Walking skeleton performance analysis: A dot framework research paper

A Software Engineering Study Project

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Document Version History

Version	Date	Author	Description
1	09-09-25	Yardi van Nimwegen	Initial draft created
2	24-10-25	Yardi van Nimwegen	Added research methods chapter

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Abstract

Within this report the findings of an performance test performed on the walking skeleton version of the Spotify clone. This application has only one endpoint **GET /stream/song** and was performance tested on **16 September 2025**. During this test it was concluded that the **performance is currently unacceptable** and does not match the non functional requirements when trying to support a high amount of users. Though the system demonstrated **perfect reliability with 0.00% error rate**, it's response times when under load were a lot higher than required in the non-functionals. This indicates that a bottleneck is holding the application back and requires further investigation and optimisation.

Research and methodology

This performance analysis is structured to use the development oriented triangulation framework.

1. Lab research
   - Non functional test: the core of this performance analysis is the performance testing against the non functional requirements
2. Showroom research
   - Benchmark test: the measured performance of the application was directly compared against the set non functional requirements and was concluded to not meet the requirements

Findings and analysis

The test results clearly showed that the application is not up to the standards set in the non-functional requirements.

Metric	Result	Target	Achieved
Average response time	1.11s	500ms	Failed
95th percentile response time	3.3s	500ms	Failed
90th percentile response time	2.69s	500ms	Failed
Throughput	147 requests per second	/	/
Error rate	0.00% (0 out of 4283 failed)	less than 0.01%	Success

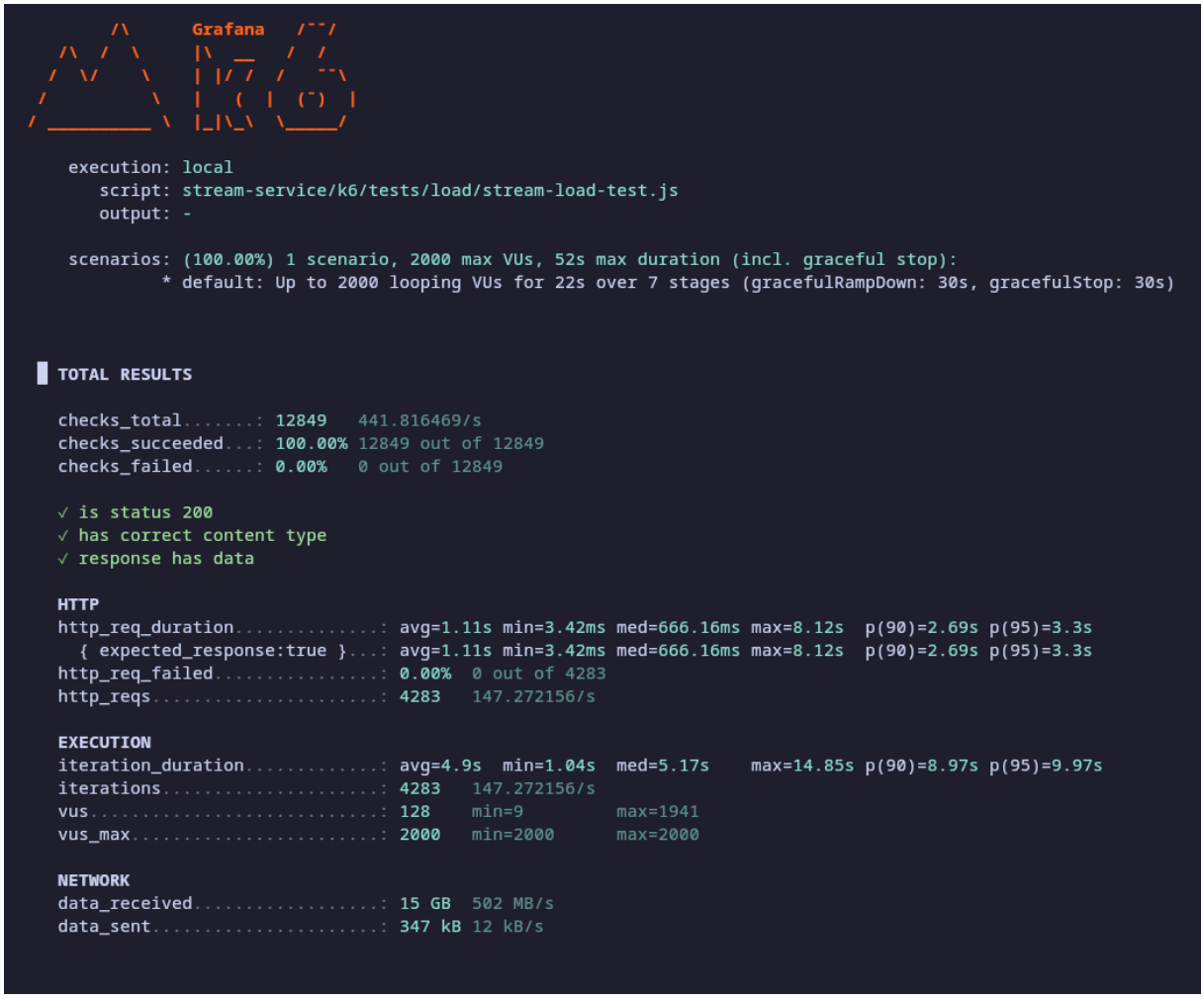

Figure 1: K6 performance test 16 september

Conclusion

Based on the results that have been achieved during these tests, the conclusion is that the current implementation of the song streaming endpoint is not built for high concurrency and must be improved to meet the non functional requirements of the application. The lack of performance will impact the user experience, possibly leading to buffering and having streams delayed.

To fix these issues we must:

Investigate performance. To increase the performance of the application a research must be done to pinpoint what is causing the bottleneck.

Optimization implementation. Once the bottleneck is discovered a new iteration of the streaming implementation can be created which resolves this bottleneck and increase the performance of the application.

Re-testing the application. After the optimizations have been implemented, a new load test will be performed to validate the improvements and make sure the new version either meets the targets or requires more optimizations to meet the performance targets.

Status: Doesn’t meet requirements