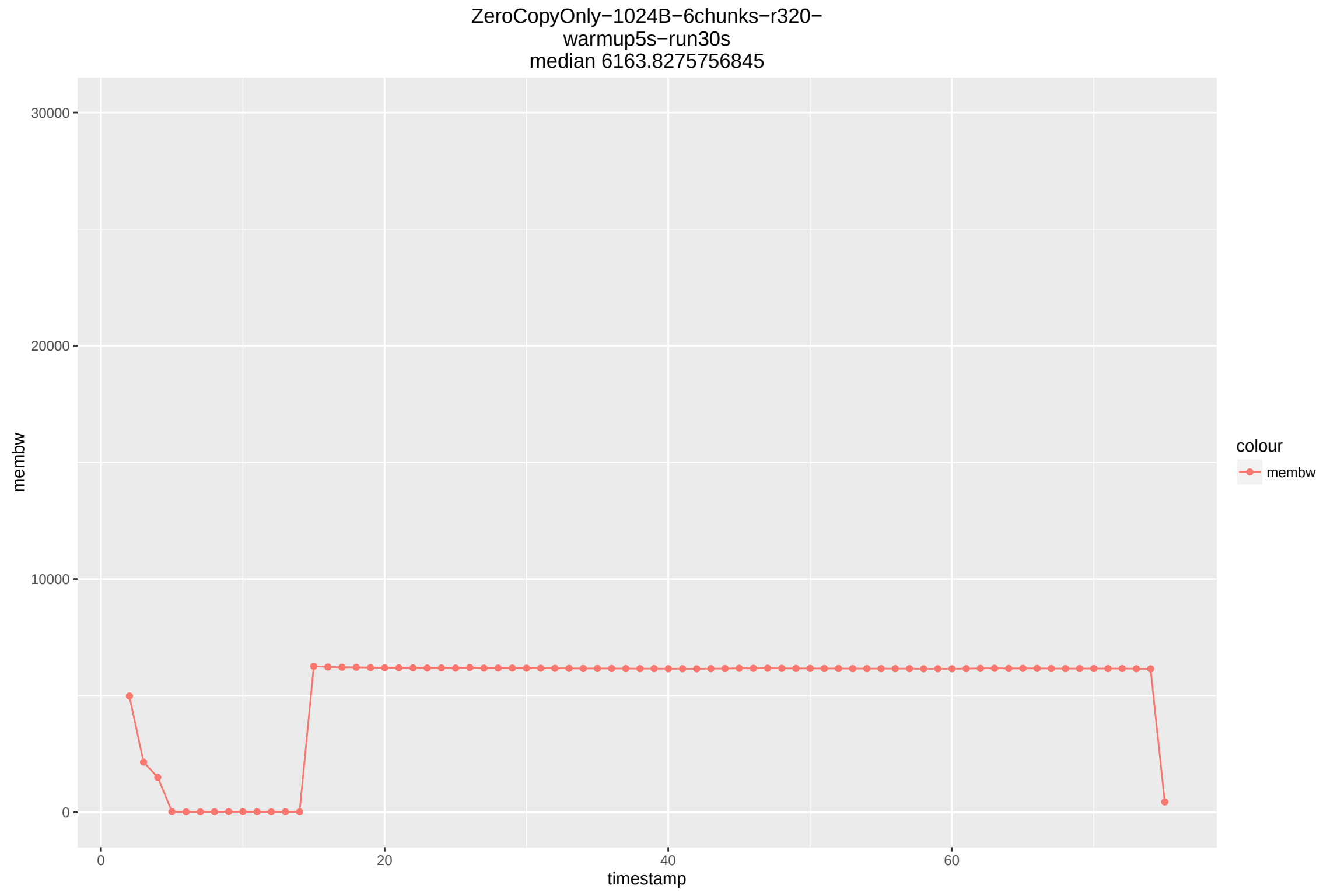

CopyOutOnly−128B−5chunks−r320−me
warmup5s−run30s
median 3486.856140132
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

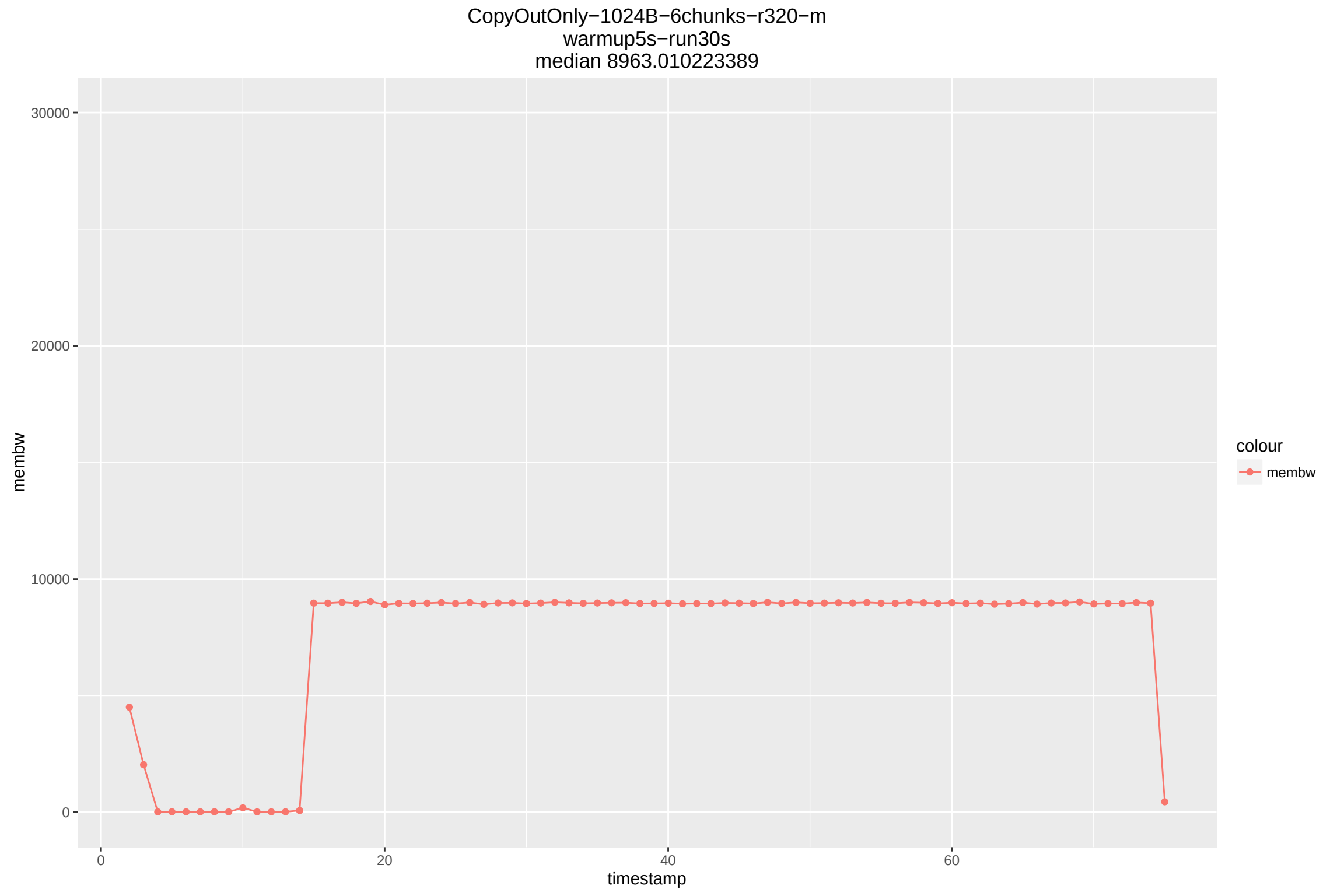

ZeroCopyOnly−1024B−5chunks−r320−
warmup5s−run30s
median 6097.756652833
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

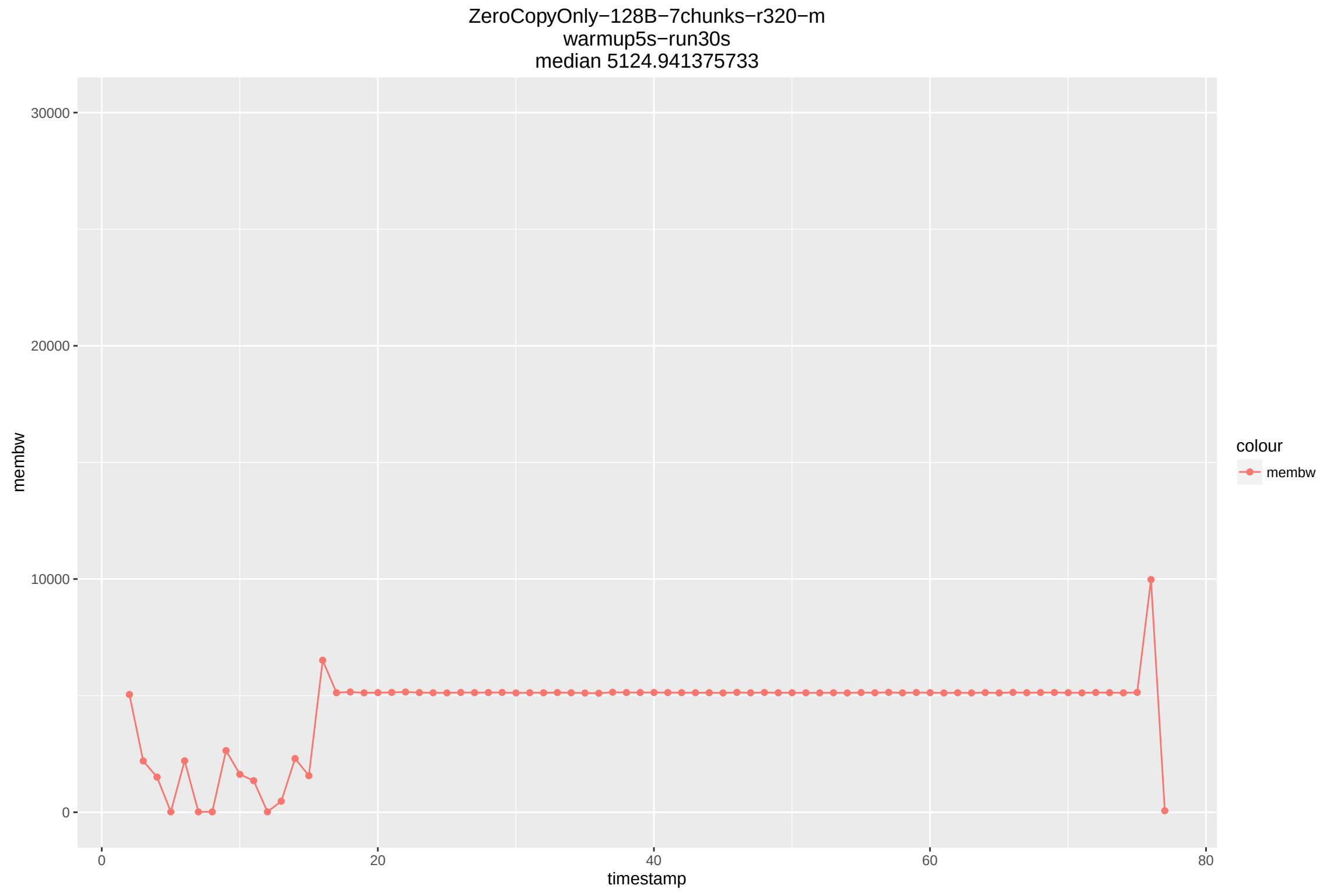

CopyOutOnly−1024B−5chunks−r320−m
warmup5s−run30s
median 8626.076843263
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

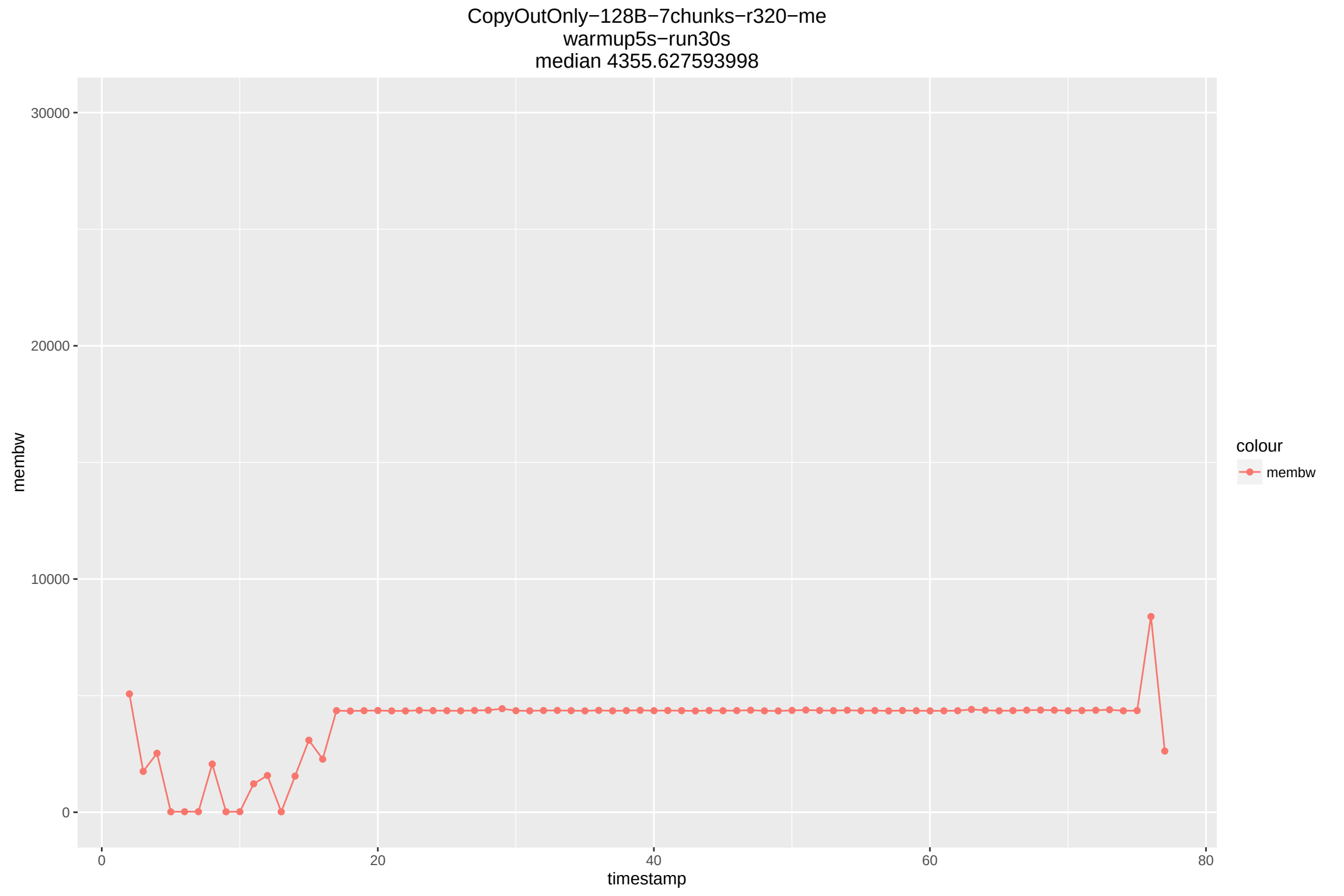

ZeroCopyOnly−128B−6chunks−r320−m
warmup5s−run30s
median 4449.1226501465
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

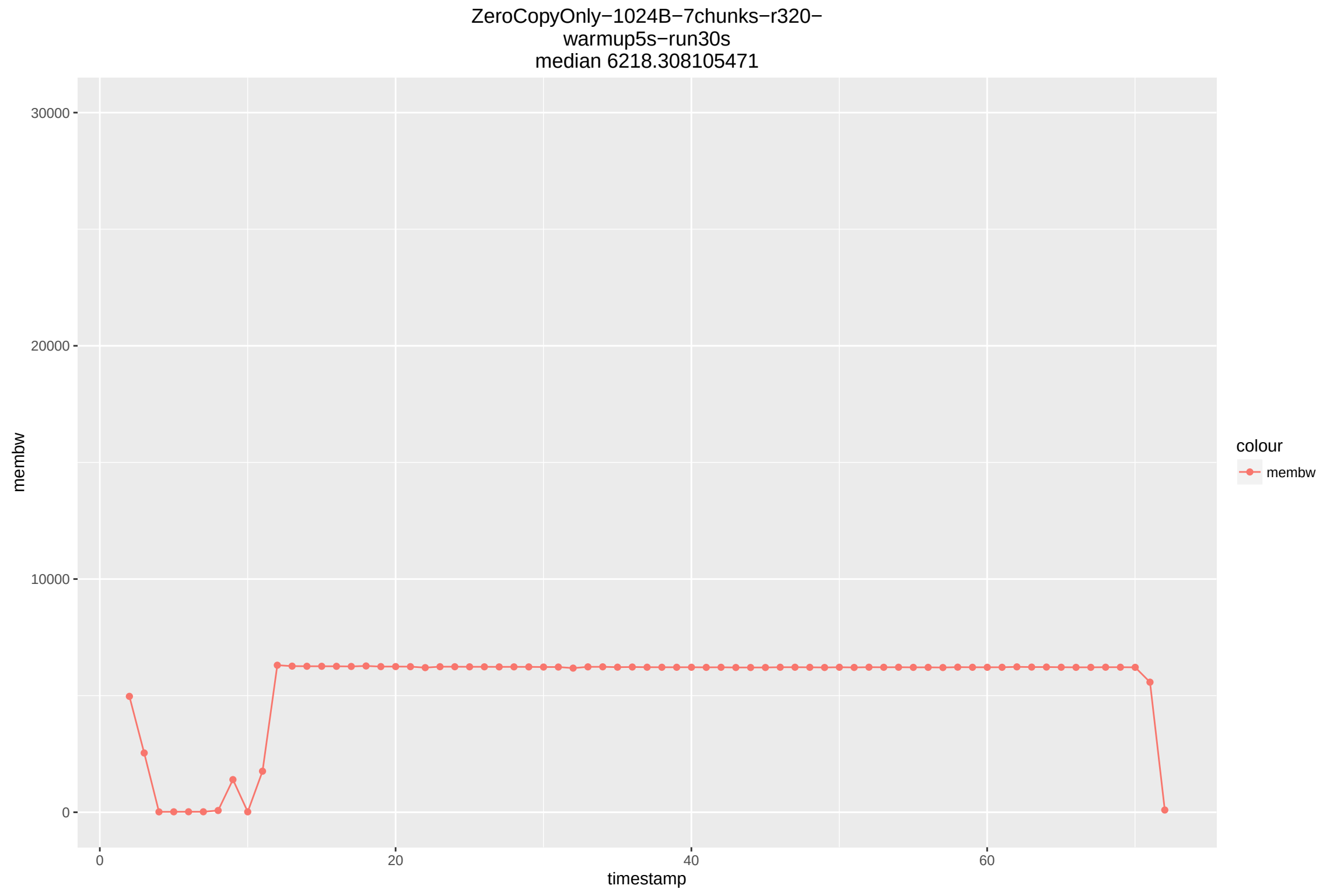

CopyOutOnly−128B−6chunks−r320−me
warmup5s−run30s
median 4009.623474125
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

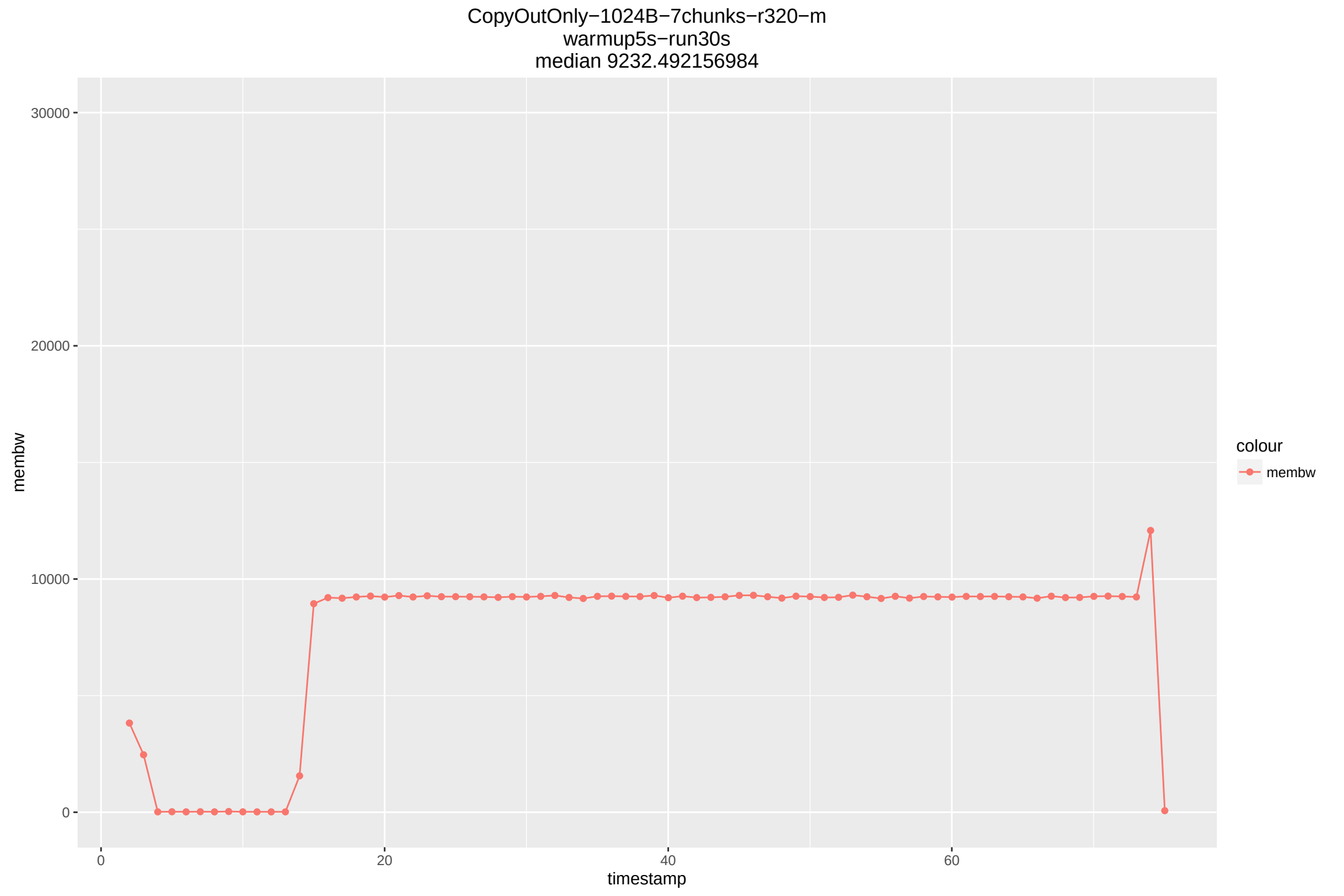

ZeroCopyOnly−1024B−6chunks−r320−
warmup5s−run30s
median 6163.8275756845
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

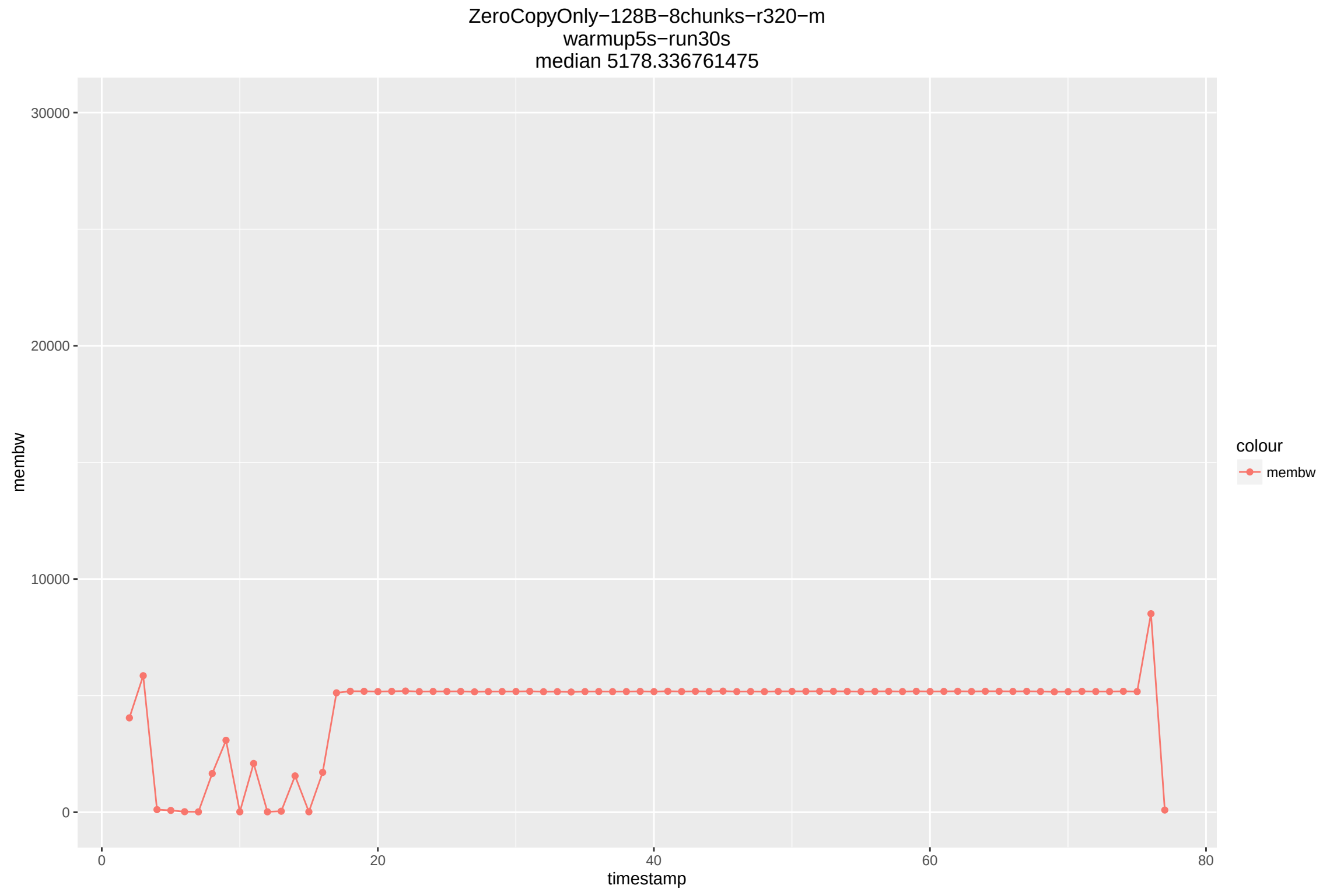

CopyOutOnly−1024B−6chunks−r320−m
warmup5s−run30s
median 8963.010223389
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

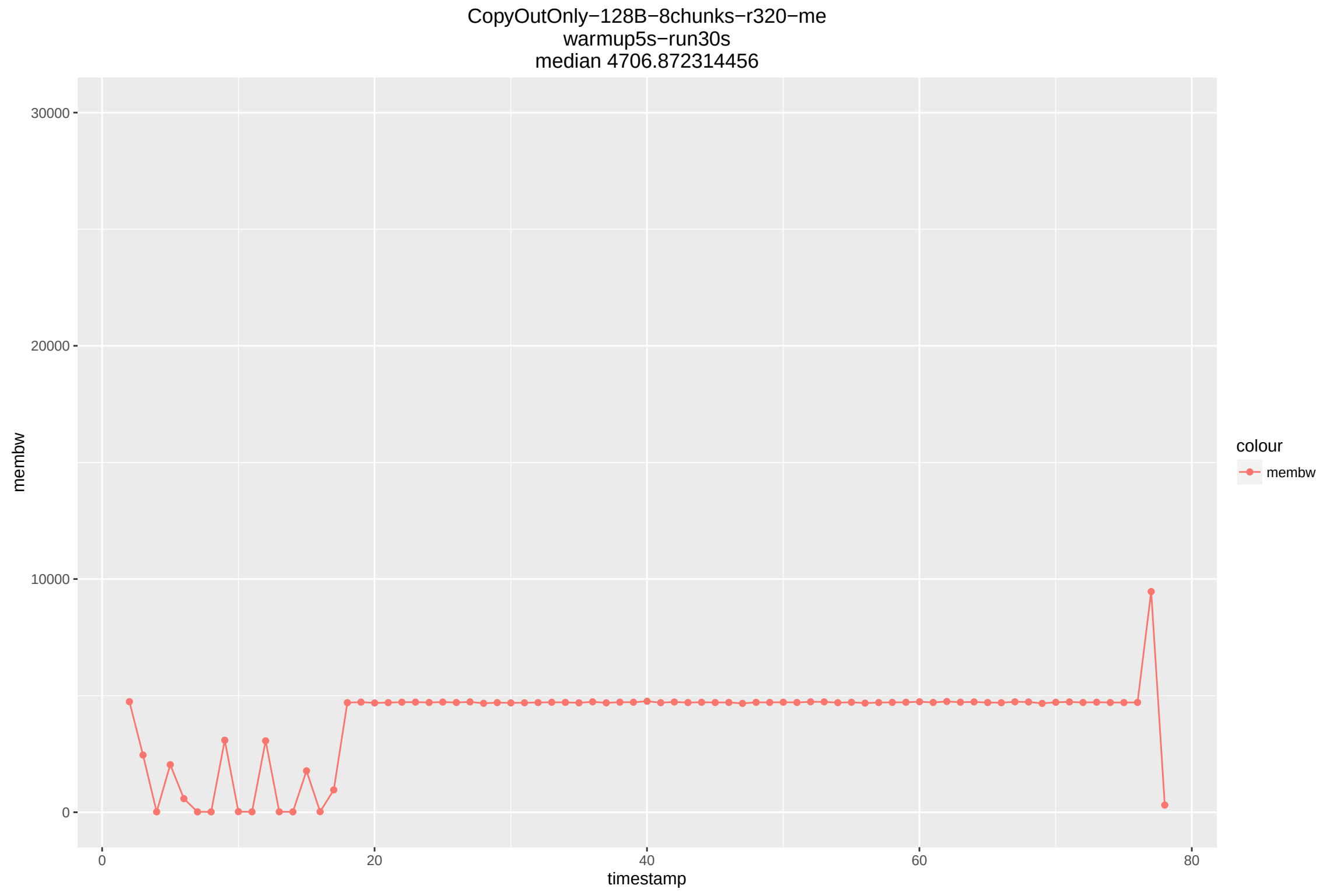

ZeroCopyOnly−128B−7chunks−r320−m
warmup5s−run30s
median 5124.941375733
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

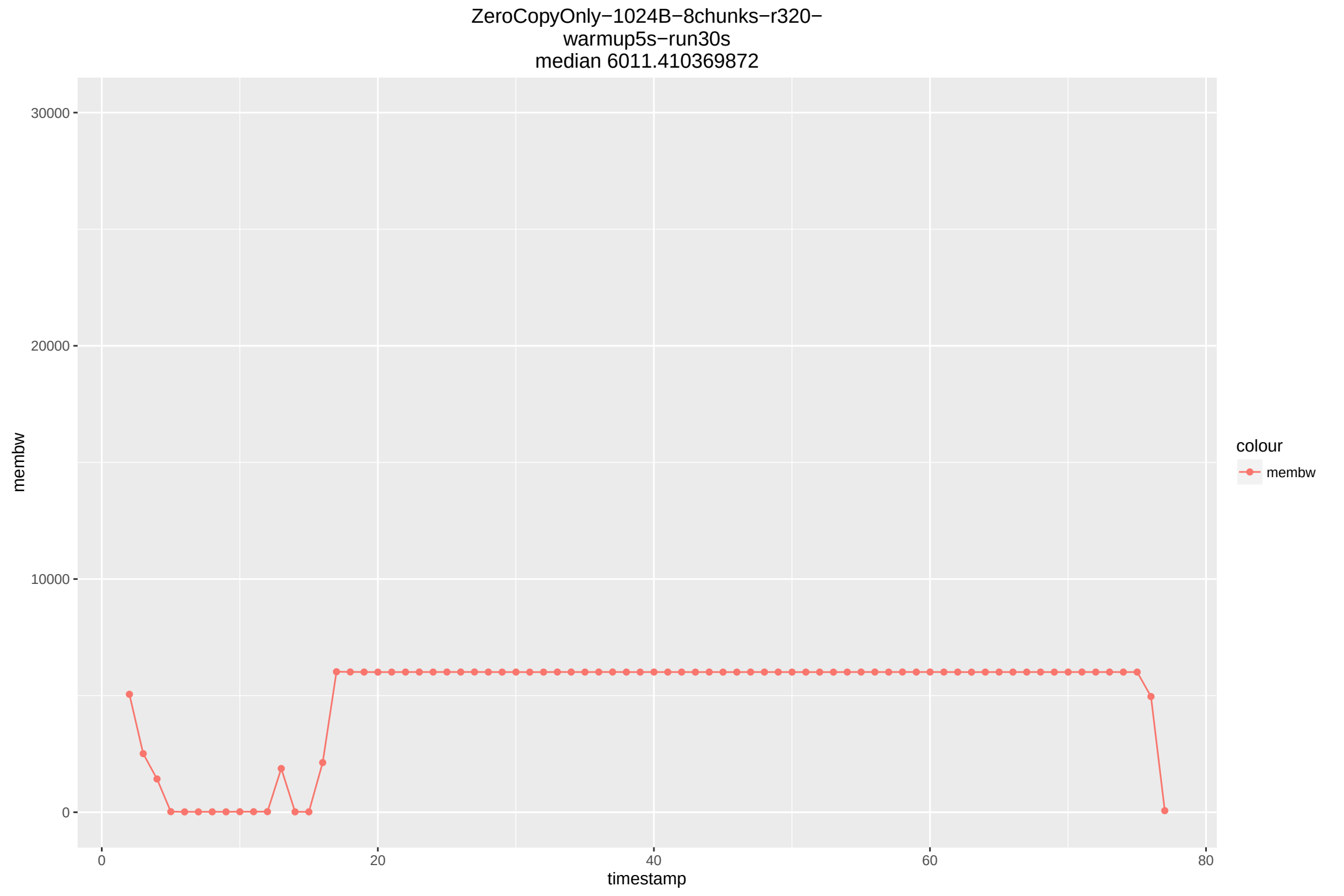

CopyOutOnly−128B−7chunks−r320−me
warmup5s−run30s
median 4355.627593998
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

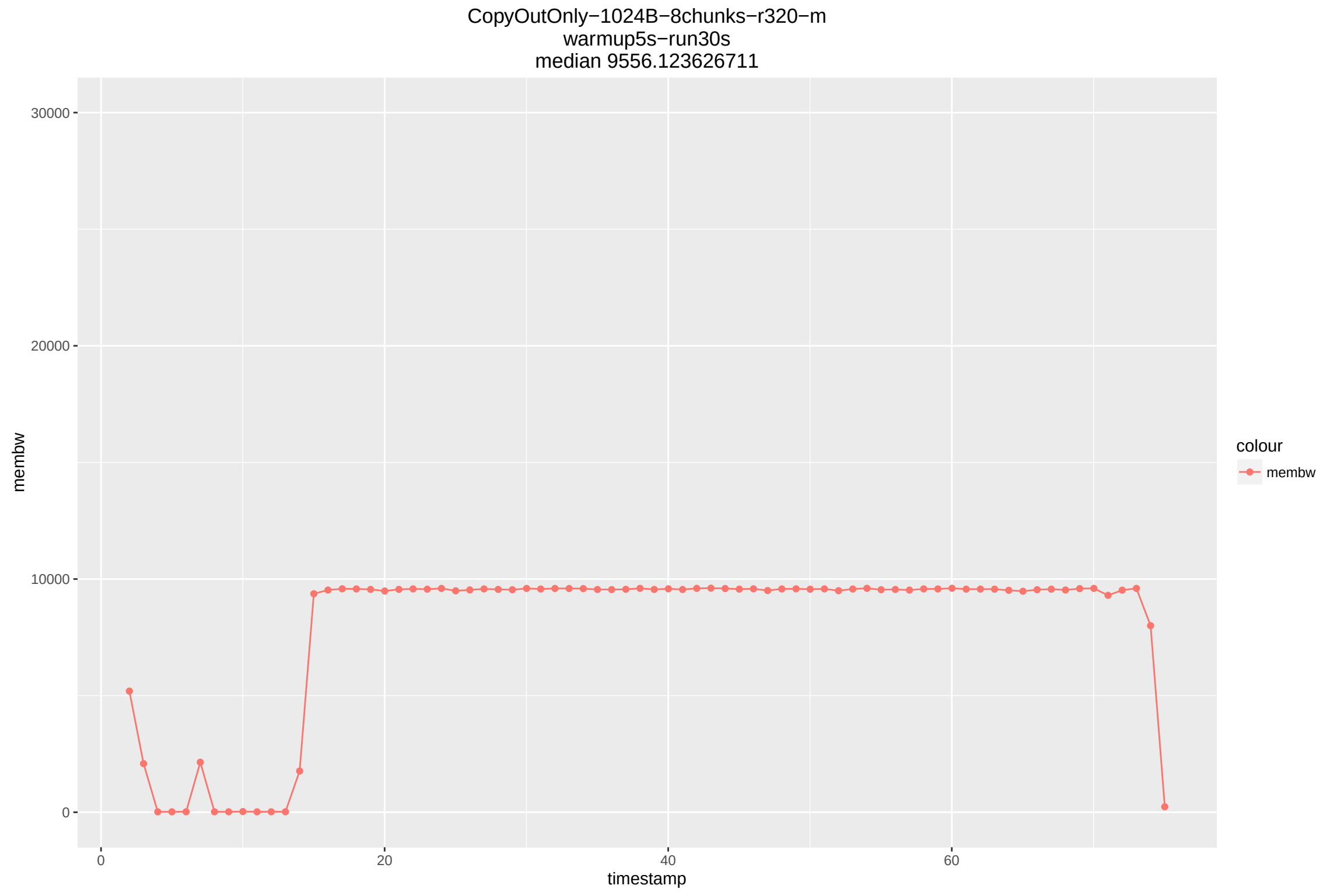

ZeroCopyOnly−1024B−7chunks−r320−
warmup5s−run30s
median 6218.308105471
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

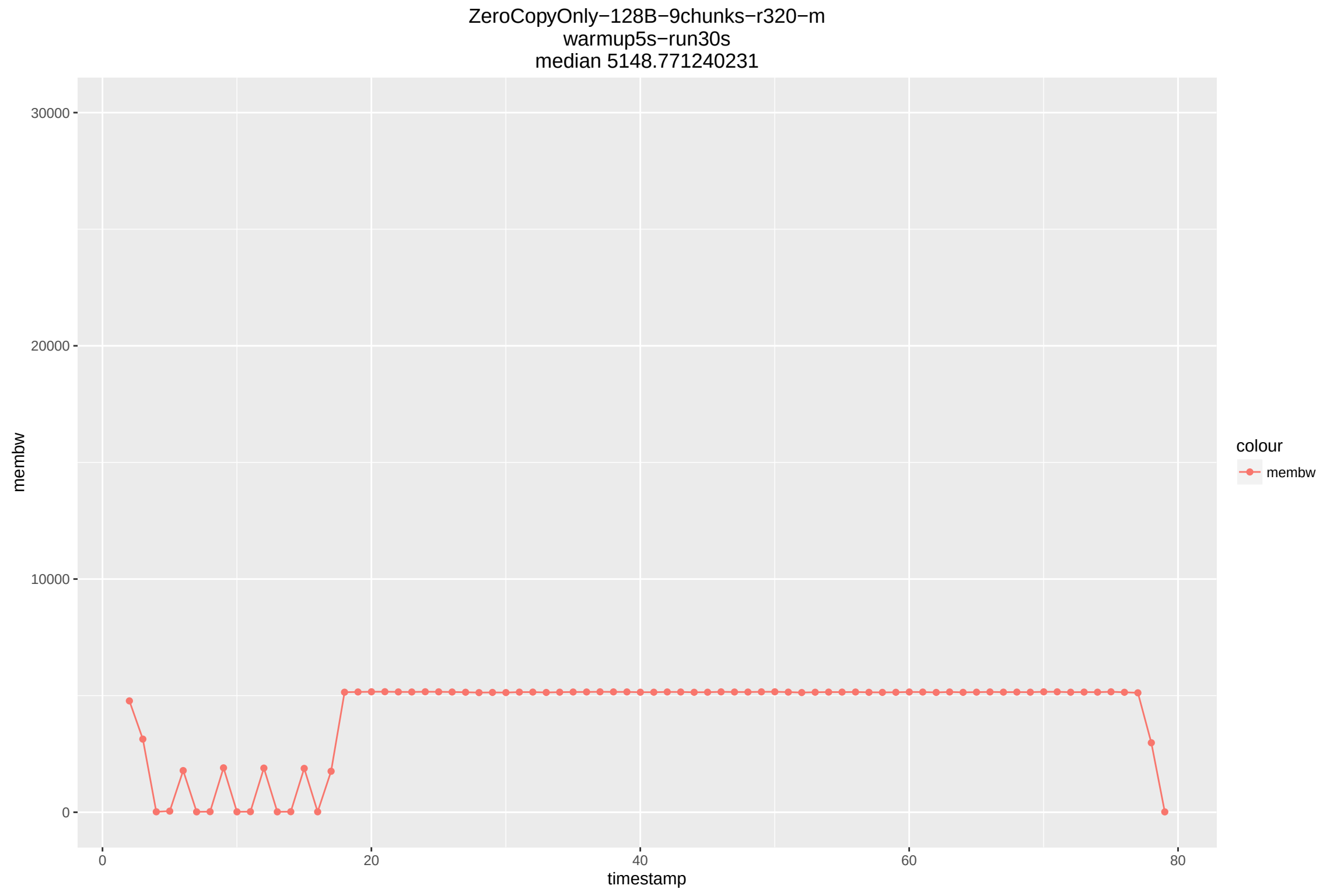

CopyOutOnly−1024B−7chunks−r320−m
warmup5s−run30s
median 9232.492156984
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

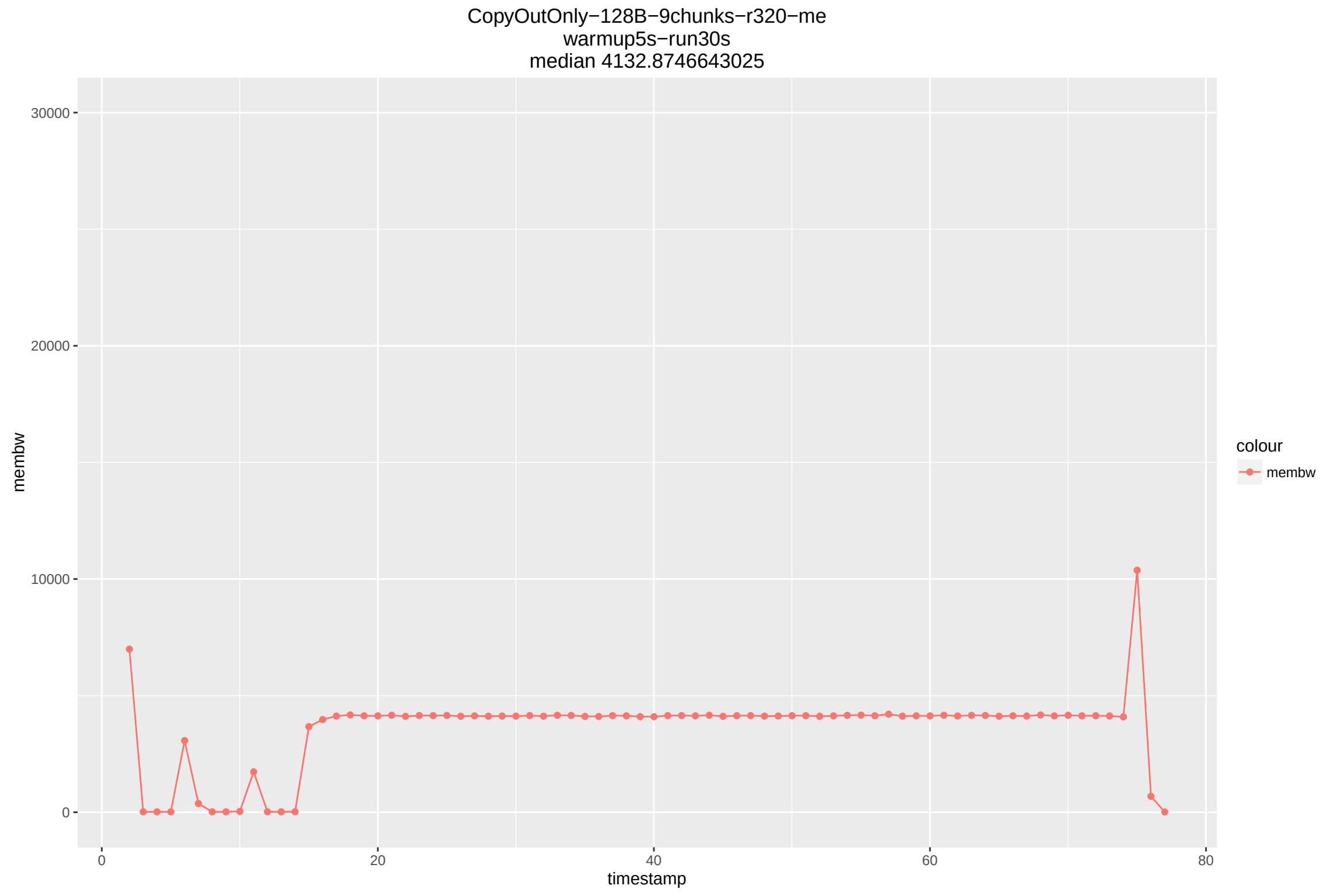

ZeroCopyOnly−128B−8chunks−r320−m
warmup5s−run30s
median 5178.336761475
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

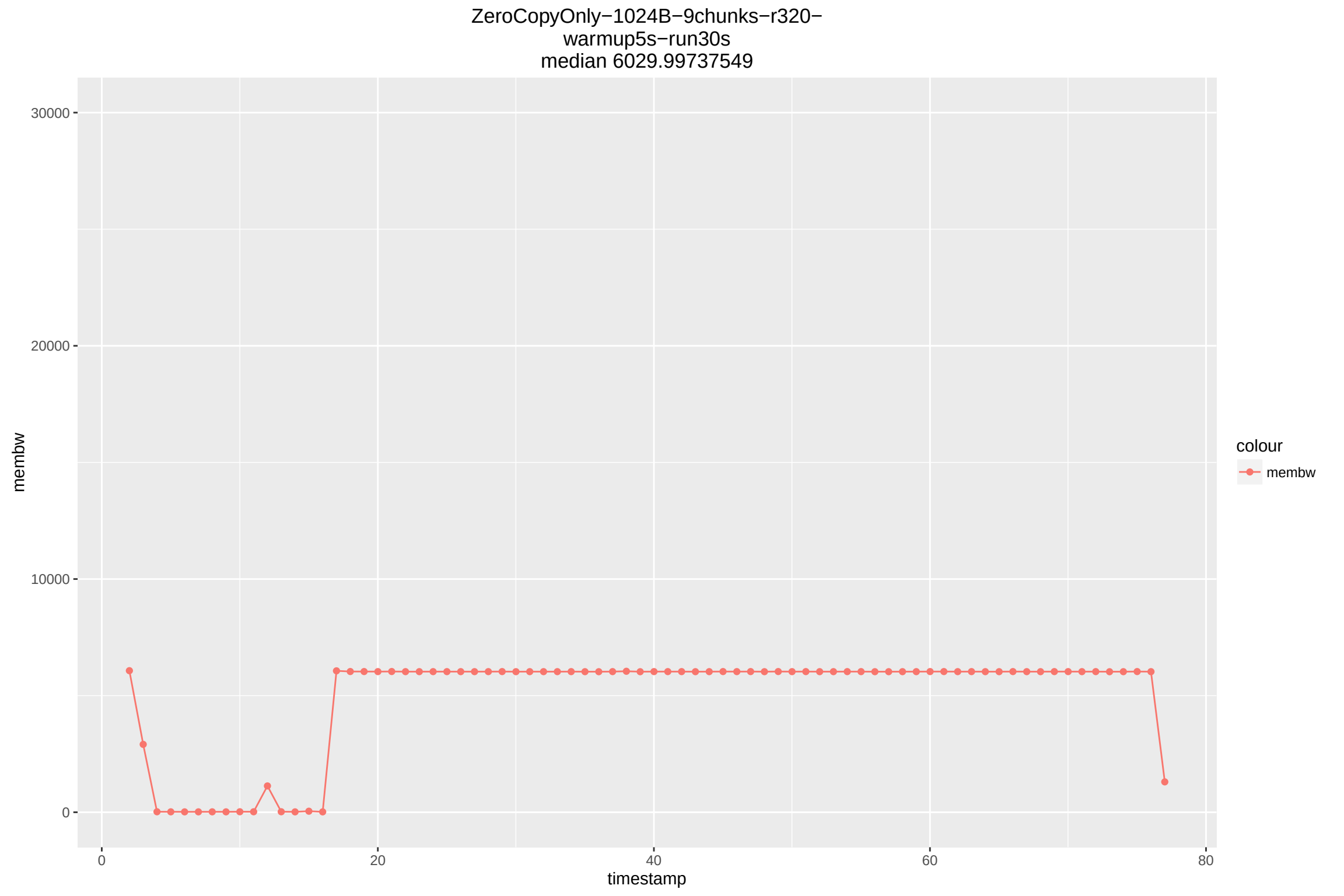

CopyOutOnly−128B−8chunks−r320−me
warmup5s−run30s
median 4706.872314456
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

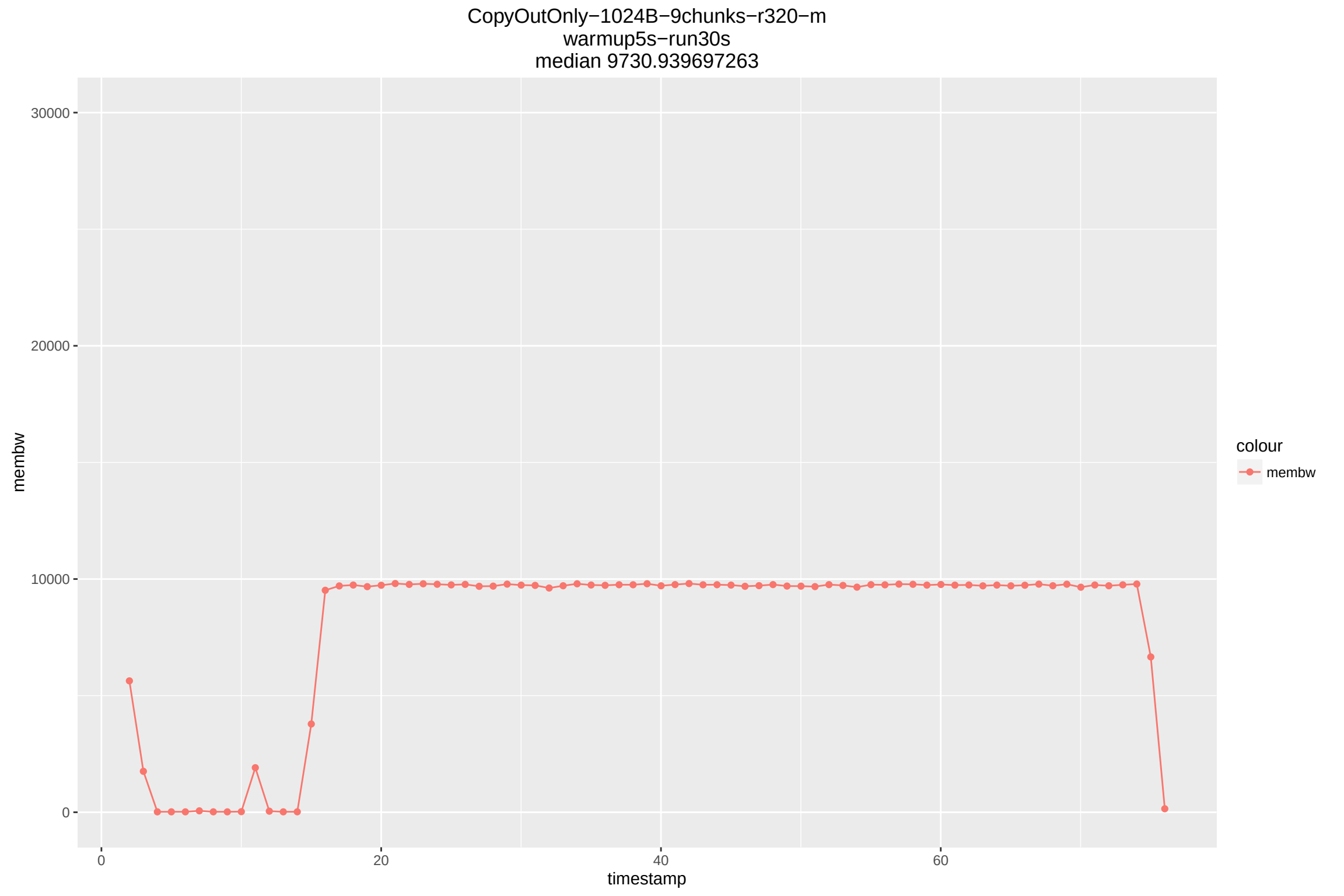

ZeroCopyOnly−1024B−8chunks−r320−
warmup5s−run30s
median 6011.410369872
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

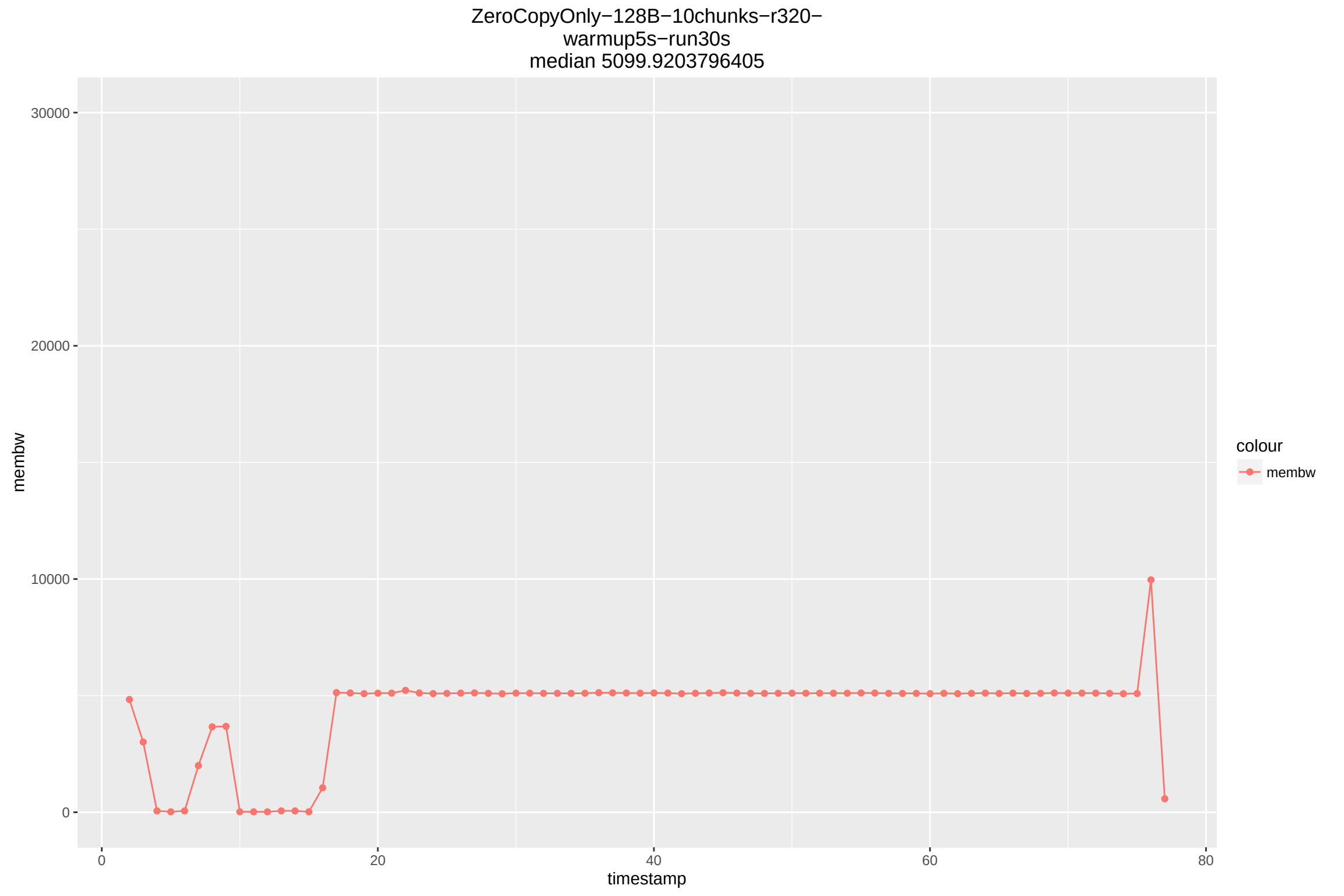

CopyOutOnly−1024B−8chunks−r320−m
warmup5s−run30s
median 9556.123626711
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

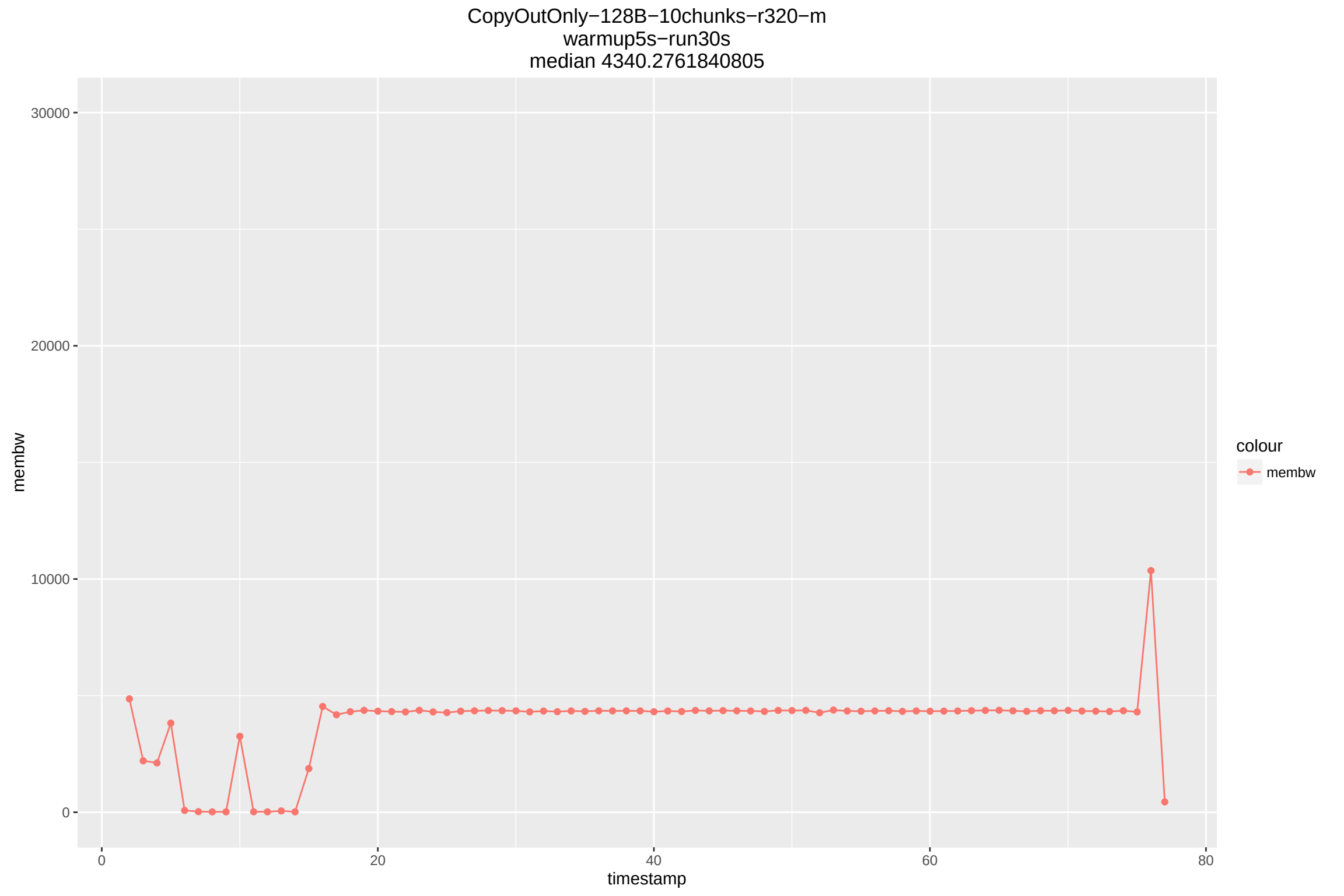

ZeroCopyOnly−128B−9chunks−r320−m
warmup5s−run30s
median 5148.771240231
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

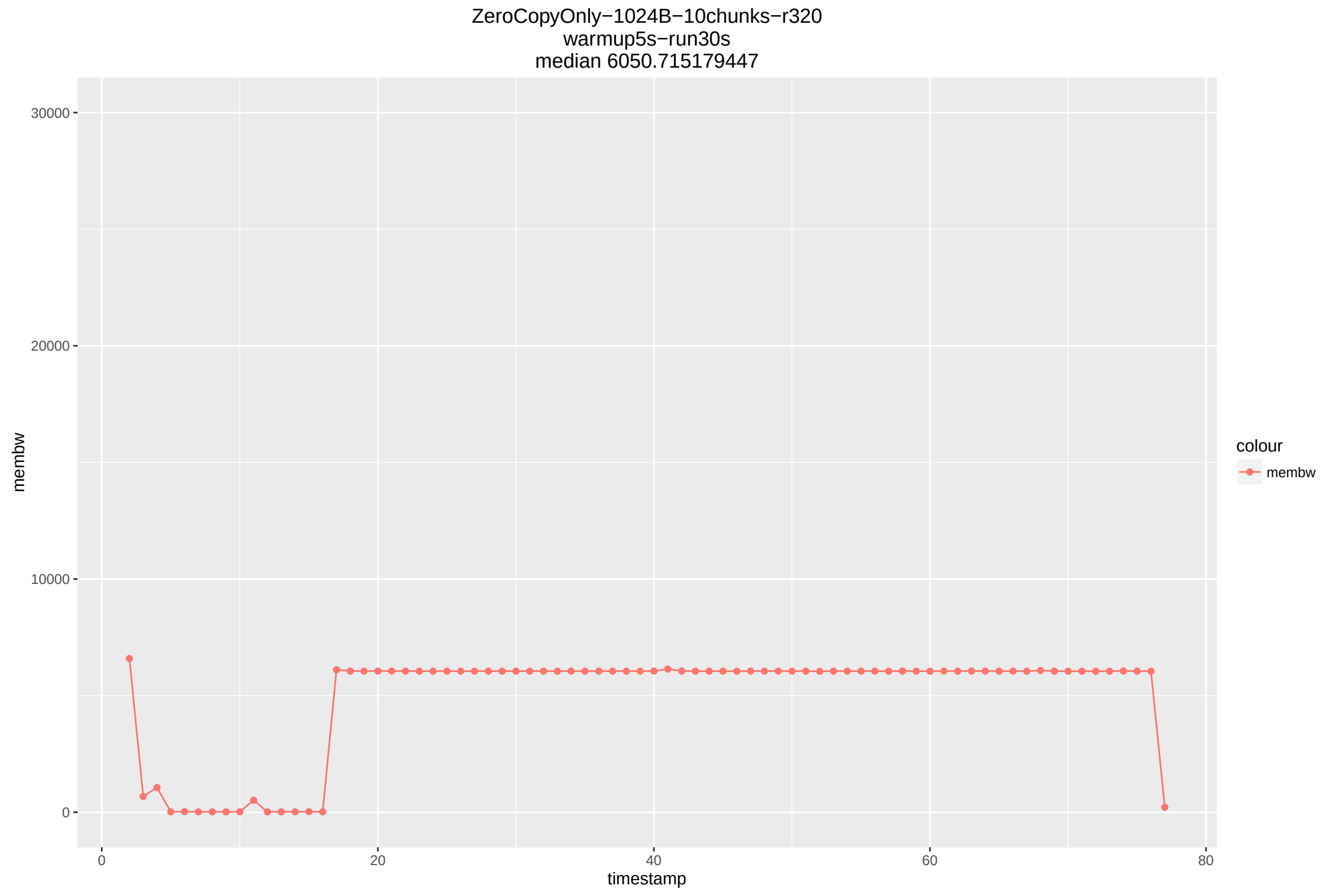

CopyOutOnly−128B−9chunks−r320−me
warmup5s−run30s
median 4132.8746643025
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

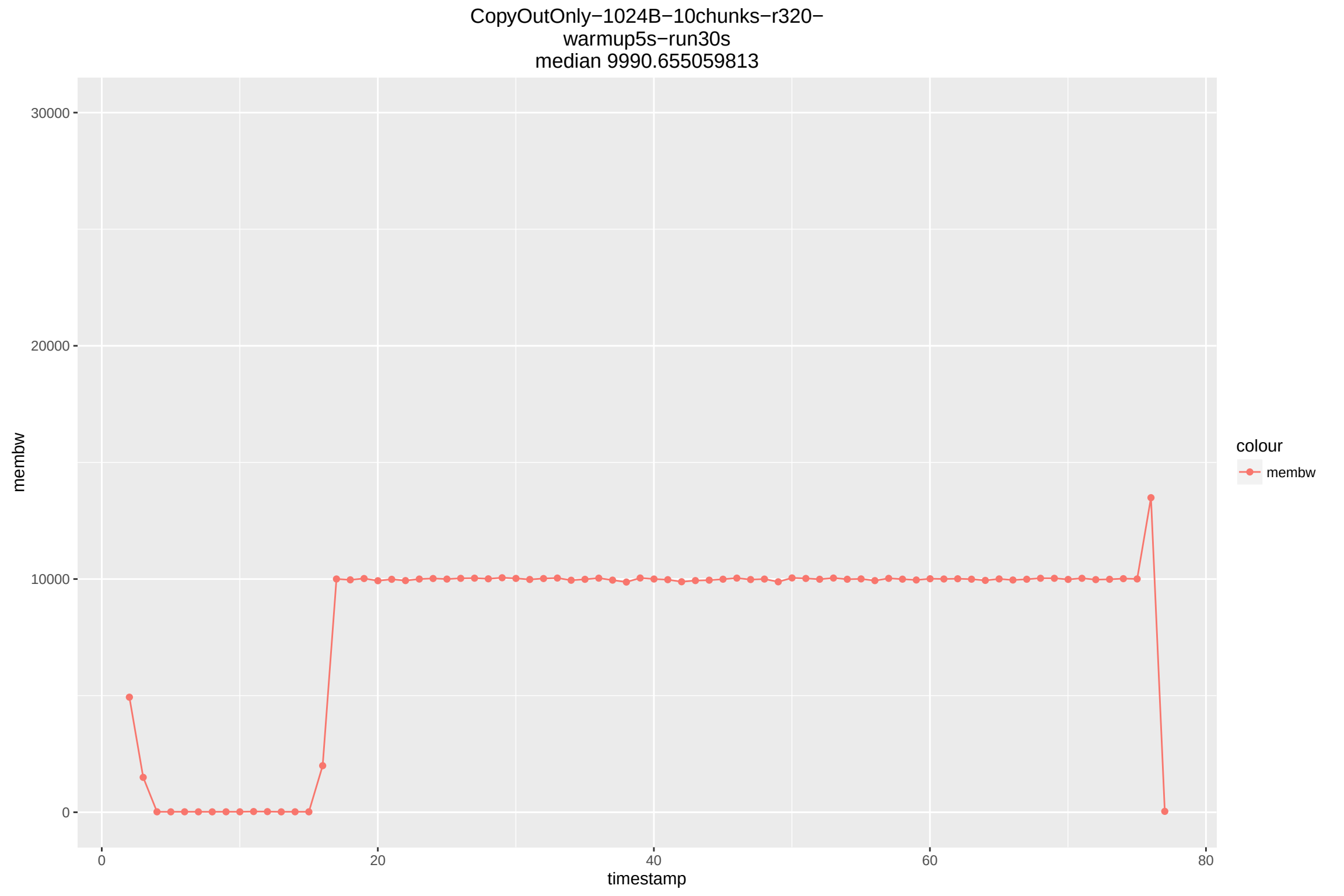

ZeroCopyOnly−1024B−9chunks−r320−
warmup5s−run30s
median 6029.99737549
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

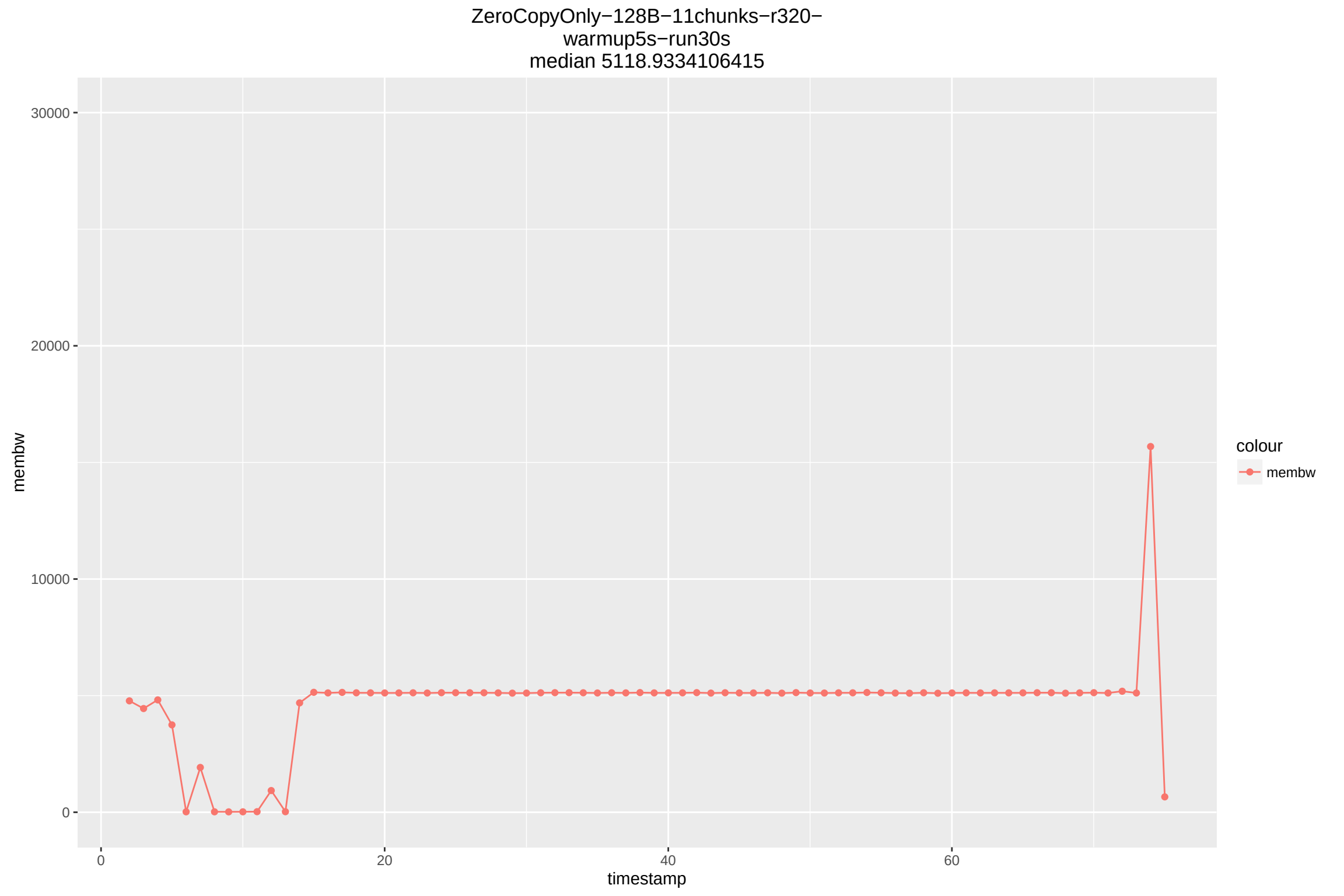

CopyOutOnly−1024B−9chunks−r320−m
warmup5s−run30s
median 9730.939697263
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

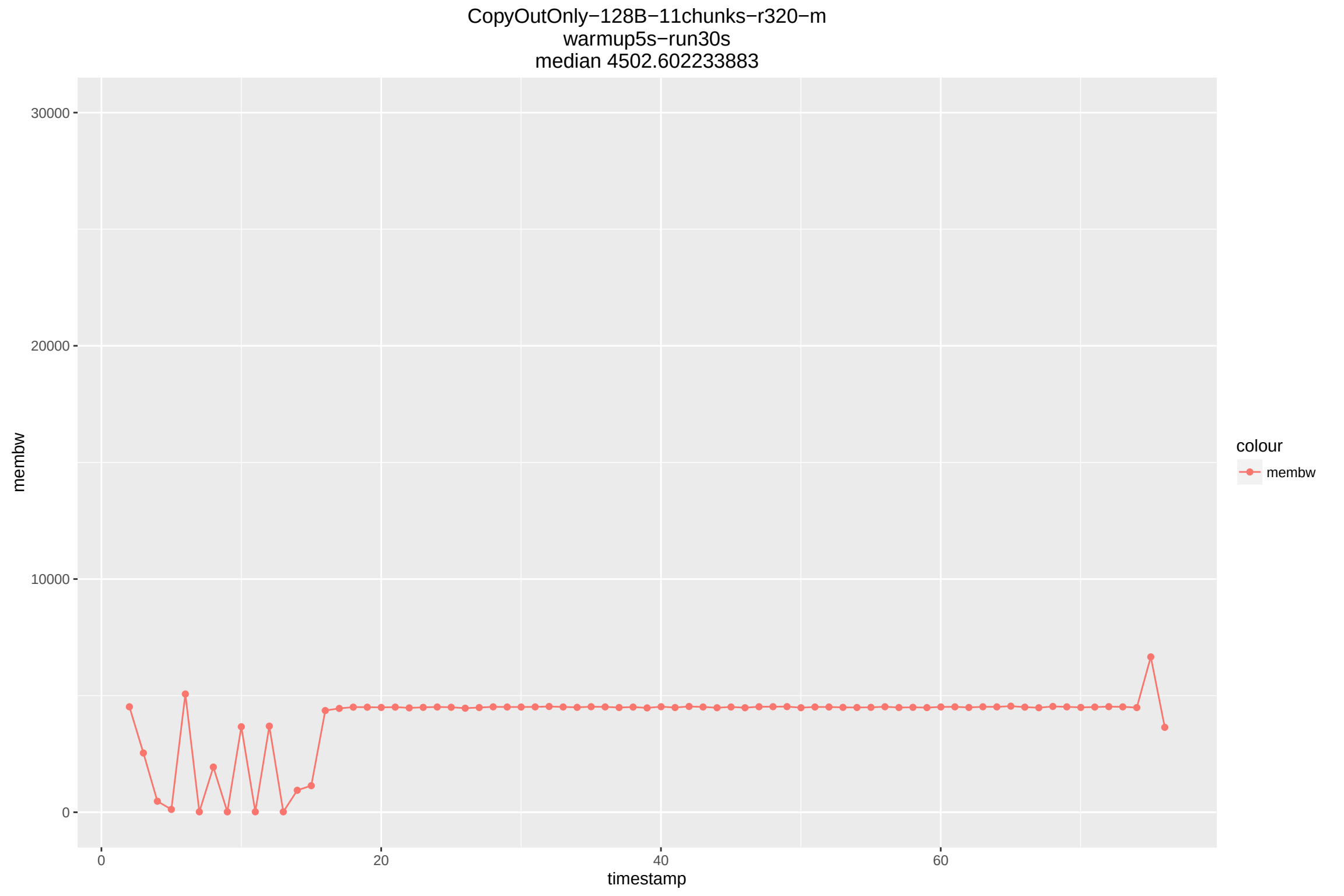

ZeroCopyOnly−128B−10chunks−r320−
warmup5s−run30s
median 5099.9203796405
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

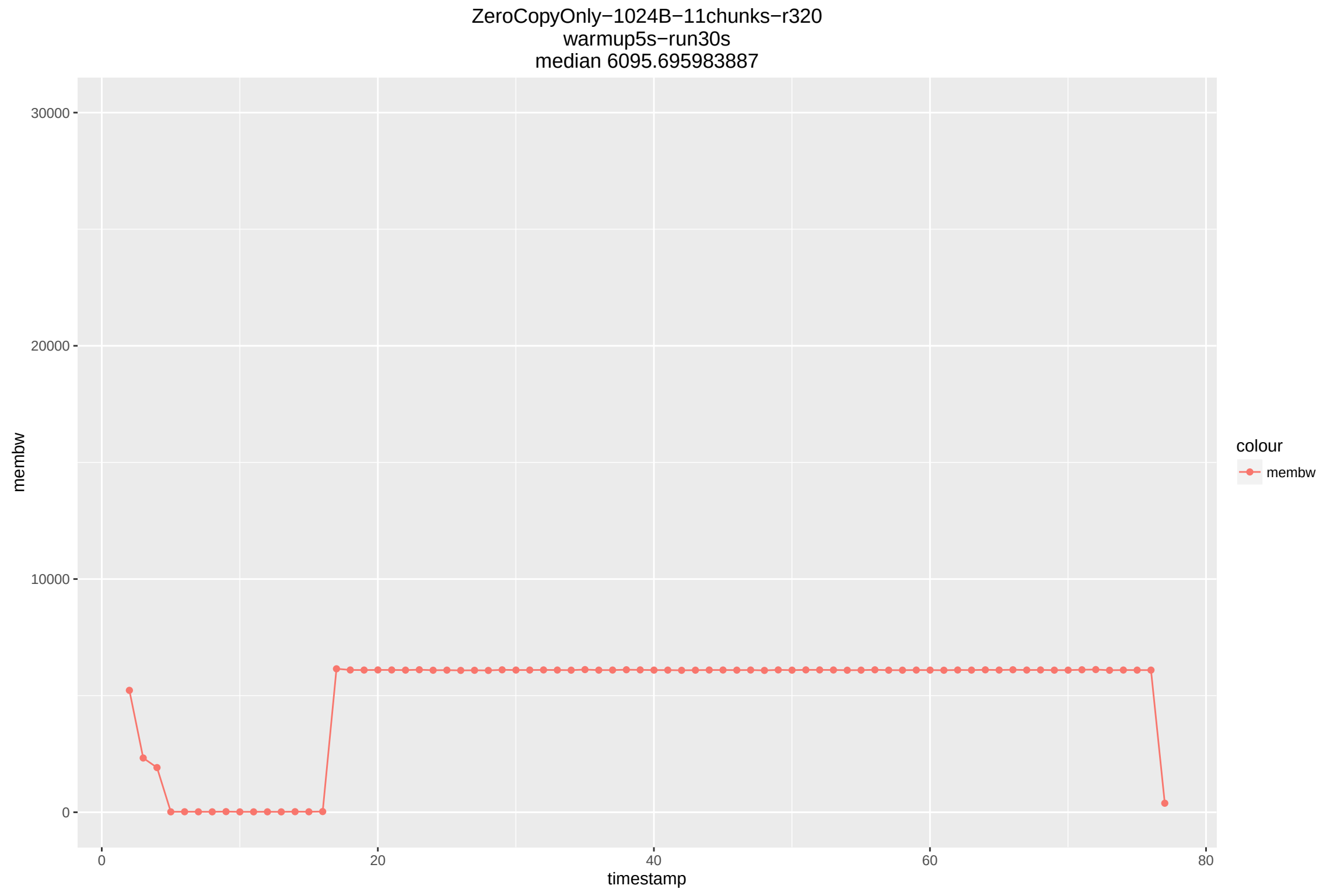

CopyOutOnly−128B−10chunks−r320−m
warmup5s−run30s
median 4340.2761840805
membw
30000
20000
10000
0
0
20
40
60
80
timestamp
colour
membw

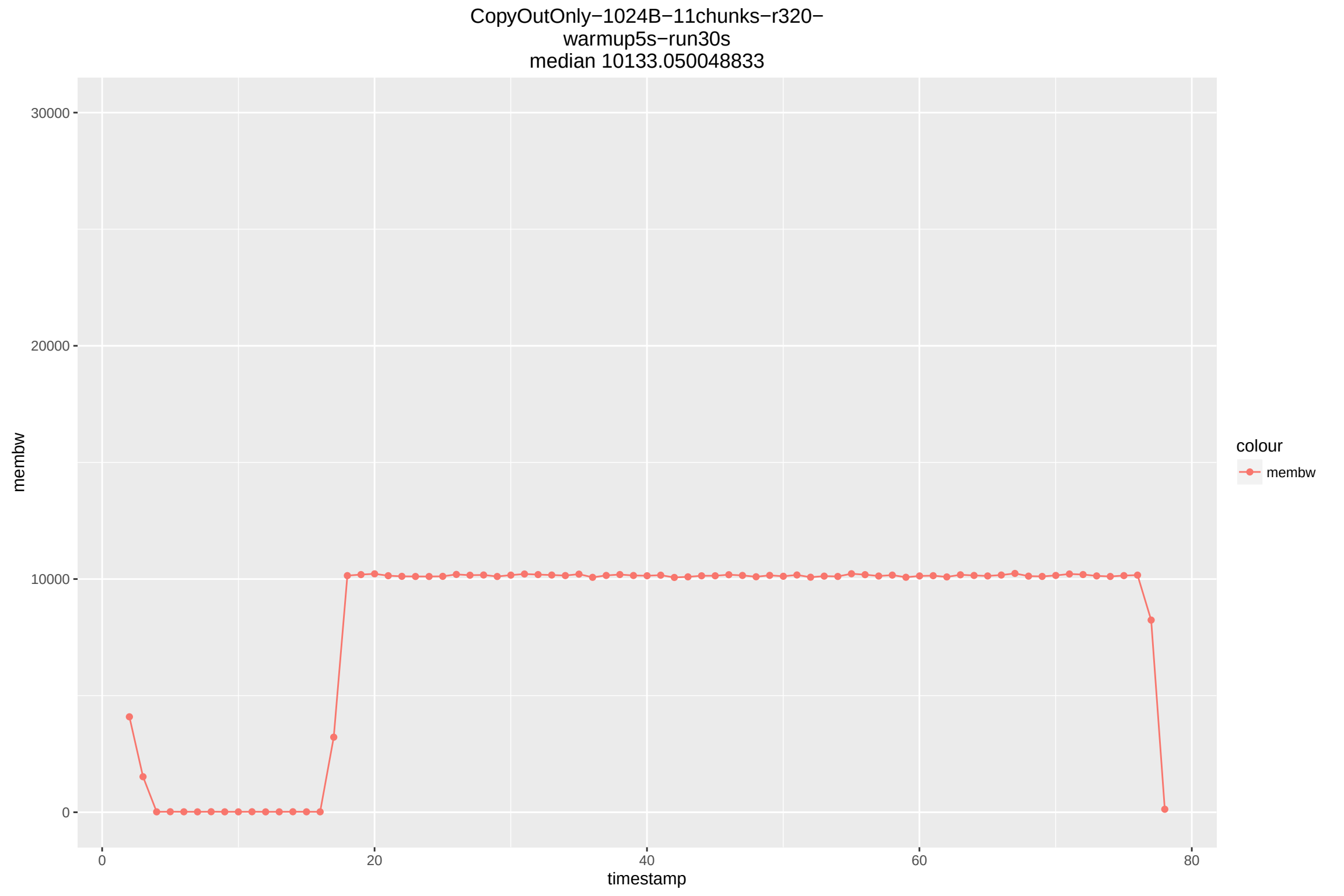

ZeroCopyOnly−1024B−10chunks−r320
warmup5s−run30s
median 6050.715179447
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

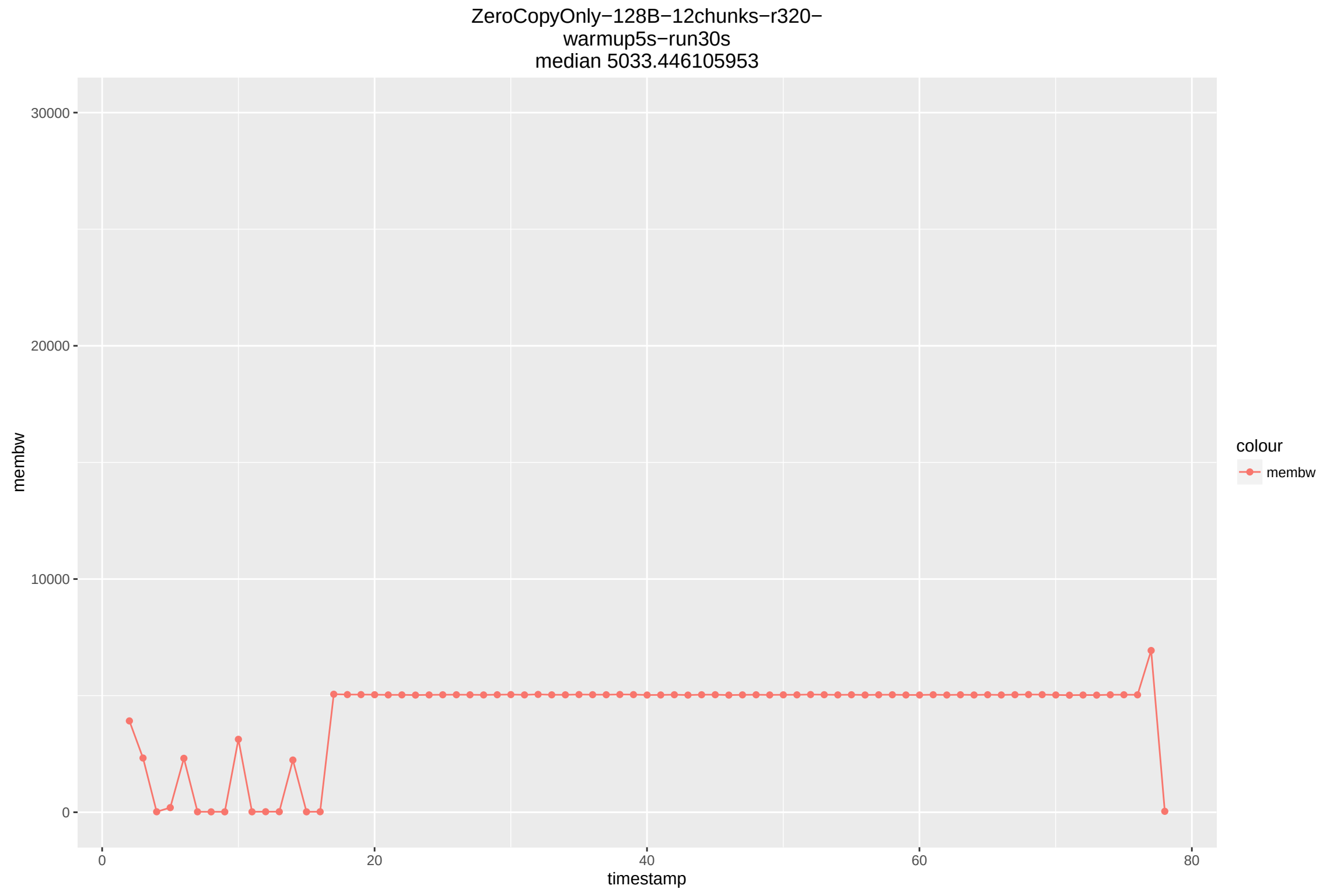

CopyOutOnly−1024B−10chunks−r320−
warmup5s−run30s
median 9990.655059813
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

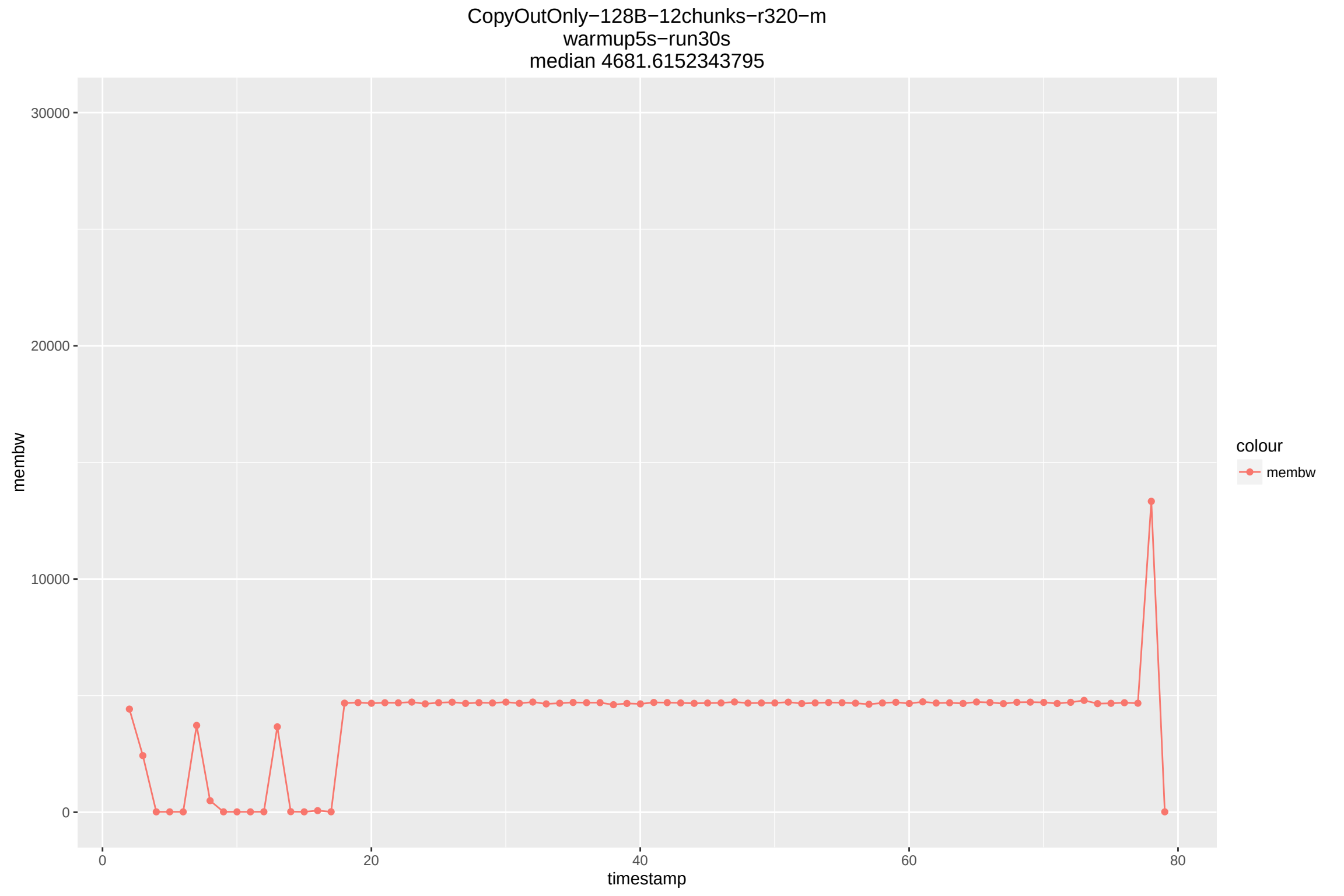

ZeroCopyOnly−128B−11chunks−r320−
warmup5s−run30s
median 5118.9334106415
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

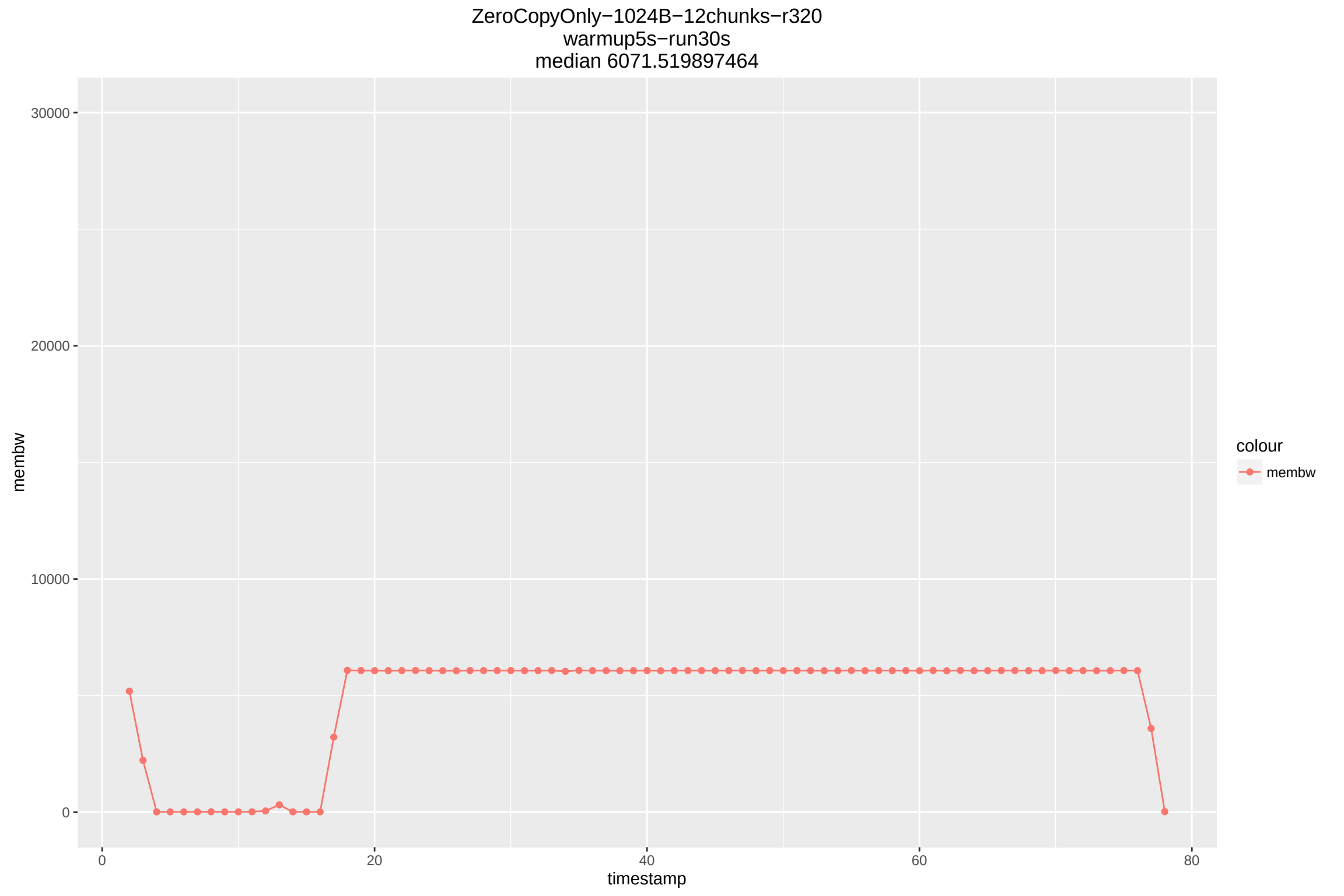

CopyOutOnly−128B−11chunks−r320−m
warmup5s−run30s
median 4502.602233883
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

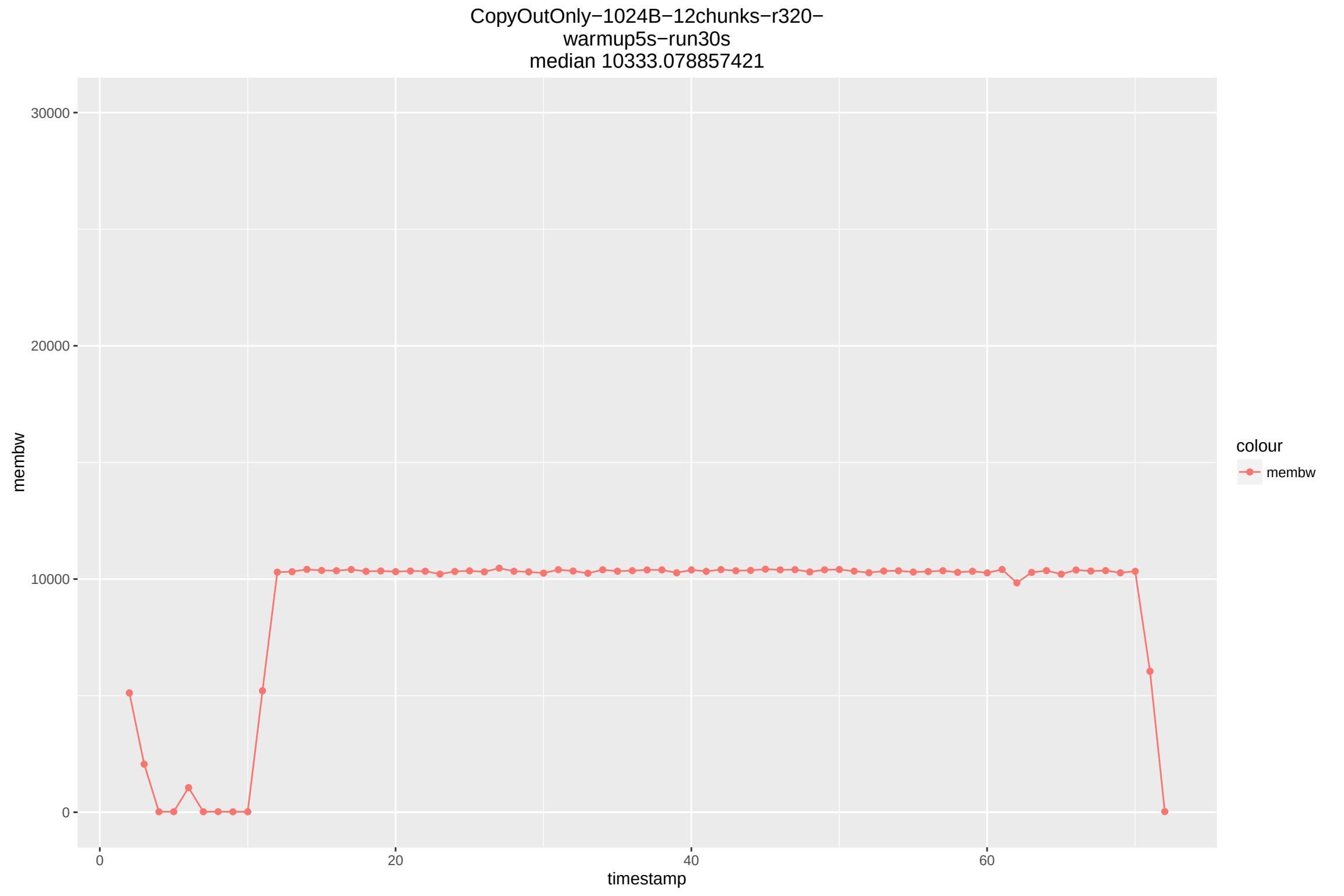

ZeroCopyOnly−1024B−11chunks−r320
warmup5s−run30s
median 6095.695983887
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

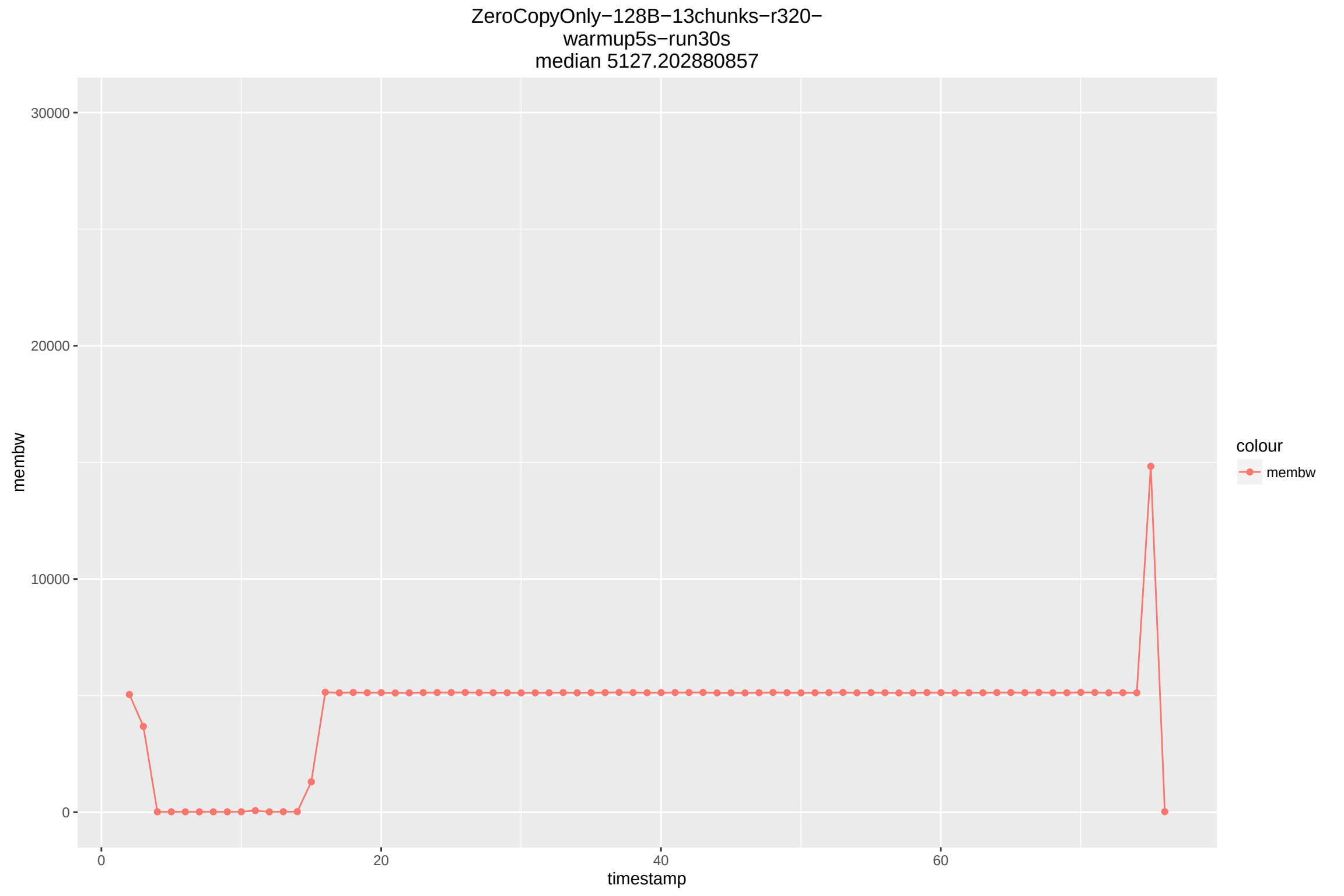

CopyOutOnly−1024B−11chunks−r320−
warmup5s−run30s
median 10133.050048833
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

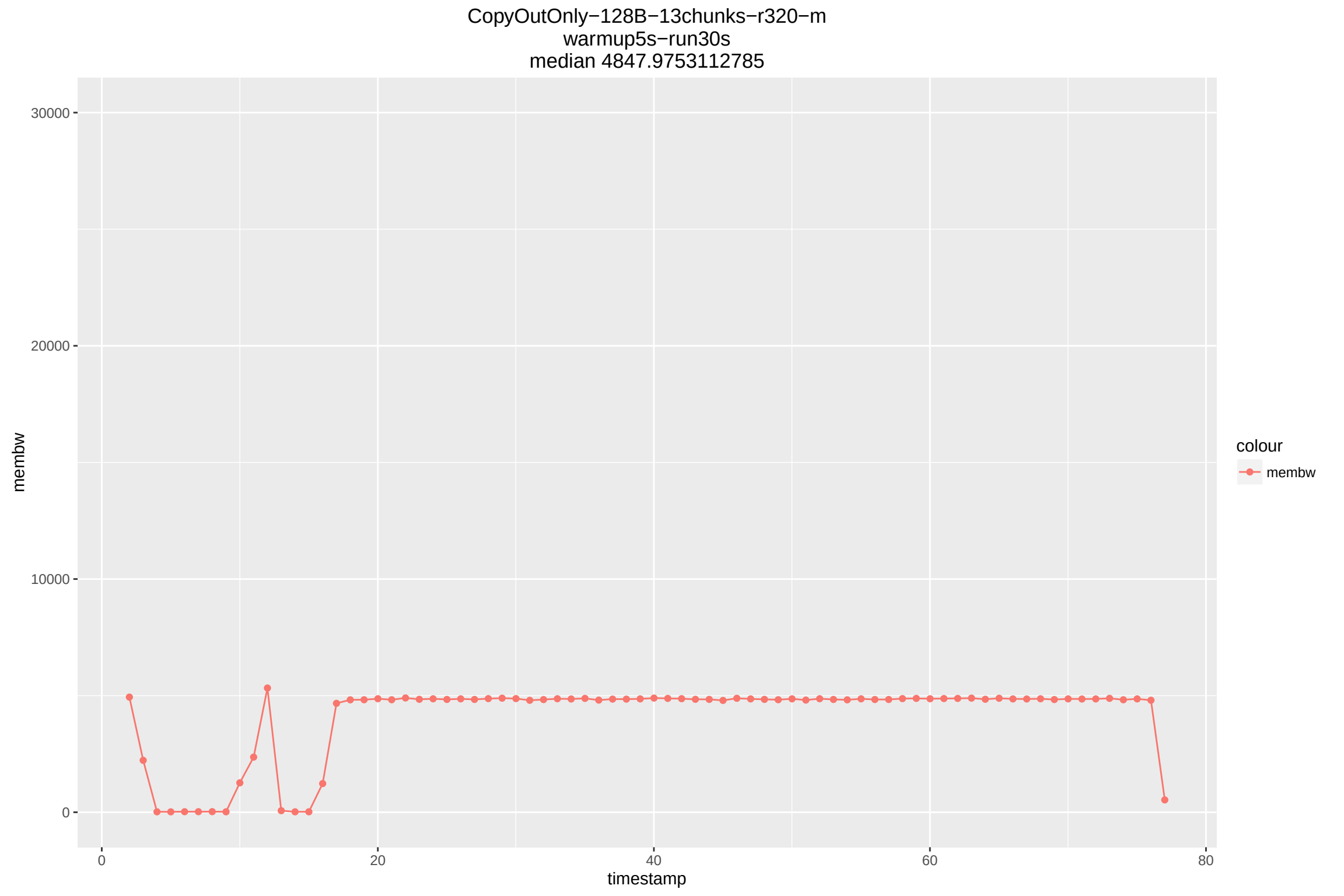

ZeroCopyOnly−128B−12chunks−r320−
warmup5s−run30s
median 5033.446105953
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

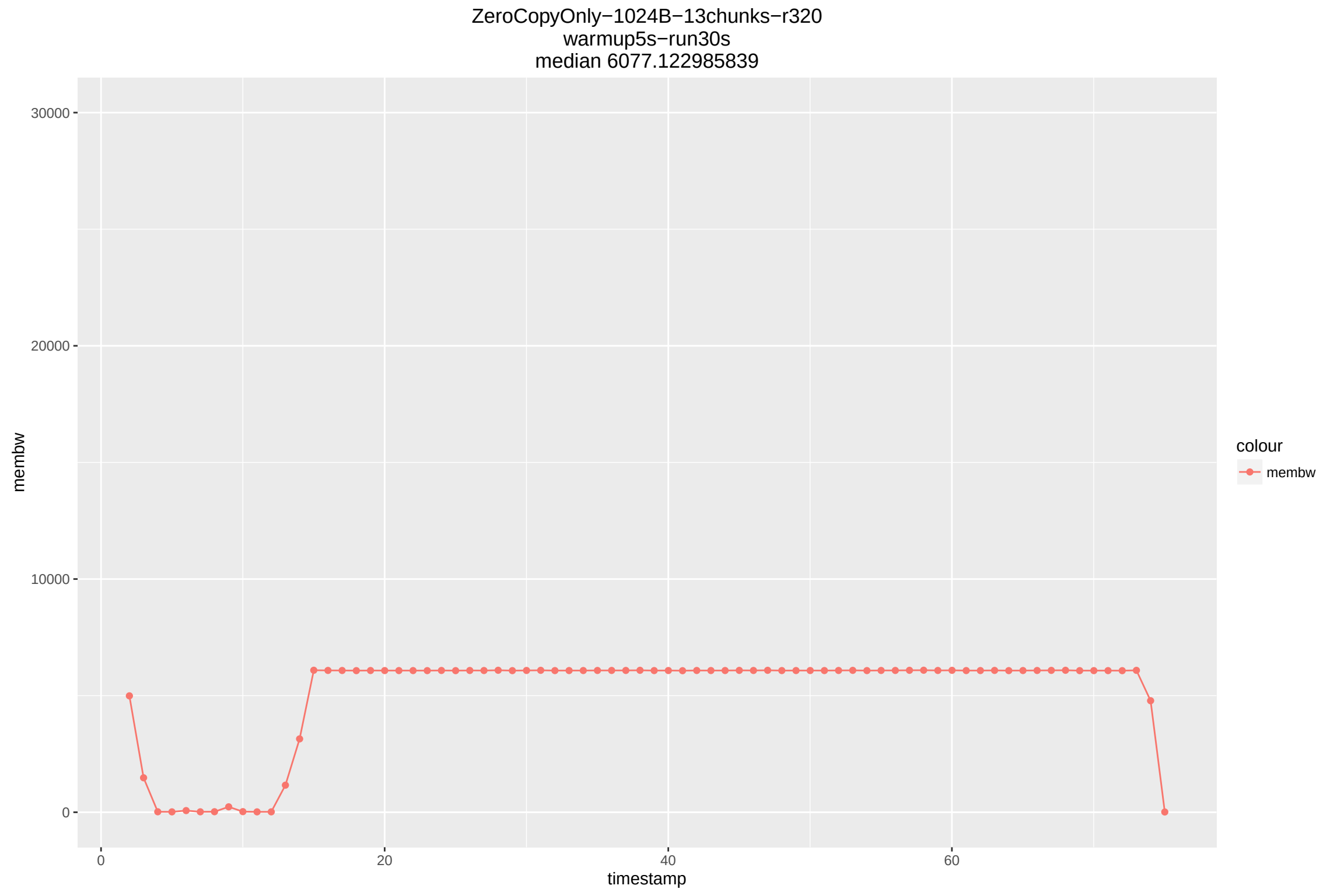

CopyOutOnly−128B−12chunks−r320−m
warmup5s−run30s
median 4681.6152343795
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

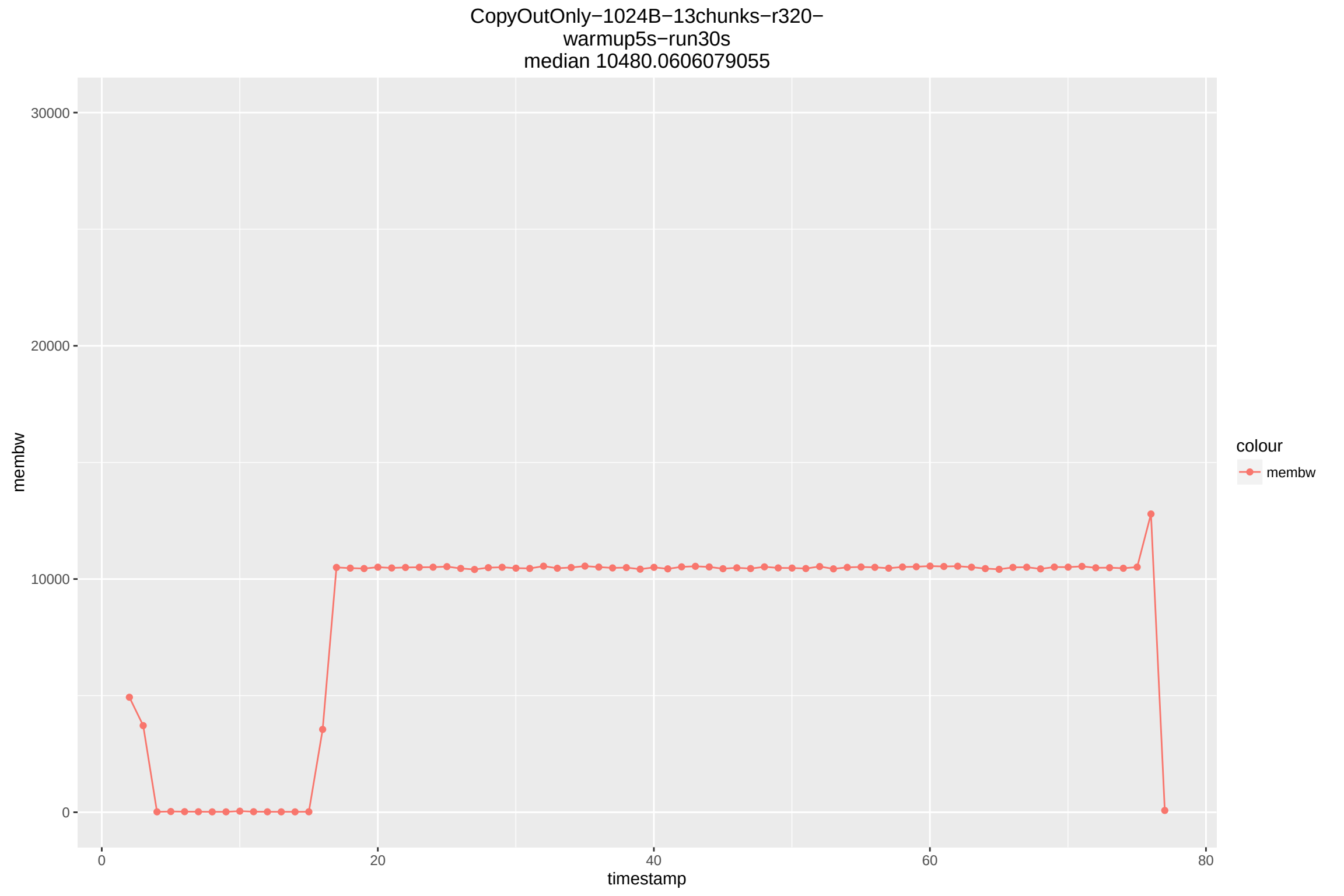

ZeroCopyOnly−1024B−12chunks−r320
warmup5s−run30s
median 6071.519897464
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

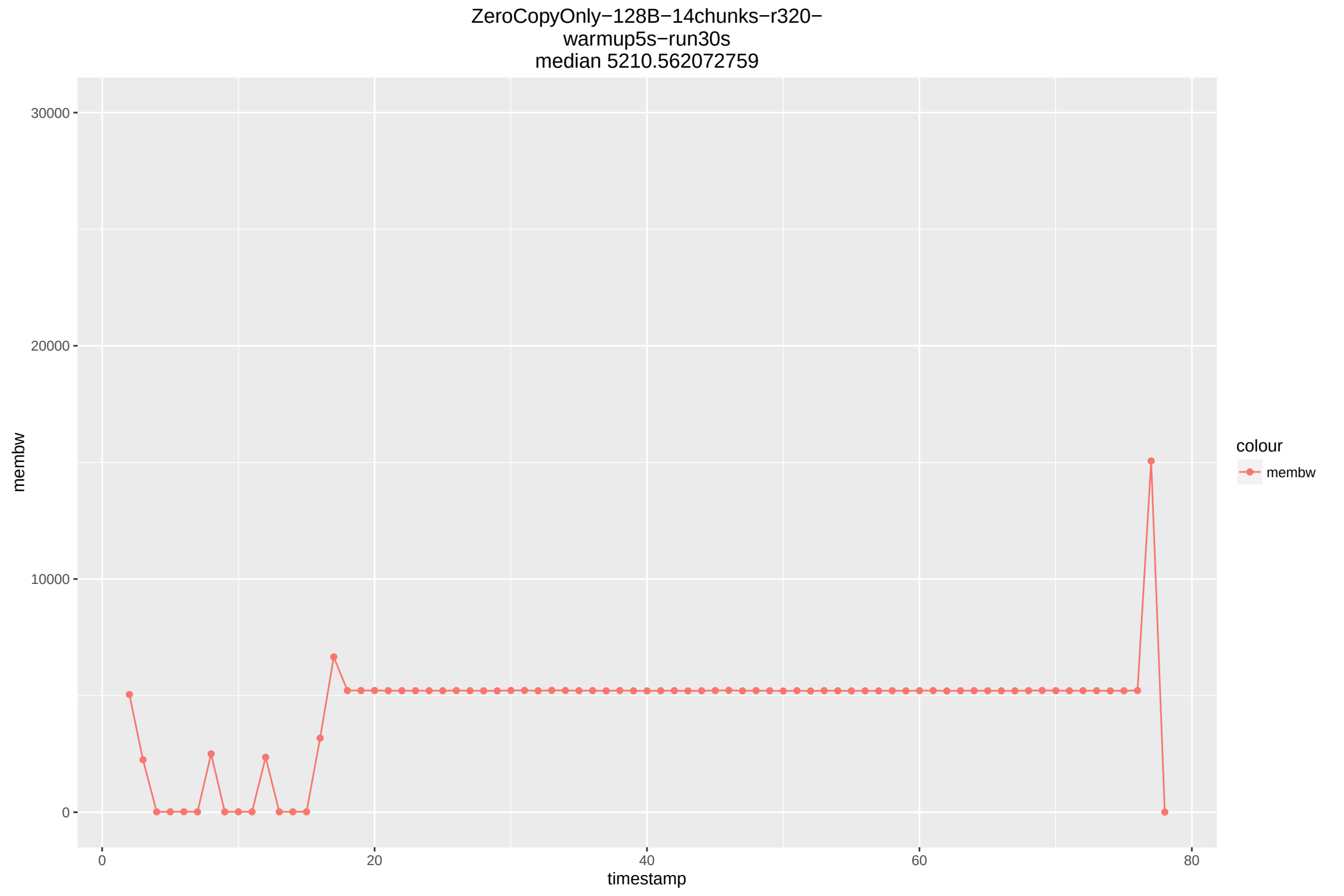

CopyOutOnly−1024B−12chunks−r320−
warmup5s−run30s
median 10333.078857421
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

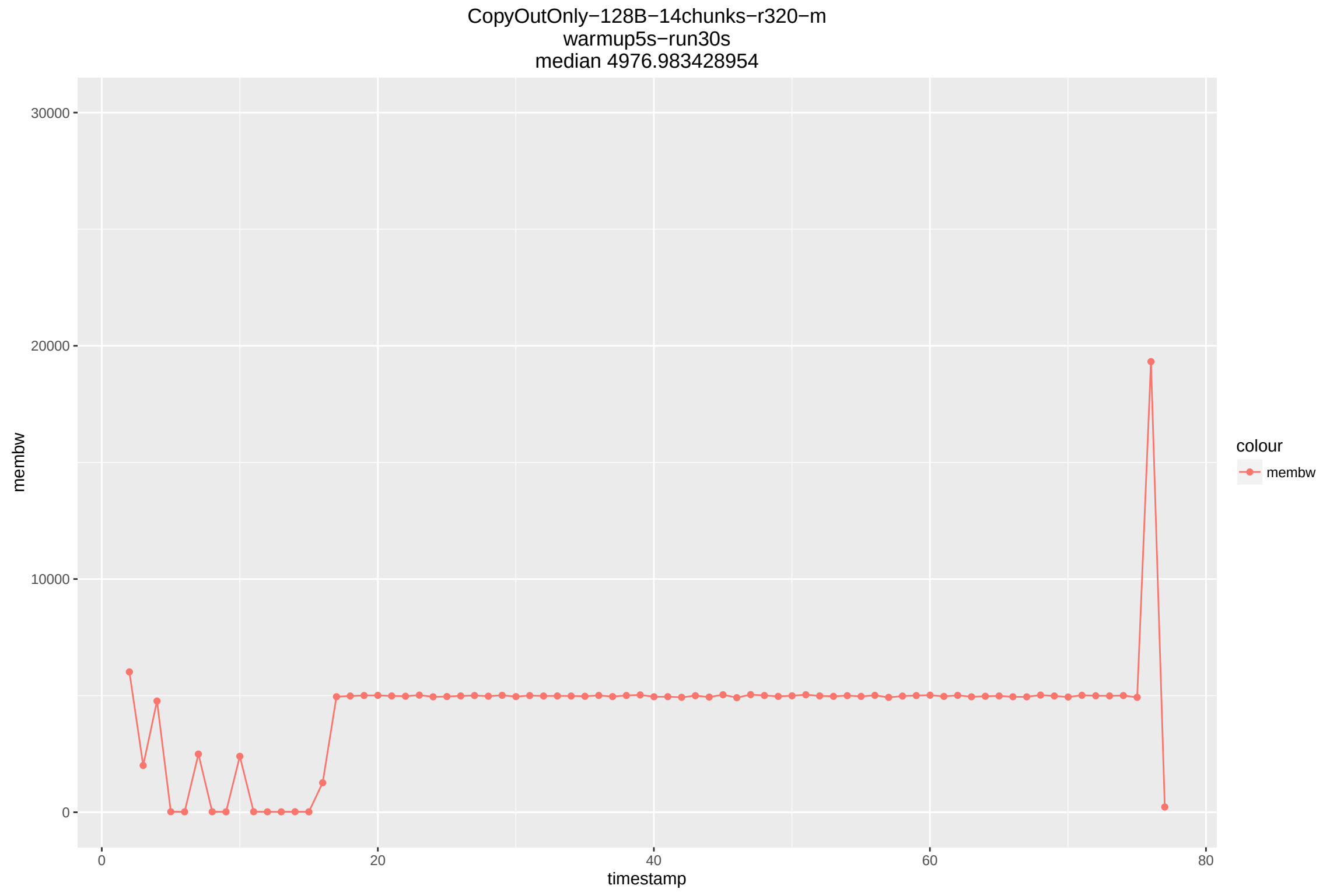

ZeroCopyOnly−128B−13chunks−r320−
warmup5s−run30s
median 5127.202880857
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

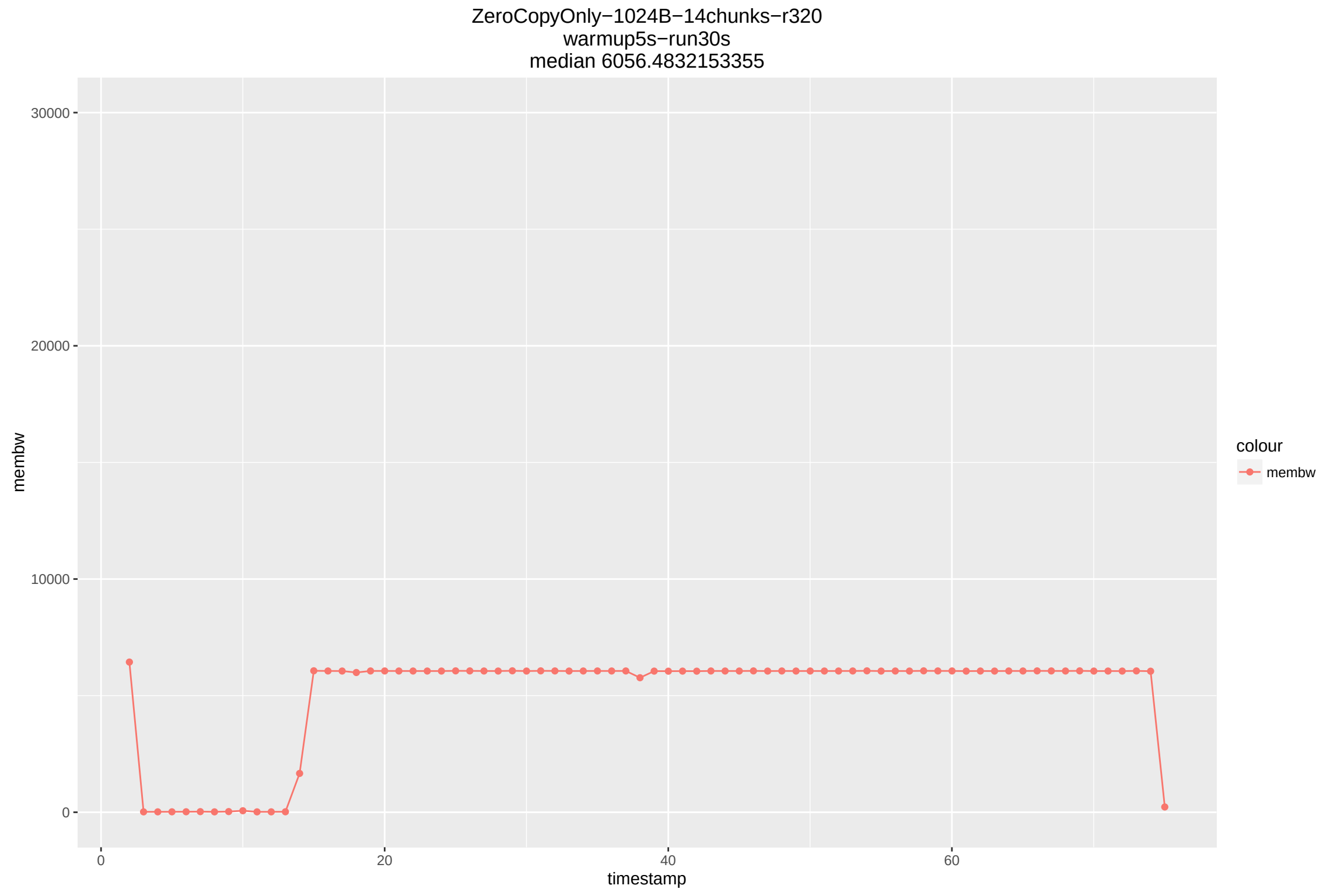

CopyOutOnly−128B−13chunks−r320−m
warmup5s−run30s
median 4847.9753112785
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

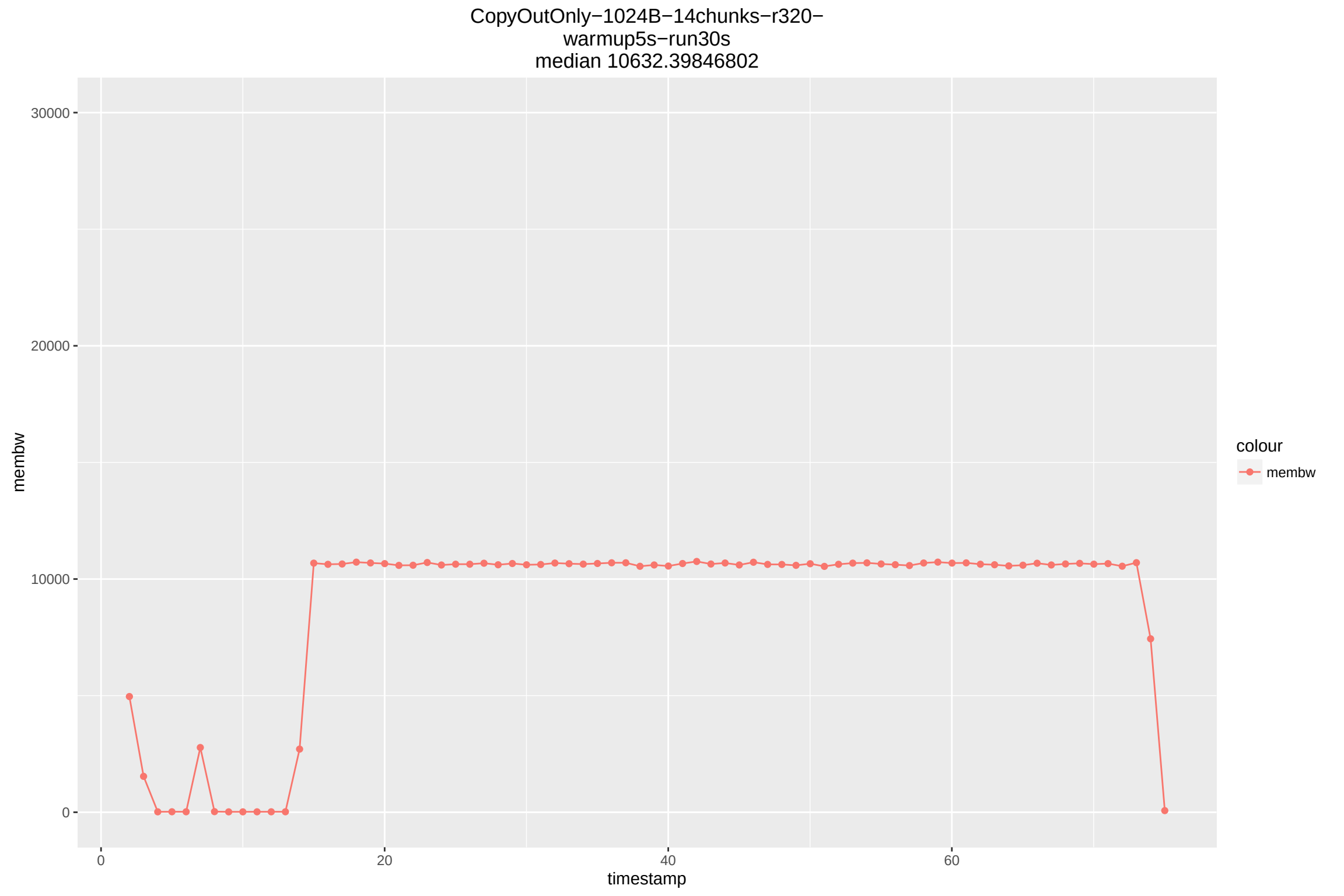

ZeroCopyOnly−1024B−13chunks−r320
warmup5s−run30s
median 6077.122985839
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

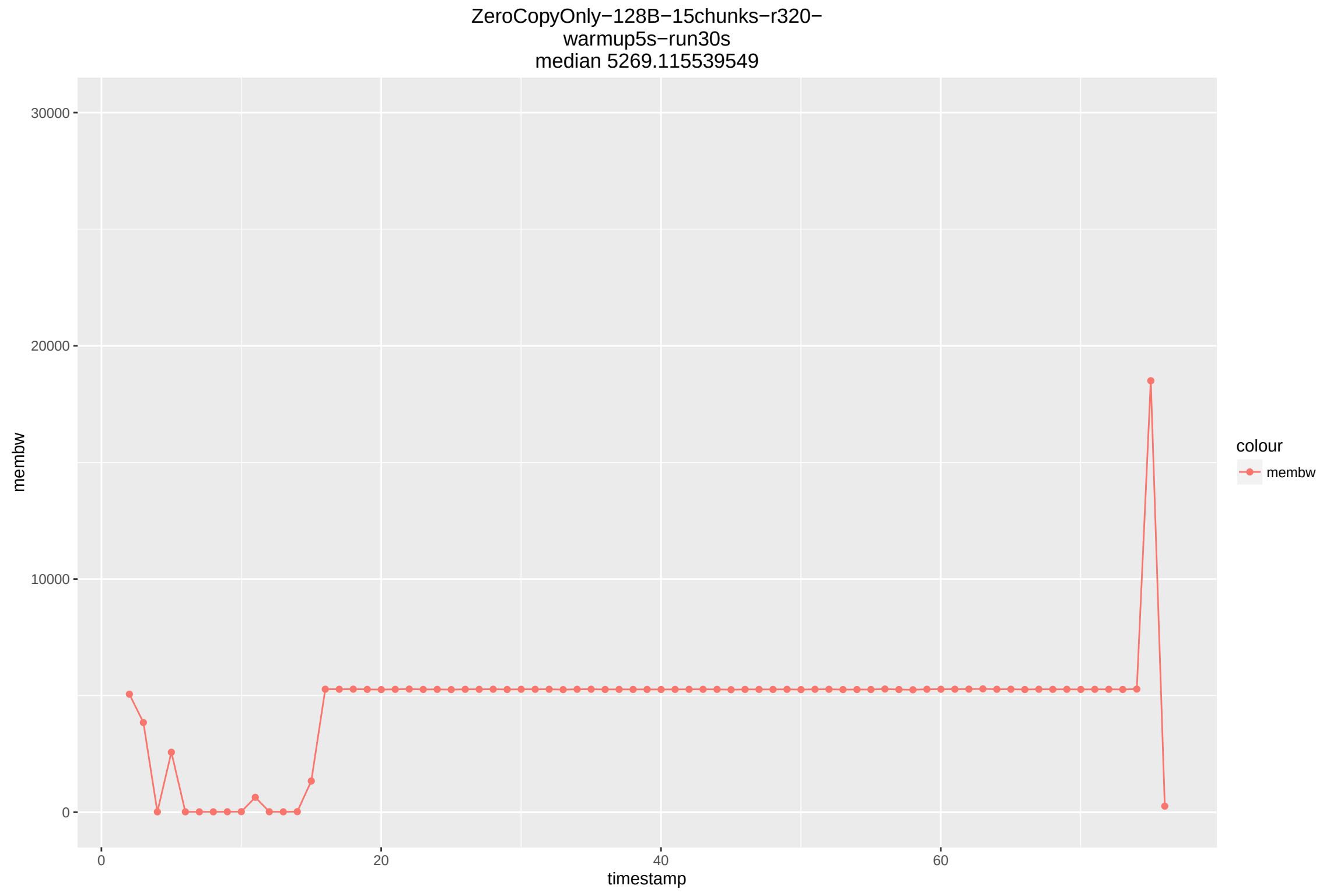

CopyOutOnly−1024B−13chunks−r320−
warmup5s−run30s
median 10480.0606079055
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

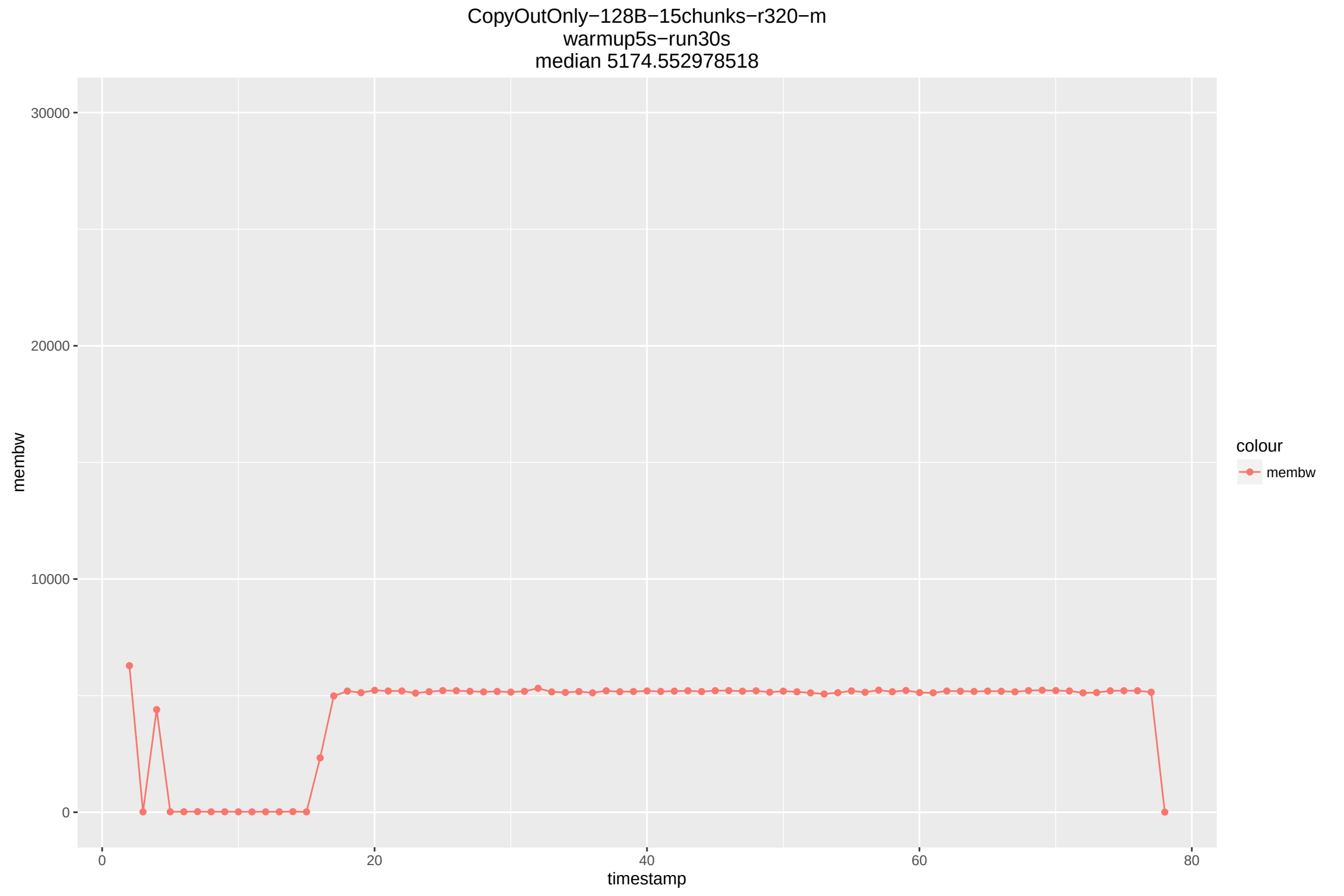

ZeroCopyOnly−128B−14chunks−r320−
warmup5s−run30s
median 5210.562072759
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

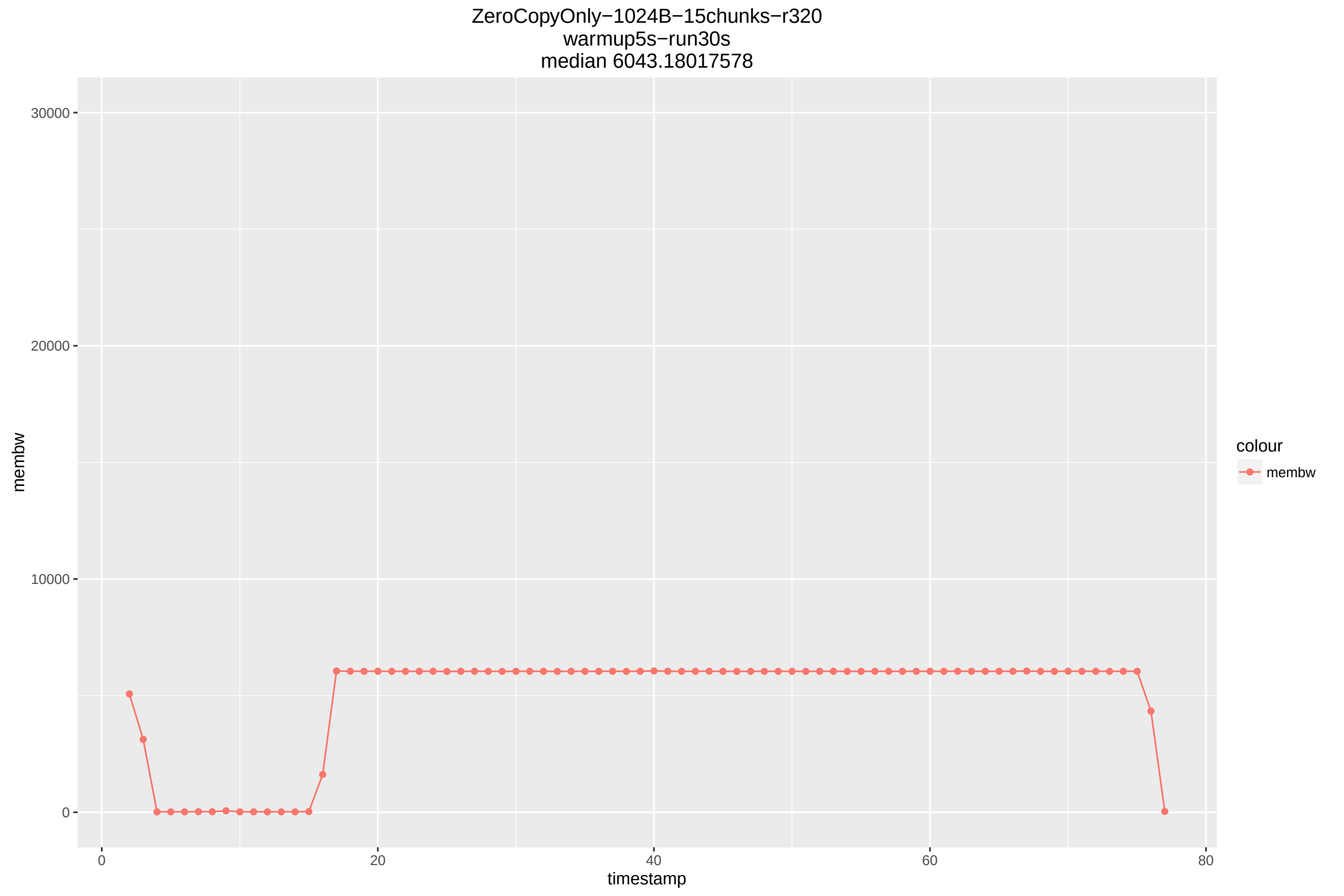

CopyOutOnly−128B−14chunks−r320−m
warmup5s−run30s
median 4976.983428954
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

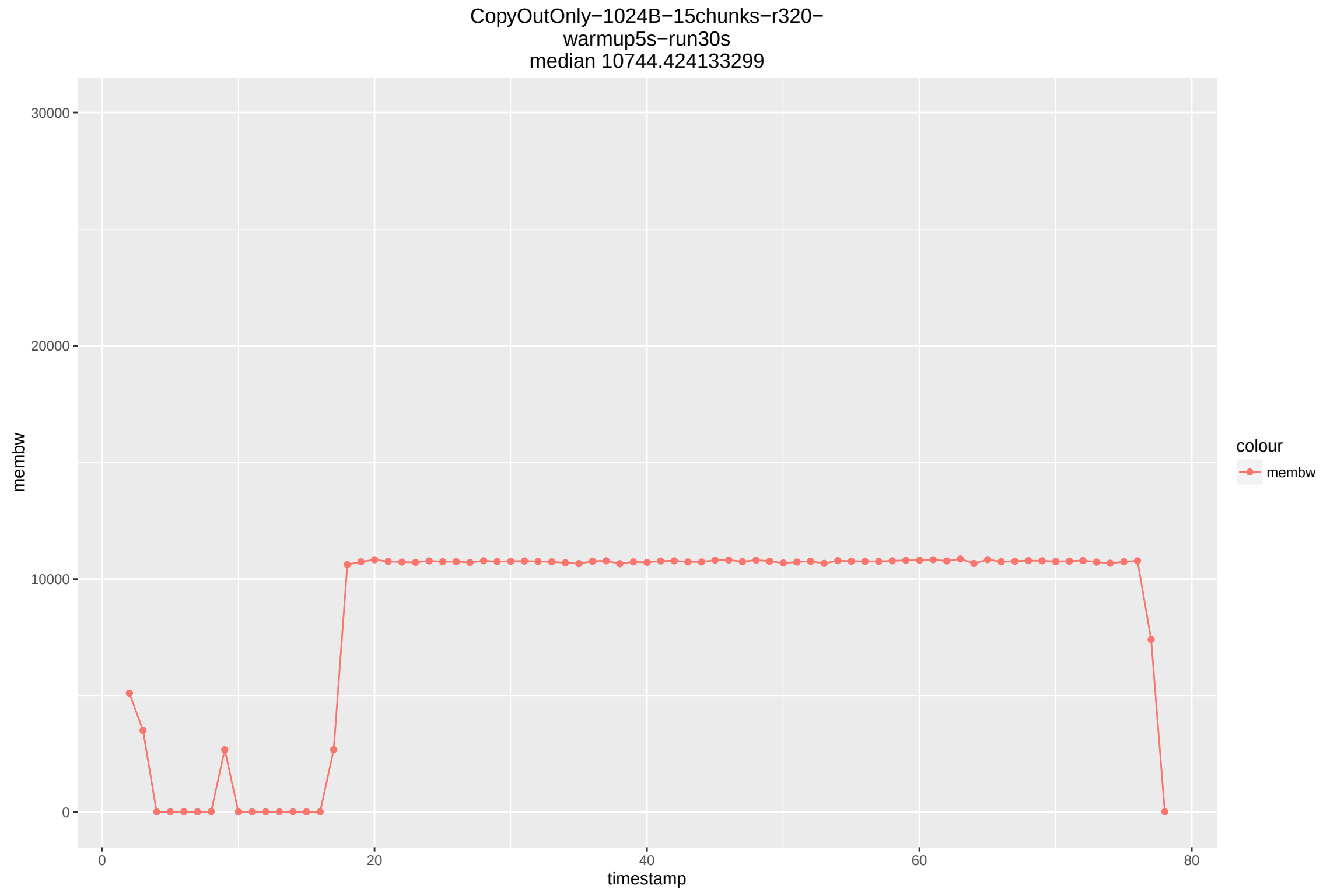

ZeroCopyOnly−1024B−14chunks−r320
warmup5s−run30s
median 6056.4832153355
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

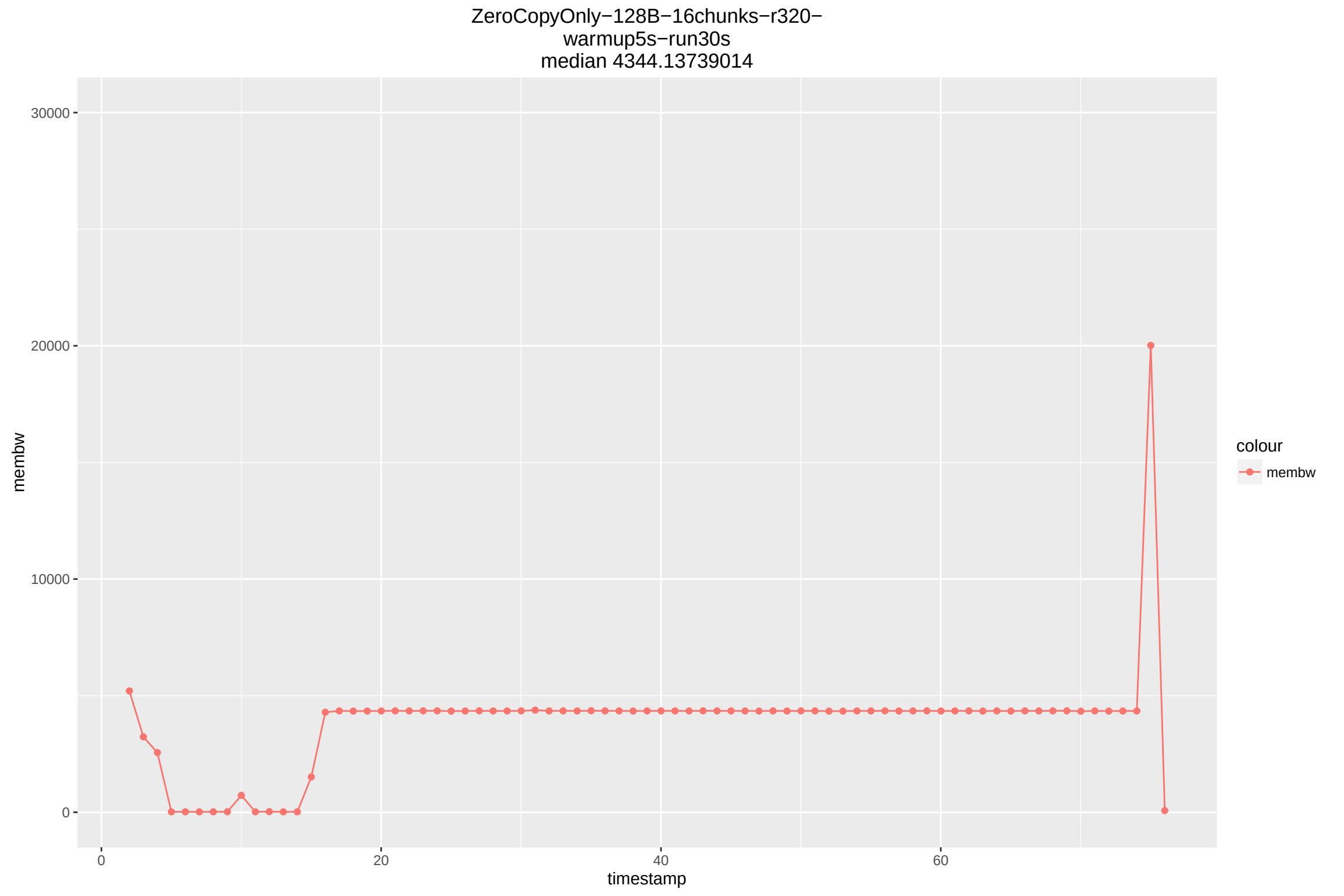

CopyOutOnly−1024B−14chunks−r320−
warmup5s−run30s
median 10632.39846802
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

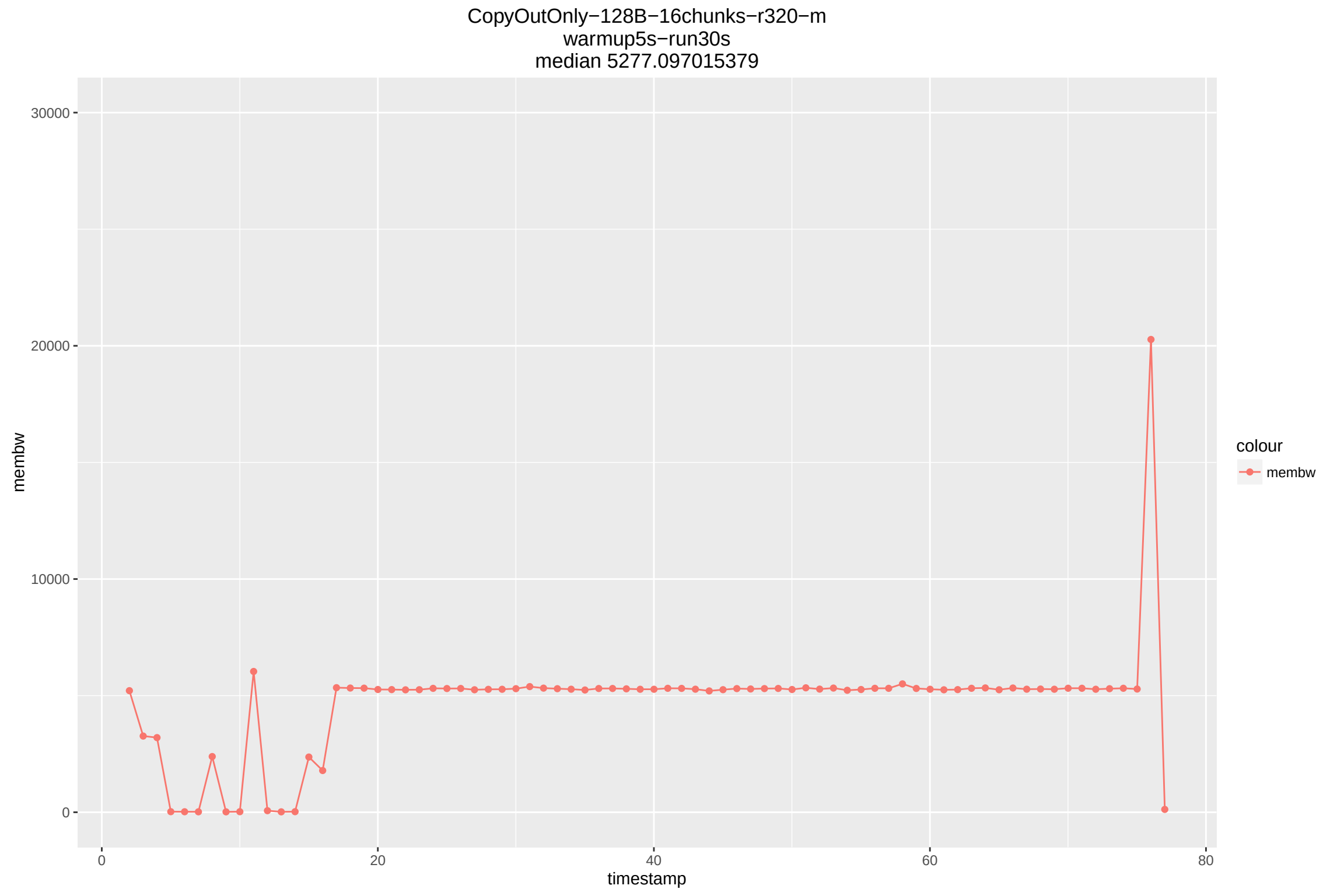

ZeroCopyOnly−128B−15chunks−r320−
warmup5s−run30s
median 5269.115539549
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

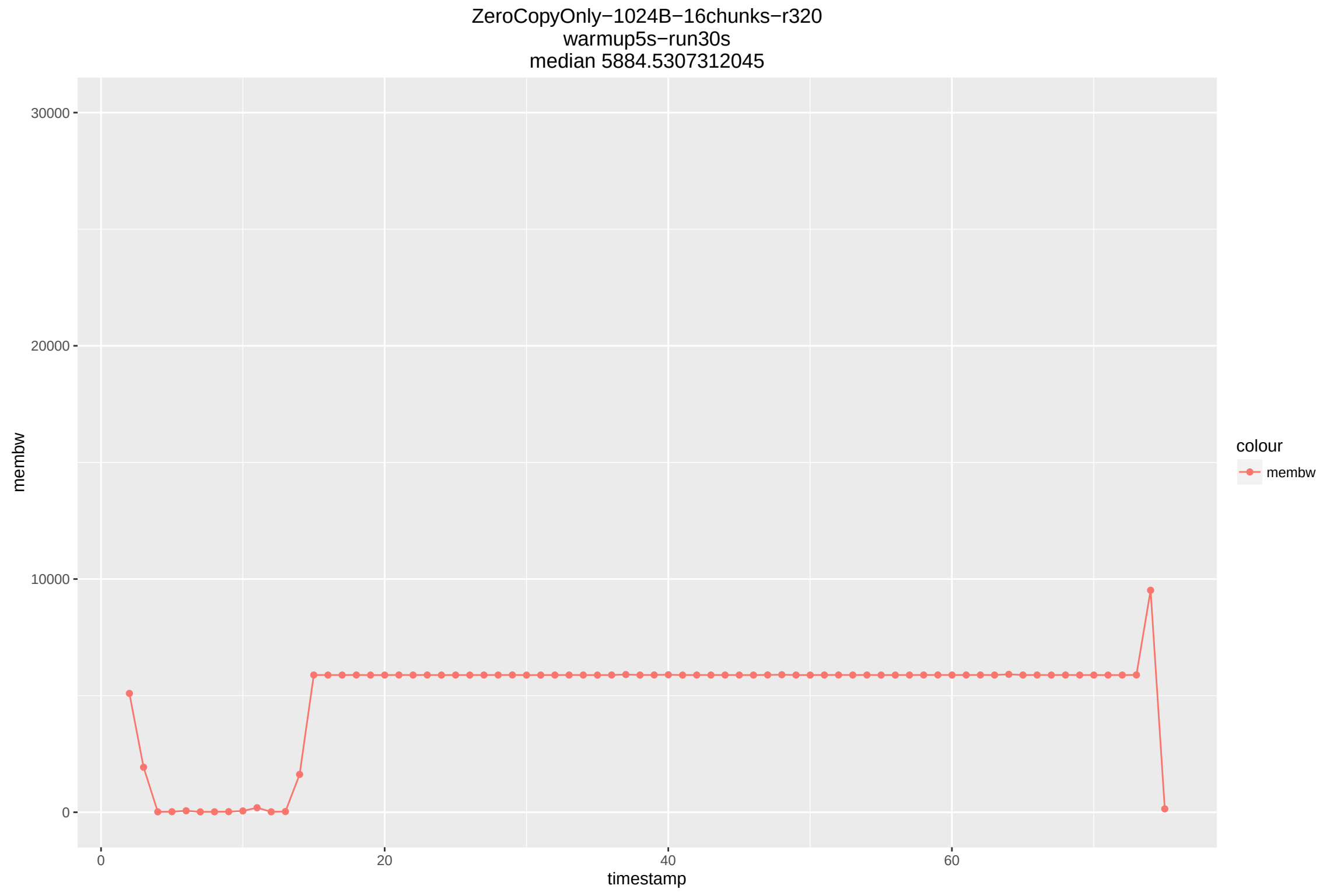

CopyOutOnly−128B−15chunks−r320−m
warmup5s−run30s
median 5174.552978518
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

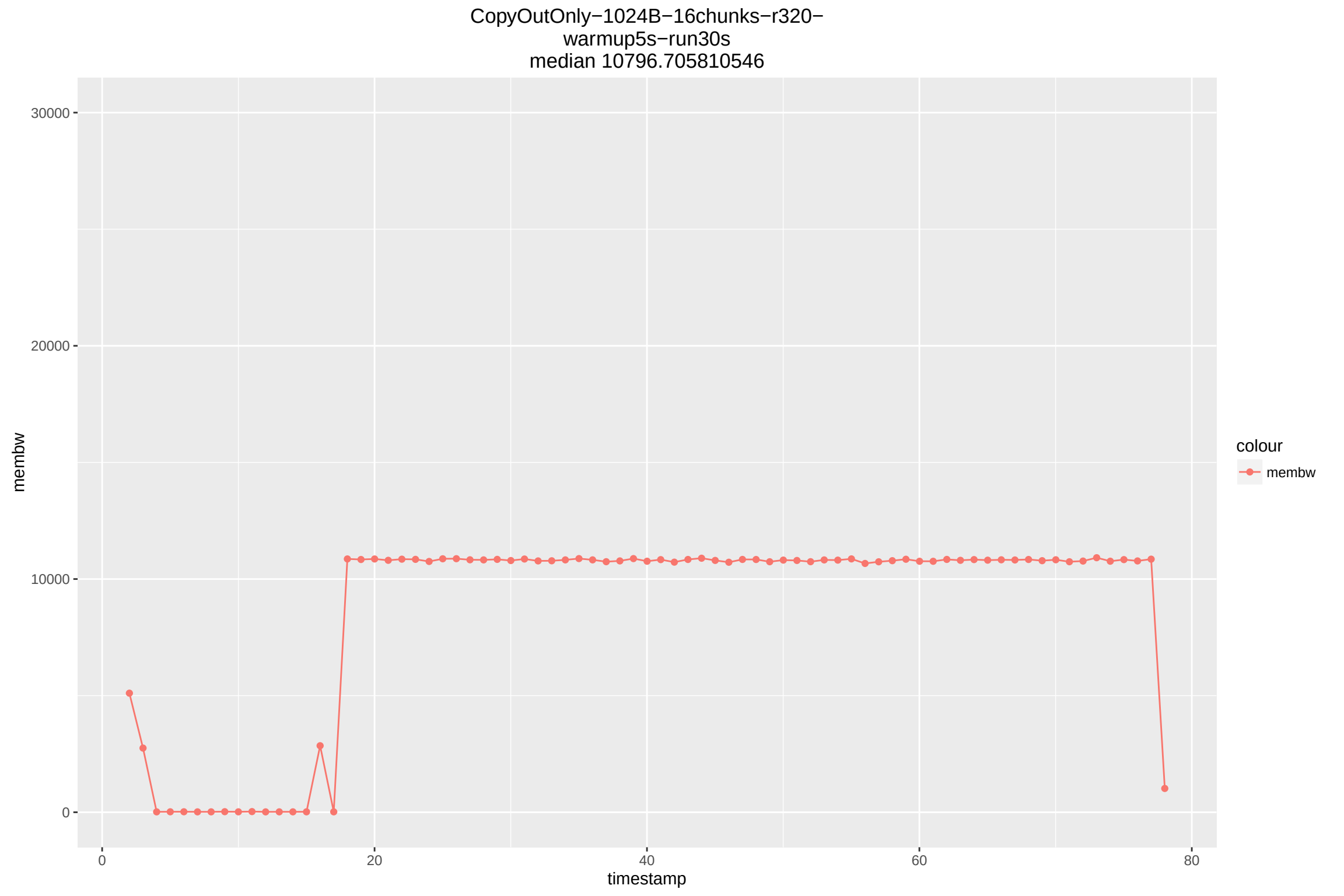

ZeroCopyOnly−1024B−15chunks−r320
warmup5s−run30s
median 6043.18017578
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

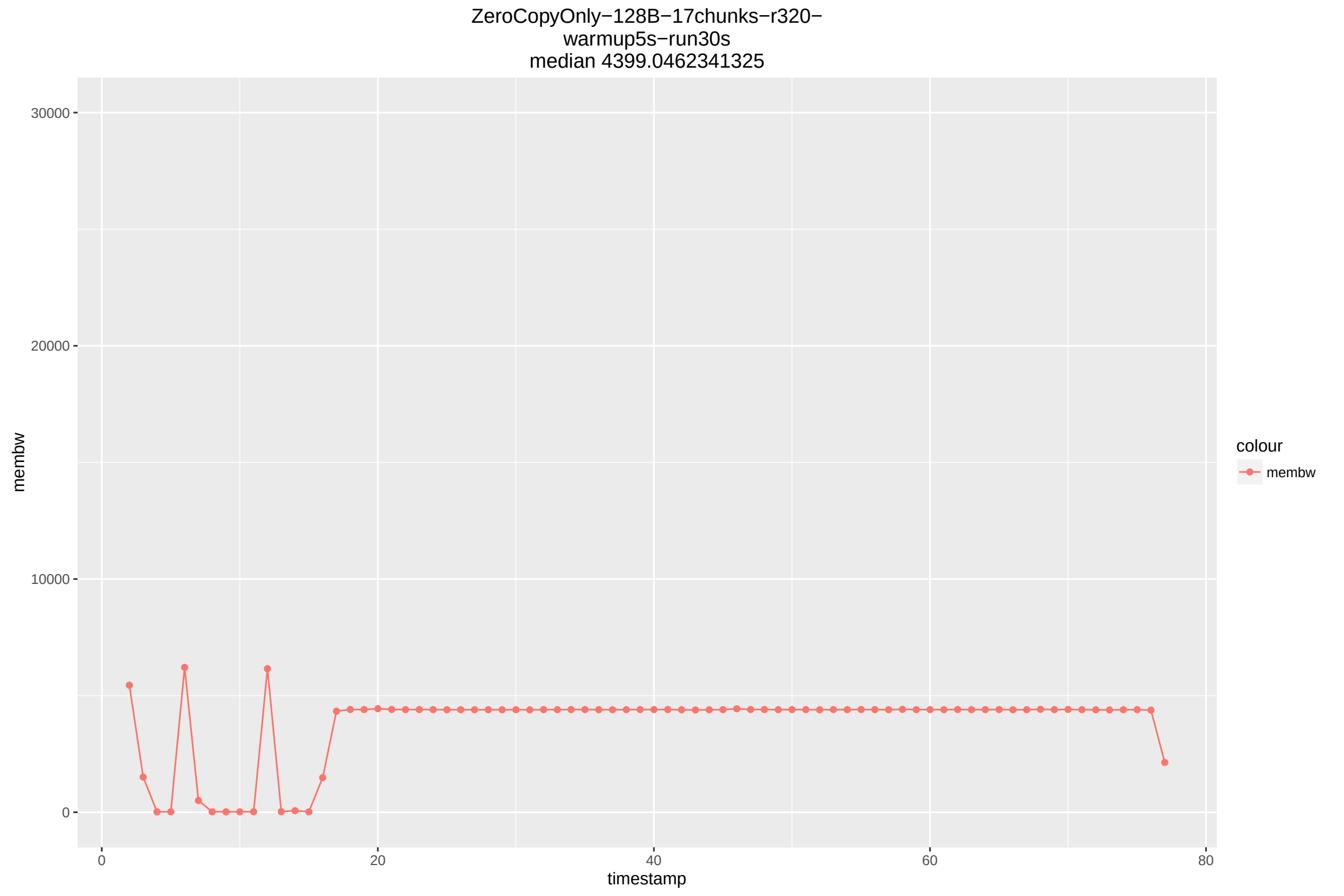

CopyOutOnly−1024B−15chunks−r320−
warmup5s−run30s
median 10744.424133299
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

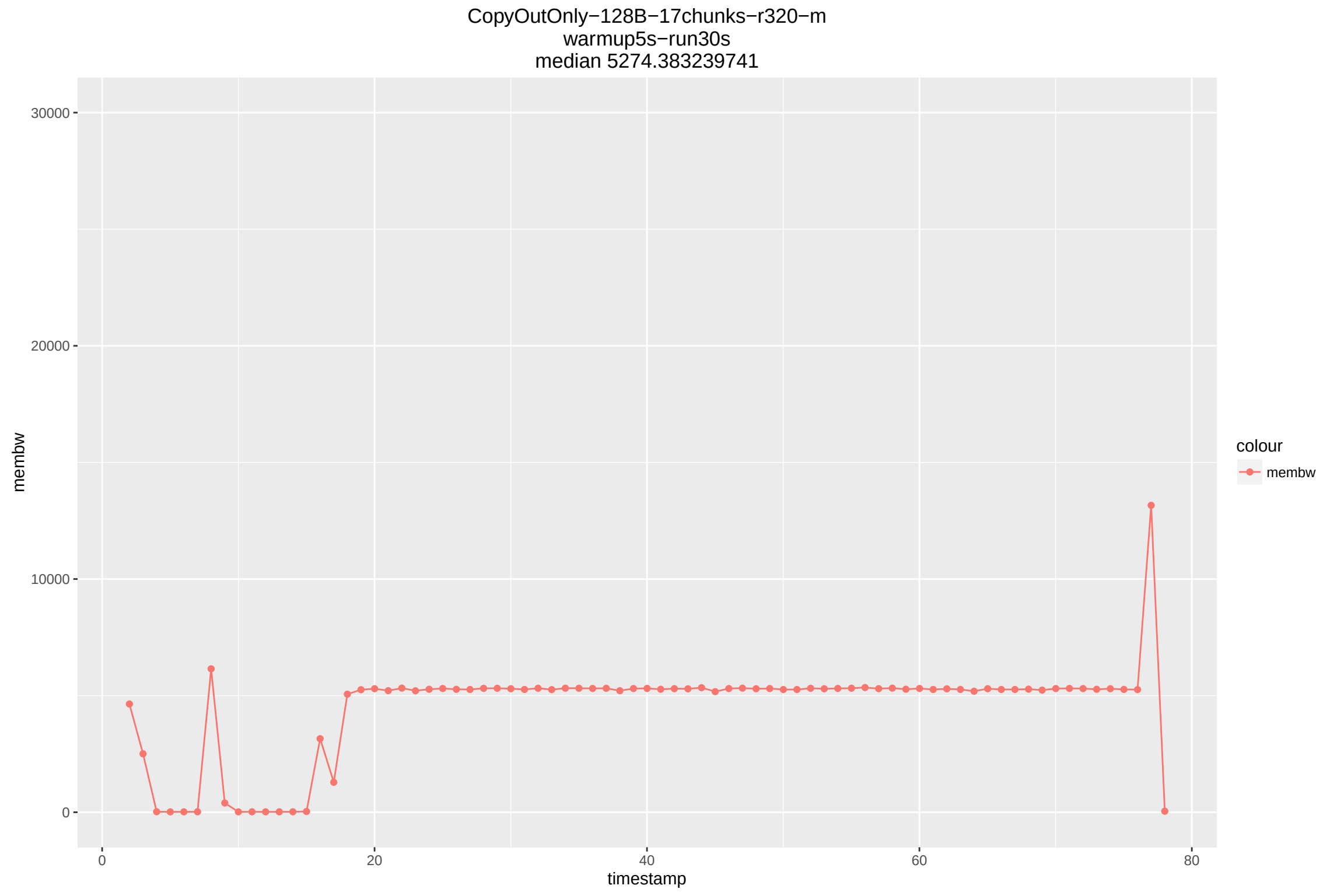

ZeroCopyOnly−128B−16chunks−r320−
warmup5s−run30s
median 4344.13739014
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

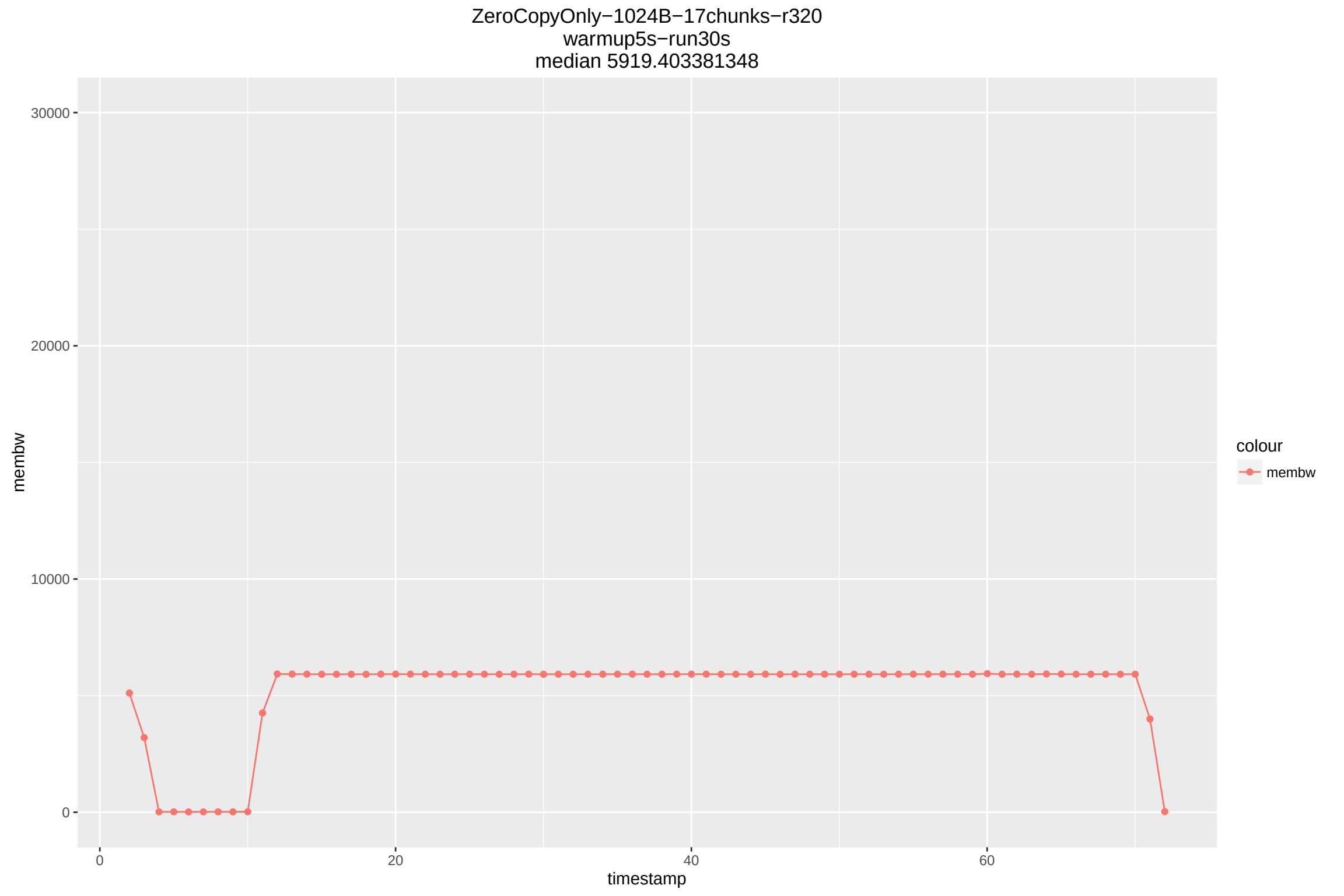

CopyOutOnly−128B−16chunks−r320−m
warmup5s−run30s
median 5277.097015379
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

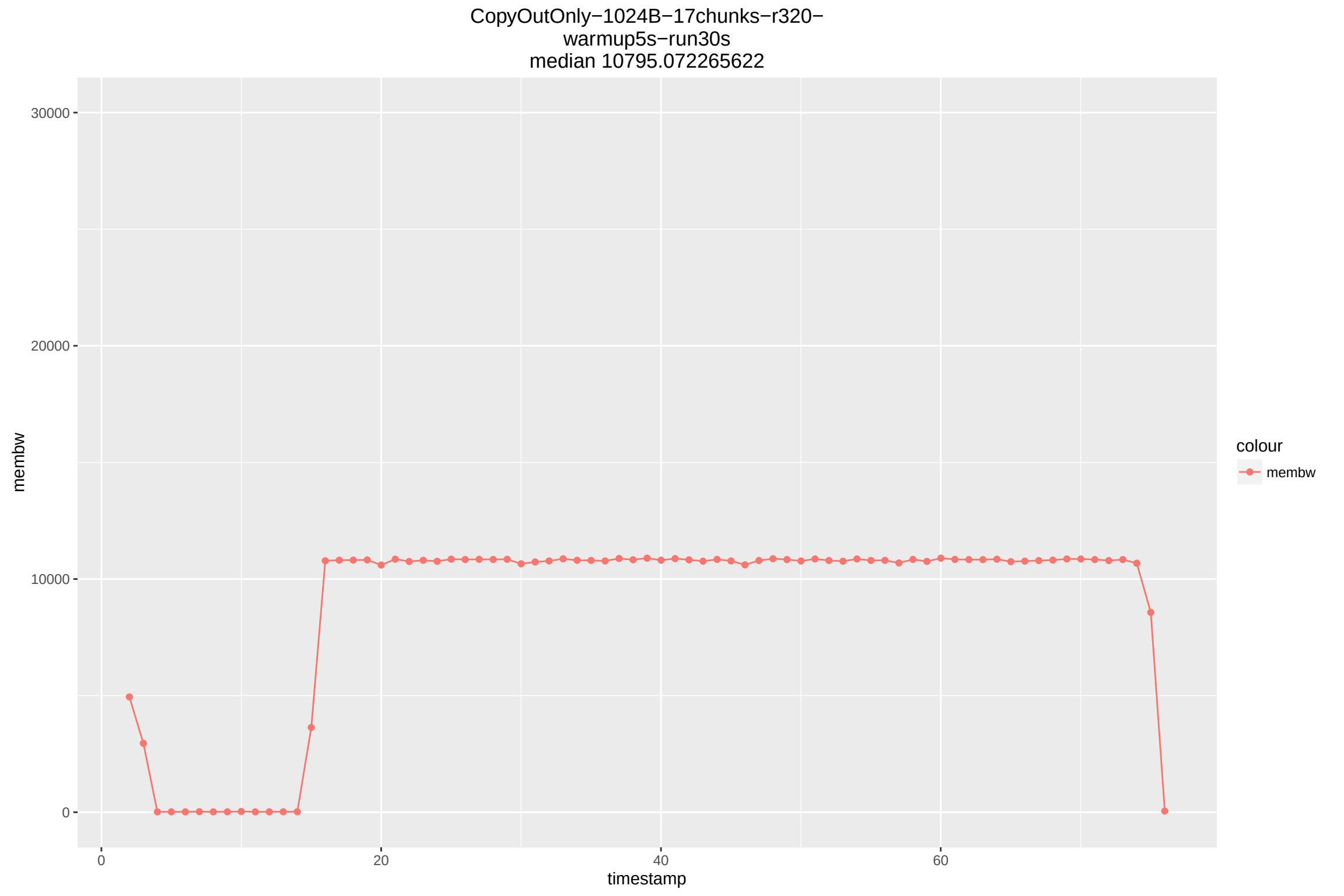

ZeroCopyOnly−1024B−16chunks−r320
warmup5s−run30s
median 5884.5307312045
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

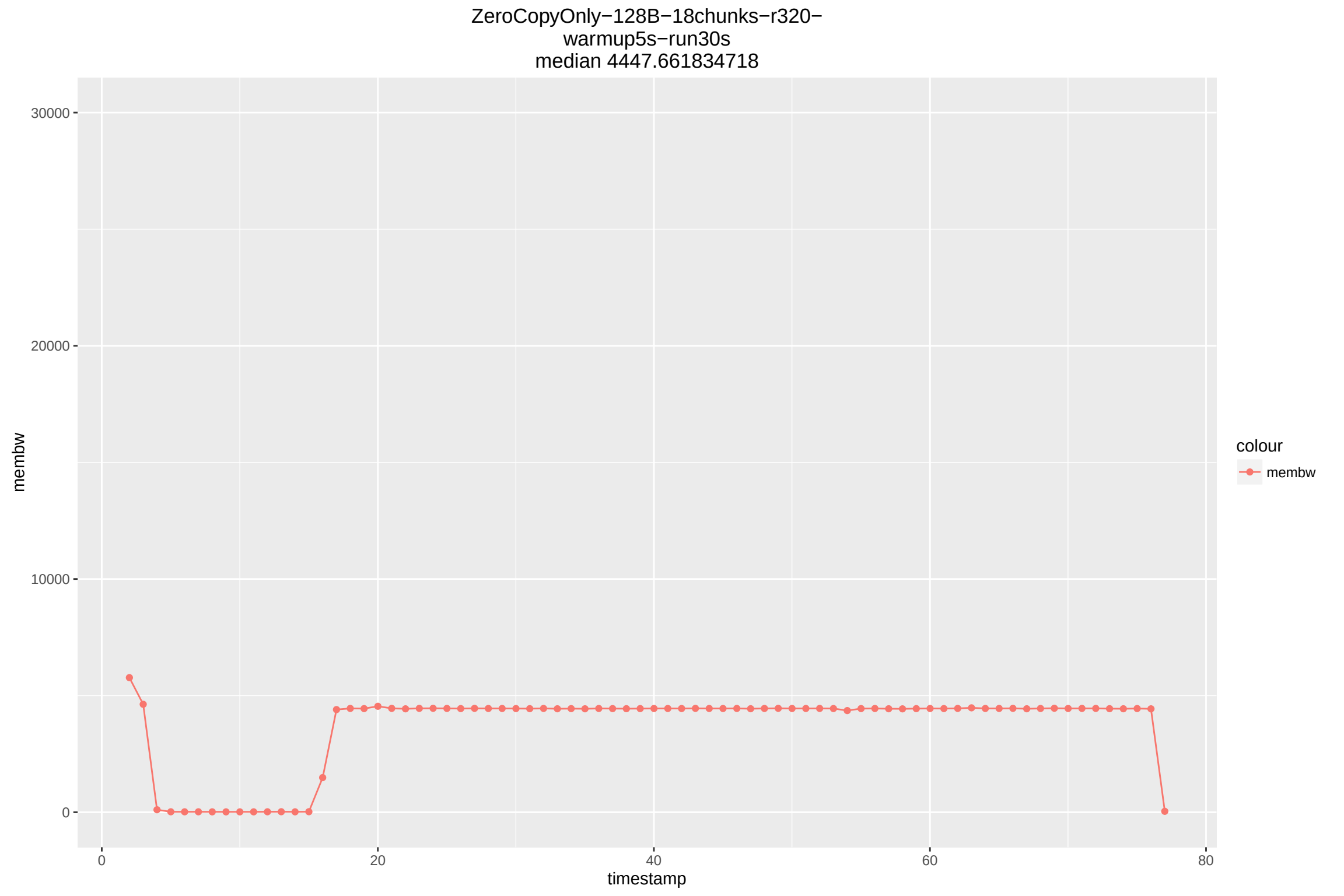

CopyOutOnly−1024B−16chunks−r320−
warmup5s−run30s
median 10796.705810546
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

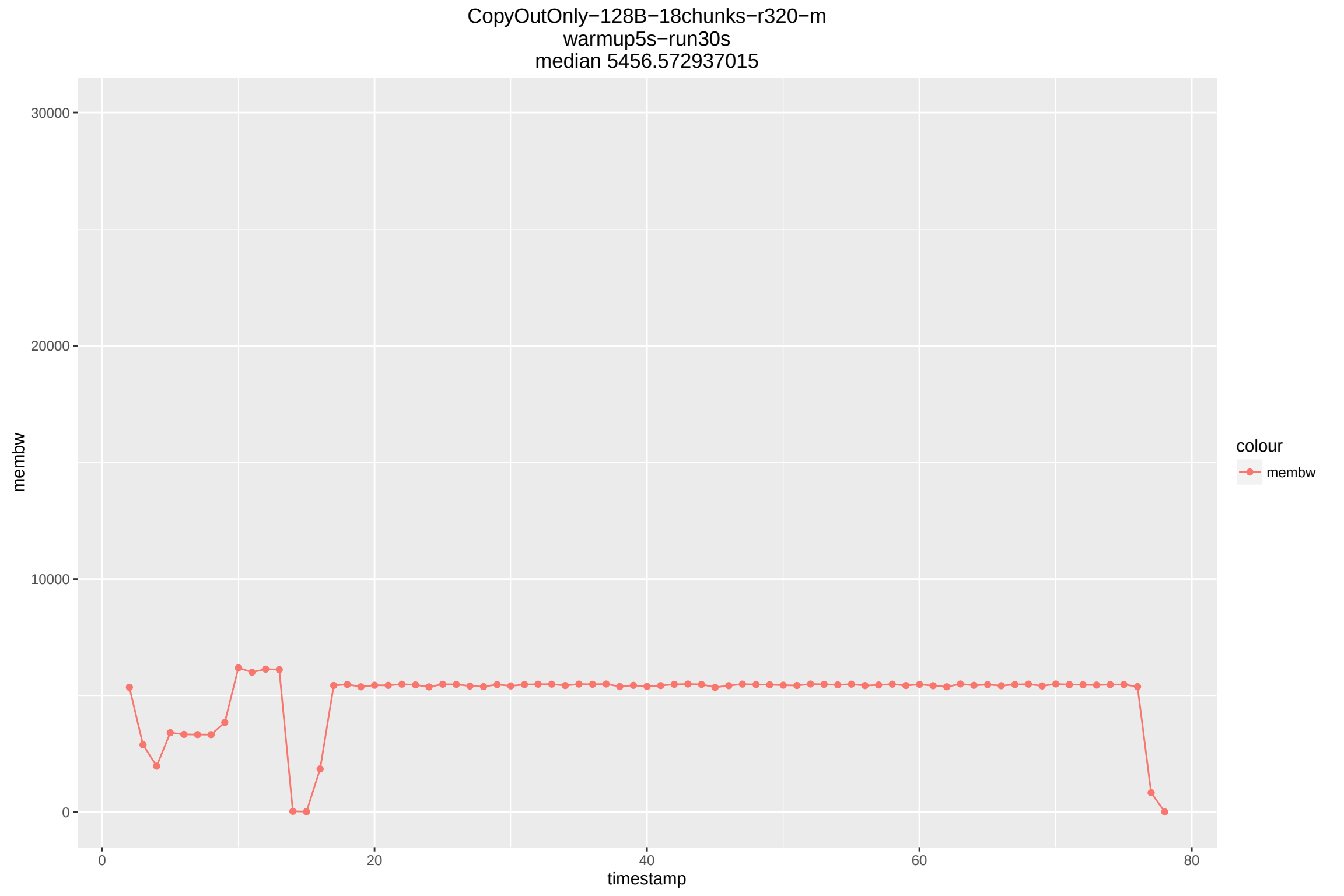

ZeroCopyOnly−128B−17chunks−r320−
warmup5s−run30s
median 4399.0462341325
membw
30000
20000
10000
0
0
20
40
60
80
timestamp
colour
membw

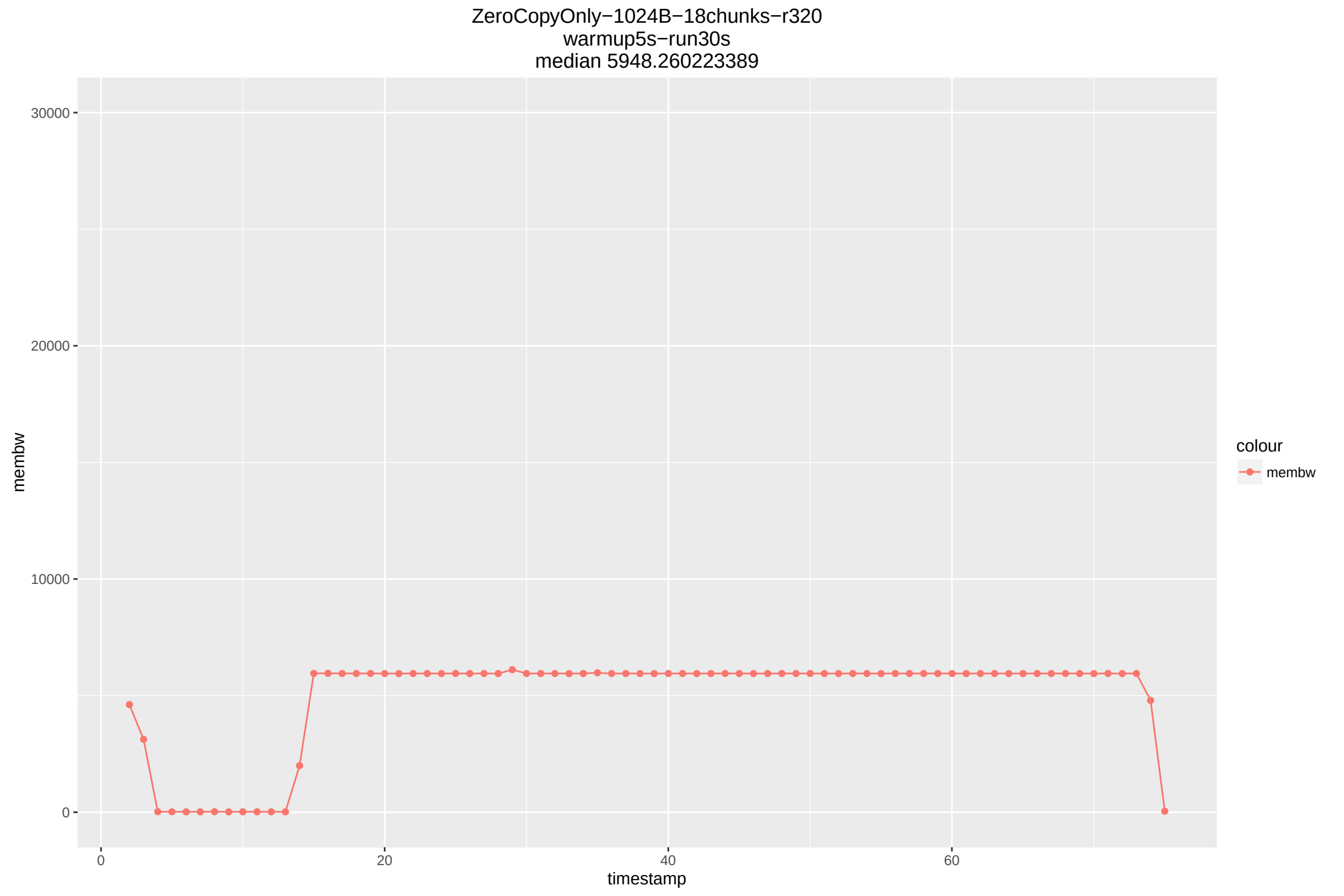

CopyOutOnly−128B−17chunks−r320−m
warmup5s−run30s
median 5274.383239741
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

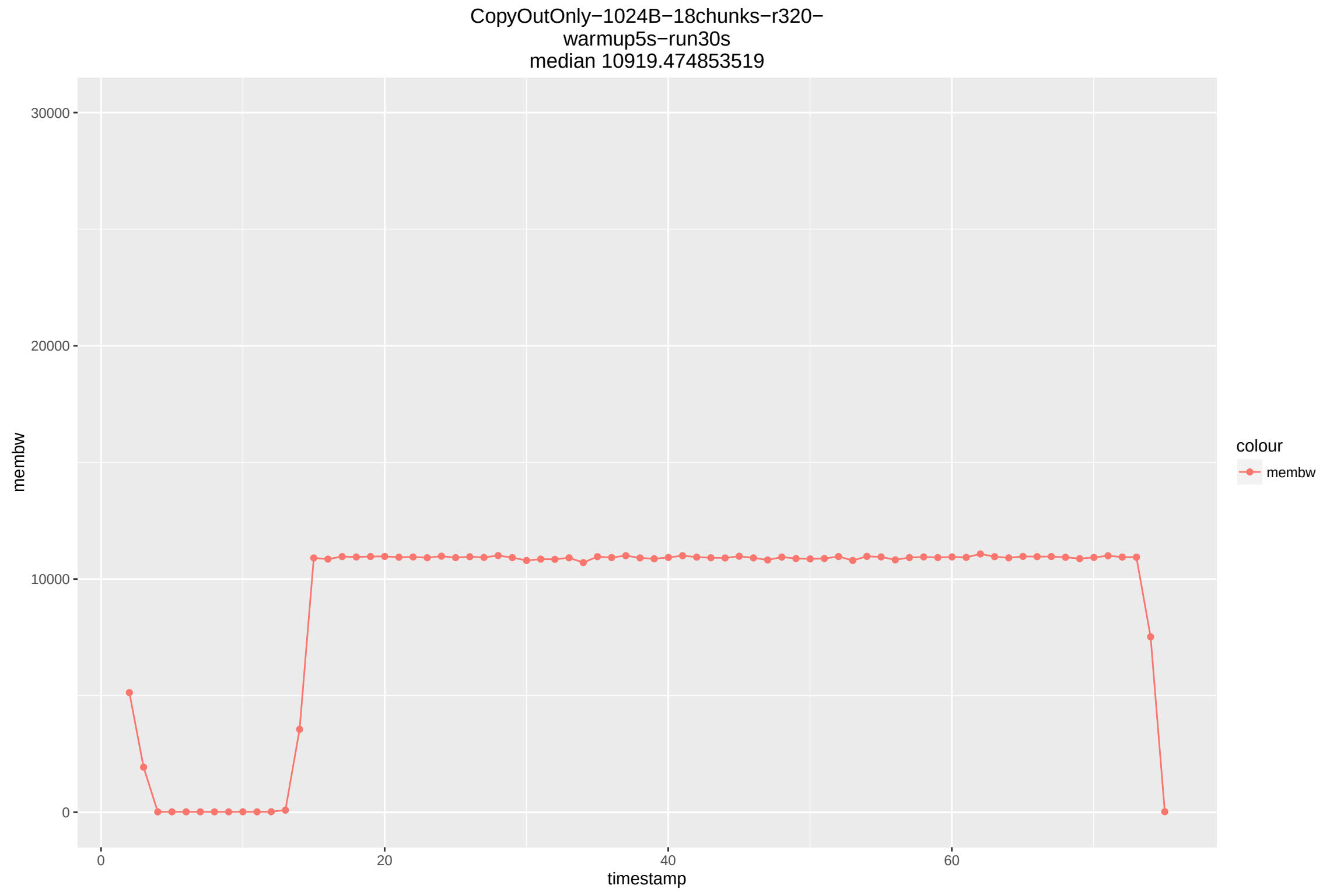

ZeroCopyOnly−1024B−17chunks−r320
warmup5s−run30s
median 5919.403381348
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

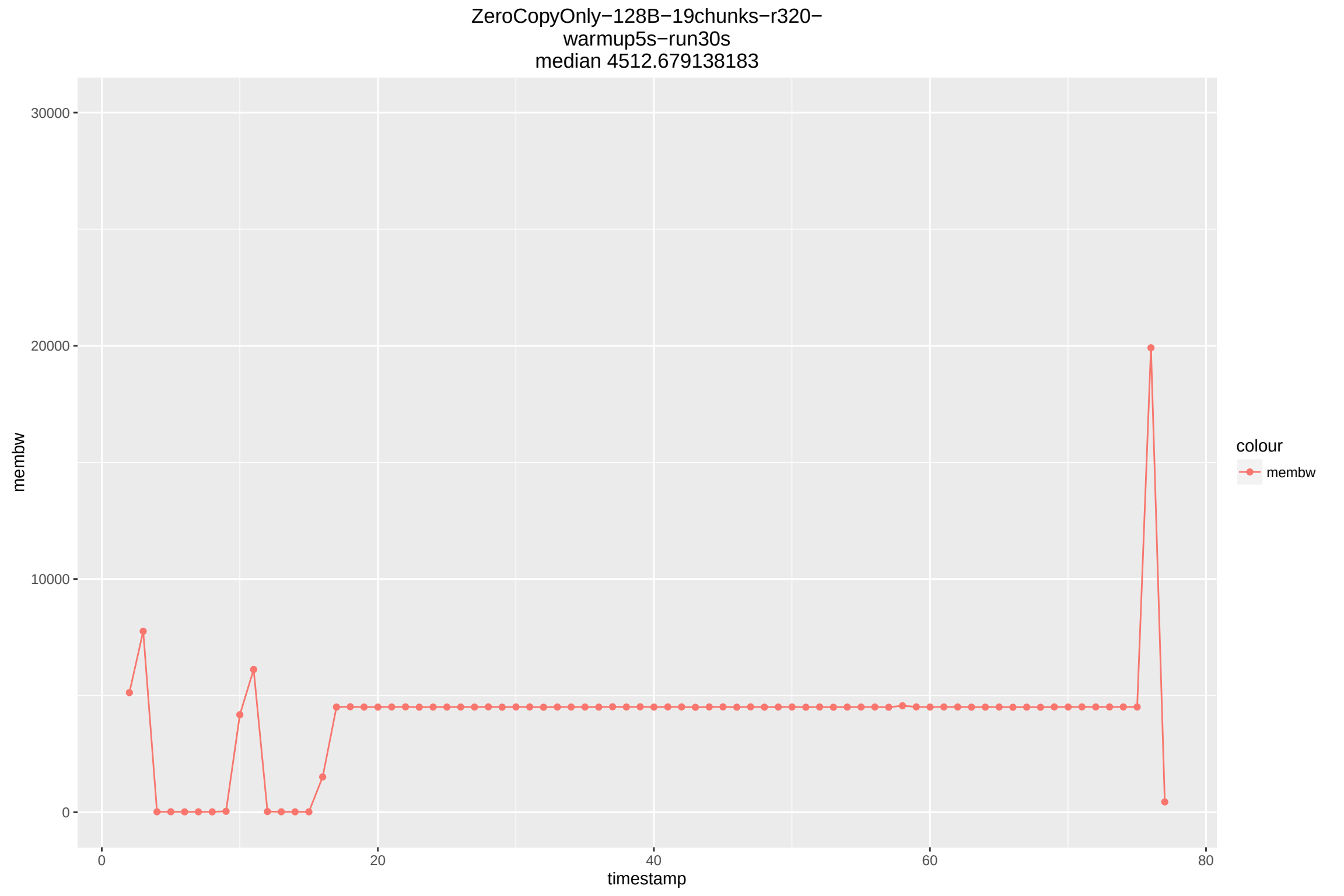

CopyOutOnly−1024B−17chunks−r320−
warmup5s−run30s
median 10795.072265622
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

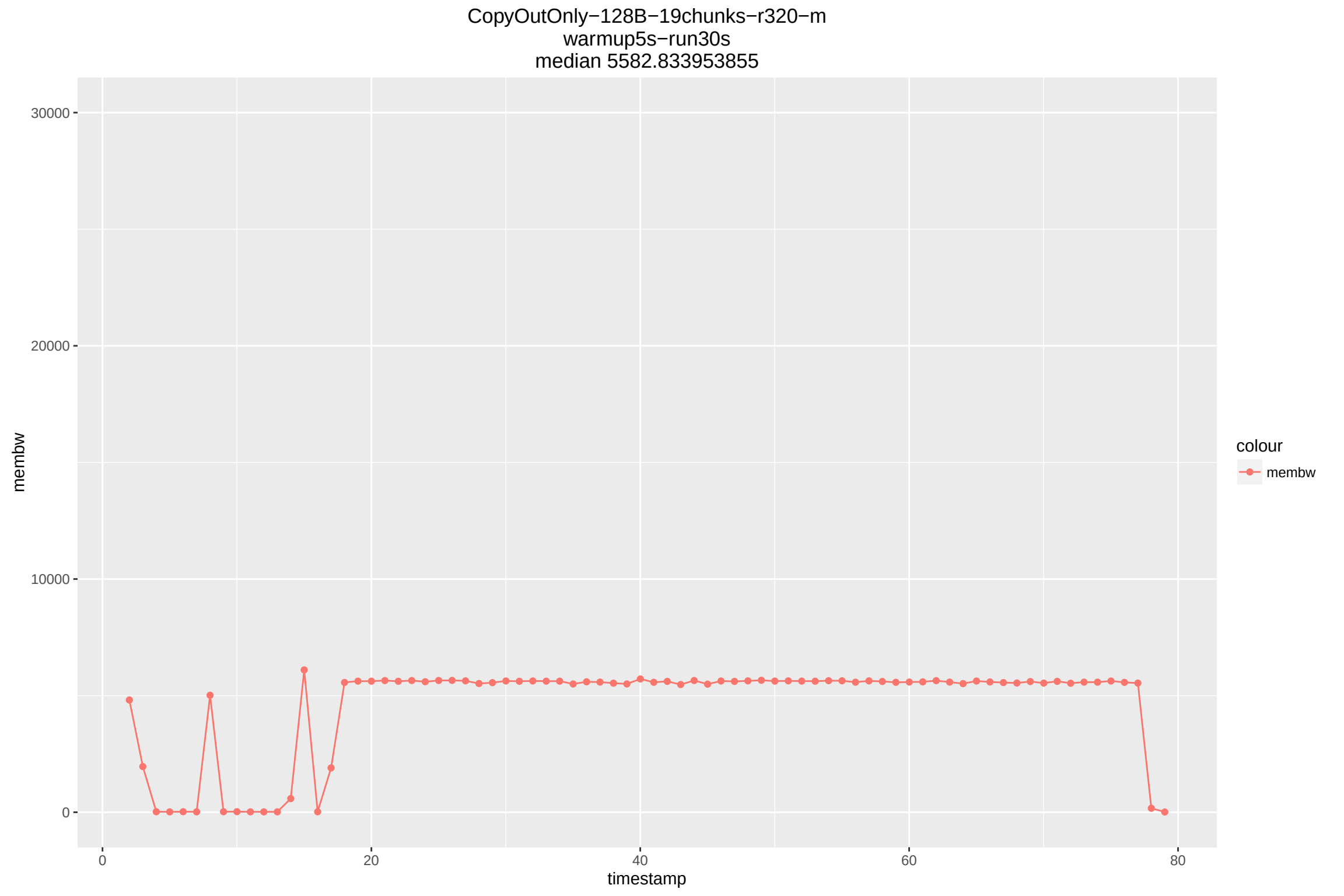

ZeroCopyOnly−128B−18chunks−r320−
warmup5s−run30s
median 4447.661834718
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

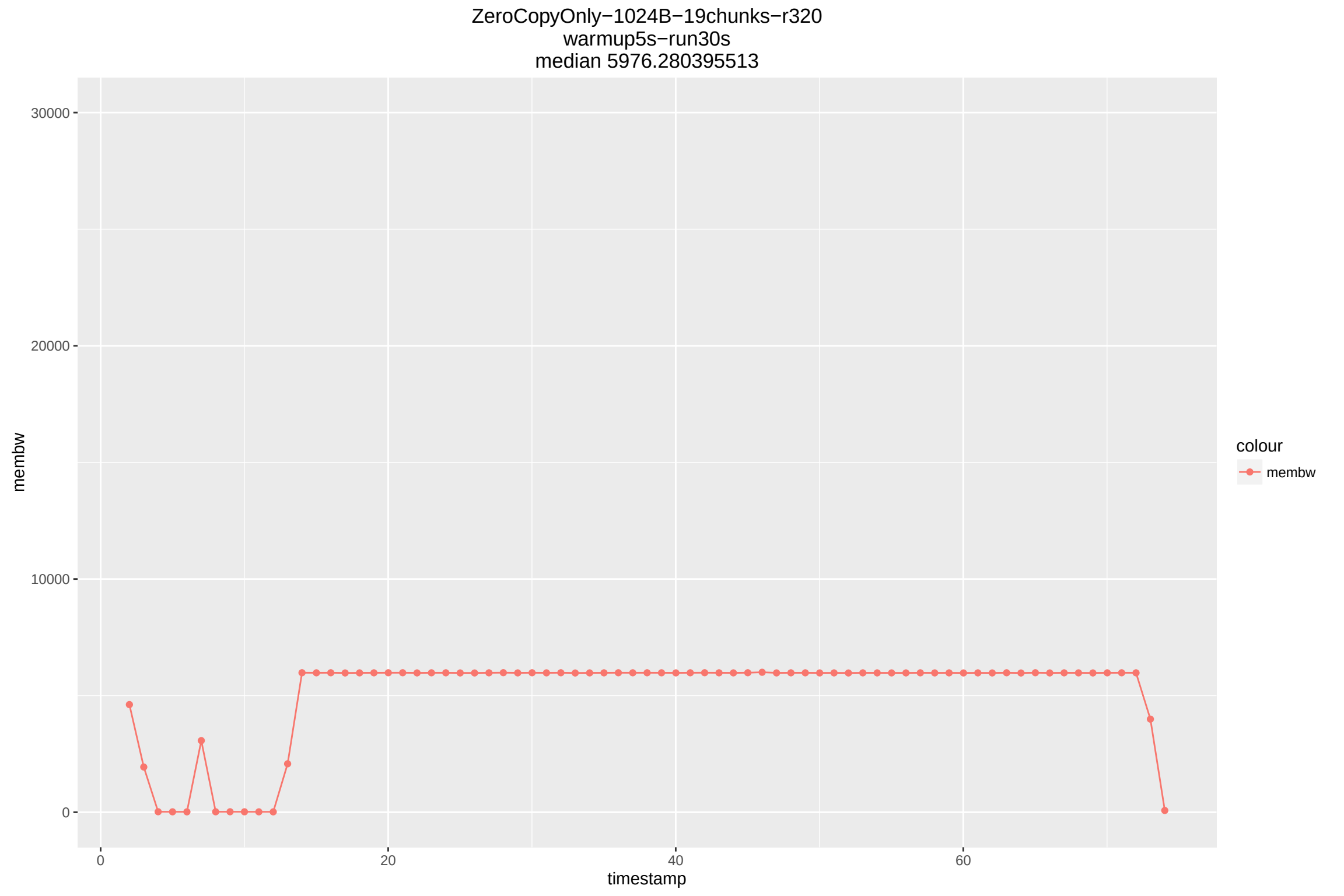

CopyOutOnly−128B−18chunks−r320−m
warmup5s−run30s
median 5456.572937015
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

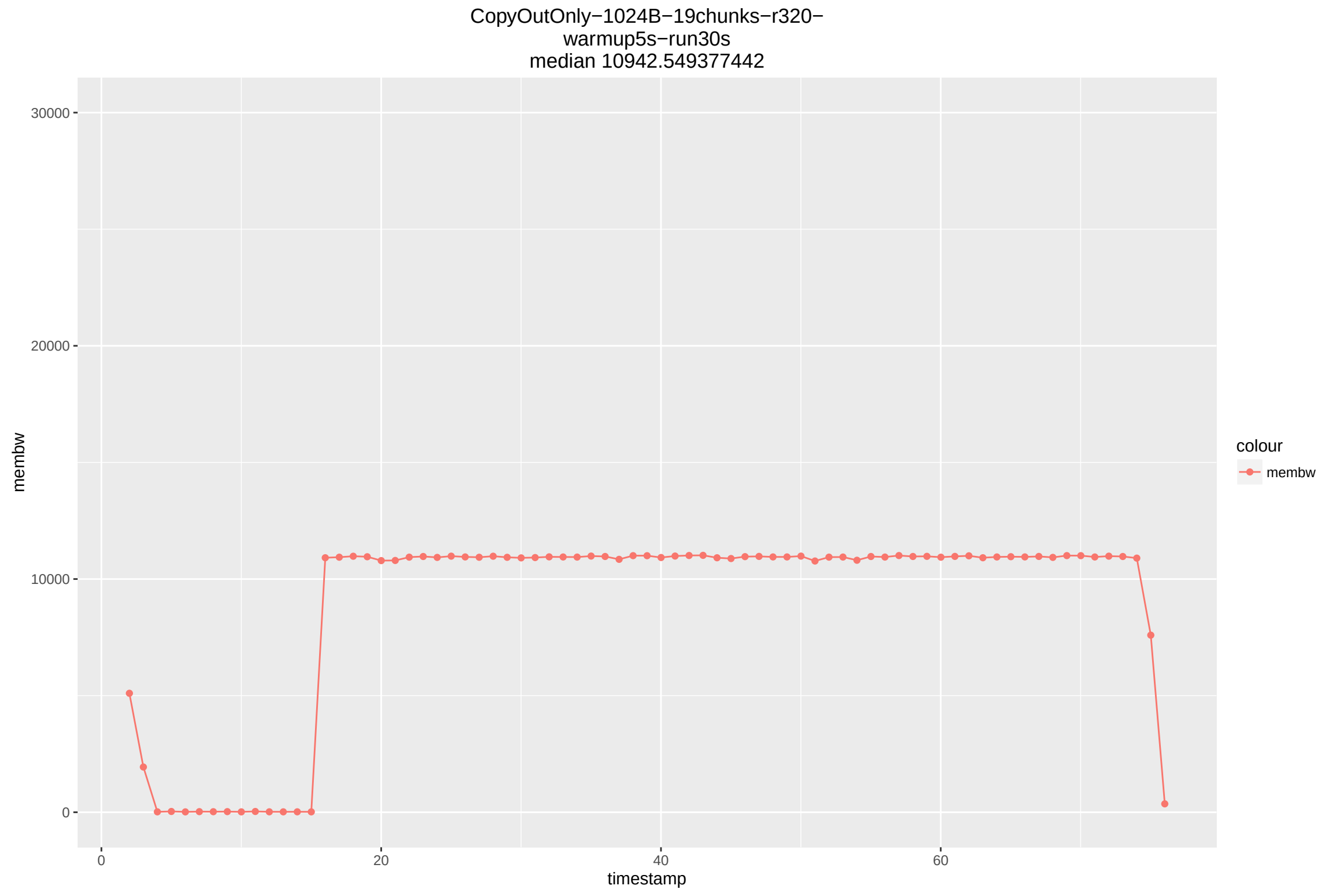

ZeroCopyOnly−1024B−18chunks−r320
warmup5s−run30s
median 5948.260223389
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

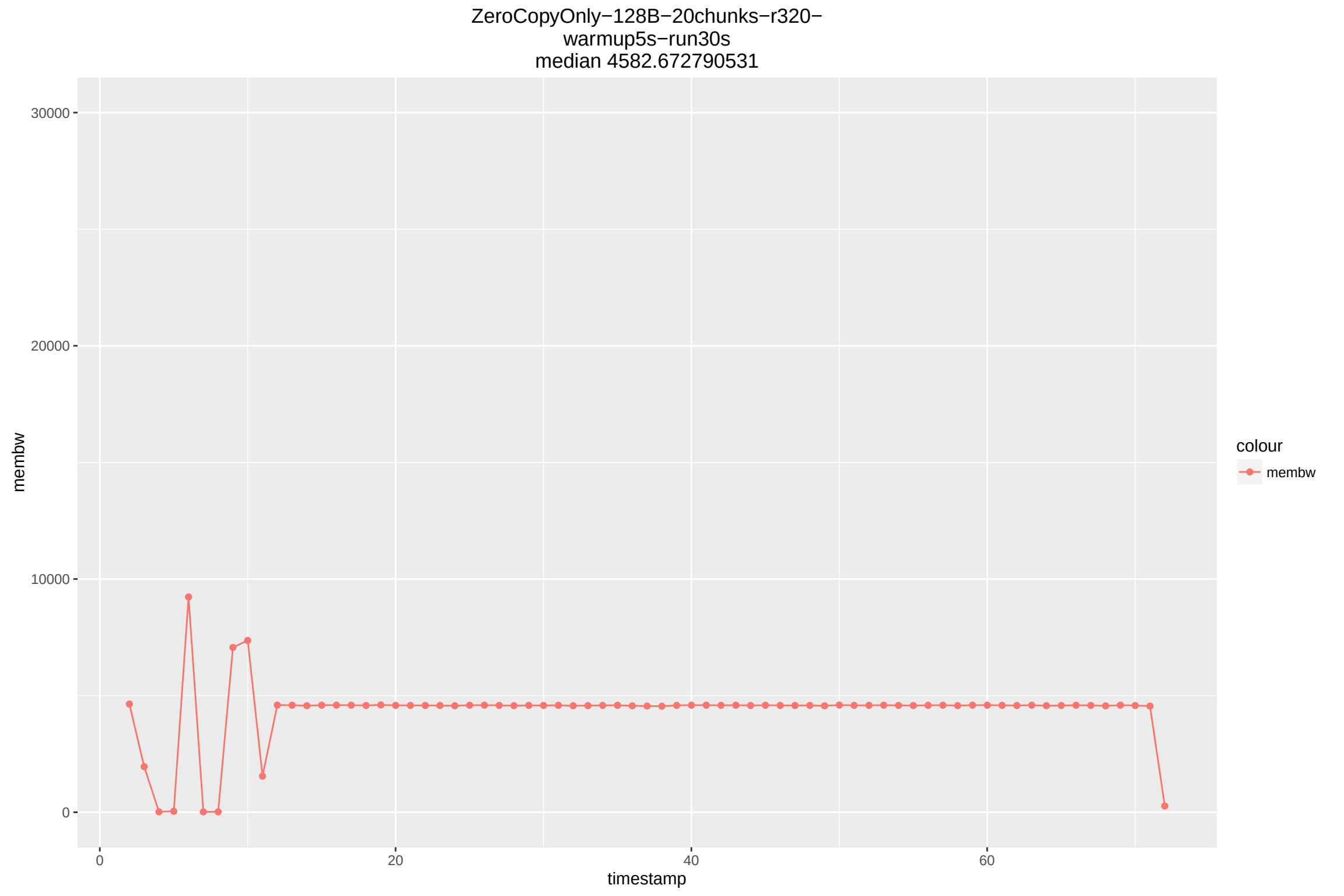

CopyOutOnly−1024B−18chunks−r320−
warmup5s−run30s
median 10919.474853519
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

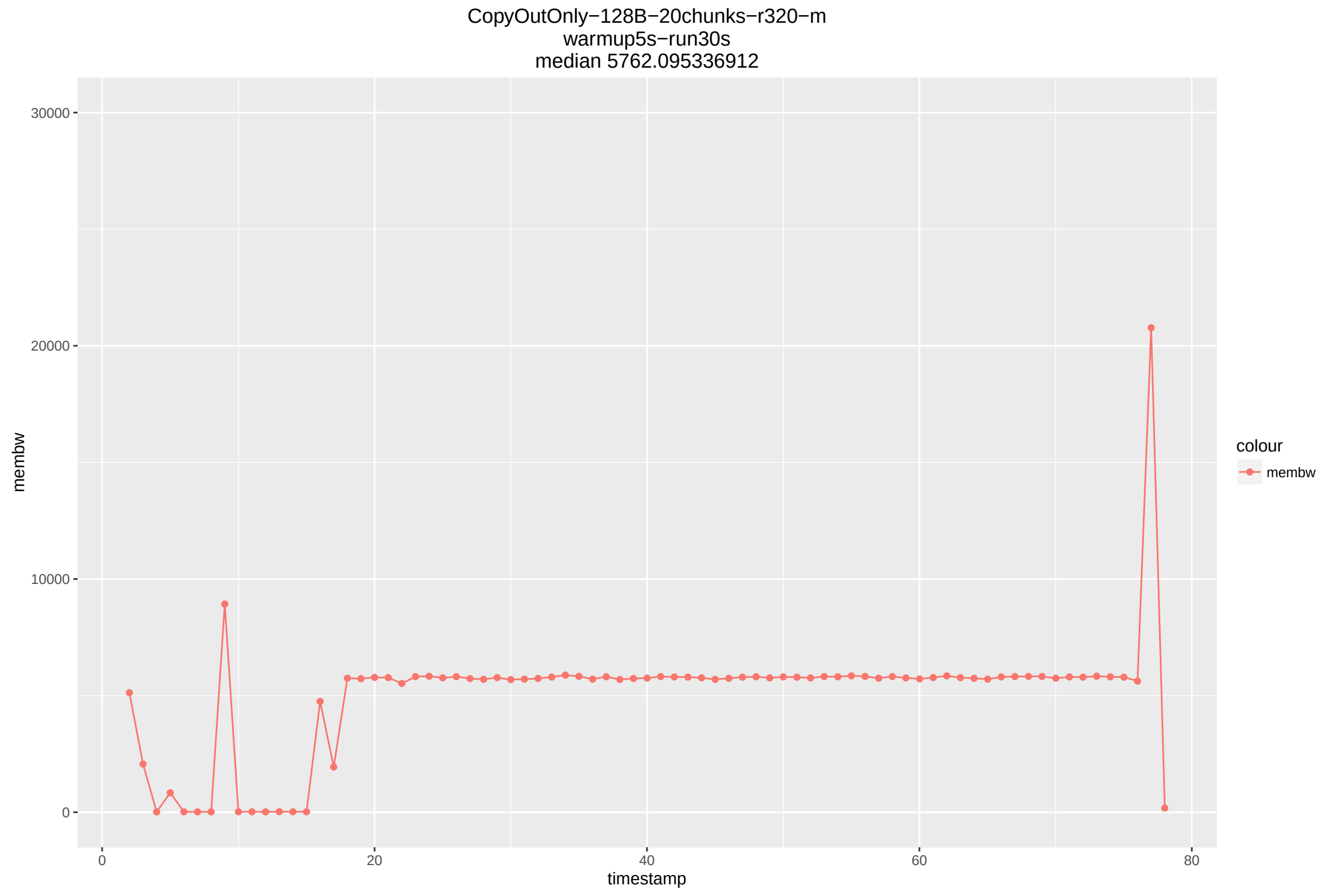

ZeroCopyOnly−128B−19chunks−r320−
warmup5s−run30s
median 4512.679138183
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

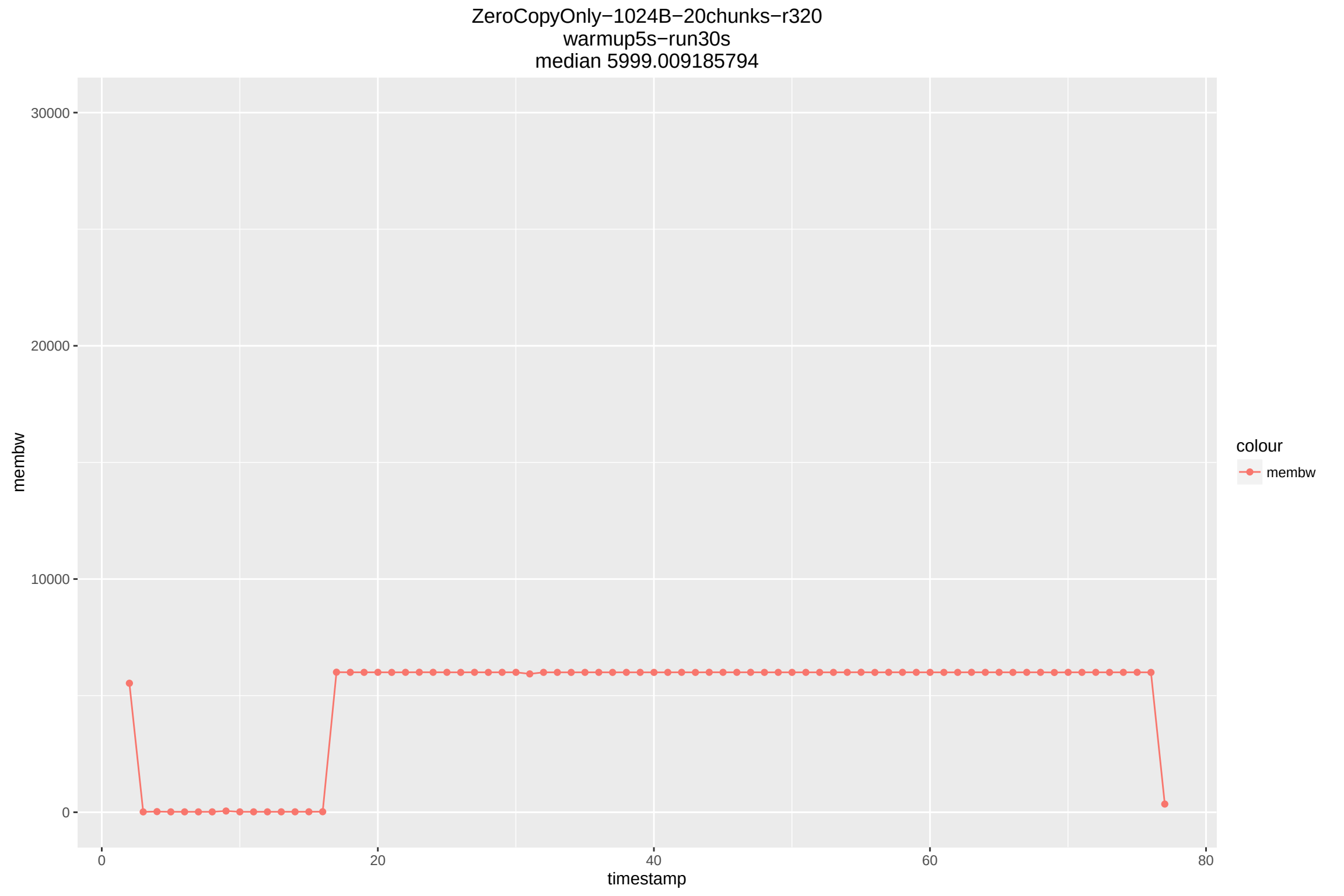

CopyOutOnly−128B−19chunks−r320−m
warmup5s−run30s
median 5582.833953855
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

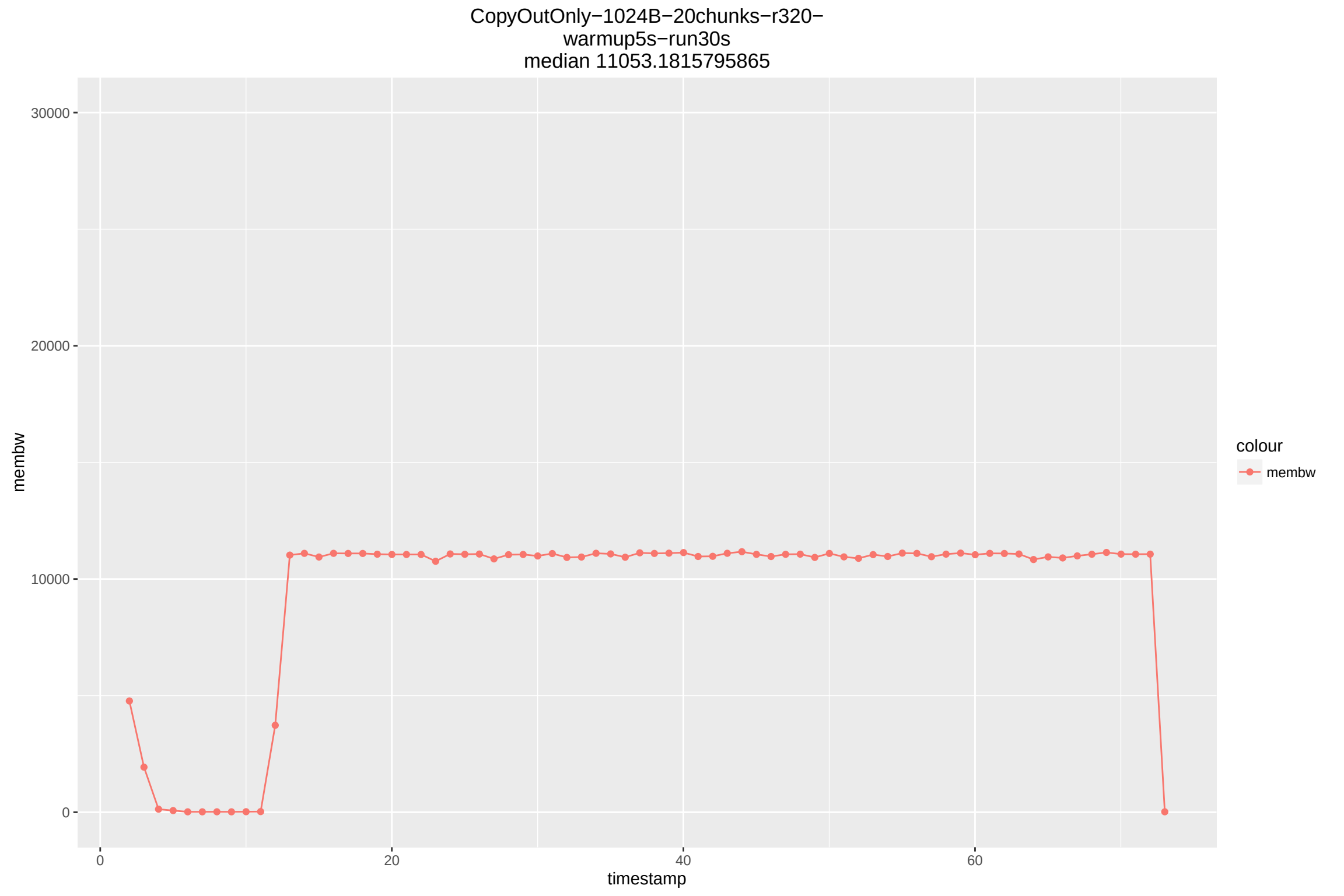

ZeroCopyOnly−1024B−19chunks−r320
warmup5s−run30s
median 5976.280395513
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

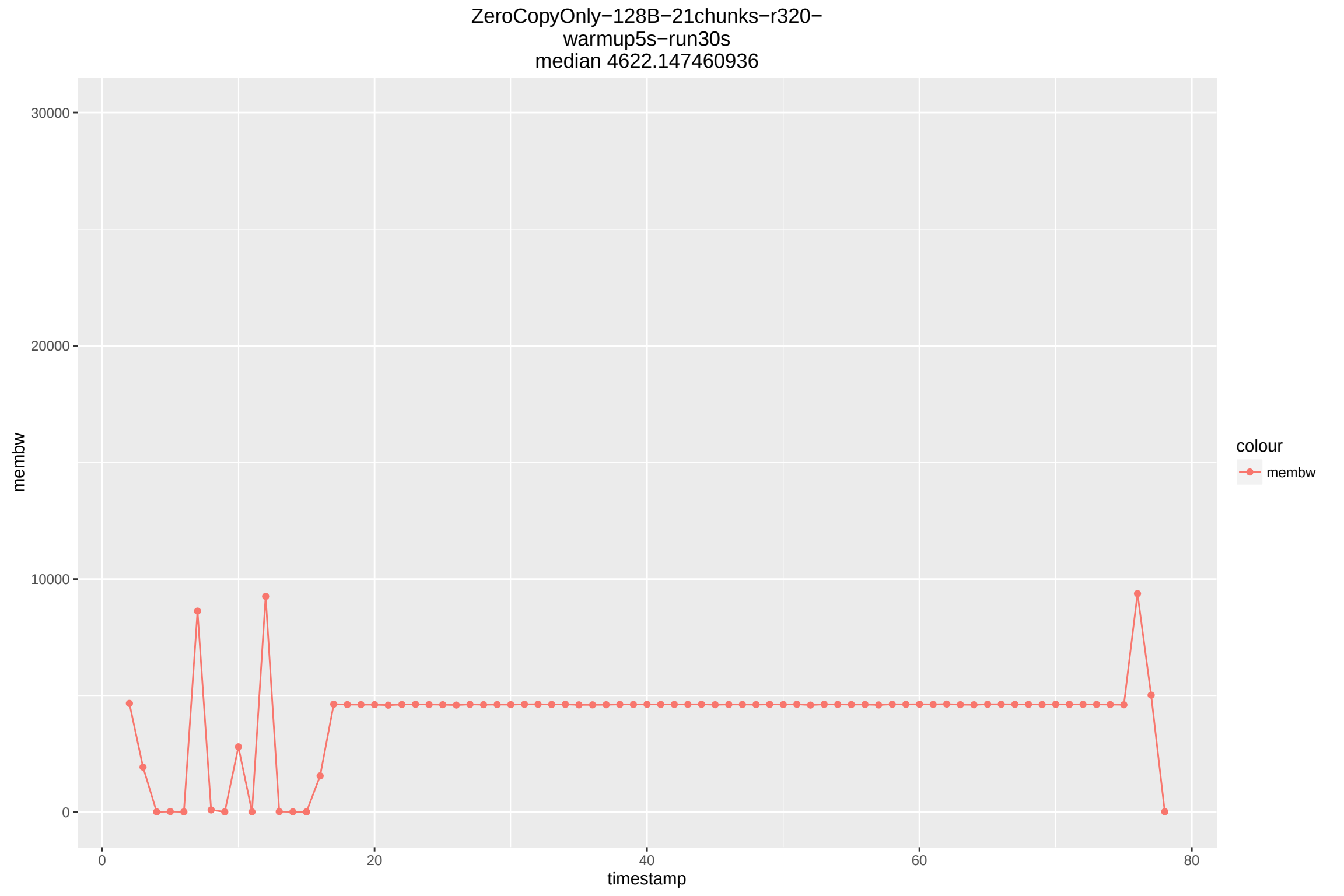

CopyOutOnly−1024B−19chunks−r320−
warmup5s−run30s
median 10942.549377442
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

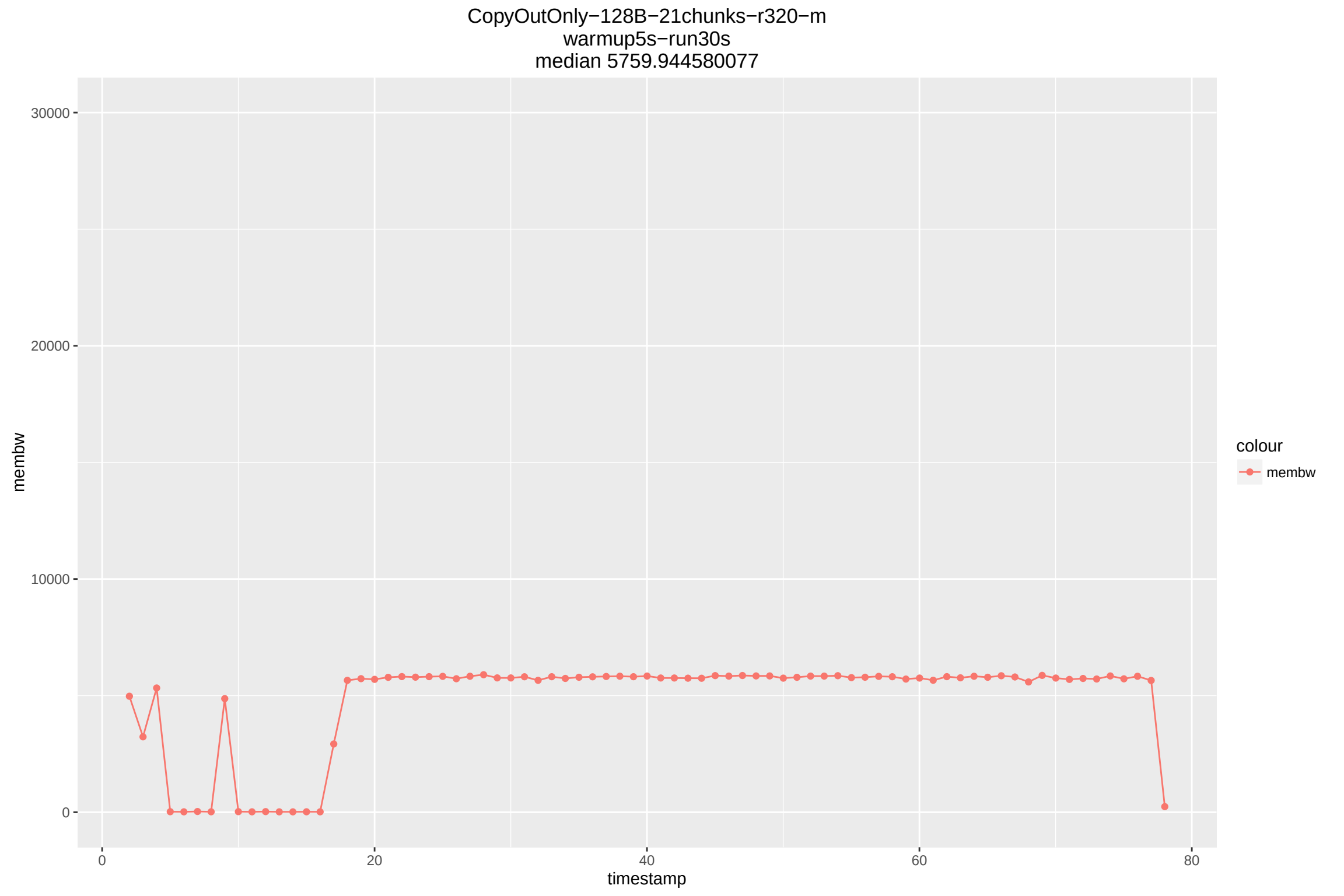

ZeroCopyOnly−128B−20chunks−r320−
warmup5s−run30s
median 4582.672790531
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

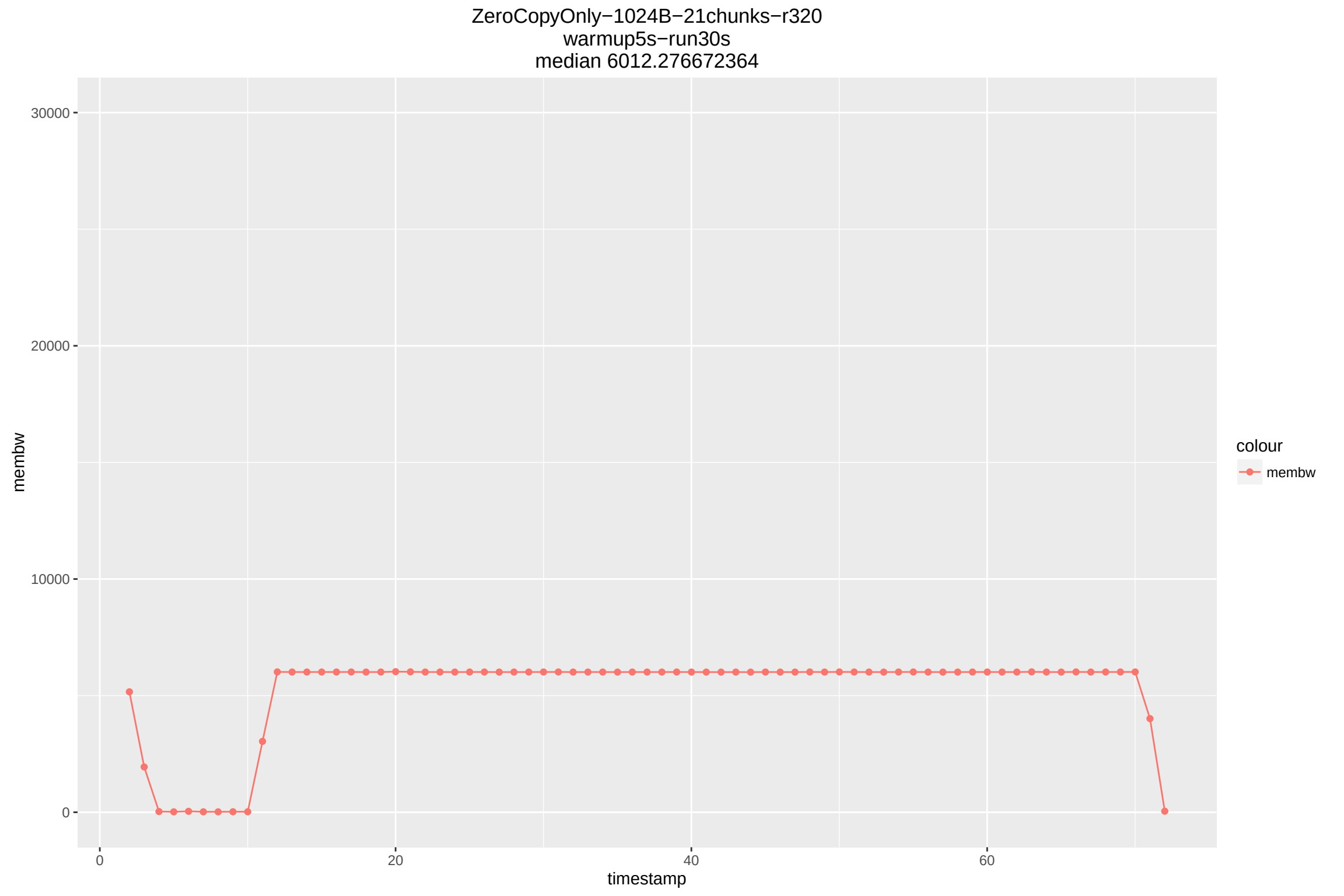

CopyOutOnly−128B−20chunks−r320−m
warmup5s−run30s
median 5762.095336912
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

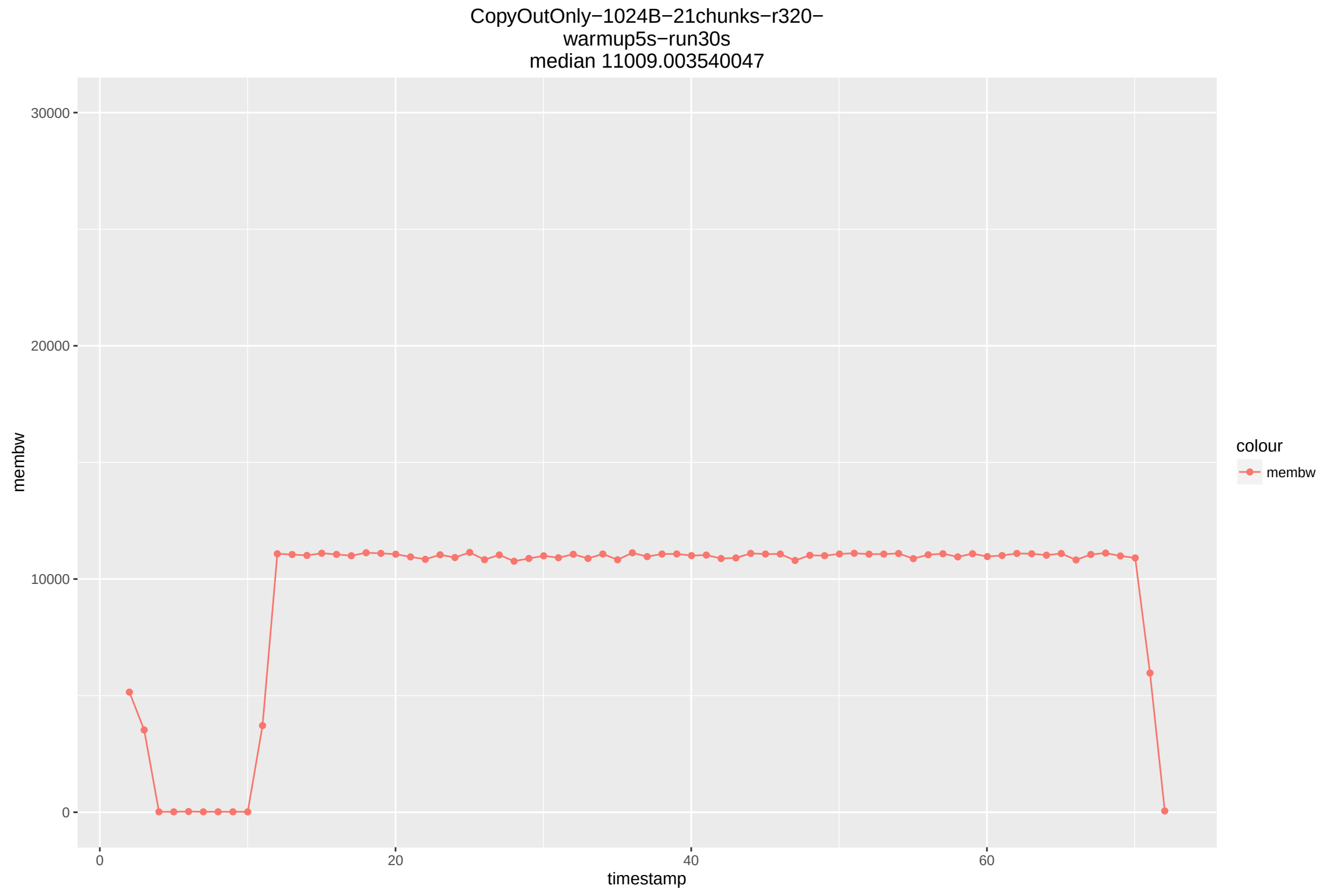

ZeroCopyOnly−1024B−20chunks−r320
warmup5s−run30s
median 5999.009185794
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

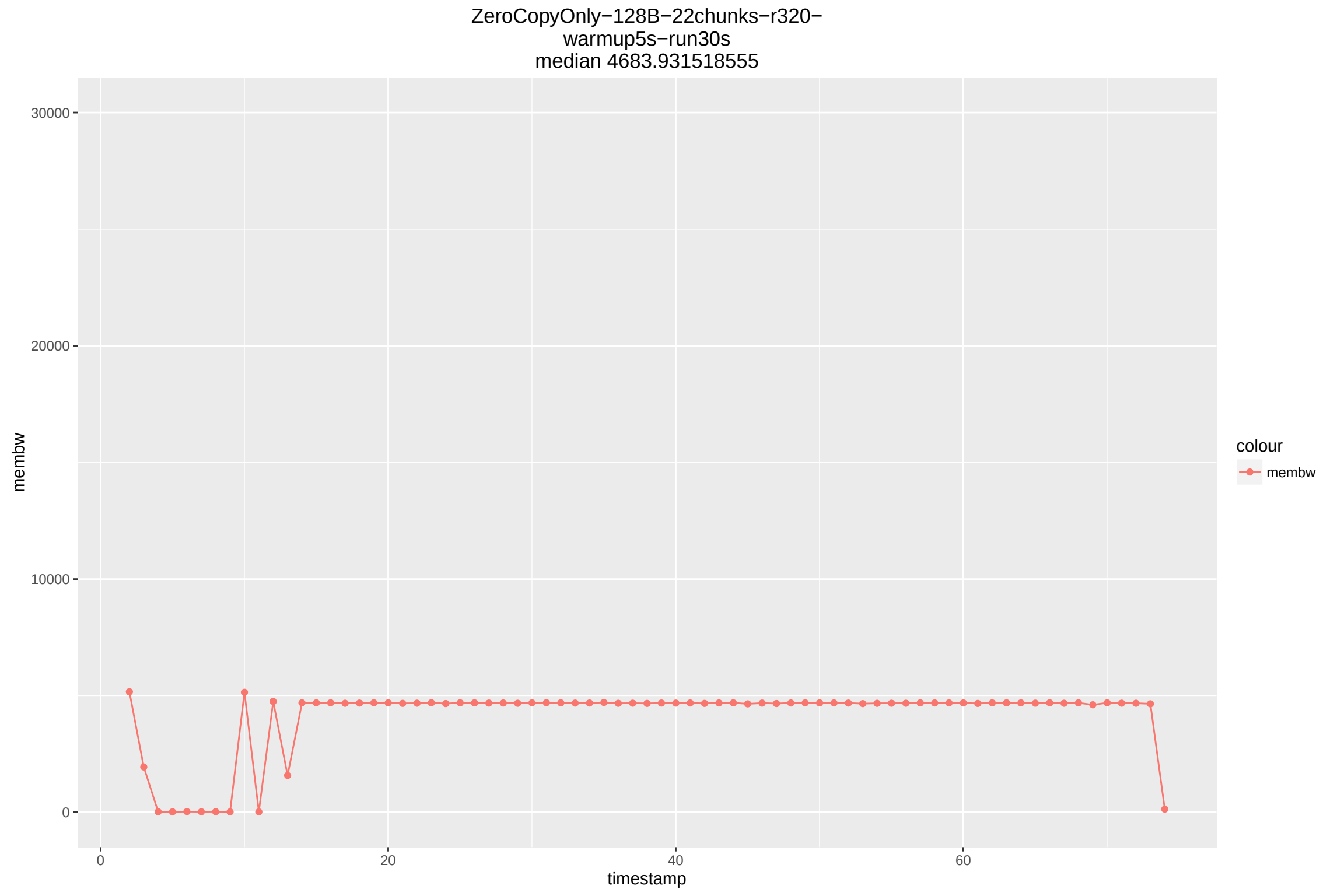

CopyOutOnly−1024B−20chunks−r320−
warmup5s−run30s
median 11053.1815795865
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

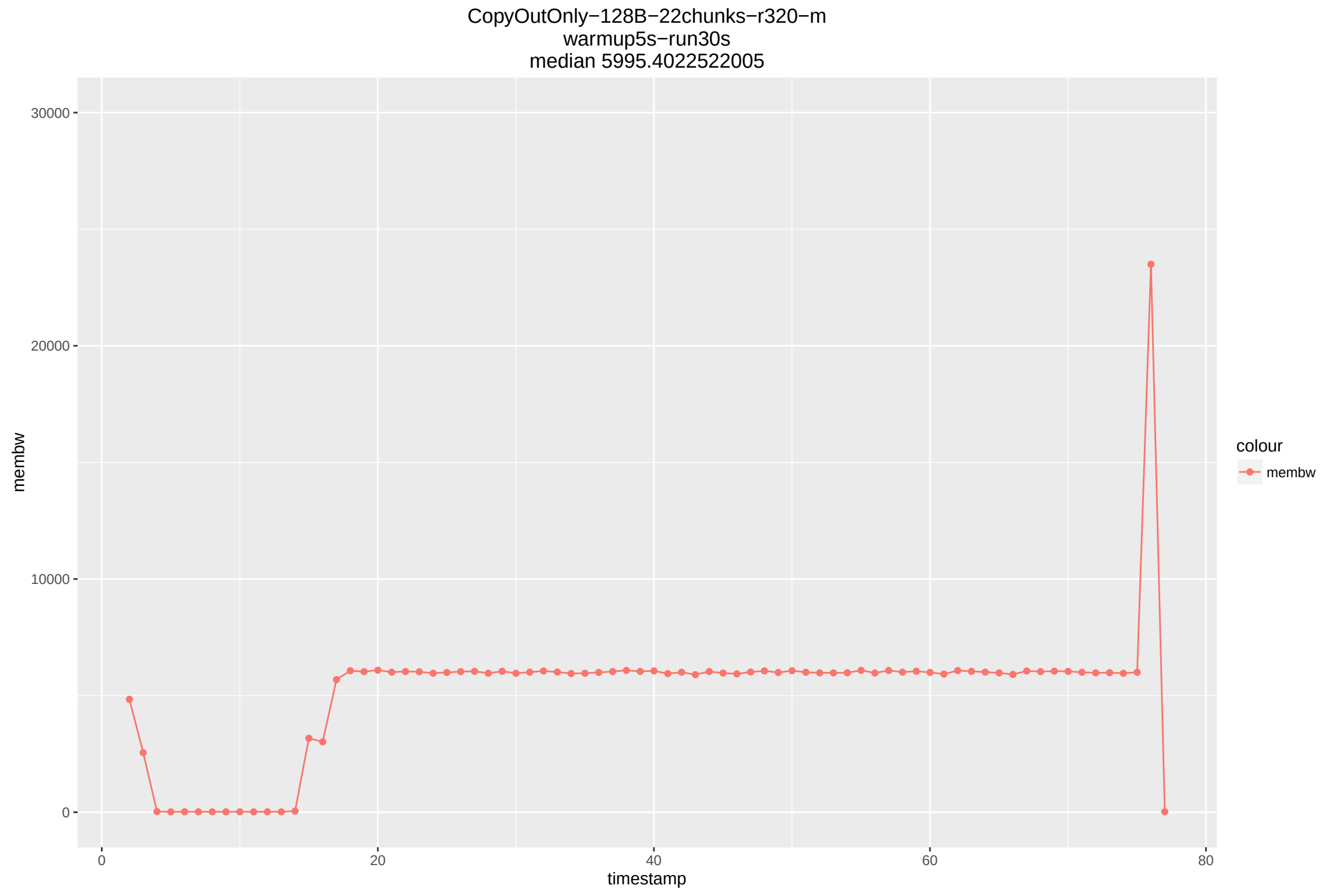

ZeroCopyOnly−128B−21chunks−r320−
warmup5s−run30s
median 4622.147460936
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

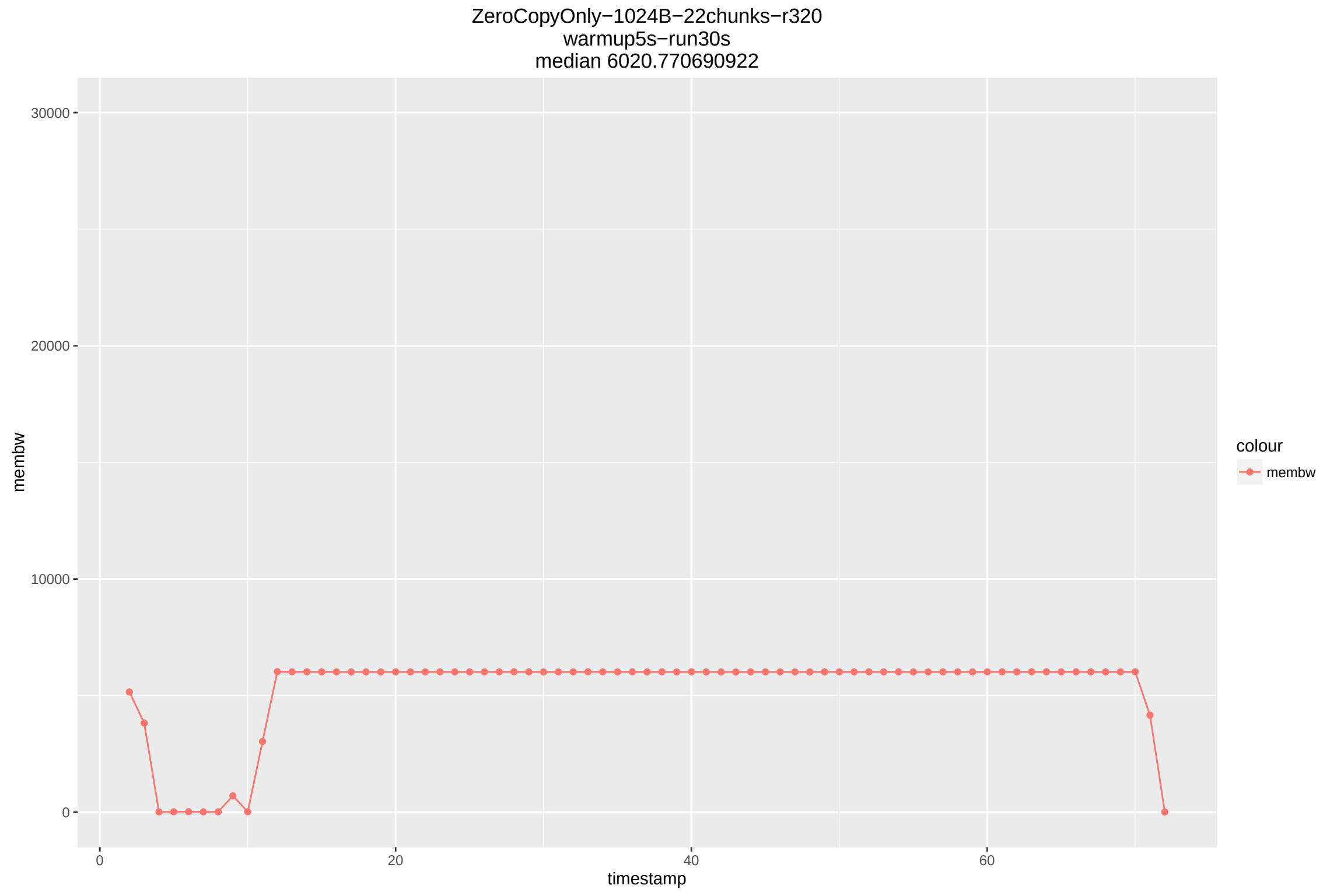

CopyOutOnly−128B−21chunks−r320−m
warmup5s−run30s
median 5759.944580077
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

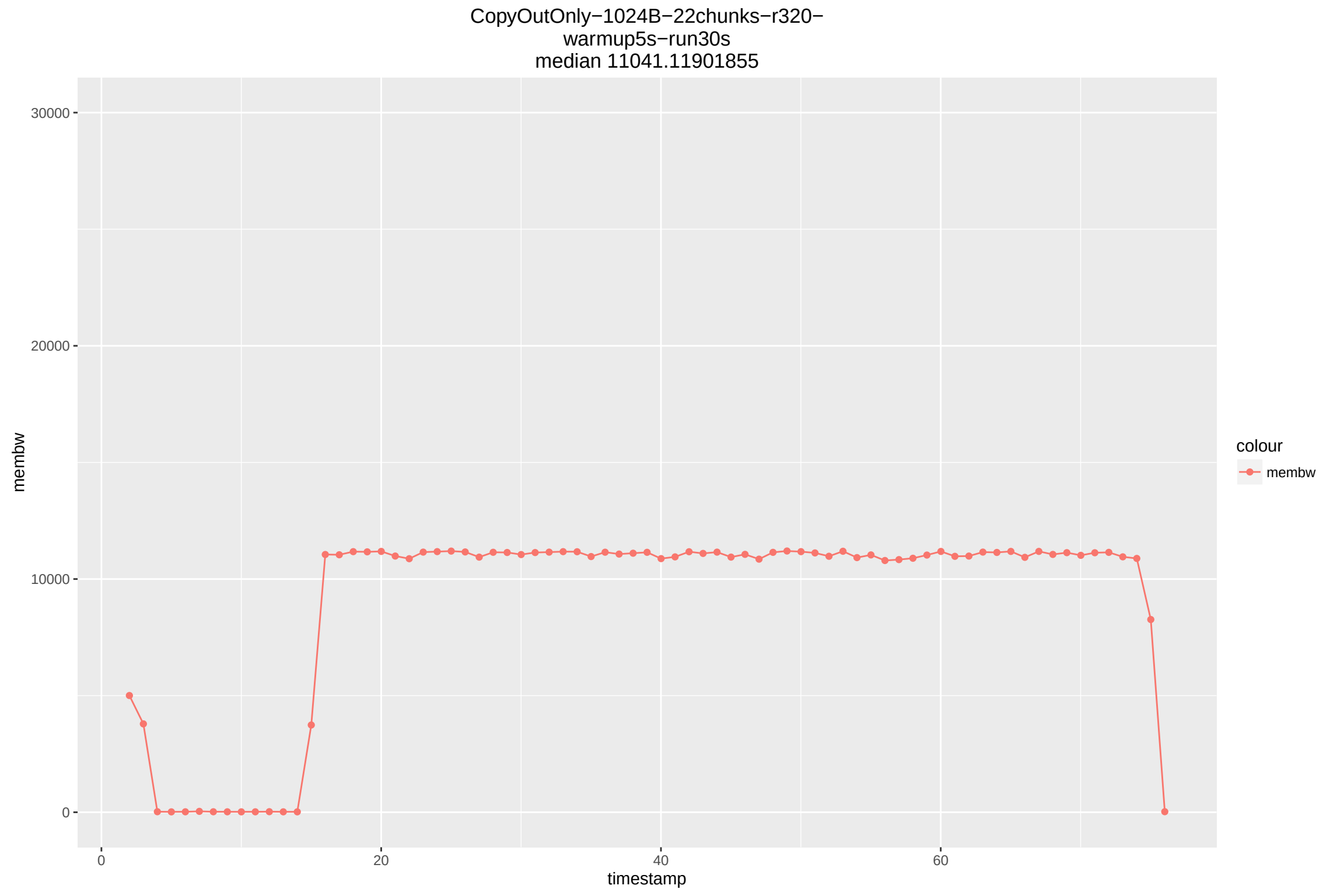

ZeroCopyOnly−1024B−21chunks−r320
warmup5s−run30s
median 6012.276672364
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

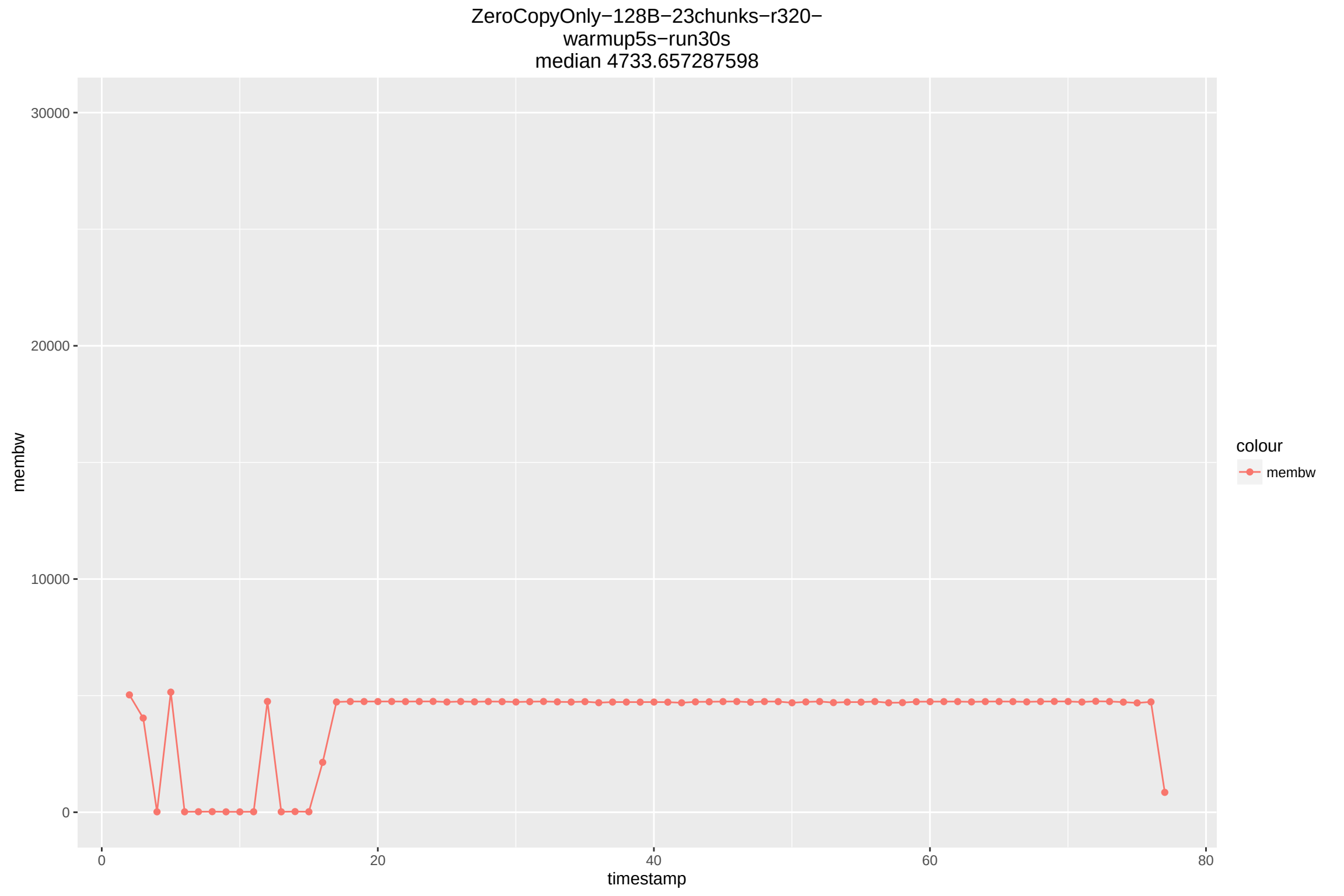

CopyOutOnly−1024B−21chunks−r320−
warmup5s−run30s
median 11009.003540047
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

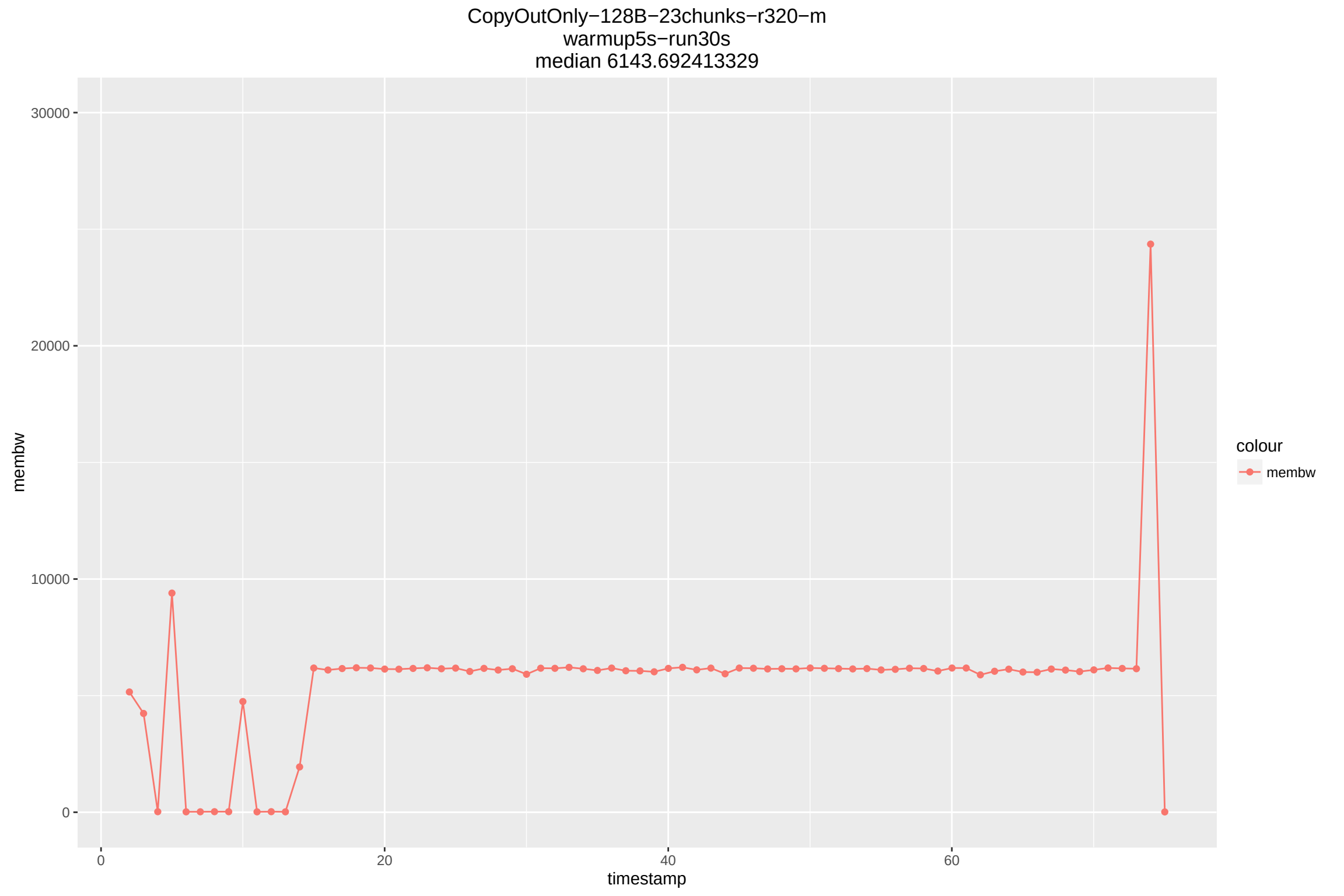

ZeroCopyOnly−128B−22chunks−r320−
warmup5s−run30s
median 4683.931518555
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

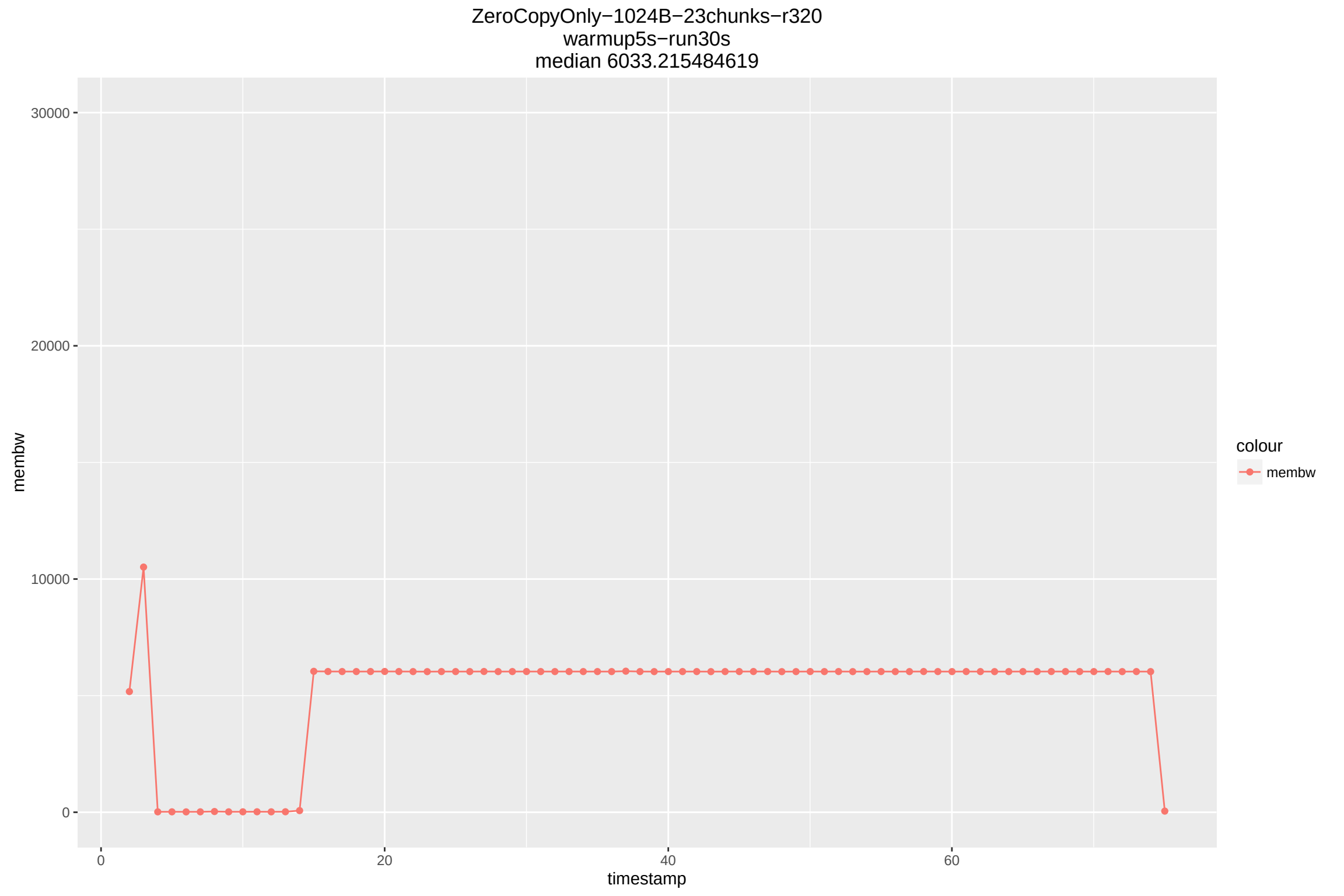

CopyOutOnly−128B−22chunks−r320−m
warmup5s−run30s
median 5995.4022522005
membw
30000
20000
10000
0
0
20
40
60
80
timestamp
colour
membw

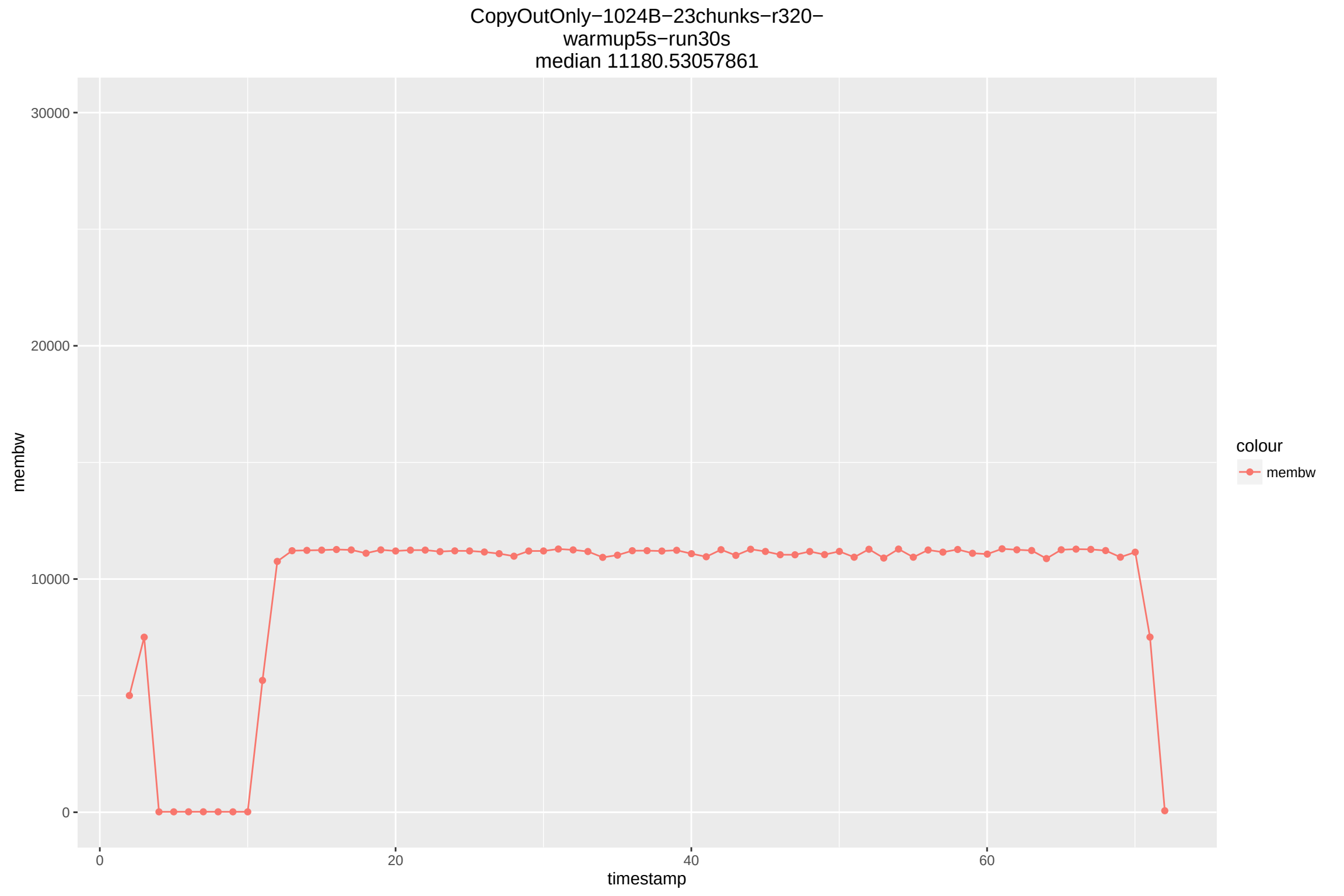

ZeroCopyOnly−1024B−22chunks−r320
warmup5s−run30s
median 6020.770690922
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

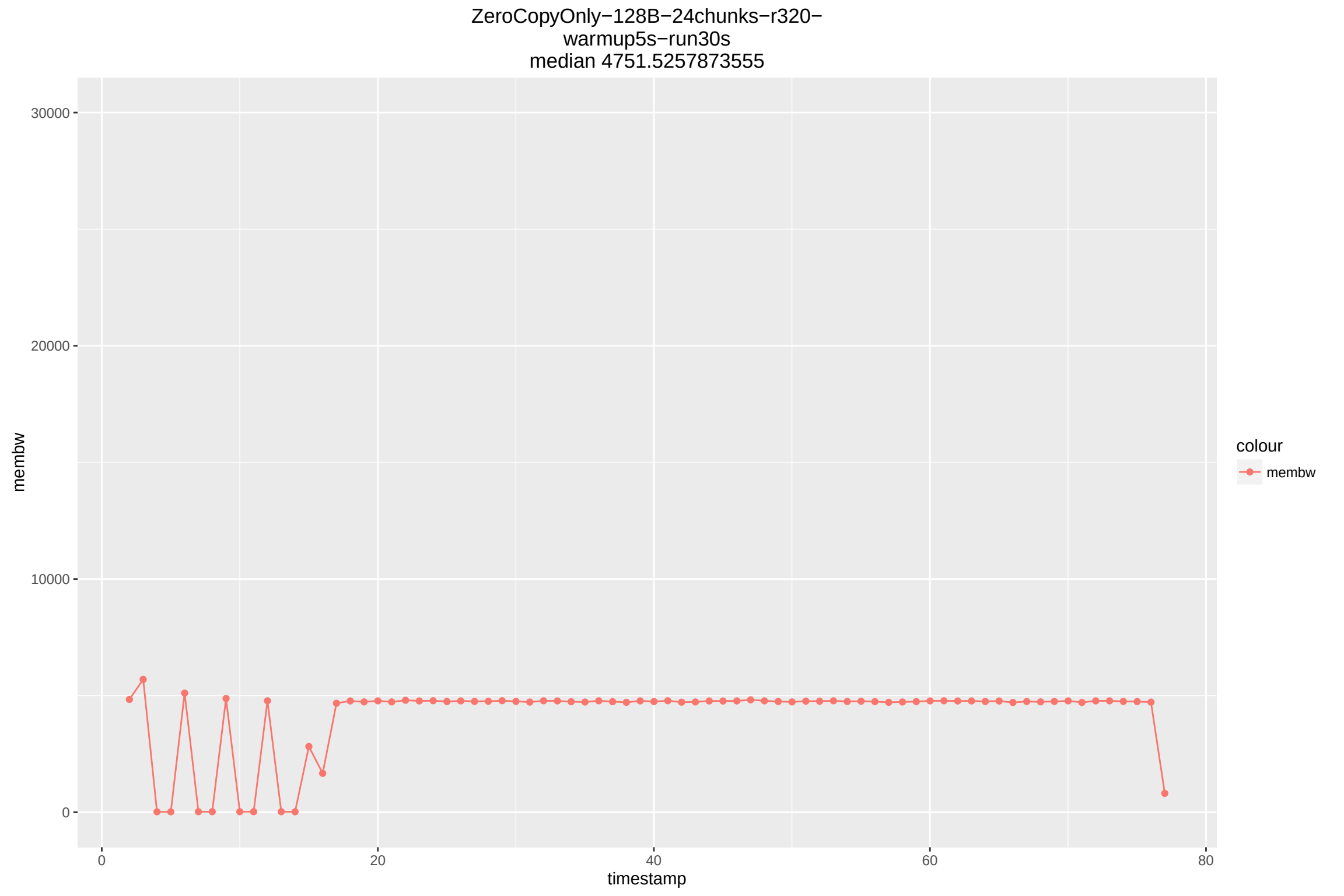

CopyOutOnly−1024B−22chunks−r320−
warmup5s−run30s
median 11041.11901855
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

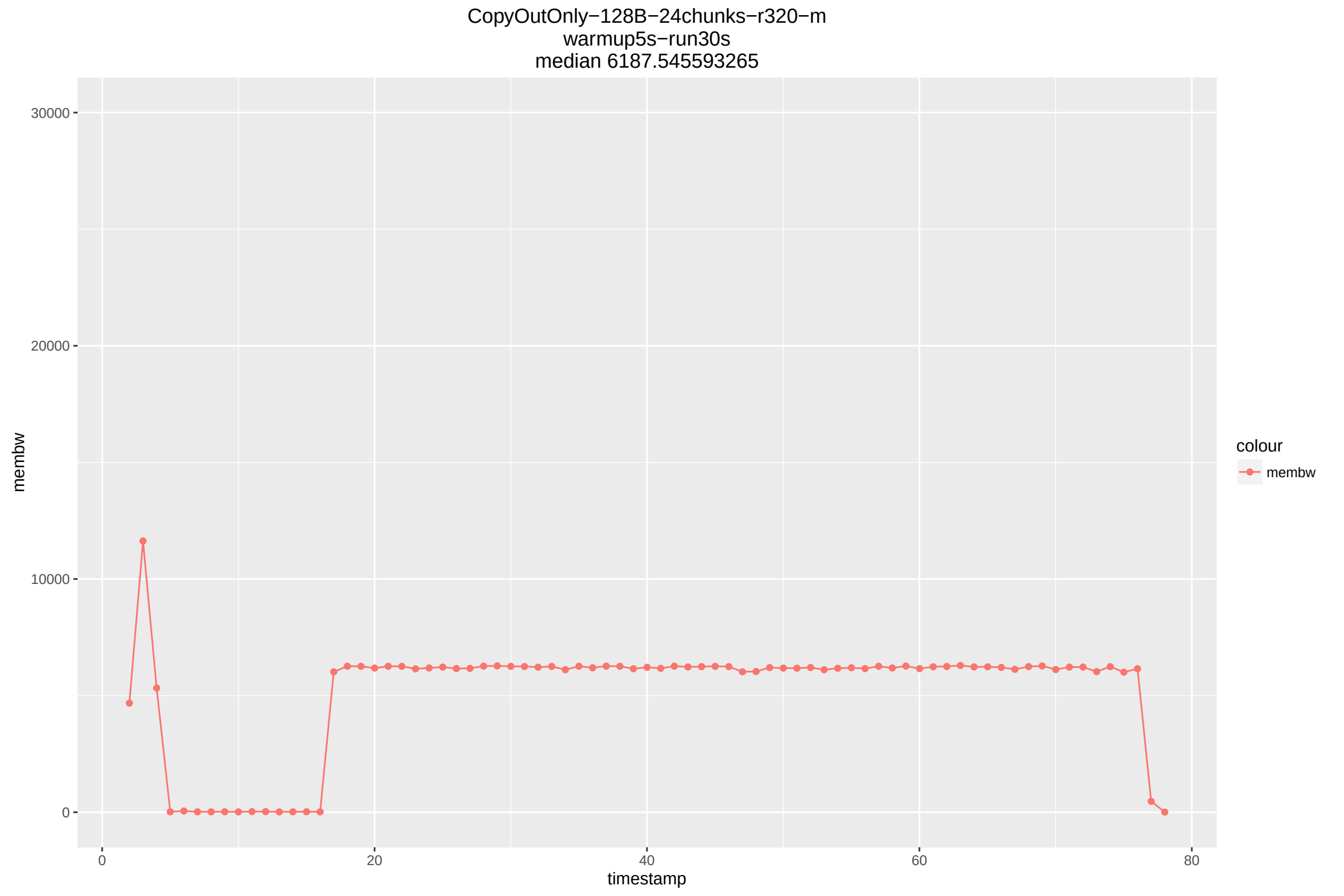

ZeroCopyOnly−128B−23chunks−r320−
warmup5s−run30s
median 4733.657287598
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

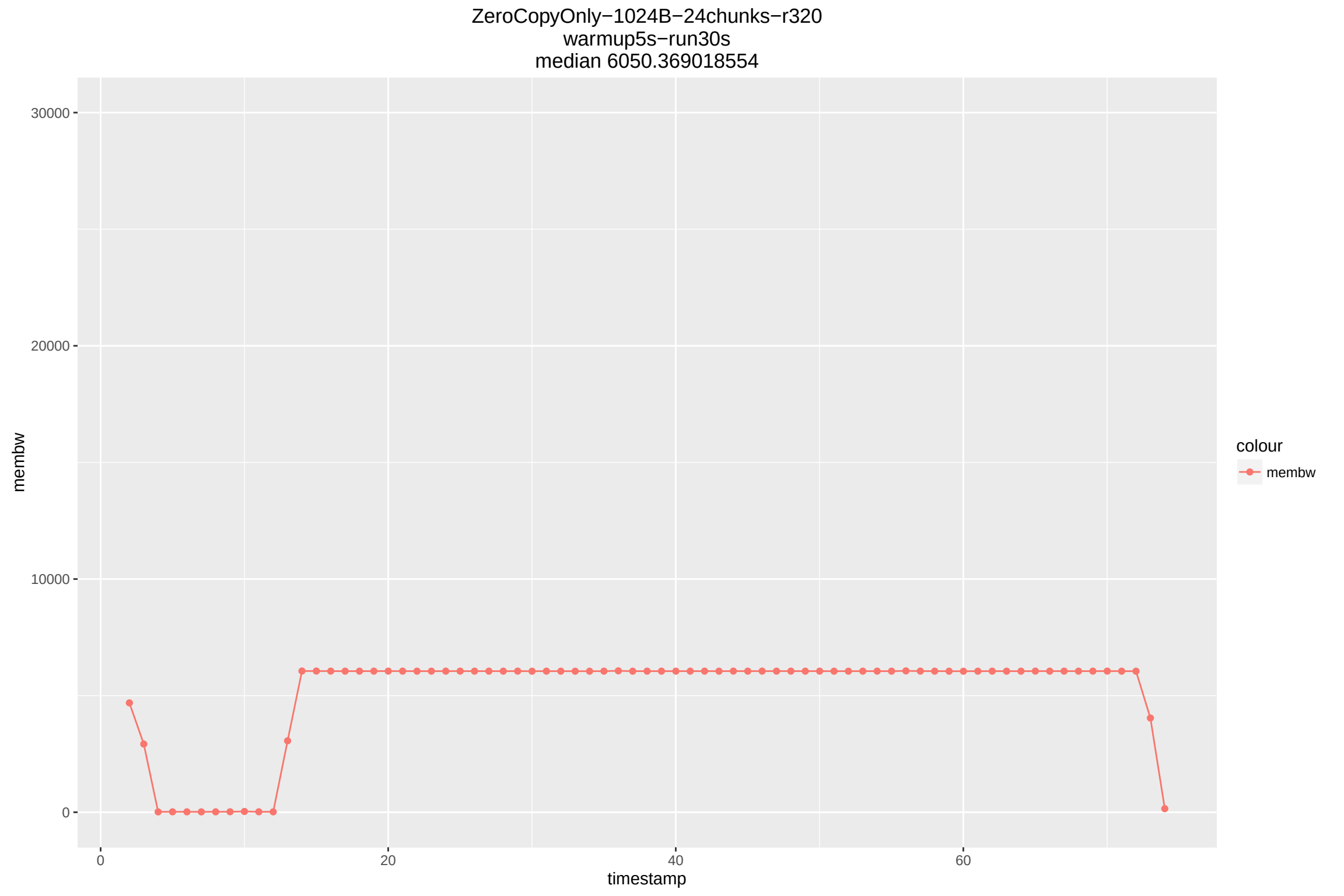

CopyOutOnly−128B−23chunks−r320−m
warmup5s−run30s
median 6143.692413329
membw
30000
20000
10000
0
0
20
40
60
timestamp
colour
membw

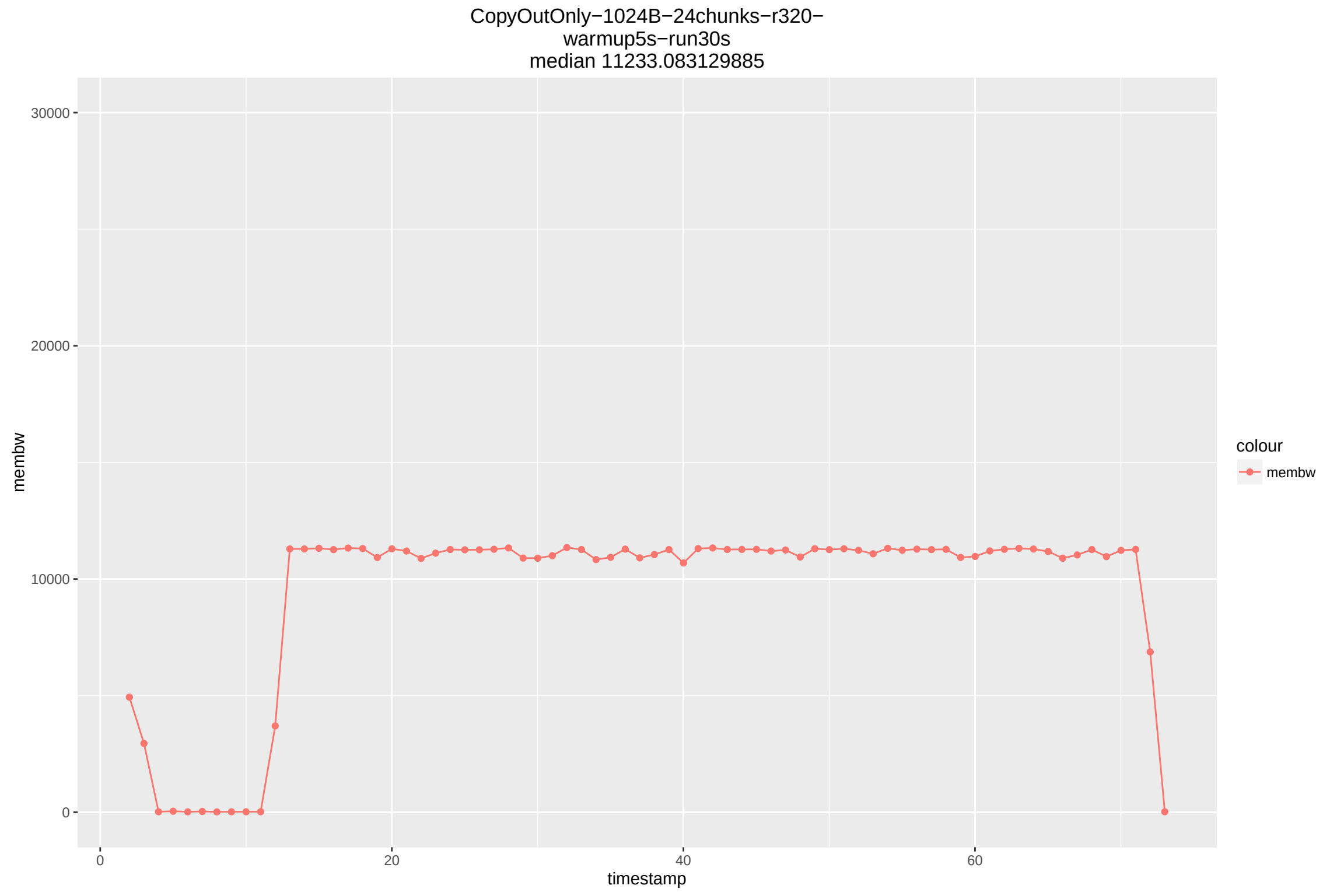

ZeroCopyOnly−1024B−23chunks−r320
warmup5s−run30s
median 6033.215484619
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

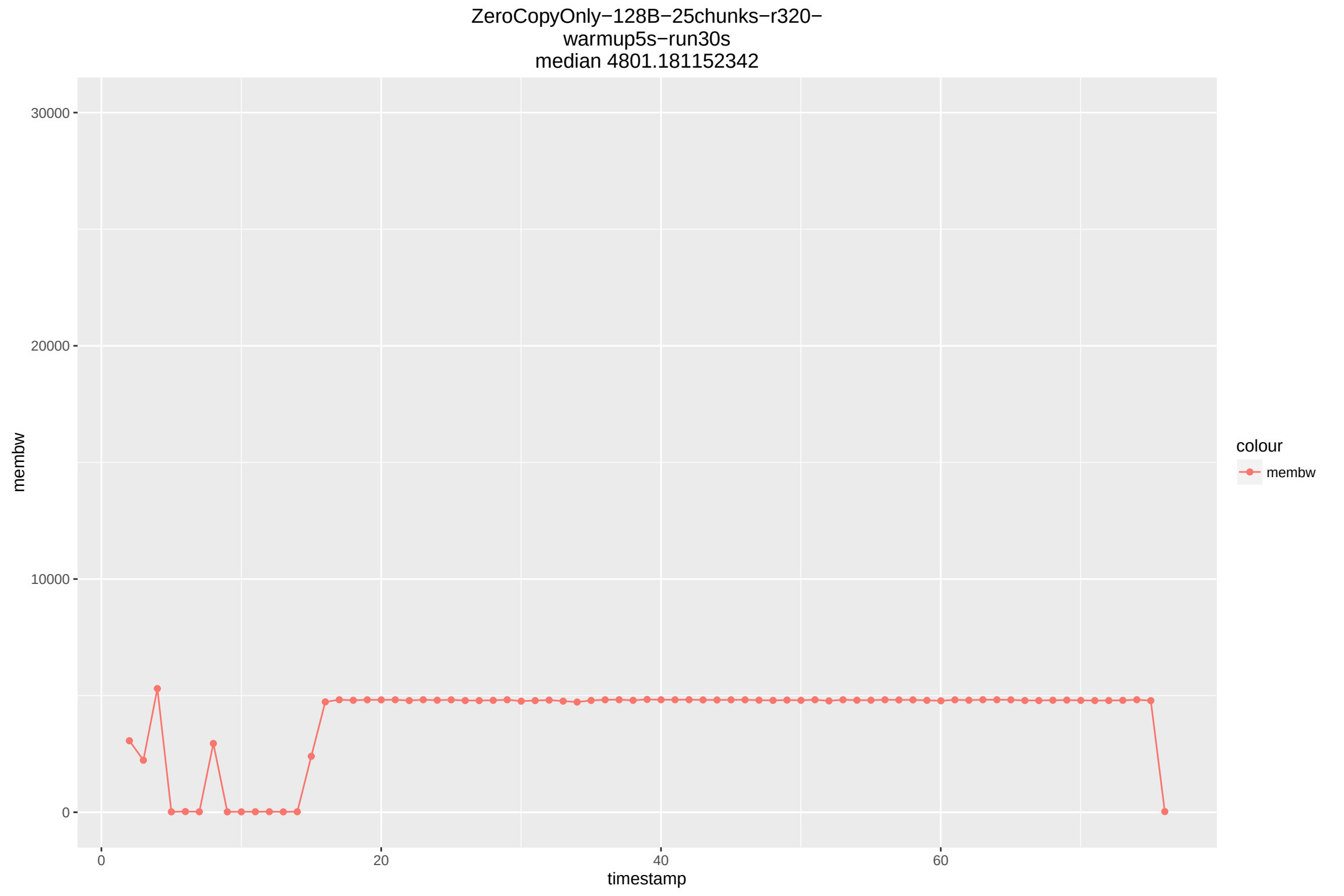

CopyOutOnly−1024B−23chunks−r320−
warmup5s−run30s
median 11180.53057861
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

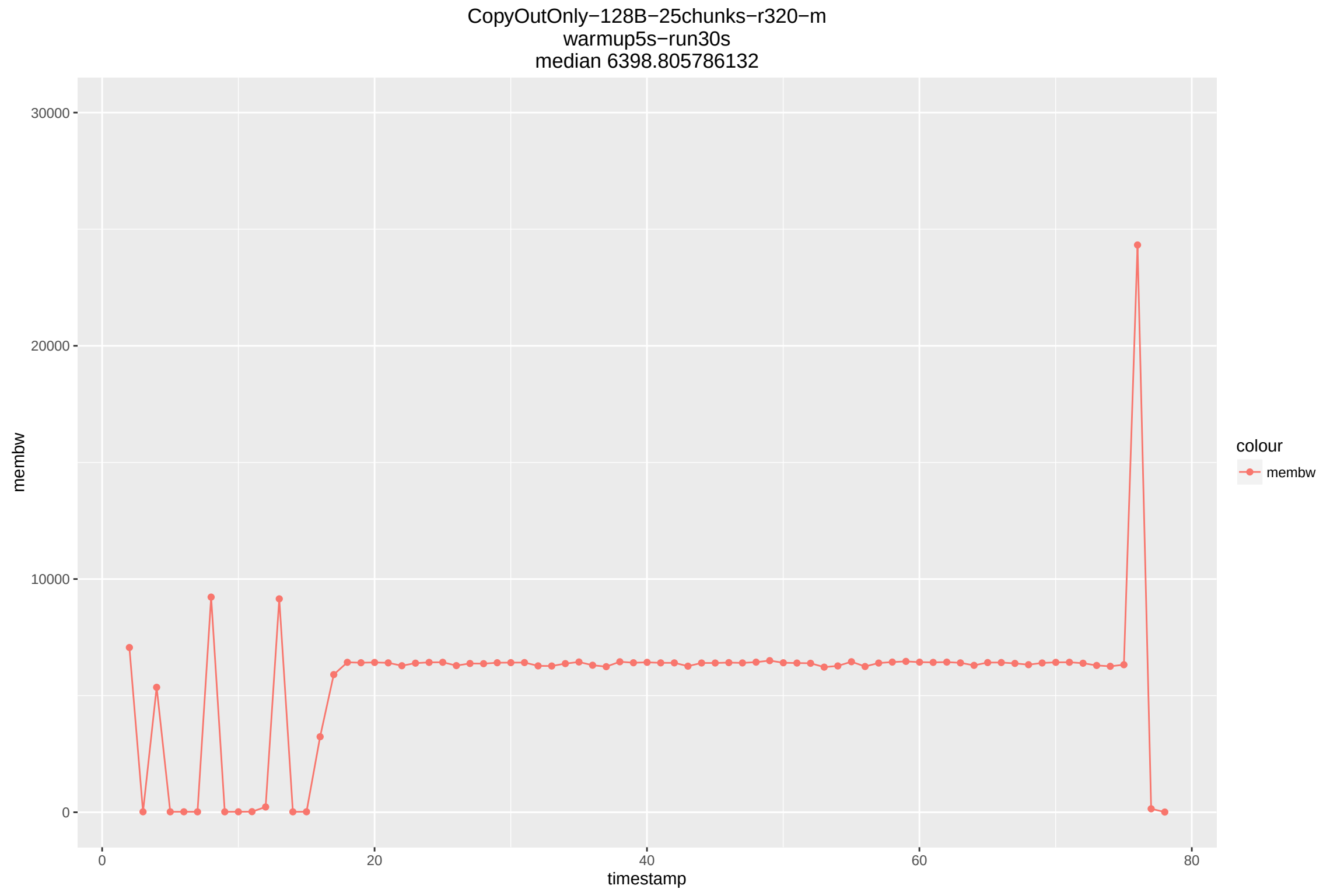

ZeroCopyOnly−128B−24chunks−r320−
warmup5s−run30s
median 4751.5257873555
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

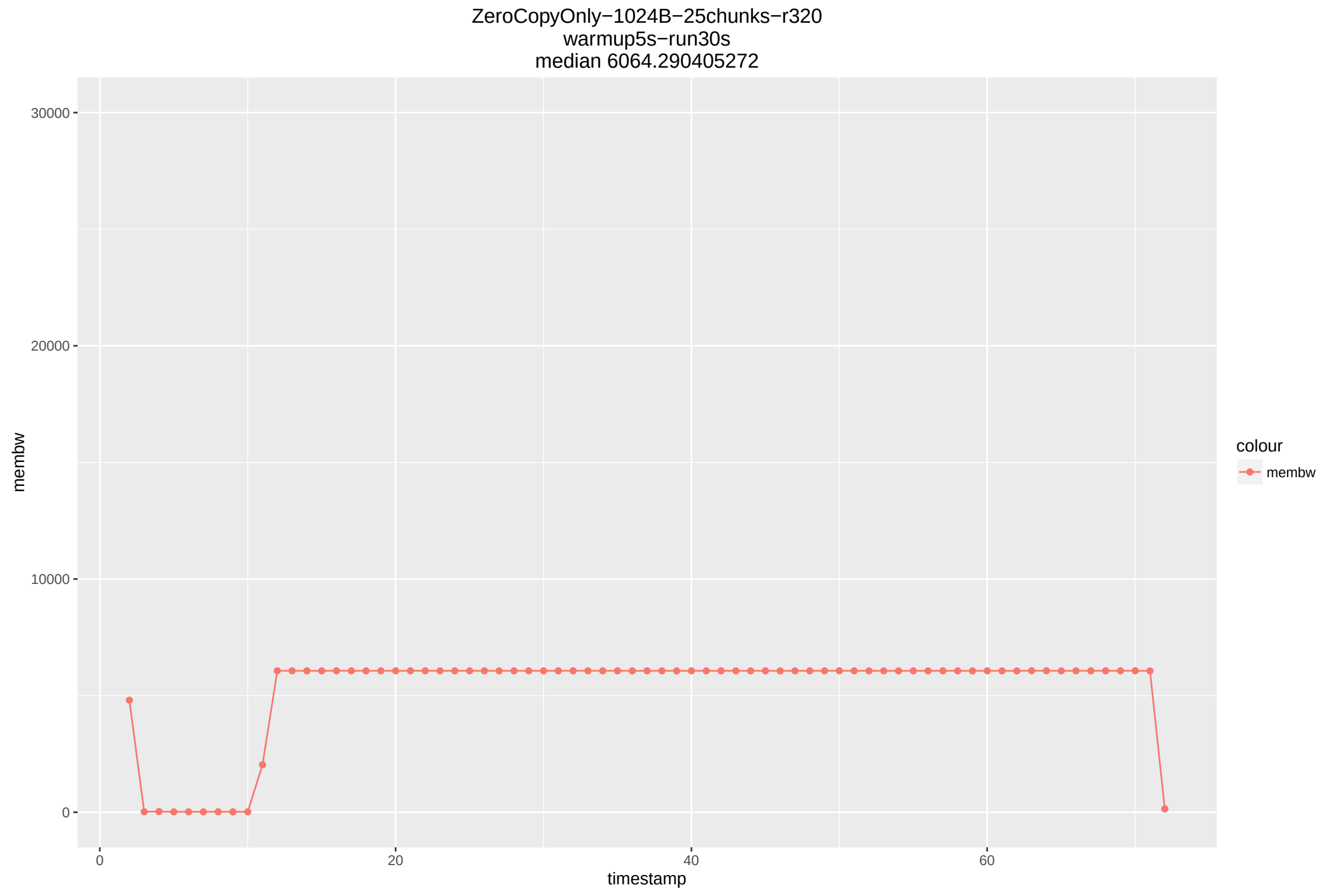

CopyOutOnly−128B−24chunks−r320−m
warmup5s−run30s
median 6187.545593265
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

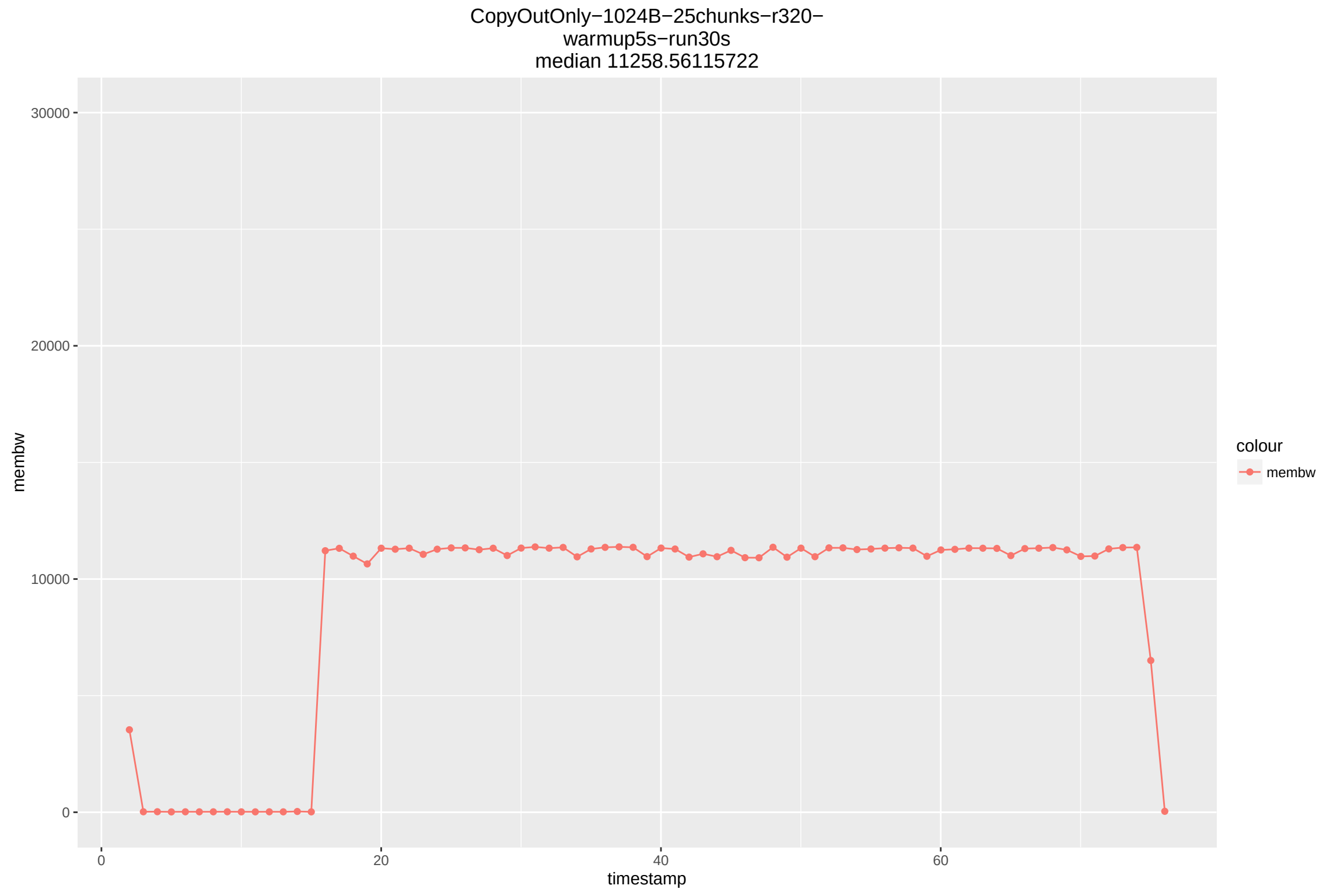

ZeroCopyOnly−1024B−24chunks−r320
warmup5s−run30s
median 6050.369018554
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

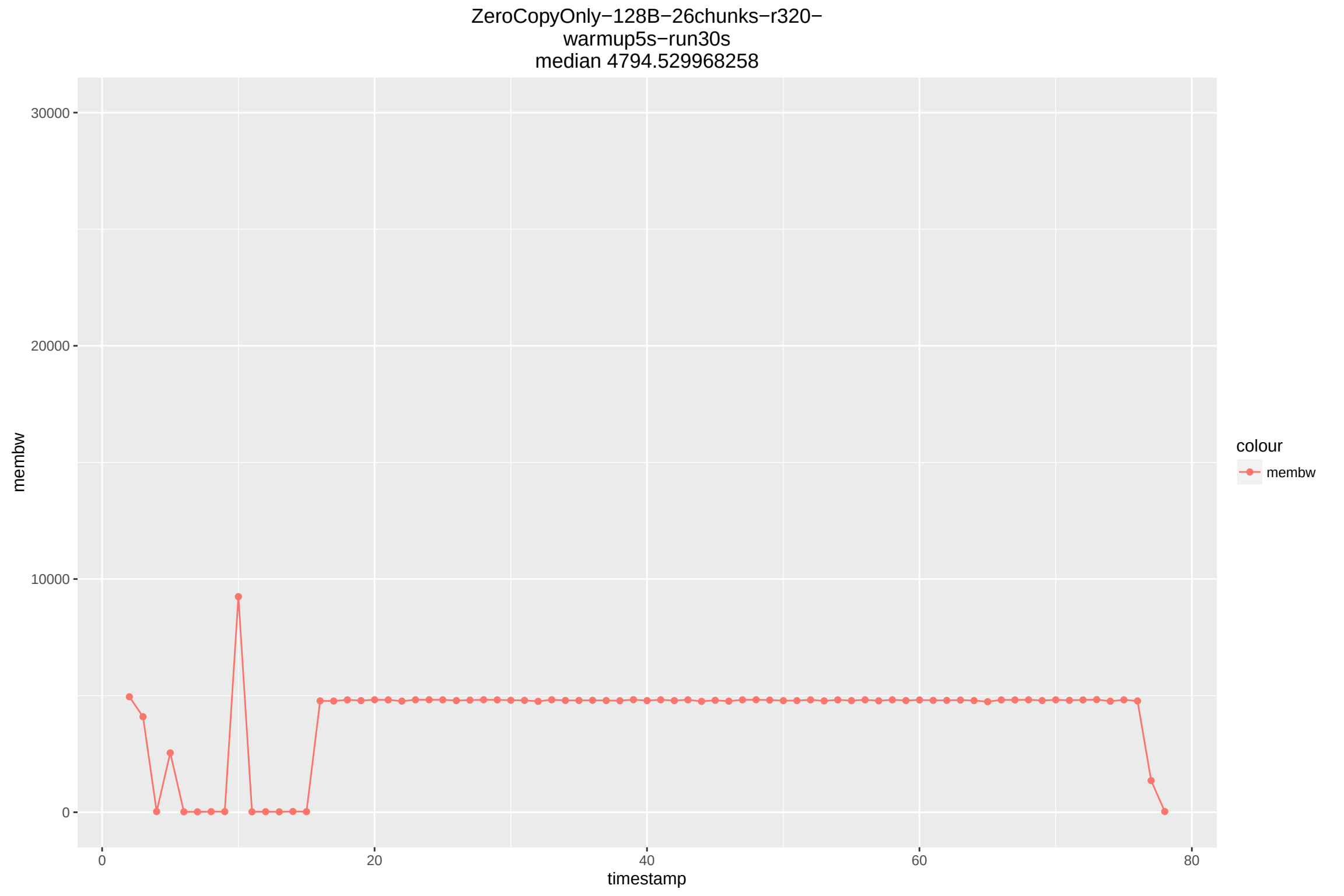

CopyOutOnly−1024B−24chunks−r320−
warmup5s−run30s
median 11233.083129885
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

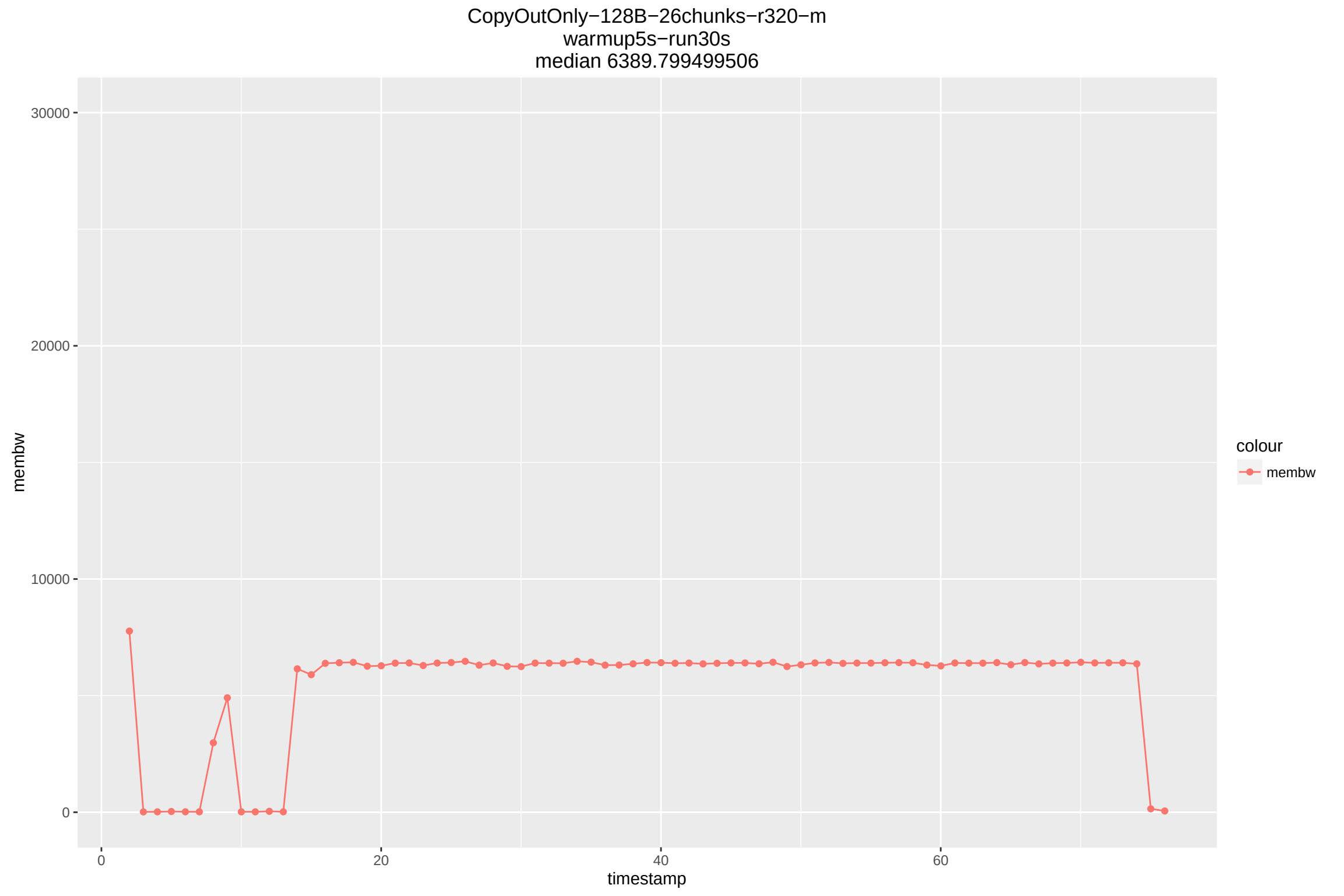

ZeroCopyOnly−128B−25chunks−r320−
warmup5s−run30s
median 4801.181152342
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

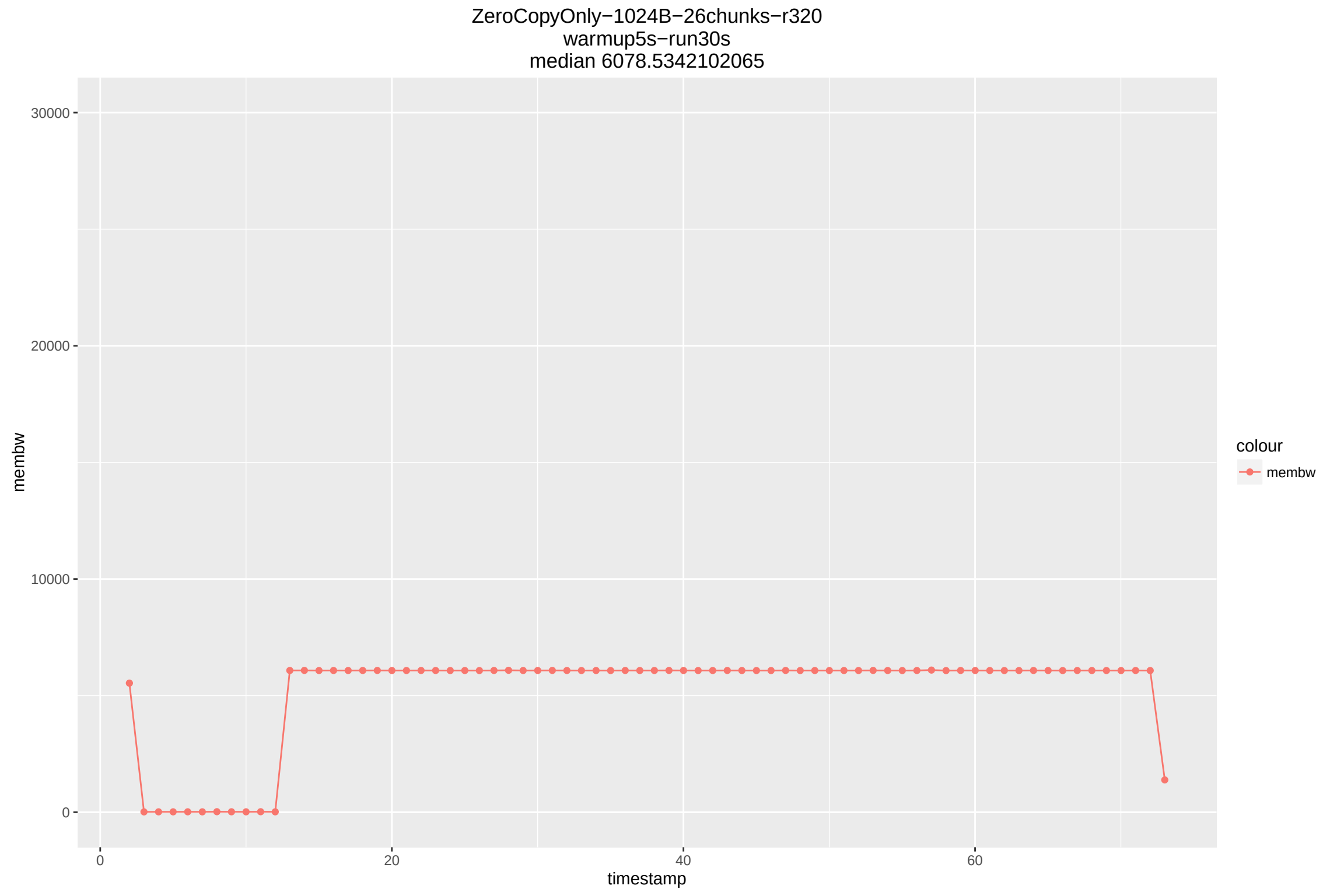

CopyOutOnly−128B−25chunks−r320−m
warmup5s−run30s
median 6398.805786132
membw
timestamp
0
10000
20000
30000
0
20
40
60
80
colour
membw

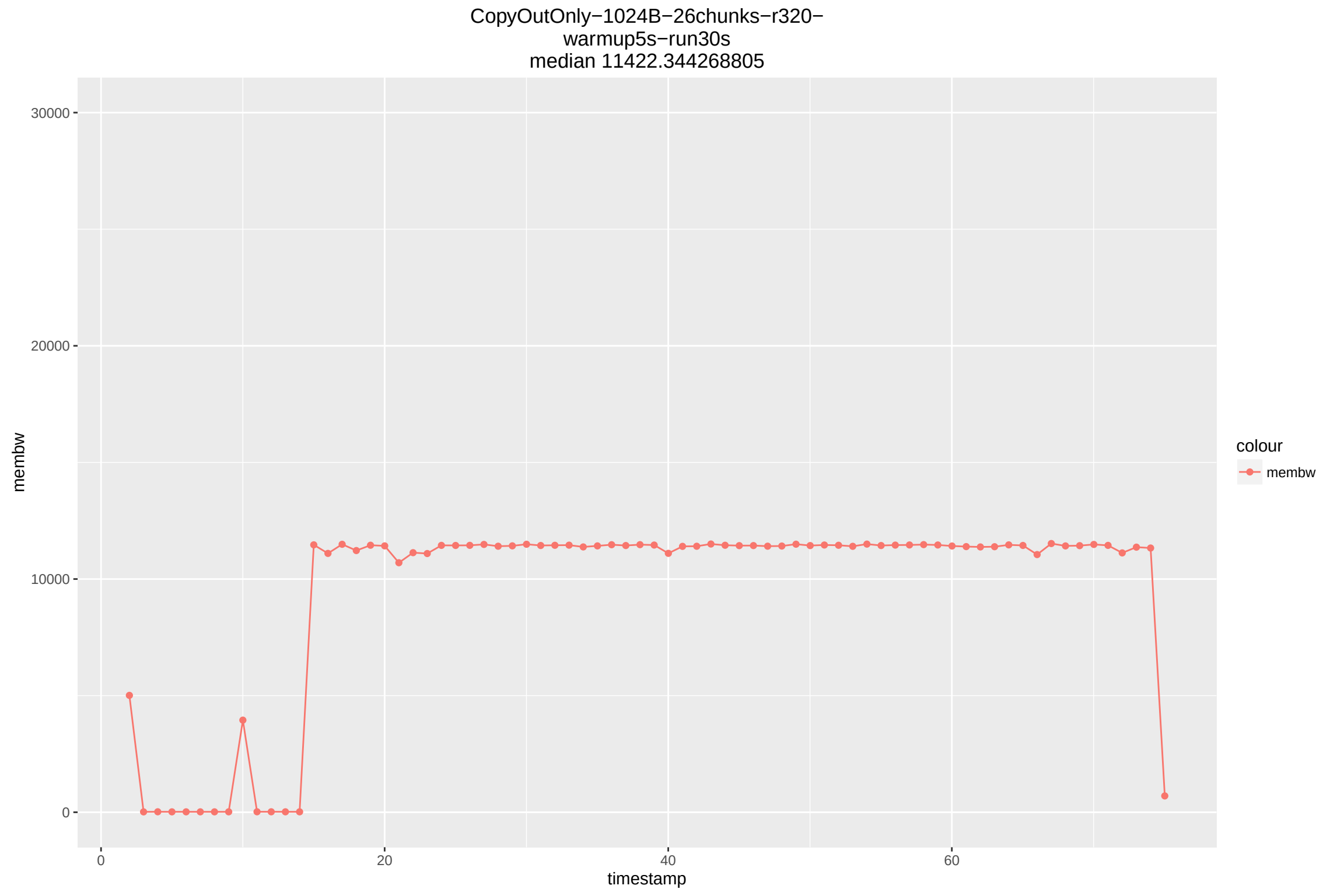

ZeroCopyOnly−1024B−25chunks−r320
warmup5s−run30s
median 6064.290405272
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

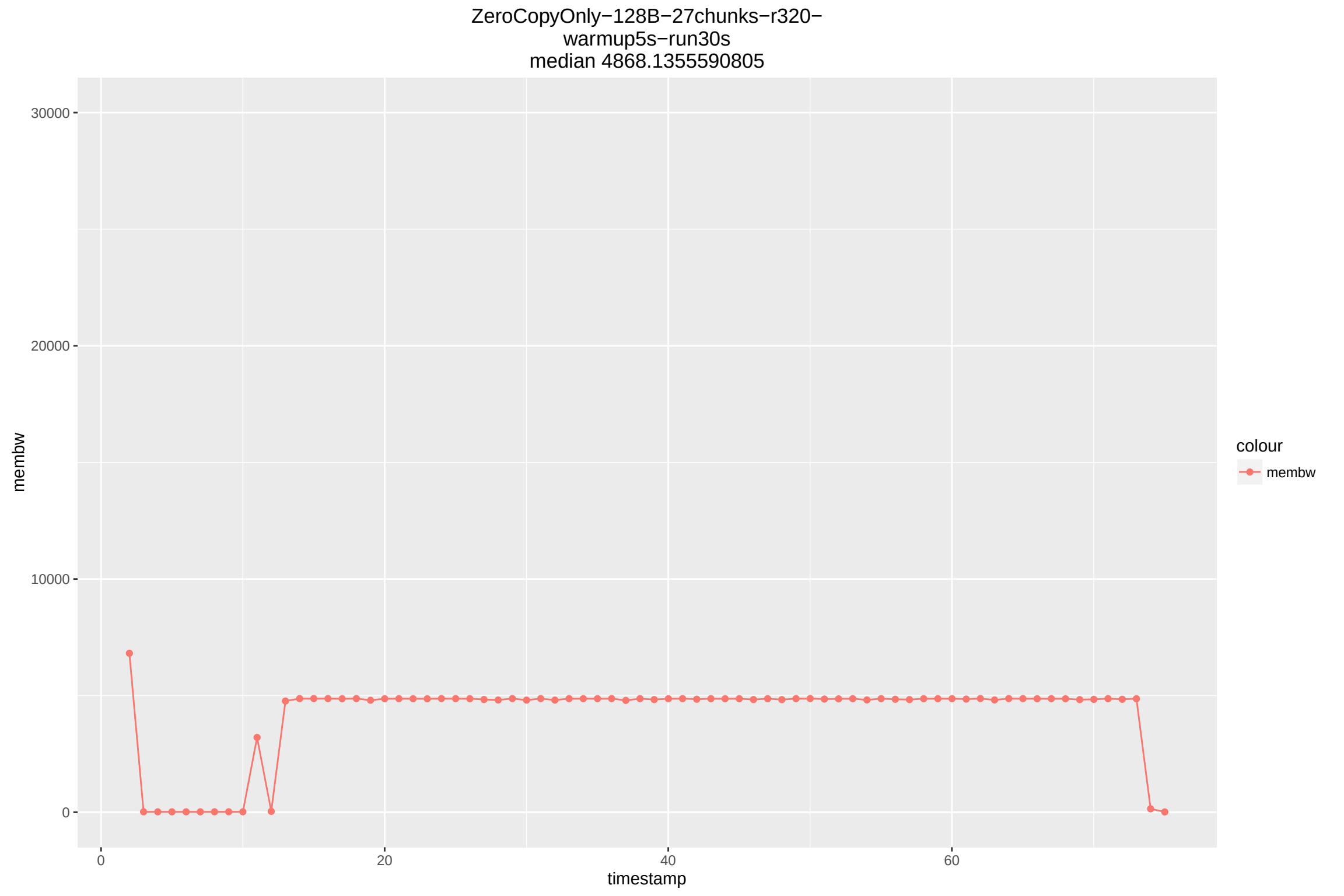

CopyOutOnly−1024B−25chunks−r320−
warmup5s−run30s
median 11258.56115722
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

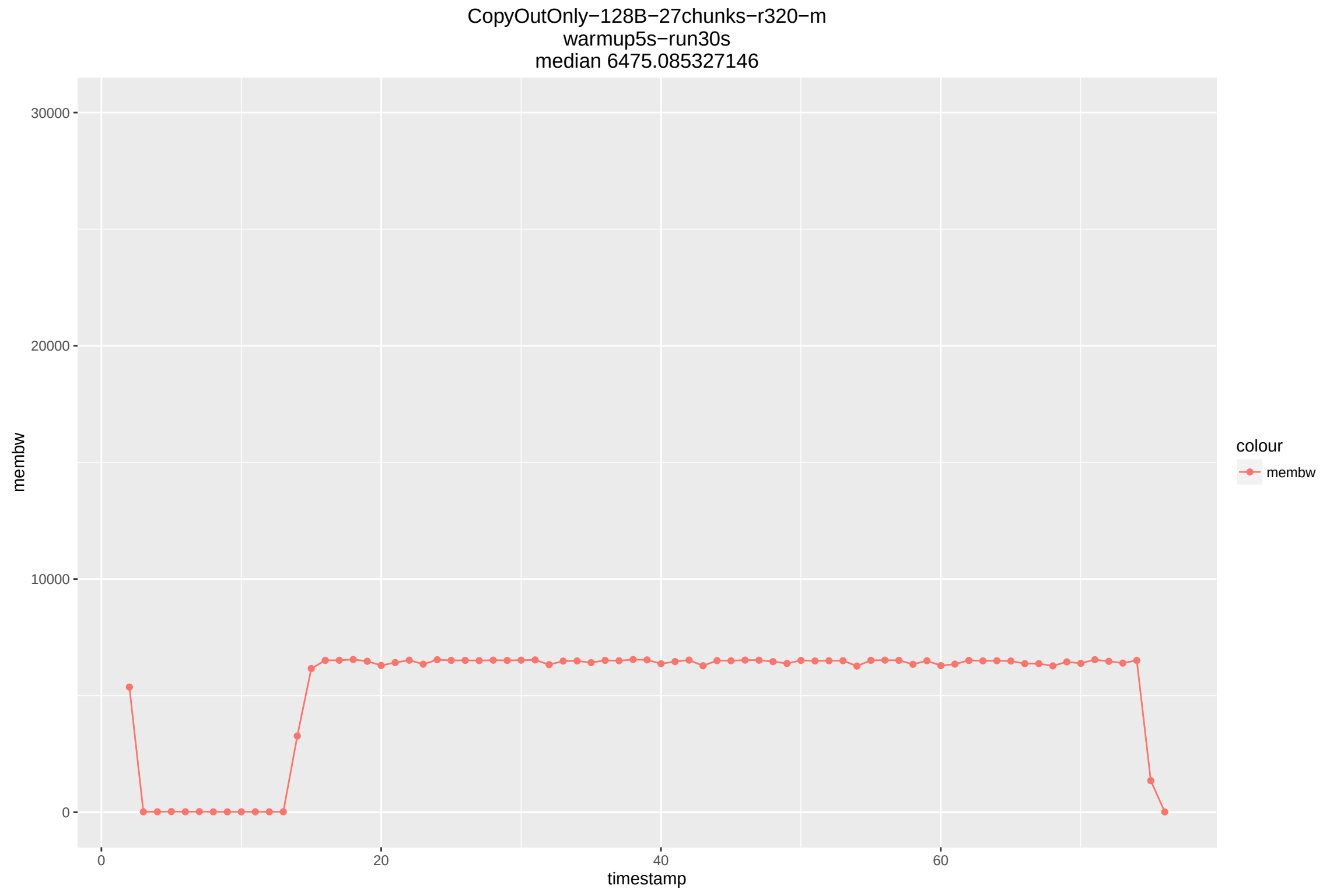

ZeroCopyOnly−128B−26chunks−r320−
warmup5s−run30s
median 4794.529968258
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

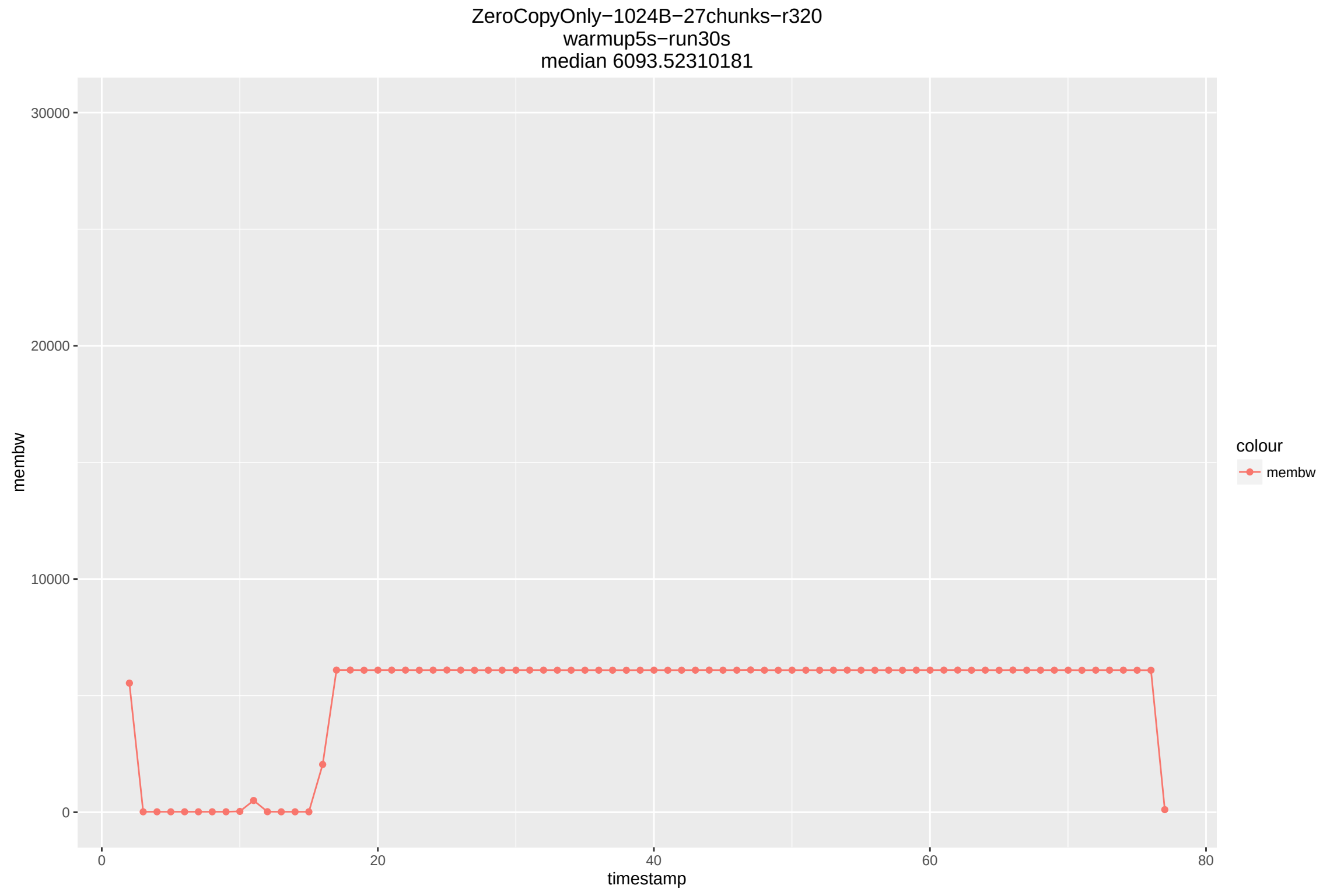

CopyOutOnly−128B−26chunks−r320−m
warmup5s−run30s
median 6389.799499506
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

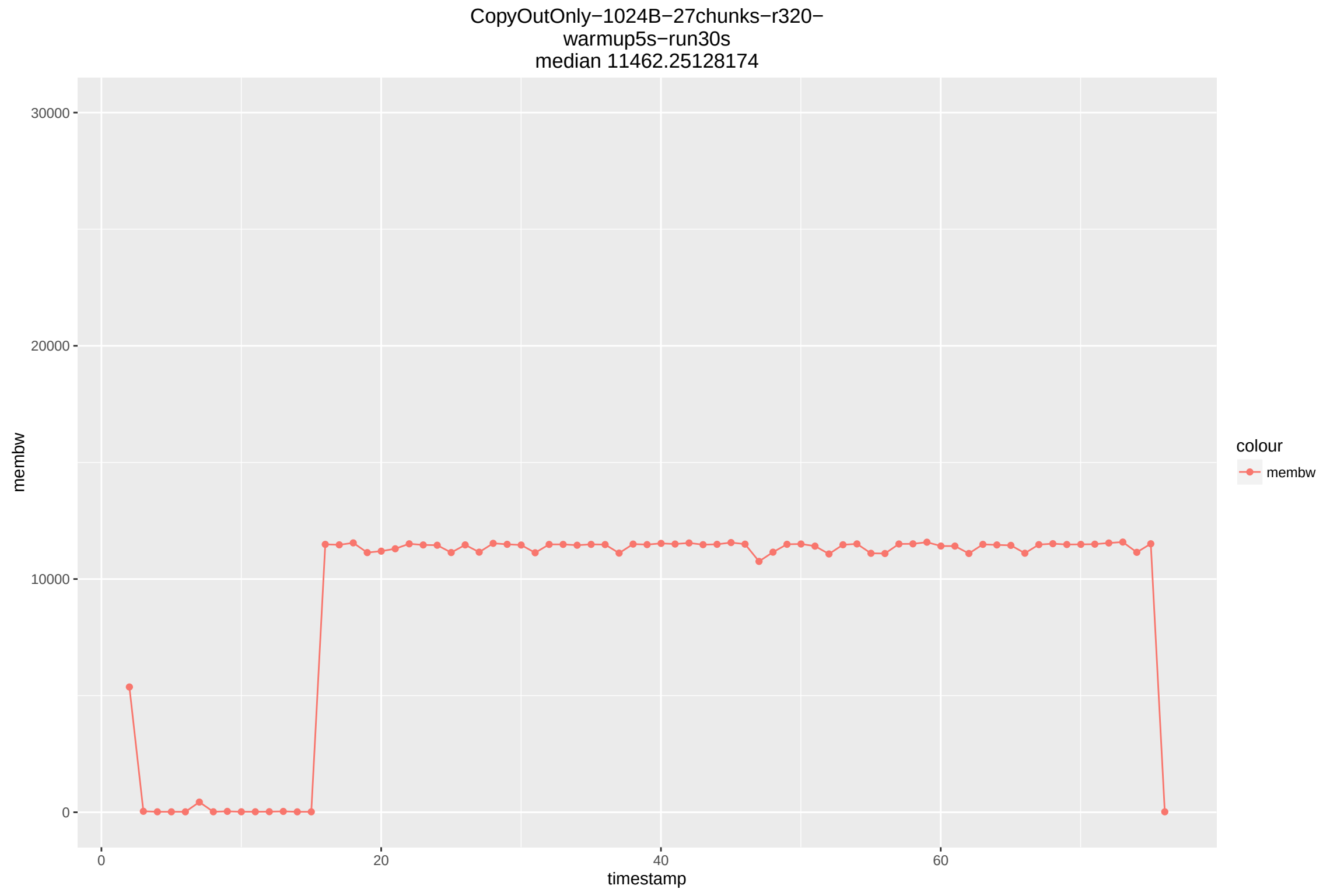

ZeroCopyOnly−1024B−26chunks−r320
warmup5s−run30s
median 6078.5342102065
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

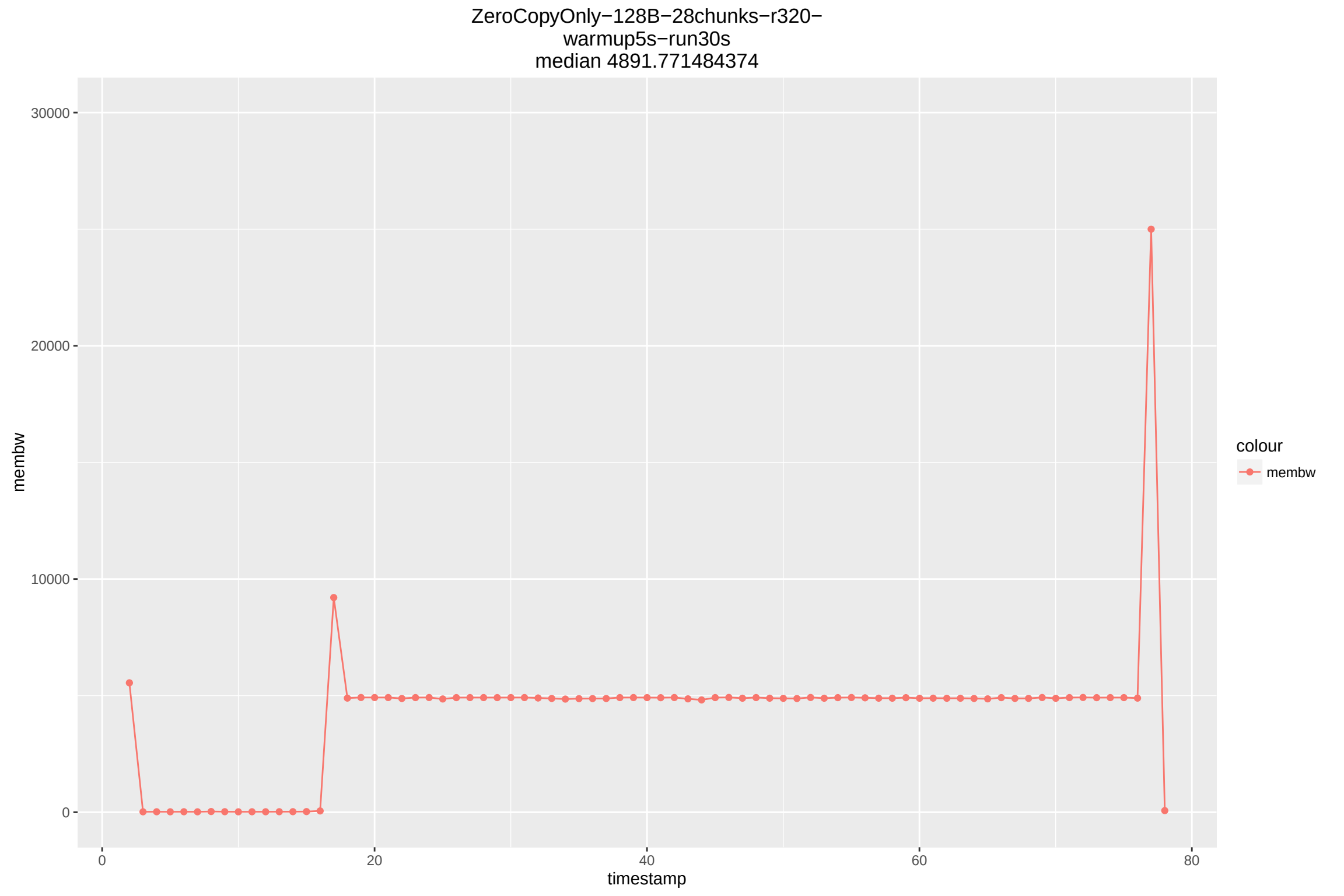

CopyOutOnly−1024B−26chunks−r320−
warmup5s−run30s
median 11422.344268805
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

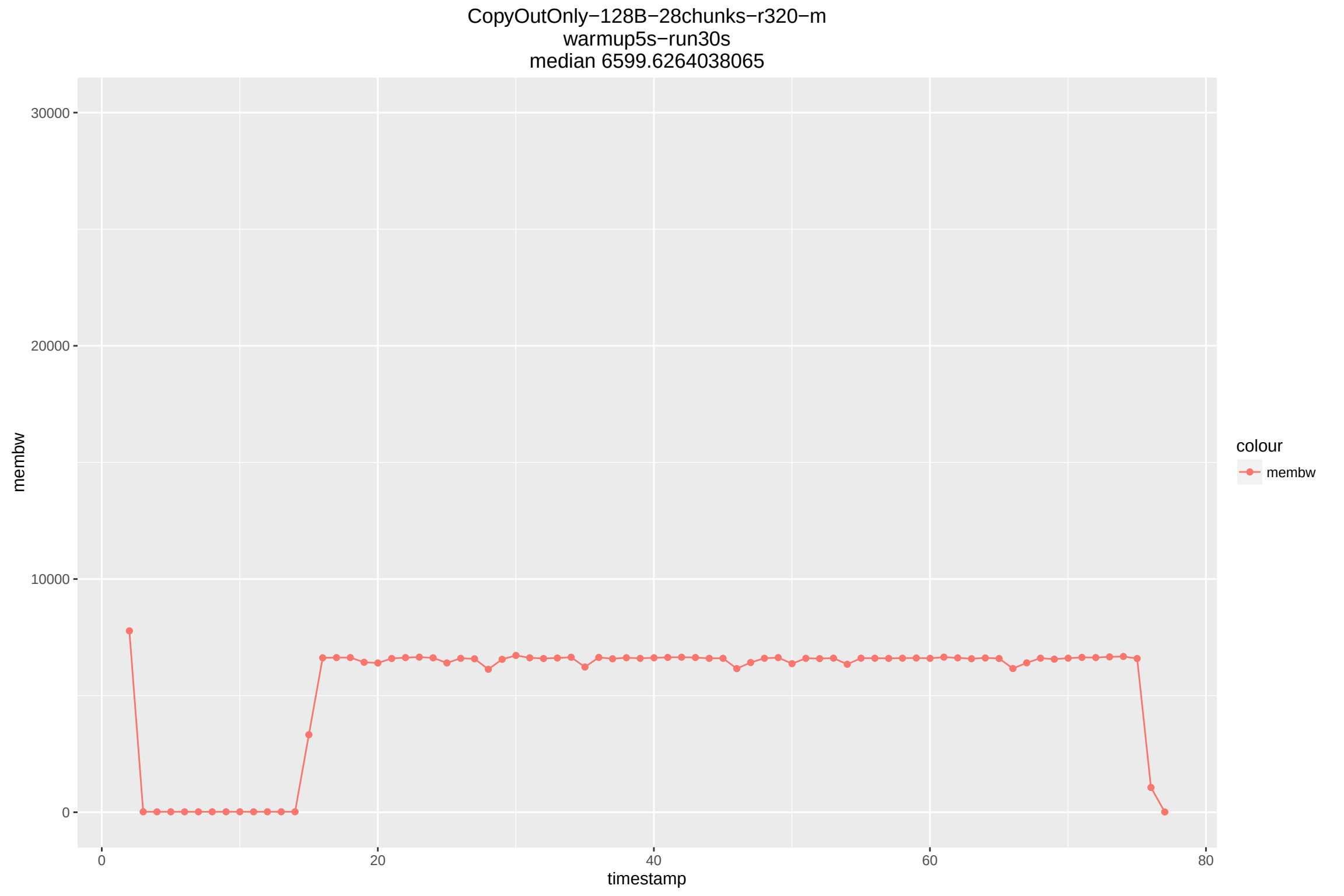

ZeroCopyOnly−128B−27chunks−r320−
warmup5s−run30s
median 4868.1355590805
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

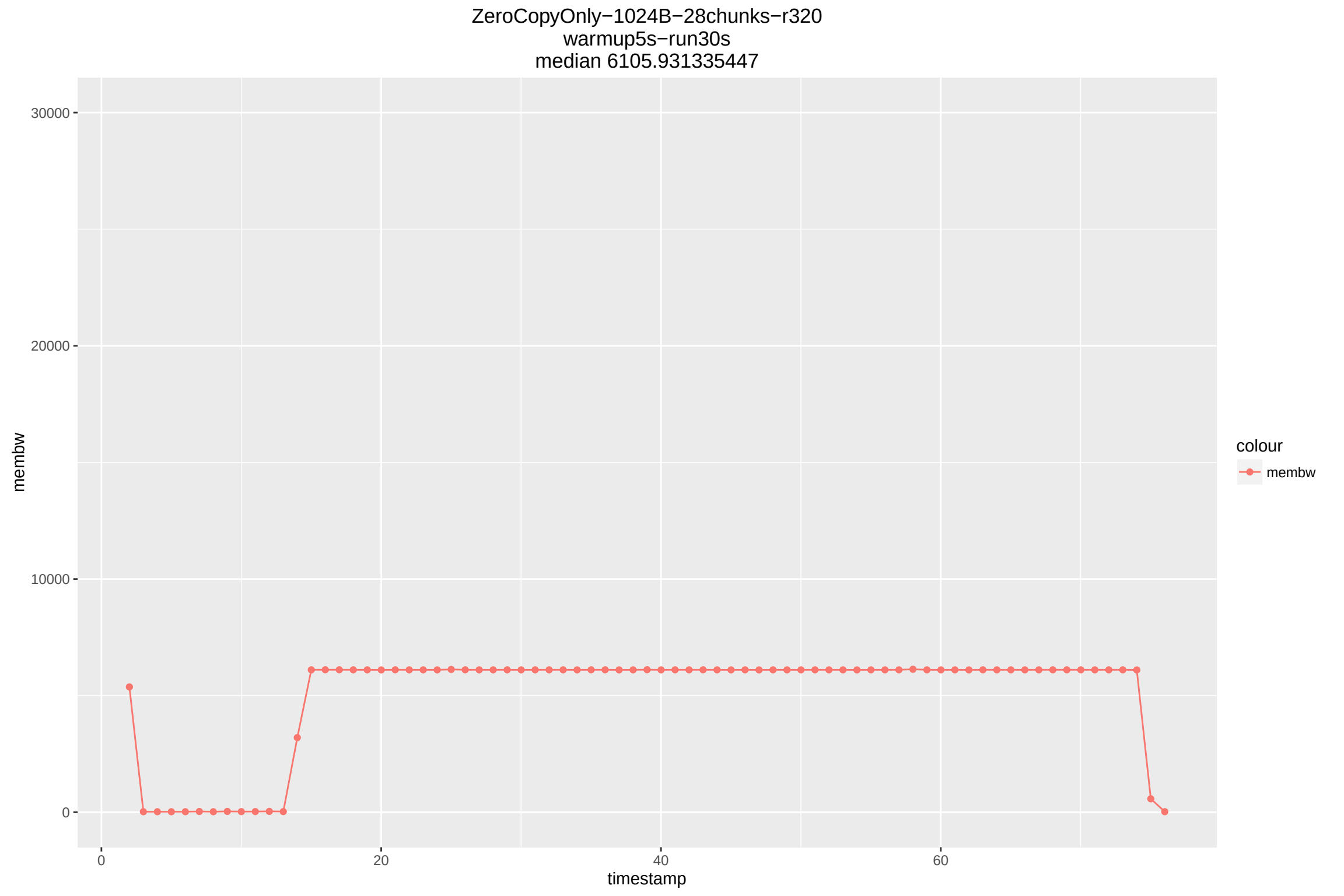

CopyOutOnly−128B−27chunks−r320−m
warmup5s−run30s
median 6475.085327146
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

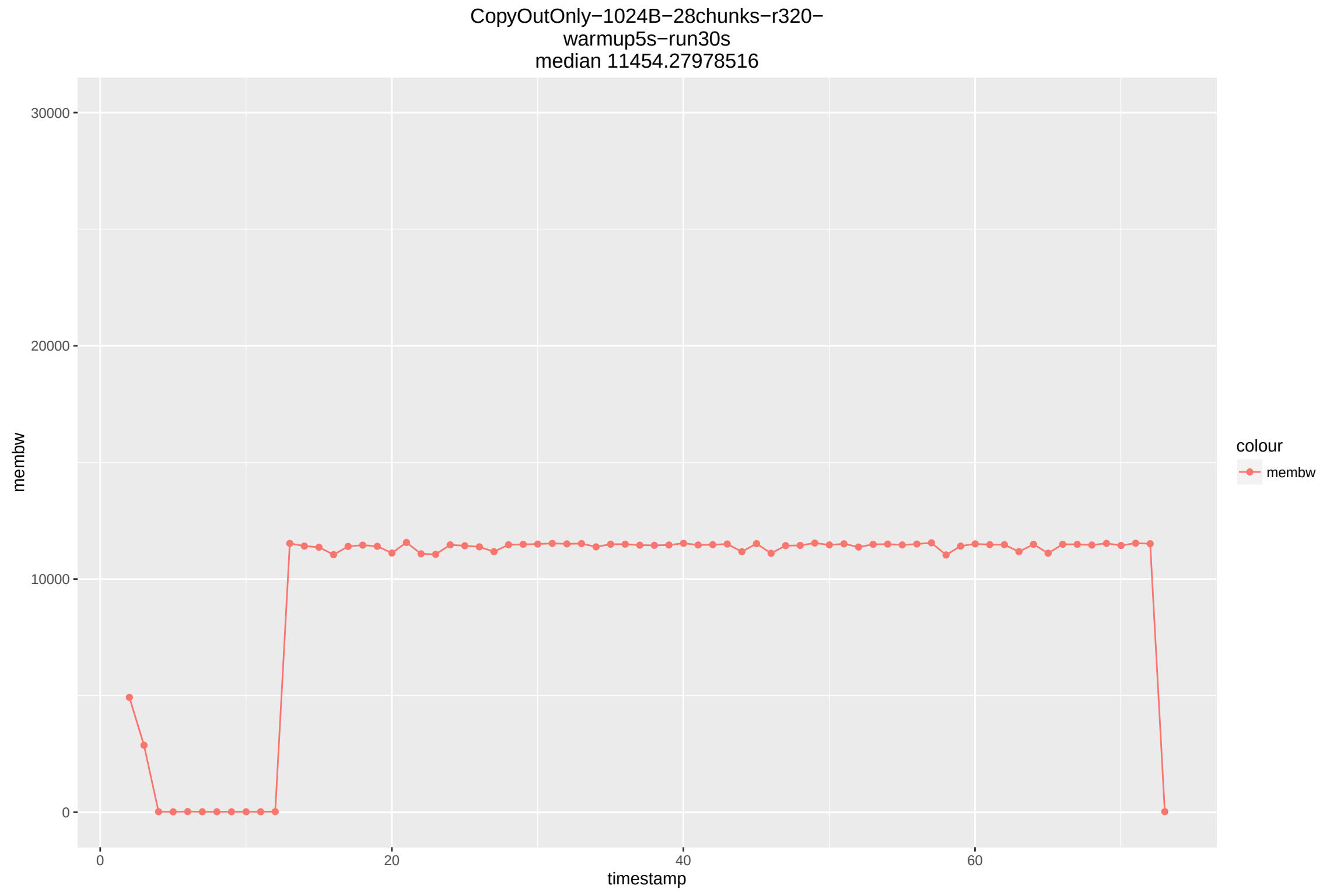

ZeroCopyOnly−1024B−27chunks−r320
warmup5s−run30s
median 6093.52310181
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

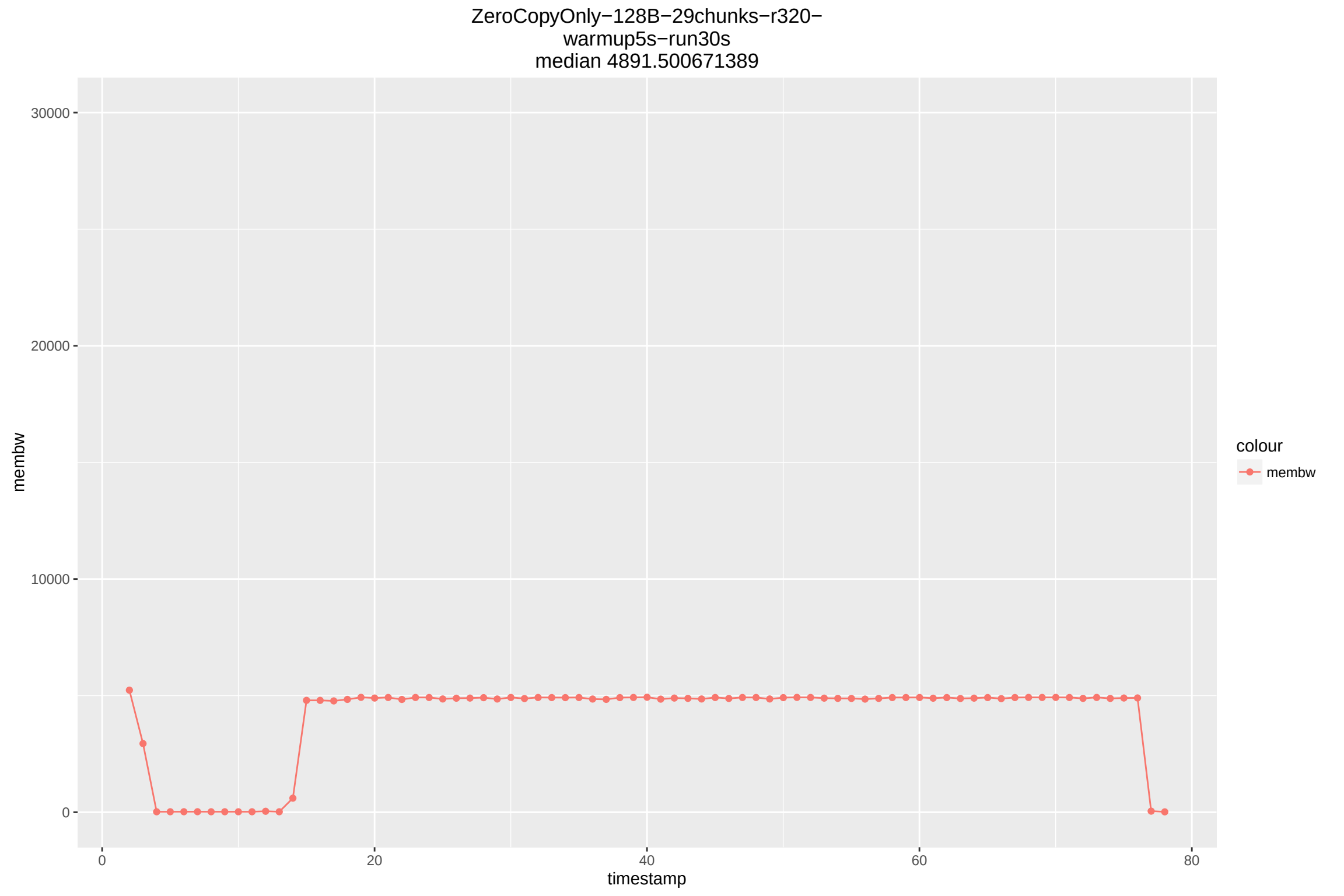

CopyOutOnly−1024B−27chunks−r320−
warmup5s−run30s
median 11462.25128174
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

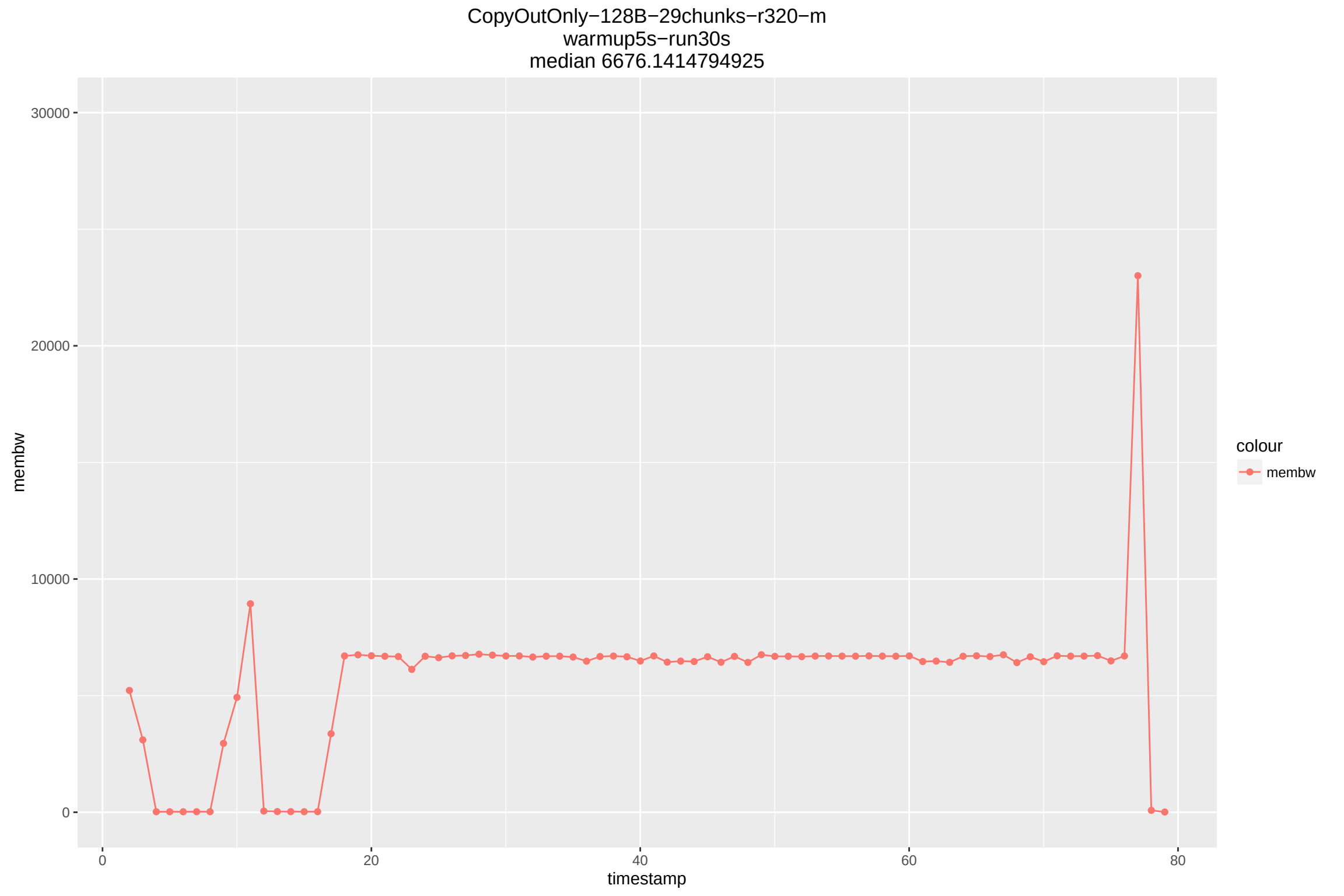

ZeroCopyOnly−128B−28chunks−r320−
warmup5s−run30s
median 4891.771484374
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

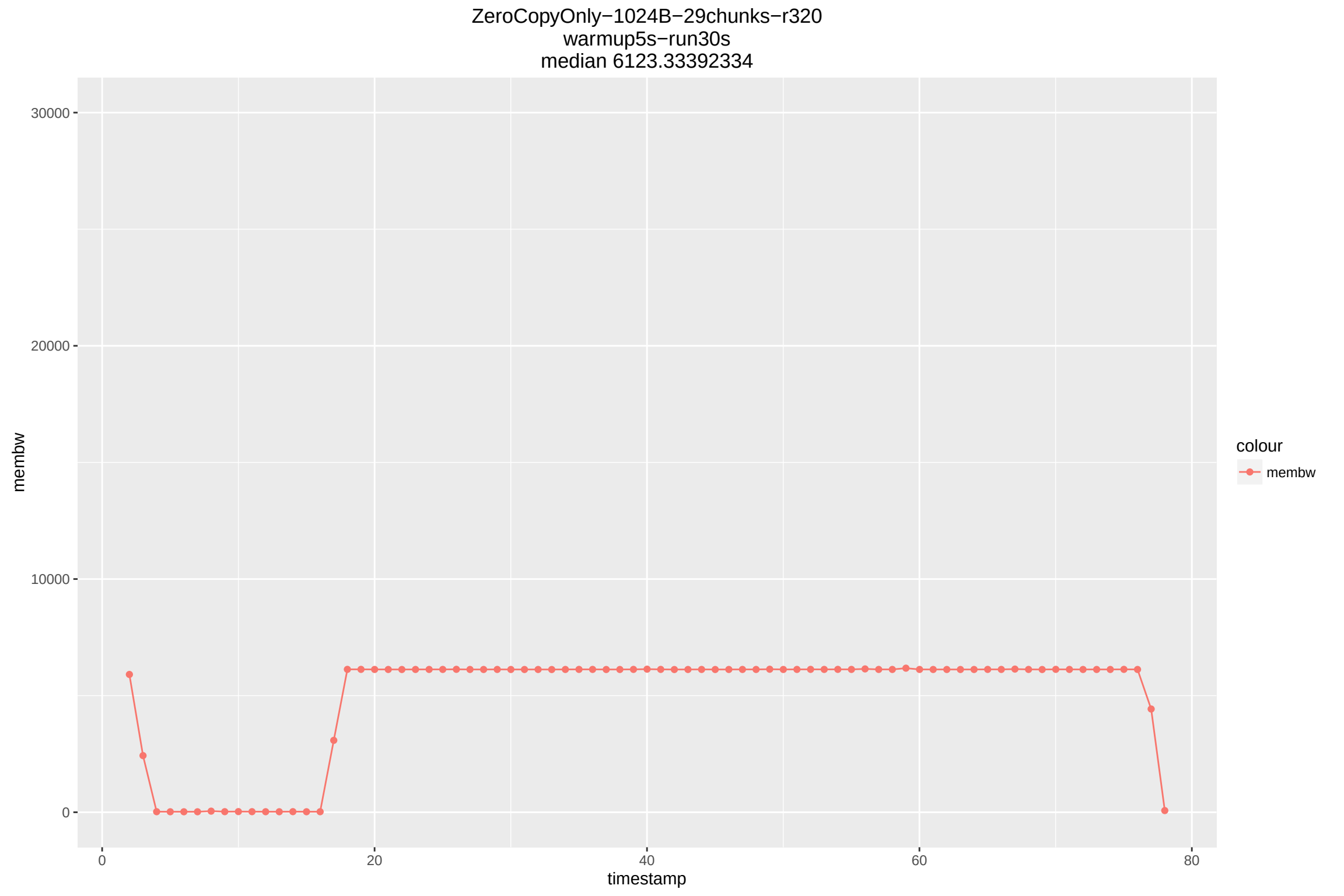

CopyOutOnly−128B−28chunks−r320−m
warmup5s−run30s
median 6599.6264038065
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

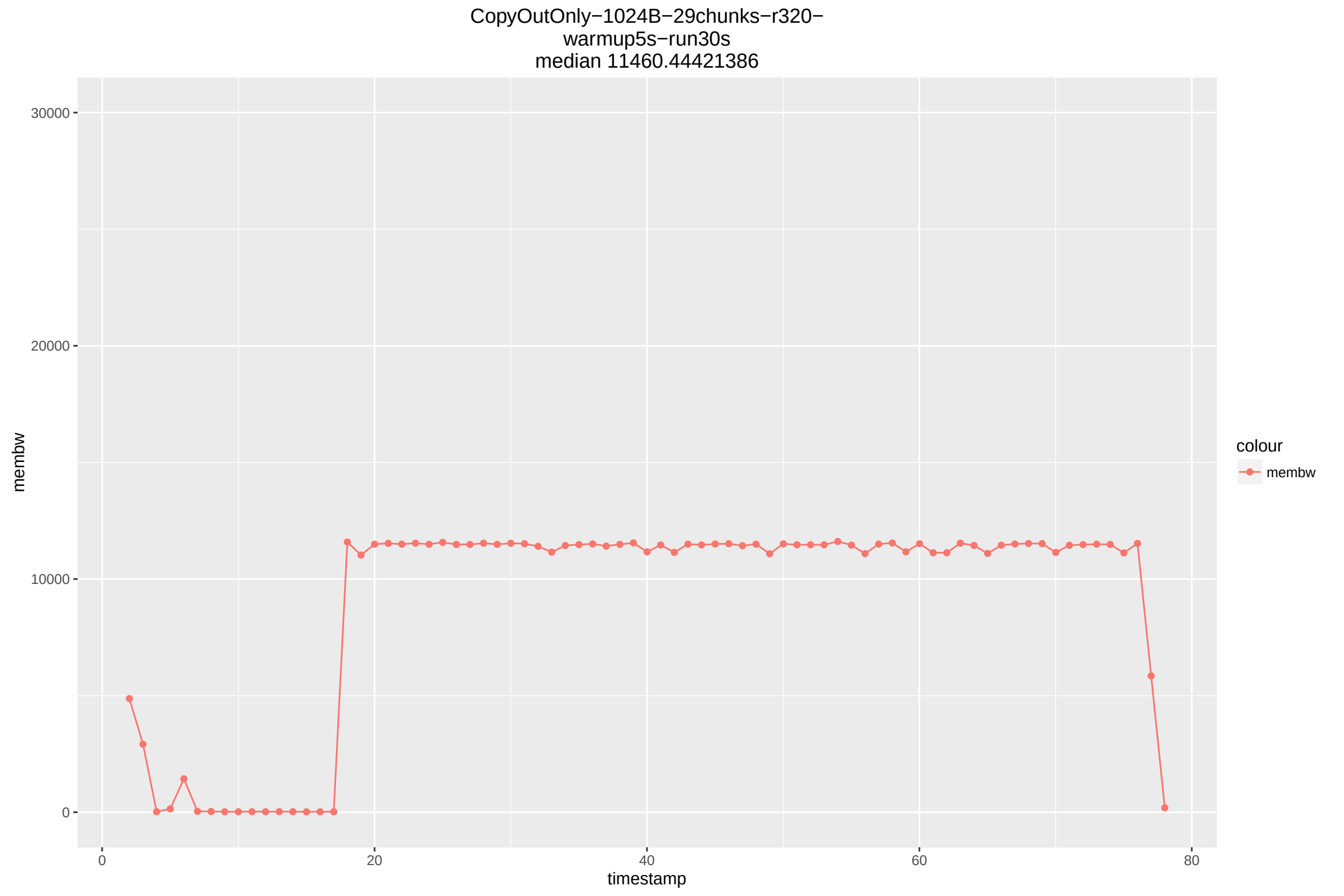

ZeroCopyOnly−1024B−28chunks−r320
warmup5s−run30s
median 6105.931335447
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

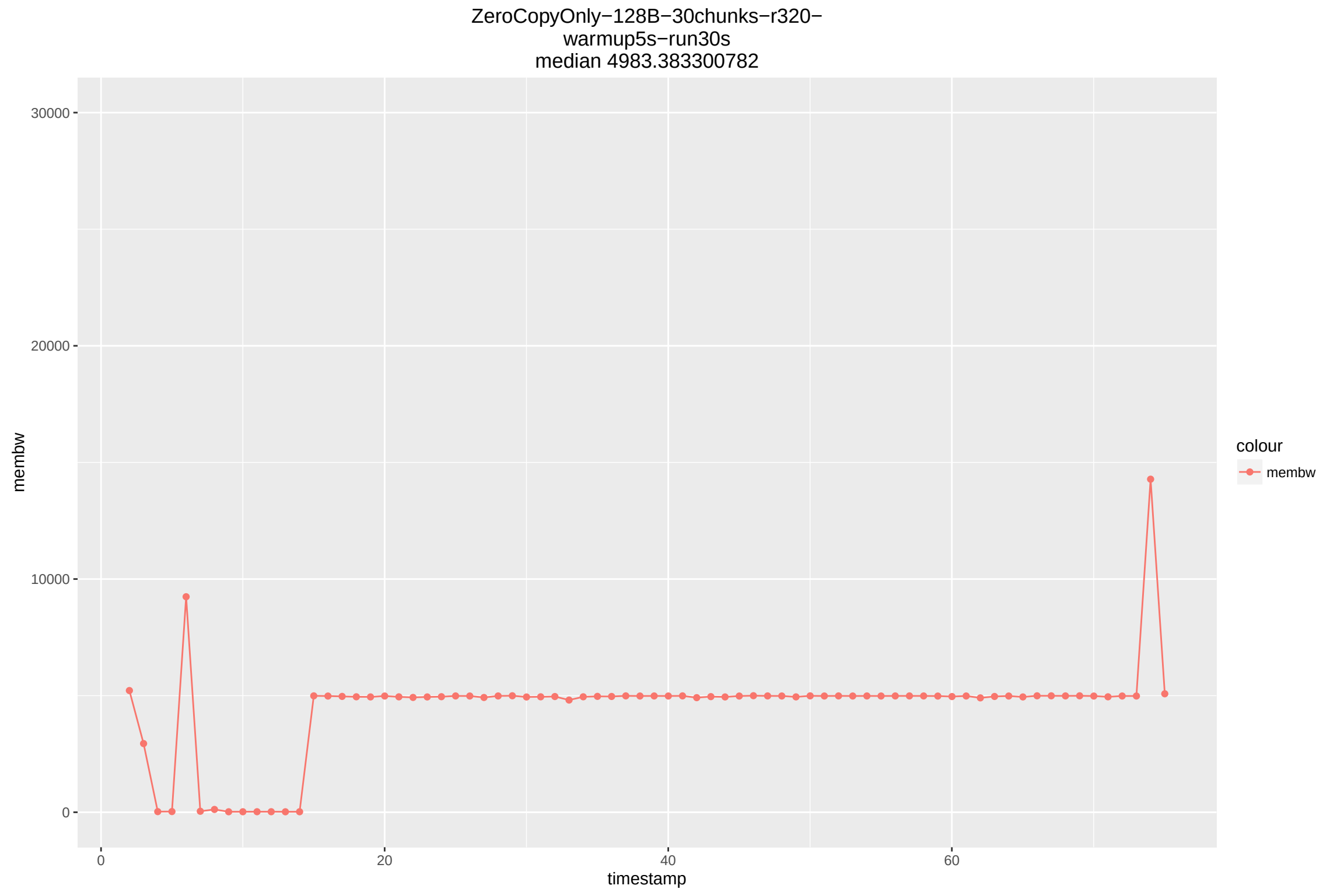

CopyOutOnly−1024B−28chunks−r320−
warmup5s−run30s
median 11454.27978516
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

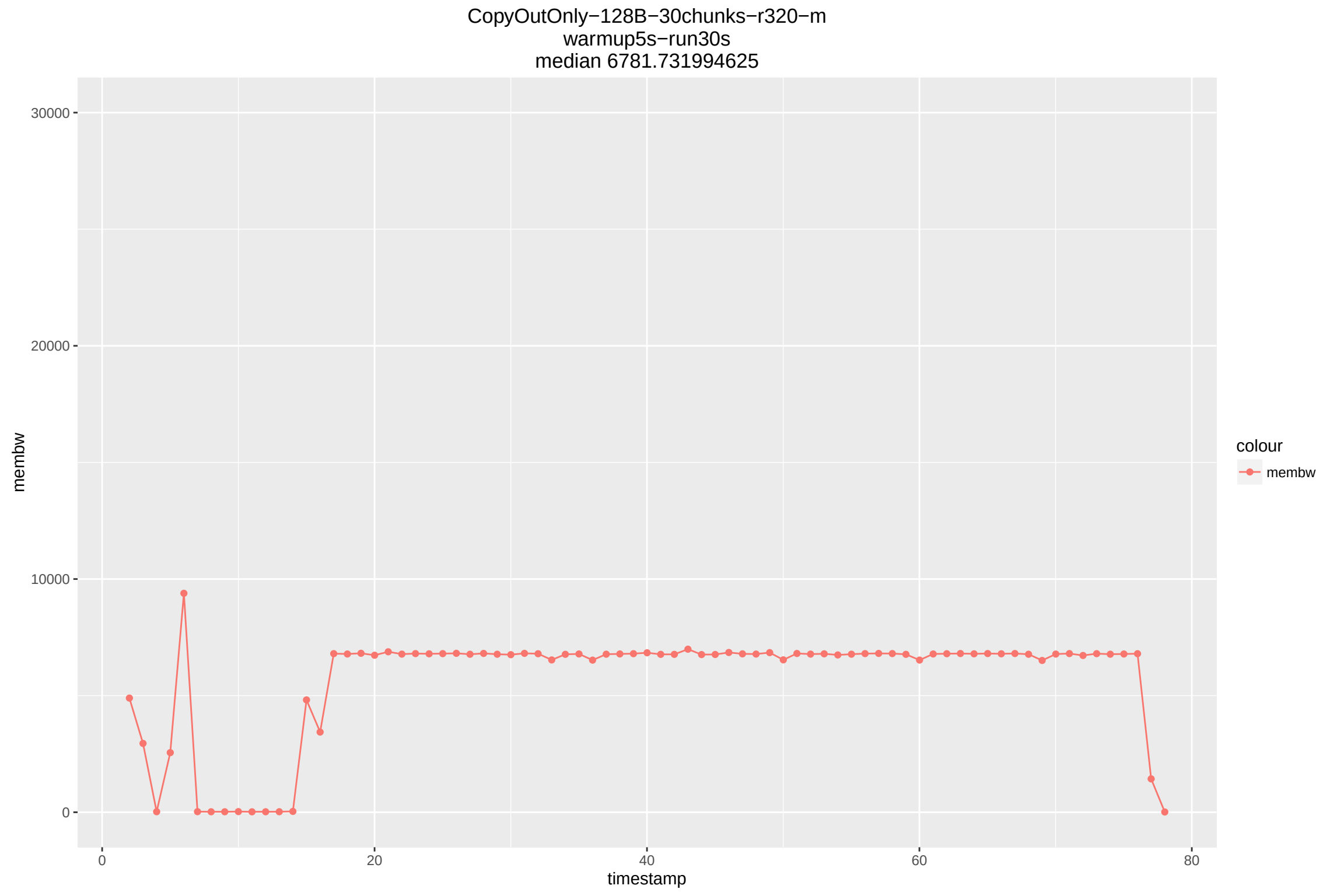

ZeroCopyOnly−128B−29chunks−r320−
warmup5s−run30s
median 4891.500671389
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

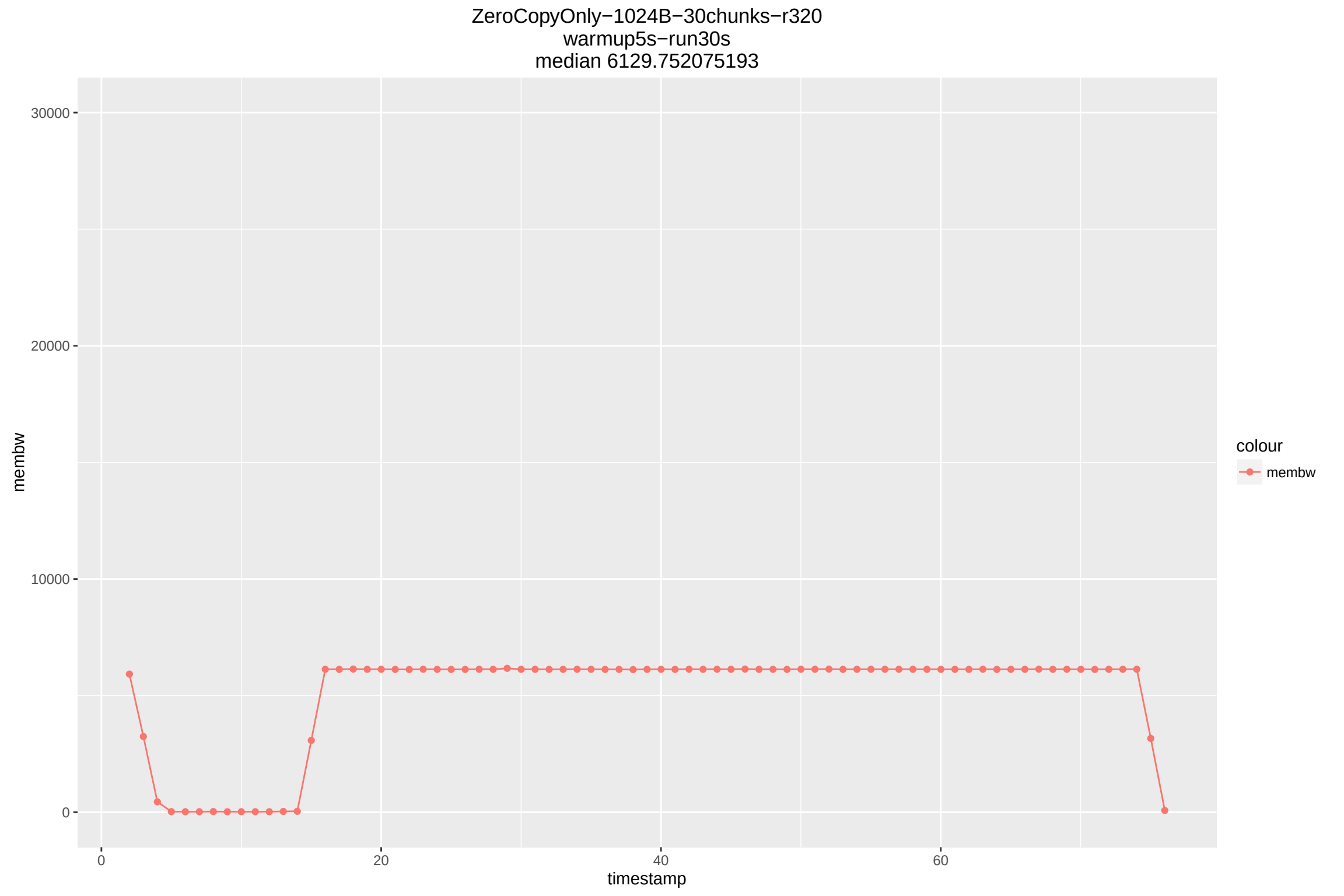

CopyOutOnly−128B−29chunks−r320−m
warmup5s−run30s
median 6676.1414794925
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

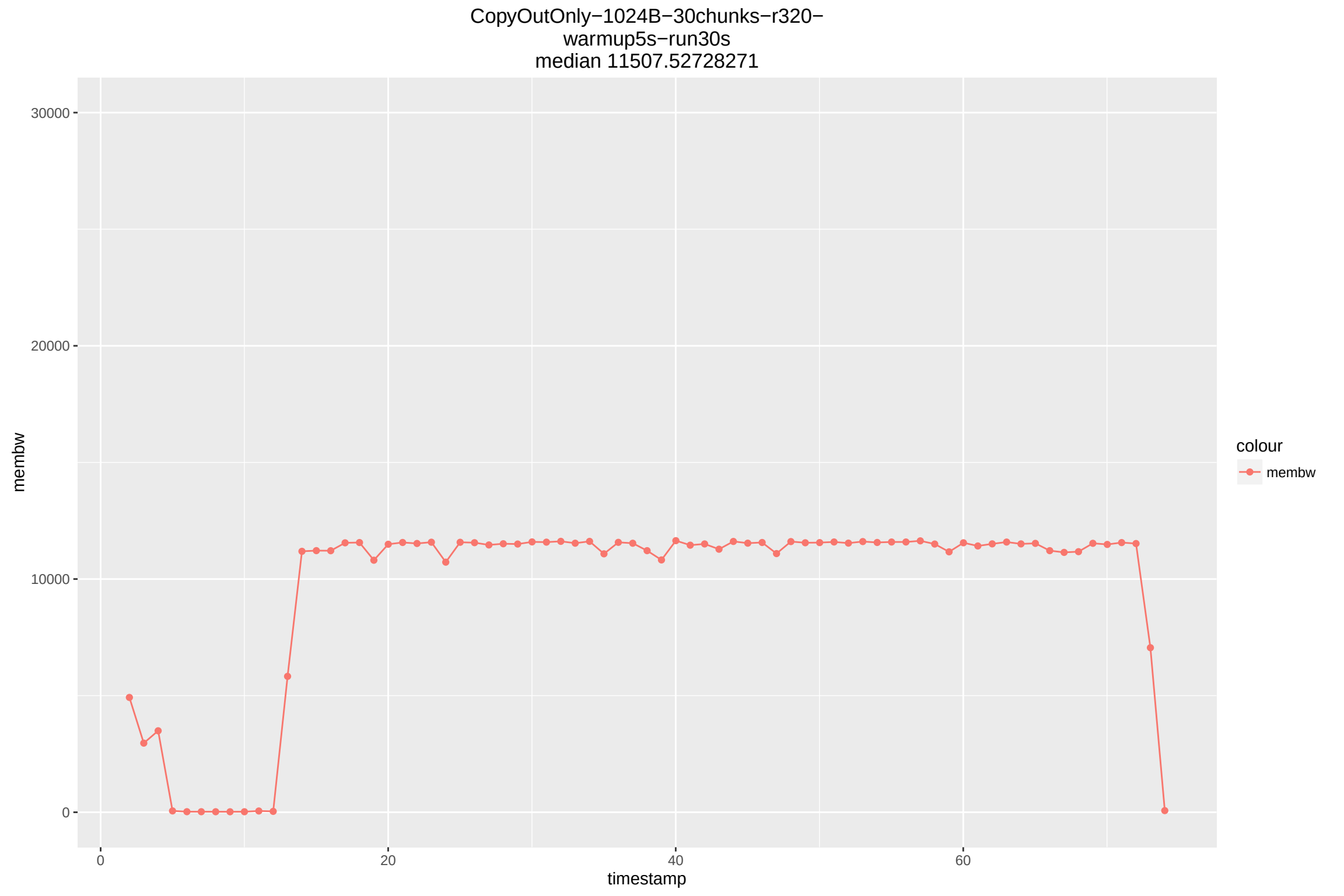

ZeroCopyOnly−1024B−29chunks−r320
warmup5s−run30s
median 6123.33392334
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

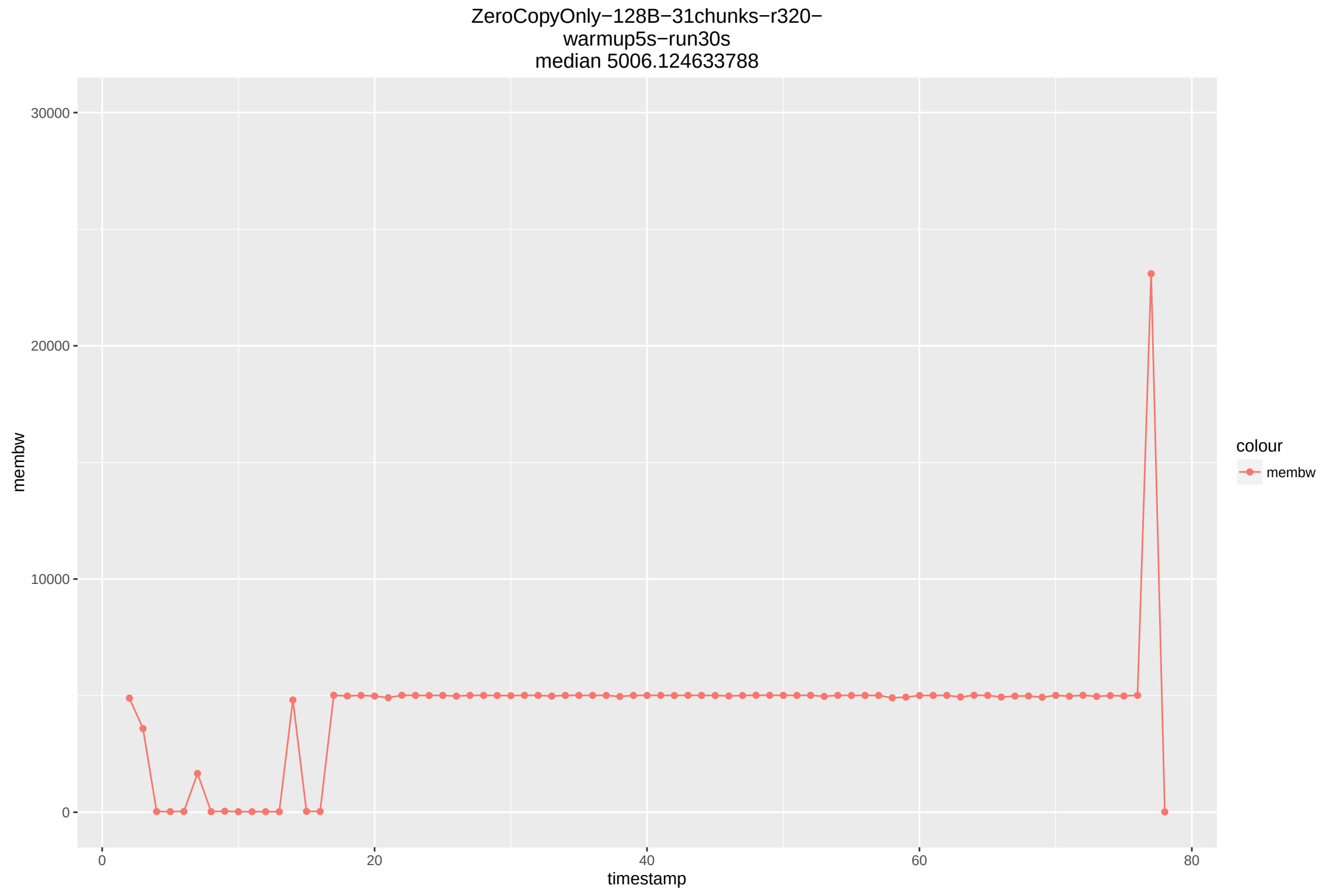

CopyOutOnly−1024B−29chunks−r320−
warmup5s−run30s
median 11460.44421386
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

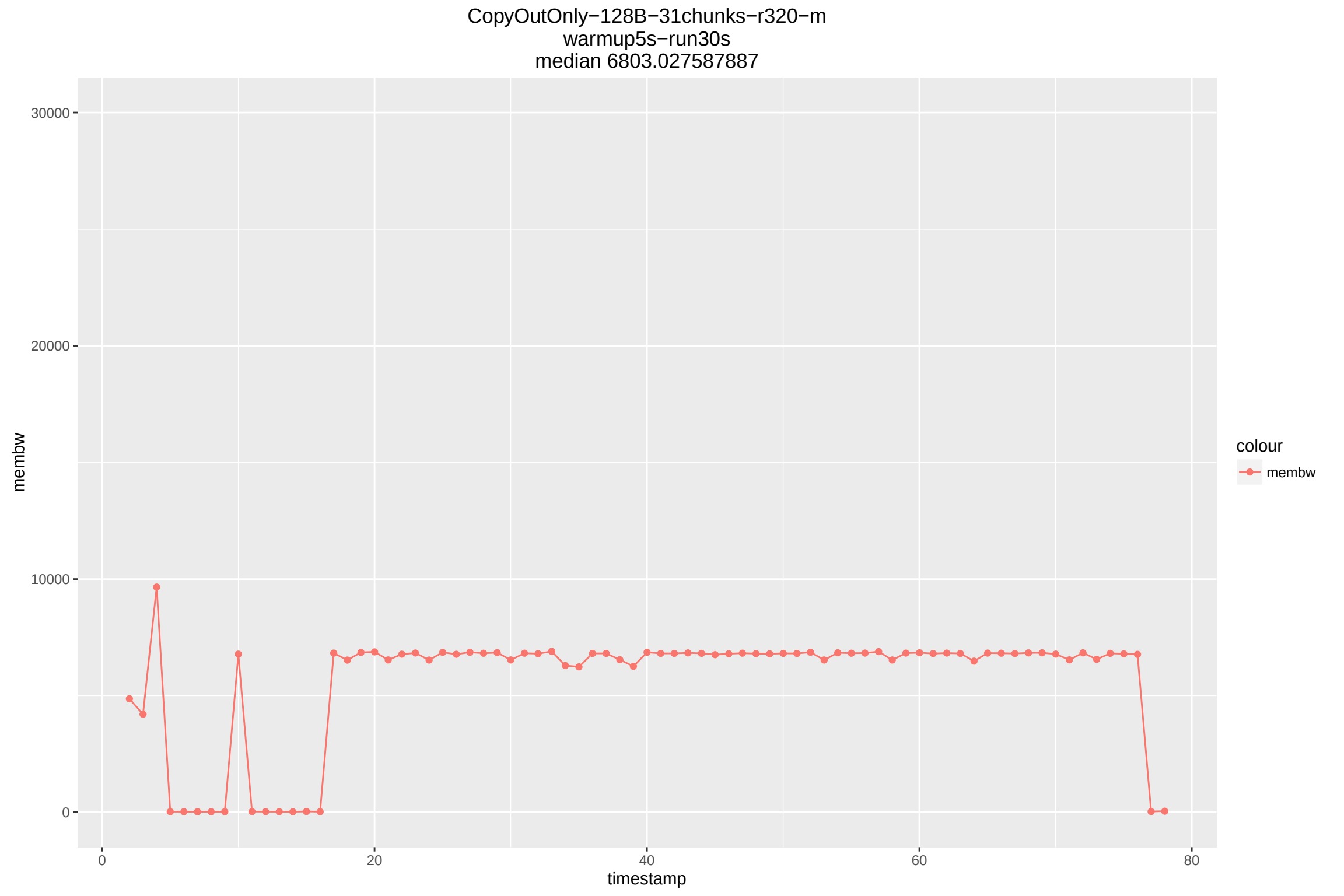

ZeroCopyOnly−128B−30chunks−r320−
warmup5s−run30s
median 4983.383300782
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

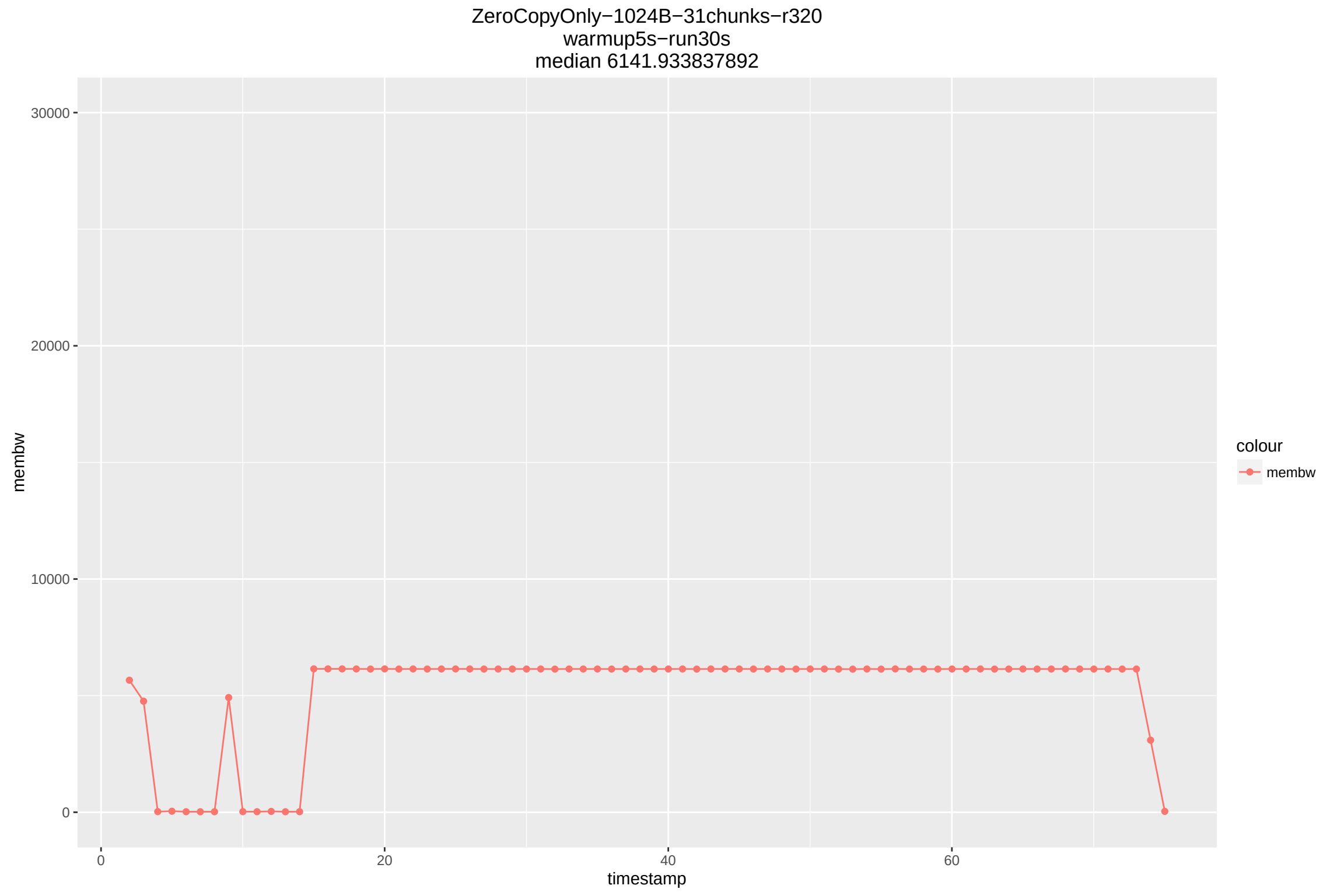

CopyOutOnly−128B−30chunks−r320−m
warmup5s−run30s
median 6781.731994625
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

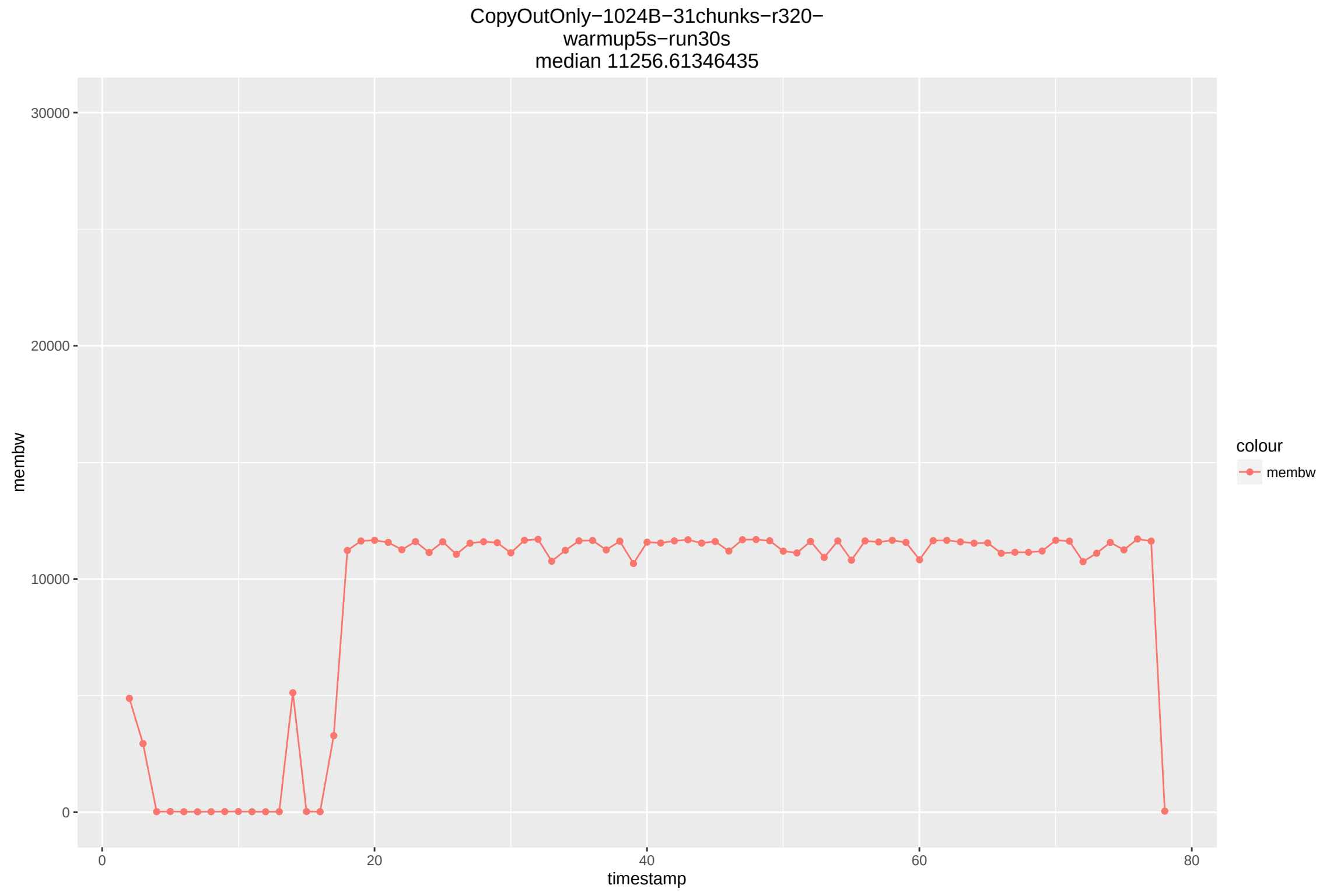

ZeroCopyOnly−1024B−30chunks−r320
warmup5s−run30s
median 6129.752075193
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

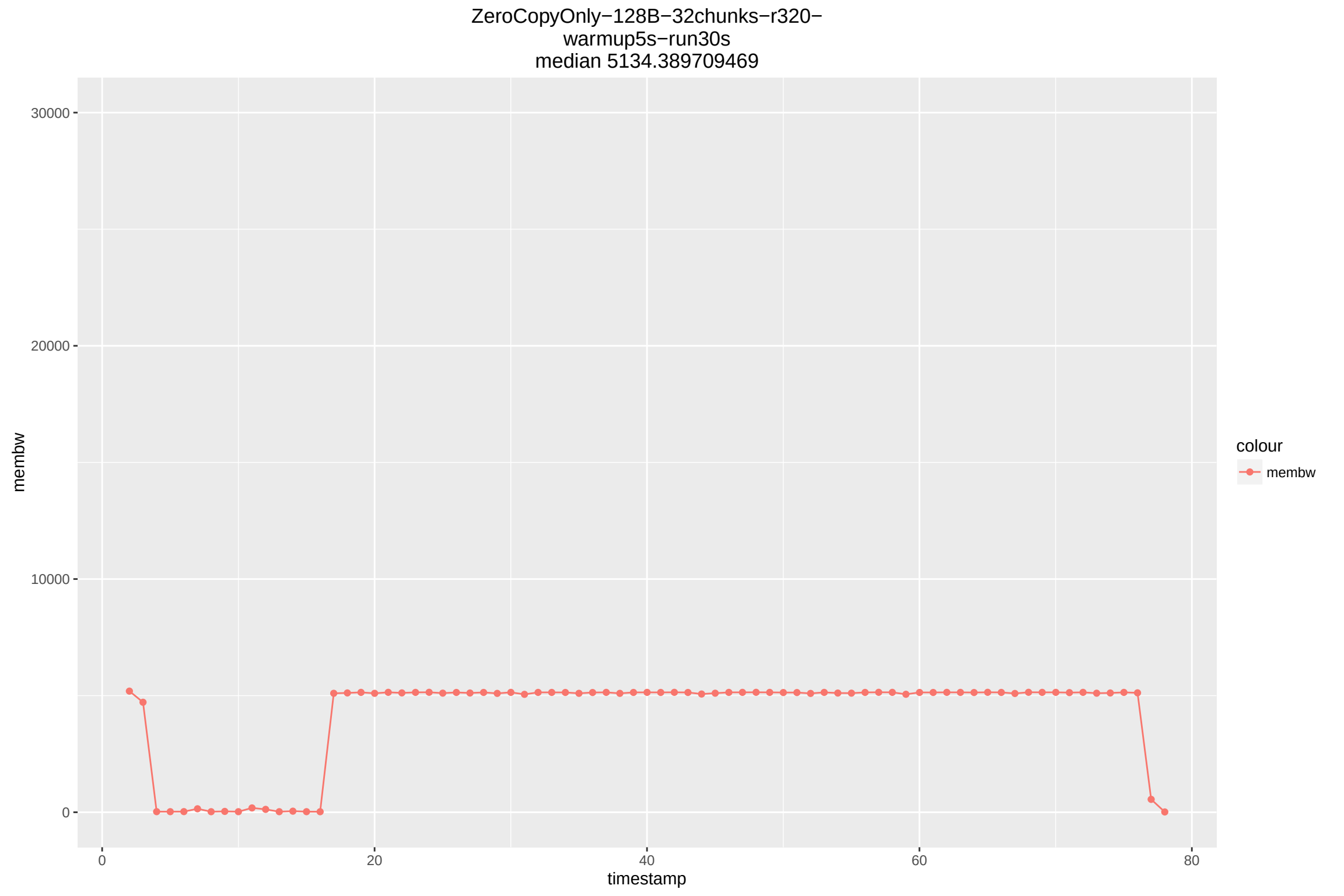

CopyOutOnly−1024B−30chunks−r320−
warmup5s−run30s
median 11507.52728271
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw

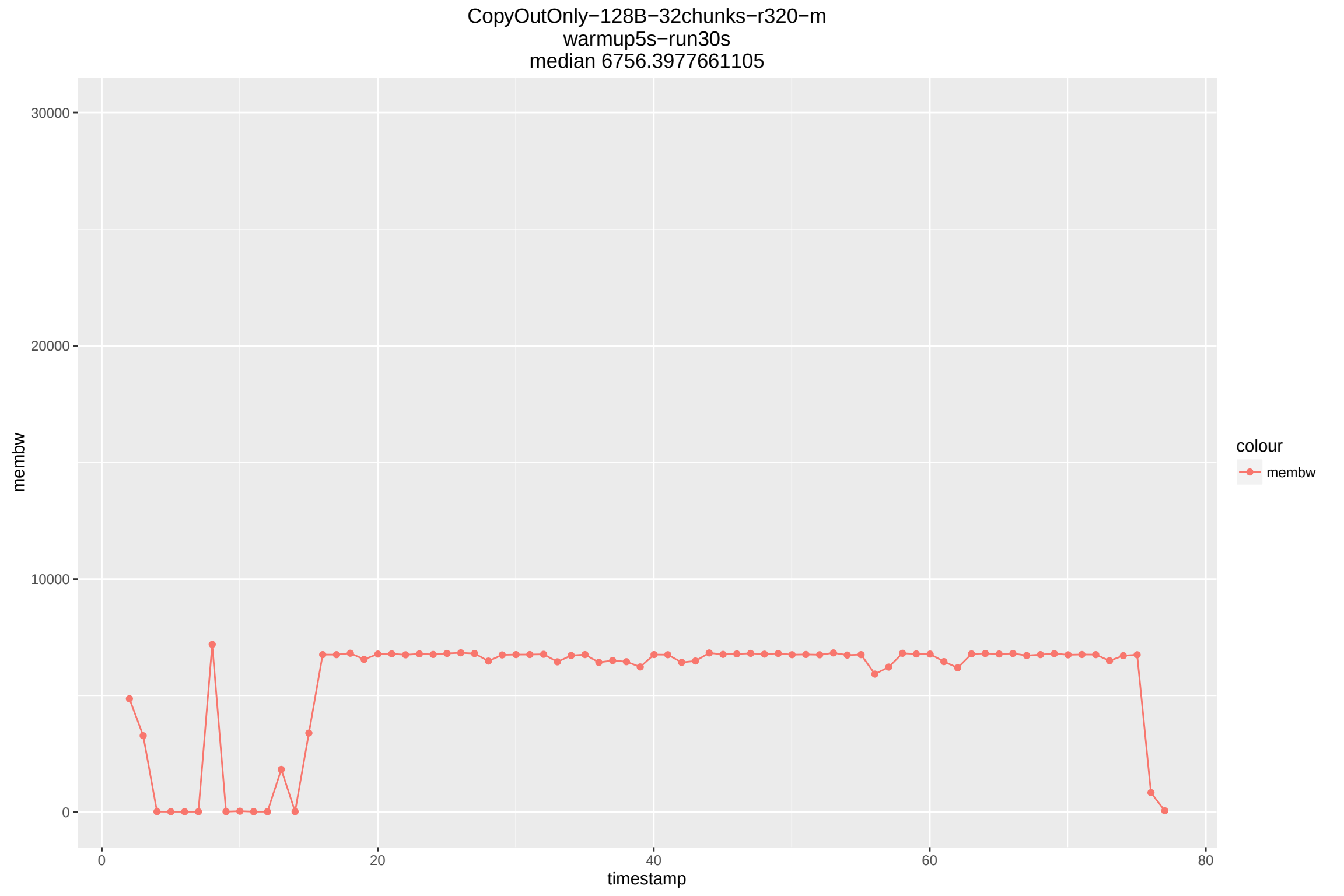

ZeroCopyOnly−128B−31chunks−r320−
warmup5s−run30s
median 5006.124633788
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

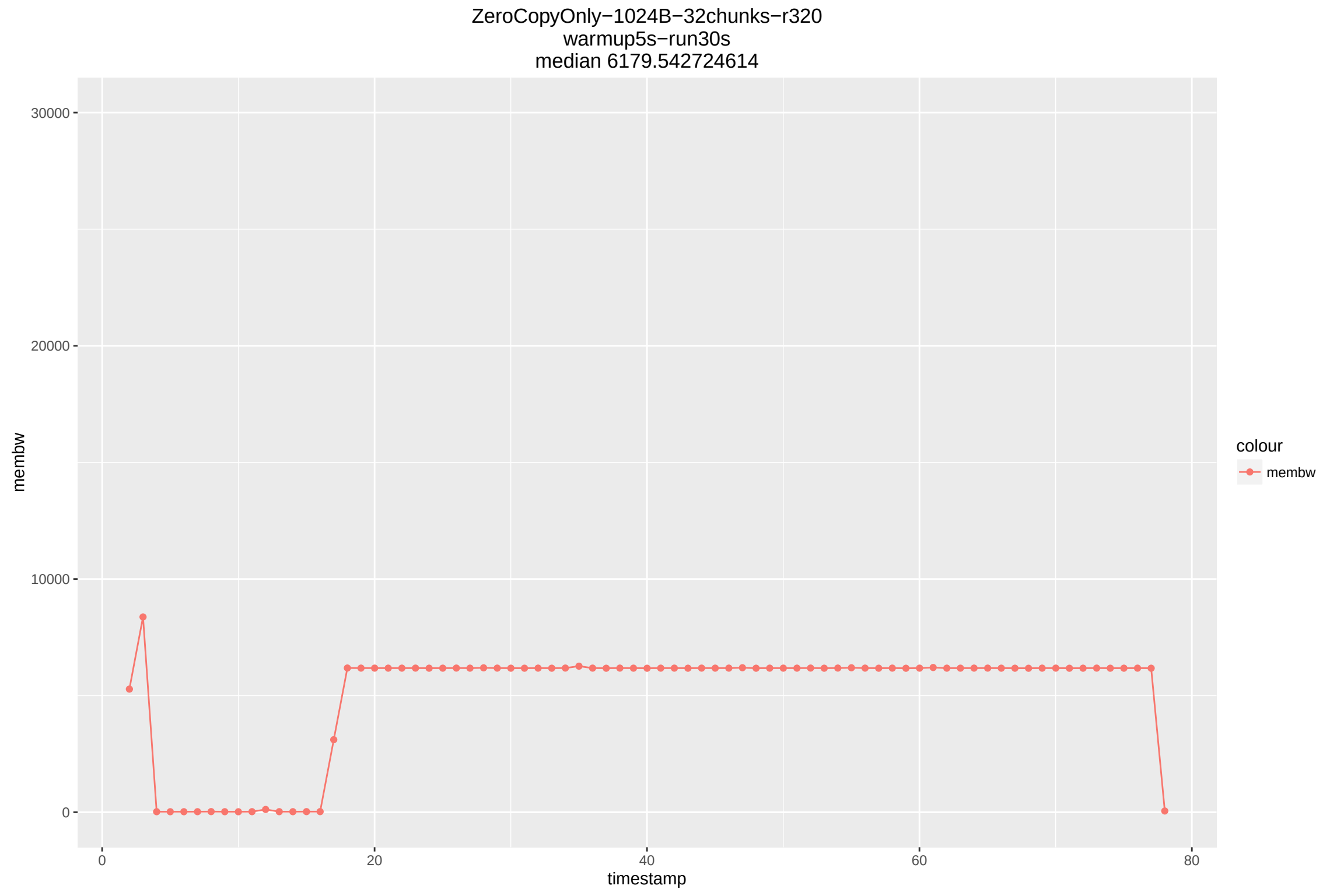

CopyOutOnly−128B−31chunks−r320−m
warmup5s−run30s
median 6803.027587887
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw

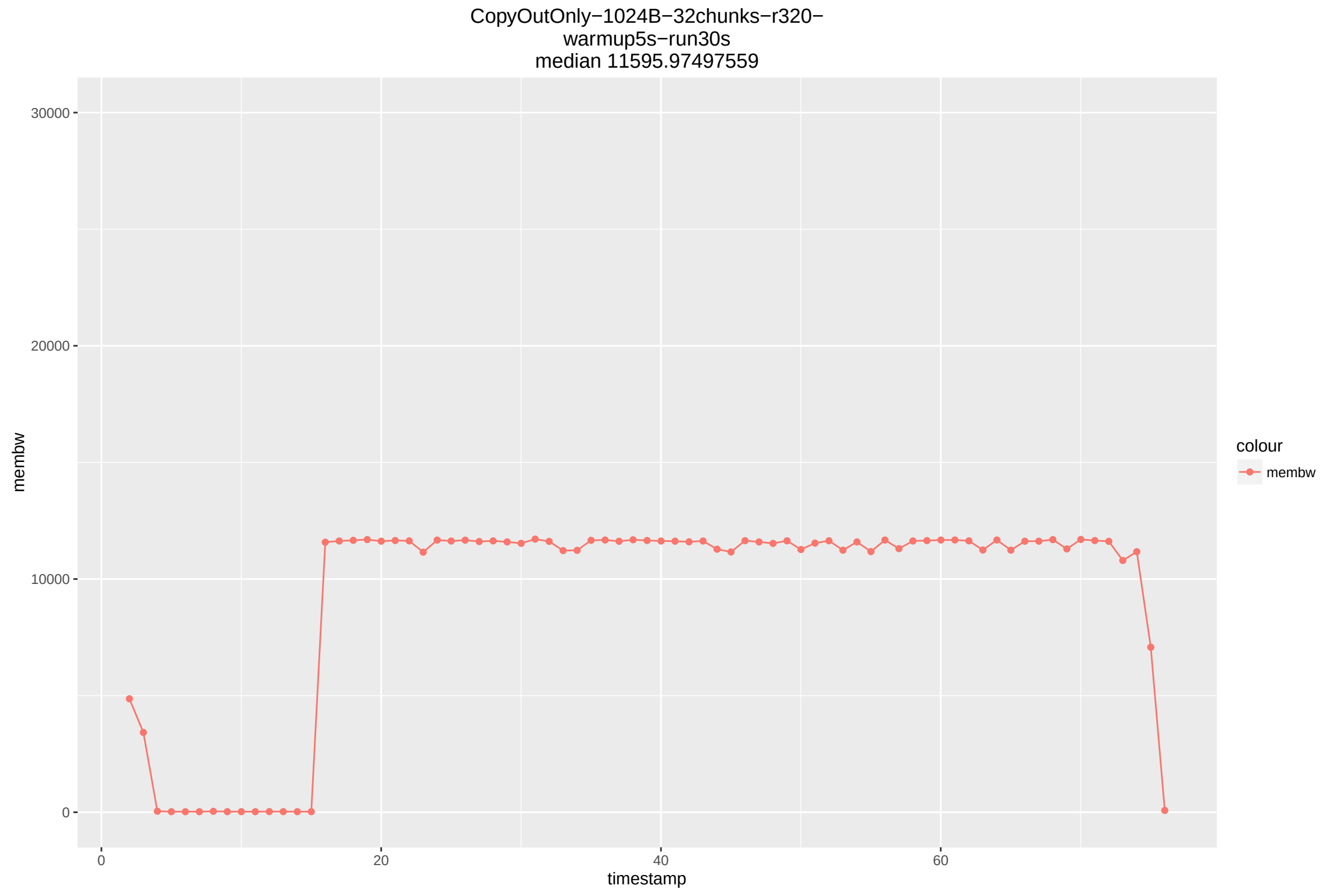

ZeroCopyOnly−1024B−31chunks−r320
warmup5s−run30s
median 6141.933837892
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw


CopyOutOnly−1024B−31chunks−r320−
warmup5s−run30s
median 11256.61346435
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw


ZeroCopyOnly−128B−32chunks−r320−
warmup5s−run30s
median 5134.389709469
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw


CopyOutOnly−128B−32chunks−r320−m
warmup5s−run30s
median 6756.3977661105
membw
30000
20000
10000
0
0
20
40
60
80
timestamp
colour
membw


ZeroCopyOnly−1024B−32chunks−r320
warmup5s−run30s
median 6179.542724614
30000
20000
10000
0
membw
0
20
40
60
80
timestamp
colour
membw


CopyOutOnly−1024B−32chunks−r320−
warmup5s−run30s
median 11595.97497559
30000
20000
10000
0
membw
0
20
40
60
timestamp
colour
membw