

# 主题：打造前端监控体系

何方舟 (adamhe)



# 个人介绍



## 何方舟(adam)

- 腾讯高级前端工程师
- 负责腾讯直播，手Q附近，NOW直播结合版相关开发
- 前端监控方案 Aegis 负责人

# 一个常见的面试题

用户反馈页面打不开了怎么办

# BADJS



BetterJS / badjs-report

Used by 1,783

Code Issues 18 Pull requests 0 Projects 0 Wiki Security Ins

monitor error and report

194 commits 2 branches 5 releases

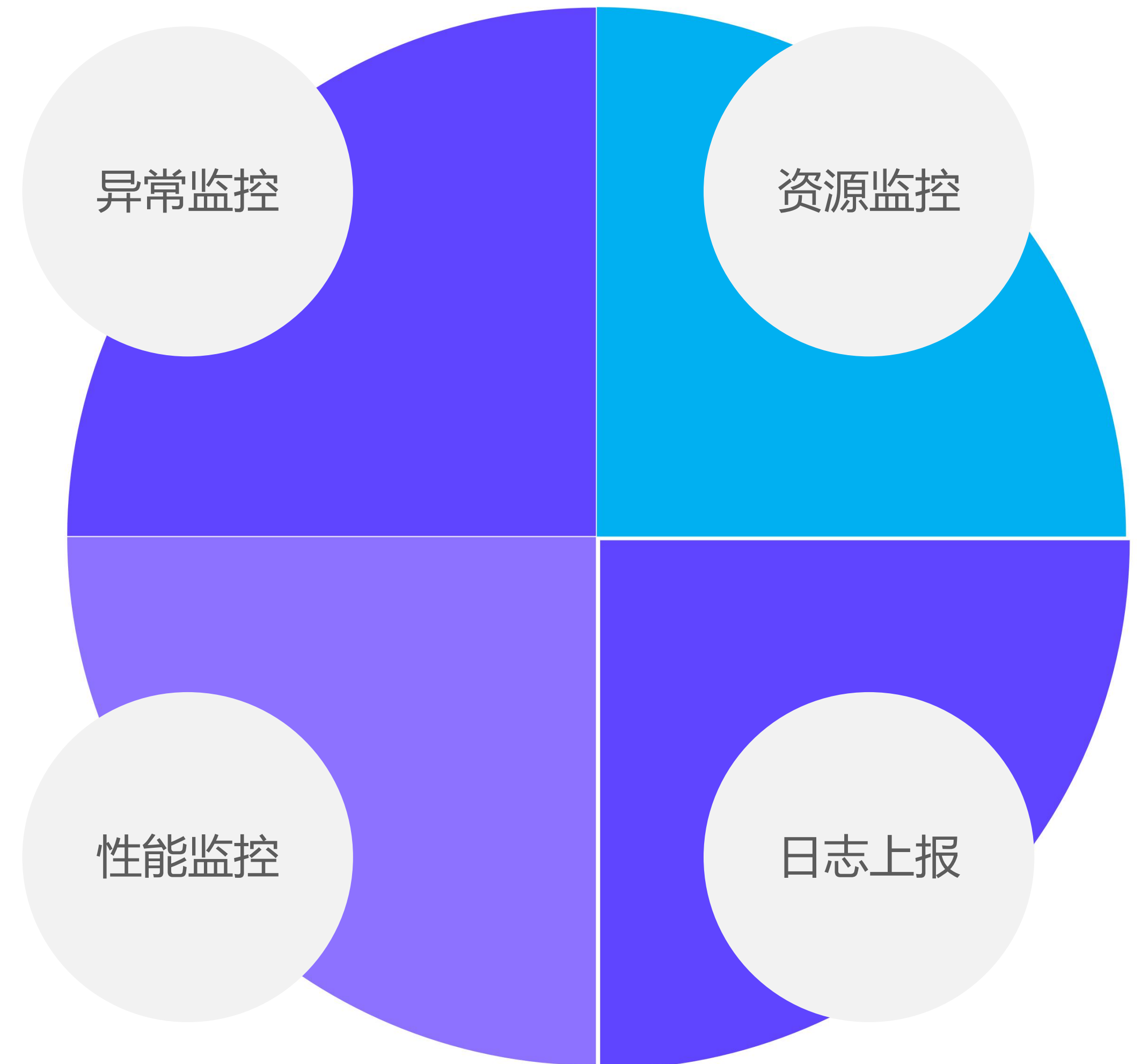
Branch: master New pull request Create new

caihuiji Update README.md

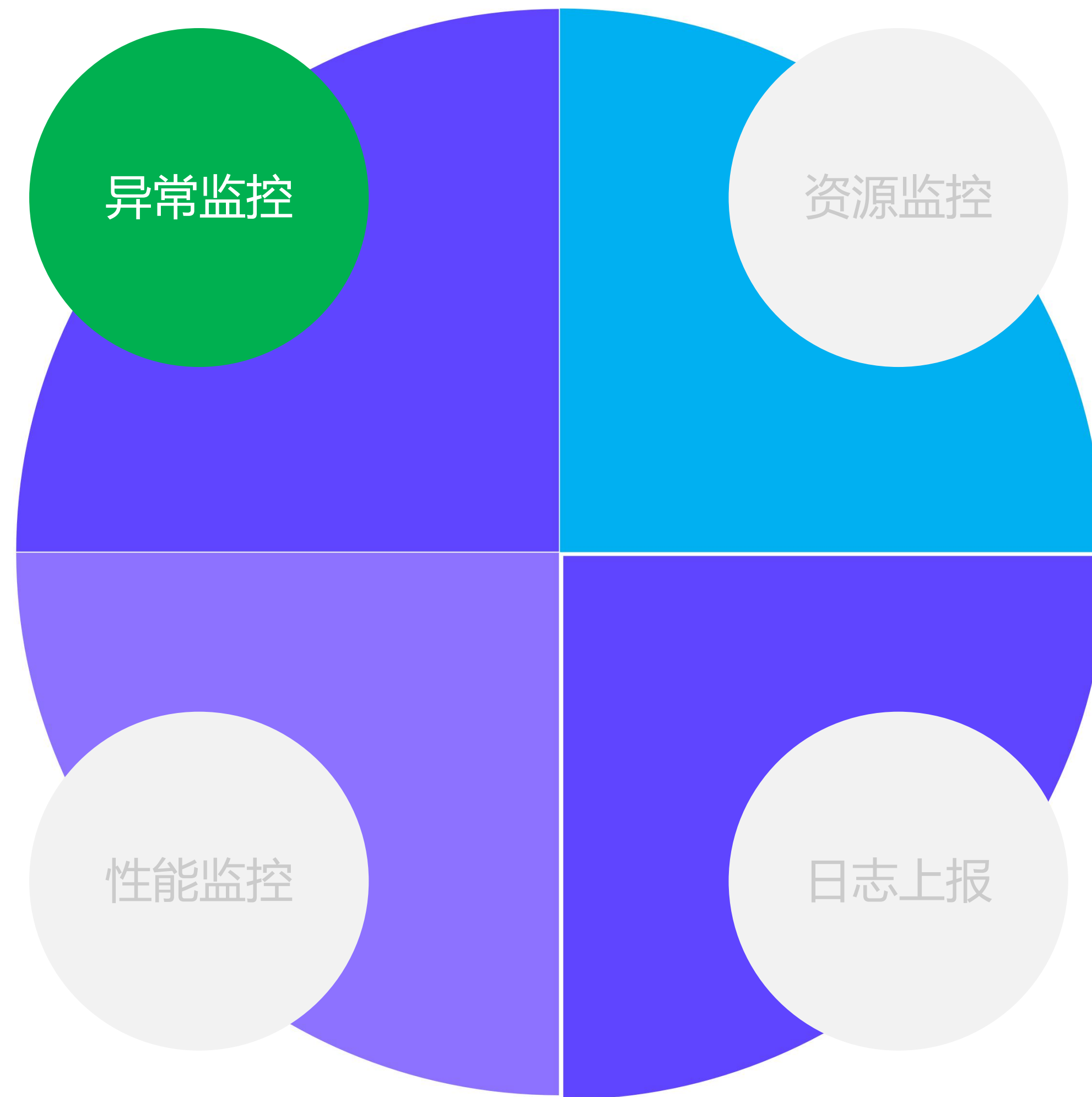
dist	build:dist
example	bugfix
src	[M] 简化代码
test	style: format
.bowerrc	add lego support
.editorconfig	add lego support



# 全面的前端监控方案



# 异常监控



```
window.onerror = function(message, source, lineno, colno, error)
{ ... }
```

Promise -> unhandledrejection

```
Arguments(5) ["Uncaught TypeError: window.Pager is not a constructor", "https://now.qq.com/h5/reco
▼ TypeError: window.Pager is not a constructor
    at https://now.qq.com/h5/record.html?vid=1088_1565..., callee: f, Symbol(Symbol.iterator): f] ⓘ
  0: "Uncaught TypeError: window.Pager is not a constructor"
  1: "https://now.qq.com/h5/record.html?vid=1088_1565675319fc8864deb2ee4412cd8da1&asyncMode=3"
  2: 2537
  3: 13
▶ 4: TypeError: window.Pager is not a constructor at https://now.qq.com/h5/record.html?vid=1088_15
▶ callee: f ()
  length: 5
▶ Symbol(Symbol.iterator): f values()
▶ __proto__: Object
```



# 异常监控 - Script Error

#	Time	Uin	Message
0	2019-08-14 17:24:39	535234840	Script error.@ca9a0393@offline:1565695988763

**Time:** 2019-08-14 17:24:39

**IP:** 112.28.133.110

**uin:** 535234840

**userAgent:** Mozilla/5.0 (iPhone; CPU iPhone OS 9\_3\_4 like Mac OS X) AppleWebKit/601.1.46 (KHTML, like Gecko) Mobile Safari/537.51

**Form:** [https://now.qq.com/h5/story.html?roomid=1210246329&\\_bid=2409&\\_wv=16778245&from=qq](https://now.qq.com/h5/story.html?roomid=1210246329&_bid=2409&_wv=16778245&from=qq)

**App:** 8.0.6.432

**Platform:** 9.3.4

**ExtraInfo:** 浏览器内核为 WebKit:601.1.46

**version:** 1

Bug 363897	
Don't give onerror handlers detailed information about syntax errors in off-site "scripts"	
RESOLVED FIXED	
▼ Status	
Product: Core ▼	Opened: 13 years ago
Component: DOM: Events ▼	Updated: 6 years ago
Type: <span>+</span> enhancement	
Status: RESOLVED FIXED	
► People (Reporter: jruderman, Assigned: jst)	
▼ Tracking	
Version: Trunk	Depends on: <a href="#">467439</a> , <a href="#">696301</a>
Target: ---	Blocks: <a href="#">historyleak</a> , <a href="#">CVE-2008-5507</a>
Keywords: csectype-disclosure, fixed1.8.1.21, verified1.8.1.19	Dependency <a href="#">tree</a> / <a href="#">graph</a>
Points: ---	Bug Flags: <b>sicking</b> blocking1.9+ <b>samuel.sidler+old</b> blocking1.8.1.19+ <b>samuel.sidler+old</b> blocking1.8.1.next+ <b>dveditz</b> wanted1.8.1.x+ <b>asac</b> blocking1.8.0.next+ <b>Waldo</b> in-testsuite?
► Firefox Tracking Flags (Not tracked)	



# 异常监控 - 跨域脚本错误

crossorigin 并不能完全解决

## 1. iOS 跨域脚本中的异步错误依旧是无法捕获的

```
<script type="text/javascript" src="//11.url.cn/now/h5/record_4df8f758.js?_bid=152" integrity="sha256-HunxcRHdB4E5DzSC3N4E2xjwZ5n1F0eC8/dnnvudbXE= sha384-6qYE8ZV/DiOI394p6yWyIRtsW4MDyNtNeV0zFoGnYaQDg7/338p0zk0WzxyEuyDk" crossorigin="anonymous">
</script>
```

## 2. 客户端代码报错

2017-10-25 19:58:41	ReferenceError: WeixinJSBridge is not defined @ <anonymous>:1:12	112.97.52.130	 	1行 12列 https://admin.qidian.qq.com/template/blue/mp/menu/qr- &kfuin=2852150930&kfext=2852150930&fid=22&key=e0 Mozilla/5.0 (Linux; Android 6.0.1; vivo Y66 Build/MMB29M; ww) AppleWebKit/53 TBS/043602 Safari/537.36 MicroMessenger/6.3.18.800 NetType/3gnet Language
---------------------	---	---------------	---	--

# 异常监控 - PATCH

```
/**
 * 包装函数
 * @param {Function} fn
 * @return {Function} cat fn
 */
function cat(fn) {
  // 防止多次包装
  if (!isFunction(fn) || fn.__fn) {
    return fn;
  }
  // 保持一对一，要不然容易引起未知的问题
  // 例如：两次ele.bind('', fn)再ele.unbind('')会有一个无法unbind
  if (fn.__catFn) {
    return fn.__catFn;
  }
  const __catFn = function() {
    try {
      return fn.apply(this, arguments);
    } catch (e) {
      onthrow(e);
    }
  };
  fn.__catFn = __catFn;
  __catFn.__fn = fn;
  __catFn.__proto__ = fn;
  // __catFn.__catFn -> fn -> fn.__catFn -> __catFn, so set it undefined
  __catFn.__catFn = undefined;
  return __catFn;
}
```

Patch 原生异步方法 ( tryjs )

setTimeout

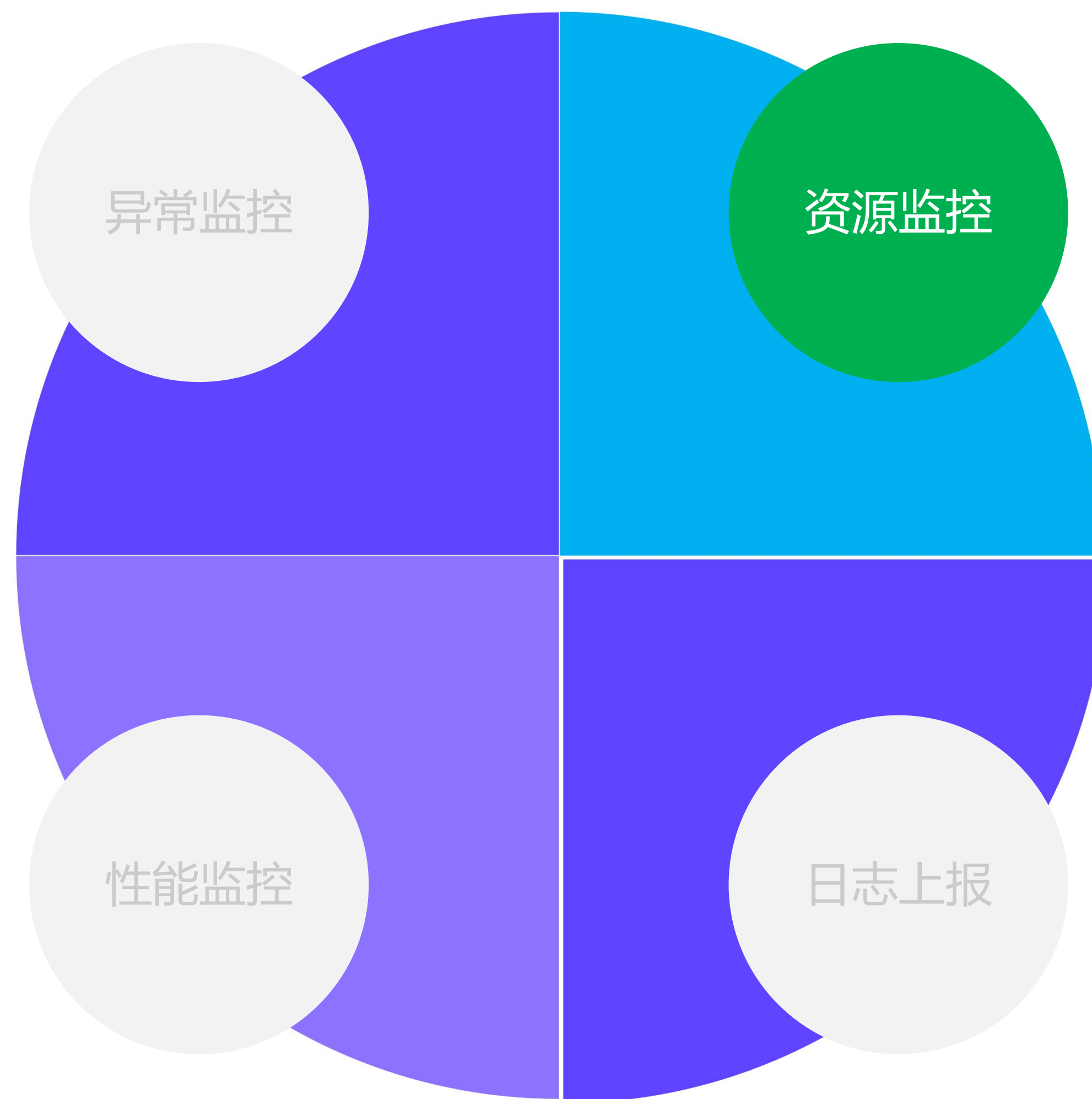
setInterval

requestAnimationFrame

EventTarget



# 资源监控



# 异常监控 - 资源加载失败

资源异常错误

`window.addEventListener('error')`

(这不就是 *window.onError* 吗? )

```
▼ Event {isTrusted: true, type: "error", target: script, currentTarget: Window, eventPhase: 1, ...} ⓘ  
  bubbles: false  
  cancelBubble: false  
  cancelable: false  
  composed: false  
  ▶ currentTarget: Window {postMessage: f, blur: f, focus: f, close: f, parent: Window, ...}  
    defaultPrevented: false  
    eventPhase: 1  
    isTrusted: true  
  ▶ path: (5) [script, head, html, document, Window]  
    returnValue: true  
  ▶ srcElement: script  
  ▶ target: script  
    timeStamp: 731.7399999592453  
    type: "error"  
  ▶ __proto__: Event
```



# 测速上报 接口测速

```
xhrProto.open = function(method: string, url: string) {  
  const xhr = this,  
    args = arguments;  
  
  xhr.speedLog = {  
    url,  
    method,  
    openTime: Date.now()  
  } as SpeedLog;  
  
  xhr.addEventListener('readystatechange', function() {  
    if(xhr.readyState === 4) {  
      xhr.speedLog.responseTime = Date.now();  
      xhr.speedLog.duration = xhr.speedLog.responseTime - xhr.speedLog.openTime;  
  
      notify && notify(xhr.speedLog);  
    }  
  })  
  
  return originOpen.apply(xhr, args);  
}
```

1. XHR

2. FETCH

# 测速上报 图片测速

```
(<any>window).Image = function (width: any, height: any) {  
  const img = new realImage(width, height);  
  const speedLog: SpeedLog = {  
    method: 'get',  
    openTime: Date.now(),  
    sendTime: Date.now(),  
    ret: 0,  
    status: 200  
  }  
  img.addEventListener('load', () => {  
    speedLog.url = formatUrl(img.src);  
    speedLog.responseTime = Date.now();  
    speedLog.duration = speedLog.responseTime - speedLog.sendTime;  
    notify && notify(speedLog);  
  })  
  
  return img;  
}
```

Image 和  
HtmlImageElement ?



# 测速上报 资源测速

HTMLElement.offsetHeight	只读	double
HTMLElement.offsetLeft	只读	double
HTMLElement.offsetParent	只读	Element
HTMLElement.offsetTop	只读	double
HTMLElement.offsetWidth	只读	double
HTMLElement.properties	只读 	HTMLPropertiesCollection
HTMLElement.spellcheck		Boolean
HTMLElement.style		CSSStyleDeclaration
HTMLElement.tabIndex		long
HTMLElement.title		DOMString
HTMLElement.translate		Boolean

*HTMLLinkElement*  
*HTMLScriptElement*  
*HTMLImageElement*

*overwrite onload ?*

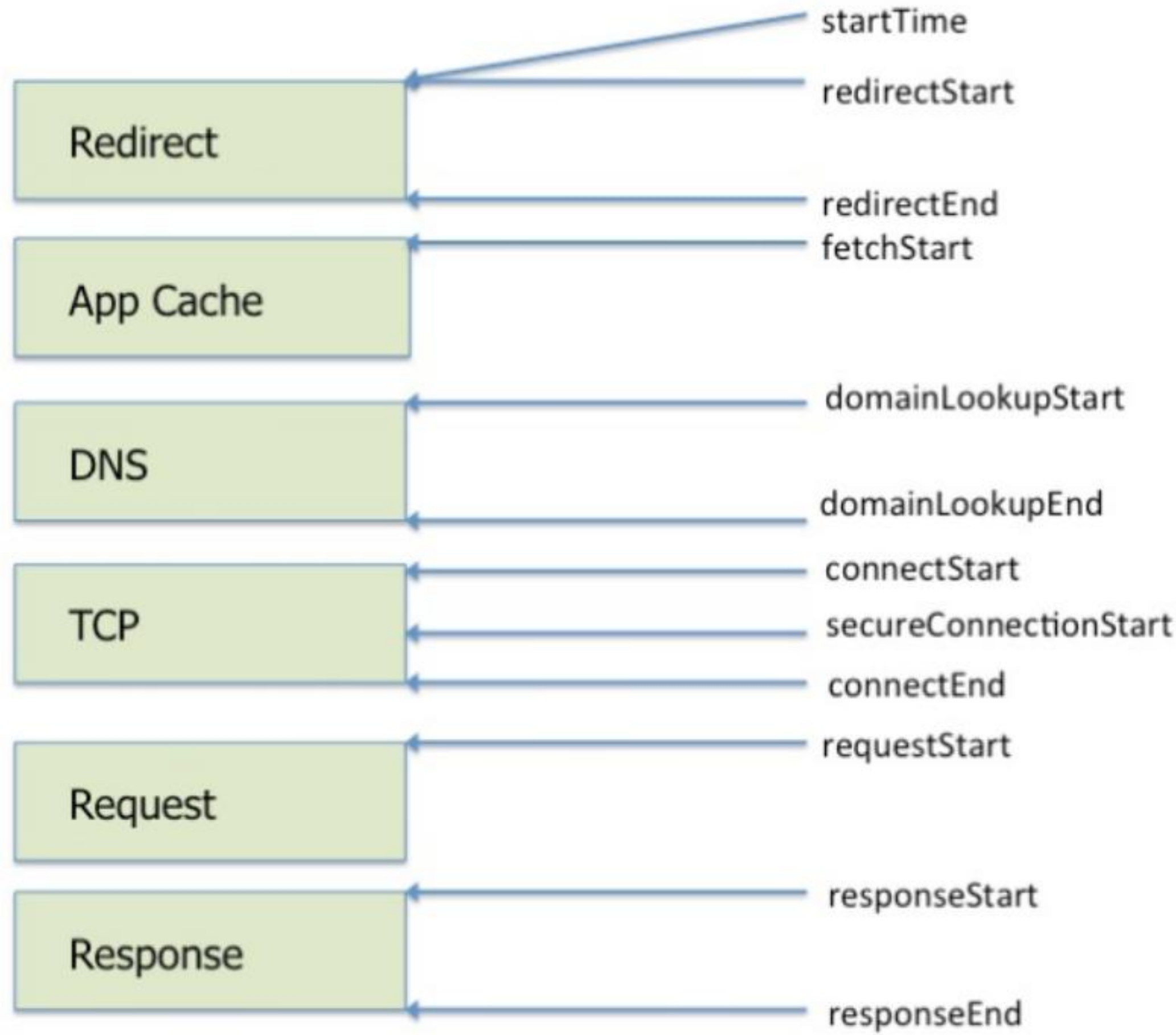
# 测速上报 加载器

```
export default class LazyLoad extends Component {  
  
  constructor(props) { ...  
  }  
  
  componentWillReceiveProps(nextProps) { ...  
  }  
  
  componentDidMount() {  
    // set 标志位  
    this.mounted = true;  
  
    const {showImmediately} = this.props;  
    if (showImmediately) {  
      this.load(this.resource);  
    } else {  
      // 加入队列  
      Queue.add(this);  
    }  
  }  
}
```

使用加载器代理加载



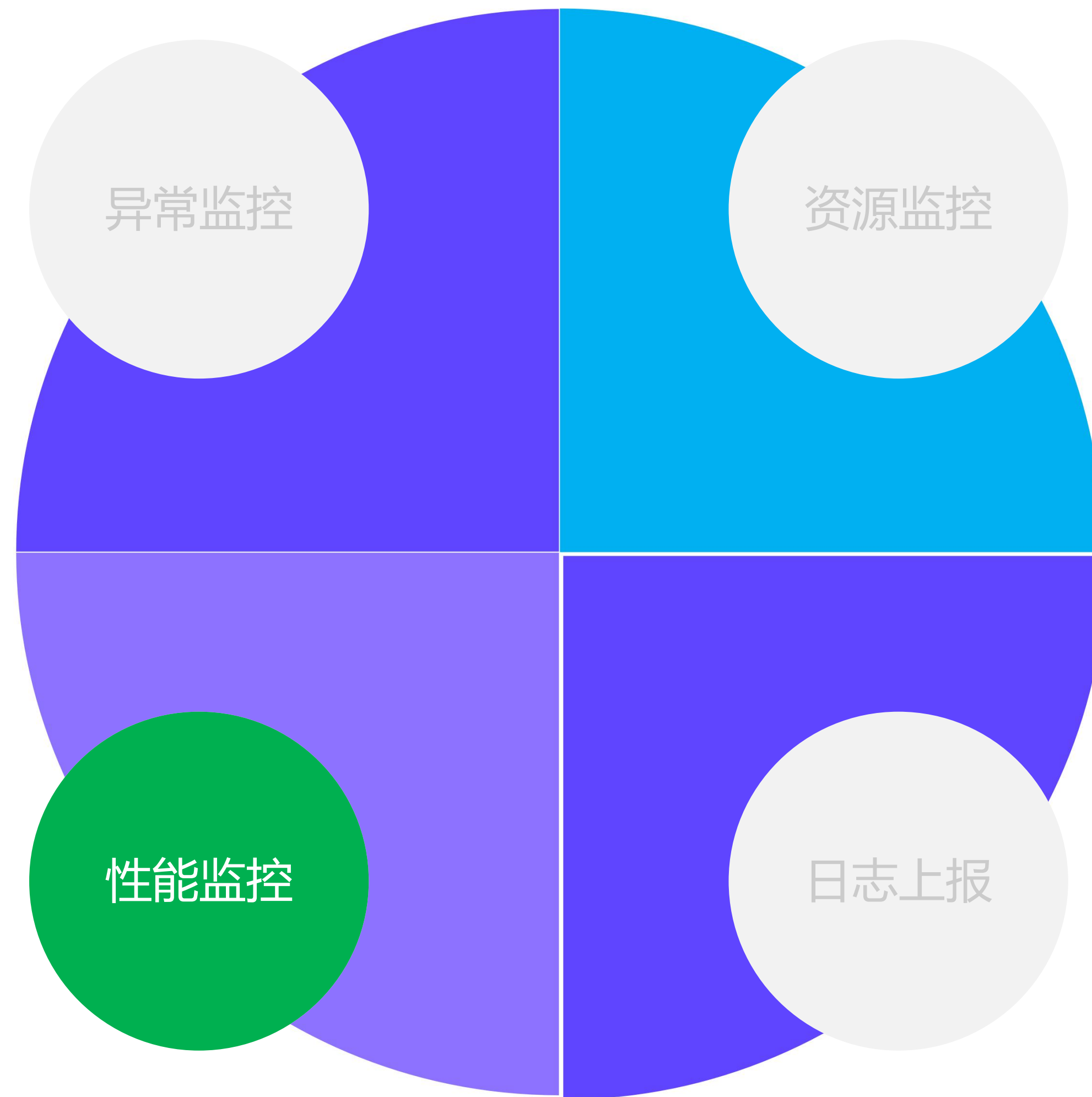
100



# ResourceTiming

[illegible]

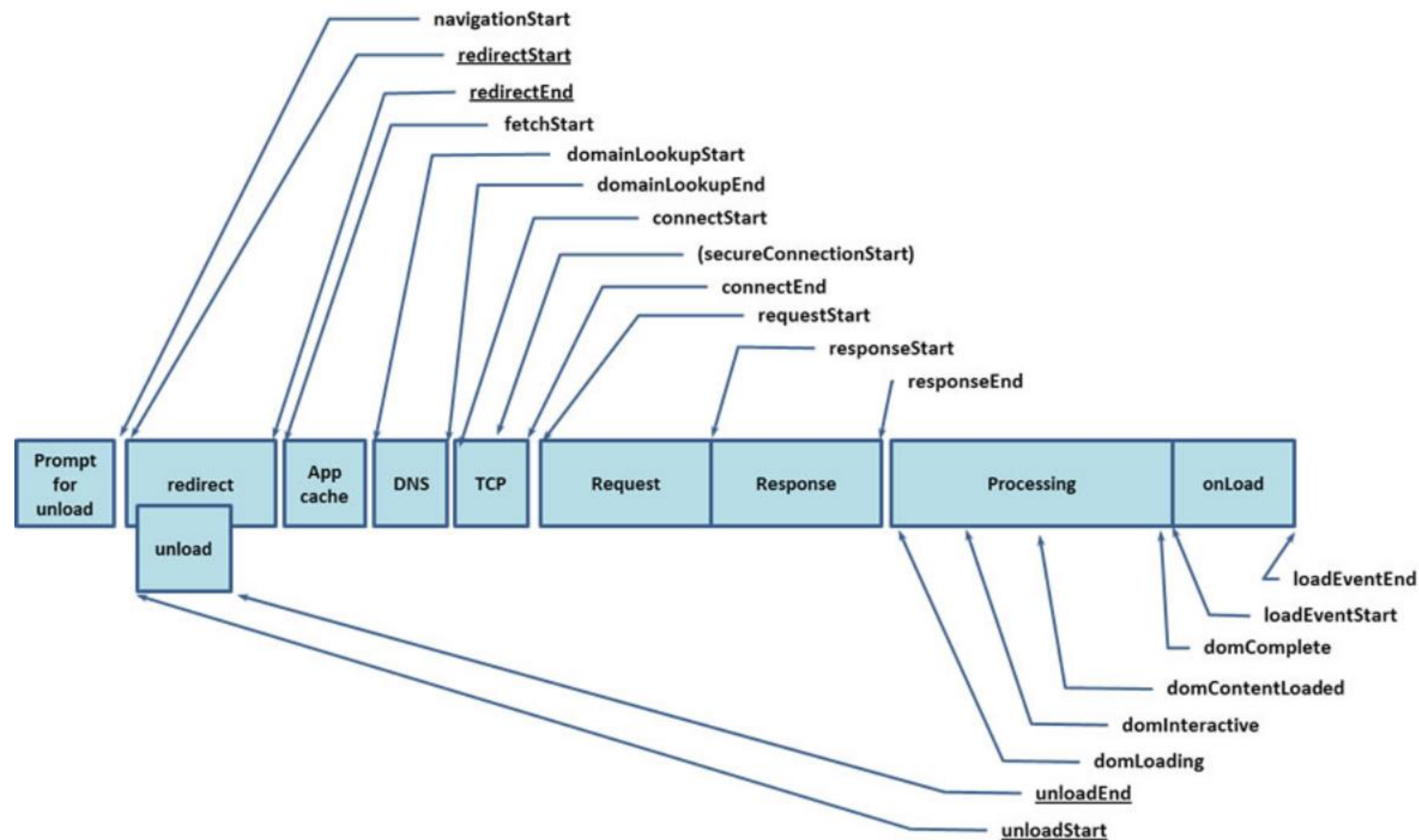
# 资源监控





# PerformanceTiming

performance Timing



# 首屏时间计算

首屏时间 = render\_fp\_timing - navigationStart ?

```
<!DOCTYPE html>
<html lang="zh_CN">
<head>
  <!--inline[modules/html/meta.html]-->
  <title></title>
  <script>
    window._T = {
      page_start: new Date()
    };
  </script>
  You, 24 days ago • feat: 接入 feflow
</head>
<body> ...
</body>

<script>
  window.aegis.info('page_render_fp:' + (window._T.page_isomorphism_render_fp - w
    .page_start));
</script>
</html>
<script data-inline=" /inline"></script>
```



# 首屏时间计算



SSR 页面

```
(x,o,n)}):function(x){for(var o,n,t,e,l,i=w(x),c=r.features&&r.features.length?r.features.sort():y,u=[],f=0,s=c.length,f<s:f++){var a=c[f],p=g(a):d(a,y)&&p&&u.push(a)}o={features:u,_polyfillUrl:r._polyfillUrl,urlGenerator:r.urlGenerator},n=i,t=o.features||[],e=o._polyfillUrl,l=o.urlGenerator,t.length?n({src:(e?l||w:m)(t,e)||"/cdn.polyfill.io/v2/polyfill.min.js"},type:"text/javascript"):n({})}({polyfillUrl:"//11.url.cn/now/polyfill/",polyfillSuccess:function(x){console.log("polyfillSuccess",x)},polyfillError:function(x){console.log("polyfillError",x)},defineSuccess:function(x){console.log("defineSuccess",x)},defineError:function(x){console.log("defineError",x)}}),{"object"===i(o)?r.exports=l():void 0===(e=function(){return t.call(o,n,o,x):t}||r.exports=e))})</script><div id="container"><div data-reactroot=""><div id="mainWrapper" class="store-wrap"><div class="navigation-wrapper" style="background-color:#fff"><div class="contain-area"><div class="left-area"><div class="logo"></div><a href="//now.qq.com/pcweb/index.html" class="home">首页</a><div class="topic-filter"><div class="cg cur-topic"><span class="text">分类</span><span class="category-icon"></span></div><div class="location-filter"><div class="cg cur-location"><span class="text">地区</span><span class="category-icon"></span></div><div class="game-filter"><div class="cg cur-game"><span class="text">游戏</span><span class="category-icon"></span></div><div class="right-area"><div></div></div><div class="dividing-line" data-canrely=false"></div><div class="more-div"><div class="more-icon"></div><div class="more-wording">更多</div></div><div class="history-div" to="history"><div class="history-icon"></div><div class="history-text" to="history">历史</div></div><div class="attention-div" to="attention"><div class="attention-icon"></div><div class="attention-text" to="attention">关注</div></div><div class="download-div"><div class="download-icon"></div><div class="download-wording">下载</div></div><div class="sign-lottery-entry"><div class="baohe-icon"></div><div class="baohe-wording">每日宝盒</div></div><div class="search-area"><div></div><div class="search-wrapper"><div class="search-input"><input placeholder="用户名或直播ID"></div><div class="search-icon"></div></div></div></div><div id="user-info-container" class=""><div class="user-info"><div class="user-info-line1"><div class="image" placeholder="//11.url.cn/now/h5/img/avatar_16ba37c.png" src="//11.url.cn/now/h5/img/avatar_16ba37c.png" style="background-image:url(/11.url.cn/now/h5/img/avatar_16ba37c.png)"></div><div class="v-emotion user-name"></div><div class="user-info-line2"><div class="coin-icon"></div><div class="user-coin">金币: <span></span></div><a title="NOW直播充值" href="//now.qq.com/pcweb/pay-recharge.html?&andbox=0" class="charge-btn">充值</a></div></div><div id="follow-anchor-info-container"><div class="follow-wording follow-empty-wording">你关注的主播还未开播哦</div></div></div><div></div></div><div id="root" class="isOffline anchor-room-wrapper" style="min-width:1180px"><div class="layout-middle-wrapper"><div class="anchor-info-root"><div class="anchor-info"><div class="anchor-avatar hand"></div><div class="anchor-info-main"><div class="anchor-info-column"><h2 class="anchor-nick flex-center"><div class="v-emotion">夜幕*封</div><div class="watermark-label"><div class="nowid-mark">NOW ID:<!-- 212530059</div></div></h2><div class="anchor-info-digit"><div class="anchor-level"></div><div class="anchor-online-num"><span class="sign"></span><span></span></div></div></div><div class="report-follow"><a class="report-btn" href="https://support.qq.com/products/1324" target="view_window">举报</a><div class="live-download-code hand" style="display:none">下载游戏</div><div class="hand follow-btn" style="padding-left:0"><span class="follow-icon" style="display:inline"></span>关注<i style="background:#fff"></i></div></div></div><div class="layout-player-compo room tcplayer end"><div class="video-mask-layer"></div></div></div><div class="live-recommend-wrapper"><div></div></div></div><div class="section class=slider-category-layout"><div class="topic-container"><span class="follow_histoty">关注与历史</span><div class="item-container"></div></div><div class="topic-container"><span class="topic">热门</span><div class="item-container"><div class="item">户外</div><div></div><div class="item">音乐</div><div></div><div class="item">舞蹈</div><div></div><div class="item">新人</div></div></div><div class="topic-container"><span class="game">游戏</span><div class="item-container"><div class="item">王者荣耀</div><div class="item">刺激战场</div><div class="item">棋牌游戏</div><div class="item">其他</div></div></div><div class="topic-container"><span class="location">地区</span><div class="item-container"><div class="item">北京</div><div class="item">上海</div><div class="item">广州</div><div class="item">深圳</div><div class="item">其他</div></div></div></section></div><div class="discussion-container"><div class="rank-panel"></div><div class="drive-container" style="display:none"><div class="enter-animation-wrapper"><div class="step-0"><div class="enter-animation"><div class="enter-shadow"></div><div class="enter-nick-name"></div><div class="tip-text">来了</div></div></div><div class="drive-container-inner"><div class="drive-effect-container"><section class=effect-video-player-container"><video class=effect-video" crossorigin=anonymous"></video><canvas class=effect-canvas-origin"></canvas><canvas class=effect-canvas-output"></canvas></section></div></div></div></div></div><!-- ISOMORPHISM--><script>window.isIsomorphism&&window.__initialState&&(window.T.page_server_render_end=new Date,window.T.report_report_report_report("page_server_render_end:"+window.T.page_server_render_end+(window.T.page_server_render_end=window.T.page_start)))</script><!--ignore--><script>var _mtac={senseQuery:1};setTimeout(function(){var t=document.createElement("script");t.src="//pingjs.qq.com/h5/stats.js?v2.0.4",t.setAttribute("name","MTAH5"),t.setAttribute("sid","500671276"),t.setAttribute("cid","500685596");var e=document.getElementsByTagName("script")[0];e.parentNode.insertBefore(t,e),1500,window.tcplayer_type="2.3.1"</script><script src="//11.url.cn/now/h5/lib/flyjs/1.5.0/fly-1.5.0.min.js?max_age=2592000" crossorigin=anonymous"></script><script src="//sding.qq.com/expert_qq/webtrtcLive/1.0.0/WebRTC_API.min.js?max_age=2592000" crossorigin=anonymous"></script><script src="//11.url.cn/now/lib/tcplayer/2.3.2/TcPlayer-2.3.2.js?max_age=2592000" charset="utf-8" crossorigin=anonymous"></script><script data-inline=.../modules/common/isomorphism-tcplayer.js?_inline">function(i){var o={}:function r(e){if(o[e])return o[e].exports;var t=o[e]={l:!1,exports:{}}:return e[o].call(r.exports,r,r.exports,n),r.l=!0,r.exports}n.m=e,n.c=t,n.d=function(o,r,e){n.o(o,r)||Object.defineProperty(o,r,{configurable:!1,enumerable:!0,get:e})},n.n=function(o){var r=o.__esModule?function(){return r.d(t,"a",t),r.o=function(e,t){return
```

非SSR 页面

```
console.log(a)}},j=function(b){var c=b.polyfillSuccess||a,d=b.polyfillError||a;return function(a){a&&h(a,c,d)}:return function(a){for(=j(a),e=a.features&&a.features.length?a.features.sort():FEATURES,f=[],h=0,k=e.length,h<k:h++){var e=j(a),m=c(1):b(1,FEATURES)&&!m&&f.push(1)}g({features:f,_polyfillUrl:a._polyfillUrl,urlGenerator:a.urlGenerator},d)}}):polyfillLoader("://11.url.cn/now/polyfill/",features:[],polyfillSuccess:function(){window._report_.monitor(33612300)},polyfillError:function(){window._report_.monitor(33612301)}});</script></head><body><script>window.T.page_css_ready=new Date,window._report_.report("load css access"),window.avReportFlag.css_load=!0,invoke("jsbridge://app/loadSucc"),window.handleSriError=function(o){throw indow._report_.monitor(33606479),new Error("story.js load error")}</script><div id="container"><!--HTML_PLACEHOLDER--></div><div id="statusbarmask"></div><script>window.isIsomorphism&&window.__initialState&&(window.T.page_isomorphism_render_fp=new Date,window._report_.report("page_isomorphism_render_fp:"+window.T.page_isomorphism_render_fp=window.T.page_start)))</script><script type="text/javascript" src="//s.url.cn/now/lib/16.2.0/react.min.js? bid=3234"></script><script type="text/javascript" src="//s.url.cn/now/lib/16.2.0/react-dom.min.js? bid=3234"></script><script type="text/javascript" src="//11.url.cn/now/h5/story_ca9a03f?bid=152" integrity="sha256-+cwrQCEi4jkIqvXMP67sE/gILkcLOYR8gUgvcS087fM= sha384-wJHd10P/qB84PAMdrQhHDS9PbRE20XtOyJl6tHnesskTgyQdi2Pwa0ud" crossorigin=anonymous"></script></body></html><script data-inline=". /inline.js">!function(e){var t={}:function n(o){if(t[o])return t[o].exports;var r=t[o]={i:o,l:!1,exports:{}}:return e[o].call(r.exports,r,r.exports,n),r.l=!0,r.exports}n.m=e,n.c=t,n.d=function(o,r,e){n.o(o,r)||Object.defineProperty(o,r,{configurable:!1,enumerable:!0,get:e})},n.n=function(o){var r=o.__esModule?function(){return r.d(t,"a",t),r.o=function(e,t){return
```

1. SSR 页面 -> DOMContentLoaded 作为首屏时间点

2. 非 SSR —> 异步数据请求完成后，第一次渲染，作为首屏时间点

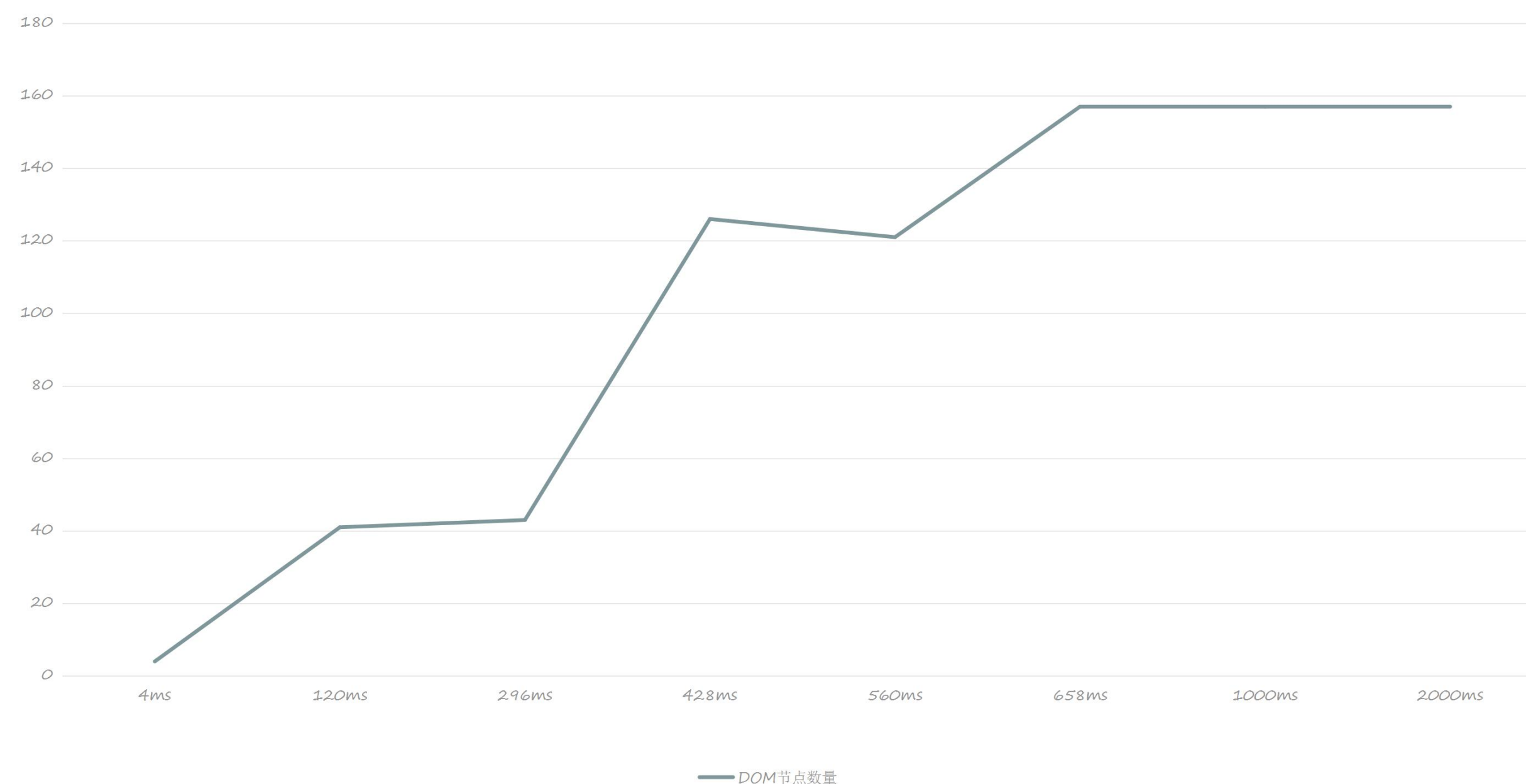


# 手动打点问题

1. 侵入业务开发
2. 无法全部覆盖
3. 首屏打点标准不一致



# 自动化计算的尝试



1. 记录DOM节点的变化
2. 当 DOM 节点不再突增，认为首屏时间即可完成

# Paint—timing

## Paint Timing 1

Editor's Draft, 13 June 2019



### This version:

<https://w3c.github.io/paint-timing/>

### Latest published version:

<https://www.w3.org/TR/paint-timing/>

### Issue Tracking:

[GitHub](#)

### Editor:

[Shubhie Panicker](#) (Google)

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## Abstract

This document defines an API that can be used to capture a series of key moments (First Paint, First Contentful Paint) during pageload which developers care about.

## Status of this document

Fyrd / caniuse

[Code](#) [Issues 1,041](#) [Pull requests 8](#) [Pro](#)

V

If you have a bug or an ide

Filters

☒ Clear current search query, filters, and sorts

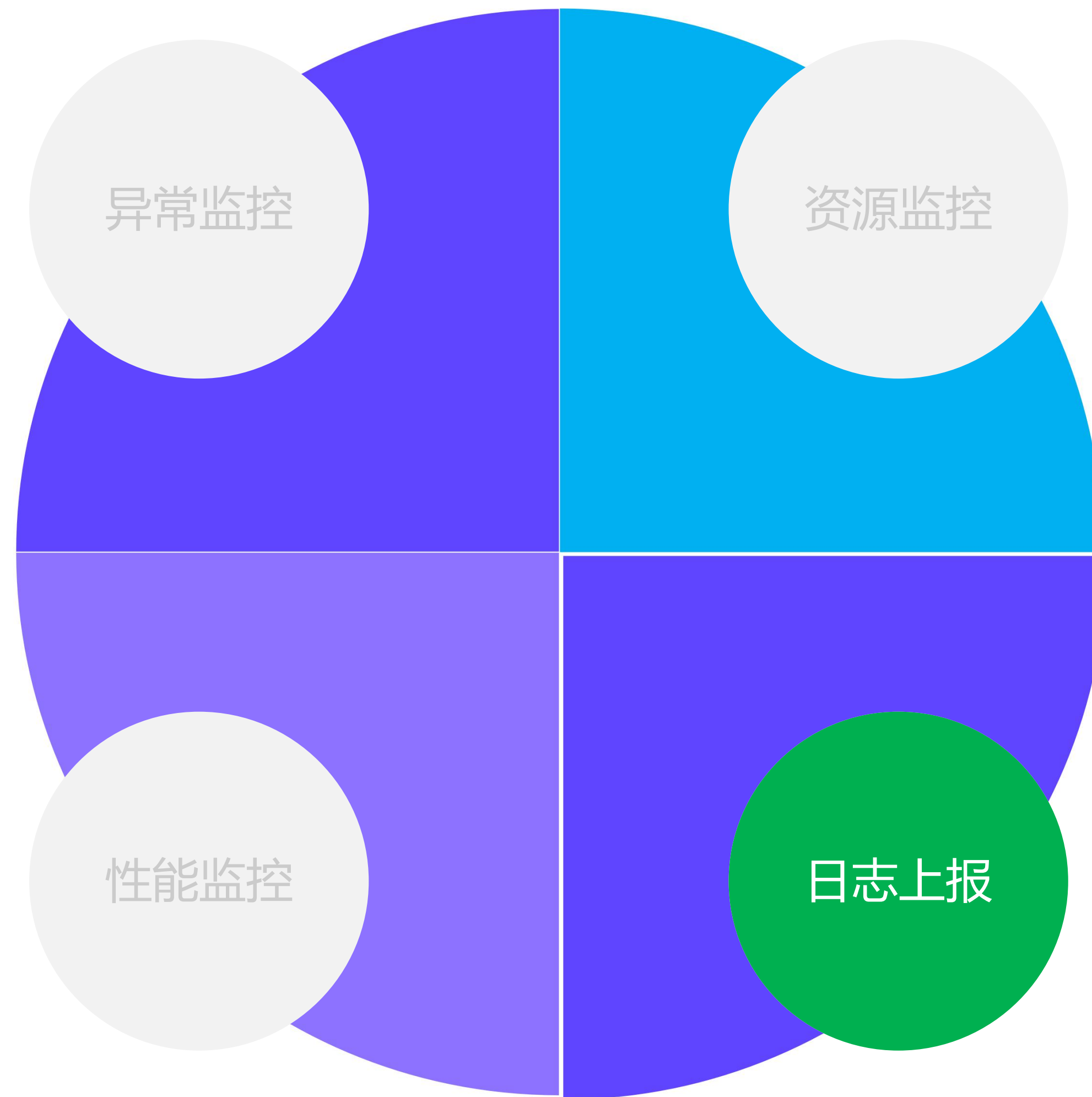
[1 Open](#) [1 Closed](#)

[Paint Timing API](#) [Support data suggestion](#)

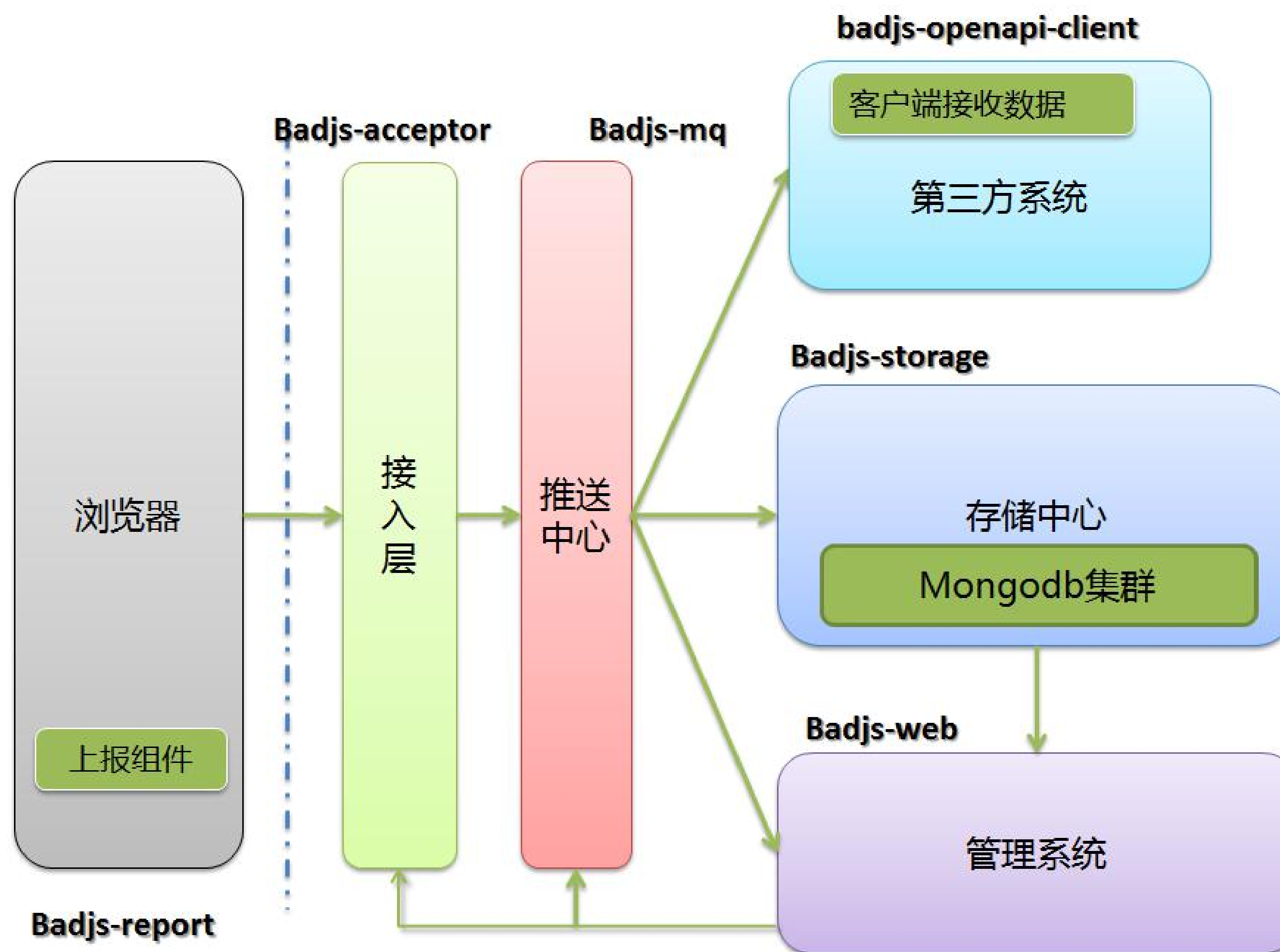
#3858 opened on 17 Nov 2017 by Krinkle



# 资源监控



# 后台设计



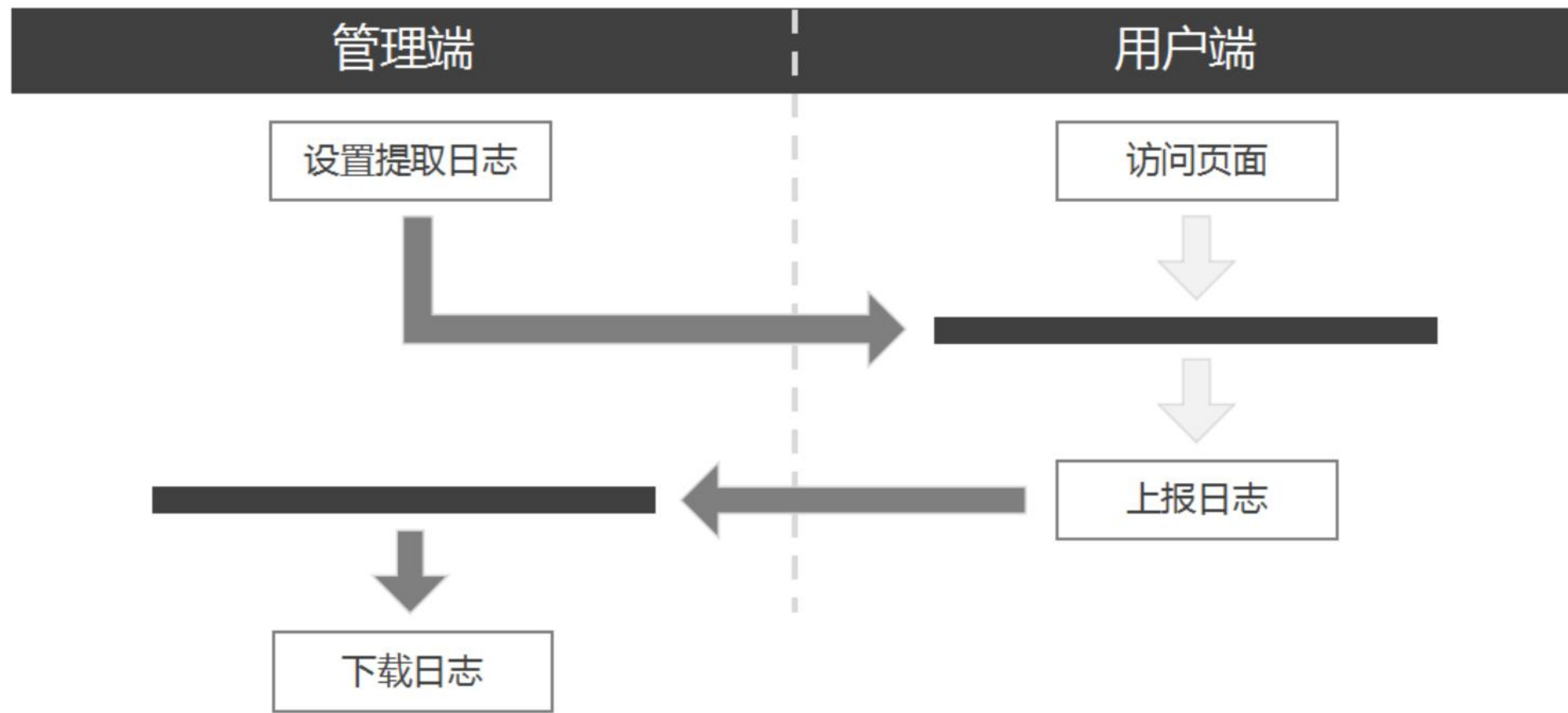


# 用户日志收集

1. 白名单
2. 抽样
3. 日志等级

```
// str is null undefined false  
aegis.info('client_callback:returnStr:' + JSON.stringify(str) + '.');
```

# 离线日志的实现





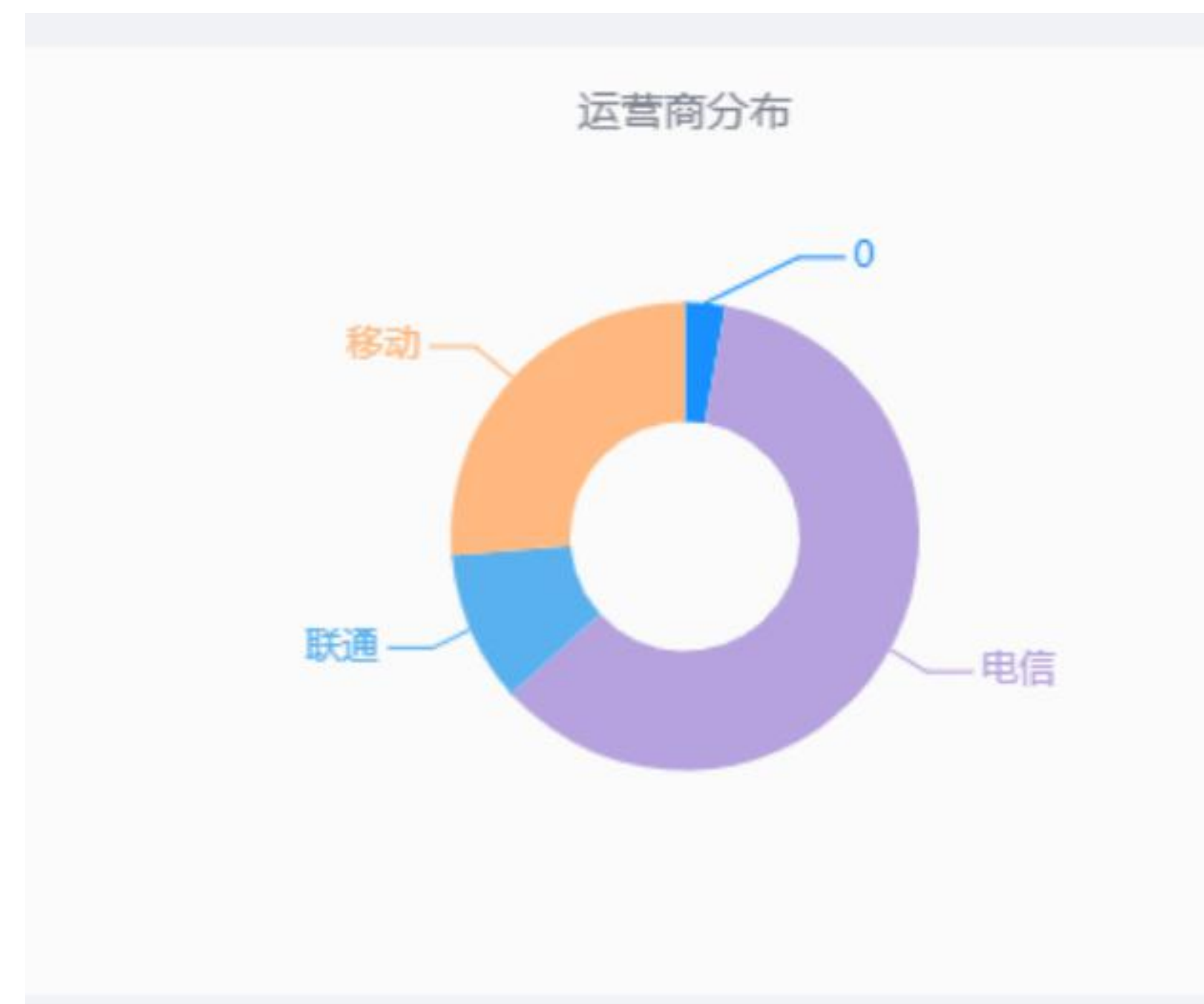
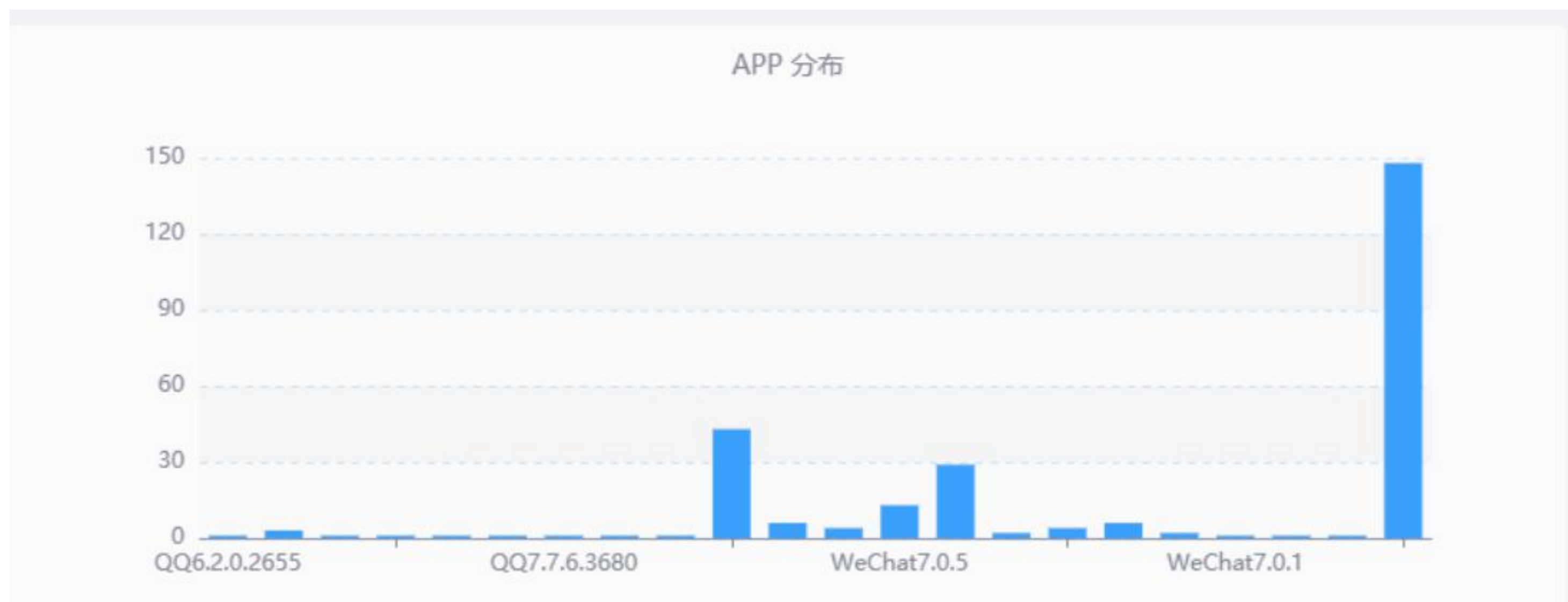
# ■ 上报发送

1. 合并上报
2. 压缩上报内容
3. navigator.sendBeacon

```
export function send (url: string, data?: any) {  
  if (navigator.sendBeacon && typeof navigator.sendBeacon === 'function') {  
    navigator.sendBeacon(url, data);  
  } else {  
    new Image().src = url;  
  }  
}
```

# 管理后台分析

1. *ua* -> 浏览器内核, 系统版本, 平台
2. *ip* -> 地区, 运营商





# 错误分析

sourceMap

-

16

2019-08-14  
16:41:31

1334967783

SyntaxError: Unexpected EOF@ca9a0393@offline:1565695988763

Time:

2019-08-14 16:41:31

IP:

223.104.103.54

uin:

1334967783

userAgent:

Mozilla/5.0 (iPhone; CPU iPhone OS 12\_3\_2 like Mac OS X) AppleWebKit/605.1.15 (KHTML, like Gecko) Plus) NetType/4G QBWebViewType/1 WKType/1


Form:

1行


[https://now.qq.com/h5/story.html?roomid=1348549356&\\_bid=2409&\\_wv=16778245&from=story&id=27065618](https://now.qq.com/h5/story.html?roomid=1348549356&_bid=2409&_wv=16778245&from=story&id=27065618)

SourceMap

App:

 8.1.0.437

Platform:

 12.3.2

ExtraInfo:

浏览器内核为 WebKit:605.1.15

version:

1

**Thank you for your attention!**