

WEBPACK 5 – WHAT'S NEW

TOBIAS KOPPERS










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ORGANIZATION

- WEBPACK 5 → WEBPACK **CORE** (webpack/webpack) **MAJOR** VERSION 5
- OTHER REPOS DEVELOP INDIVIDUALLY → SEPARATE MAJOR VERSIONS
- DEVELOPMENT ON `webpack/webpack#next`
- ~1K COMMITS COMPARED TO MASTER
- ~500 PRs MERGED

CATEGORIES

- HOTNESS/BENEFIT:   
- RISK OF BREAKING:   
- RISK OF BUGS:   



NODE POLYFILLS

```
require("crypto");  
import crypto from "crypto";
```

WEBPACK 4

- COMPILED SUCCESSFUL
- CRYPTO POLYFILL 301KB
- LIMITED FEATURES
- OUTDATED
- INSTALLED WITH WEBPACK

WEBPACK 5

- "CRYPTO" CANNOT BE RESOLVED

```
yarn add crypto-browserify  
resolve: { alias: {  
  crypto: "crypto-browserify"  
} }
```




DETERMINISTIC MODULE/CHUNK IDS

WEBPACK 4 (PRODUCTION+)

- 1.1A2B3C.BUNDLE.JS
 - [1] ENTRY.JS
 - [2] LOGIN.JS
- 2.4A5B6C.BUNDLE.JS
 - [3] BUTTON.JS
- 1.3A2B1C.BUNDLE.JS
 - [1] ENTRY.JS
 - [2] LOGIN.JS
- 2.7A8B9C.BUNDLE.JS
 - [3] LOGIN-HELPER.JS
- 3.6A5B4C.BUNDLE.JS
 - [4] BUTTON.JS

WEBPACK 5 (PRODUCTION)

- 426.1A2B3C.BUNDLE.JS
 - [293] ENTRY.JS
 - [953] LOGIN.JS
- 853.4A5B6C.BUNDLE.JS
 - [832] BUTTON.JS
- 426.3A2B1C.BUNDLE.JS
 - [293] ENTRY.JS
 - [953] LOGIN.JS
- 157.7A8B9C.BUNDLE.JS
 - [533] LOGIN-HELPER.JS
- 853.4A5B6C.BUNDLE.JS
 - [832] BUTTON.JS



NAMED CHUNK IDS

WEBPACK 4 (DEVELOPMENT)

- MAIN.BUNDLE.JS
 - [./ENTRY.JS]
 - [./LOGIN.JS]
- 2.BUNDLE.JS
 - [./LOGIN-HELPER.JS]
- 3.BUNDLE.JS
 - [./BUTTON.JS]

WEBPACK 5 (DEVELOPMENT)

- MAIN.BUNDLE.JS
 - [./ENTRY.JS]
 - [./LOGIN.JS]
- LOGIN-HELPER_JS.BUNDLE.JS
 - [./LOGIN-HELPER.JS]
- BUTTON_JS.BUNDLE.JS
 - [./BUTTON.JS]

NEW IDS

	Source	[id].js (dev)	[id].js (prod)	[name].js
webpack 4	import("./module");	1.js	1.js	1.js
	import(/* webpackChunkName: "something" */ "./module");	1.js	1.js	something.js
webpack 5	import("./module");	src_module_js.js	452.js	452.js
	import(/* webpackChunkName: "something" */ "./module");	something.js	853.js	something.js



DETERMINISTIC EXPORT MANGLING

```
export { a_used, b_unused, c_used }
```

```
import { c_used } from "module"; console.log(c_used);
```

WEBPACK 4

- export { a_used as a,
/* b_unused, */ c_used as b }
- export { a_used as a,
b_unused as b, c_used as c }
- console.log(__WEBPACK_MODULE_M.b);
- console.log(__WEBPACK_MODULE_M.c);

WEBPACK 5

- export { a_used as d,
/* b_unused, */ c_used as u }
- export { a_used as d,
b_unused as w, c_used as u }
- console.log(__WEBPACK_MODULE_M.u);
- console.log(__WEBPACK_MODULE_M.u);



JS-LESS CHUNKS

```
splitChunks: { cacheGroups: { styles: {  
  moduleType: "stylesheet"  
} } }
```

WEBPACK 4

- STYLES.CSS 200KB
- STYLES.JS 10BYTES

WEBPACK 5

- STYLES.CSS 200KB



SOURCE TYPES

WEBPACK 4

[2] 2.bundle.js 135kb

```
splitChunks: {  
  minSize: 10_000,  
  maxSize: 100_000  
}
```

WEBPACK 5

[324] 324.bundle.js 135kb
14kb javascript 1.2kb runtime 20kb
webassembly 100kb stylesheet

```
splitChunks: {  
  minSize: {  
    javascript: 10_000,  
    webassembly: 5000,  
    stylesheet: 20_000  
  },  
  maxSize: {  
    javascript: 100_000,  
    webassembly: 50_000,  
    stylesheet: 200_000  
  }  
}
```




DEPENDENT CHUNKS

```
target: "node", // same for webworker, async-node
splitChunks: {
  chunks: "all"
}
```

WEBPACK 4

undefined is not a function



WEBPACK 5

- ENTRY CHUNK LOADS ALL DEPENDENT CHUNKS





MINIMUM NODE.JS VERSION

WEBPACK 4

```
"engines": {  
  "node": ">=6.11.5"  
}
```

WEBPACK 5

```
"engines": {  
  "node": ">=8.9.0"  
}
```

OBJECT SPREAD { ...OBJ }

ASYNC FUNCTIONS



(UN)SAFE CACHING

- RENAME `module.js` → `module.ts`

WEBPACK 4

Error: ENOENT: module.js not found

- ✗ RESTART WEBPACK
- `module.unsafeCache: true`
- `resolve.unsafeCache: true`

WEBPACK 5



- `module.unsafeCache: /node_modules/`
- ~~`resolve.unsafeCache`~~
- `resolve.cache: true`



IMPROVED WATCHING

- extensions: [".ts", ".js"]
- module.js
- ADD module.ts

WEBPACK 4

- ✗ NO CHANGE DETECTED

WEBPACK 5

- ✓ CHANGE DETECTED



SPLIT CHUNKS – MIN REMAINING SIZE

```
import(/* webpackChunkName: "chunk" */ "../module");
```

```
// module.js  
import "react";
```

WEBPACK 4

- CHUNK.JS 1KB
- VENDORS-CHUNK.JS 40KB

WEBPACK 5

- CHUNK.JS 41KB

```
splitChunks: {  
  minRemainingSize: 10_000  
}
```



MAX SIZE FOR INITIAL AND ASYNC

WEBPACK 4

```
splitChunks: {  
  maxSize: 100_000  
}
```

WEBPACK 5

```
splitChunks: {  
  maxInitialSize: 100_000,  
  maxAsyncSize: 50_000  
}
```

I. E. ONLY `maxAsyncSize` WHEN
INFRASTRUCTURE ISN'T READY FOR INITIAL SPLITTING



SPLIT CHUNKS – NAME

- `entry: { primary: "../primary", secondary: "../secondary" }`
- `splitChunks: { chunks: "all" }`

WEBPACK 4

- PRIMARY.JS
 - SECONDARY.JS
 - PRIMARY~SECONDARY.JS
-
- ADDING `tertiary` ENTRY:
PRIMARY~SECONDARY~TERTIARY.JS

WEBPACK 5

- PRIMARY.JS
- SECONDARY.JS
- `NODE_MODULES_SHARED_INDEX_JS.JS`



MERGING RESOLVE AND PARSER OPTIONS

```
resolve: {  
  alias: {  
    a: "..."  
  }  
}
```

```
module: {  
  rules: [{  
    resolve: {  
      alias: {  
        b: "..."  
      }  
    }  
  ]  
}
```

WEBPACK 4

```
alias: {  
  b: "..."  
}
```

WEBPACK 5

```
alias: {  
  a: "...",  
  b: "..."  
}
```




PLACEHOLDER RENAME

WEBPACK 4

filename: “[hash].js”

HASH OF THE WHOLE APPLICATION
(LOOKS INNOCENT, BUT IS BAD)

filename: “[contenthash].js”

HASH OF THE FILE

WEBPACK 5

filename: “[fullhash].js”

HASH OF THE WHOLE APPLICATION
(CLEAR)

filename: “[contenthash].js”

HASH OF THE FILE

filename: “[hash].js”

ERROR WITH MIGRATION INFO



FUTURE-PROOF OPTIONS

WEBPACK 4

```
externals:  
  (context, request, callback) => {}
```

```
new IgnorePlugin(  
  /some-regexp/  
)
```

```
new BannerPlugin(  
  "Some banner"  
)
```

WEBPACK 5

```
externals:  
  ({ context, request }, callback) => {}
```

```
new IgnorePlugin({  
  resourceRegExp: /some-regexp/  
})
```

```
new BannerPlugin({  
  banner: "Some banner"  
})
```




PERSISTENT CACHING

WEBPACK 4

- `cache: true`
IN-MEMORY CACHING

- RESTARTING WEBPACK TAKES TIME

WEBPACK 5

- `cache: { type: "memory" }`
IN-MEMORY CACHING
- `cache: { type: "filesystem" }`
PERSISTENT CACHING
- EXPERIMENTAL PERSISTENT CACHING CAN BE ENABLED
- RESTARTING WEBPACK TAKES LESS TIME

CACHE OPTIONS

```
cache: {  
  type: "filesystem",  
  cacheDirectory: `node_modules/.cache/webpack`,  
  name: `${name}-${mode}`,  
  version: "",  
  cacheLocation: `${cache.cacheDirectory}/${cache.name}`  
  hashAlgorithm: "md4",  
  store: "pack", // "pack" | "idle" | "background" | "instant"  
  idleTimeout: 10_000, // 10s  
  idleTimeoutForInitialStore: 0,  
  loglevel: false // "debug" | "verbose" | "info" | "warning"  
}
```


CACHE OPTIONS (TODO)

```
cache: {  
  configDependencies: [  
    "./webpack.config.js",  
    "webpack-merge",  
    "./src/schema.gql"  
  ],  
  buildDependencies: [  
    "graphql-schema-compiler",  
    "html-webpack-plugin",  
    // loaders will be added automatically  
  ]  
}
```

- CACHE RELATIVE TO CONTEXT



STATS PRESET

WEBPACK 4

```
stats: "verbose"
```

WEBPACK 5

```
stats: {  
  preset: "verbose",  
  modules: false  
}
```




NEW STATS OPTIONS

WEBPACK 4

```
stats: {  
  chunkModules: true  
}
```

WEBPACK 5

```
stats: {  
  chunkRootModules: true,  
  SHOW ONLY THE ROOT MODULES  
  chunkModules: false,  
  SHOW ALL MODULES (NOW FALSE BY DEFAULT)  
  orphanModules: false,  
  HIDE NOT-INCLUDED MODULES  
  runtime: false,  
  HIDE RUNTIME MODULES  
  chunkRelations: false  
  SHOW PARENT/CHILDREN/SIBLING CHUNKS  
}
```



PLUGINS FOR STATS

WEBPACK 4

✗ NO PLUGINS, LIMITED CUSTOMIZING

WEBPACK 5

✓ HOOKS FOR **PLUGINS**

- NEW PRESETS
- MORE INFO IN JSON
- MORE INFO IN TEXT FORMAT
- DIFFERENT TEXT FORMAT



FILENAME FOR INITIAL CHUNKS

```
output: {  
  filename: "[id].bundle.js",  
  chunkFilename: "[id].chunk.js"  
}
```

WEBPACK 4

- RUNTIME.BUNDLE.JS
- PRIMARY.CHUNK.JS
- VENDORS~PRIMARY.CHUNK.JS
- SECONDARY.CHUNK.JS
- PRIMARY-SECONDARY.CHUNK.JS
- ON-DEMAND.CHUNK.JS
- VENDORS~ON-DEMAND.CHUNK.JS

WEBPACK 5

- RUNTIME.BUNDLE.JS
- PRIMARY.BUNDLE.JS
- VENDORS-PRIMARY.BUNDLE.JS
- SECONDARY.BUNDLE.JS
- SHARED.BUNDLE.JS
- ON-DEMAND.CHUNK.JS
- VENDORS-ON-DEMAND.CHUNK.JS



EXTENDED EXPORTS INFO

exports { a, b, c }

WEBPACK 4

- providedExports: ["a", "b", "c"]
- usedExports: ["a", "c"]

WEBPACK 5

```
ExportsInfo: {  
  exports: Map {  
    a: {  
      provided: true,  
      used: UsageState.Used,  
      canMangle: true,  
      mangledName: "a",  
      ...  
    },  
    ...  
  }  
}
```




BETTER TREE SHAKING

```
x.js: exports { a, b, c };
```

```
y.js: import * as x from "./x"; exports { x };
```

```
z.js: import * as y from "./y"; console.log(y.x.b);
```

WEBPACK 4

```
y.js usedExports: ["x"]
```

```
x.js usedExports: true
```

USED IN UNKNOWN WAY

ALL EXPORTS MAY BE NEEDED

NO MANGLING

✗ EXPORTS A, B AND C INCLUDED IN BUNDLE

WEBPACK 5

```
y.js x: {  
  used: OnlyPropertiesUsed  
}
```

```
x.js a: { used: Unused }  
     b: { used: Used }
```

✓ EXPORTS A AND C OMITTED FROM BUNDLE



RUNTIME HELPER CODE

```
import thing from “./commonjs”  
  
var _commonjs__WP_MODULE_0__ = __webpack_require__(123);  
var _commonjs__WP_MODULE_0__default =  
    /*#__PURE__*/ __webpack_require___.n(_commonjs__WP_MODULE_0__);  
  
__webpack_require___.n(exports)  
GETS DEFAULT EXPORTS FROM NON-ESM
```

WEBPACK 4

- CODE FOR `__webpack_require___.n` IS ALWAYS IN THE RUNTIME CODE
- MAYBE UNNEEDED RUNTIME CODE IN THE BUNDLE

WEBPACK 5

- `DependencyTemplates` TELL `RuntimeRequirements`
- `Compilation` AGGREGATES `RuntimeRequirements`
- `RuntimePlugin` ADDS `RuntimeModules` DEPENDING ON `RuntimeRequirements`
- `runtimeModules` ADD HELPER CODE
- ONLY RUNTIME CODE THAT'S NEEDED

SERIALIZATION

WEBPACK 4

- NO SERIALIZATION CODE

WEBPACK 5

```
serialize({ write }) {
  write(this.flag);
  write(this.value);
}
```

```
deserialize({ read }) {
  this.flag = read();
  this.value = read();
}
```



PLUGINS:

CACHE INTERFACE

WEBPACK 4

```
compilation.cache = {}
```

WEBPACK 5

```
compilation.cache = new Cache();  
class Cache {  
  store(identifier, etag, data, callback)  
  get(identifier, etag, callback)  
  ...  
  hooks: {  
    get, store,  
    beginIdle, endIdle,  
    shutdown  
  }  
}
```


PLUGIN SYSTEM

WEBPACK 4

- TAPABLE 1
- AWESOME
BUT SOME FEATURES WERE
UNNEEDED AND COMPLEX

WEBPACK 5

- TAPABLE 2
- TYPESCRIPT TYPINGS
- DEPRECATED
 - CONTEXT
 - TAPABLE BASE CLASS
 - HOOKMAP.TAP

ARRAY TO SETS

WEBPACK 4

- `Compilation.modules: Module[]`
- `Compilation.chunks: Chunk[]`
- `Chunk.files: string[]`

WEBPACK 5

- `Compilation.modules: Set<Module>`
- `Compilation.chunks: Set<Chunk>`
- `Chunk.files: Set<string>`
- COMPAT-LAYER MAKES THESE Sets ACCEPT MOST ARRAY METHODS TOO

FILE SYSTEM INFO

- MODULES NEED TO CHECK IF CACHED SOURCE IS STILL VALID
- THEY COMPARE TIMESTAMPS OF ALL DEPENDENCIES

WEBPACK 4

- WATCHER TRACKS TIMESTAMPS
- TIMESTAMPS OBJECT IS PASSED TO COMPILATION
- MODULE READ TIMESTAMP FROM OBJECT
- MISSING TIMESTAMP INVALIDATES CACHE

WEBPACK 5

- WATCHER TRACKS TIMESTAMPS
- TIMESTAMPS ARE PASSED TO **FILESYSTEMINFO**
- MODULE READ TIMESTAMP FROM **FILESYSTEMINFO** CLASS
- MISSING TIMESTAMP IS **READ FROM FILESYSTEM**
- TIMESTAMPS FROM WATCHER ARE OPTIONAL



HOT MODULE REPLACEMENT

WEBPACK 4

- `HOTMODULEREPLACEMENT` ONLY FOR JS
- HMR IS NOT EXTENSIBLE BY PLUGINS

WEBPACK 5

- HMR IS **EXTENSIBLE** BY PLUGINS
- HMR IS POSSIBLE FOR **OTHER SOURCE TYPES**
- WE WILL ADD HMR SUPPORT FOR DEFAULT SOURCE TYPES (**WEBASSEMBLY, RUNTIME**)
- AND FOR `MINI-CSS-WEBPACK-PLUGIN` (SOURCE TYPE: **STYLE SHEET**)



ASYNC QUEUES

parallelism: 100

WEBPACK 4

- ASYNC FOR EACH AND CALLBACKS TO PROCESS THE MODULE GRAPH
- SEMAPHORE TO CONTROL PARALLELISM

WEBPACK 5

- ASYNC **QUEUES** FOR ALL WORKLOADS
- OBSERVABLE BY **PLUGINS**
- PARALLELISM OPTION

MODULE GRAPH

WEBPACK 4

- `Module.dependencies: Dependency[]`
 - `Dependency.module: Module`
- GRAPH

WEBPACK 5

- `Module.dependencies: Dependency[]`
- ~~`Dependency.module`~~
- `ModuleGraph.getModule(dependency)`



EXPERIMENTS

WEBPACK 4

- EXPERIMENTAL .MJS SUPPORT ENABLED (DEPRECATED BY NODE.JS)
- EXPERIMENTAL .WASM SUPPORT ENABLED (OLD SPEC)

WEBPACK 5

- EXPERIMENTAL FEATURES DISABLED BY DEFAULT

```
experiments: {  
  mjs: true,  
  syncWasm: true,  
  asyncWasm: true,  
  topLevelAwait: true,  
  importAsync: true,  
  importAwait: true  
}
```

INJECTED MODULES

- USING `module` INJECTS A REFERENCE TO `webpack/builtin/module.js`
- USING THE `ProvidePlugin` INJECTS A REFERENCE SOME PROVIDED MODULE

WEBPACK 4

- `DependenciesBlockVariables`
- ADDS `var variable = expression;`
- DEDUPPLICATED
- PREVENTS MODULE CONCATENATION

WEBPACK 5

- `InitFragments`
- ADDS CODE FRAGMENT BEFORE SOURCE CODE
- DEDUPPLICATED
- `ALLOWS` MODULE CONCATENATION



WATCHING DEPENDENCIES

WEBPACK 4

- WEBPACK
 - WATCHPACK
 - CHOKIDAR
 - FSEVENTS (NATIVE DEPENDENCY)

WEBPACK 5

- WEBPACK
 - WATCHPACK

OWN WATCHING SOLUTION



INSTALL SIZE

WEBPACK 4

- WEBPACK: 1.33MB
- NODE_MODULES: 19.6MB

WEBPACK 5

- WEBPACK: 1.81MB
- NODE_MODULES: 13.0MB (-34%)



INSTALL

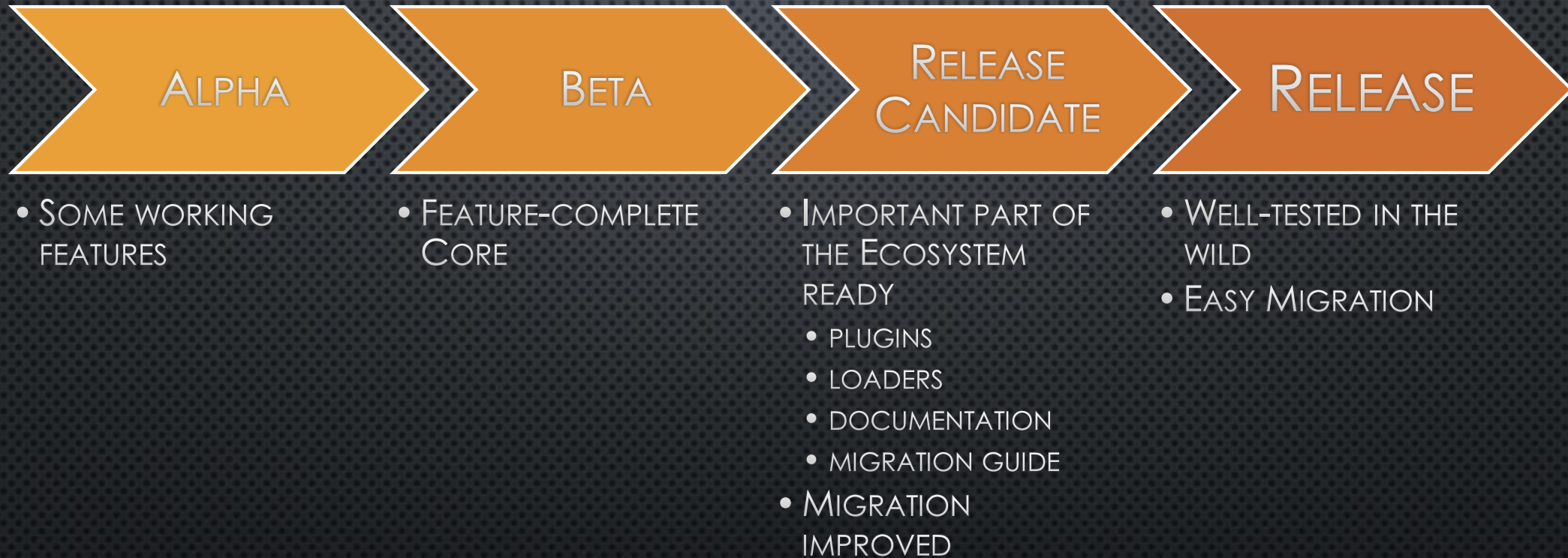
WEBPACK 4

- `yarn add --dev webpack`
- `npm i -D webpack`

WEBPACK 5

- `yarn add --dev webpack@next`
- `npm i --D webpack@next`
- THERE MIGHT BE BUGS
- IT MIGHT BE NOT WORKING AS DESCRIBED HERE
- WE MAY CHANGE BEHAVIOR

ROADMAP WEBPACK 5



THANKS

SLIDES:

<https://github.com/sokra/slides>

ALL



- DETERMINISTIC MODULE/CHUNK IDS
- NAMED CHUNK IDS
- DETERMINISTIC EXPORT MANGLING
- DEPENDENT CHUNKS
- (UN)SAFE CACHING
- IMPROVED WATCHING



- JS-LESS CHUNKS
- SPLIT CHUNKS — MIN REMAINING SIZE
- MAX SIZE FOR INITIAL AND ASYNC



- NODE POLYFILLS
- SOURCE TYPES
- MINIMUM NODE.JS VERSION
- PLACEHOLDER RENAME

- MERGING RESOLVE AND PARSER OPTIONS
- PERSISTENT CACHING
- STATS PRESET
- NEW STATS OPTIONS
- PLUGINS FOR STATS
- BETTER TREE SHAKING

- SPLIT CHUNKS — NAME
- FILENAME FOR INITIAL CHUNKS
- CACHE INTERFACE

- FUTURE-PROOF OPTIONS
- EXTENDED EXPORTS INFO
- SERIALIZATION
- ARRAY TO SETS

- RUNTIME HELPER CODE
- FILE SYSTEM INFO
- HOT MODULE REPLACEMENT
- EXPERIMENTS
- INSTALL SIZE

- ASYNC QUEUES
- WATCHING DEPENDENCIES

- MODULE GRAPH
- INJECTED MODULES