

# Angular Component Performance: Classic Approach vs. Standalone in Small and Large Projects

Hannes Beinhundner

hbeinhundner.mmt-b2021@fh-salzburg.ac.at

FH Salzburg

19. Jänner 2024

## Introduction

In the ever-changing world of web development, Angular is a crucial framework offering developers different ways to build applications. This bachelor thesis explores how Angular's performance varies between the classic coding style and the modern standalone component approach.

## Concept

This study builds upon the basics of standalone components in Angular, aiming to understand their practical implications in real-world projects. I am looking at projects of different sizes, from small to large.

To gain a clear understanding, I will implement both classic code and standalone components for each project size, following industry best practices. Through testing, I will analyze important metrics like load times, rendering efficiency, and overall responsiveness.

The intriguing part of this study is discovering the potential benefits of using standalone components, especially in cases where they might enhance performance during the runtime of the application.

## Status of Research

In web development, Angular stands as a foundational framework, equipping developers with diverse tools for building applications. This bachelor thesis intricately explores the performance dynamics of Angular, with a particular emphasis on contrasting the traditional coding style with the contemporary standalone component approach.

## Methodology

When working on this study, the approach involves implementing both classic and standalone components in Angular using the migration tool. Testing with Apache JMeter will specifically target load times and responsiveness. Through self-analysis of the collected data and anticipating outcomes, the goal is to gain practical insights for Angular development practices.

## Research Question

How does the performance of Angular applications vary between the traditional classic code and the modern standalone component approach, and what practical insights can be gained for development practices through self-conducted testing and analysis using tools like Apache JMeter?

## Goals

### 1. Performance Comparison:

- Evaluate the performance of Angular applications under traditional monolithic code and the standalone component approach.

### 2. Metrics Analysis with Apache JMeter:

- Utilize Apache JMeter to assess key metrics such as load times and responsiveness, providing quantitative insights.

### 3. Practical Insights for Development:

- Uncover practical implications for real-world projects, offering actionable insights to enhance Angular development practices.

## Outline

### • Introduction

- Background and Context
- Introduction to Angular 14 and Standalone Components
- Purpose and Significance of the Study

### • Literature Review

- Historical Evolution of Angular Architecture
- Best Practices in Angular Development

- Performance Considerations in Monolithic and Standalone Component Approaches
- Relevance of Architectural Choices in Web Development
- **Scope and Limitations**
  - Scope of the Study
  - Project Scale Considerations
  - Limitations and Constraints
- **Programming**
  - Comparison
  - Implementation of Monolithic Code and Standalone Components
  - Use of Angular Migration Tool
- **Performance**
  - Testing Metrics: Load Times, Rendering Efficiency, Responsiveness
  - Data Collection Methods
  - Analysis Techniques
- **Discussion**
- **Conclusion**

## References

- Albanese, Massimiliano, Angelo Chianese, Vincenzo Moscato, and Lucio Sansone. 2004. „A Formal Model for Video Shot Segmentation and its Application via Animate Vision.“ *Multimedia Tools and Applications* 24 (3): 253–272.
- Białecki, Gabriel, and Beata Pańczyk. 2021. „Performance analysis of Svelte and Angular applications.“ *Journal of Computer Sciences Institute* 19 (June): 139–143. <https://doi.org/10.35784/jcsi.2633>. <https://ph.pollub.pl/index.php/jcsi/article/view/2633>.
- Bosch, Martí, Pierre Genevès, and Nabil Layaïda. 2014. „Automated refactoring for size reduction of CSS style sheets,“ 13–16. ISBN: 9781450329491. <https://doi.org/10.1145/2644866.2644885>.
- Escott, Kirita-Rose, and James Noble. 2019. „Design patterns for angular hotdraw.“ In *Proceedings of the 24th European Conference on Pattern Languages of Programs*. EuroPLop ’19. Irsee, Germany: Association for Computing Machinery. ISBN: 9781450362061. <https://doi.org/10.1145/3361149.3361185>. <https://doi.org/10.1145/3361149.3361185>.
- Fried, Carrie B. 2008. „In-class laptop use and its effects on student learning.“ *Computers & Education* 50 (3): 906–914.

- Geetha, G., Monisha Mittal, K. Mohana Prasad, and J. Godwin Ponsam. 2022. „Interpretation and Analysis of Angular Framework.“ In *2022 International Conference on Power, Energy, Control and Transmission Systems (ICPECTS)*, 1–6. <https://doi.org/10.1109/ICPECTS56089.2022.10047474>.
- McConnell, Steve. 2004. *Code Complete, Second Edition*. Redmond, WA, USA: Microsoft Press. ISBN: 0735619670.
- Mulloni, Alessandro, Andreas Dünser, and Dieter Schmalstieg. 2010. „Zooming Interfaces for Augmented Reality Browsers.“ In *Proceedings of the 12th International Conference on Human Computer Interaction with Mobile Devices and Services*, 161–170. MobileHCI '10. Lisbon, Portugal: ACM. ISBN: 978-1-60558-835-3. <https://doi.org/10.1145/1851600.1851629>.
- Tahir, Zulkifli, Amil Ahmad Ilham, Muhammad Niswar, Adnan, and Andi Ahmad Fauzy. 2021. „Progressive Web Apps Development and Analysis with Angular Framework and Service Worker for E-Commerce System.“ In *2021 IEEE International Conference on Computing (ICOCO)*, 192–195. <https://doi.org/10.1109/ICOCO53166.2021.9673557>.
- Vandevoorde, David, and Nicolai M. Josuttis. 2002. *C++ Templates: The Complete Guide*. Addison-Wesley Professional, November. ISBN: 0201734842.

## Schedule

- January 26th - hand in this exposé
- February 13th - Entering the application for admission to the Bachelor's thesis in FHSyS and uploading an exposé
- Early march - Discussion based on a preliminary version of the BA
- April - Discussion based on previous version of the BA
- May 6th - Uploading the final version to FHSyS

## Supervisor

Andreas Bilke, M.Sc.