

RESEARCH PLAN

Individual Project

Abstract

A research plan outlining the research questions and methods used for the MyWatchList

project.

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# Research Questions

## Main Research Question

How can MyWatchList be effectively prepared for deployment while considering diverse factors such as scalability and performance optimization?

## Sub Research Questions

Scalability:

1. What are the key principles and strategies for designing a scalable architecture?
2. What are the best practices for load balancing and auto-scaling configurations?
3. How can cloud-based infrastructure contribute to the scalability of MyWatchList? Performance:
4. What are the common performance bottlenecks in web applications and how can they be mitigated?
5. How can caching mechanisms and CDNs enhance application performance?

# Research Methodology

Scalability:

1. What are the key principles and strategies for designing a scalable architecture?

**Design pattern research (Library)** is essential because it offers proven solutions to recurring design challenges in software engineering. By studying various design patterns I can gain valuable insights into structuring software for scalability.

**IT architecture sketching (Workshop)** serves as a tool for defining the architecture’s high-level components. This method involves visually representing the architecture based on

requirements and focusing on the high-level concepts, thus avoiding unnecessary details.

1. What are the best practices for load balancing and auto-scaling configurations?

**Best good and bad practices (Library)** provide valuable insights into what works and what doesn’t in load balancing and auto-scaling configurations. By reviewing already existing strategies, I can identify successful strategies to adopt.

**Non-functional Test (Lab)** is vital to assess the system’s behavior under various conditions. By designing test scenarios that simulate real-world usage, focusing on scalability, I can ensure that the system meets the requirements.

1. How can cloud-based infrastructure contribute to the scalability of MyWatchList?

**Available product analysis (Library)** examines cloud-based infrastructure offerings, assessing whether solutions exist that align with the scalability needs of MyWatchList. This analysis

seeks to identify cloud-based services, platforms, or tools that can efficiently handle

scalability requirements. By evaluating these products, decisions can be made on what cloud solutions to adopt.

**Multi-criteria decision making (Workshop)** is a structured approach to evaluate various cloud- based infrastructure options. This method ensures that decisions regarding cloud service providers, deployment models and scalability features are thoroughly assessed.

Performance:

1. What are the common performance bottlenecks in web applications and how can they be mitigated?

**Community research (Library)** helps by gathering knowledge of online communities to identify recurring issues that affect web application performance. Platforms like Stack

Overflow provide valuable insights into common challenges encountered by developers. **Problem analysis (Field)** is an important step to understand the specific manifestations of performance bottlenecks within the context of the web application. By doing a problem analysis, we can gain clarity on the problem and identify solutions, if any.

1. How can caching mechanisms and CDNs enhance application performance?

**Component testing (Lab)** is important to validate the correctness and effectiveness of caching mechanisms and CDN components before integration. This is to make sure that it all works as intended.

**Literature study (Library)** provides insights into anything related to caching mechanisms and CDNs. By conducting a thorough search and identifying relevant sources, important

knowledge about caching and CDN technologies can be found.

**Prototyping (Workshop)** is a practical approach to develop and evaluate concepts related to caching and CDNs. By creating prototypes, I can test ideas and uncover technical limitations.