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GitHub Repo Under NEU Organization:

<https://github.ccs.neu.edu/lisiqi/CS6650-DSBS-Repo>

Explanation About Client Structure and How it works:

Total three Packages @ “SuperMarketClient”:

* Model: (general utils for both client 1 and 2)
  + Record: the record object used to store all latency results for Client2
  + LogStderr: the error logger for write out system error to err.txt file
  + HttpMethod: Enum for POST and GET
* part1: (package for client 1 to generate requested outputs)
  + Client1:
    - Main for execute all threads by calling SingleThread in package part1
    - Parse command line arguments with designed cmd options
    - Check if command line arguments are valid
    - Generate output results for part 1, print out to console
  + SingleThread:
    - the single runnable object represents as one thread to make purchase requests with remote server
    - Use AtomicInteger to count the total successful/unsuccessful requests
    - Use CountDownLatch to initiate phase 2 and phase 3 threads
    - designed for Client 1 without capture latency of each request
    - use LogStderr to log errors into txt file
* part2: (package for client 2 to generate requested outputs)
  + Clinet2:
    - Main for execute all threads by calling SingleThread in package part2
    - Parse command line arguments with designed cmd options
    - Check if command line arguments are valid
    - Generate output results for part 2, print out to console
  + SingleThread:
    - the single runnable object represents as one thread to make purchase requests with remote server
    - Use AtomicInteger to count the total successful/unsuccessful requests
    - Use CountDownLatch to initiate phase 2 and phase 3 threads
    - designed for Client 2 to capture start and end time of each request, in order to get latency time
    - use LogStderr to log errors into txt file
  + RecordWriter:
    - Runnable object used to generate Records object and write to csv file
    - Using BlockingQueue, and work as a Consumer, when consider each SingleThread are all producers of the queue
  + ReportGenerator:
    - Generate output results for part 2, print out to console
    - Read in all Records stored in CSV and get all Latency in to a list and sort list
    - Analysis all latency list, and get mean, median, max and p99 response time

Below are the output results for Client 1 and Client 2 and some analysis Charts:

* Results based on run Server on EC2, and run client locally
* With 32 Threads:

Generate Output Result For Part1.Client1 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 32, numOfCustomersPerStore: 1000, maxItemId: 100000

numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

==============================================================================

1. Total number of successful requests sent: 17280

2. Total number of unsuccessful requests: 0

3. The total run time (wall time) for all phases to complete: 48.301 second

4. Throughput: 357.757 requests/second

Generate Output Result For Part2.Client2 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 32, numOfCustomersPerStore: 1000, maxItemId: 100000

numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

==============================================================================

1. Total number of successful requests sent: 17280

2. Total number of unsuccessful requests: 0

3. Mean response time for POSTs: 85.689 milliseconds

4. Median response time for POSTs: 81.000 milliseconds

5. The total run time (wall time) for all phases to complete: 49.925 second

6. Throughput: 346.119 requests/second

7. P99 (99th percentile) response time for POSTs: 173 milliseconds

8. Max response time for POSTs: 466 milliseconds

* With 64 Threads:

Generate Output Result For Part1.Client1 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 64, numOfCustomersPerStore: 1000, maxItemId: 100000

numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

==============================================================================

1. Total number of successful requests sent: 34560

2. Total number of unsuccessful requests: 0

3. The total run time (wall time) for all phases to complete: 47.984 second

4. Throughput: 720.240 requests/second

Generate Output Result For Part2.Client2 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 64, numOfCustomersPerStore: 1000, maxItemId: 100000

numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

==============================================================================

1. Total number of successful requests sent: 34560

2. Total number of unsuccessful requests: 0

3. Mean response time for POSTs: 85.586 milliseconds

4. Median response time for POSTs: 81.000 milliseconds

5. The total run time (wall time) for all phases to complete: 48.779 second

6. Throughput: 708.502 requests/second

7. P99 (99th percentile) response time for POSTs: 177 milliseconds

8. Max response time for POSTs: 486 milliseconds

* With 128 Threads:

Generate Output Result For Part1.Client1 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 128, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 69120

2. Total number of unsuccessful requests: 0

3. The total run time (wall time) for all phases to complete: 49.115 second

4. Throughput: 1407.309 requests/second

Generate Output Result For Part2.Client2 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 128, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 69120

2. Total number of unsuccessful requests: 0

3. Mean response time for POSTs: 86.010 milliseconds

4. Median response time for POSTs: 82.000 milliseconds

5. The total run time (wall time) for all phases to complete: 48.636 second

6. Throughput: 1421.170 requests/second

7. P99 (99th percentile) response time for POSTs: 172 milliseconds

8. Max response time for POSTs: 647 milliseconds

* With 256 Threads:

Generate Output Result For Part1.Client1 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 256, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 138240

2. Total number of unsuccessful requests: 0

3. The total run time (wall time) for all phases to complete: 49.65 second

4. Throughput: 2784.290 requests/second

Generate Output Result For Part2.Client2 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 256, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 138240

2. Total number of unsuccessful requests: 0

3. Mean response time for POSTs: 89.204 milliseconds

4. Median response time for POSTs: 84.000 milliseconds

5. The total run time (wall time) for all phases to complete: 50.183 second

6. Throughput: 2754.718 requests/second

7. P99 (99th percentile) response time for POSTs: 191 milliseconds

8. Max response time for POSTs: 617 milliseconds

* With 512 Threads:

Generate Output Result For Part1.Client1 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 512, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 276480

2. Total number of unsuccessful requests: 0

3. The total run time (wall time) for all phases to complete: 52.526 second

4. Throughput: 5263.679 requests/second

Generate Output Result For Part2.Client2 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 512, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 276480

2. Total number of unsuccessful requests: 0

3. Mean response time for POSTs: 100.661 milliseconds

4. Median response time for POSTs: 86.000 milliseconds

5. The total run time (wall time) for all phases to complete: 59.737 second

6. Throughput: 4628.287 requests/second

7. P99 (99th percentile) response time for POSTs: 444 milliseconds

8. Max response time for POSTs: 6916 milliseconds

* With 1024 Threads:

Generate Output Result For Part1.Client1 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 1024, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 552558

2. Total number of unsuccessful requests: 0

3. The total run time (wall time) for all phases to complete: 127.755 second

4. Throughput: 4328.285 requests/second

Generate Output Result For Part2.Client2 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 1024, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 552837

2. Total number of unsuccessful requests: 0

3. Mean response time for POSTs: 131.917 milliseconds

4. Median response time for POSTs: 107.000 milliseconds

5. The total run time (wall time) for all phases to complete: 81.049 second

6. Throughput: 6822.539 requests/second

7. P99 (99th percentile) response time for POSTs: 638 milliseconds

8. Max response time for POSTs: 7183 milliseconds

* With 2048 Threads:

Generate Output Result For Part1.Client1 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 2048, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 1105837

2. Total number of unsuccessful requests: 0

3. The total run time (wall time) for all phases to complete: 175.212 second

4. Throughput: 6311.896 requests/second

Generate Output Result For Part2.Client2 Based On Following Parameters:

IP Address: 54.166.123.80, Max Store: 2048, numOfCustomersPerStore: 1000, maxItemId: 100000, numPurchasesPerHour: 60, numItemsPerPurchase: 5, @ Date: 2021-01-01

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1. Total number of successful requests sent: 1101468

2. Total number of unsuccessful requests: 0

3. Mean response time for POSTs: 202.161 milliseconds

4. Median response time for POSTs: 120.000 milliseconds

5. The total run time (wall time) for all phases to complete: 176.355 second

6. Throughput: 6270.987 requests/second

7. P99 (99th percentile) response time for POSTs: 1875 milliseconds

8. Max response time for POSTs: 18614 milliseconds

Charts on Analysis Program Performance: