1. webpack 介绍

- Webpack是一个前端资源加载/打包工具。它将根据模块的依赖关系进行静态分析，然后将这些模块按照指定的规则生成对应的静态资源。
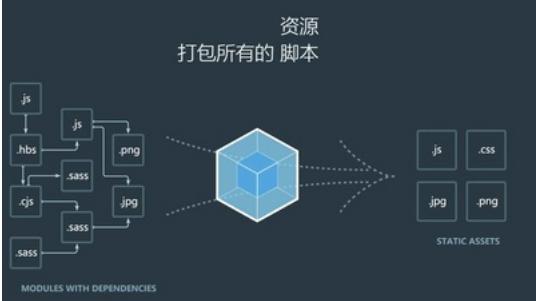
2. 预备知识

2.1 toStringTag

- Symbol.toStringTag 是一个内置 symbol，它通常作为对象的属性键使用，对应的属性值应该为字符串类型，这个字符串用来表示该对象的自定义类型标签
- 通常只有内置的 Object.prototype.toString() 方法会去读取这个标签并把它包含在自己的返回值里。

```js
console.log(Object.prototype.toString.call("foo"));
console.log(Object.prototype.toString.call([1, 2]));
console.log(Object.prototype.toString.call(3));
console.log(Object.prototype.toString.call(true));
console.log(Object.prototype.toString.call(undefined));
console.log(Object.prototype.toString.call(null));
let myExports = {};
Object.defineProperty(myExports, Symbol.toStringTag, { value: "Module" });
console.log(Object.prototype.toString.call(myExports));
```

```
[object String]
[object Array]
[object Number]
[object Boolean]
[object Undefined]
[object Null]
[object Module]
```

2.2 defineProperty

- defineProperty (https://developer.mozilla.org/zh-CN/docs/Web/JavaScript/Reference/Global_Objects/Object/defineProperty) 方法会直接在一个对象上定义一个新属性，或者修改一个对象的现有属性，并返回这个对象。
    - obj 要在其上定义属性的对象。
    - prop 要定义或修改的属性的名称。
    - descriptor 将被定义或修改的属性描述符。

```js
let obj = {};
var ageValue = 10;

Object.defineProperty(obj, "age", {

  get() {
    return ageValue;
  },
  set(newValue) {
    ageValue = newValue;
  },

  enumerable: true,
  configurable: true,
});

console.log(obj.age);
obj.age = 20;
console.log(obj.age);
```

3. 同步加载

3.1 安装模块

```
cnpm i webpack webpack-cli html-webpack-plugin clean-webpack-plugin -D
```

3.2 webpack.config.js

```
const path = require("path");
const HtmlWebpackPlugin = require("html-webpack-plugin");
const { CleanWebpackPlugin } = require("clean-webpack-plugin");
module.exports = {
  mode: "development",
  devtool: "source-map",
  entry: "./src/index.js",
  output: {
    path: path.resolve(__dirname, "dist"),
    filename: "main.js",
  },
  module: {},
  plugins: [
    new CleanWebpackPlugin({ cleanOnceBeforeBuildPatterns: ["**/*"] }),
    new HtmlWebpackPlugin({
      template: "./src/index.html",
      filename: "index.html",
    }),
  ],
  devServer: {},
};
```

3.2 index.js

src\index.js

```
let title = require("./title.js");
console.log(title);
```

3.3 title.js

src\title.js

```
module.exports = "title";
```

3.4 index.html

src\index.html

```
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>webpacktitle
  head>
  <body>body>
html>
```

3.5 package.json

package.json

```
"scripts": {
  "build": "webpack"
}
```

3.6 打包文件

```
(() => {
  var modules = ({
    "./src/title.js":
      ((module) => {
        module.exports = "title";
      })
  });
  var cache = {};
  function require(moduleId) {
    if (cache[moduleId]) {
      return cache[moduleId].exports;
    }
    var module = cache[moduleId] = {
      exports: {}
    };
    modules[moduleId](module, module.exports, require);
    return module.exports;
  }
  (() => {
    let title = require("./src/title.js");
    console.log(title);
  })();
})();
```

4. 兼容性实现

4.1 common.js 加载 common.js

4.1.1 index.js

```
let title = require("./title");
console.log(title.name);
console.log(title.age);
```

4.1.2 title.js

```
exports.name = "title_name";
exports.age = "title_age";
```

4.1.3 main.js

```
(() => {
  var modules = ({
    "./src/title.js":
      ((module, exports) => {
        exports.name = 'title_name';
        exports.age = 'title_age';
      })
  });
  var cache = {};
  function require(moduleId) {
    var cachedModule = cache[moduleId];
    if (cachedModule !== undefined) {
      return cachedModule.exports;
    }
    var module = cache[moduleId] = {
      exports: {}
    };
    modules[moduleId](module, module.exports, require);
    return module.exports;
  }
  var exports = {};
  (() => {
    let title = require("./src/title.js");
    console.log(title.name);
    console.log(title.age);
  })();
})()
;
```

4.2 common.js 加载 ES6 modules [#](#)

4.2.1 index.js [#](#)

```
let title = require("./title");
console.log(title);
console.log(title.age);
```

4.2.2 title.js [#](#)

```
export default "title_name";
export const age = "title_age";
```

4.2.3 main.js [#](#)

```
(() => {
  var modules = ({
    "./src/title.js":
      ((module, exports, require) => {
        require.r(exports);
        require.d(exports, {
          "default": () => (_DEFAULT_EXPORT__),
          "age": () => (age)
        });
        const _DEFAULT_EXPORT__ = ('title_name');
        const age = 'title_age';
      })
  });
  var cache = {};
  function require(moduleId) {
    var cachedModule = cache[moduleId];
    if (cachedModule !== undefined) {
      return cachedModule.exports;
    }
    var module = cache[moduleId] = {
      exports: {}
    };
    modules[moduleId](module, module.exports, require);
    return module.exports;
  }
  require.d = (exports, definition) => {
    for (var key in definition) {
      if (require.o(definition, key) && !require.o(exports, key)) {
        Object.defineProperty(exports, key, { enumerable: true, get: definition[key] });
      }
    }
  };
  require.o = (obj, prop) => (Object.prototype.hasOwnProperty.call(obj, prop))
  require.r = (exports) => {
    if (typeof Symbol !== 'undefined' && Symbol.toStringTag) {
      Object.defineProperty(exports, Symbol.toStringTag, { value: 'Module' });
    }
    Object.defineProperty(exports, '__esModule', { value: true });
  };
  let title = require("./src/title.js");
  console.log(title);
  console.log(title.age);
})()
;
```

4.3 ES6 modules 加载 ES6 modules [#](#)

4.3.1 index.js [#](#)

```
import name, { age } from "./title";
console.log(name);
console.log(age);
```

4.3.2 title.js [#](#)

```
export default name = "title_name";
export const age = "title_age";
```

4.3.3 main.js [#](#)

```
(() => {
  "use strict";
  var modules = ({
    "./src/title.js":
      ((module, exports, require) => {
        require.r(exports);
        let _DEFAULT_EXPORT__ = ('title_name');
        let age = 'title_age';
        setTimeout(() => {
          age = 'new';
        }, 1000);

        exports.age = age;
      })
  });
  var cache = {};
  function require(moduleId) {
    var cachedModule = cache[moduleId];
    if (cachedModule !== undefined) {
      return cachedModule.exports;
    }
    var module = cache[moduleId] = {
      exports: {}
    };
    modules[moduleId](module, module.exports, require);
    return module.exports;
  }
  (() => {
    require.d = (exports, definition) => {
      for (var key in definition) {
        if (require.o(definition, key) && !require.o(exports, key)) {
          Object.defineProperty(exports, key, { enumerable: true, get: definition[key] });
        }
      }
    };
  })();
  (() => {
    require.o = (obj, prop) => (Object.prototype.hasOwnProperty.call(obj, prop))
  })();
  (() => {
    require.r = (exports) => {
      if (typeof Symbol !== 'undefined' && Symbol.toStringTag) {
        Object.defineProperty(exports, Symbol.toStringTag, { value: 'Module' });
      }
      Object.defineProperty(exports, '__esModule', { value: true });
    };
  })();
  var exports = {};
  (() => {
    require.r(exports);
    var _title_0__ = require("./src/title.js");
    console.log(_title_0__["default"]);
    console.log(_title_0__.age);
  })();
})()
;
```

4.4 ES6 modules 加载 common.js

4.4.1 index.js

```
import name, { age } from "./title";
console.log(name);
console.log(age);
```

4.4.2 title.js

```
module.exports = {
  name: "title_name",
  age: "title_age",
};
```

4.4.3 main.js

```
(() => {
  var modules = ({
    "./src/title.js":
      ((module) => {
        module.exports = {
          name: 'title_name',
          age: 'title_age'
        }
      })
  });
  var cache = {};
  function require(moduleId) {
    var cachedModule = cache[moduleId];
    if (cachedModule !== undefined) {
      return cachedModule.exports;
    }
    var module = cache[moduleId] = {
      exports: {}
    };
    modules[moduleId](module, module.exports, require);
    return module.exports;
  }
  require.n = (module) => {
    var getter = module && module.__esModule ?
      () => (module['default']) :
      () => (module);

    return getter;
  };
  require.d = (exports, definition) => {
    for (var key in definition) {
      if (require.o(definition, key) && !require.o(exports, key)) {
        Object.defineProperty(exports, key, { enumerable: true, get: definition[key] });
      }
    }
  };
  require.o = (obj, prop) => (Object.prototype.hasOwnProperty.call(obj, prop))
  require.r = (exports) => {
    Object.defineProperty(exports, Symbol.toStringTag, { value: 'Module' });
    Object.defineProperty(exports, '__esModule', { value: true });
  };
  var exports = {};
  (() => {

    require.r(exports);
    var _title_0__ = require("./src/title.js");
    var _title_0___default = require.n(_title_0__);
    console.log((_title_0___default()));
    console.log(_title_0__.age);
  })();
})()
  ;
```

5.异步加载

5.1 webpack.config.js

```
const path = require("path");
const HtmlWebpackPlugin = require("html-webpack-plugin");
const { CleanWebpackPlugin } = require("clean-webpack-plugin");
module.exports = {
  mode: "development",
  devtool: "source-map",
  entry: "./src/index.js",
  output: {
    path: path.resolve(__dirname, "dist"),
    filename: "main.js",
  },
  module: {},
  plugins: [
    new CleanWebpackPlugin({ cleanOnceBeforeBuildPatterns: ["**/*"] }),
    new HtmlWebpackPlugin({
      template: "./src/index.html",
      filename: "index.html",
    }),
  ],
  devServer: {},
};
```

5.2 src\index.js

src\index.js

```
import( "./hello").then((result) => {
    console.log(result.default);
});
```

5.3 hello.js

src\hello.js

```
export default 'hello';
```

5.4 dist\main.js

```
var modules = ({});

var cache = {};

function require(moduleId) {
  var cachedModule = cache[moduleId];
  if (cachedModule !== undefined) {
    return cachedModule.exports;
  }
  var module = cache[moduleId] = {
    exports: {}
  };
  modules[moduleId](module, module.exports, require);
  return module.exports;
}
require.d = (exports, definition) => {
  for (var key in definition) {
    Object.defineProperty(exports, key, { enumerable: true, get: definition[key] });
  }
};
require.r = (exports) => {
  Object.defineProperty(exports, Symbol.toStringTag, { value: 'Module' });
  Object.defineProperty(exports, '__esModule', { value: true });
};

var installedChunks = {
  "main": 0,

};

function webpackJsonpCallback([chunkIds, moreModules]) {
  const resolves = [];
  for (let i = 0; i < chunkIds.length; i++) {
    const chunkId = chunkIds[i];
    resolves.push(installedChunks[chunkId][0]);
    installedChunks[chunkId] = 0;
  }

  for (const moduleId in moreModules) {
    modules[moduleId] = moreModules[moduleId];
  }

  while (resolves.length) {
    resolves.shift()();
  }
}

require.m = modules;
require.f = {};

require.p = '';

require.u = function (chunkId) {
  return chunkId+'.main.js'
}
require.l = function (url) {
  let script = document.createElement('script');
  script.src = url;
  document.head.appendChild(script);
}

require.f.j = function (chunkId, promises) {

  let installedChunkData;

  const promise = new Promise((resolve, reject) => {
    installedChunkData = installedChunks[chunkId] = [resolve, reject];
  });
  installedChunkData[2] = promise;
  promises.push(promise);

  const url = require.p + require.u(chunkId);
  require.l(url);
}
require.e = function (chunkId) {
  let promises = [];
  require.f.j(chunkId,promises);
  return Promise.all(promises);
}
var chunkLoadingGlobal = window['webpack5'] = [];
chunkLoadingGlobal.push = webpackJsonpCallback;

require.e('hello')
  .then(require.bind(require, './src/hello.js'))
  .then(result => { console.log(result) });
```

5.5 hello.main.js

hello.main.js

```
(window["webpack5"] = window["webpack5"] || []).push([["hello"], {
  "./src/hello.js":
    ((module, exports, __webpack_require__) => {
      "use strict";
      __webpack_require__.renderEsModule(exports);
      __webpack_require__.defineProperties(exports, {
        "default": () => DEFAULT_EXPORT
      });
      const DEFAULT_EXPORT = ('hello');
    })
}]);
```