A Comparative Study: Monolithic vs. Microservices Architectures

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1. What are you going to do?

For research project, I propose to do a compare monolithic architecture with microservices architecture. The goal is evaluating their advantages, disadvantages over each other, as well as their suitability for different use cases. I aim to start the study by data collection on various industries to define which architecture is more preferred.

Later on, the study will delve into analyzing the trade-offs between monolithic and microservices architectures. Some key aspects to be explored include complexity, scalability, deployment, monitoring, and other relevant factors, and so on.

2. How is it done today? Current Limitations?

Today, both architectures are used in the industry. While microservices architecture had gained rapid popularity over the years, there are many companies that still use monolithic architecture. There have been many studies done on this field, and many new frameworks that implement microservices architecture. Popular frameworks such as Spring Boot, FastAPI, Ruby on Rails, and many more make it easier to build microservices applications.

3. What is your idea to do something better?

In order to conduct a comprehensive comparative analysis between these architectures, I aim to follow a structured evaluation with the following steps included:

- Detailed analysis of each architecture
- Real world use cases on various industries
- Evaluation based on multiple criteria, including scalability, complexity, deployment, testing, monitoring, and more
- Results and key takeaways

4. Who will benefit from your work? Why?

Mostly me, as I aim to switch from my current career to Software Engineering. I know that system design and architecture are essential skills for software engineers, and conducting this study will provide me with invaluable experience and knowledge in this area. I believe, with the help of this study, I will gain valuable knowledge and experience in system design and architecture, which will greatly contribute to my transition into Software Engineering.

5. What risks do you anticipate?

During this study, I expect the following potential risks:

- Industry data availability: As mentioned before, I'm planning to do industry research on which architecture is more preferred. It's possible that I will encounter with lack of data, as companies might not openly share their architectures.
- Complexity: Since this is a comparative study, I aim to make this comprehensive. So, it might get complex as I progress. It is important to ensure that the analysis does justice to both architectures without becoming overly loaded.
- Technical Difficulties: Some concepts might require higher level of technical expertise and I might face challenges in understanding and interpreting those concepts.

6. Out of pocket costs? Complete within 11 weeks?

I am not expecting any costs.

7. Midterm results?

By midterm, I intend to analyze relevant papers for literature review, as well as analyzing both architectures separately. Additionally, I plan to do industry research and collect relevant data and finally, define exact comparison criteria. By achieving these milestones, I believe the remaining time will be enough to conduct the comparison and share the study results.

8. Final Demonstration?

At the end of the class, I aim to demonstrate a comprehensive comparison between monolithic and micrsoservices architectures with relevant data and meaningful outcomes and key takeaways.