

## Results



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JMH version: 1.37



VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CacheGet

Parameters: (dataSize = 100)

Run progress: 0.00% complete, ETA 00:42:00

Fork: 1 of 2

Warmup Iteration 1: 400041.760 ops/ms

Warmup Iteration 2: 405889.285 ops/ms

Iteration 1: 437474.820 ops/ms

Iteration 2: 439902.782 ops/ms

Iteration 3: 433786.395 ops/ms

Iteration 4: 417408.682 ops/ms

Iteration 5: 375973.623 ops/ms



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Run progress: 2.78% complete, ETA 00:41:28

Fork: 2 of 2

Warmup Iteration 1: 405460.052 ops/ms

Warmup Iteration 2: 330583.285 ops/ms

Iteration 1: 301619.669 ops/ms  
Iteration 2: 298577.266 ops/ms  
Iteration 3: 342854.524 ops/ms  
Iteration 4: 396641.981 ops/ms  
Iteration 5: 424215.848 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCacheGet":  
386845.559 ±(99.9%) 82986.446 ops/ms [Average]  
(min, avg, max) = (298577.266, 386845.559, 439902.782), stdev = 54890.396  
CI (99.9%): [303859.113, 469832.005] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
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Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CacheGet

Parameters: (dataSize = 1000)

Run progress: 5.56% complete, ETA 00:40:15

Fork: 1 of 2

Warmup Iteration 1: 387245.861 ops/ms

Warmup Iteration 2: 379789.068 ops/ms

Iteration 1: 369103.699 ops/ms  
Iteration 2: 384010.593 ops/ms  
Iteration 3: 383163.503 ops/ms  
Iteration 4: 384166.304 ops/ms  
Iteration 5: 388204.416 ops/ms



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Run progress: 8.33% complete, ETA 00:39:04

Fork: 2 of 2

Warmup Iteration 1: 386453.885 ops/ms

Warmup Iteration 2: 375567.746 ops/ms

Iteration 1: 359314.445 ops/ms  
Iteration 2: 317593.690 ops/ms  
Iteration 3: 324675.133 ops/ms  
Iteration 4: 330437.265 ops/ms  
Iteration 5: 326414.664 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCacheGet":  
356708.371 ±(99.9%) 43689.003 ops/ms [Average]  
(min, avg, max) = (317593.690, 356708.371, 388204.416), stdev = 28897.571  
CI (99.9%): [313019.368, 400397.374] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
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Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CacheGet

Parameters: (dataSize = 10000)

Run progress: 11.11% complete, ETA 00:37:53

Fork: 1 of 2

Warmup Iteration 1: 62594.498 ops/ms

Warmup Iteration 2: 48592.673 ops/ms

Iteration 1: 57357.634 ops/ms

Iteration 2: 51918.262 ops/ms

Iteration 3: 56267.154 ops/ms

Iteration 4: 63924.179 ops/ms

Iteration 5: 64116.820 ops/ms



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Run progress: 13.89% complete, ETA 00:36:42

Fork: 2 of 2

Warmup Iteration 1: 85519.264 ops/ms

Warmup Iteration 2: 68258.926 ops/ms

Iteration 1: 69859.601 ops/ms  
Iteration 2: 70547.491 ops/ms  
Iteration 3: 69517.512 ops/ms  
Iteration 4: 69177.490 ops/ms  
Iteration 5: 69626.160 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCacheGet":  
64231.230 ±(99.9%) 10272.210 ops/ms [Average]  
(min, avg, max) = (51918.262, 64231.230, 70547.491), stdev = 6794.431  
CI (99.9%): [53959.020, 74503.440] (assumes normal distribution)

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Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CacheInvalidate

Parameters: (dataSize = 100)

Run progress: 16.67% complete, ETA 00:35:31

Fork: 1 of 2

Warmup Iteration 1: 103424.870 ops/ms

Warmup Iteration 2: 98956.184 ops/ms

Iteration 1: 102975.598 ops/ms

Iteration 2: 106098.129 ops/ms

Iteration 3: 88070.073 ops/ms

Iteration 4: 95258.211 ops/ms

Iteration 5: 91097.817 ops/ms



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Run progress: 19.44% complete, ETA 00:34:20

Fork: 2 of 2

Warmup Iteration 1: 97990.456 ops/ms

Warmup Iteration 2: 93673.357 ops/ms

Iteration 1: 97792.379 ops/ms  
Iteration 2: 99948.372 ops/ms  
Iteration 3: 109267.368 ops/ms  
Iteration 4: 108840.751 ops/ms  
Iteration 5: 109060.394 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCacheInvalidate":  
100840.909 ±(99.9%) 11645.955 ops/ms [Average]  
(min, avg, max) = (88070.073, 100840.909, 109267.368), stdev = 7703.078  
CI (99.9%): [89194.955, 112486.864] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

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Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CacheInvalidate

Parameters: (dataSize = 1000)

Run progress: 22.22% complete, ETA 00:33:10

Fork: 1 of 2

Warmup Iteration 1: 98768.203 ops/ms

Warmup Iteration 2: 100597.953 ops/ms

Iteration 1: 99466.367 ops/ms

Iteration 2: 100343.952 ops/ms

Iteration 3: 100499.542 ops/ms

Iteration 4: 97132.605 ops/ms

Iteration 5: 100565.608 ops/ms



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Run progress: 25.00% complete, ETA 00:31:59

Fork: 2 of 2

Warmup Iteration 1: 103387.400 ops/ms

Warmup Iteration 2: 101962.214 ops/ms

Iteration 1: 104054.119 ops/ms  
Iteration 2: 104233.102 ops/ms  
Iteration 3: 103782.010 ops/ms  
Iteration 4: 103567.258 ops/ms  
Iteration 5: 104492.288 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCacheInvalidate":  
101813.685 ±(99.9%) 3833.503 ops/ms [Average]  
(min, avg, max) = (97132.605, 101813.685, 104492.288), stdev = 2535.625  
CI (99.9%): [97980.181, 105647.188] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
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Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CacheInvalidate

Parameters: (dataSize = 10000)

Run progress: 27.78% complete, ETA 00:30:48

Fork: 1 of 2

Warmup Iteration 1: 100936.528 ops/ms

Warmup Iteration 2: 102008.856 ops/ms

Iteration 1: 103205.710 ops/ms

Iteration 2: 102589.750 ops/ms

Iteration 3: 103147.824 ops/ms

Iteration 4: 102216.493 ops/ms

Iteration 5: 102766.967 ops/ms



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Run progress: 30.56% complete, ETA 00:29:37

Fork: 2 of 2

Warmup Iteration 1: 100783.451 ops/ms

Warmup Iteration 2: 101939.624 ops/ms

Iteration 1: 103141.209 ops/ms  
Iteration 2: 101999.424 ops/ms  
Iteration 3: 99873.704 ops/ms  
Iteration 4: 102803.153 ops/ms  
Iteration 5: 101631.383 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCacheInvalidate":  
102337.562 ±(99.9%) 1530.149 ops/ms [Average]  
(min, avg, max) = (99873.704, 102337.562, 103205.710), stdev = 1012.099  
CI (99.9%): [100807.413, 103867.711] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CachePut

Parameters: (dataSize = 100)

Run progress: 33.33% complete, ETA 00:28:26

Fork: 1 of 2

Warmup Iteration 1: 198715.066 ops/ms

Warmup Iteration 2: 194302.803 ops/ms

Iteration 1: 201583.773 ops/ms

Iteration 2: 201359.623 ops/ms

Iteration 3: 201684.721 ops/ms

Iteration 4: 202619.287 ops/ms

Iteration 5: 169151.392 ops/ms



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Run progress: 36.11% complete, ETA 00:27:14

Fork: 2 of 2

Warmup Iteration 1: 177634.394 ops/ms

Warmup Iteration 2: 178219.892 ops/ms

Iteration 1: 184168.983 ops/ms  
Iteration 2: 187280.788 ops/ms  
Iteration 3: 188310.717 ops/ms  
Iteration 4: 190665.308 ops/ms  
Iteration 5: 189296.889 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCachePut":  
191612.148 ±(99.9%) 16038.548 ops/ms [Average]  
(min, avg, max) = (169151.392, 191612.148, 202619.287), stdev = 10608.507  
CI (99.9%): [175573.600, 207650.696] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
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Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CachePut

Parameters: (dataSize = 1000)

Run progress: 38.89% complete, ETA 00:26:03

Fork: 1 of 2

Warmup Iteration 1: 158547.396 ops/ms

Warmup Iteration 2: 159165.867 ops/ms

Iteration 1: 154779.656 ops/ms

Iteration 2: 156113.164 ops/ms

Iteration 3: 83465.323 ops/ms

Iteration 4: 81528.523 ops/ms

Iteration 5: 29230.531 ops/ms



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Run progress: 41.67% complete, ETA 00:25:34

Fork: 2 of 2

Warmup Iteration 1: 741.088 ops/ms

Warmup Iteration 2: 137847.435 ops/ms

Iteration 1: 154355.015 ops/ms  
Iteration 2: 158944.127 ops/ms  
Iteration 3: 160398.856 ops/ms  
Iteration 4: 160113.563 ops/ms  
Iteration 5: 159999.779 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCachePut":  
129892.854 ±(99.9%) 71495.725 ops/ms [Average]  
(min, avg, max) = (29230.531, 129892.854, 160398.856), stdev = 47289.996  
CI (99.9%): [58397.128, 201388.579] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
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Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeine  
CachePut

Parameters: (dataSize = 10000)

Run progress: 44.44% complete, ETA 01:04:41

Fork: 1 of 2

Warmup Iteration 1: 45263.694 ops/ms

Warmup Iteration 2: 46022.082 ops/ms

Iteration 1: 46082.610 ops/ms

Iteration 2: 46392.987 ops/ms

Iteration 3: 46346.064 ops/ms

Iteration 4: 44102.180 ops/ms

Iteration 5: 39294.642 ops/ms



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Run progress: 47.22% complete, ETA 00:59:10

Fork: 2 of 2

Warmup Iteration 1: 49703.468 ops/ms

Warmup Iteration 2: 49876.876 ops/ms

Iteration 1: 50439.359 ops/ms  
Iteration 2: 51420.651 ops/ms  
Iteration 3: 47356.344 ops/ms  
Iteration 4: 50363.215 ops/ms  
Iteration 5: 25949.530 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testCaffeineCachePut":  
44774.758 ±(99.9%) 11334.140 ops/ms [Average]  
(min, avg, max) = (25949.530, 44774.758, 51420.651), stdev = 7496.832  
CI (99.9%): [33440.618, 56108.899] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
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Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapGet

Parameters: (dataSize = 100)

Run progress: 50.00% complete, ETA 00:54:07

Fork: 1 of 2

Warmup Iteration 1: 695708.656 ops/ms

Warmup Iteration 2: 695182.175 ops/ms

Iteration 1: 711726.529 ops/ms

Iteration 2: 722291.072 ops/ms

Iteration 3: 718632.447 ops/ms

Iteration 4: 723053.091 ops/ms

Iteration 5: 727122.647 ops/ms



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You can change this at any time in your Atlassian account.

Run progress: 52.78% complete, ETA 00:49:29

Fork: 2 of 2

Warmup Iteration 1: 684487.315 ops/ms

Warmup Iteration 2: 689606.769 ops/ms

Iteration 1: 718820.450 ops/ms  
Iteration 2: 721427.687 ops/ms  
Iteration 3: 730493.228 ops/ms  
Iteration 4: 729669.173 ops/ms  
Iteration 5: 729153.126 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapGet":  
723238.945 ±(99.9%) 9036.437 ops/ms [Average]  
(min, avg, max) = (711726.529, 723238.945, 730493.228), stdev = 5977.044  
CI (99.9%): [714202.508, 732275.382] (assumes normal distribution)

JMH version: 1.37

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Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapGet

Parameters: (dataSize = 1000)

Run progress: 55.56% complete, ETA 00:45:11

Fork: 1 of 2

Warmup Iteration 1: 600013.904 ops/ms

Warmup Iteration 2: 626852.975 ops/ms

Iteration 1: 600711.873 ops/ms

Iteration 2: 648513.263 ops/ms

Iteration 3: 652992.335 ops/ms

Iteration 4: 652729.967 ops/ms

Iteration 5: 637262.721 ops/ms



Cookie preferences saved

You can change this at any time in your Atlassian account.

Run progress: 58.33% complete, ETA 00:41:12

Fork: 2 of 2

Warmup Iteration 1: 585618.122 ops/ms

Warmup Iteration 2: 638252.490 ops/ms

Iteration 1: 594096.219 ops/ms  
Iteration 2: 647994.969 ops/ms  
Iteration 3: 643407.911 ops/ms  
Iteration 4: 634609.405 ops/ms  
Iteration 5: 630112.748 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapGet":  
634243.141 ±(99.9%) 31602.562 ops/ms [Average]  
(min, avg, max) = (594096.219, 634243.141, 652992.335), stdev = 20903.138  
CI (99.9%): [602640.579, 665845.703] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
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Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapGet

Parameters: (dataSize = 10000)

Run progress: 61.11% complete, ETA 00:37:27

Fork: 1 of 2

Warmup Iteration 1: 262966.442 ops/ms

Warmup Iteration 2: 308024.955 ops/ms

Iteration 1: 391784.618 ops/ms

Iteration 2: 379984.487 ops/ms

Iteration 3: 557809.938 ops/ms

Iteration 4: 802818.988 ops/ms

Iteration 5: 768484.476 ops/ms



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Run progress: 63.89% complete, ETA 00:33:57

Fork: 2 of 2

Warmup Iteration 1: 674670.914 ops/ms

Warmup Iteration 2: 717059.765 ops/ms

Iteration 1: 757203.058 ops/ms  
Iteration 2: 756436.015 ops/ms  
Iteration 3: 760570.471 ops/ms  
Iteration 4: 747308.164 ops/ms  
Iteration 5: 751266.062 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapGet":  
667366.628 ±(99.9%) 245456.100 ops/ms [Average]  
(min, avg, max) = (379984.487, 667366.628, 802818.988), stdev = 162354.013  
CI (99.9%): [421910.527, 912822.728] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapPut

Parameters: (dataSize = 100)

Run progress: 66.67% complete, ETA 00:30:37

Fork: 1 of 2

Warmup Iteration 1: 137216.240 ops/ms

Warmup Iteration 2: 134929.166 ops/ms

Iteration 1: 136312.528 ops/ms

Iteration 2: 91826.289 ops/ms

Iteration 3: 79599.854 ops/ms

Iteration 4: 89552.184 ops/ms

Iteration 5: 93848.393 ops/ms



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Run progress: 69.44% complete, ETA 00:27:28

Fork: 2 of 2

Warmup Iteration 1: 84363.569 ops/ms

Warmup Iteration 2: 88858.948 ops/ms

Iteration 1: 91928.175 ops/ms  
Iteration 2: 92260.044 ops/ms  
Iteration 3: 89814.463 ops/ms  
Iteration 4: 87795.318 ops/ms  
Iteration 5: 91891.433 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapPut":  
94482.868 ±(99.9%) 23026.250 ops/ms [Average]  
(min, avg, max) = (79599.854, 94482.868, 136312.528), stdev = 15230.439  
CI (99.9%): [71456.618, 117509.118] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapPut

Parameters: (dataSize = 1000)

Run progress: 72.22% complete, ETA 00:24:28

Fork: 1 of 2

Warmup Iteration 1: 158905.337 ops/ms

Warmup Iteration 2: 188476.220 ops/ms

Iteration 1: 188236.010 ops/ms

Iteration 2: 191455.063 ops/ms

Iteration 3: 186477.776 ops/ms

Iteration 4: 188332.327 ops/ms

Iteration 5: 191236.143 ops/ms



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Run progress: 75.00% complete, ETA 00:21:36

Fork: 2 of 2

Warmup Iteration 1: 183235.000 ops/ms

Warmup Iteration 2: 177379.259 ops/ms

Iteration 1: 187515.651 ops/ms  
Iteration 2: 187488.976 ops/ms  
Iteration 3: 186276.096 ops/ms  
Iteration 4: 184973.486 ops/ms  
Iteration 5: 184250.854 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapPut":  
187624.238 ±(99.9%) 3569.353 ops/ms [Average]  
(min, avg, max) = (184250.854, 187624.238, 191455.063), stdev = 2360.906  
CI (99.9%): [184054.886, 191193.591] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapPut

Parameters: (dataSize = 10000)

Run progress: 77.78% complete, ETA 00:18:51

Fork: 1 of 2

Warmup Iteration 1: 174069.593 ops/ms

Warmup Iteration 2: 173341.047 ops/ms

Iteration 1: 174611.741 ops/ms

Iteration 2: 174709.374 ops/ms

Iteration 3: 169373.243 ops/ms

Iteration 4: 165058.062 ops/ms

Iteration 5: 158505.644 ops/ms



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Run progress: 80.56% complete, ETA 00:16:13

Fork: 2 of 2

Warmup Iteration 1: 161338.572 ops/ms

Warmup Iteration 2: 147222.894 ops/ms

Iteration 1: 121639.002 ops/ms  
Iteration 2: 120939.297 ops/ms  
Iteration 3: 143398.184 ops/ms  
Iteration 4: 148568.732 ops/ms  
Iteration 5: 150575.361 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapPut":  
152737.864 ±(99.9%) 29859.256 ops/ms [Average]  
(min, avg, max) = (120939.297, 152737.864, 174709.374), stdev = 19750.049  
CI (99.9%): [122878.608, 182597.120] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapRemove

Parameters: (dataSize = 100)

Run progress: 83.33% complete, ETA 00:13:40

Fork: 1 of 2

Warmup Iteration 1: 1026329.827 ops/ms

Warmup Iteration 2: 972070.738 ops/ms

Iteration 1: 1165362.528 ops/ms

Iteration 2: 1140566.007 ops/ms

Iteration 3: 973265.737 ops/ms

Iteration 4: 1135191.788 ops/ms

Iteration 5: 1140959.367 ops/ms



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Run progress: 86.11% complete, ETA 00:11:13

Fork: 2 of 2

Warmup Iteration 1: 951104.755 ops/ms

Warmup Iteration 2: 938859.293 ops/ms

Iteration 1: 939554.026 ops/ms  
Iteration 2: 777461.740 ops/ms  
Iteration 3: 785892.761 ops/ms  
Iteration 4: 797721.648 ops/ms  
Iteration 5: 798036.380 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapRemove":  
965401.198 ±(99.9%) 254343.061 ops/ms [Average]  
(min, avg, max) = (777461.740, 965401.198, 1165362.528), stdev = 168232.187  
CI (99.9%): [711058.137, 1219744.260] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapRemove

Parameters: (dataSize = 1000)

Run progress: 88.89% complete, ETA 00:08:50

Fork: 1 of 2

Warmup Iteration 1: 193387.010 ops/ms

Warmup Iteration 2: 160644.077 ops/ms

Iteration 1: 170489.205 ops/ms

Iteration 2: 168834.899 ops/ms

Iteration 3: 172633.025 ops/ms

Iteration 4: 165756.901 ops/ms

Iteration 5: 165255.074 ops/ms



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Run progress: 91.67% complete, ETA 00:06:32

Fork: 2 of 2

Warmup Iteration 1: 206067.297 ops/ms

Warmup Iteration 2: 162903.513 ops/ms

Iteration 1: 157976.333 ops/ms  
Iteration 2: 164948.333 ops/ms  
Iteration 3: 164795.247 ops/ms  
Iteration 4: 164715.128 ops/ms  
Iteration 5: 167621.353 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapRemove":  
166302.550 ±(99.9%) 6028.536 ops/ms [Average]  
(min, avg, max) = (157976.333, 166302.550, 172633.025), stdev = 3987.503  
CI (99.9%): [160274.014, 172331.086] (assumes normal distribution)

JMH version: 1.37

VM version: JDK 17.0.13, OpenJDK 64-Bit Server VM,  
17.0.13+11-LTS

VM invoker: C:\Users\kashan.asim\.jdks\azul-  
17.0.13\bin\java.exe

VM options: -javaagent:C:\Program Files\JetBrains\IntelliJ IDEA  
2021.1.3\lib\idea\_rt.jar=50095:C:\Program



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Files\JetBrains\IntelliJ IDEA 2021.1.3\bin -Dfile.encoding=UTF-8

Blackhole mode: compiler (auto-detected, use -Djmh.blackhole.autoDetect=false to disable)

Warmup: 2 iterations, 10 s each

Measurement: 5 iterations, 10 s each

Timeout: 10 min per iteration

Threads: 4 threads, will synchronize iterations

Benchmark mode: Throughput, ops/time

Benchmark:

com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapRemove

Parameters: (dataSize = 10000)

Run progress: 94.44% complete, ETA 00:04:18

Fork: 1 of 2

Warmup Iteration 1: 210837.414 ops/ms

Warmup Iteration 2: 158537.580 ops/ms

Iteration 1: 166481.797 ops/ms

Iteration 2: 172553.415 ops/ms

Iteration 3: 176843.827 ops/ms

Iteration 4: 154531.648 ops/ms

Iteration 5: 175883.050 ops/ms



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Run progress: 97.22% complete, ETA 00:02:07

Fork: 2 of 2

Warmup Iteration 1: 194935.930 ops/ms

Warmup Iteration 2: 190179.148 ops/ms

Iteration 1: 196581.280 ops/ms  
Iteration 2: 197033.855 ops/ms  
Iteration 3: 157365.256 ops/ms  
Iteration 4: 163761.508 ops/ms  
Iteration 5: 163615.999 ops/ms

Result "com.dust.corp.cache.benchmark.CacheBenchmark.testConcurrentHashMapRemove":  
 $172465.163 \pm (99.9\%) 22285.585$  ops/ms [Average]  
(min, avg, max) = (154531.648, 172465.163, 197033.855), stdev = 14740.535  
CI (99.9%): [150179.578, 194750.749] (assumes normal distribution)

Run complete. Total time: 01:15:28

REMEMBER: The numbers below are just data. To gain reusable insights, you need to follow up on why the numbers are the way they are. Use profilers (see -prof, -lprof), design factorial experiments, perform baseline and negative tests that provide experimental control, make sure the benchmarking environment is safe on JVM/OS/HW level, ask for reviews from the domain experts. Do not assume the numbers tell you what you want them to tell.

NOTE: Current JVM experimentally supports Compiler Blackholes, and they are in use. Please exercise extra caution when trusting the results, look into the generated code to check the benchmark still works, and factor in a small probability of new VM bugs. Additionally, while comparisons between different JVMs are already problematic, the performance difference caused by different Blackhole modes can be very significant. Please make sure you use the consistent Blackhole mode for comparisons.

Benchmark	(dataSize)	Mode	Cnt	Score	Error	Units
CacheBenchmark.testCaffeineCacheGet		thrpt	10	386845.559	$\pm$ 82986.446	ops/ms
CacheBenchmark.testCaffeineCacheGet		thrpt	1000	356708.371	$\pm$ 43689.003	ops/ms
CacheBenchmark.testCaffeineCacheGet		thrpt	10000	64231.230	$\pm$ 10272.210	ops/ms
CacheBenchmark.testCaffeineCacheInvalidate		thrpt	100	100840.909	$\pm$ 11645.955	ops/ms
CacheBenchmark.testCaffeineCacheInvalidate		thrpt	1000	101813.685	$\pm$ 3833.503	ops/ms
CacheBenchmark.testCaffeineCacheInvalidate		thrpt	10000	102337.562	$\pm$ 1530.149	ops/ms
CacheBenchmark.testCaffeineCachePut		thrpt	100	191612.148	$\pm$ 16038.548	ops/ms
CacheBenchmark.testCaffeineCachePut		thrpt	1000	129892.854	$\pm$ 71495.725	ops/ms
CacheBenchmark.testCaffeineCachePut		thrpt	10000	44774.758	$\pm$ 11334.140	ops/ms
CacheBenchmark.testConcurrentHashMapGet		thrpt	100	723238.945	$\pm$ 9036.437	ops/ms
CacheBenchmark.testConcurrentHashMapGet		thrpt	1000	634243.141	$\pm$ 31602.562	ops/ms
CacheBenchmark.testConcurrentHashMapGet		thrpt	10000	667366.628	$\pm$ 245456.100	ops/ms
CacheBenchmark.testConcurrentHashMapPut		thrpt	100	94482.868	$\pm$ 23026.250	ops/ms
CacheBenchmark.testConcurrentHashMapPut		thrpt	1000	187624.238	$\pm$ 3569.353	ops/ms
CacheBenchmark.testConcurrentHashMapPut		thrpt	10000	152737.864	$\pm$ 29859.256	ops/ms



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ave 100 thrpt 10 965401.198  $\pm$  254343.061 ops/ms  
ave 1000 thrpt 10 166302.550  $\pm$  6028.536 ops/ms  
ave 10000 thrpt 10 172465.163  $\pm$  22285.585 ops/ms

Process finished with exit code 0

