**FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE**

Review report of a final thesis

Reviewer:	Ing. Lukáš Forst
Student:	Bc. Jan Chybík
Thesis title:	Build pipeline for edge computing applications
Branch / specialization:	System Programming
Created on:	1 June 2024

Evaluation criteria

1. Fulfillment of the assignment

[1] assignment fulfilled
▸ [2] **assignment fulfilled with minor objections**
[3] assignment fulfilled with major objections
[4] assignment not fulfilled

The submitted thesis defines its objectives clearly and aligns them with the assignment requirements. The objectives are well-formulated and generally fulfilled. However, it lacks a comprehensive definition of a threat model and the types of attacks adversaries could launch on the build infrastructure with their respective impact. It is a minor deficiency but it impacts the overall completeness of the security analysis of what we're trying to protect when building such build pipeline. The assignment otherwise meets the standard requirement and this shortfall has a moderate impact on the security evaluation, slightly affecting the final assessment.

2. Main written part   73 /100 (C)

The master thesis presents a detailed discussion, though certain sections, like the differences between distributed systems and scaling, seemed a bit too much and could have been written in a few sentences to maintain focus on edge computing. The build pipeline analysis lacked a state-of-the-art comparison, such as how Cloudflare or GitHub or other CI/CD providers handle untrusted code, which would give the reader perspective on what others do. I was also missing the experiment part - there were no verifiable outputs - for example how does the chosen architecture perform in the real world? How fast are you able to scale or how many jobs are you able to perform given hardware/ time? The thesis is free of factual errors and discrepancies, and is clear and comprehensible. There were few spelling errors and different word formats (JavaScript and javascript, nginx and Nginx etc.), but nothing that would affect the readability. Citations and formal notations are correctly used, and no copyright violations were found.

Overall, I would award it 73% mainly because of the missing state-of-the art comparisons.

3. Non-written part, attachments   86 /100 (B)

The non-written part of the thesis, specifically the software, demonstrates overall high quality. The chosen technology, from development to deployment, is suitable and appropriate for the task. The selection and use of tools were adequate, and the reasoning behind these choices is well-founded and clearly articulated. I did not find any issues with the functionality. There were no experiments to verify. Overall, the technology and tools used were appropriate for the project's goals. I would award this aspect 86% because of the lacking experiments.

4. Evaluation of results, publication outputs and awards   95 /100 (A)

The results of this thesis demonstrate practical applicability and can be effectively deployed in real-world scenarios. The solutions presented are robust and well-designed, making them suitable for practical implementation.

The overall evaluation   83 /100 (B)

The most significant factors affecting my grading process were the absence of a state-of-the-art analysis for similar build pipelines and the lack of a detailed threat model in the security evaluations. I was also missing experiments, which would have provided insights into the platform's performance. Despite these gaps, the implementation and choice of technologies were good and demonstrated a strong practical application. I strongly believe this system can be deployed to production. Overall, it was a good thesis that met the assignment requirements, though these missing elements prevented it from achieving the highest grade. I would award the thesis an overall grade of B.

Questions for the defense

How do other CI/CD providers, such as Github, Azure CI, Cloudflare, handle security for their build pipelines? What is their threat model? What technologies do they use for their build pipelines?
Is this platform able to mitigate DDoS? Like programs that would take many hours and resources to build? What are the weak spots of the final implementation?

Instructions

Fulfillment of the assignment

Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.

Main written part

Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies?

Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 52/2021, Art. 3.

Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.

Non-written part, attachments

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

Evaluation of results, publication outputs and awards

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

The overall evaluation

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.