Configuration Styles and Assets

webpack
MODULE BUNDLER

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#webpack

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Loading Styles

CSS, Less, Sass, PostCSS

Loading Styles

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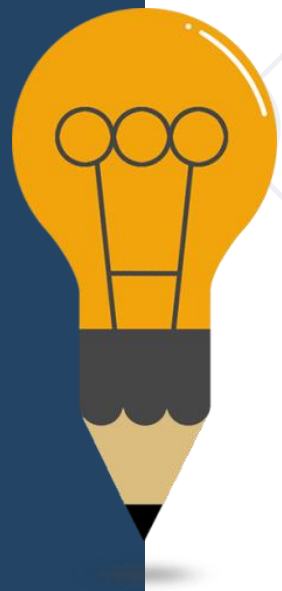
- Webpack doesn't handle styling out of the box
- In order to **handle styling** in Webpack, you have to use **loaders** and **plugins**
- When a change is made to the CSS Webpack **doesn't force** a full **refresh**. It can patch the CSS without one

Loading CSS



- To load CSS, you need to use **css-loader** and **style-loader** or **MiniCssExtractPlugin**
- Without having an entry pointing to the .css file somehow, webpack is not able to find it
  - src/main.css

```
body { background: cornsilk; }
```

  - src/index.js

```
import "./main.css";
...
```

Less

- Less is a CSS processor packed with functionality
- Using Less doesn't take a lot of effort through webpack as less-loader deals with the heavy lifting
- You should install Less as well given it's a peer dependency of *less-loader*

Loading Less

- The loader supports Less plugins, source maps, and so on
- Installing **less-loader**

```
npm install less-loader --save-dev
```

- Minimal configuration

```
{
  test: /\.less$/,
  use: ["style-loader",
        "css-loader",
        "less-loader"],
},
```

Loading Sass - CSS with superpowers

- Sass is a widely used CSS **preprocessor** - you should use **sass-loader** with it
- Install **node-sass**, as it's a peer **dependency**
- Webpack configuration

```
{
  test: /\.scss$/,
  use: ["style-loader",
        "css-loader",
        "sass-loader"],
},
```

Loading Stylus and Yeticss

- Stylus is yet another example of a CSS processor
- It works well through stylus-loader
- yeticss is a pattern library that works well with it
- To start using yeticss with Stylus, you must import it to one of your app's *.styl* files

```
@import "yeticss"
//or
@import "yeticss/components/type"
```

Stylus Configuration

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```
{
  ...
  module: {
    rules: [
      {
        test: /\.styl$/,
        use: [
          "style-loader",
          "css-loader",
          {
            loader: "stylus-loader",
            options: {
              use: [require("yeticss")],
 ...
```

PostCSS

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- Allows you to **inject** functionality to CSS in through its **plugin system**
- postcss-loader allows using PostCSS with webpack
- Include autoprefixer and precss to your project for this to work

```
{
  test: /\.css$/,
  use: [
    "style-loader",
    "css-loader",
    {
      loader: "postcss-loader",
      options: {
        plugins: () => ([
          require("autoprefixer"),
          require("precss"),
        ]),
      },
    },
  ],
},
```

cssnext

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- PostCSS plugin that allows experiencing the future now with certain restrictions
- You can use it through postcss-cssnext and enable it as follows:

```
{
  use: {
    loader: "postcss-loader",
    options: {
      plugins: () => [require("postcss-cssnext")()],
    },
  },
},
```

Lookups

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- Even though **css-loader** handles relative imports by default, it doesn't touch **absolute imports** (url("/static/img/demo.png"))
- If you rely on absolute imports, you have to **copy** the files to your project
- **copy-webpack-plugin** works for this purpose, but you can also copy the files outside of webpack
- **resolve-url-loader** comes in handy if you use Sass or Less. It adds support for relative imports to the environments

Processing *css-loader* Imports

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- If you want to **process** css-loader **imports** in a specific way, you should set up **importLoaders option** to a **number**

- To import CSS files through the **@import** statement and to **process** the imports through specific loaders, this technique is essential

```
@import "./variables.sass";
```

```
{
  test: /\.css$/,
  use: [
    "style-loader",
    {
      loader: "css-loader",
      options: {
        importLoaders: 1,
      },
    },
    "sass-loader",
...
```

Processing Sass files

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To process the Sass file, you would have to write configuration:

```
{
  test: /\.css$/,
  use: [
    "style-loader",
    {
      loader: "css-loader",
      options: {
        importLoaders: 1,
      },
    },
    "sass-loader",
  ],
},
```

Loading from *node_modules* Directory

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- You can **load** files **directly** from your **node_modules** directory

```
@import "~bootstrap/less/bootstrap";
```

- The tilde character (**~**) tells webpack that it's **not** a **relative** import as by default
- If tilde is included, it performs a lookup **against** node_modules
- With postcss-loader, you can skip using ~ . It can resolve the imports without a tilde

Using Bootstrap through Webpack

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- One option is to point to the **npm version** and perform loader configuration
- The **Sass version** is another option. In this case, you should set **precision** option of sass-loader to at least **8**
- The third option is to go through **bootstrap-loader**. It does a lot more but **allows customization**

Separating CSS and Managing Styles

Why to Separate your CSS?

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- Inlining CSS to JavaScript during development is convenient, but it is not ideal
- This approach doesn't allow cache CSS. You can also get a **F**lash **o**f **U**nstyled **C**ontent (**FOUC**)
- Separating CSS to a file of its own **avoids** the problem by letting the **browser** to manage it **separately**
- It can be potentially **dangerous** to use inline styles within JavaScript in production as it represents an attack vector
- You can use **MiniCSSExtract Plugin**

Managing Styles Outside of JavaScript

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- Referring to **styling** through JavaScript and then **bundling** is the recommended option, it's possible to achieve the same result through an **entry** and **globbing** the CSS files through an entry

```
...
const glob = require("glob");
...
const commonConfig = merge([
  {
    entry: {
      ...
      style: glob.sync("./src/**/*.css"),
    },
    ... },
  ...
```

Managing Styles Outside of JavaScript

- After this type of change, you would **not have** to refer to styling from your application code
- You should get both **style.css** and **style.js**
- If you want **strict** control over the ordering, you can set up a **single** CSS **entry** and then use **@import** to bring the rest to the project through it

Eliminating Unused CSS

PurifyCSS

PurifyCSS

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- Frameworks like Bootstrap tend to come with **a lot of** CSS. Often you use only a **small** part of it. Typically, you bundle even the **unused** CSS. It's possible, however, to **eliminate** the portions you aren't using
- PurifyCSS is a tool that can achieve this by **analyzing** files
- It walks through your code and **figures out** which CSS classes are being used

Enabling PurifyCSS

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- Using PurifyCSS can lead to **significant** savings
- **purifycss-webpack** allows to achieve similar results. You should use the **MiniCssExtractPlugin** with it for the best results

```
npm install glob purifycss-webpack purify-css --save-dev
```

```
const PurifyCSSPlugin = require("purifycss-webpack");

exports.purifyCSS = ({ paths }) => ({
  plugins: [new PurifyCSSPlugin({ paths })],
});
```

Connecting with Configuration

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```
const path = require("path");
const glob = require("glob");

const parts = require("./webpack.parts");
const PATHS = {
  app: path.join(__dirname, "src"),
};
...
const productionConfig = merge([
  ...
  parts.purifyCSS({
    paths: glob.sync(`${PATHS.app}/**/*.js`, { nodir: true }),
  }),
]);
```

- The order matters. CSS extraction has to happen **before** purifying

PurifyCSS Additional Options

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- **minify**: Set to **true** to minify. Default: false
- **output**: Filepath to write purified CSS to. Returns **raw** string if false. D efault: false.
- **info**: Logs info on how much CSS was removed if true. Default: false.
- **rejected**: Logs the CSS rules that were removed if true. Default: false.
- **whitelist** Array of selectors to always leave in. Ex. ['button-active', '*m odal*'] this will leave any selector that includes modal in it and select ors that match button-active. (wrapping the string with *'s, leaves all selectors that include it)

PurifyCSS Additional Options

- **minify**
  - Set to **true** to minify. Default: false
- **output**
  - Filepath to write purified CSS to. **Returns raw string** if false. Default: false.
- **info**
  - Logs info on how much CSS was **removed** if true. Default: false.
- **rejected**
  - Logs the CSS **rules** that were **removed** if true. Default: false.
- Other

Critical Path Rendering

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- Instead of **optimizing** for size, it optimizes for render order and **emphasizes** above-the-fold CSS
- The result is achieved by **rendering** the page and then **figuring out** which rules are **required** to obtain the shown result
- **webpack-critical** and **html-critical-webpack-plugin** implement the technique as a **HtmlWebpackPlugin** plugin
- **isomorphic-style-loader** achieves the same using Webpack and React

Autoprefixing

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- Convenient technique as it **decreases** the amount of work needed while crafting CSS
- Autoprefixing can be enabled through the **autoprefixer** PostCSS plugin
- Writes **missing** CSS definitions based on your minimum **browser** definition
- .**browserslistrc** is a standard file that works with tooling beyond **autoprefixer**

Setting Up Autoprefixing

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- Install ***postcss-loader*** and ***autoprefixer*** first

```
npm install postcss-loader autoprefixer --save-dev
```

- Add a fragment enabling autoprefixing

```
exports.autoprefix = () => ({
  loader: "postcss-loader",
  options: {
    plugins: () => [require("autoprefixer")()],
  },
});
```

Connecting with Configuration

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To connect the loader with CSS extraction, hook it up as follows:

```
const productionConfig = merge([
  parts.extractCSS({
    use: "css-loader",
    use: ["css-loader", parts.autoprefix()],
  }),
  ...
]);
```

Loading Images

url-loader, file-loader etc.

Loading Images

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- Webpack can **inline** assets by using **url-loader**
  - It **emits** your images as base64 **strings** within your JavaScript bundles and **decreases** the number of **requests** needed
- Webpack gives **control** over the inlining process and can **defer** loading to **file-loader**
  - **file-loader** outputs image files and returns **paths** to them instead of inlining
- Be careful **not** to apply both loaders on images at the same time! Use the **include** field for further control if **url-loader** limit isn't enough.

Integrating Images to the Project

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Set up a function as below

```
exports.loadImages = ({ include, exclude, options } = {}) => ({
  module: {
    rules: [
      {
        test: /\.(png|jpg)$/,
        include,
        exclude,
        use: {
          loader: "url-loader",
          options,
...
```

Attaching to the Configuration


```
const productionConfig = merge([
  ...
  parts.loadImages({
    options: {
      limit: 15000,
      name: "[name].[ext]",
    },
  }),
]);
const developmentConfig = merge([
  ...
  parts.loadImages(),
]);
```

Loading SVGs

- Webpack allows a couple ways to load SVGs. However, the easiest way is through *file-loader*

```
{
  test: /\.svg$/,
  use: "file-loader",
},
```

- Refering to your SVG files

```
.icon {
   background-image: url("../assets/icon.svg");
}
```

Useful Loaders

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- **raw-loader** - gives access to the raw SVG content.
- **svg-inline-loader** - goes a step further and eliminates unnecessary markup from your SVGs
- **svg-sprite-loader** - can merge separate SVG files into a single sprite
- **svg-url-loader** - loads SVGs as UTF-8 encoded data urls
- **react-svg-loader** - emits SVGs as React components

Optimizing Images

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- Compression is particularly valuable for production builds as it **decreases** the amount of **bandwidth** required to download your image assets and **speed up** your site or application
- In case you want to compress your images, use **image-webpack-loader**, **svgo-loader** (SVG specific), or **imagemin-webpack-plugin**
  - This type of loader should be applied **first** to the **data**

Utilizing srcset

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- **resize-image-loader** and **responsive-loader** allow you to generate **srcset** compatible collections of images for modern browsers
- srcset gives more **control** to the **browsers** over what images to load and when resulting in **higher performance**

Loading Sprites

- **Spriting** technique allows you to **combine** multiple smaller images into a single image
- webpack-spritesmith converts provided images into a **sprite sheet** and Sass/Less/Stylus mixins
- You have to set up a **SpritesmithPlugin**, point it to target images, and set the name of the generated mixin

```
@import "~sprite.sass";
.close-button {
  sprite($close);
}
.open-button {
  sprite($open);
}
```

Using Placeholders

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- **Image-trace-loader** loads images and exposes the results as image/svg+xml URL encoded data
- It can be used in conjunction with *file-loader* and *url-loader* for **showing** a **placeholder** while the actual image is being loaded
- **lqip-loader** implements a similar idea. It provides a **blurred** image instead of a traced one
- Sometimes getting the only reference to an image isn't enough. image-size-loader emits image dimensions, type, and size in addition to the reference to the image itself

Referencing to Images

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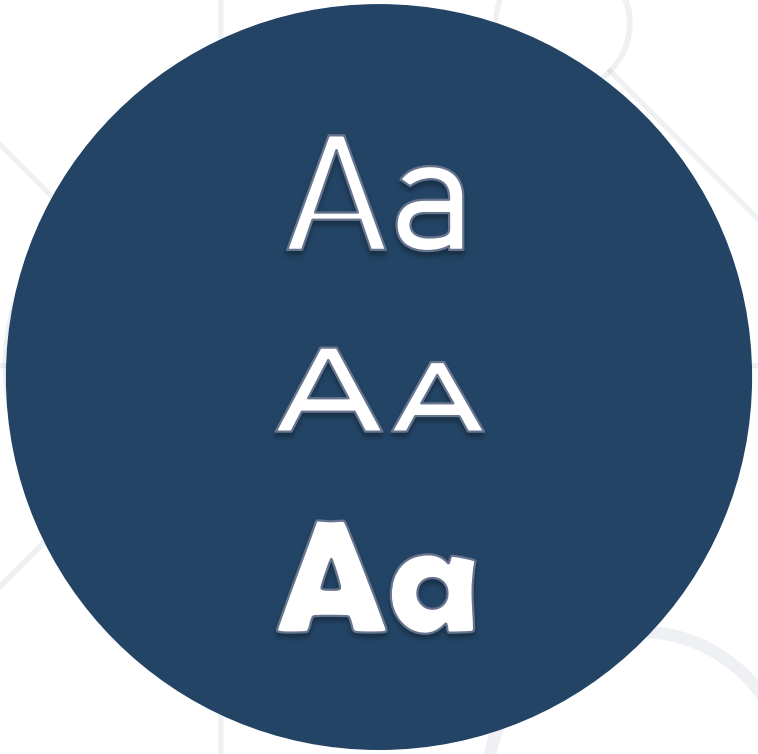
- You can also **refer** to your images within the code. In this case, you have to import the files **explicitly**

```
import src from "./file.png";

// Use the image in your code somehow now
const Profile = () => <img src={src} />;
```

- If you are using React, then you use **babel-plugin-transform-react-jsx-img-import**
- It's also possible to set up **dynamic imports**

```
const src = require(`./files/${file}`);`.
```



Loading Fonts

Loading Fonts

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- If you're currently using Webpack to manage your CSS, importin g font files won't work without a little bit of **extra** configuration
- Loading fonts is **similar** to loading other **assets**. You have to consider the **browsers** you want to support
- The same **techniques** as for **images** apply. You can choose to **inline** small fonts while bigger ones are **served** as **separate** assets

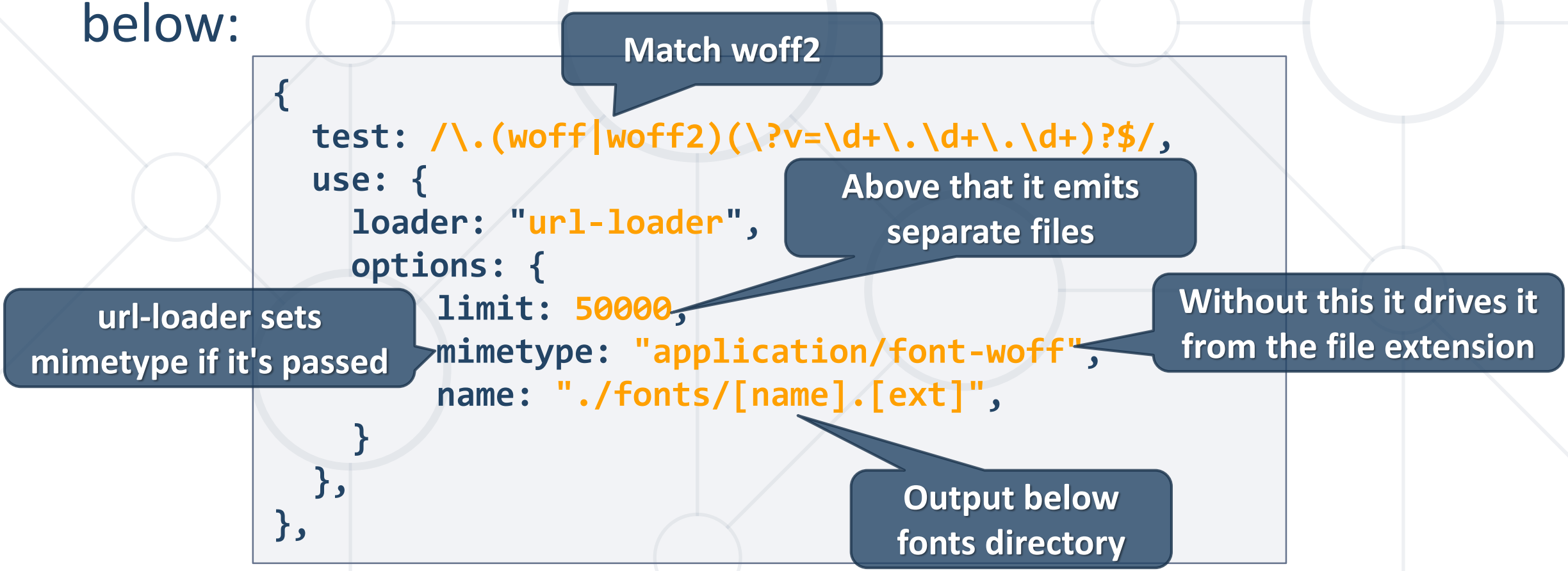
Choosing One Format

- If you exclude Opera Mini, all browsers support the **.woff** format. Its newer version, **.woff2**, is widely supported by modern browsers and can be a good **alternative**
- Going with **one** format, you can use a similar setup as for **images** and rely on both **file-loader** and **url-loader** while using the **limit** option

```
{
  test: /\.woff$/,
  use: {
    loader: "url-loader",
    options: {
      limit: 50000,
...
```

Choosing One Format

- A more elaborate approach to achieve a similar result that includes **.woff2** and others would be to end up with the code as below:



Supporting Multiple Formats

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- If you want to make sure the site **looks good** on a **maximum** amount of browsers, you can use **file-loader** and forget about **inlining**
- It's a trade-off as you get **extra** requests

```
{
  test: /\.(ttf|eot|woff|woff2)$/,
  use: {
    loader: "file-loader",
    options: {
      name: "fonts/[name].[ext]",
. . .
```

Supporting Multiple Formats

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- The way you write your CSS definition **matters**
- To make sure you are getting the **benefit** from the newer formats, they should become **first** in the **definition**

```
@font-face {
  font-family: "myfontfamily";
  src: url("./fonts/myfontfile.woff2") format("woff2"),
    url("./fonts/myfontfile.woff") format("woff"),
    url("./fonts/myfontfile.eot") format("embedded-opentype"),
    url("./fonts/myfontfile.ttf") format("truetype");
    /* Add other formats as you see fit */
}
```

Manipulating file-loader Output Path

- **file-loader** allows **shaping** the output
- This way you can output your fonts below **fonts/**, images below **images/**, and so on over using the **root**
- It's possible to manipulate **publicPath** and override the **default** per loader definition

Manipulating file-loader Output Path

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```
{
  // Match woff2 and patterns like .woff?v=1.1.1.
  test: /\.woff2?(\?v=\d+\.\d+\.\d+)?$/,
  use: {
    loader: "url-loader",
    options: {
      limit: 50000,
      mimetype: "application/font-woff",
      name: "./fonts/[name].[ext]", // Output below ./fonts
      publicPath: "../", // Take the directory into account
    },
  },
},
```

Other Font Loaders and Plugins

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- webfonts-loader
  - Bundles SVG based fonts
- google-fonts-webpack-plugin
  - Downloads Google Fonts to webpack build directory or connect to them using a CDN
- iconfont-webpack-plugin
  - Designed to simplify loading icon based fonts. It inlines SVG references within CSS files
- Other

Live Exercise

Summary

- Styling
  - To load CSS, you need to use **css-loader** and **style-loader**
  - Separating CSS to a file of its own avoids **FOUC**
  - PurifyCSS is a tool that **eliminates** CSS this by **analyzing** files
  - Autoprefixnig
- Loading Assets
  - Webpack allows you to **inline images** within your **bundles** when needed
  - Loading **fonts** is similar to loading other **assets**

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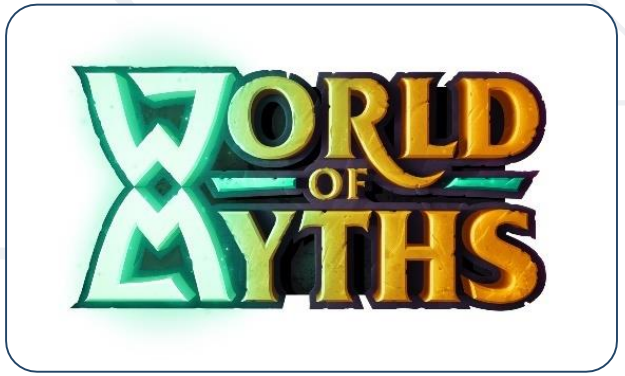

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