**Report about conducted load test**

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**Author:** Shushanik Tonoyan

**Application:** BlogEngine.NET version 3.2

**Environment:** Test Environment

**Test Environment configuration (RAM, CPU etc.):**

|  |  |
| --- | --- |
| Processor | Intel(R) Core(TM) i7-10610U CPU 1.80 GHz 2.30 GHz |
| RAM | 3.95 GB |
| System type | 64-bit operating system |
| Operating System | Windows 10 Enterprise 21H1 |

1. **Why such testing was conducted:** Performed load test for different configurations of test environment to determine the optimal configuration.
2. **Test script description:**

The following script should be run for

1. Anonymous script with probability usage is implemented according to the following table

|  |  |
| --- | --- |
| **Flow** | **Execution percentage %** |
| Home Page | 15 |
| Open Random Date | 10 |
| Open Predefined Date | 30 |
| Search by Name | 30 |
| Open Large Calendar | 10 |
| Open Contacts | 5 |
| Open Random page (yes/no) | 50/50 |
| Open post (yes/no) | 80/20 |
| Random or First | 65/35 |
| Comment (yes/no) | 20/80 |
|  |  |

1. Admin script
2. Editor script

**Anonymous script**

Diagram

Description automatically generatedDiagram

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Description automatically generated

**Admin Script**

Diagram

Description automatically generated

**Editor Script**

Diagram

Description automatically generated

1. **Tests:**   
     
   **Test run preconditions:** 2 admins, 2 editors should be created, and1000 posts created by different users.

**Load Model:** Load testing. Test was conducted overall for 40 users, duration 900 sec, constant delay between requests 2 sec with deviation 0.10 sec.

|  |  |  |
| --- | --- | --- |
| **Users** | **Threads count** | **Rampup in seconds** |
| Admins | 2 | 120 |
| Editors | 4 | 120 |
| Anonymous Users | 34 | 120 |

1. **Short summary on conducted tests:**

The scalability test for the application under test were conducted. On the base of the capacity test the average load was defined.

**Average load**: as 40 virtual users.

**Metrics to monitor:** average throughput, response time 95th percentile, error rate, and CPU usage.

**Base configuration:** CPU count 1, RAM 4 GB.

Detailed test results presented on the section 5 of the report. Further the CPU count was increasing by one for each next run, the RAM was the same. According to my test results increase of CPU count from 1 to 2 affects throughput and response time dramatically (growth of throughput by almost 50% and decrease of response time by 82%). Further increase of CPU count reflected on mentioned KPIs much less (growth of throughput by 5% and decrease of response time by 36%). So, the scaling is not linear. The best configuration was determined as CPU count 3 and RAM 4 GB. Then the RAM was decreased by 1 GB on each step. According to the test result the RAM decrease led to the degradation of KPIs, but the CPU count has more impact on the KPIs.

1. **Detailed test results:**

**1 Configuration (****1 CPU, 4 GB RAM)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **max** | **avg** | **min** |
| **Throughput (Req/s)** | 20.00 | 11.13 | 0.20 |
| **Response Time 95th percentile** | 11.04 s | 3.05 s |  |
| **Error Rate %** | 0.1 | | |
| **CPU usage %** | 85.3 | 41.2 | 3.31 |

**A screenshot of a computer

Description automatically generated with medium confidence**

As follows from the chart and the table below, and the average throughput during this run is 11.13 request, average response time is 11.04 s.

**2 Configuration (2 CPU, 4 GB RAM)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **max** | **avg** | **min** |
| **Throughput (Req/s)** | 22.40 | 16.53 | 0.20 |
| **Response Time 95th percentile** | 4.09 s | 535.40 ms |  |
| **Error Rate %** | 0.24 | | |
| **CPU usage %** | 99.3 | 39.5 | 10.8 |

Chart

Description automatically generated

After adding second CPU, the results have been improved. The throughput increased by 48.5% and became 16.53, response time decreased by 82.2% and became 535.40 ms. CPU usage decreased by ~4%.

**3 Configuration (3 CPU, 4 GB RAM)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **max** | **avg** | **min** |
| **Throughput (Req/s)** | 24.60 | 17.36 | 1.00 |
| **Response Time 95th percentile** | 1.16 s | 341.06 ms |  |
| **Error Rate %** | 0.26 | | |
| **CPU usage %** | 52.7 | 16.0 | 1.51 |

Chart

Description automatically generated

The further addition of the third CPU increased average throughput by 5%, and decreased response time by 36.3%. The CPU usage decreased by ~60%.

**4 Configuration (3 CPU, 3 GB RAM)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **max** | **avg** | **min** |
| **Throughput (Req/s)** | 23.80 | 16.96 | 0.20 |
| **Response Time 95th percentile** | 3.99 s | 417.14 ms |  |
| **Error Rate %** | 0.25 | | |
| **CPU usage %** | 52.0 | 28.0 | 6.30 |

Chart

Description automatically generated

If we keep 3 CPUs but decrease RAM from 4 to 3 GB, the small degradation by 2.3% in throughput observed. The response time increased by 22%.CPU usage increased by 75%.

**5 Configuration (3 CPU, 2 GB RAM)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **max** | **avg** | **min** |
| **Throughput (Req/s)** | 24.80 | 14.08 | 1.20 |
| **Response Time 95th percentile** | 1.65 s | 394.16 ms |  |
| **Error Rate %** | 0.26 | | |
| **CPU usage %** | 54.3 | 18.0 | 0.76 |

**Timeline

Description automatically generated**

**RAM 4 GB**



|  |  |  |  |
| --- | --- | --- | --- |
|  | 1 CPU | 2 CPU | 3CPU |
| **Throughput (Req/s)** | 11.13 | 16.53 | 17.36 |
| **Response Time 95th percentile** | 3.05 s | 535.40 ms | 341.06 ms |
| **Error Rate %** | 0.1 | 0.24 | 0.26 |
| **CPU usage %** | 41.2 | 39.5 | 16.0 |

**3 CPU**

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2 GB | 3 GB | 4 GB |
| **Throughput (Req/s)** | 14.8 | 16.96 | 17.36 |
| **Response Time 95th percentile** | 394.16 ms | 417.14 ms | 341.06 ms |
| **Error Rate %** | 0.26 | 0.25 | 0.26 |
| **CPU usage %** | 18 | 28.0 | 16.0 |

1. **Conclusion: On the base of the conducted load tests result the optimal configuration has been selected as the following:**

|  |  |
| --- | --- |
| CPU count | 3 |
| RAM | 4 GB |