

AngusTester 和 JMeter HTTP 测试结果比较

本次测试主要目的是对比 AngusTester 和 JMeter 在 HTTP 协议基准性能测试(最小延迟小于1毫秒)的表现。

测试环境

以下测试 AngusTester 和 JMeter 使用相同环境。注意：本次测试是在同一台 PC 机上进行，如果想测试特定配置下服务的准确性能，需要将测试机和服务分开部署，或者使用更高配置的测试服务器。

软件

- 测试服务
 - AngusMockService-1.0.0
- 测试工具
 - AngusTester 1.0.0
 - Apache JMeter 4.0

系统

MacBookPro16 PC

- Processors: 1
- Cores: 8 * 2 Intel Core i9 2.3 GHz
- Memory: 32 GB

服务配置

```
## Mock服务绑定IP，默认为0.0.0.0。
angusmock.serverIp=0.0.0.0
## Mock服务绑定端口，默认为30010。
angusmock.serverPort=30010
## 在Netty HTTP服务器上启用SSL选项，默认为false。
angusmock.useSsl=false
## 处理请求的线程数量，最大为10000，默认为256。
angusmock.workThreadNum=256
## Mock服务处理请求的线程前缀，默认为AngusMock-Thread。
angusmock.threadNamePrefix=AngusMock-Thread
## 启用Netty日志。建议仅在调试模式下打开，默认为false。
angusmock.enableNettyLog=false
## 配置将请求信息记录到日志文件的级别，包括两个选项：NONE、BASIC、HEADERS和FULL。
### - NONE：不记录日志。
### - BASIC：仅记录请求方法和URL，以及响应状态码和执行时间，默认值。
```

```
### - HEADERS: 记录基本信息以及请求和响应头部。
### - FULL: 记录请求和响应的头部、主体和元数据。
angusmock.logFileLevel=NONE
## 是否将模拟请求日志发送到服务器端, 默认为true。
angusmock.sendRequestLog=false
## 允许的最大请求大小, 默认为1000 * 1024 * 1024 (1000MB)。
angusmock.maxContentLength=1048576000
## 处理推送请求的线程数量, 默认为8。
angusmock.pushbackThreadNum=8
## 推送回退连接的最大超时时间, 单位毫秒, 默认为5000。
angusmock.maxPushbackConnectTimeout=5000
## 推送回退请求的最大超时时间, 单位毫秒, 默认为-1表示不超时。
angusmock.maxPushbackReadTimeout=-1
## 启用Mock服务的CORS (跨源资源共享) 配置, 默认为false。注意: 服务配置的优先级高于属性文件配置。
angusmock.allowCors=false
## Access-Control-Allow-Origin: 指定可以参与跨源资源共享的Web站点, 默认为*。
angusmock.allowCorsOrigin=*
## Access-Control-Allow-Credentials: 指定第三方站点是否可以执行特权操作并检索敏感信息, 默认为true。
angusmock.allowCorsCredentials=true
## Access-Control-Allow-Headers: 指定客户端可以使用的允许的HTTP请求头, 默认为空。
angusmock.allowCorsRequestHeaders=*
## Access-Control-Allow-Methods: 指定允许的HTTP方法, 默认为GET、POST、PUT、PATCH、DELETE、OPTIONS、HEAD。
angusmock.allowCorsRequestMethod=GET,POST,PUT,PATCH,DELETE,OPTIONS,HEAD
## Access-Control-Expose-Headers: 指定允许在响应中访问的特定头字段, 这些字段不包括在默认的可访问头集合中, 客户端 (通常是Web浏览器) 可以访问, 默认为空。
angusmock.allowCorsExposeHeaders=*
#-----
# Angus Mock服务管理配置
#-----
## Mock服务管理端点的基本路径, 固定为/actuator。
# angusmock.management.endpointsBasePath=/actuator
## Mock服务管理端点允许跨域访问, 默认为true。
angusmock.management.endpointsAllowCors=true
#-----
# Angus Mock身份配置
#-----
## Mock服务的租户ID, 私有版本环境时需要手动配置, 默认为空。
angusmock.principal.tenantId=1
## Mock服务的ID, 私有版本环境时需要手动配置, 默认为空。
angusmock.principal.mockServiceId=190640054090072119
## Mock服务设备(节点)ID, 私有版本环境时需要手动配置, 默认为空。
angusmock.principal.deviceId=187166587336261670
#-----
# Angus Mock推送配置
#-----
# 推送JVM指标的时间间隔, 默认为15秒。
angusmock.jvmMetrics.pushIntervalInSeconds=15
```

```
# 推送JVM指标的超时时间，不能超过exchange.pushTimeout，默认为5秒。  
angusmock.jvmMetrics.pushTimeoutInSeconds=10
```

测试接口

```
curl -i http://localhost:30010/benchmark  
HTTP/1.1 200 OK  
XC-Mock-ServiceId: 190640054090072119  
XC-Mock-RequestId: fc479980-59e2-4479-a732-008e3eff218f  
Access-Control-Allow-Origin: *  
Access-Control-Allow-Credentials: true  
Access-Control-Allow-Headers: *  
Access-Control-Allow-Methods: GET, POST, PUT, PATCH, DELETE, OPTIONS, HEAD  
Access-Control-Expose-Headers: *  
Content-Type: text/plain  
content-length: 7  
  
Success
```

测试脚本

- JMeter 脚本 (Http_Testing_Benchmark_AngusTesterVSMeter.jmx)

```
<?xml version="1.0" encoding="UTF-8"?>  
<jmeterTestPlan version="1.2" properties="4.0" jmeter="4.0 r1823414">  
  <hashTree>  
    <TestPlan guiclass="TestPlanGui" testclass="TestPlan" testname="Http performance testing" enabled="true">  
      <stringProp name="TestPlan.comments"></stringProp>  
      <boolProp name="TestPlan.functional_mode">false</boolProp>  
      <boolProp name="TestPlan.tearDown_on_shutdown">true</boolProp>  
      <boolProp name="TestPlan.serialize_threadgroups">false</boolProp>  
      <elementProp name="TestPlan.user_defined_variables" elementType="Arguments" guiclass="ArgumentsPanel" testclass="Arguments" testname="User  
Defined Variables" enabled="true">  
        <collectionProp name="Arguments.arguments"/>  
      </elementProp>  
      <stringProp name="TestPlan.user_define_classpath"></stringProp>  
    </TestPlan>  
    <hashTree>  
      <ThreadGroup guiclass="ThreadGroupGui" testclass="ThreadGroup" testname="Thread Group" enabled="true">  
        <stringProp name="ThreadGroup.on_sample_error">continue</stringProp>  
        <elementProp name="ThreadGroup.main_controller" elementType="LoopController" guiclass="LoopControlPanel" testclass="LoopController"  
testname="Loop Controller" enabled="true">  
          <boolProp name="LoopController.continue_forever">false</boolProp>
```

```

    <intProp name="LoopController.loops">-1</intProp>
  </elementProp>
  <stringProp name="ThreadGroup.num_threads">1<!-- 1/10/50/100/200/500/1000/2000 --></stringProp>
  <stringProp name="ThreadGroup.ramp_time"></stringProp>
  <boolProp name="ThreadGroup.scheduler">true</boolProp>
  <stringProp name="ThreadGroup.duration">60</stringProp>
  <stringProp name="ThreadGroup.delay"></stringProp>
</ThreadGroup>
<hashTree>
  <HTTPSamplerProxy guiclass="HttpTestSampleGui" testclass="HTTPSamplerProxy" testname="HTTP Request" enabled="true">
    <elementProp name="HTTPSampler.Arguments" elementType="Arguments" guiclass="HTTPArgumentsPanel" testclass="Arguments" testname="User
Defined Variables" enabled="true">
      <collectionProp name="Arguments.arguments"/>
    </elementProp>
    <stringProp name="HTTPSampler.domain">localhost</stringProp>
    <stringProp name="HTTPSampler.port">30010</stringProp>
    <stringProp name="HTTPSampler.protocol">http</stringProp>
    <stringProp name="HTTPSampler.contentEncoding"></stringProp>
    <stringProp name="HTTPSampler.path">/benchmark</stringProp>
    <stringProp name="HTTPSampler.method">GET</stringProp>
    <boolProp name="HTTPSampler.follow_redirects">true</boolProp>
    <boolProp name="HTTPSampler.auto_redirects">false</boolProp>
    <boolProp name="HTTPSampler.use_keepalive">true</boolProp>
    <boolProp name="HTTPSampler.DO_MULTIPART_POST">false</boolProp>
    <stringProp name="HTTPSampler.embedded_url_re"></stringProp>
    <stringProp name="HTTPSampler.connect_timeout"></stringProp>
    <stringProp name="HTTPSampler.response_timeout"></stringProp>
  </HTTPSamplerProxy>
  <hashTree/>
</hashTree>
</hashTree>
</jmeterTestPlan>

```

运行脚本：

```
./jmeter -n -t ~/scripts/Http_Testing_Benchmark_AngusTesterVSJMeter.jmx
```

- AngusTester 脚本 (Http_Testing_Benchmark_AngusTesterVSJMeter.yaml)

```

specification: angus/1.0.0
type: TEST_PERFORMANCE
plugin: Http
configuration:

```

```
duration: 60s
thread:
  threads: 1 # 1/10/50/100/200/500/1000/2000
priority: 1000
task:
  pipelines:
    - target: HTTP
      name: Total
      enabled: true
      request:
        method: GET
        url: http://localhost:30010/benchmark
```

运行脚本：

```
./startup-runner.sh -s ~/scripts/Http_Testing_Benchmark_AngusTesterVSJMeter.yaml -e 1
```

测试结果

Insert 测试

- 1 个线程运行 60 秒测试结果

JMeter 测试结果:

```
Starting the test @ Sat Jan 13 10:01:20 CST 2024 (1705111280949)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 88138 in 00:00:09 = 10013.4/s Avg: 0 Min: 0 Max: 50 Err: 0 (0.00%) Active: 1 Started: 1 Finished: 0
summary + 338604 in 00:00:30 = 11286.8/s Avg: 0 Min: 0 Max: 5 Err: 0 (0.00%) Active: 1 Started: 1 Finished: 0
summary = 426742 in 00:00:39 = 10997.9/s Avg: 0 Min: 0 Max: 50 Err: 0 (0.00%)
summary + 262119 in 00:00:21 = 12315.9/s Avg: 0 Min: 0 Max: 4 Err: 0 (0.00%) Active: 0 Started: 1 Finished: 1
summary = 688861 in 00:01:00 = 11464.6/s Avg: 0 Min: 0 Max: 50 Err: 0 (0.00%)
Tidying up ... @ Sat Jan 13 10:02:21 CST 2024 (1705111341284)
... end of run
```

AngusTester 测试结果:

```
=====
```

```
*** Task Summary Report @ Http TEST_PERFORMANCE @ 2024-01-12 22:05:28 ***
```

```
=====
```

Exec ID: 1	Run Mode: LOCAL	Memory: 114.51MBM(Used), 9.12GBM(Free)
------------	-----------------	--

```
Bytes: 270.42MB(Recv), 34.69MB(Write)      Iterations: 742283      Cpu: 55.70%(Proc), 226.68%(Sys)
Date: 01/12 10:04:28 to 01/12 10:05:28    Duration: 60 Second    Threads: 0/1  terminated

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Name | Samples | Mean | Min | Max | P50 | P75 | P90 | P99 | P999 | Trans | Trans/s | Errors | Error% | Recv/s | Write/s |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Total | 742283 | 0.08 | 0.0 | 119.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 742283 | 12371.38 | 0 | 0.0 | 4.51MB | 591.99KB |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

*** Sampling Result: SUCCESS
=====
```

- 10 个线程运行 60 秒测试结果

JMeter 测试结果：

```
Starting the test @ Fri Jan 12 22:11:55 CST 2024 (1705068715265)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 208924 in 00:00:04 = 46697.4/s Avg:      0 Min:      0 Max:    68 Err:      0 (0.00%) Active: 10 Started: 10 Finished: 0
summary + 2007667 in 00:00:30 = 66922.2/s Avg:      0 Min:      0 Max:    21 Err:      0 (0.00%) Active: 10 Started: 10 Finished: 0
summary = 2216591 in 00:00:34 = 64297.5/s Avg:      0 Min:      0 Max:    68 Err:      0 (0.00%)
summary + 1331246 in 00:00:26 = 51977.4/s Avg:      0 Min:      0 Max:      6 Err:      0 (0.00%) Active: 0 Started: 10 Finished: 10
summary = 3547837 in 00:01:00 = 59045.0/s Avg:      0 Min:      0 Max:    68 Err:      0 (0.00%)
Tidying up ...      @ Fri Jan 12 22:12:55 CST 2024 (1705068775613)
... end of run
```

AngusTester 测试结果：

```
=====
*** Task Summary Report @ Http TEST_PERFORMANCE @ 2024-01-12 22:09:57 ***
=====

Exec ID: 1                      Run Mode: LOCAL                      Memory: 216.81MBM(Used), 9.02GBM(Free)
Bytes: 1.23GB(Recv), 161.86MB(Write)  Iterations: 3463729                  Cpu: 550.21%(Proc), 1242.21%(Sys)
Date: 01/12 10:09:01 to --          Duration: 55 Second                  Threads: 10/10  running

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Name | Samples | Mean | Min | Max | P50 | P75 | P90 | P99 | P999 | Trans | Trans/s | Errors | Error% | Recv/s | Write/s |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Total | 3463719 | 0.16 | 0.0 | 155.0 | 0.0 | 0.0 | 1.0 | 1.0 | 1.0 | 3463719 | 62687.21 | 0 | 0.0 | 22.84MB | 2.93MB |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

*** Sampling Result: SUCCESS
=====
```

- 50 个线程运行 60 秒测试结果

JMeter 测试结果：

Starting the test @ Fri Jan 12 22:16:19 CST 2024 (1705068979674)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 804544 in 00:00:10 = 79879.3/s Avg: 0 Min: 0 Max: 250 Err: 0 (0.00%) Active: 50 Started: 50 Finished: 0
summary + 2240631 in 00:00:30 = 74687.7/s Avg: 0 Min: 0 Max: 137 Err: 0 (0.00%) Active: 50 Started: 50 Finished: 0
summary = 3045175 in 00:00:40 = 75992.6/s Avg: 0 Min: 0 Max: 250 Err: 0 (0.00%)
summary + 1274138 in 00:00:20 = 63627.4/s Avg: 0 Min: 0 Max: 167 Err: 0 (0.00%) Active: 0 Started: 50 Finished: 50
summary = 4319313 in 00:01:00 = 71872.4/s Avg: 0 Min: 0 Max: 250 Err: 0 (0.00%)
Tidying up ... @ Fri Jan 12 22:17:20 CST 2024 (1705069040026)
... end of run

AngusTester 测试结果:

```
=====
*** Task Summary Report @ Http TEST_PERFORMANCE @ 2024-01-12 22:15:40 ***
=====
Exec ID: 1                               Run Mode: LOCAL                       Memory: 433.35MBM(Used), 8.81GBM(Free)
Bytes: 1.85GB(Recv), 242.69MB(Write)      Iterations: 5193453                     Cpu: 477.60%(Proc), 1108.46%(Sys)
Date: 01/12 10:14:40 to 01/12 10:15:40    Duration: 60 Second                     Threads: 0/50 terminated
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Name | Samples | Mean | Min | Max | P50 | P75 | P90 | P99 | P999 | Trans | Trans/s | Errors | Error% | Recv/s | Write/s |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Total | 5193453 | 0.57 | 0.0 | 260.0 | 0.0 | 1.0 | 1.0 | 4.0 | 35.0 | 5193453 | 86556.11 | 0 | 0.0 | 31.53MB | 4.04MB |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
*** Sampling Result: SUCCESS
=====

Stop from 192.168.255.22 @ Fri Jan 12 22:15:41 CST 2024, force=false, timeoutInMillis=3000
Runner threads has been shutdown
```

- 100 个线程运行 60 秒测试结果

JMeter 测试结果:

Starting the test @ Fri Jan 12 22:20:26 CST 2024 (1705069226157)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 187584 in 00:00:04 = 52106.7/s Avg: 1 Min: 0 Max: 341 Err: 0 (0.00%) Active: 100 Started: 100 Finished: 0
summary + 2081627 in 00:00:30 = 69387.6/s Avg: 1 Min: 0 Max: 286 Err: 0 (0.00%) Active: 100 Started: 100 Finished: 0
summary = 2269211 in 00:00:34 = 67536.0/s Avg: 1 Min: 0 Max: 341 Err: 0 (0.00%)
summary + 1676282 in 00:00:27 = 63253.5/s Avg: 1 Min: 0 Max: 179 Err: 0 (0.00%) Active: 0 Started: 100 Finished: 100
summary = 3945493 in 00:01:00 = 65646.6/s Avg: 1 Min: 0 Max: 341 Err: 0 (0.00%)

```
Tidying up ... @ Fri Jan 12 22:21:26 CST 2024 (1705069286502)
... end of run
```

AngusTester 测试结果:

[illegible]

- 200 个线程运行 60 秒测试结果

JMeter 测试结果:

```
Starting the test @ Fri Jan 12 22:34:57 CST 2024 (1705070097385)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 35249 in 00:00:02 = 15419.5/s Avg: 9 Min: 0 Max: 754 Err: 0 (0.00%) Active: 200 Started: 200 Finished: 0
summary + 1758509 in 00:00:30 = 58642.4/s Avg: 3 Min: 0 Max: 1130 Err: 0 (0.00%) Active: 200 Started: 200 Finished: 0
summary = 1793758 in 00:00:32 = 55580.8/s Avg: 3 Min: 0 Max: 1130 Err: 0 (0.00%)
summary + 1693121 in 00:00:28 = 60752.8/s Avg: 3 Min: 0 Max: 405 Err: 0 (0.00%) Active: 0 Started: 200 Finished: 200
summary = 3486879 in 00:01:00 = 57977.4/s Avg: 3 Min: 0 Max: 1130 Err: 0 (0.00%)
Tidying up ... @ Fri Jan 12 22:35:57 CST 2024 (1705070157870)
... end of run
```

AngusTester 测试结果:

```

=====
*** Task Summary Report @ Http TEST_PERFORMANCE @ 2024-01-12 22:34:47 ***
=====
Exec ID: 1                               Run Mode: LOCAL                       Memory: 219.95MBM(Used), 9.02GBM(Free)
Bytes: 1.61GB(Recv), 211.23MB(Write)     Iterations: 4520270                  Cpu: 615.87%(Proc), 1368.42%(Sys)
Date: 01/12 10:33:47 to 01/12 10:34:47  Duration: 60 Second                  Threads: 0/200 terminated
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

```


Name	Samples	Mean	Min	Max	P50	P75	P90	P99	P999	Trans	Trans/s	Errors	Error%	Recv/s	Write/s
Total	4520270	2.65	0.0	551.0	1.0	2.0	3.0	44.0	129.0	4520270	75337.83	0	0.0	27.45MB	3.52MB

*** Sampling Result: SUCCESS

- 500 个线程运行 60 秒测试结果

JMeter 测试结果：

```
Starting the test @ Fri Jan 12 22:40:58 CST 2024 (1705070458720)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 6514 in 00:00:01 = 6293.7/s Avg: 32 Min: 0 Max: 853 Err: 0 (0.00%) Active: 500 Started: 500 Finished: 0
summary + 2227998 in 00:00:30 = 74266.6/s Avg: 6 Min: 0 Max: 1181 Err: 649 (0.03%) Active: 500 Started: 500 Finished: 0
summary = 2234512 in 00:00:31 = 71999.7/s Avg: 6 Min: 0 Max: 1181 Err: 649 (0.03%)
summary + 1406168 in 00:00:29 = 48313.6/s Avg: 10 Min: 0 Max: 669 Err: 192 (0.01%) Active: 0 Started: 500 Finished: 500
summary = 3640680 in 00:01:00 = 60536.7/s Avg: 8 Min: 0 Max: 1181 Err: 841 (0.02%)
Tidying up ... @ Fri Jan 12 22:41:59 CST 2024 (1705070519105)
... end of run
```

AngusTester 测试结果：

```
=====
*** Task Summary Report @ Http TEST_PERFORMANCE @ 2024-01-12 22:39:30 ***
=====
```

Exec ID: 1	Run Mode: LOCAL	Memory: 285.7MBM(Used), 8.96GBM(Free)
Bytes: 1.46GB(Recv), 192.0MB(Write)	Iterations: 4108760	Cpu: 610.46%(Proc), 1257.58%(Sys)
Date: 01/12 10:38:30 to 01/12 10:39:30	Duration: 60 Second	Threads: 0/500 terminated

Name	Samples	Mean	Min	Max	P50	P75	P90	P99	P999	Trans	Trans/s	Errors	Error%	Recv/s	Write/s
Total	4108760	7.28	0.0	1009.0	3.0	5.0	11.0	98.0	159.0	4108760	68479.33	0	0.0	24.95MB	3.2MB

```
*** Sampling Result: SUCCESS
=====
```

- 1000 个线程运行 60 秒测试结果

JMeter 测试结果：

Starting the test @ Fri Jan 12 22:48:15 CST 2024 (1705070895534)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 625738 in 00:00:14 = 44199.9/s Avg: 19 Min: 0 Max: 1840 Err: 1499 (0.24%) Active: 1000 Started: 1000 Finished: 0
summary + 1167397 in 00:00:30 = 38640.2/s Avg: 25 Min: 0 Max: 2298 Err: 5215 (0.45%) Active: 1000 Started: 1000 Finished: 0
summary = 1793135 in 00:00:44 = 40413.2/s Avg: 23 Min: 0 Max: 2298 Err: 6714 (0.37%)
summary + 551761 in 00:00:16 = 34857.6/s Avg: 29 Min: 0 Max: 2384 Err: 3758 (0.68%) Active: 0 Started: 1000 Finished: 1000
summary = 2344896 in 00:01:00 = 38952.4/s Avg: 24 Min: 0 Max: 2384 Err: 10472 (0.45%)
Tidying up ... @ Fri Jan 12 22:49:16 CST 2024 (1705070956042)
... end of run

AngusTester 测试结果:

```
=====
*** Task Summary Report @ Http TEST_PERFORMANCE @ 2024-01-12 22:48:09 ***
=====
Exec ID: 1                               Run Mode: LOCAL                       Memory: 307.85MBM(Used), 8.93GBM(Free)
Bytes: 1.16GB(Recv), 152.72MB(Write)      Iterations: 3268051                     Cpu: 694.65%(Proc), 1162.53%(Sys)
Date: 01/12 10:47:09 to 01/12 10:48:09   Duration: 60 Second                     Threads: 0/1000 terminated
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Name | Samples | Mean | Min | Max | P50 | P75 | P90 | P99 | P999 | Trans | Trans/s | Errors | Error% | Recv/s | Write/s |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Total | 3268051 | 18.29 | 0.0 | 2012.0 | 8.0 | 14.0 | 35.0 | 141.0 | 205.0 | 3268051 | 54467.52 | 0 | 0.0 | 19.84MB | 2.55MB |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
*** Sampling Result: SUCCESS
=====
```

- 2000 个线程运行 60 秒测试结果

JMeter 测试结果:

Starting the test @ Fri Jan 12 22:53:28 CST 2024 (1705071208693)
Waiting for possible Shutdown/StopTestNow/Heapdump message on port 4445
summary + 2012 in 00:00:01 = 1832.4/s Avg: 64 Min: 0 Max: 731 Err: 31 (1.54%) Active: 2000 Started: 2000 Finished: 0
summary + 329540 in 00:00:30 = 11000.8/s Avg: 183 Min: 0 Max: 2754 Err: 169684 (51.49%) Active: 2000 Started: 2000 Finished: 0
summary = 331552 in 00:00:31 = 10676.6/s Avg: 182 Min: 0 Max: 2754 Err: 169715 (51.19%)
summary + 185640 in 00:00:30 = 6187.6/s Avg: 314 Min: 0 Max: 3874 Err: 138797 (74.77%) Active: 4 Started: 2000 Finished: 1996
summary = 517192 in 00:01:01 = 8470.8/s Avg: 230 Min: 0 Max: 3874 Err: 308512 (59.65%)
summary + 3 in 00:00:00 = 35.7/s Avg: 1084 Min: 1080 Max: 1088 Err: 0 (0.00%) Active: 0 Started: 2000 Finished: 2000
summary = 517195 in 00:01:01 = 8459.1/s Avg: 230 Min: 0 Max: 3874 Err: 308512 (59.65%)
Tidying up ... @ Fri Jan 12 22:54:30 CST 2024 (1705071270087)
... end of run

AngusTester 测试结果：

```
=====
*** Task Summary Report @ Http TEST_PERFORMANCE @ 2024-01-12 22:51:33 ***
=====
Exec ID: 1                               Run Mode: LOCAL                       Memory: 167.23MBM(Used), 9.07GBM(Free)
Bytes: 688.03MB(Recv), 88.26MB(Write)    Iterations: 1888681                   Cpu: 1017.14%(Proc), 1352.72%(Sys)
Date: 01/12 10:50:32 to 01/12 10:51:32  Duration: 60 Second                   Threads: 0/2000 terminated
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Name  | Samples | Mean  | Min  | Max   | P50   | P75   | P90   | P99   | P999  | Trans  | Trans/s | Errors | Error% | Recv/s | Write/s |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Total | 1888681 | 62.69 | 0.0  | 3996.0 | 35.0  | 84.0  | 149.0 | 204.0 | 3134.0 | 1888681 | 31478.02 | 0      | 0.0    | 11.47MB | 1.47MB  |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
*** Sampling Result: SUCCESS
=====
```

对比结果

- 相同条件下，不断增加并发线程数，AngusTester 性能都要比 JMeter 高，JMeter 50 并发时 QPS 达到最高 71872.4/s，AngusTester 50 并发时 QPS 达到最高 86556.11，**最大 QPS 提升了 20.43%**；
- QPS 达到最大后，随着并发线程数继续增加，JMeter 性能下降迅速，AngusTester 性能下降比较平缓，表现平稳。
- 在基准性能测试(最小延迟小于1毫秒)过程中，随着并发线程增加到 1000 后，JMeter 开始出现大量错误，错率率不断升高，AngusTester 未出现错误。进过测试验证，当并发线程数超过 1000 时，ab、wrk、JMeter 都存在错误率，会出现连接被重置异常，或者到达采样结束时间时强制关闭连接的情况。