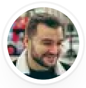

Menu

July 5, 2024

Modern Emacs Typescript Web (React) Config with lsp-mode, treesitter, tailwind, TSX & more

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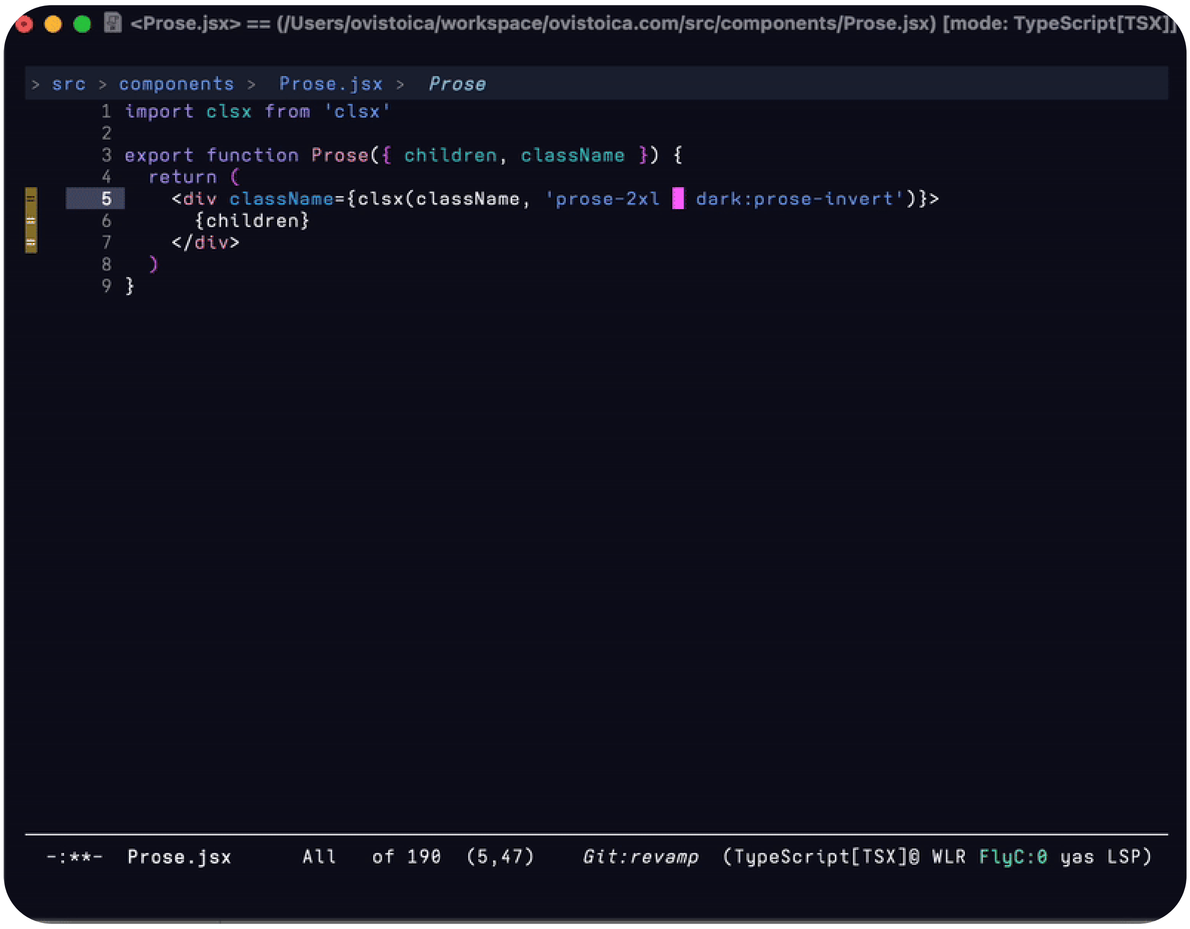
Introduction

I've worked within the JS ecosystem for the past 8 years using editors like **Webstorm** and **VSCode**, I started using Emacs around 6 months ago and I quickly found that some of the pre-made configurations like Doom, don't come setup to fully support modern web development like the other ones, so I started a journey to make my own configuration that would satisfy all the needs of modern web dev.

Here are some requirements:

- Multiple LSP server support (`typescript` , `eslint` , `tailwind` - optional) that work well together
- JSX/TSX support with full features in an efficient way (**treesitter**)
- JSX structural editing (**combobulate**)
- Prettier auto-formatting (**apheleia**)

We will setup all of these parts so the end result looks like this:

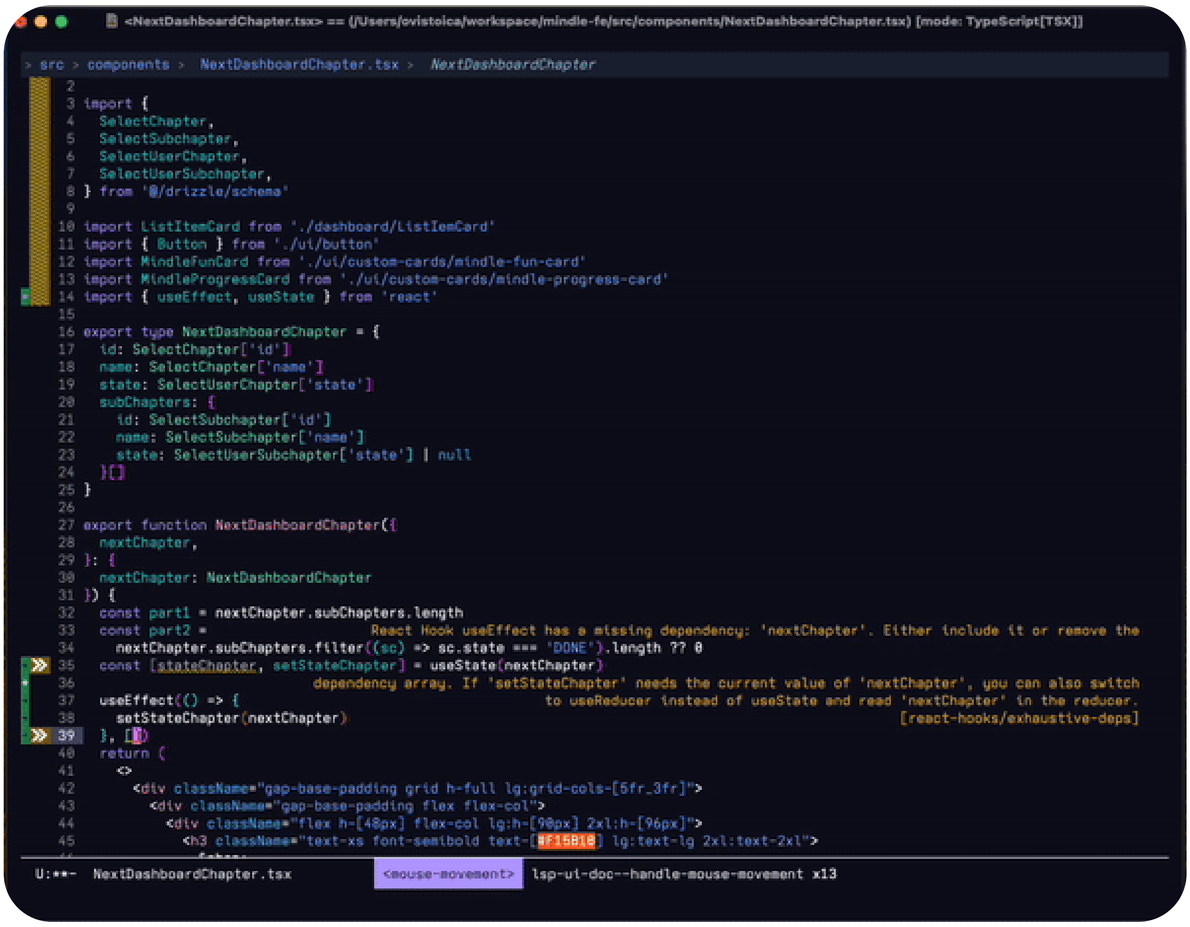


```
<Prose.jsx> == (/Users/ovistoica/workspace/ovistoica.com/src/components/Prose.jsx) [mode: TypeScript[TSX]]
> src > components > Prose.jsx > Prose
import clsx from 'clsx'

export function Prose({ children, className }) {
  return (
    <div className={clsx(className, 'prose-2xl  dark:prose-invert')}>
      {children}
    </div>
  )
}

-:**-  Prose.jsx      All   of 190  (5,47)    Git:revamp  (TypeScript[TSX]@ WLR FlyC:0 yas LSP)
```

Part 1: Treesitter for Typescript & TSX

People in the Emacs community have been combining libraries like **Web Mode** and **Tide** to achieve good TSX support but this setup doesn't pair nice with LSP servers.

You can setup **eslint** through **flycheck** or **flymake** but this removes the possibility to execute code actions:



```
<NextDashboardChapter.tsx> == (/Users/ovistoica/workspace/mindle-fe/src/components/NextDashboardChapter.tsx) [mode: TypeScript[TSX]]
> src > components > NextDashboardChapter.tsx > NextDashboardChapter

import {
  SelectChapter,
  SelectSubchapter,
  SelectUserChapter,
  SelectUserSubchapter,
} from '@/drizzle/schema'

import ListItemCard from './dashboard/ListIemCard'
import { Button } from './ui/button'
import MindleFunCard from './ui/custom-cards/mindle-fun-card'
import MindleProgressCard from './ui/custom-cards/mindle-progress-card'
import { useEffect, useState } from 'react'

export type NextDashboardChapter = {
  id: SelectChapter['id']
  name: SelectChapter['name']
  state: SelectUserChapter['state']
  subChapters: {
    id: SelectSubchapter['id']
    name: SelectSubchapter['name']
    state: SelectUserSubchapter['state'] | null
  }[]
}

export function NextDashboardChapter({
  nextChapter,
}: {
  nextChapter: NextDashboardChapter
}) {
  const part1 = nextChapter.subChapters.length
  const part2 =                    React Hook useEffect has a missing dependency: 'nextChapter'. Either include it or remove the
    nextChapter.subChapters.filter((sc) => sc.state === 'DONE').length ?? 0
  const [stateChapter, setStateChapter] = useState(nextChapter)
                               dependency array. If 'setStateChapter' needs the current value of 'nextChapter', you can also switch
  useEffect(() => {                                 to useReducer instead of useState and read 'nextChapter' in the reducer.
    setStateChapter(nextChapter)                                                                [react-hooks/exhaustive-deps]
  }, [])
  return (
    <>
      <div className="gap-base-padding grid h-full lg:grid-cols-[5fr_3fr]">
        <div className="gap-base-padding flex flex-col">
          <div className="flex h-[48px] flex-col lg:h-[90px] 2xl:h-[96px]">
            <h3 className="text-xs font-semibold text-[#F15B18] lg:text-lg 2xl:text-2xl">

U:**-  NextDashboardChapter.tsx        <mouse-movement> lsp-ui-doc--handle-mouse-movement x13
```

Nowadays we can add full TSX support with Treesitter for the best performance in parsing the file and support for structural editing directly on the syntax tree (think **`delete-entire-jsx-node`**, **`wrap-jsx-node`** etc.)

```
(use-package treesit
      :mode (("\\.tsx\\'" . tsx-ts-mode)
             ("\\.js\\'"  . typescript-ts-mode)
             ("\\.mjs\\'" . typescript-ts-mode)
             ("\\.mts\\'" . typescript-ts-mode)
             ("\\.cjs\\'" . typescript-ts-mode)
             ("\\.ts\\'"  . typescript-ts-mode)
             ("\\.jsx\\'" . tsx-ts-mode)
             ("\\.json\\'" .  json-ts-mode)
             ("\\.Dockerfile\\'" . dockerfile-ts-mode)
             ("\\.prisma\\'" . prisma-ts-mode)
             ;; More modes defined here...
             )
      :preface
```

```
(defun os/setup-install-grammars ()
  "Install Tree-sitter grammars if they are absent."
  (interactive)
  (dolist (grammar
           '((css . ("https://github.com/tree-sitter/tree-si
             (bash "https://github.com/tree-sitter/tree-sitt
             (html . ("https://github.com/tree-sitter/tree-s
             (javascript . ("https://github.com/tree-sitter/
             (json . ("https://github.com/tree-sitter/tree-s
             (python . ("https://github.com/tree-sitter/tree
             (go "https://github.com/tree-sitter/tree-sitter
             (markdown "https://github.com/ikatyang/tree-sit
             (make "https://github.com/alemuller/tree-sitter
             (elisp "https://github.com/Wilfred/tree-sitter-
             (cmake "https://github.com/uyha/tree-sitter-cma
             (c "https://github.com/tree-sitter/tree-sitter-
             (cpp "https://github.com/tree-sitter/tree-sitte
             (toml "https://github.com/tree-sitter/tree-sitt
             (tsx . ("https://github.com/tree-sitter/tree-si
             (typescript . ("https://github.com/tree-sitter/
             (yaml . ("https://github.com/ikatyang/tree-sitt
             (prisma "https://github.com/victorhqc/tree-sitt
    (add-to-list 'treesit-language-source-alist grammar)
    ;; Only install `grammar' if we don't already have it
    ;; installed. However, if you want to *update* a grammar
    ;; this obviously prevents that from happening.
    (unless (treesit-language-available-p (car grammar))
      (treesit-install-language-grammar (car grammar)))))

;; Optional, but recommended. Tree-sitter enabled major mode
;; distinct from their ordinary counterparts.
;;
;; You can remap major modes with `major-mode-remap-alist'.
;; that this does *not* extend to hooks! Make sure you migra
;; also
(dolist (mapping
         '((python-mode . python-ts-mode)
           (css-mode . css-ts-mode)
           (typescript-mode . typescript-ts-mode)
           (js-mode . typescript-ts-mode)
           (js2-mode . typescript-ts-mode)
           (c-mode . c-ts-mode)
           (c++-mode . c++-ts-mode)
           (c-or-c++-mode . c-or-c++-ts-mode)
           (bash-mode . bash-ts-mode)
           (css-mode . css-ts-mode)
           (json-mode . json-ts-mode)
           (js-json-mode . json-ts-mode)
           (sh-mode . bash-ts-mode)
           (sh-base-mode . bash-ts-mode)))
  (add-to-list 'major-mode-remap-alist mapping))
:config
(os/setup-install-grammars))
```

Full credit for this clean **`treesitter`** setup goes to **Mickey Petersen** in the **Combobulate Treesitter section**

LSP Support

We'll need LSP support for features like **`completion`**, **`go-to-definition`**, renaming variable in the entire project and so on. Web development is particularly different then other environments because you need more than one LSP provider.

If you look at VSCode, in a project with Tailwind support, there are 3 LSP servers active at the same time, providing actions for users.

If you want a comprehensive comparison between the current LSP options for emacs, **here is the best comparison I found**.

I've tried **`eglot`**, **`lsp-bridge`** & **`lsp-mode`**:

- **eglot** is a nice since it's the emacs default but it doesn't support multiple servers in the same buffer which makes it a non-candidate.
- **lsp-bridge** is the **fastest** provider but all tools used are custom made (custom completion, custom reference explorer) which makes it hard to integrate into your normal workflow. Setting it up is also harder than the rest
- **lsp-mode** satisfies all the criteria and all the bells & whistles that it comes with can be muted so this is the provider I chose. We will delve in the performance tweaks after the initial setup.

Completion setup

First we need to setup a completion provider. For this I use **Corfu**:

```
;;;; Code Completion
;;;; Code Completion
(use-package corfu
  :ensure t
  ;; Optional customizations
  :custom
  (corfu-cycle t)                 ; Allows cycling through cand
  (corfu-auto t)                  ; Enable auto completion
  (corfu-auto-prefix 2)           ; Minimum length of prefix fo
  (corfu-auto-delay 0)            ; No delay for completion
  (corfu-popupinfo-delay '(0.5 . 0.2))  ; Automatically update
  (corfu-preview-current 'insert) ; insert previewed candidate
  (corfu-preselect 'prompt)
  (corfu-on-exact-match nil)      ; Don't auto expand tempel sn
  ;; Optionally use TAB for cycling, default is `corfu-complete
  :bind (:map corfu-map
              ("M-SPC"      . corfu-insert-separator)
              ("TAB"        . corfu-next)
              ([tab]        . corfu-next)
              ("S-TAB"      . corfu-previous)
```

```
                  ([backtab]    . corfu-previous)
                  ("S-<return>" . corfu-insert)
                  ("RET"        . corfu-insert))

            :init
            (global-corfu-mode)
            (corfu-history-mode)
            (corfu-popupinfo-mode) ; Popup completion info
            :config
            (add-hook 'eshell-mode-hook
                      (lambda () (setq-local corfu-quit-at-boundary t
                                             corfu-quit-no-match t
                                             corfu-auto nil)
                        (corfu-mode))
                      nil
                      t))
```

Linter setup

Optionally you can setup a linter through which lsp-mode will give you diagnostics for your project & buffer.

```
          (use-package flycheck
            :ensure t
            :init (global-flycheck-mode)
            :bind (:map flycheck-mode-map
                  ("M-n" . flycheck-next-error) ; optional but rec
                  ("M-p" . flycheck-previous-error)))
```

LSP Setup

```
(use-package lsp-mode
      :diminish "LSP"
      :ensure t
      :hook ((lsp-mode . lsp-diagnostics-mode)
             (lsp-mode . lsp-enable-which-key-integration)
             ((tsx-ts-mode
               typescript-ts-mode
               js-ts-mode) . lsp-deferred))
      :custom
      (lsp-keymap-prefix "C-c l")           ; Prefix for LSP actio
      (lsp-completion-provider :none)       ; Using Corfu as the p
      (lsp-diagnostics-provider :flycheck)
      (lsp-session-file (locate-user-emacs-file ".lsp-session"))
      (lsp-log-io nil)                      ; IMPORTANT! Use only
      (lsp-keep-workspace-alive nil)        ; Close LSP server if
      (lsp-idle-delay 0.5)                  ; Debounce timer for `
      ;; core
      (lsp-enable-xref t)                   ; Use xref to find ref
      (lsp-auto-configure t)                ; Used to decide betwe
      (lsp-eldoc-enable-hover t)            ; Display signature in
      (lsp-enable-dap-auto-configure t)     ; Debug support
      (lsp-enable-file-watchers nil)
      (lsp-enable-folding nil)              ; I disable folding si
      (lsp-enable-imenu t)
      (lsp-enable-indentation nil)          ; I use prettier
      (lsp-enable-links nil)                ; No need since we hav
      (lsp-enable-on-type-formatting nil)   ; Prettier handles thi
      (lsp-enable-suggest-server-download t) ; Useful prompt to do
      (lsp-enable-symbol-highlighting t)     ; Shows usages of sym
      (lsp-enable-text-document-color nil)   ; This is Treesitter'

      (lsp-ui-sideline-show-hover nil)      ; Sideline used only f
      (lsp-ui-sideline-diagnostic-max-lines 20) ; 20 lines since t
      ;; completion
      (lsp-completion-enable t)
      (lsp-completion-enable-additional-text-edit t) ; Ex: auto-in
```

```
  (lsp-enable-snippet t)                         ; Important t
  (lsp-completion-show-kind t)                   ; Optional
  ;; headerline
  (lsp-headerline-breadcrumb-enable t)  ; Optional, I like the
  (lsp-headerline-breadcrumb-enable-diagnostics nil) ; Don't m
  (lsp-headerline-breadcrumb-enable-symbol-numbers nil)
  (lsp-headerline-breadcrumb-icons-enable nil)
  ;; modeline
  (lsp-modeline-code-actions-enable nil) ; Modeline should be
  (lsp-modeline-diagnostics-enable nil)  ; Already supported t
  (lsp-modeline-workspace-status-enable nil) ; Modeline displa
  (lsp-signature-doc-lines 1)                ; Don't raise the
  (lsp-ui-doc-use-childframe t)              ; Show docs for s
  (lsp-eldoc-render-all nil)            ; This would be very u
  ;; lens
  (lsp-lens-enable nil)                 ; Optional, I don't ne
  ;; semantic
  (lsp-semantic-tokens-enable nil)      ; Related to highlight

  :init
  (setq lsp-use-plists t))

(use-package lsp-completion
  :no-require
  :hook ((lsp-mode . lsp-completion-mode)))

(use-package lsp-ui
  :ensure t
  :commands
  (lsp-ui-doc-show
   lsp-ui-doc-glance)
  :bind (:map lsp-mode-map
              ("C-c C-d" . 'lsp-ui-doc-glance))
  :after (lsp-mode evil)
  :config (setq lsp-ui-doc-enable t
                evil-lookup-func #'lsp-ui-doc-glance ; Makes K
                lsp-ui-doc-show-with-cursor nil      ; Don't s
```

```
                          lsp-ui-doc-include-signature t       ; Show si
                          lsp-ui-doc-position 'at-point))
```

It's quite big but most of it disables things I don't need. I took 90% of this config from Andrey Listopadov's **Migrating from LSP-Mode to Eglot** article where ironically in the end he moves back to lsp-mode.

Now we have a minimal LSP configuration. If you visit a `.ts` or `.tsx` file, you will be prompted to enable LSP and most likely download a server. Select `ts-ls`

Eslint

Let's setup `eslint` to start in projects that support it

```
(use-package lsp-eslint
  :demand t
  :after lsp-mode)
```

Additionally, follow the steps from **LSP-Mode's React Javascript tutorial for adding linting** in order to download the server.

(Optional) Tailwind LSP Server

We'll use **lsp-tailwindcss** however it's not on Melpa so I'll use **straight** to download it. You can also download the lsp-tailwindcss.el file and load it in your `init.el`. Here's my config

```
(use-package lsp-tailwindcss
  :straight '(lsp-tailwindcss :type git :host github :repo "me
  :init (setq lsp-tailwindcss-add-on-mode t)
  :config
  (dolist (tw-major-mode
           '(css-mode
             css-ts-mode
             typescript-mode
             typescript-ts-mode
             tsx-ts-mode
             js2-mode
             js-ts-mode
             clojure-mode))
    (add-to-list 'lsp-tailwindcss-major-modes tw-major-mode)))
```

Install the server: **`M-x lsp-install-server`** , then select **`tailwindcss`** .

LSP Performance

Everything is working correctly now, and you should have already good support for web development *BUT* performance can be better.

Run **`M-x lsp-doctor`** . If you see

```
Checking for Native JSON support: OK
Check emacs supports `read-process-output-max': OK
Check `read-process-output-max' default has been changed from 
Byte compiled against Native JSON (recompile lsp-mode if failin
`gc-cons-threshold' increased?: OK
Using `plist' for deserialized objects? (refer to https://emac
Using emacs 28+ with native compilation?: OK
```

You are in a very good place. If not, please have a look at **The official lsp-mode performance guide**

Here's my setting for performance

```
(setenv "LSP_USE_PLISTS" "true") ;; in early-init.el

;; init.el
;;;; per https://github.com/emacs-lsp/lsp-mode#performance
(setq read-process-output-max (* 10 1024 1024)) ;; 10mb
(setq gc-cons-threshold 200000000)
```

Emacs LSP Booster

My experience has been that even with all of these improvements, you'll still get consistent freezes in your UI given the single threaded sync nature of Emacs.

I'll admit I was close to starting exploring Nvim until I found **Emacs LSP Booster**.

The most expensive operation for an LSP provider is parsing JSON since that is the agreed-upon protocol. While newer versions of Emacs ship with native JSON support, it's still not performant enough especially for servers like Tailwind which I found give emacs a lot of JSON to parse.

LSP Booster is an external executable that wraps LSP server providers and asynchronously converts JSON to **plists** so lsp-mode can use them directly.

To install, follow the instructions from the github repository. After that add these lines in your `lsp-mode` config:

```
(use-package lsp-mode
  ;; ... previous configuration
  :preface
  (defun lsp-booster--advice-json-parse (old-fn &rest args)
    "Try to parse bytecode instead of json."
    (or
     (when (equal (following-char) ?#)

       (let ((bytecode (read (current-buffer))))
         (when (byte-code-function-p bytecode)
           (funcall bytecode))))
     (apply old-fn args)))
  (defun lsp-booster--advice-final-command (old-fn cmd &optiona
    "Prepend emacs-lsp-booster command to lsp CMD."
    (let ((orig-result (funcall old-fn cmd test?)))
      (if (and (not test?)                             ;; for
               (not (file-remote-p default-directory)) ;; see
               lsp-use-plists
               (not (functionp 'json-rpc-connection))  ;; nati
               (executable-find "emacs-lsp-booster"))
          (progn
            (message "Using emacs-lsp-booster for %s!" orig-re
            (cons "emacs-lsp-booster" orig-result))
        orig-result)))
  :init
  (setq lsp-use-plists t)
  ;; Initiate https://github.com/blahgeek/emacs-lsp-booster fo
  (advice-add (if (progn (require 'json)
                         (fboundp 'json-parse-buffer))
                  'json-parse-buffer
                'json-read)
              :around
              #'lsp-booster--advice-json-parse)
  (advice-add 'lsp-resolve-final-command :around #'lsp-booster
```

Now your LSP completions will be blazingly fast 🔥 and there will be no UI freezes!

Structural editing

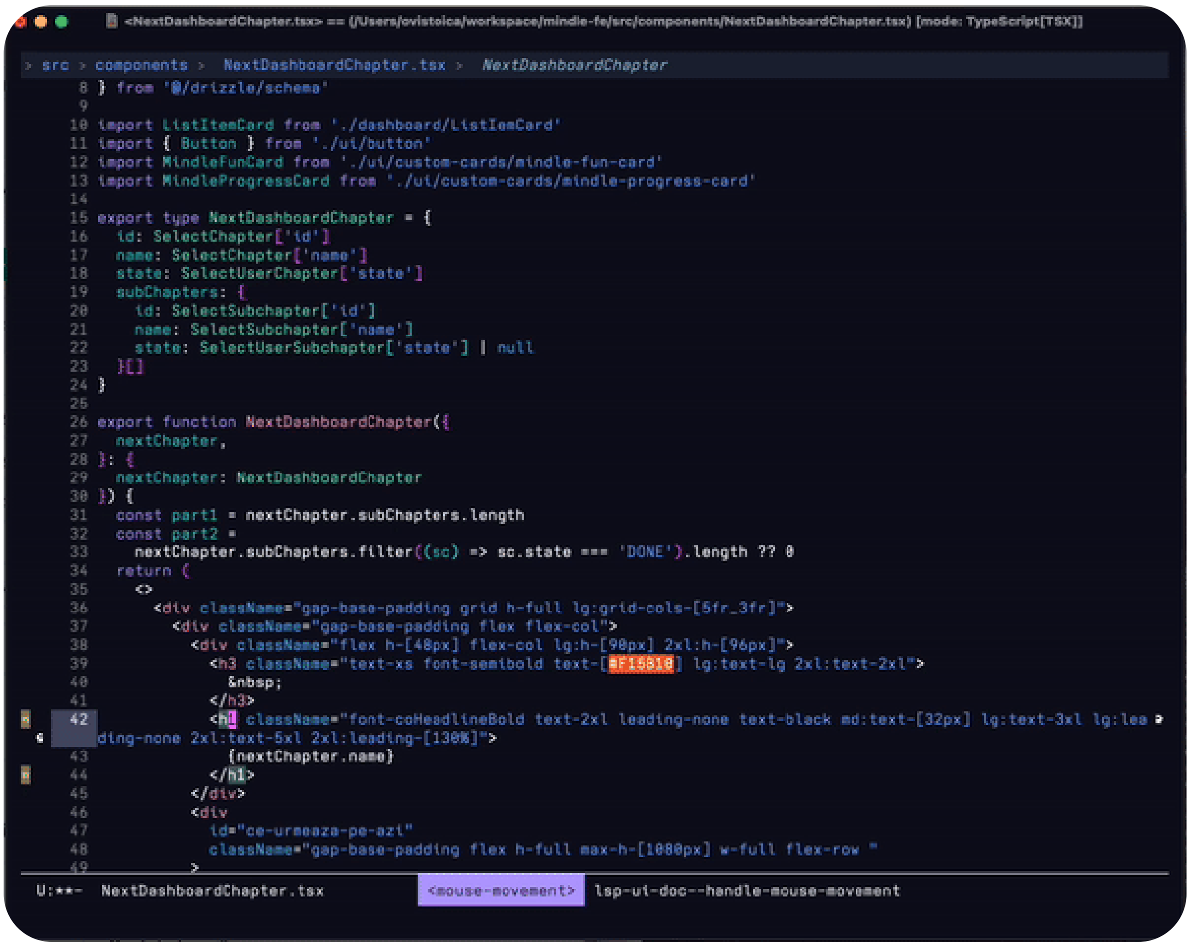
I use **Combobulate** for structural editing. It adds support for structural navigation and edition like you would get in lisp-like languages.

Here's the config, from the repo itself:

```
(use-package treesit
  ;; ... all the config from above
  :config
  (os/setup-install-grammars)
  ;; Do not forget to customize Combobulate to your liking:
  ;;
  ;;  M-x customize-group RET combobulate RET
  ;;
  (use-package combobulate
    :preface
    ;; You can customize Combobulate's key prefix here.
    ;; Note that you may have to restart Emacs for this to take ef
    (setq combobulate-key-prefix "C-c o")

    ;; Optional, but recommended.
    ;;
    ;; You can manually enable Combobulate with `M-x
    ;; combobulate-mode'.
    :hook
    ((python-ts-mode . combobulate-mode)
     (js-ts-mode . combobulate-mode)
     (go-mode . go-ts-mode)
     (html-ts-mode . combobulate-mode)
     (css-ts-mode . combobulate-mode)
     (yaml-ts-mode . combobulate-mode)
     (typescript-ts-mode . combobulate-mode)
```

```
         (json-ts-mode . combobulate-mode)
         (tsx-ts-mode . combobulate-mode))
        ;; Amend this to the directory where you keep Combobulate's so
        ;; code.
        :load-path ("~/workspace/combobulate")))
```

Here's the result:



```
<NextDashboardChapter.tsx> == (/Users/ovistoica/workspace/mindle-fe/src/components/NextDashboardChapter.tsx) [mode: TypeScript[TSX]]
> src > components > NextDashboardChapter.tsx > NextDashboardChapter
} from '@/drizzle/schema'

import ListItemCard from './dashboard/ListIemCard'
import { Button } from './ui/button'
import MindleFunCard from './ui/custom-cards/mindle-fun-card'
import MindleProgressCard from './ui/custom-cards/mindle-progress-card'

export type NextDashboardChapter = {
  id: SelectChapter['id']
  name: SelectChapter['name']
  state: SelectUserChapter['state']
  subChapters: {
    id: SelectSubchapter['id']
    name: SelectSubchapter['name']
    state: SelectUserSubchapter['state'] | null
  }[]
}

export function NextDashboardChapter({
  nextChapter,
}: {
  nextChapter: NextDashboardChapter
}) {
  const part1 = nextChapter.subChapters.length
  const part2 =
    nextChapter.subChapters.filter((sc) => sc.state === 'DONE').length ?? 0
  return (
    <>
      <div className="gap-base-padding grid h-full lg:grid-cols-[5fr_3fr]">
        <div className="gap-base-padding flex flex-col">
          <div className="flex h-[48px] flex-col lg:h-[90px] 2xl:h-[96px]">
            <h3 className="text-xs font-semibold text-[#F15810] lg:text-lg 2xl:text-2xl">
              &nbsp;
            </h3>
            <h1 className="font-coHeadlineBold text-2xl leading-none text-black md:text-[32px] lg:text-3xl lg:leading-none 2xl:text-5xl 2xl:leading-[130%]">
              {nextChapter.name}
            </h1>
          </div>
          <div
            id="ce-urmeaza-pe-azi"
            className="gap-base-padding flex h-full max-h-[1080px] w-full flex-row "
          >
U:**-  NextDashboardChapter.tsx        <mouse-movement> lsp-ui-doc--handle-mouse-movement
```

Formatting buffers with prettier

I use **apheleia** for formatting buffers on save. It works great and almost out of the box.

```
  ;;; APHELEIA
  ;; auto-format different source code files extremely intelligently
  ;; https://github.com/radian-software/apheleia
```

```
    (use-package apheleia
      :ensure apheleia
      :diminish ""
      :defines
      apheleia-formatters
      apheleia-mode-alist
      :functions
      apheleia-global-mode
      :config
      (setf (alist-get 'prettier-json apheleia-formatters)
            '("prettier" "--stdin-filepath" filepath))
      (apheleia-global-mode +1))
```

And now, apheleia will take your `.prettierrc` from the repository root and use that to format your files whenever you save.

Other resources

Here are some other resources that I explored which might be handy:

- **tsx-mode.el** - Special TSX mode that handles auto-closing tags, css-in-js, line code coverage and code folding
- **tide** - Typescript interactive development. Works well out of the box and is the default choice in Doom Emacs. I found it is limited in a monorepo setup.

Conclusion

I am very happy with the current setup I landed on and it took me a while to make it resemble the experience from VSCode & Webstorm.

I worked with this configuration within a big monorepo at my previous job and it performs as you expected.

Hope this is useful for you! If you think others might benefit, give it a share!