Performance Testing Mentoring Program 2022-2023

Task 7

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1 Goal

Perform Smoke and Capacity testing for a combined scenario describing scenarios for simultaneous work with the BlogEngine.NET 3.2. by users with the roles admin, editor, anonymous.

Prerequisites: previously generated 1000 posts.

Testing scenario: simulating user behavior on the site, where:
Admin - Open home page, log in as Admin user, open Admin's page, check number of Anonymous users and decide to add or delete user, finally Log out

Editor - Open home page, log in as an Editor user, open a predefined date, open a random post and edit it, rapid it 50 times, and finally Log out.

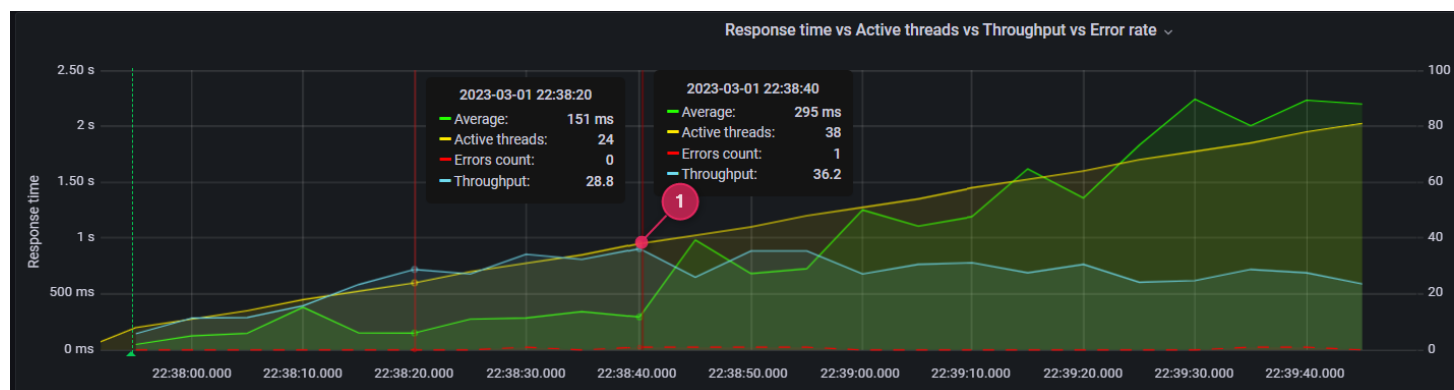Anonymous user - visits different pages, opens posts and leave comments.

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.

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2 Summary

Capacity is reached with 38 concurrent users with 36.2 successful transactions per second,

Comfort zone [response time is not growing, and throughput is stable growing] – up to 24 concurrent

users and up to 28.8 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 24 and 38 concurrent users, and throughput from 28.8 to 36.2 successful transactions per second.

Error details: The number of errors is insignificant. For 8018 transactions, only 14 errors were recorded. So 8 of them on "Edit post" PUT request, 4 on "leave a comment" POST request, 1 on "Add user" POST request and 1 on "Open Random post" GET request

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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

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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)
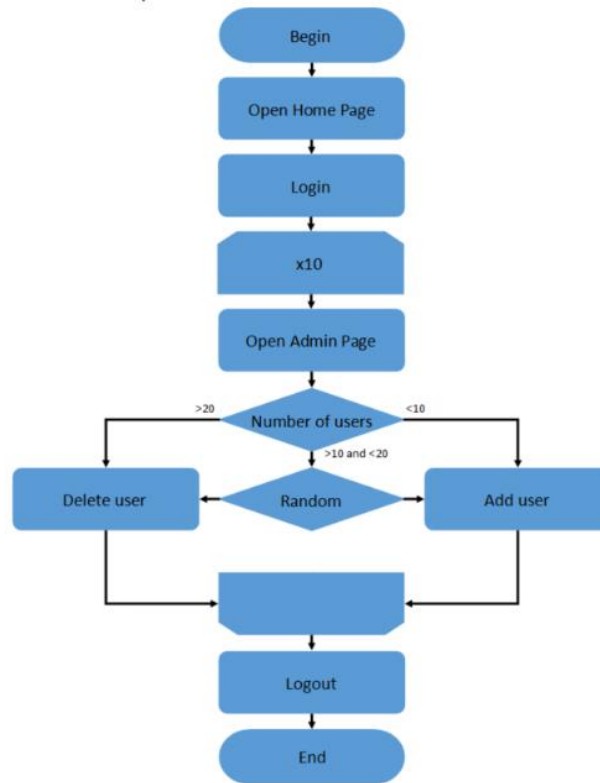
Storage: C: 248 Gb, D: Locked

Running Tests: Jenkins

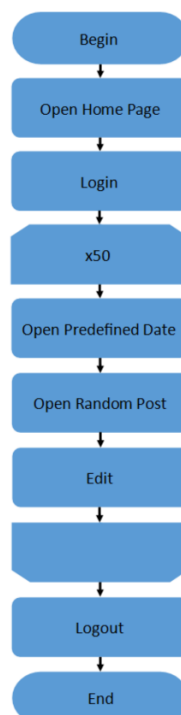Collection and visualization of metrics: InfluxDB, Telegraf, Grafana

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5. Admin script

First, open the home page then log in as an Admin user, after that 10 times check number of Anonymous users and decide to add or delete users, and finally log out.
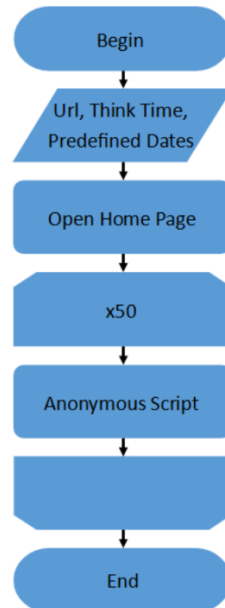
Begin
↓
Open Home Page
↓
Login
↓
x10
↓
Open Admin Page
↓
Number of users
>20   <10
>10 and <20
Delete user ← Random → Add user
↓
Logout
↓
End

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6. Editor script

First, Open home page, log in as an Editor user, open a predefined date, open a random post and edit it, rapid it 50 times, and finally Log out.

Begin
↓
Open Home Page
↓
Login
↓
x50
↓
Open Predefined Date
↓
Open Random Post
↓
Edit
↓
Logout
↓
End

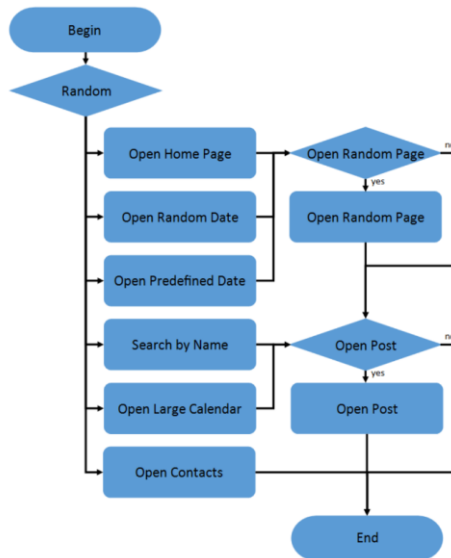First, open the home page then 50 times runs Anonymous Script.

In the Anonymous Script:

Step 1. The following pages open with the following probabilities:

1. Home Page: 15%

2. Open Random Date: 10%

3. Open Predefined Date: 30%

4. Search by Name: 30%

5. Open Large Calendar: 10%

6. Open Contacts: 5%

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
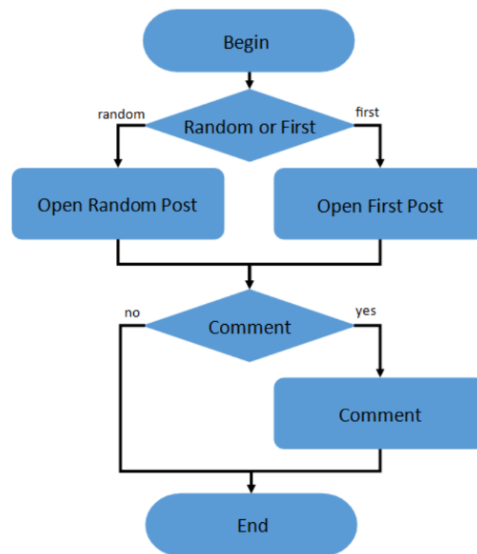
there is more than one page with posts).

Step 3. After Step 2 (or after Step 1 if there was no opened one of the first three pages) make a decision to open or not to open a post with 80% / 20% probabilities.

If "Open post script" is selected

Step 1. Make a decision to open a random post of the first post with 65% / 35% probabilities.

Step 2. Make a decision to add a comment or not with 20% / 80% probabilities.

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8 Test results

Admin users: 2 users, ramp-up 6 seconds, duration 300 seconds
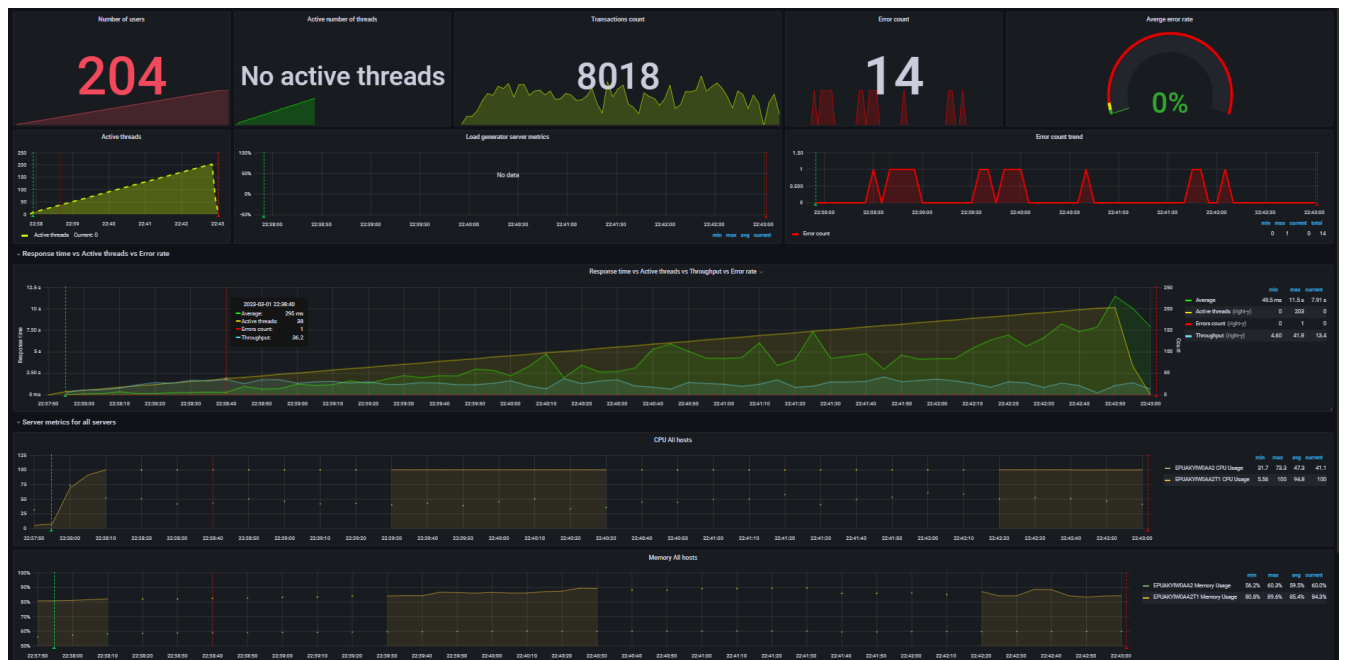Editor users: 2 users, ramp-up 6 seconds, duration 300 seconds
Anonymous users: 200 users, ramp-up 300 seconds, duration 300 seconds

Capacity (users)	38
Throughput (successful transactions per second)	36.2
Capacity point (time)	22:38:40

Aggregate report:

transaction	NumberOfSamples	Average	pct90	pct95	pct99	Min	Max	Error Count
leave a comment	501.00	3.04 K	6.82 K	8.61 K	13.14 K	24.00	13.14 K	4.00
TC_start_Open Home page	220.00	2.08 K	6.41 K	7.78 K	12.68 K	22.00	12.69 K	-
TC_Search by Name	1.19 K	3.25 K	7.49 K	8.51 K	13.45 K	51.00	13.46 K	-
TC_Open Random page ≠1	324.00	2.44 K	7.19 K	7.86 K	11.66 K	0.00	12.68 K	-
TC_Open Random page =1	36.00	2.05 K	5.69 K	6.65 K	12.08 K	369.00	12.08 K	-
TC_Open Random Date	400.00	2.46 K	6.59 K	8.15 K	12.59 K	20.00	12.60 K	-
TC_Open Predefined Date	1.21 K	3.10 K	7.46 K	8.41 K	12.77 K	0.00	12.77 K	-
TC_Open Large Calendar	440.00	2.61 K	7.00 K	8.19 K	12.82 K	13.00	12.82 K	-
TC_Open Home page	598.00	2.79 K	7.29 K	8.16 K	12.91 K	0.00	12.91 K	-
TC_Open Contacts	158.00	1.83 K	5.77 K	6.60 K	11.64 K	10.00	13.27 K	-
TC_LogOff	4.00	4.17 K	15.37 K	15.37 K	15.37 K	1.36 K	15.37 K	-
TC_Ed_Open login page	2.00	150.00	230.00	230.00	230.00	70.00	230.00	-
TC_Ed_Open editpost page	39.00	1.15 K	8.25 K	8.98 K	13.91 K	14.00	13.91 K	-
TC_Ed_Open Random post	39.00	565.72	3.73 K	4.50 K	11.45 K	13.00	11.45 K	-
TC_Ed_Open Predefined Date	39.00	629.93	4.18 K	6.93 K	7.21 K	13.00	7.21 K	-
TC_Ed_Open Home page	2.00	20.00	24.00	24.00	24.00	16.00	24.00	-
TC_Ed_Login	2.00	32.00	48.00	48.00	48.00	16.00	48.00	-
TC_Ed_Editpost	38.00	2.12 K	12.41 K	15.17 K	20.93 K	193.00	20.93 K	8.00
TC_Ad_Open login page	5.00	1.30 K	12.94 K	12.94 K	12.94 K	103.00	12.94 K	-
TC_Ad_Open Users page	40.00	1.05 K	7.79 K	9.10 K	10.35 K	66.00	10.35 K	-
TC_Ad_Open USERS menu	40.00	519.29	3.42 K	4.48 K	7.22 K	5.00	7.22 K	-
TC_Ad_Open Home page	6.00	1.58 K	12.86 K	12.86 K	12.86 K	25.00	12.86 K	-
TC_Ad_Open Admin Page	40.00	410.69	2.71 K	5.92 K	7.15 K	3.00	7.15 K	-
TC_Ad_Login	4.00	395.88	1.65 K	1.65 K	1.65 K	35.00	1.65 K	-
TC_Ad_Delete user	21.00	1.45 K	8.27 K	12.77 K	13.35 K	173.00	13.35 K	-
TC_Ad_Add user	19.00	2.07 K	12.57 K	15.74 K	15.74 K	134.00	15.74 K	1.00
Open first post	919.00	3.04 K	7.35 K	8.40 K	12.66 K	12.00	12.66 K	-
Open Random post	1.68 K	3.22 K	7.43 K	8.53 K	13.23 K	11.00	13.24 K	1.00

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

On this graph, we could see that at 22:38:40 Response time began to grow essentially and Transaction per second stopped growing. So that means that capacity is reached with nearly 36 concurrent users.

Links to source data:

https://snapshots.raintank.io/dashboard/snapshot/Abmv4mlvk6S7mHg5My7F5tiNM1liNIat

http://localhost:3000/d/rxKcwpFmk_3/load-test-monitoring_3?orgId=1&from=1677703068572&to=1677703382366&var-group_time=5s&var-metric=All&var-scenario=All&var-transactions=All&var-server_measurements=All&var-host=All&var-measurement=jmeter

http://localhost:8080/job/Load%20Test%20Hello%20world%20(HW7)/12/