Performance Testing Mentoring Program 2022-2023

Task 3

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1 Goal

Define the capacity of BlogEngine.NET 3.2.

Capacity is the number of users, where the throughput per second is the highest and response time stable and not growing with spikes.

Prerequisites: previously generated 100 posts.

Testing scenario: simulating user behavior on the site, where he visits different pages, opens posts and leave comments.

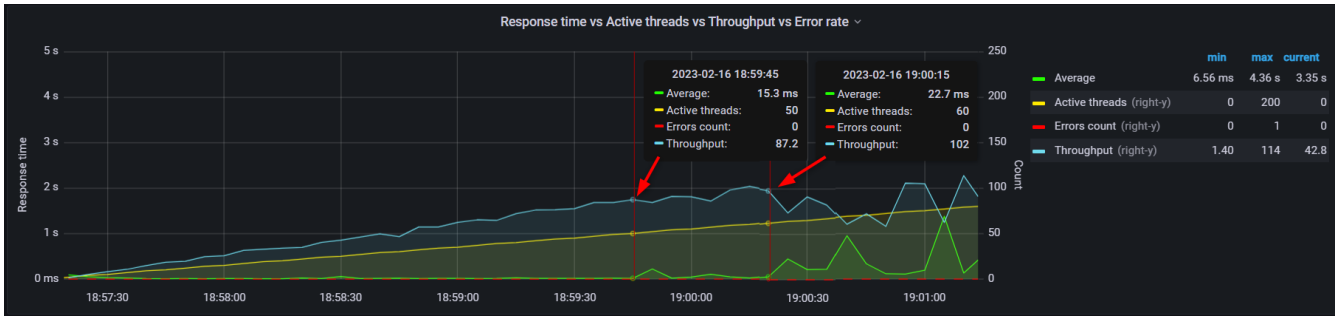
Test environment: test application and load generator are running on the same computer. Application is executed on the virtual machine and the load generator is executed on the host.

2 Summary

Capacity is reached with 60 concurrent users with 102 successful transactions per second,

Comfort zone [response time is not growing, and throughput is stable growing] – up to 50 concurrent users and up to 87.2 successful transactions per second.

Performance degradation zone [response time is lightly growing, and throughput is growing more slowly than in the comfort zone] - in the range between 50 and 60 concurrent users, and throughput from 87.2 to 102 successful transactions per second.



Error details: The number of errors is insignificant. For 5000 transactions, only 2 errors were recorded. Both errors reproduced on the "leave a comment" POST request.

3 What was tested

BlogEngine.NET 3.2 (web) (Executed on the application server)

Parameters of the system under test:

VirtualBox Graphical User Interface Version 7.0.4 r154605 (Qt5.15.2), Windows Server 2016 Standard (64-bit)

OS Name: Microsoft Windows 10 Enterprise, (64-bit) Version 10.0.19044 Build 19044

Base memory: 2,0Gb

Processor: Intel(R) Core(TM) i7-10610U CPU @ 1.80GHz, 2304 Mhz, 1 Core(s), 1 Logical Processor(s)

Storage: Virtual size 60.00 GB

Network: Bridged adapter, Intel® Wi-Fi 6 AX201 160Mhz

4 Load generator system options

Load generator tool: Apache JMeter 5.5 (Executed on Host)

OS Name: Microsoft Windows 10 Enterprise (64-bit) Version 10.0.19045 Build 19045

Base memory: 32,0 GB

Processor: Intel(R) Core(TM) i7-10610U CPU @ 1.80GHz, 2304 Mhz, 4 Core(s), 8 Logical Processor(s)

Storage: C: 248 Gb, D: Locked

Running Tests: Jenkins

Collection and visualization of metrics: InfluxDB, Telegraf, Grafana

5. Main script

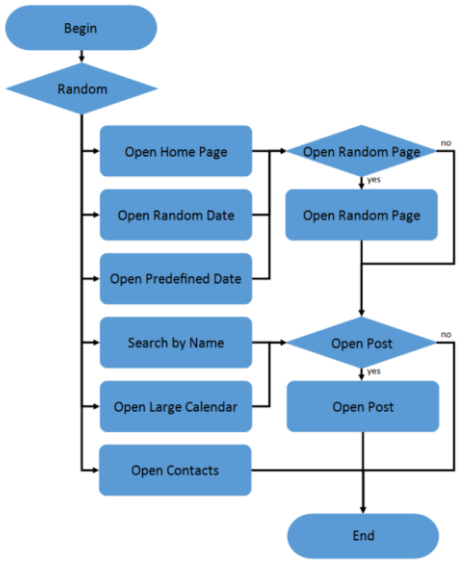
First, open the home page then 50 times runs Anonymous Script.

6 Anonymous script

Step 1. Open randomly one of these pages: home page, page of random date, page of predefined date from csv file, page with search result, large calendar page, and a contacts page.

Step 2. If Step 1 is opened one of the first three pages (home page, page of random date, page of predefined date from csv file) then make a random decision to open or not to open a random page (if there is more than one page with posts).

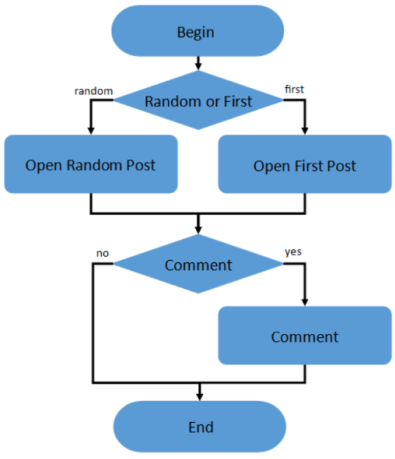
Step 3. After Step 2 (or after Step 1 if there was no opened one of the first three pages) make a random decision to open or not to open a post.



7 Open post script

Step 1. Make a random decision to open a random post of the first post

Step 2. Make a random decision to add a comment or not.



8 Test results

200 users, ramp-up 600 seconds, duration 750 seconds

Capacity (users)	60
Throughput (successful transactions per second)	102
Capacity point (time)	18:59:45

Aggregate report:

transaction	NumberOfSamples	Average	pct90	pct95	pct99	Min	Max	Error Count
TC_leave a comment	4.68 K	1.21 K	2.94 K	3.75 K	79.06 K	0	79.17 K	2
TC_Open first post	4.66 K	1.17 K	3.02 K	4.07 K	6.82 K	0	6.87 K	-
TC_Open Random post	4.78 K	1.09 K	2.94 K	3.55 K	4.47 K	4	4.47 K	-
TC_Search by Name	5.96 K	1.08 K	2.90 K	3.33 K	4.42 K	0	4.42 K	-
TC_Open Random Date	5.86 K	1.08 K	2.89 K	3.33 K	4.46 K	0	4.50 K	-
TC_Open Large Calendar	5.97 K	1.08 K	2.86 K	3.36 K	4.48 K	0	4.48 K	-
TC_Open Home page	5.95 K	1.08 K	2.92 K	3.32 K	4.42 K	0	4.42 K	-
TC_Open Predefined Date	5.95 K	1.07 K	2.86 K	3.28 K	4.42 K	0	4.42 K	-
TC_Open Contacts	6.03 K	1.07 K	2.84 K	3.34 K	4.47 K	0	4.47 K	-
TC_Open Random page >1	2.67 K	1.06 K	2.93 K	3.67 K	4.41 K	4	4.41 K	-
TC_start_Open Home page	814	970.86	2.68 K	3.17 K	4.37 K	5	4.37 K	-
TC_Open Random page =1	284	765.2	2.52 K	2.99 K	4.23 K	5	4.23 K	-

Response time vs Active threads vs Throughput vs Error rate graph:

On this graph, we could see that at 19:00:15 Response time began to grow essentially and Transaction per second stopped growing. So that means that capacity is reached with nearly 60 concurrent users.
On CPU usage graph we could see that at 19:00:15 CPU is reaching its higher position, which means that capacity is reached.