

# Hippo Digital

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# Documentation and Solution Design

**Life cycle software implementation with Microfrontends**

<https://github.com/kukuu/hippy/tree/main>

# Problem statement

I was super inspired as Head of Development to conduct a Prototype project to find a solution to optimise sections of an existing eCommerce application for a client we had initially built an online eCommerce trading platform and make it lean, more efficient and ensure core parts of the application become re-usable as the Client was expanding in creating further categories of the platform and wanted to leverage existing resources and re-use.

My research into various surveys and reports in the landscape of emerging technologies indicated a growing trend towards adopting Microfrontends as a preferred architectural approach. These reports highlight benefits such as improved development speed, scalability, modular architecture, and team autonomy. They also provide insights into real-world implementations, challenges, and best practices.

# The Solution

1. Evidence
2. Architecture - <https://www.figma.com/file/rRULXARl2cYkMxCbSLah1X/Microfrontends?type=whiteboard&node-id=0-1&t=GVPZQp8mP7xGEj8T-0>
3. Design choices
4. Technology choices
5. Timescales
6. Deployment
7. Budget

# How the solution was delivered

1. Size of squad
2. Testing
3. Deployment decisions
4. Tooling
5. Development methods

# Challenges/setbacks and how this was overcome

## Summary

The main challenge of Microfrontends is creating a fast and responsive client. We must never lose sight of the fact that the frontend lives in an environment with limited memory, CPU, and network, or we risk ending up with a slow UI.

A snappy UI is vital for the success of the product. Our initial research during user workshops and brainstorming revealed that a site that loads in 1 second has a conversion rate three times higher than a site that loads in 5 seconds. Every second the user has to wait, money is thrown out of the window.

Being a complex system, Microfrontends are not meant for a greenfield project. In a traditional way, projects get built, dockerised, tested and then deployed. So long as the servers are up and working you could be safe. With MFE you have a hostpage which will dynamically load different sections from different teams into the Hostpage. Teams could mess up and take down the Hostpage.

Worth knowing that JavaScript is a single-threaded execution model. It is not particularly sandboxed at all so very likely runtime environmental issues will occur that is not expected. Different data formats etc.

While developing, we never lost sight of the fact that the frontend lives in an environment with limited memory, CPU, and network, or we risked ending up with a slow UI. Heavy reliance on JavaScript to render the page negatively affects accessibility.

# Challenges/setbacks and how this was overcome

## Strategies and best practices

- Communication
- Version and deployment
- Cross-Origin Resource Sharing (CORS)
- Shared code and dependencies
- Consistency and styling
- Testing and Quality Assurance
- Performance and Load Times
- Monitoring and Debugging
- Team Collaboration

# What was implemented and delivered

## Compelling design solution factors

- Independent Development and Deployment
- Technology Agnosticism
- Scalability and Performance
- Modular Architecture and Reusability
- Team Autonomy and Productivity
- User Experience Composition
- Simplified Maintenance and Troubleshooting



# What was implemented and delivered

## Resources

- Architecture - <https://www.figma.com/file/rRULXARI2cYkMxCbSLah1X/Microfrontends?type=whiteboard&node-id=0-1&t=GVPZQp8mP7xGEj8T-0>
- Source code (Git Repository) - <https://github.com/kukuu/microfrontends/tree/main/single-SPA-module-federation>
- Snapshot of application - <https://github.com/kukuu/microfrontends/blob/main/microfrontends-ecommerce-app.png>

# Conclusion

The project was delivered on time as agreed by the milestone definition and roadmap with our stakeholders. Lined-up initiatives and project execution timeframes for reviews and releases were met as set up and validated by the SLA and contract delivery.

The success of the Prototype continued to serve as a business model to enter into more delivery and aftercare contract services. Analytics gathered showed that conversion rates, click-through rates, first painting, loading times and Average Order Value (AOV) increased by 30%. Cart Abandonment Rate, Bounce Rates dropped drastically as pages loaded faster from 60% to 40%. We aimed for a Page Load time of 2 seconds which was achieved. This was crucial in providing a good user experience and reducing bounce rates which led to lower conversion rates.

There was a greater improvement in Mobile responsiveness targeting new devices. With the growing use of mobile devices for online shopping, optimising mobile responsiveness was crucial. Increased ratios of Customer Lifetime Value (CLV) and Repeat Purchase Rate were recorded as a result of increased efficiency and smooth and intuitive user experiences.