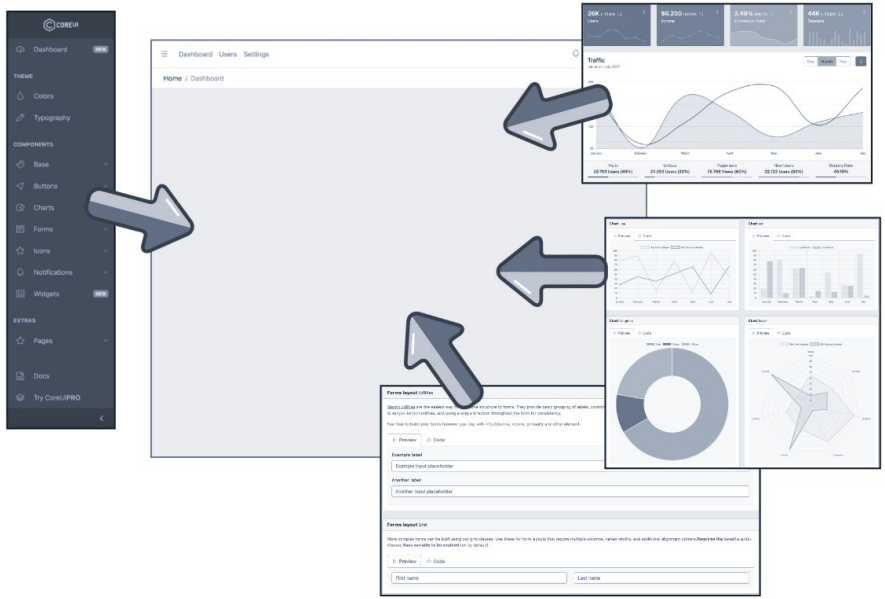
Microfrontends using Module Federation

Creating a unified front-end experience using independently owned and deployed applications

Chris Fryer - 2023

What is a Microfrontend Architecture?

Microfrontend architecture is an approach to breaking up your front-end into a set of independently deployable, loosely coupled applications and/or components. These applications are then assembled together to act as a single user experience, once deployed.



What is Module Federation?

Module Federation is a new variant of Microfrontends which aims to solve shipping those critical shared pieces as macro or as micro as you would like.

Benefits

Module Federation is primarily designed to solve problems related to the development and maintenance of large-scale, complex web applications, especially those built using microfrontend architecture or distributed development teams. Here are some problems that this help addresses:

Cost Effective

Requires far less infrastructure, and the pieces of your application become smaller and more manageable.

Cross-Team Collaboration

Enables teams to develop features independently while still integrating them into the overall application.

Independent and Isolated

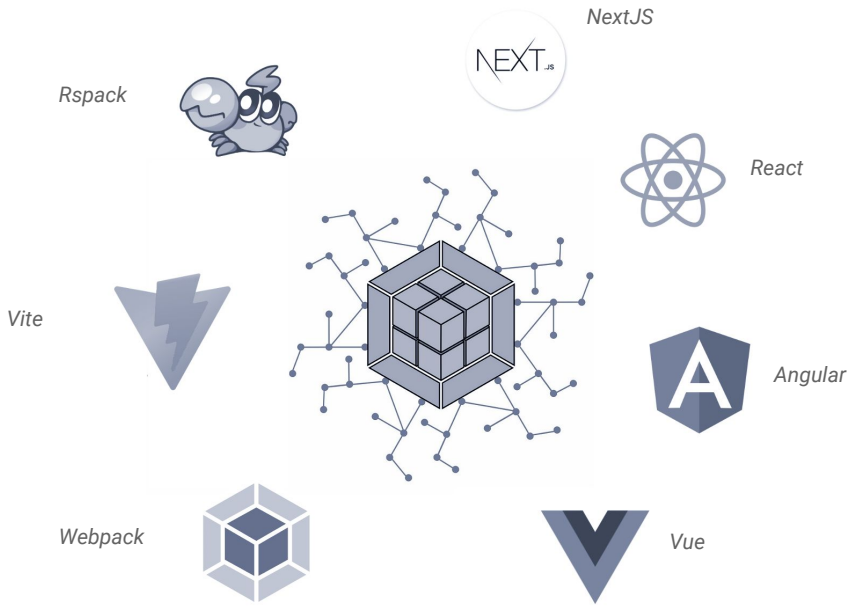
Each feature can run in its own isolated environment, reducing the risk of one module interfering with another.

Code Reusability

Encourages the creation of reusable features, which can be shared across different microfrontends or projects.

Technology Agnostic

Module Federation can be used with a wide array of frameworks and technologies, but not limited to:



Downsides

While Module Federation offers numerous advantages, it also introduces certain challenges and considerations that developers need to be aware of:

Complex Configuration

Setting up Module Federation can be complex, especially for those who are new to it. Configuring the bundler, managing shared modules, and dealing with various settings can be challenging.

Set the standard and stick with it.

Documentation and Communication

Documenting the architecture, dependencies, and communication between microfrontends is crucial to maintain a clear understanding of how the application works.

Establish effective communication among teams early.

Debugging can be complex

Debugging can be more challenging in a microfrontend architecture, as each microfrontend may have its own development environment and debugging tools.

Coordinating debugging efforts across different teams can be tricky.

Modernizing the Modernization Project

At REDACTED, they were attempting to modernize their legacy website but quickly realized it was becoming expensive and time consuming. They brought in CapTech to help them understand why and a path forward. Adopting and migrating to Module Federation had a number of positive impacts for the organization:

Deployments went from maybe once a week, to 5-10 per day per team.

Build times went from 45min per application to under 2min.

Costs per application reduced from $300 (avg) per month, to less than $10 (avg) per month.

Development time decreased from months to roll out a project to as low as a single sprint.

Bugs discovered by QA, decreased by 5x.

Thank you!