THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Scaling databases in an application based on a microservice architecture**
Author's name:	**Nalutka Mikhail**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Katedra počítačů
Thesis reviewer:	Ing. Kyrylo Bulat
Reviewer's department:	System Testing IntelLigent Lab

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

How demanding was the assigned project?

The assignment is challenging because it comprises theoretical and practical components (refer to points 3-5). Additionally, the topic of database scaling is extensive and may require extensive research.

Fulfilment of assignment **fulfilled with minor objections**

How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.

The student covered some scalability techniques in their thesis, but I was expecting more to be presented. Additionally, when focusing on the topic of scalability, multiple types of scalability could be discussed, such as load, space, and structural scalability. The practical part of the work, including the implementation of the demo application, is well described. However, point number 3 on the assignment list has not been fulfilled.

Methodology **correct**

Comment on the correctness of the approach and/or the solution methods.

Before implementing the demo application, the student introduced microservice architecture, database scalability techniques, and tools used to deploy applications based on microservice architecture. In later chapters, the student applied some of the mentioned database scalability techniques during the implementation of the demo application. Load testing helped to demonstrate the benefits of the database scalability techniques used.

Technical level **B - very good.**

Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?

The student incorporated multiple technologies to implement the demo application, the university information system. While it was not the primary focus of the student's work, the application included several diagrams to illustrate its design and architecture. The implementation section would be improved by providing more details about the technology choices used, such as the programming language, frameworks, and libraries. Additionally, further explanation is needed for certain patterns, such as the API Gateway.

Formal and language level, scope of thesis **C - good.**

Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?

The thesis is well-written in good English, with minimal language issues. The chapters contain relevant information and well-prepared visual models. However, there are a few points to note:

- Section 7.4 contains unrelated text in parentheses.
- There is no text between the title of section 3.2 and the list of functional requirements.
- The list of abbreviations is missing.

Additionally, it would be beneficial to expand the theoretical part to cover different types of scalability and more database scaling patterns that can be found in the recommended literature.

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Selection of sources, citation correctness **D - satisfactory.**
Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?
In Chapter 2, "Research," there are missing citations when discussing partitioning, indices, materialized views, and database scalability. It would have been beneficial if the student had utilized sources mentioned in the recommended literature section. Although Section 2.3 provides an explanation of microservice architecture, the student should have directly quoted the text instead of paraphrasing. It would be advisable for the student to include more references to books and research papers on database scalability, as the current references primarily consist of websites and technology documentation.

Additional commentary and evaluation (optional)
Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.
Please insert your comments here.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

The student chose a challenging topic for their bachelor's work and successfully demonstrated how the proposed scalability techniques improved application performance. However, I would have liked to see more advanced methods of database scalability discussed in the research section. Additionally, I expected a more granular evaluation of the application's performance based on each scalability technique implemented in the Testing chapter.

Questions:

Are selected database scaling techniques (replication, partitioning, indices, materialized views) specific to applications based on the microservice architecture, or are they applicable to other software architecture styles?

Are these techniques applicable to relational and non-relational databases?

In the demo application, you used the "Pgpool-II" tool. Are there similar tools for other database engines?

The grade that I award for the thesis is **C - good.**

Date: **10.6.2024** Signature: KyryloBulat