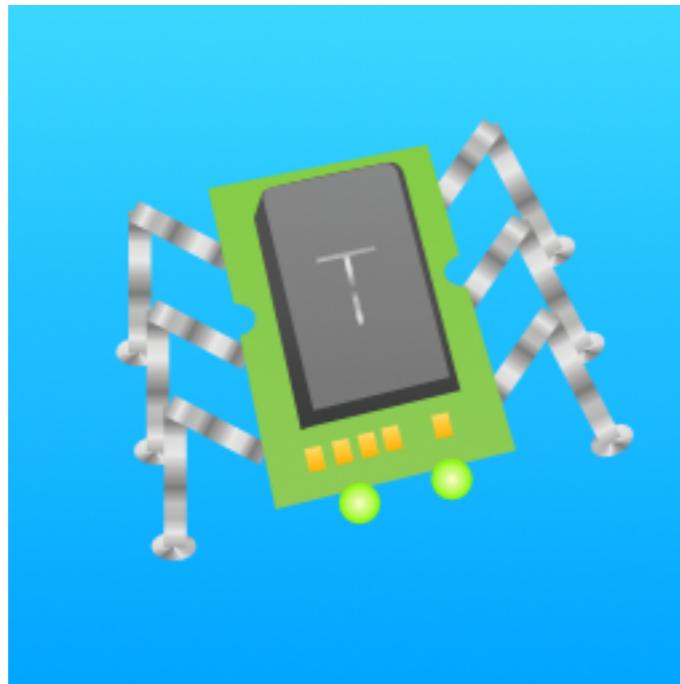


富途web前端组件化实践

TooBug / 富途web前端负责人



关于



@TooBug

富途web前端负责人

曾就职

腾讯CDC

曾维护

Less中文官网

Grunt中文社区

曾翻译

《SVG精髓（第二版）》

《与小卡特一起学Python》

《JavaScript模式》

富途组件化

1. 前尘往事
2. 初试牛刀
3. 为伊憔悴
4. 灯火阑珊

后端工程师的产物

```
<script src="/js/jquery.js"></script>
<script src="/js/jquery.client.js"></script>
<script src="/getjs/common/jquery.ext.js"></script>
<script src="/optjs/futus.js?&doc_logon_id=0"></script>
<script>
$(document).ready(function(){
    futus.docReadyInit();
    var GFUTU = new futu();
    <%if $doc.logon.id > 0%>
    GFUTU.init('futus');
    <%/if%>
});<%if $doc.js_content%>
<%$doc.js_content%>
<%else%>
alert('<%$doc.js_name%>{!JS_NOT_EXISTS!}');
<%/if%>
```

弹窗

```
<div class="floatBox01 riliFloat01" id="sign_in_calendar"  
style="display:none;">  
    <div class="alphaDiv01"></div>  
    <div class="m001">  
        <div class="t01"><h3 name="header">签到月历</h3><a name="close"  
        onclick="return false;" href="#" class="closeBtn01" title="关闭  
"></a></div>  
        <div class="c01 clearBox">...  
        </div>  
        <div class="f01">  
            <div class="fr">  
                <a onclick="return false;" name="confirm" href="#"  
                class="button btn01">确 定</a><a class="button btn04"  
                href="#" name="cancel" onclick="return false;">取 消</a>  
            </div>  
        </div>  
    </div>  
</div>
```

问题

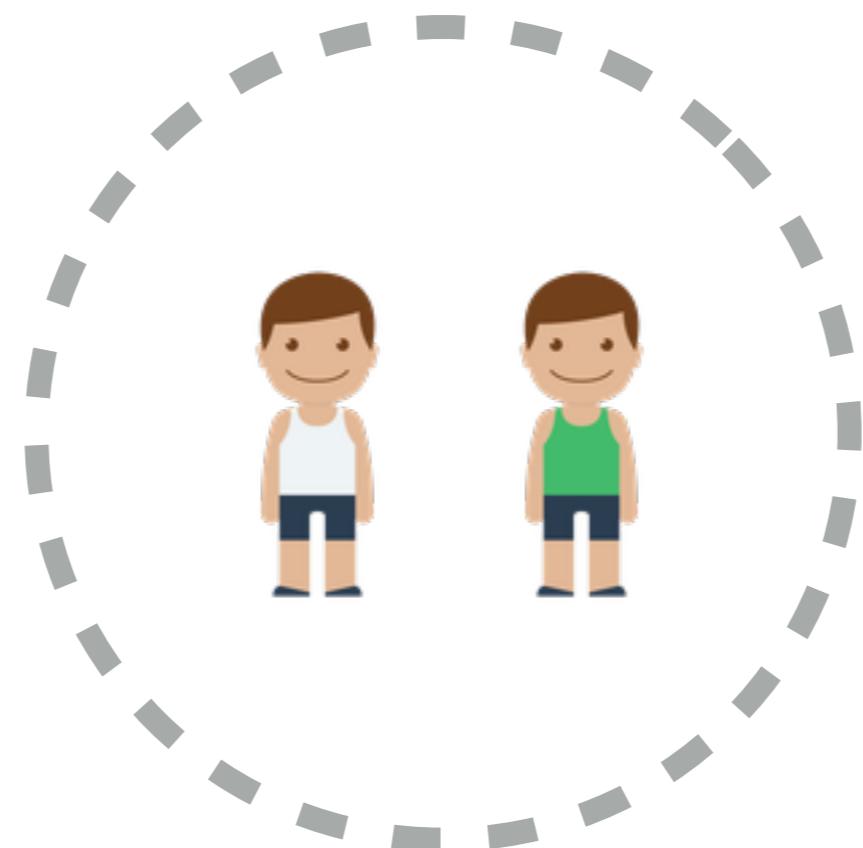
效率
低下

无法
维护

交互
各异

质量
不一

前端从零到二



富途组件化

1. 前尘往事
2. 初试牛刀
3. 为伊憔悴
4. 灯火阑珊

组件化目标

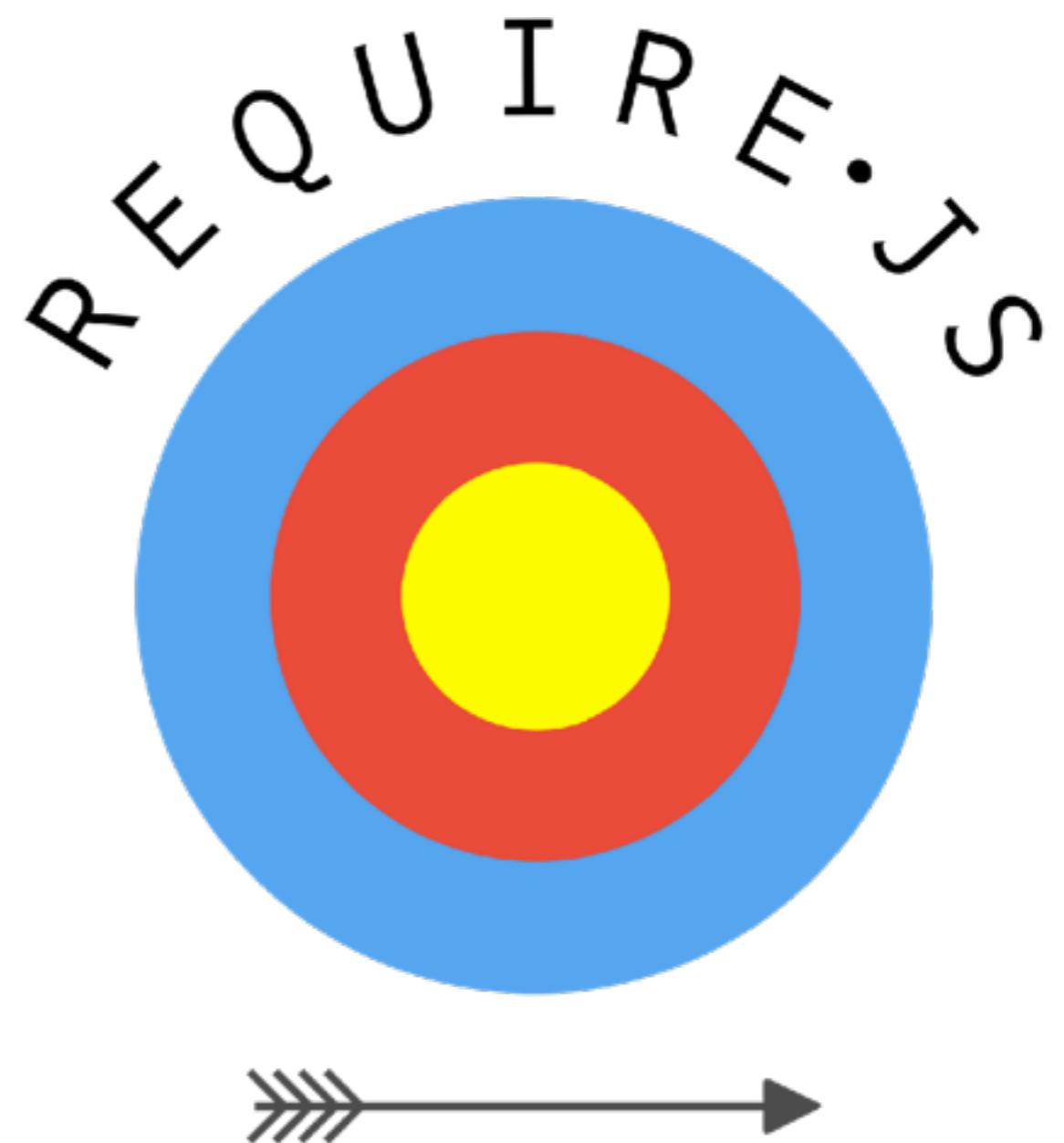
模块化

标准化

灵活性

模块化

- AMD模块化规范
- 开发免构建
- i18n插件
- html/text插件
- 构建打包上线



模块化

```
1 // a.js
2 define([
3
4 ], function(){
5     return {
6         hello:'world'
7     };
8 });
```

```
1 // b.js
2 define([
3     './a'
4 ], function(a){
5     // world
6     console.log(a.hello);
7 })
8
```

标准化

Dialog

init / 自定义结构

ConfirmBox

onCloseClick / onConfirmClick

AlertBox

bindEvent / title / content

MessageBox

show / hide / layout / onClose

Widget

preCreate / onCreate / postCreate

标准化

```
5  define([
6    'futu/_base/declare'
7  ], function(declare){
8
9  +  function _Widget(props) { ...
11 }
12 |
13 +  _Widget.prototype.construct = function(props) { ...
17 };
18
19 +  _Widget.prototype.preCreate = function(props){ ...
21 };
22   _Widget.prototype.create = function(){};
23   _Widget.prototype.postCreate = function(){};
24   _Widget.prototype.startup = function(){};
25
26 +  _Widget.prototype.set = function(name, value, options) { ...
36 };
37
38 +  _Widget.prototype.get = function(name) { ...
40 };
41
42   return _Widget;
43});
```

标准化

```
5 define([
6   'futu/_base/declare',
7   './ConfirmBox'
8 ], function(declare, ConfirmBox) {
9   return declare(ConfirmBox, {
10     content : '',
11     title : '',
12     contentClass : '',
13     containerClass : 'floatB',
14     disableCancel : false,
15     disableClose : false,
16     enableC01Node : false,
17     preFun : function() {
18       return true;
19     },
20     create : function() {
21       this.inherited(arguments);
22       var $box = this.$box;
23       this.$headerNode = this.$heade
24       this.$msgNode = this.$msgNode
25       if (this.enableC01Node) {
26         this.$msgNode = $box.find(
27           'div.c01-node'
28         );
29       }
30       if (!this._hasInitBox) {
31         $box.attr('class', this.co
32         this.$headerNode.html(this
33         this.$msgNode.attr('class'
34         this.$msgNode.removeClass(
35           'floatB'
36         );
37         this.$msgNode.addClass('floatB');
38       }
39       if (this.disableCancel && this
40         this.$msgNode.find('.cancel')
41         .on('click', this._cancelClick,
42           true);
43       }
44       if (this.disableClose && this
45         this.$msgNode.find('.close')
46         .on('click', this._closeClick,
47           true);
48     },
49     onConfirmClick : function() {
50       this._confirmClick();
51     }
52   });
53 }, {
54   create : function() {
55     this.inherited(arguments);
56     var $box = this.$box;
57     this.$headerNode = this.$heade
58     this.$msgNode = this.$msgNode
59     if (this.enableC01Node) {
60       this.$msgNode = $box.find(
61         'div.c01-node'
62       );
63     }
64     if (!this._hasInitBox) {
65       $box.attr('class', this.co
66       this.$headerNode.html(this
67       this.$msgNode.attr('class'
68       this.$msgNode.removeClass(
69         'floatB'
70       );
71       this.$msgNode.addClass('floatB');
72     }
73     if (this.disableCancel && this
74       this.$msgNode.find('.cancel')
75       .on('click', this._cancelClick,
76         true);
77   }
78 });
79 
```

灵活性

```
this.quoteChangeBox = new ConfirmBox({  
    $box : $("#qut_change_confirm_box"),  
    disableLayoutReset : true,  
    cb : lang.hitch(this, this.enableRealTimeQuote)  
});  
this.quoteChangeBox.set('content', ret.kick_msg);  
this.quoteChangeBox.show();
```

开放扩展和自定义模板

组件化目标

模块化

标准化

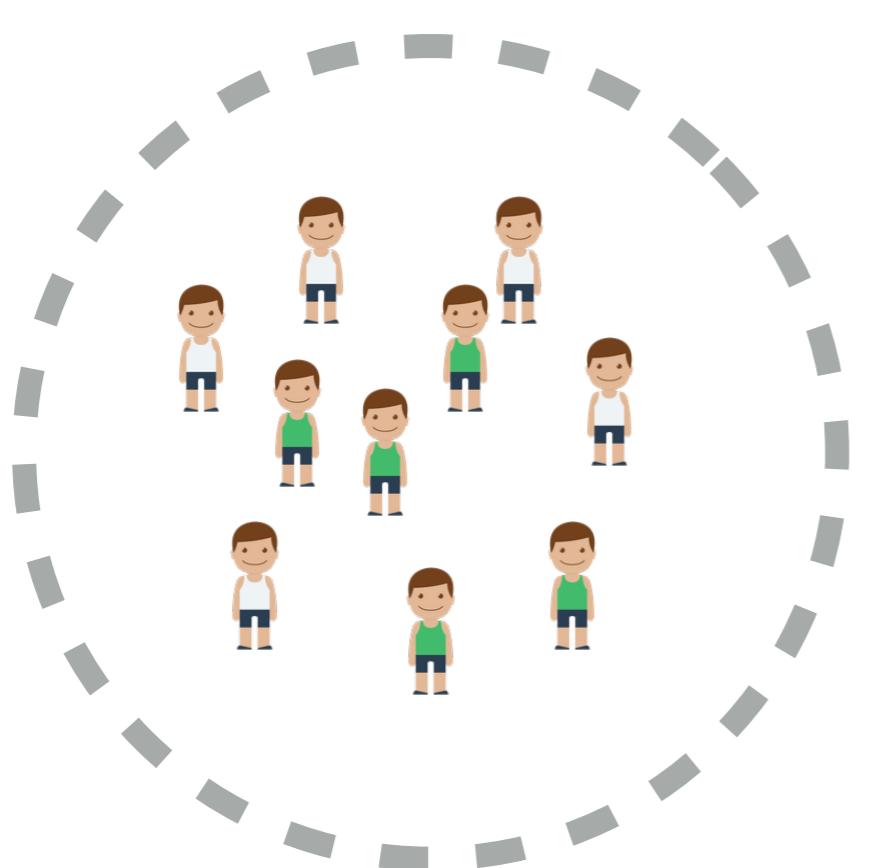
灵活性

使用

```
this.quoteChangeBox = new ConfirmBox({
    $box : $("#qut_change_confirm_box"),
    disableLayoutReset : true,
    cb : lang.hitch(this, this.enableRealTimeQuote)
});
this.quoteChangeBox.set('content', ret.kick_msg);
this.quoteChangeBox.show();
```

繁琐 难以理解

团队和项目



问题

构建不可控

构建奇慢

跨项目
复用

易用性
规范性

需要定义结构和样式
API冗长且不规范
继承过多，难以理解

富途组件化

1. 前尘往事
2. 初试牛刀
3. 为伊憔悴
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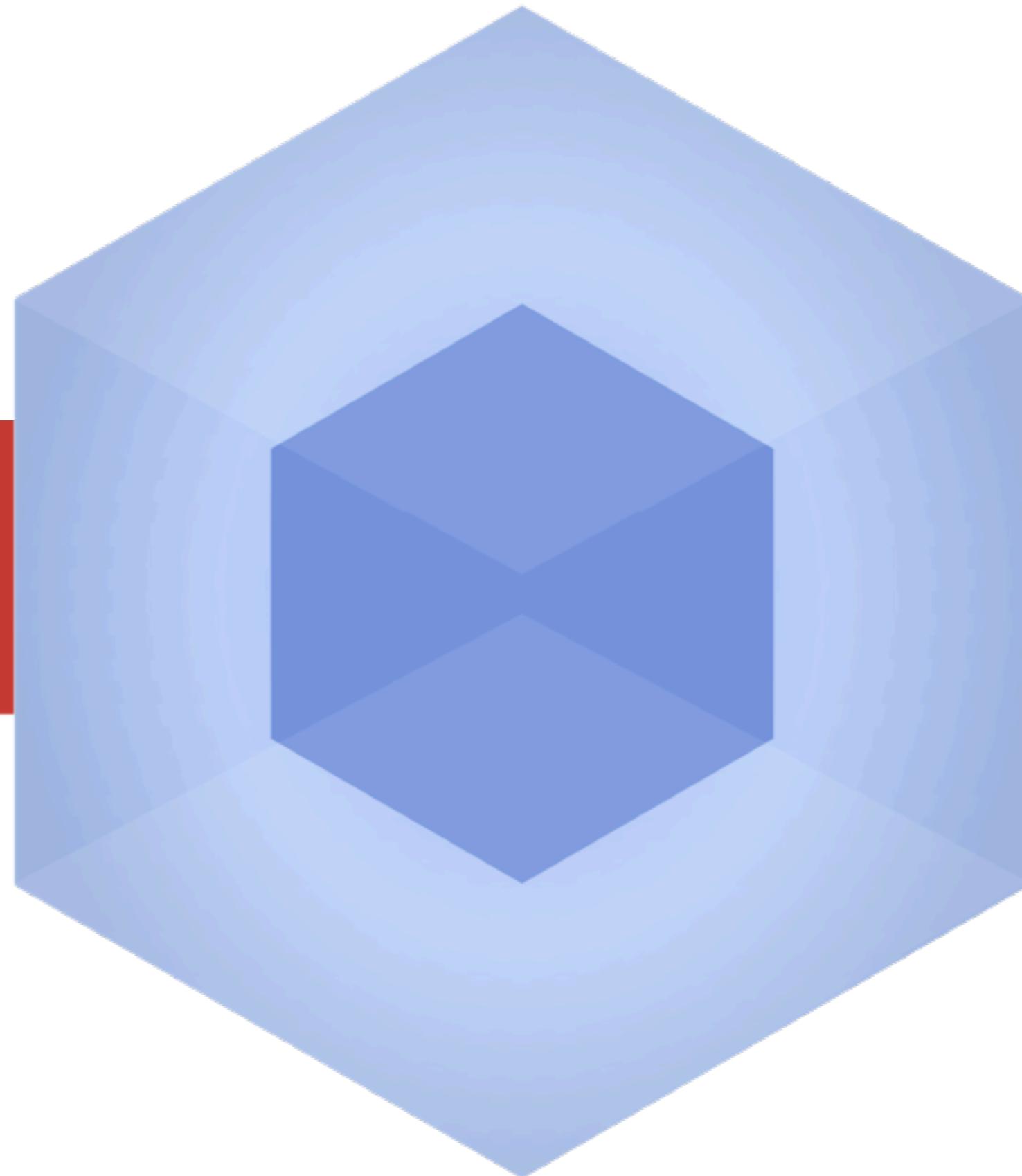
跨项目复用

- 安装（下载）升级
- 包管理
 - bower
 - component
 - npm

跨项目复用

- 引用 (打包)
- 尽可能兼容已有代码
- 跟包管理自然地结合

跨项目复用



跨项目复用

npm install ui-modal --save

```
5 define([
6   'jquery',
7   'ui-modal/Dialog',
8   'app/common/params',
9   'amdi18n!app/nls/credit'
10 ], function($, Dialog, params, i18n) {
11   // 只有在登录状态下进入首页才进行签到处理
12   if(params.logonId){ ...
131 }
132});
```

require.js → webpack

- 1个人 6个月 2单事故
- 600+ js文件
- 关键点：
 - 多页面多入口
 - require.js插件
 - 远程模块
 - shim(ueditor/jquery/plupload/angular)

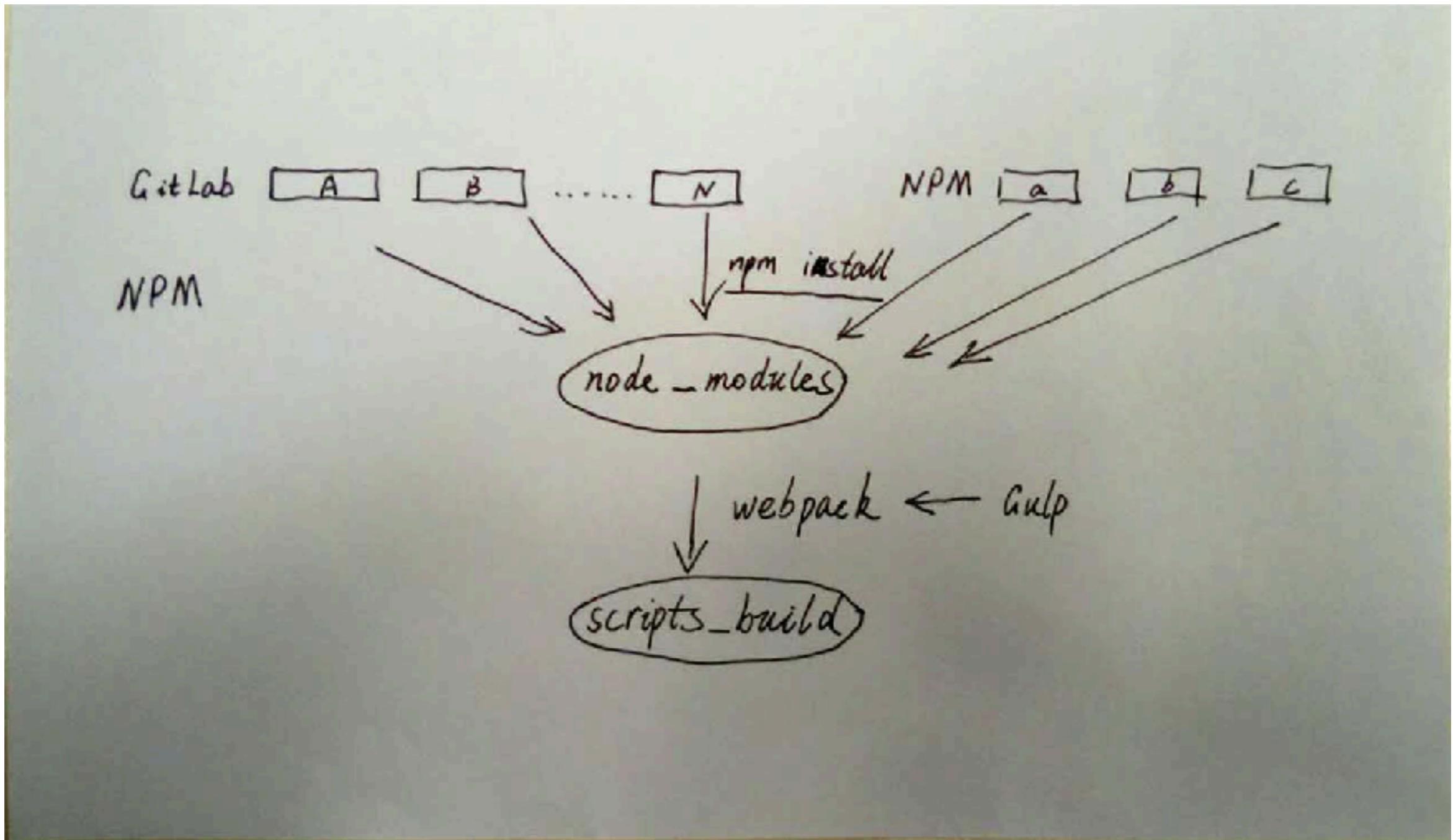
迁移webpack日志

- 1 使用npm init初始化package.json (用于声明依赖及npm install安装依赖)
- 2 准备webpack.config.js, 几个需要注意的配置项
 - entry对应require.js中的modules
 - resolve.modulesDirectories对应require.js中的basedir
 - alias对应require.js中的path
 - //1.1.js 编译会多出一个1.1.js, 是webpack自动拆分的chunk
 - publicPath:引入路径, 用于webpack在线上引入代码时补全访问路径
- 3 引入jquery1.9.1, 添加配置项amd:{jquery:true}
- 4 指定不同路径下的多个入口文件时, 保持编译后文件路径正确: 模块名中直接带上路径
- 5 去掉require.js引用
- 6 引用build后文件: /script-build/xxx/xxxMain.js
- 7 i18n插件, 自行编写amdi18n插件解决
- 8 params模块, require.js中使用了内置module模块, 改造后直接返回window._params
- 9 underscore配置: require.js中通过shim.init指定, 改造后由params模块中指定
- 10 接入gulp, 使用webpack-stream模块, 需要改造的配置
 - entry去掉, 由named插件指定
 - moduleName需要带路径, 手工写了一个小逻辑计算模块名
 - base:去掉path, 由webpack写入
- 11 远程script如微信js: 手工引入, 使用externals
- 12 DomReady插件: 放弃, 代码中去掉
- 13 部分模块中全局引用Backbone导致找不到: 模块中增加backbone依赖
- 14 老的js显式调用require(): 纳入版本管理, 需要将var xxx声明的全局变量改为window.xxx
- 15 jQuery多版本共存: 业务逻辑释放, 在业务逻辑中添加window._\$=\$固定jquery旧版本, 然后在AMD模块中通过noConflict释放新版

组件抽取

- 20+组件迁移到单独的Git仓库
- webpack支持node_modules寻址
- 使用npm引用组件

组件抽取



组件抽取

```
"dependencies": {  
    "business-cipher": "git+http://gitlab.futunn.com/webpackage/business-cipher.git#1.0.0",  
    "business-login-form": "git+http://gitlab.futunn.com/webpackage/business-login-form.git#1.1.5",  
    "business-nls": "git+http://gitlab.futunn.com/webpackage/business-nls.git#1.2.4",  
    "business-oa-common": "git+http://gitlab.futunn.com/webpackage/business-oa-common.git#1.5.2",  
    "business-qq": "git+http://gitlab.futunn.com/webpackage/business-qq.git#1.0.2",  
    "business-register-form": "git+http://gitlab.futunn.com/webpackage/business-register-form.git#",  
    "business-report": "git+http://gitlab.futunn.com/webpackage/business-report.git#0.3.0",  
    "business-validator": "git+http://gitlab.futunn.com/webpackage/business-validator.git#1.1.1",  
    "business-weixin": "git+http://gitlab.futunn.com/webpackage/business-weixin.git#1.0.2",  
    "css-fonticon": "git+http://gitlab.futunn.com/webpackage/css-fonticon.git#1.2.5",  
    "data-country-phone": "git+http://gitlab.futunn.com/webpackage/data-country-phone.git#1.0.0",  
    "tool-browser": "git+http://gitlab.futunn.com/webpackage/tool-browser.git#1.5.0",  
    "tool-cookies": "git+http://gitlab.futunn.com/webpackage/tool-cookies.git#1.0.0",  
    "tool-declare": "git+http://gitlab.futunn.com/webpackage/tool-declare.git#1.0.0",  
    "tool-dedog": "git+http://gitlab.futunn.com/webpackage/tool-dedog.git#1.0.5",  
    "tool-fastclick": "git+http://gitlab.futunn.com/webpackage/tool-fastclick.git#1.0.0",  
    "tool-nn": "git+http://gitlab.futunn.com/webpackage/tool-nn.git#1.6.0",  
    "tool-pvuv": "git+http://gitlab.futunn.com/webpackage/tool-pvuv.git#1.0.1",  
    "tool-stat": "git+http://gitlab.futunn.com/webpackage/tool-stat.git#1.1.8",  
    "tool-xhr": "git+http://gitlab.futunn.com/webpackage/tool-xhr.git#1.1.0",  
    "tool-xhr2": "git+http://gitlab.futunn.com/webpackage/tool-xhr2.git#1.2.2",  
    "ui-combobox": "git+http://gitlab.futunn.com/webpackage/ui-combobox.git#1.4.2",  
    "ui-common-selector": "git+http://gitlab.futunn.com/webpackage/ui-common-selector.git#1.0.0",  
    "ui-core": "git+http://gitlab.futunn.com/webpackage/ui-core.git#1.2.2",  
    "ui-form": "git+http://gitlab.futunn.com/webpackage/ui-form.git#1.5.4",  
}
```

i18n

- webpack-amdi18n-loader
- 与require.js i18n plugin几乎一样的用法
- runtime选择语言包
- 根据window._i18n.locale或者html[lang]选择
- 支持AMD/CommonJS/JSON/Coffee

webpack-amdi18n-loader

```
1 // AMD with dependencies
2 define([], function(){
3     return {
4         HELLO: '你好'
5     };
6});
```

```
1 // AMD with id & dependencies
2 define('id', [], function(){
3     return {
4         HELLO: '雷吼'
5     };
6});
```

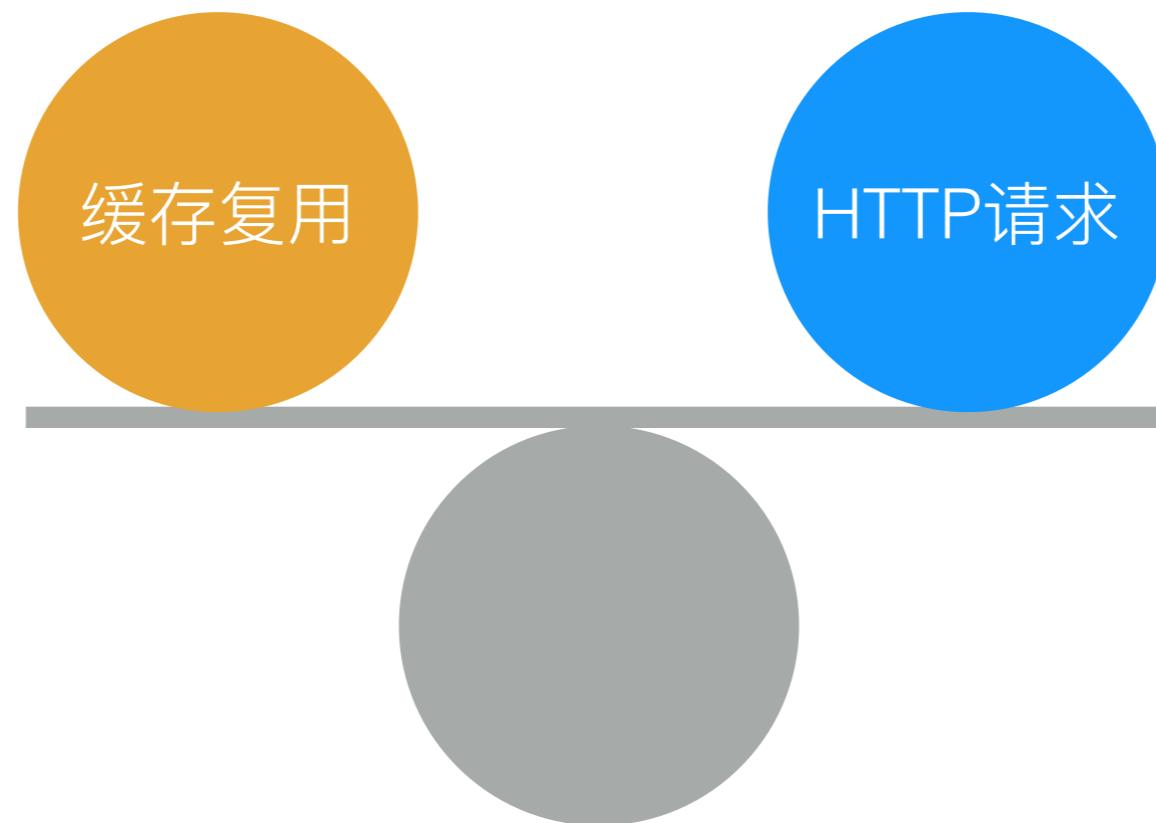
```
4 var lang = require('amdi18n!./nls/lang');
5
6 lang.init('zh-cn');
7 console.log(lang.HELLO); //你好
8
9 lang.init('zh-hk');
10 console.log(lang.HELLO); //雷吼
```

组件开源

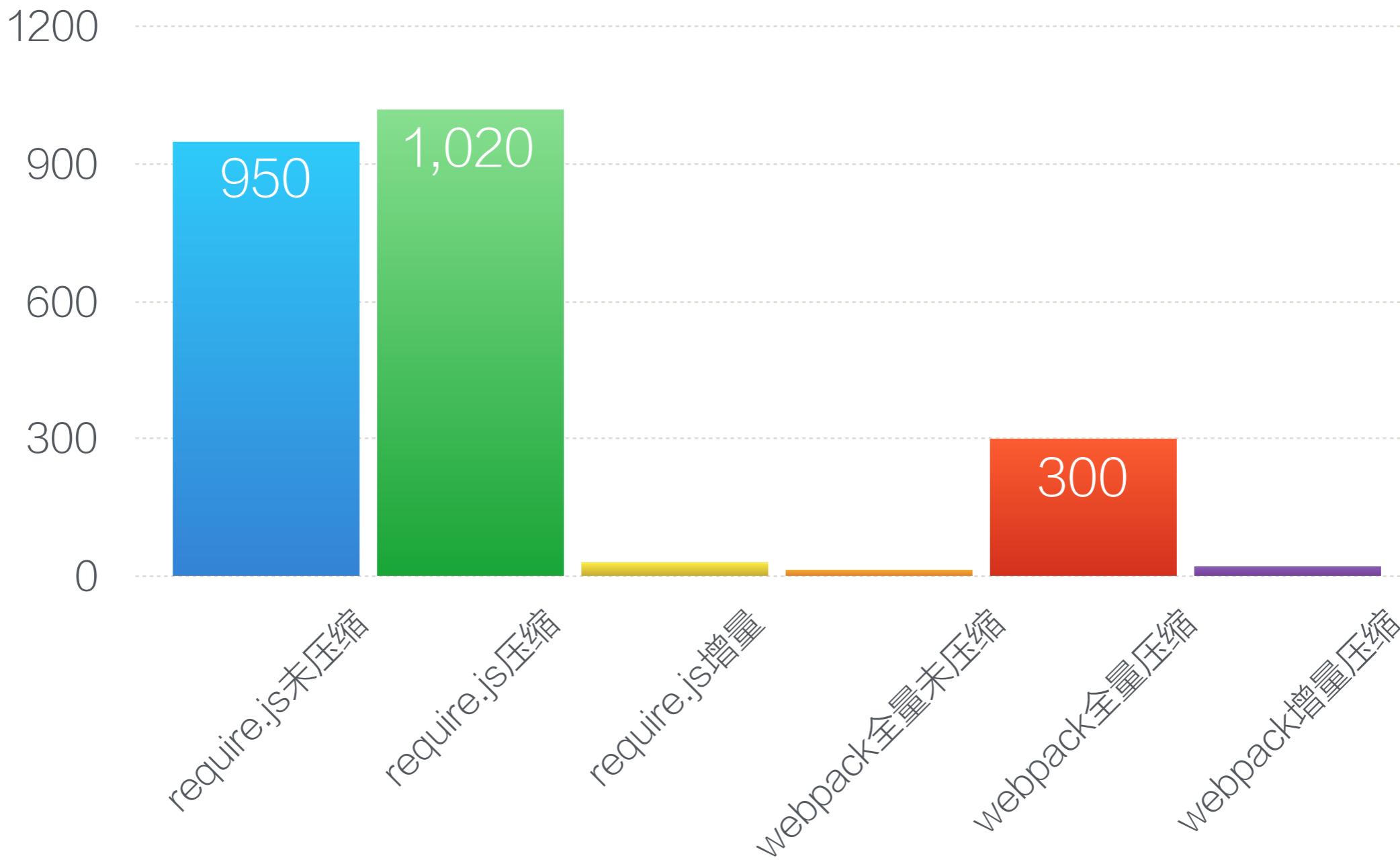
<https://github.com/futuweb>

打包体积

- 同一模块重复打包
- 多个入口文件中的相同依赖



打包速度



速度 - 增量和缓存

- 分治：划模块和子任务 分别缓存打包
- 根据源码分析依赖列表
- 根据打包后的文件获取依赖列表
- webpack watch的缓存落地
- 先打包 根据中间状态做缓存过滤 再压缩

速度 - 增量和缓存

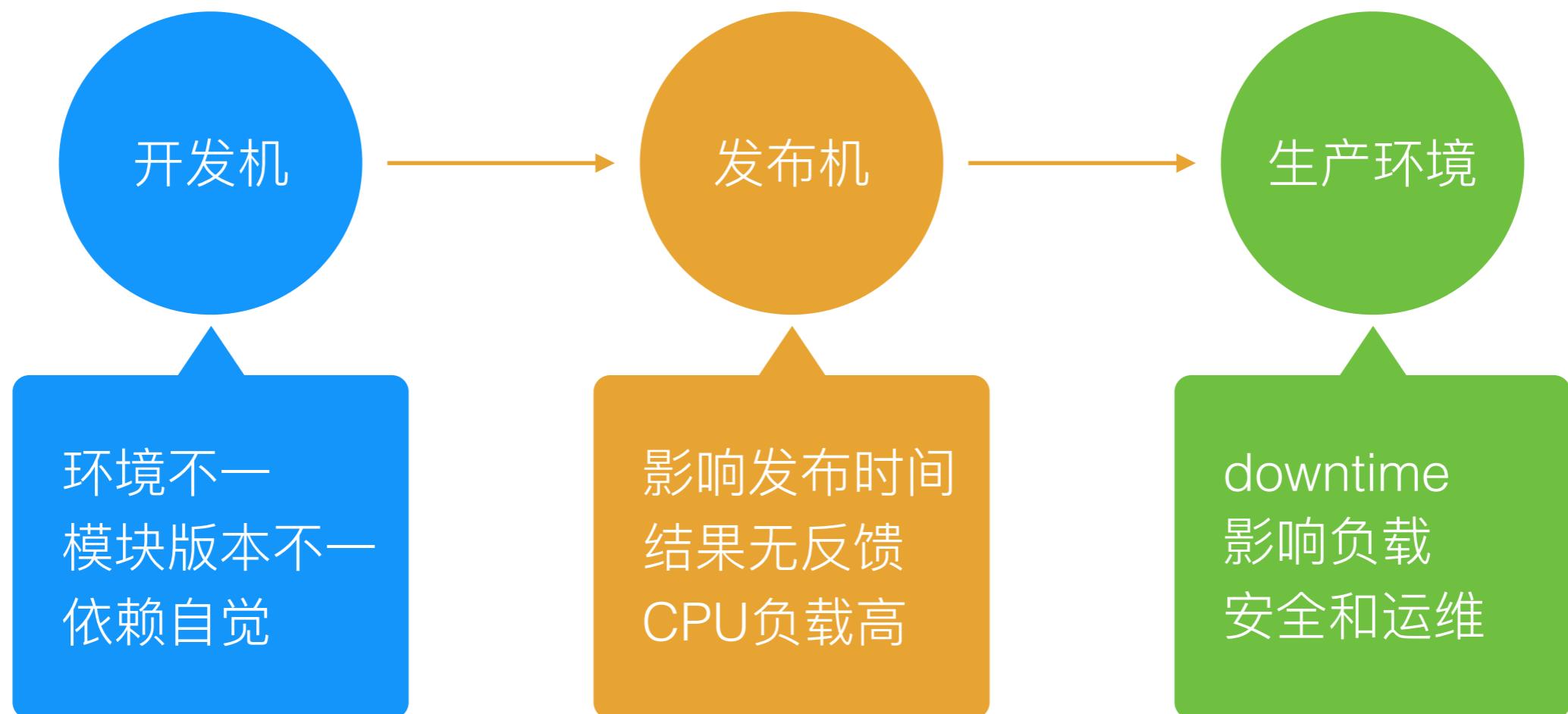
```
gulp.task('webpackProd', function(){
    // 文件系统缓存，下次编译可以加速
    var jsFsCache = fsCache('.tmp/jscache');

    return gulp.src(['./htdocs/scripts/**/*Main.js'], {base:'./htdocs/scripts/'})
        .pipe(named(function(file){
            //为模块加上模块名
            var moduleName = path.relative(path.join(file.cwd,file.base),file.history[0]);
            moduleName = moduleName.replace(/\.js$/,'');
            return moduleName;
        }))
        .pipe(webpackStream(prodWebpackConfig))//webpack打包
        .pipe(jsFsCache)//将代码与现有文件进行比较，过滤掉没有变动的文件
        .pipe(uglify({
            compress:{
                drop_console:true
            }
        }))
        .pipe(jsFsCache.restore)//还原之前过滤的文件
        .pipe(gulp.dest('htdocs/scripts-build/'));
});
```

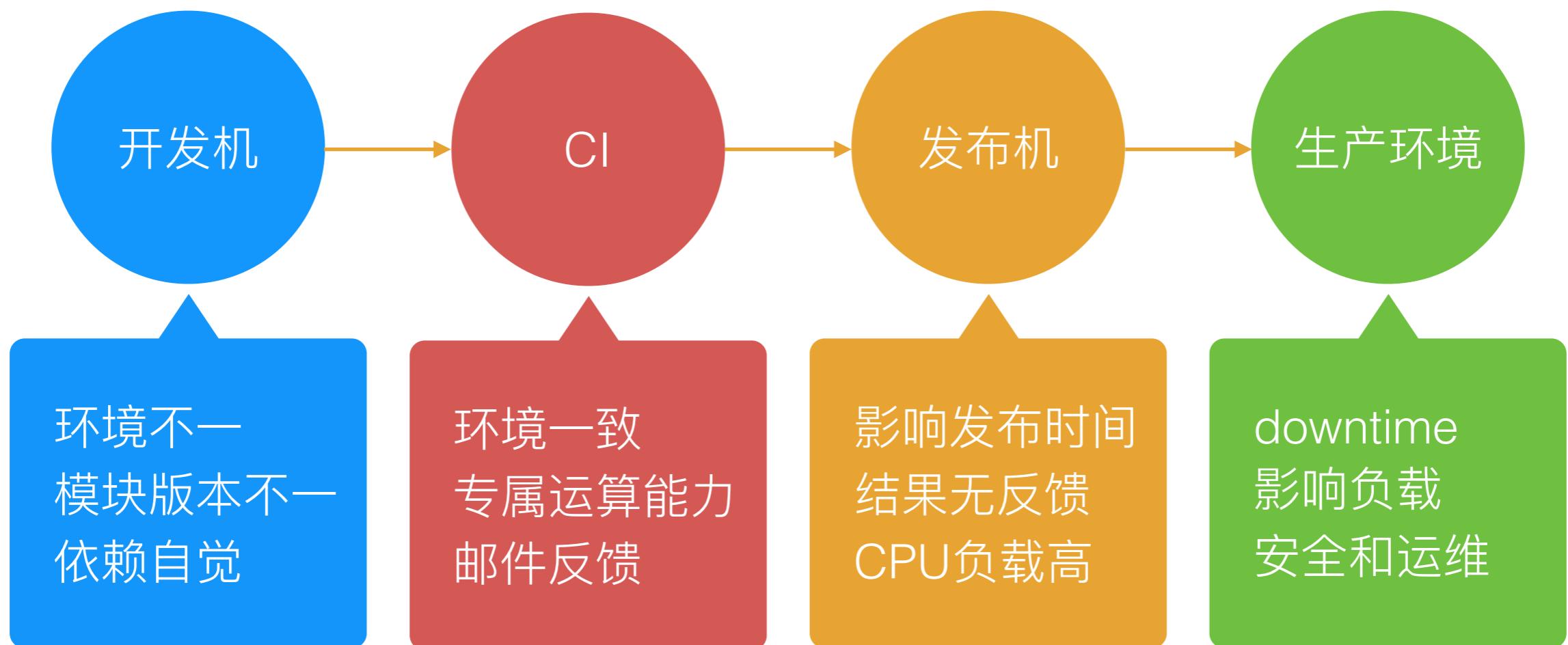
速度 - 增量和缓存

```
1 TooBug staff    74091 5 13 19:52 f9561e311dff9da7394d0fd39ff8dc11-e82262b585f1d61c1ff78f9f4c70e0d7
1 TooBug staff    277558 5 13 19:52 f9561e311dff9da7394d0fd39ff8dc11-e82262b585f1d61c1ff78f9f4c70e0d7.map
1 TooBug staff    124401 5 13 19:53 fa5574e850c2da9c8ea9df573c8cd8a5-d72badc99529843490fe171127785be6
1 TooBug staff    547043 5 13 19:53 fa5574e850c2da9c8ea9df573c8cd8a5-d72badc99529843490fe171127785be6.map
1 TooBug staff    159980 5 13 19:54 fb309a61de9bffd8a790aedd23f666e8-5f195e50ba8cf0356536c74ae787edcf
1 TooBug staff    538463 5 13 19:54 fb309a61de9bffd8a790aedd23f666e8-5f195e50ba8cf0356536c74ae787edcf.map
1 TooBug staff    21528 5 13 19:54 fb42952f0d75b3b9172ac4e9d59a6b47-43ce71834fc92d3d902374a5cbc89f07
1 TooBug staff    95273 5 13 19:54 fb42952f0d75b3b9172ae4e9d59a6b47-43ce71834fe92d3d902374a5ebe89f07.map
1 TooBug staff    139579 5 13 19:54 fc172fada3b6fa6086cf682f9499812c-f9dbb2e7b8b7cfe2e2ba77f04863432e
1 TooBug staff    384166 5 13 19:54 fc172fada3b6fa6086cf682f9499812c-f9dbb2e7b8b7cfe2e2ba77f04863432e.map
1 TooBug staff    45876 5 13 19:54 fc42753918f5a0a8d7ffa557c7a6a2-1271f133c32c5889c21c2034ad6140cb
1 TooBug staff    138404 5 13 19:54 fc42753918f5a0a8d7ffa557c7a6a2-1271f133c32c5889c21e2034ad6140eb.map
```

打包环境



打包环境



打包环境

● #1636	2017-6-6 下午9:25
	Started by GitLab push by coco.hu
● #1635	2017-6-6 下午9:06
	Started by GitLab push by jedi
● #1634	2017-6-6 下午8:14
	Started by GitLab push by coco.hu
● #1633	2017-6-6 下午5:30
	Started by GitLab push by jackie
● #1632	2017-6-6 下午5:29
	Started by GitLab push by rick
● #1631	2017-6-6 下午4:17
	Started by GitLab push by coco.hu
● #1630	2017-6-6 下午4:03
	Started by GitLab push by coco.hu
● #1629	2017-6-6 下午3:53
	Started by GitLab push by coco.hu
● #1628	2017-6-6 下午2:46
	Started by GitLab push by nick

```
app/qtinfo/stock/topDownMain.js.map      276 kB
app/qtinfo/stock/topUpMain.js.map        276 kB
app/threeyear/bdHkMain.js.map           338 kB
app/threeyear/bdMain.js.map             343 kB
app/threeyear/bdV2_Main.js.map          347 kB
app/threeyear/bdh5Main.js.map          368 kB
app/tuiguang/sem_Main.js.map           288 kB

[21:27:14] Finished 'webpackProd' after 42 s
[21:27:14] Starting 'hash'...
hash Pg/FJ+/73969tA0vZeLCyWKEavU=
hash OxokcnhRM/ewlvpHJkbNNVJM60w=
hash UPzb6HGcmc50qmP4UjNNmieboqo=
hash JnNRkVM6ZCiY457DEZ97EWlWxIo=
hash 96ppOu9k0+vM1EtJjMFrocqBqbg=
hash 2K42ilMRvP6k5WI3rcBqTUMt6to=
[21:27:19] Finished 'hash' after 5.06 s
[21:27:19] Starting 'rev-hash'...
[21:27:21] Finished 'rev-hash' after 2.02 s
[21:27:21] Starting 'artifacts'...
[21:27:27] Finished 'artifacts' after 5.86 s
Email was triggered for: Always
Sending email for trigger: Always
Sending email to: coco@futunn.com toobug@futunn.com
Finished: SUCCESS
```

问题

构建不可控

构建奇慢

跨项目
复用

易用性
规范性

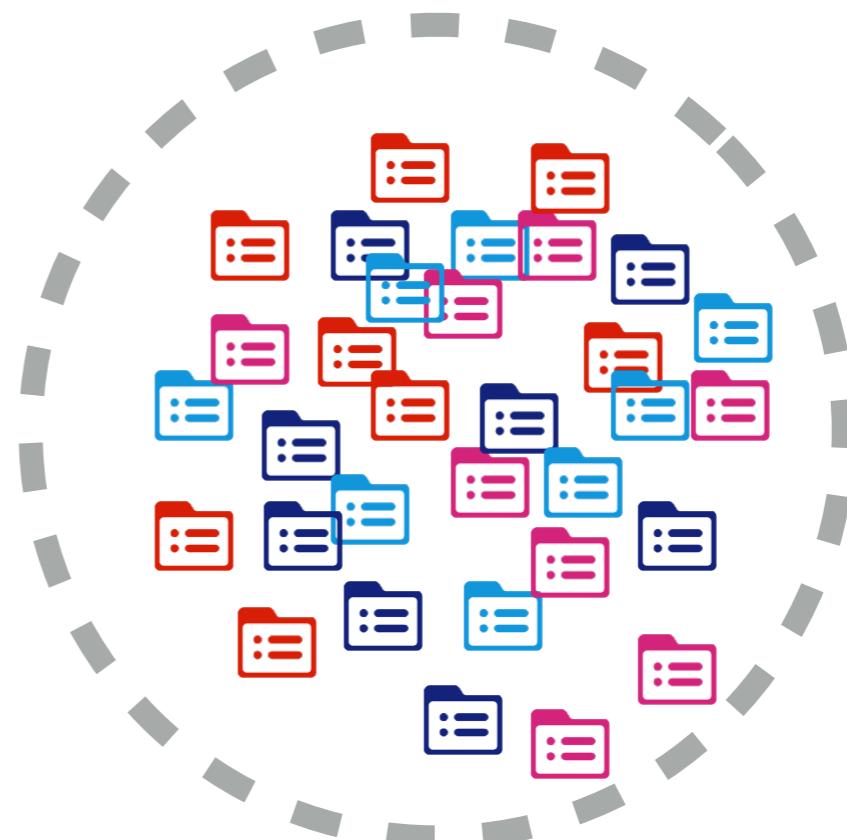
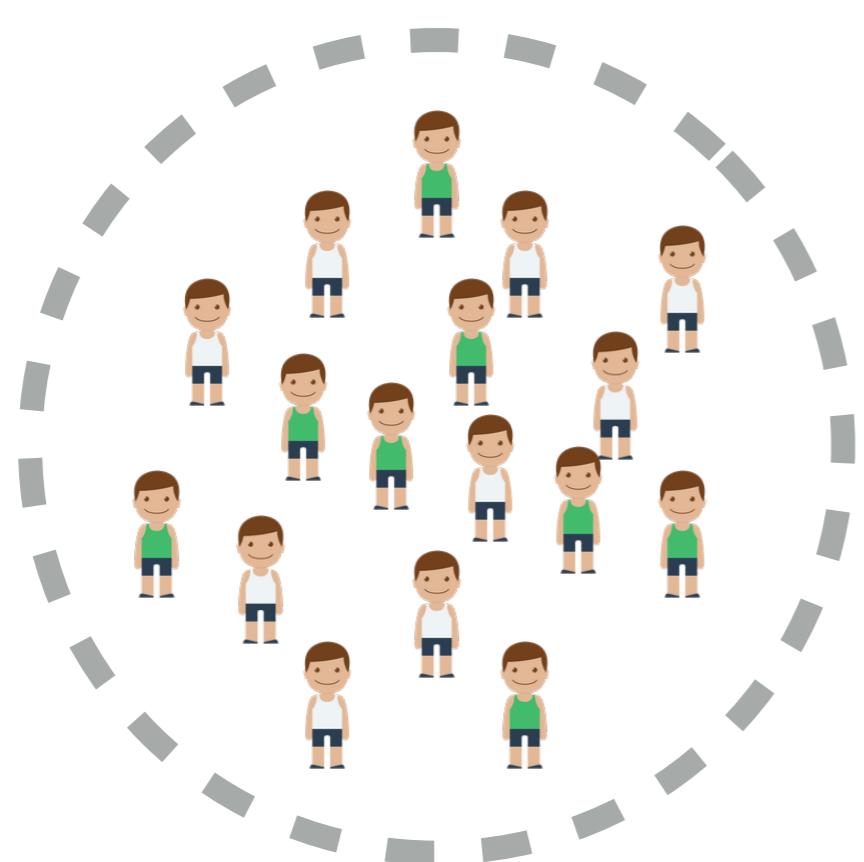
需要定义结构和样式
API冗长且不规范
继承过多，难以理解

问题

易用性
规范性

- 需要定义结构和样式
- API 冗长且不规范
- 继承过多 难以理解
- 依赖jQuery 难复用
- 野蛮发展 缺少规划
- 从Git安装 semver失效

团队和项目



组件2.0

- 全新API设计
 - 去除多重继承的设计
 - 组件封闭，提供定制化选项
- 全面去jQuery 包装适配多框架
- 私有NPM
- 重新规划组件

组件2.0

- 增删、合并组件列表
- 落地设计规范 统一交互视觉
- 编写测试用例 自动化测试
- 全新文档和展示页
- 使用LessCSS
- 全面使用ES2015

组件2.0 - 自动化测试

passes: 28 failures: 0 duration: 0.02s

100%

IE UA测试

- ✓ isIE 测试 : chromeua 不是 IE 浏览器
- ✓ getIEVersion 测试 : 这是 IE9
- ✓ getIEVersion 测试 : 这是 IE10
- ✓ getIEVersion 测试 : 这是 IE11

手Q webview 测试

- ✓ isMobileQQ: 这是 QQ (AndroidQQ)
- ✓ isMobileQQ: 这是 QQ (iosQQ)
- ✓ isMobileQQ: 这不是 手Q (pcua)

移动端ua 测试

- ✓ isMobileUA: 这是 移动端UA (AndroidQQ)
- ✓ isMobileUA: 这是 移动端UA (iosQQ)
- ✓ isMobileUA: 这不是 移动端UA (pcua)
- ✓ isMobileUA, 这是 移动端UA (iosSafari)
- ✓ isMobileUA, 这是 移动端UA (AndroidWx)
- ✓ isMobileUA, 这是 移动端UA (iosWx)
- ✓ isMobileUA, 这是 移动端UA (AndroidChrome)

组件2.0 - UI规范

UI设计规范

Button 按钮

Title 标题

Tab 标签页

Pagination 分页

Steps 步骤条

Modal 对话框

Alert 警告提示

Toast 通知提醒框

Table 表格

Input 输入框

Radio 单选框

Checkbox 多选框

Dropdown 下拉菜单

Form 表单

Dropdown 下拉菜单

各种状态的下拉框

默认

错误提示

请输入登录密码

聚焦状态

不可编辑

鼠标悬停

展开

我是个账户

我是个账户

组件2.0 - 私有NPM

```
53  "dependencies": {  
54    "@futuweb/business-cipher": "^1.0.0",  
55    "@futuweb/business-login-form": "^1.1.5",  
56    "@futuweb/business-nls": "^1.2.4",  
57    "@futuweb/business-oa-common": "^1.5.2",  
58    "@futuweb/business-qq": "^1.0.2",  
59    "@futuweb/business-register-form": "^1.2.5",  
60    "@futuweb/business-report": "^0.3.0",  
61    "@futuweb/business-validator": "^1.1.1",  
62    "@futuweb/business-weixin": "^1.0.2",  
63    "@futuweb/css-fonticon": "^1.2.5",  
64    "@futuweb/data-country-phone": "^1.0.0",
```

组件2.0 - 私有NPM

- 私有NPM registry.npm.oa.com
- 命名空间@futuweb
- semver语义化版本 解决组件重复打包

组件2.0 - API

```
2 var dialog = require('@futuweb/dialog');
3
4 dialog.show('提示', '操作成功', {
5     canCancel: false
6});
```

组件2.0 - API包装

```
10  export default ['dialog', function(dialog){  
11      dialog.show('提示', '操作成功', {  
12          canCancel: false  
13      });  
14  }];
```

```
1 <pagination  
2     page="historyList.page"  
3     count="historyList.totalCount"  
4     page-size="historyList.size"  
5     on-change="goto"  
6   />
```

组件2.0 - 文档

```
1  /**
2   * browser module.
3   * @author Rick 封装对浏览器环境的判断
4   * @module browser
5   */
6  export {...}
7 }
8
9 /**
10  * 判断是否IE浏览器
11  * @function
12  * @static
13  * @since 1.0.0
14  * @returns {Boolean} 是否为IE浏览器
15 */
16 function isIE() {...}
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39 }
```

组件2.0 - 文档

Home

MODULES

browser

getIEVersion
isAndroid
isBlackBerry
isDesktopNN
isIE
isIOS
isMac
isMacNN
isMobile
isMobileNN
isMobileQQ
isMobileUA
isNN
isNNPlatform
isNnPlatform
isPCNN
isSafari
isWindows
isWX
isWx

browser

browser module.

Source: [browser.js, line 1](#)

Author: Rick 封装对浏览器环境的判断

Methods

(static) getIEVersion() → {string}

Source: [browser.js, line 48](#)

Since: 1.0.0

获取IE版本，返回值包括7,8,9,10,11

Returns:

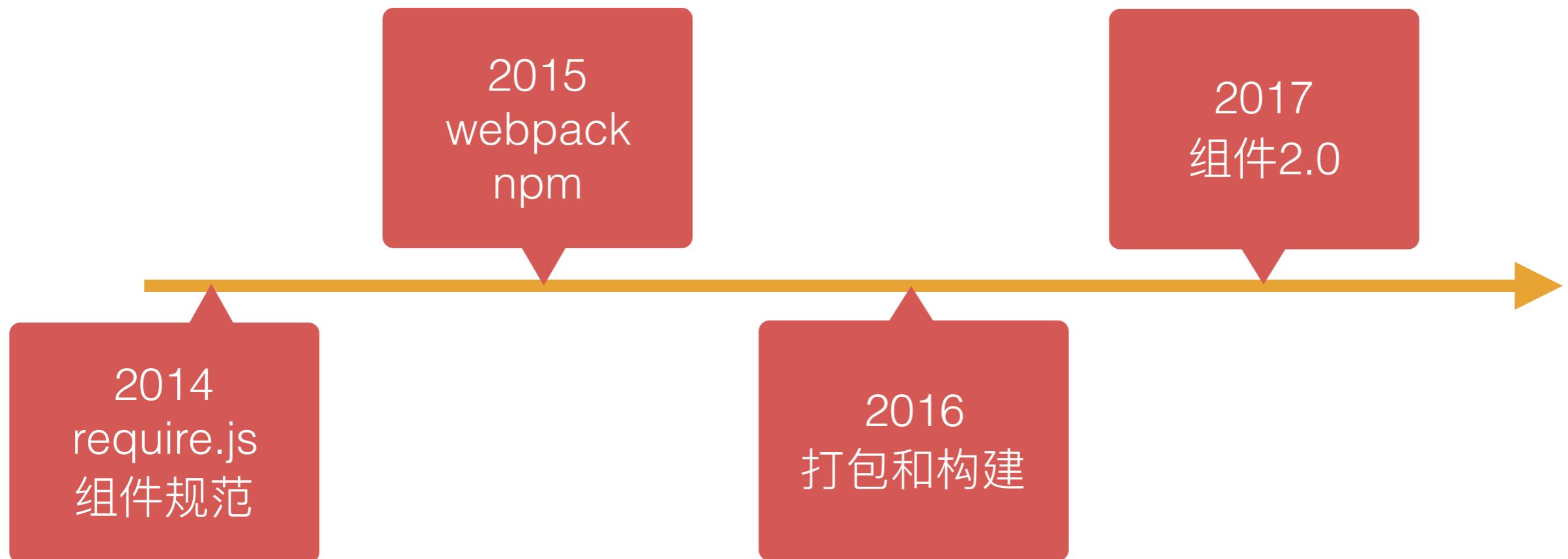
IE版本，7,8,9,10,11，非IE时返回0

Type **string**

富途组件化

1. 前尘往事
2. 初试牛刀
3. 为伊憔悴
4. 灯火阑珊

蓦然回首



蓦然回首

- 团队的工程化和技术迁移成本高
- 方案会和团队一起不断成长
- 适合团队现状的方案是最好的方案
- 临渊羡鱼者众 退而结网而寡
- 细节为王 冷暖自知

灯火阑珊

- 不断有新的问题出现
- 不断有新的工具出现
- 组件化和工程化的终点在哪里

没有终点 - CSS

- 核心问题：
 - 代码组织和复用
 - 避免冲突
- CSS Next ?
- CSS modules ?

CSS Modules

```
.input{  
    font-size:100px;  
    border: 5px solid #CCC;  
    width: 600px;  
}  
.dropdown{  
    font-size:100px;  
    color:red;  
    border: 5px solid #F00;  
    width: 600px;  
    display: none;  
}
```

```
▼ <style type="text/css">  
  .nf0mJdG4m85R63woAa6E-{  
    font-size:100px;  
    border: 5px solid #CCC;  
    width: 600px;  
  }  
  ._18LicPeDYEG9tSeV6rrWBr{  
    font-size:100px;  
    color:red;  
    border: 5px solid #F00;  
    width: 600px;  
    display: none;  
  }  
</style>
```

CSS Modules

Example:

```
:local(.className) { background: red; }
:local .className { color: green; }
:local(.className .subClass) { color: green; }
:local .className .subClass :global(.global-class-name) { color: blue; }
```

is transformed to

```
._23_aKvs-b8bW2Vg3fwHozO { background: red; }
._23_aKvs-b8bW2Vg3fwHozO { color: green; }
._23_aKvs-b8bW2Vg3fwHozO ._13LGdX8RMStbBE9w-t0gZ1 { color: green; }
._23_aKvs-b8bW2Vg3fwHozO ._13LGdX8RMStbBE9w-t0gZ1 .global-class-name { color: blue; }
```

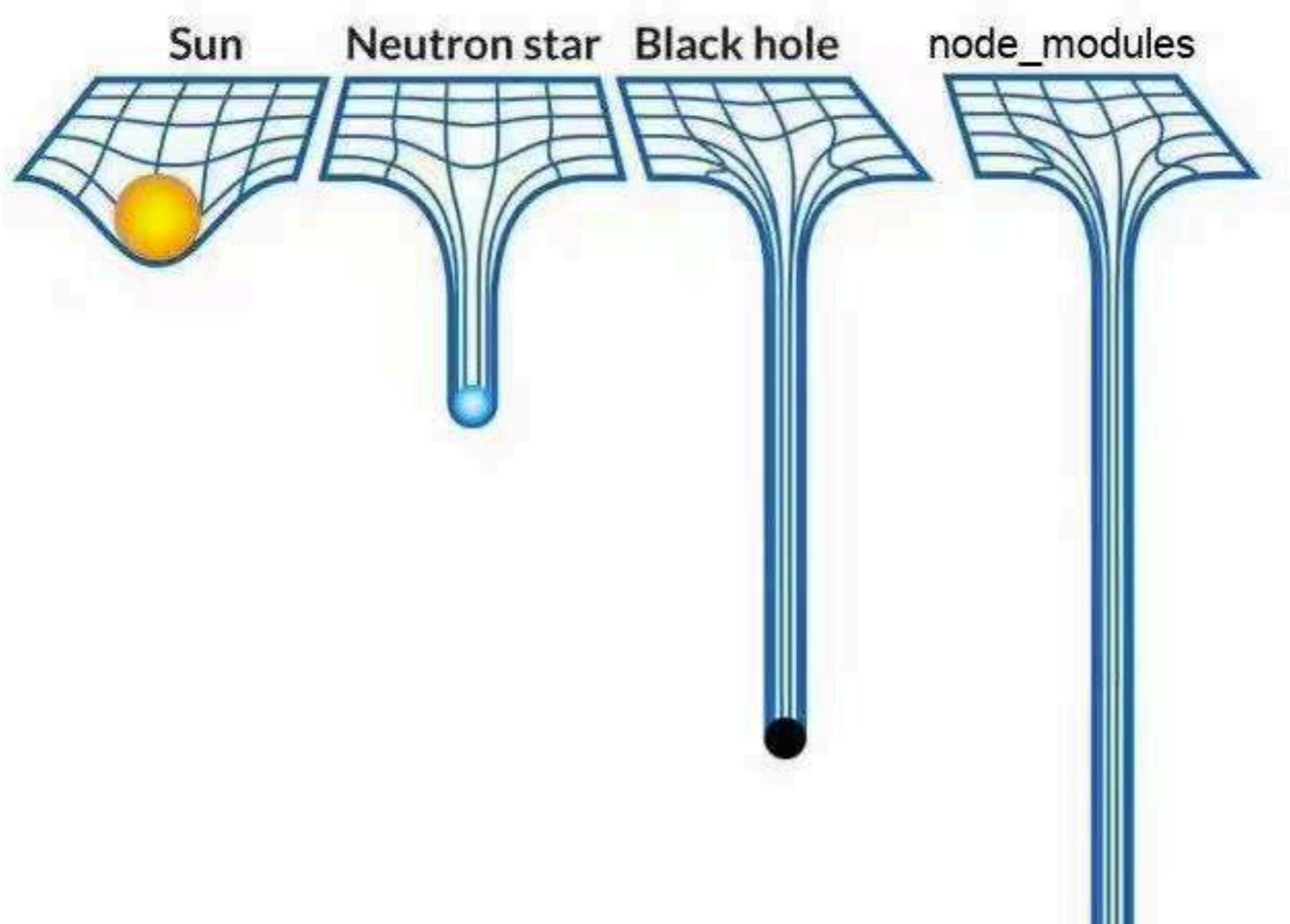
CSS Modules

- HTML模板中应用不方便
- classNames = require('xx.css');

没有终点 - 组件方案

- web components
 - 兼容性不好
 - 框架集成方案缺失
- react / angular.js / vue 通用组件方案
 - 原生代码包装
 - ngVue/angular.js + vue)
 - JSX/react + vue)

npm是终极方案吗



包管理和引入

- 包管理
 - bower和component已死
 - jspm呢？
- 引入
 - ES Modules落地？
 - system.js + http/2 ?

jspm + SystemJS

Loading NodeJS core browserify libraries

```
System.import('buffer').then(function(buffer) {
  console.log(new buffer.Buffer('base64 encoded').toString('base64'));
});
```

Loading from npm

```
System.import('npm:lodash').then(function(_) {
  console.log(_.max([1, 2, 3, 4]));
});
```

Loading jQuery

```
System.import('jquery').then(function($) {
  $(window).scrollTop(0);
});
```

配置工程师有归宿吗



Windows



Mac / iOS



Android



Web?

THANKS!

