

QCon

全球软件开发大会【上海站】

移动应用高可用性保障 探索与实践

高级技术专家 / 邹迪飞



极客时间

重拾极客精神·提升技术认知

每天10分钟,邀请顶级技术专家,为你传道授业解惑。



扫一扫,试读专栏

主办方 **Geekbang** & **InfoQ**
极客邦科技

ArchSummit

全球架构师峰会 2017

12月8-9日 北京·国际会议中心



AiCon

全球人工智能技术大会 2018

助力人工智能落地

2018.1.13 - 1.14 北京国际会议中心



扫描关注大会官网

APSEC 2017



APSEC 2017

24th Asia-Pacific Software Engineering Conference
4-8 December 2017, Nanjing, Jiangsu, China

12月4-8日
中国南京



了解详情

浙江 杭州



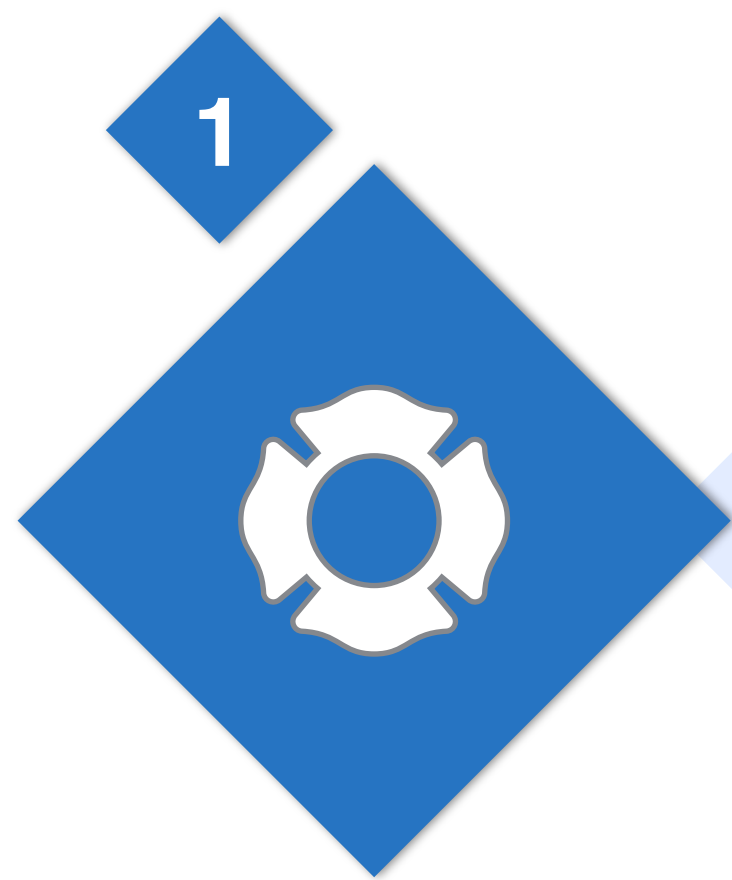
在钉钉上扫一扫加我

邹迪飞

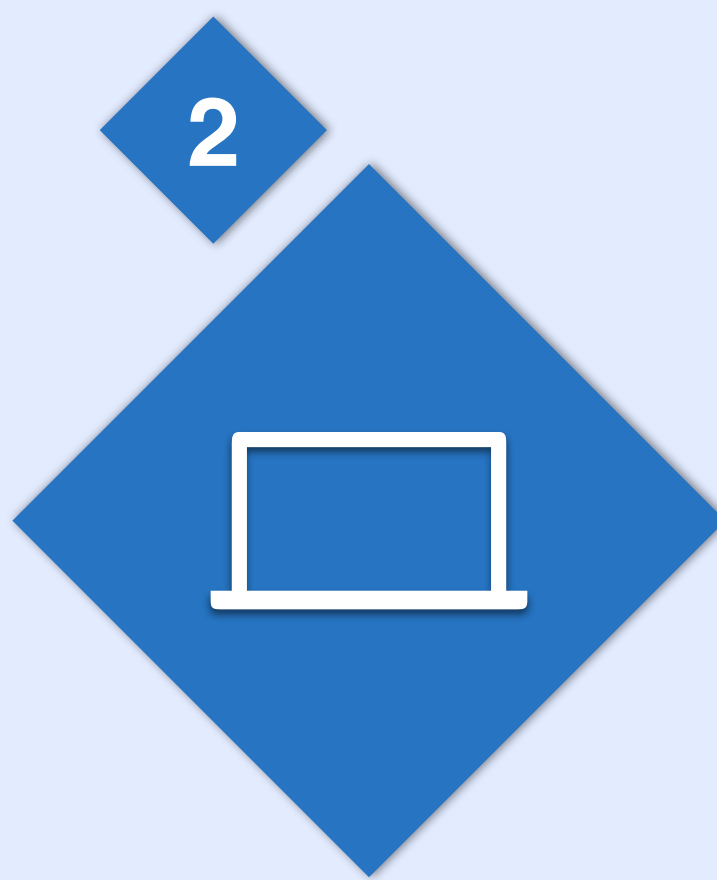
电子科技大学计算机应用硕士毕业，**09**年就职于腾讯科技，参与开发并主导了手机**QQ**，**QQ**游戏大厅等项目，是项目的技术骨干。目前在阿里巴巴淘宝技术部任高级技术专家，主要从事移动端侧基础架构与用户体验方向研究，负责保障移动端应用的高可用性。



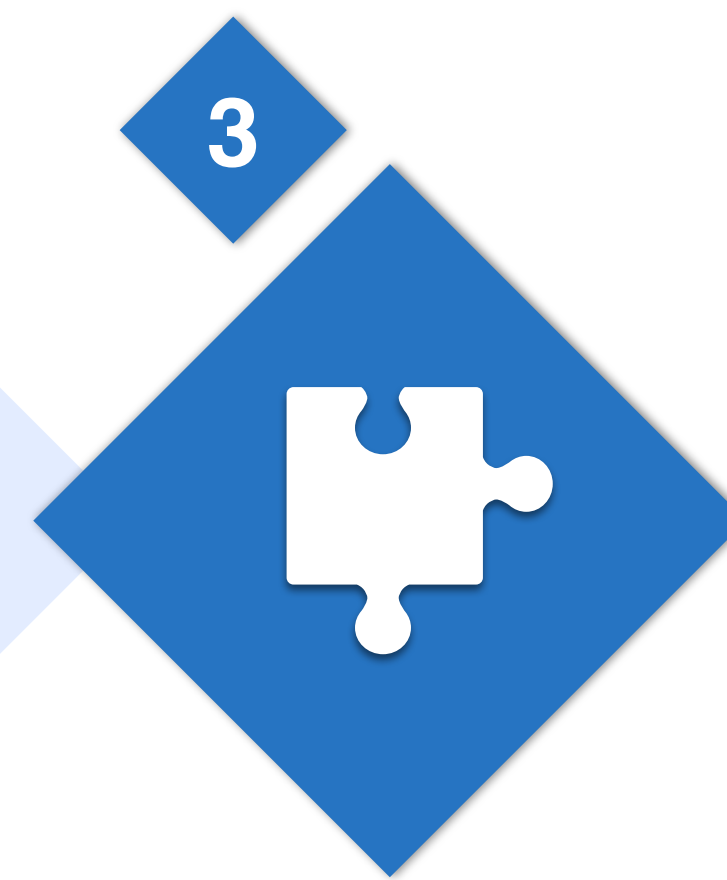
大纲



背景与挑战
BG & Challenge



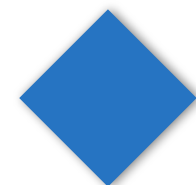
移动端高可用保障设计
High-Availability System for Apps



展望
Future

背景与挑战

BG & Challenge



背景与挑战



淘宝应用系

支撑多个应用

手淘，天猫，闲鱼...



快速发版

4天一迭代

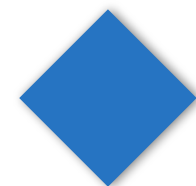
去年版本发布500+



服务多个团队

分布式开发

支撑100+人以上研发人员



背景与挑战



移动端高可用保障设计

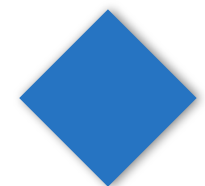
High-Availability System for Apps



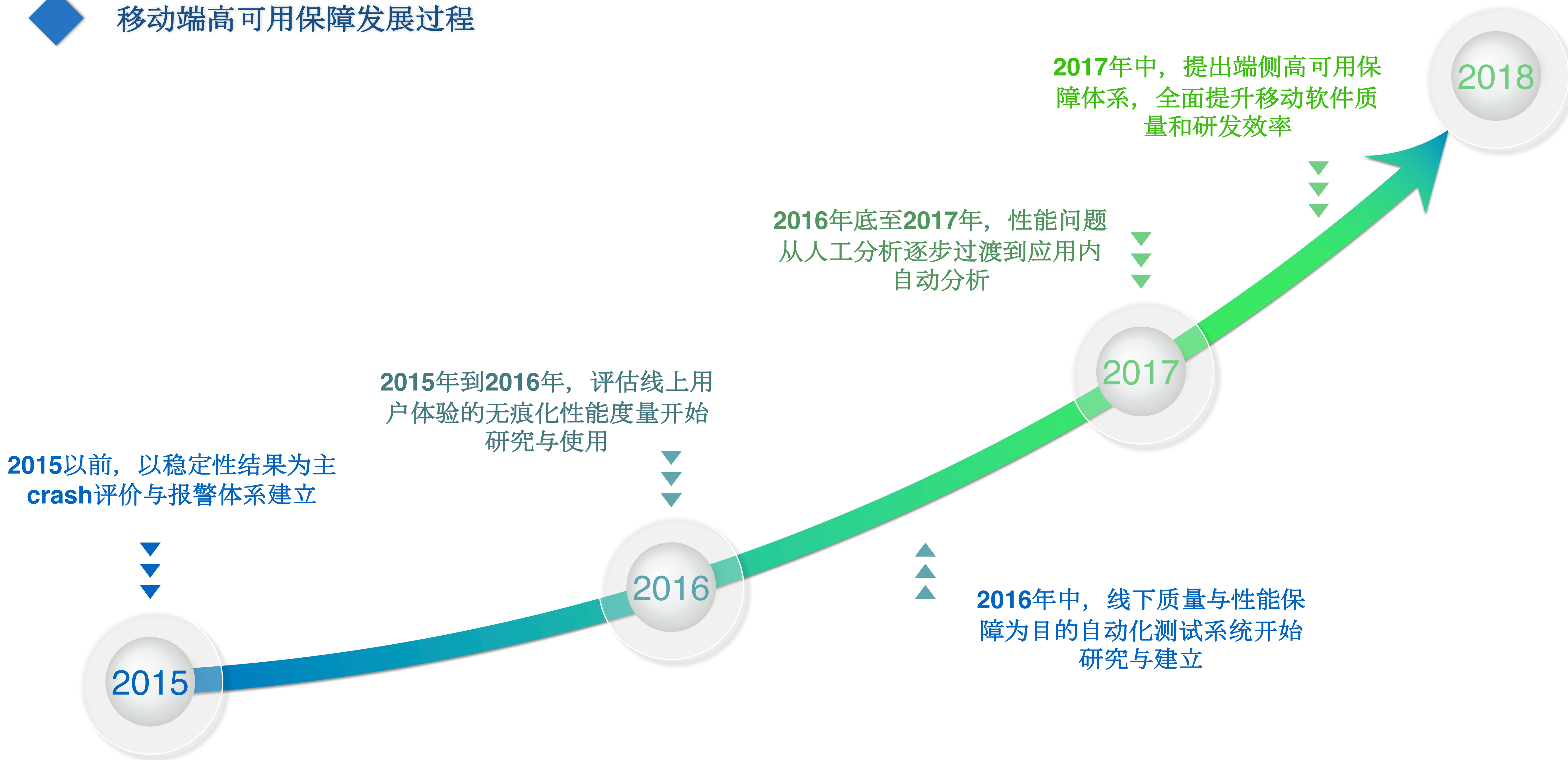
移动端高可用问题领域定义

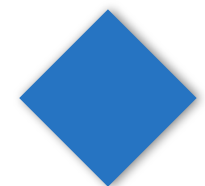
- 手机端**Apps**上的技术问题
- 重点关注导致用户在使用**App**过程发生崩溃，黑屏，卡顿，电量，流量等稳定性及性能等用户体验问题



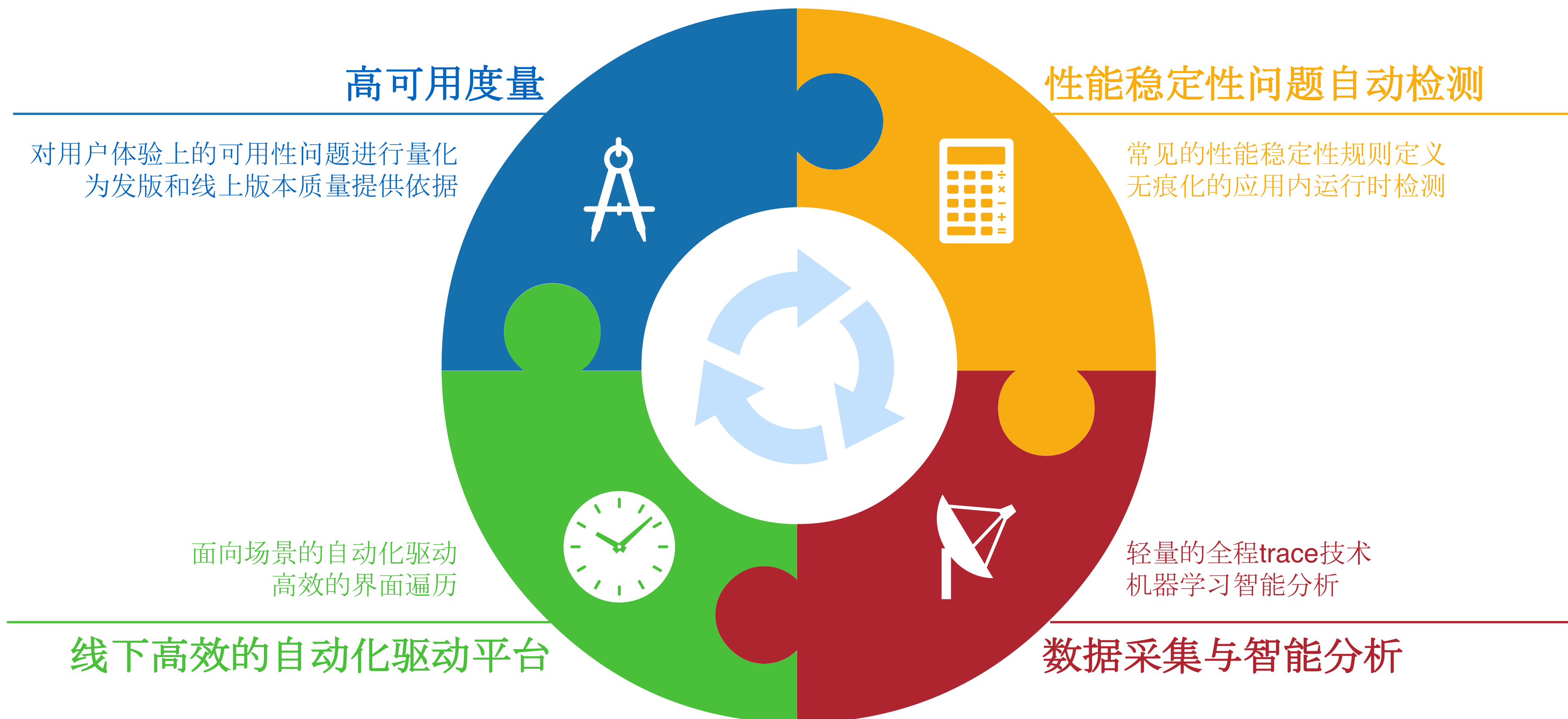


移动端高可用保障发展过程



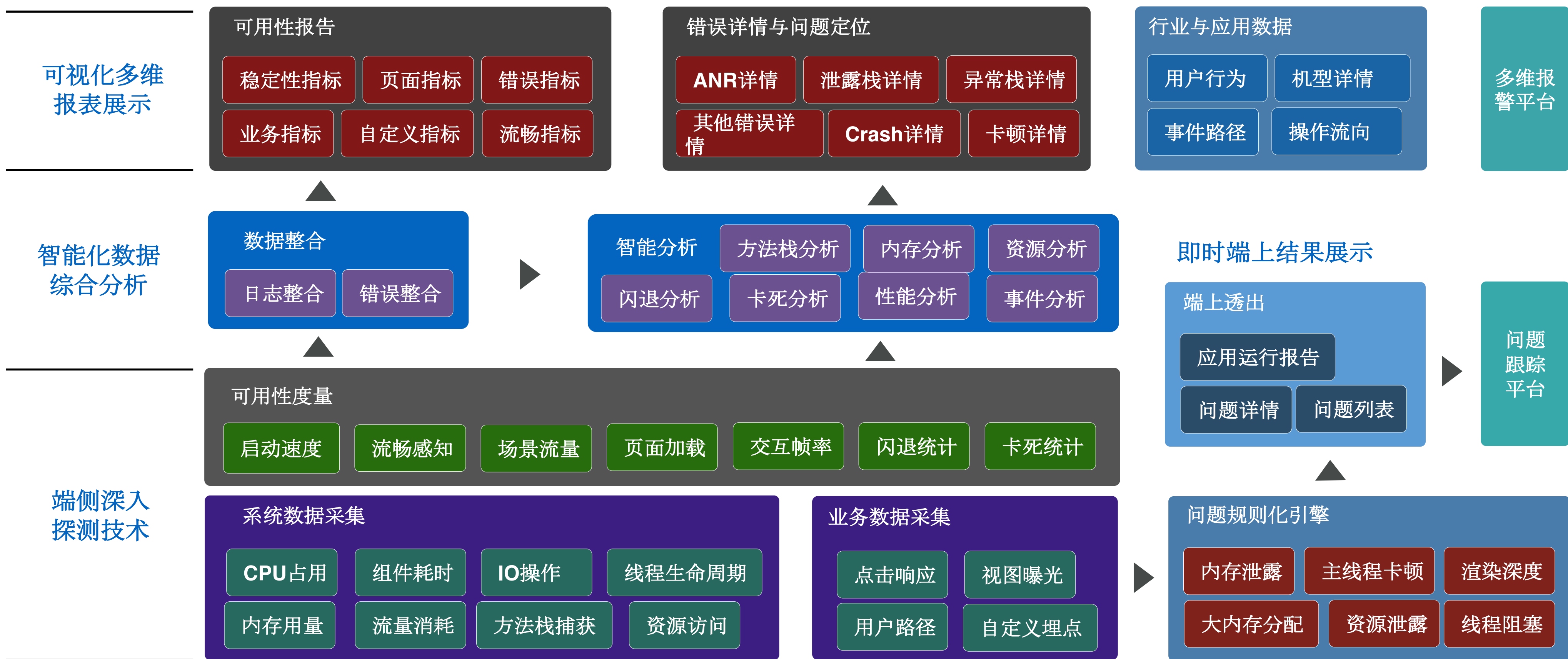


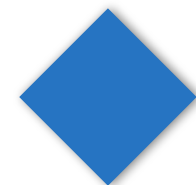
移动端高可用保障介绍





移动端高可用保障总体框架

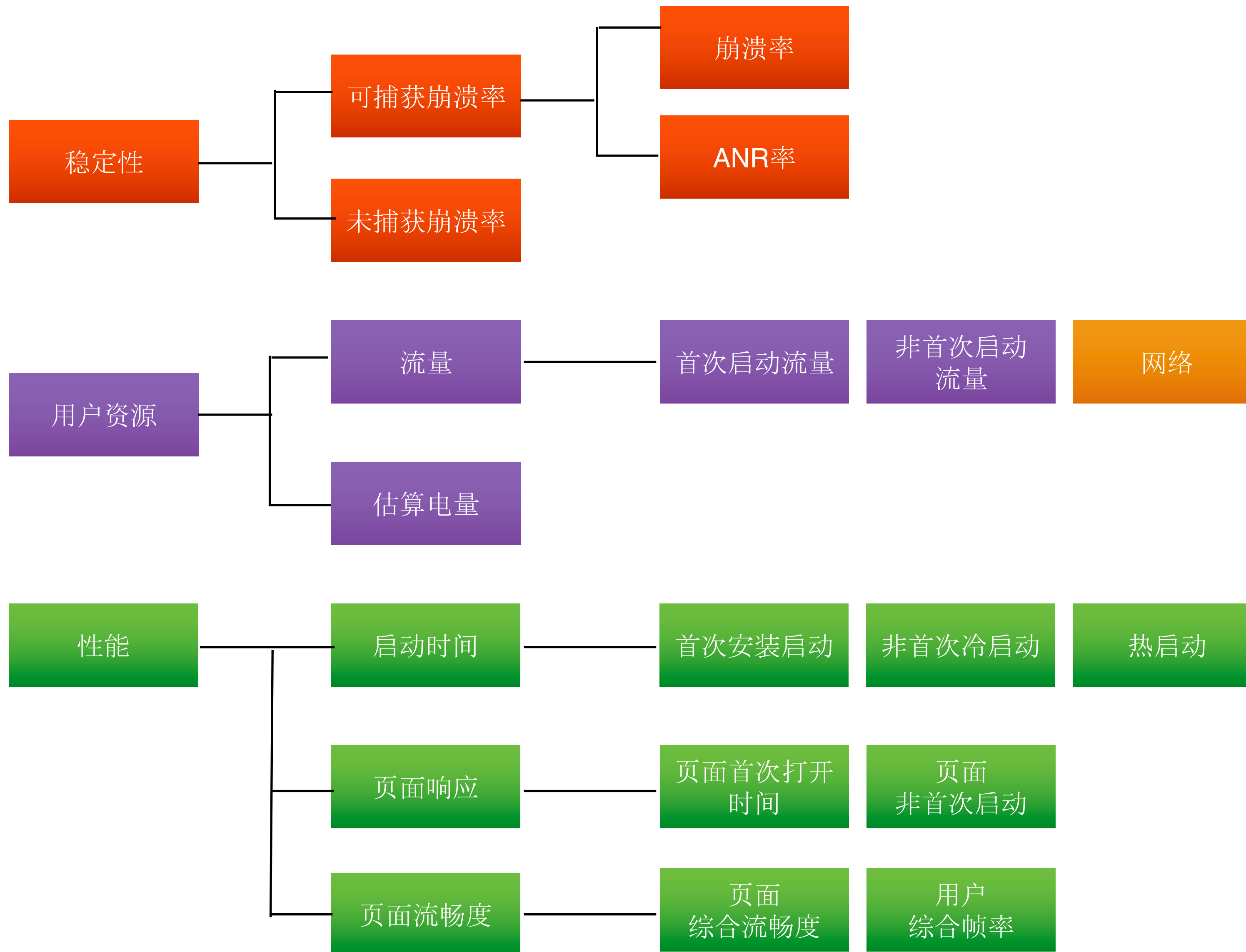


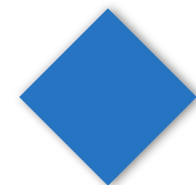


移动端高可用度量

用户视角设计

- 指标真实反映用户的感受
- 对用户在使用过程中有较大的感知

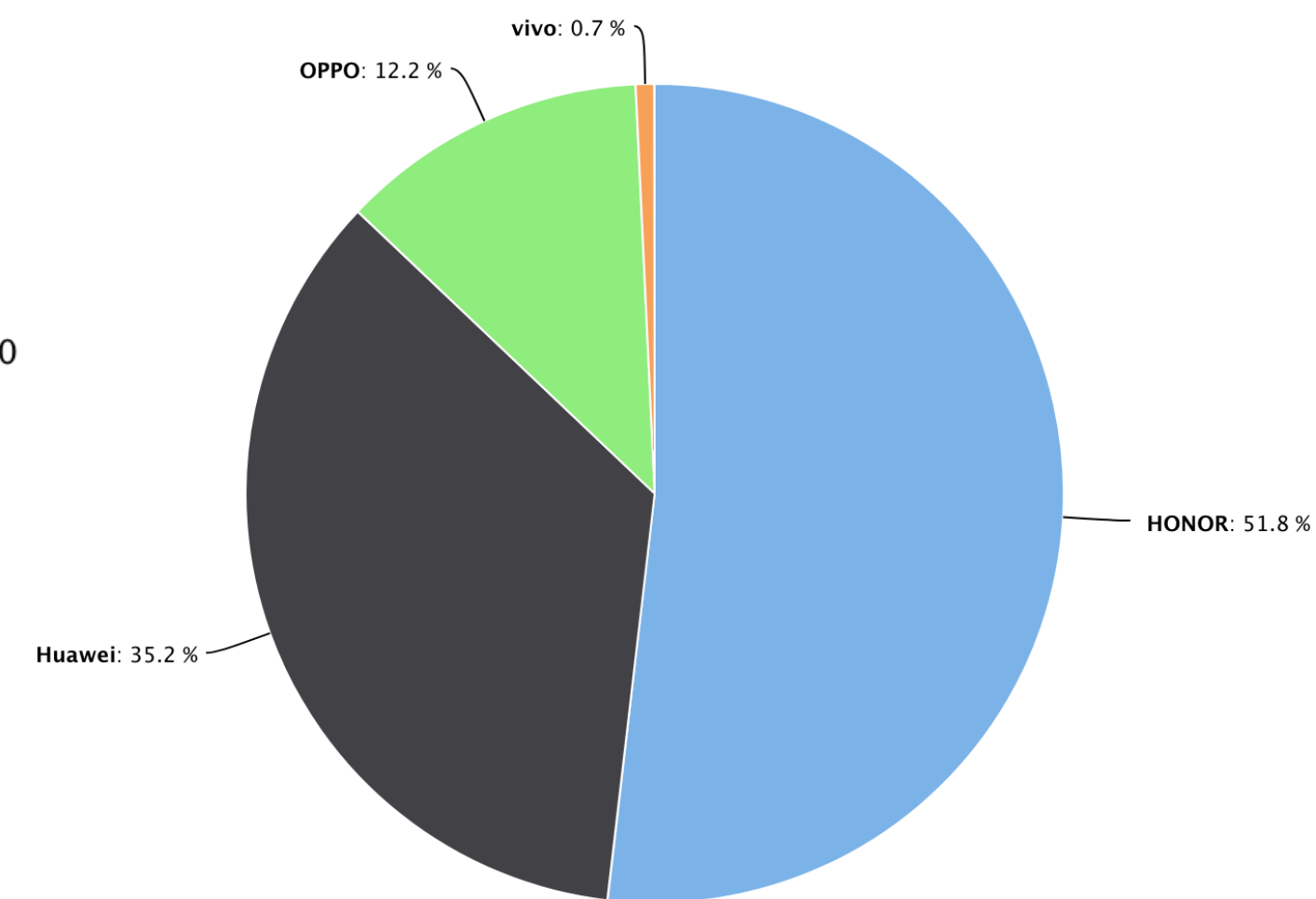
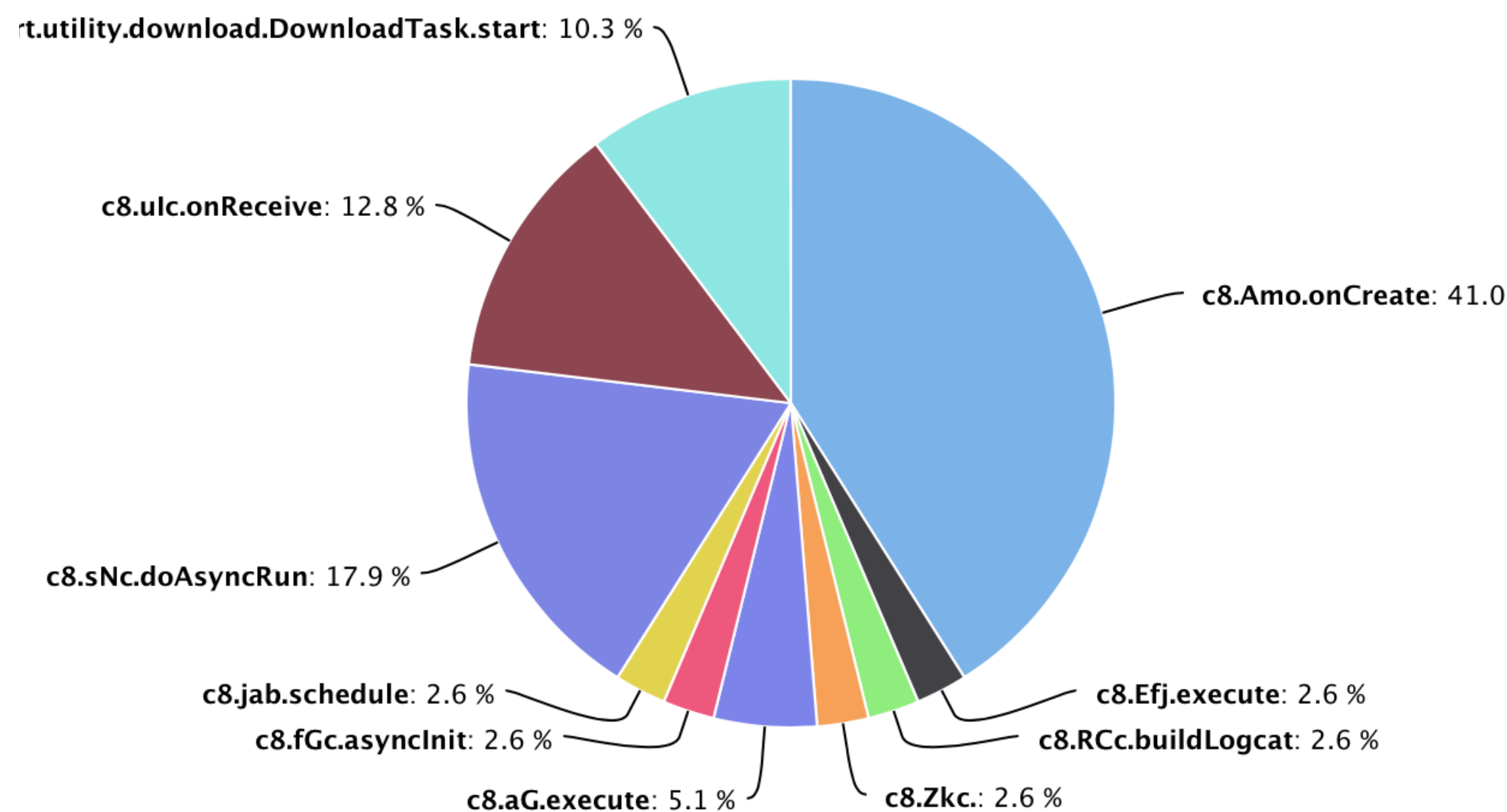
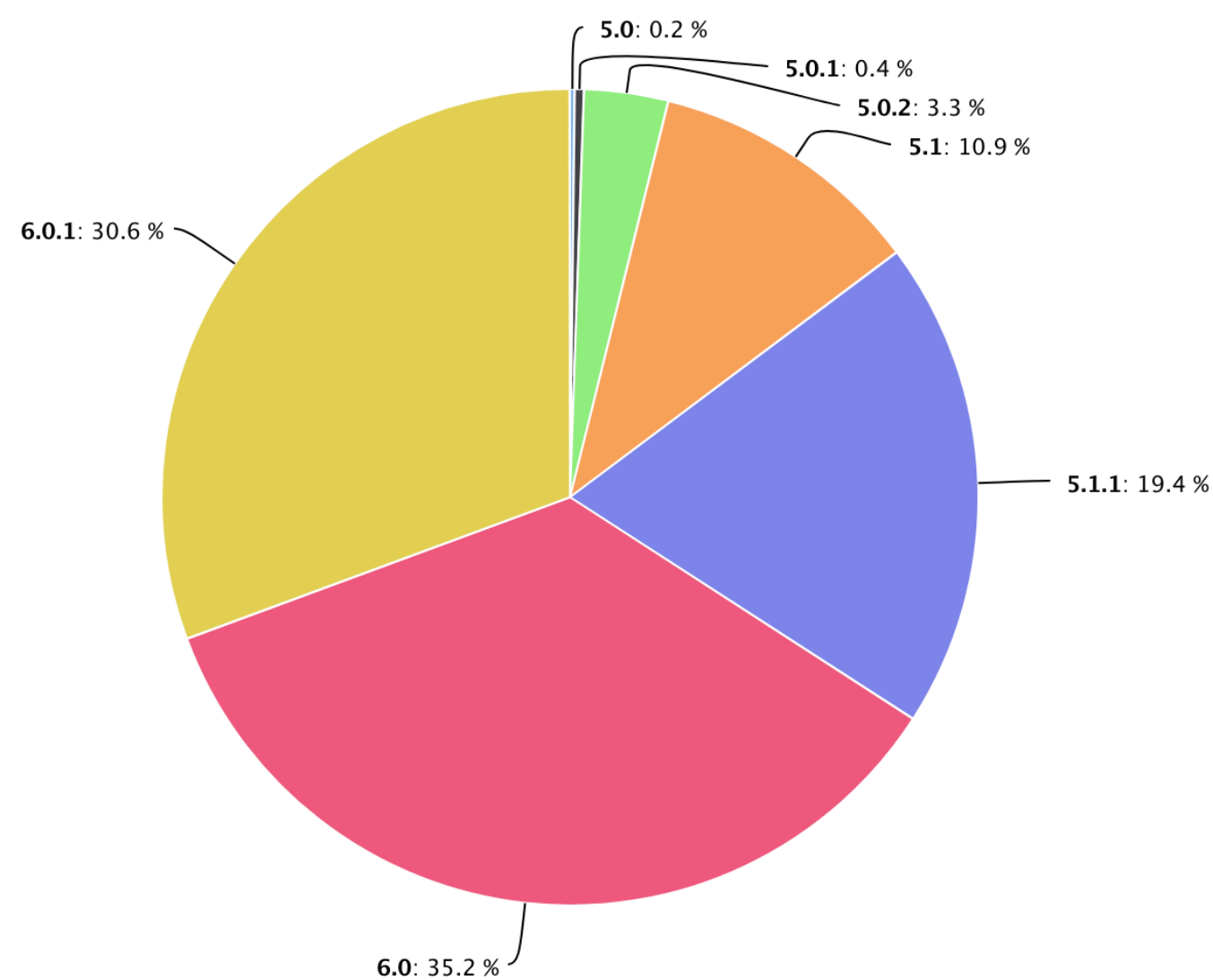
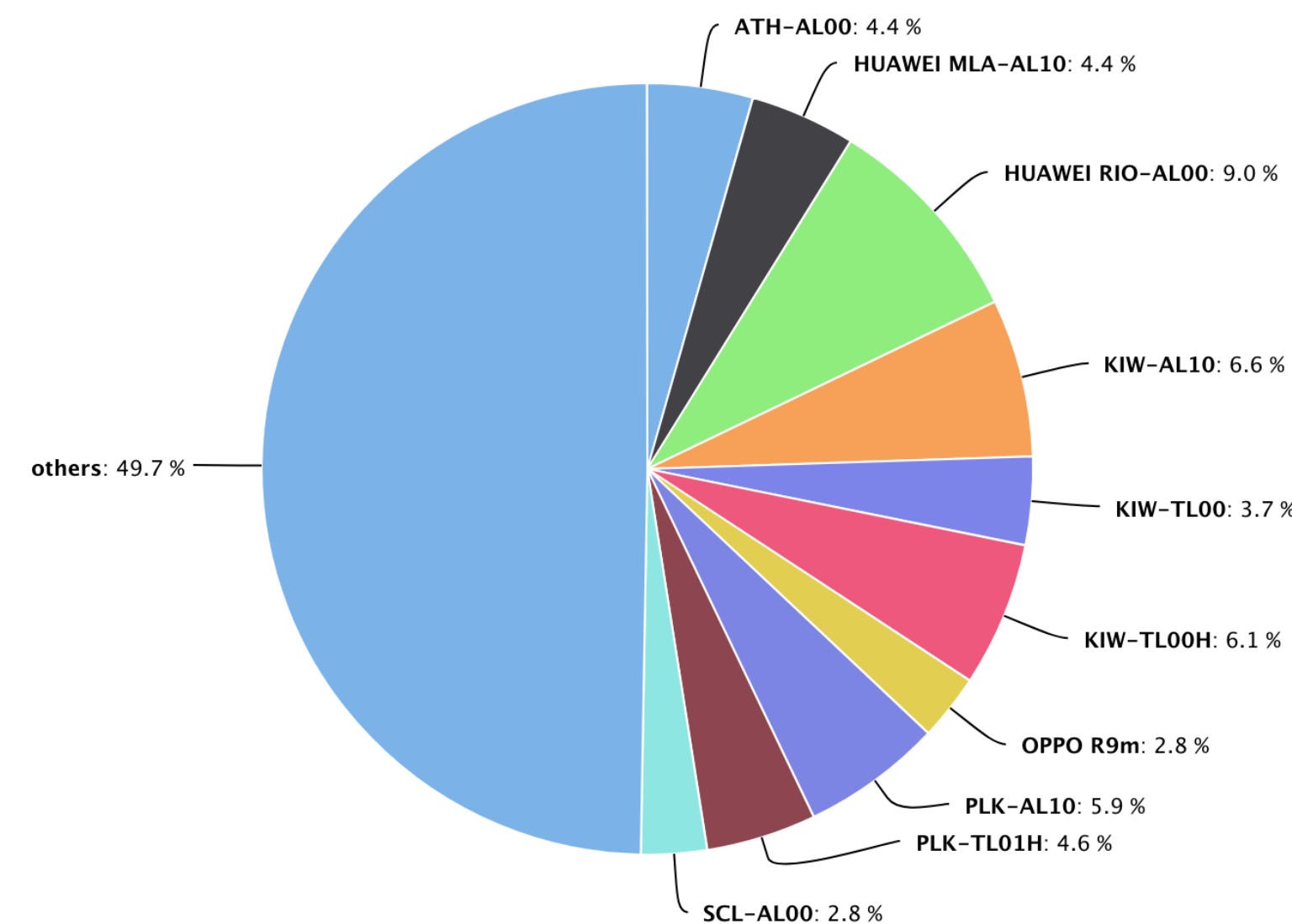
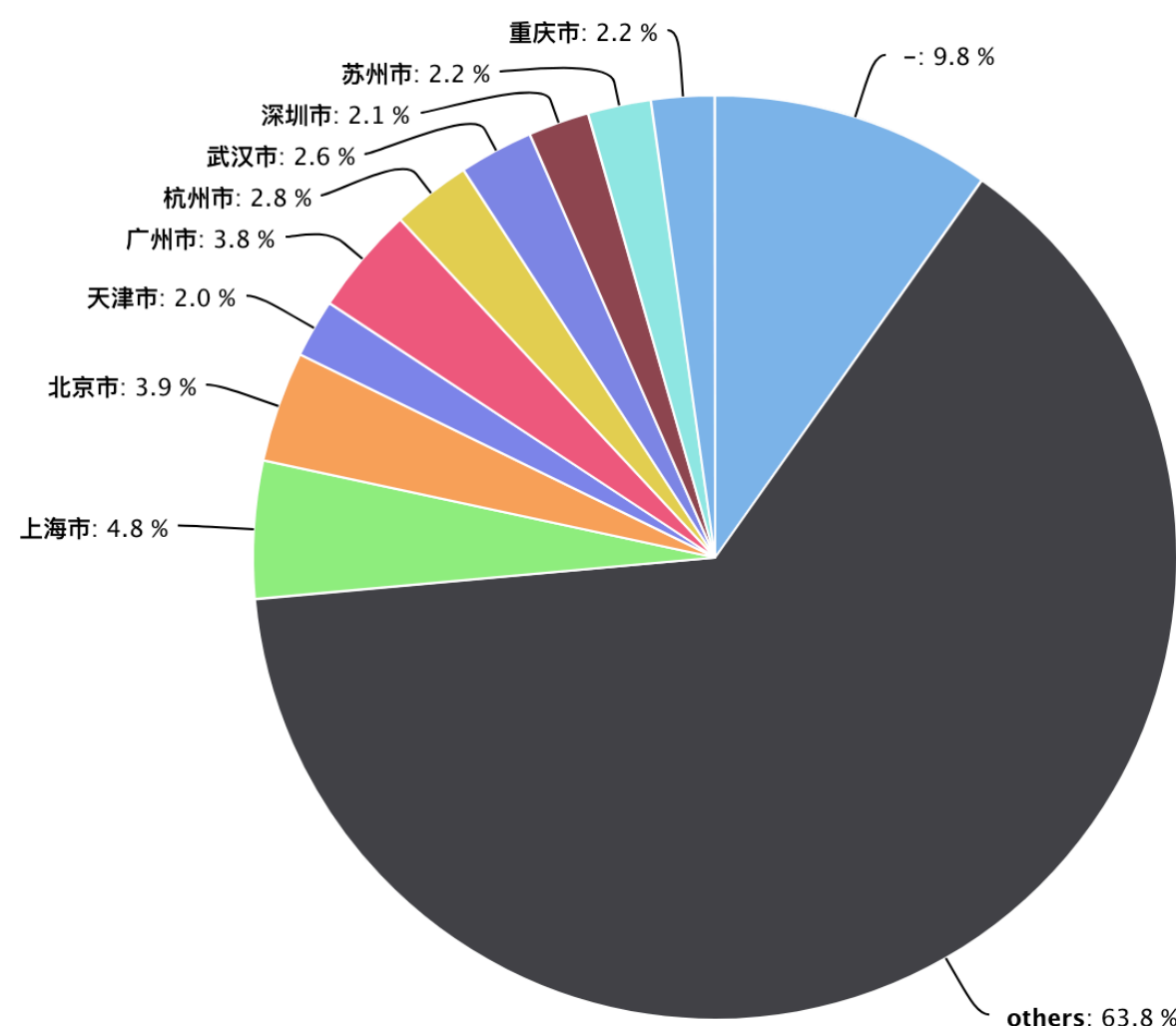


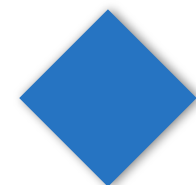


移动端高可用度量 多维视角

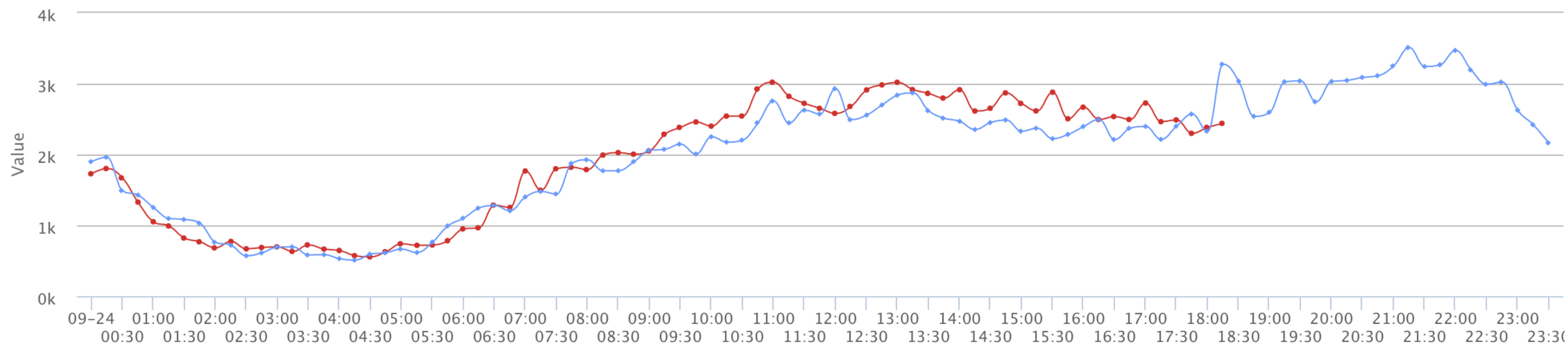
多维聚合技术

- 影响范围，发生页面机型等一目了然

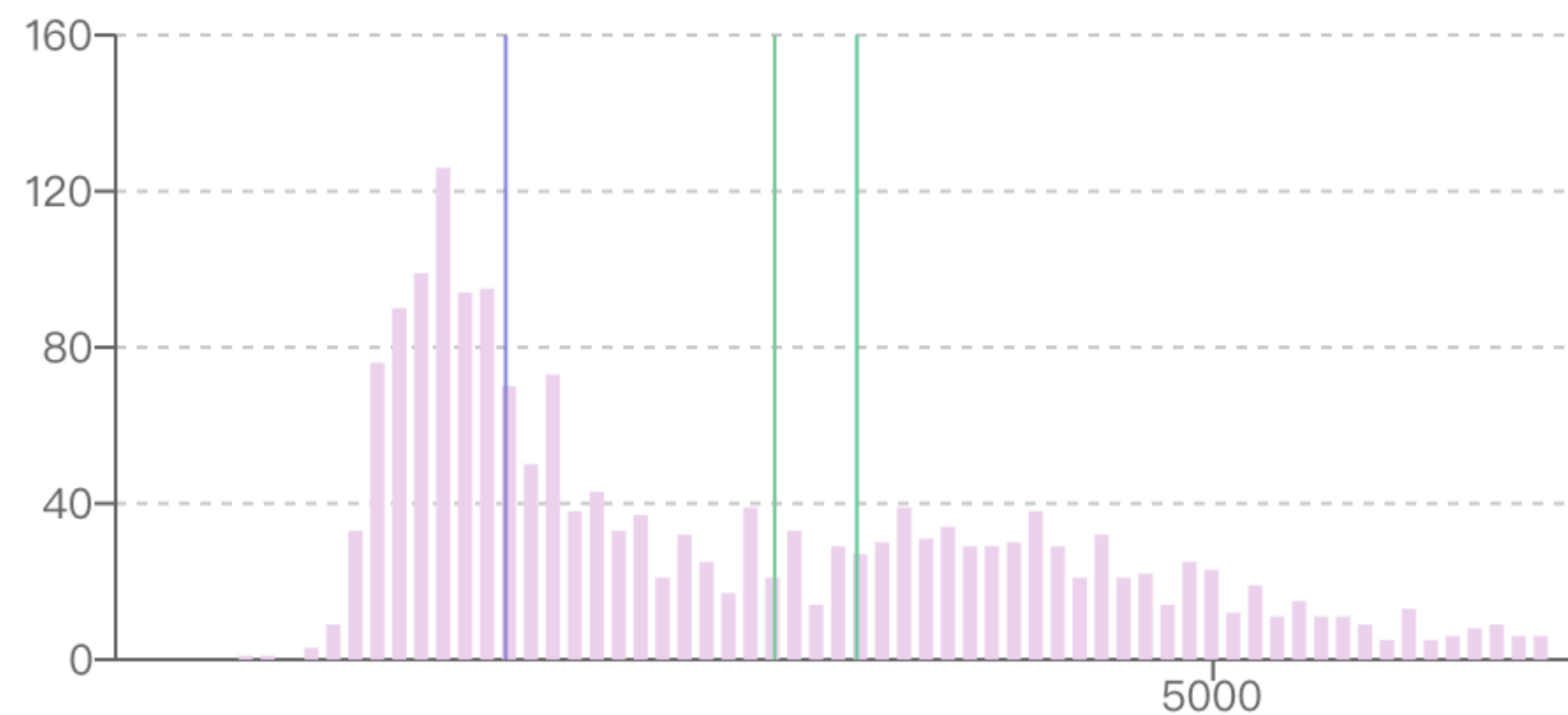




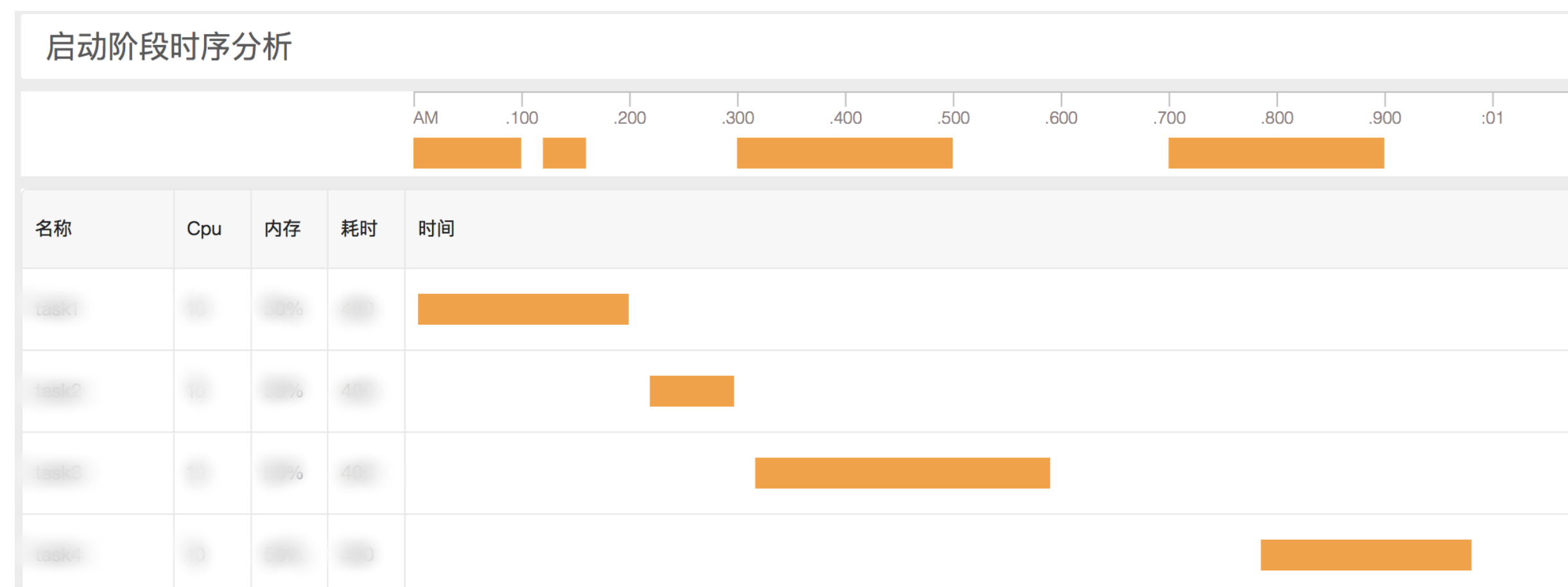
移动端高可用度量 多维视角



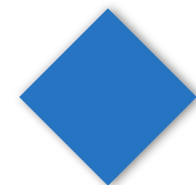
秒级实时Crash曲线



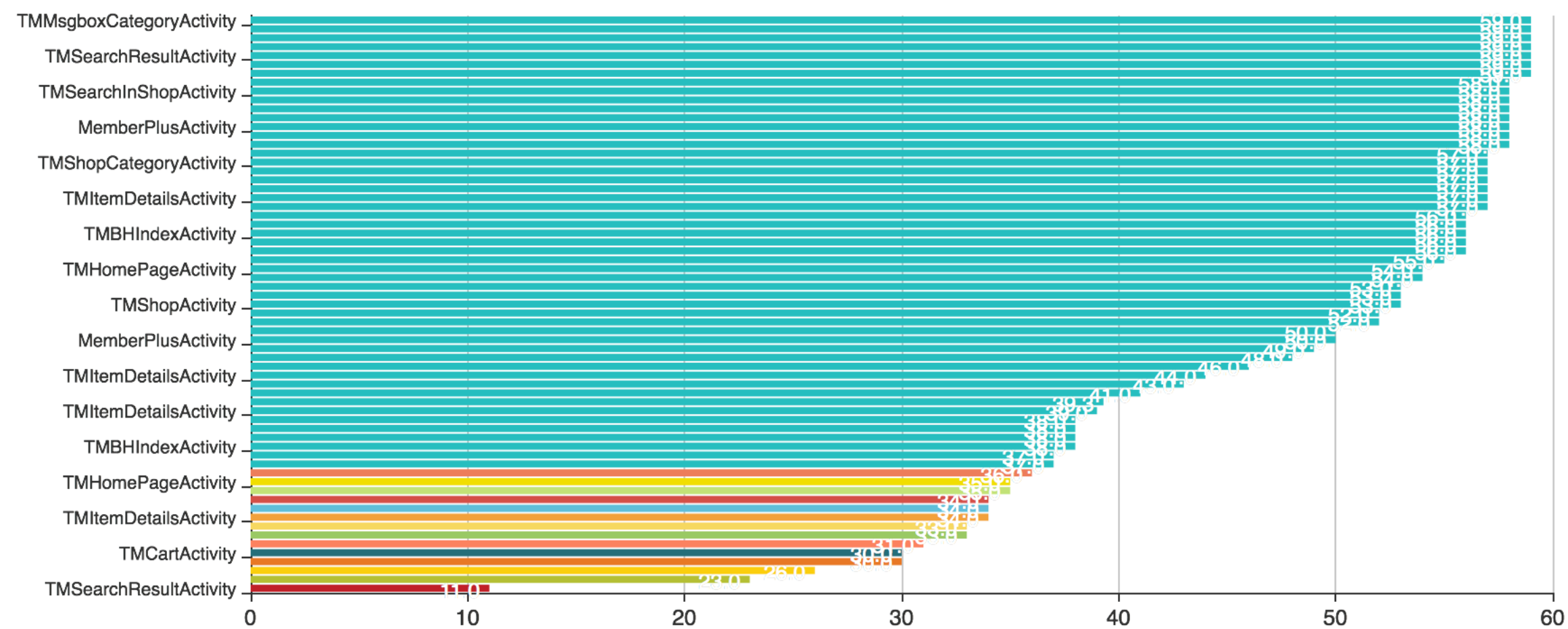
启动分布



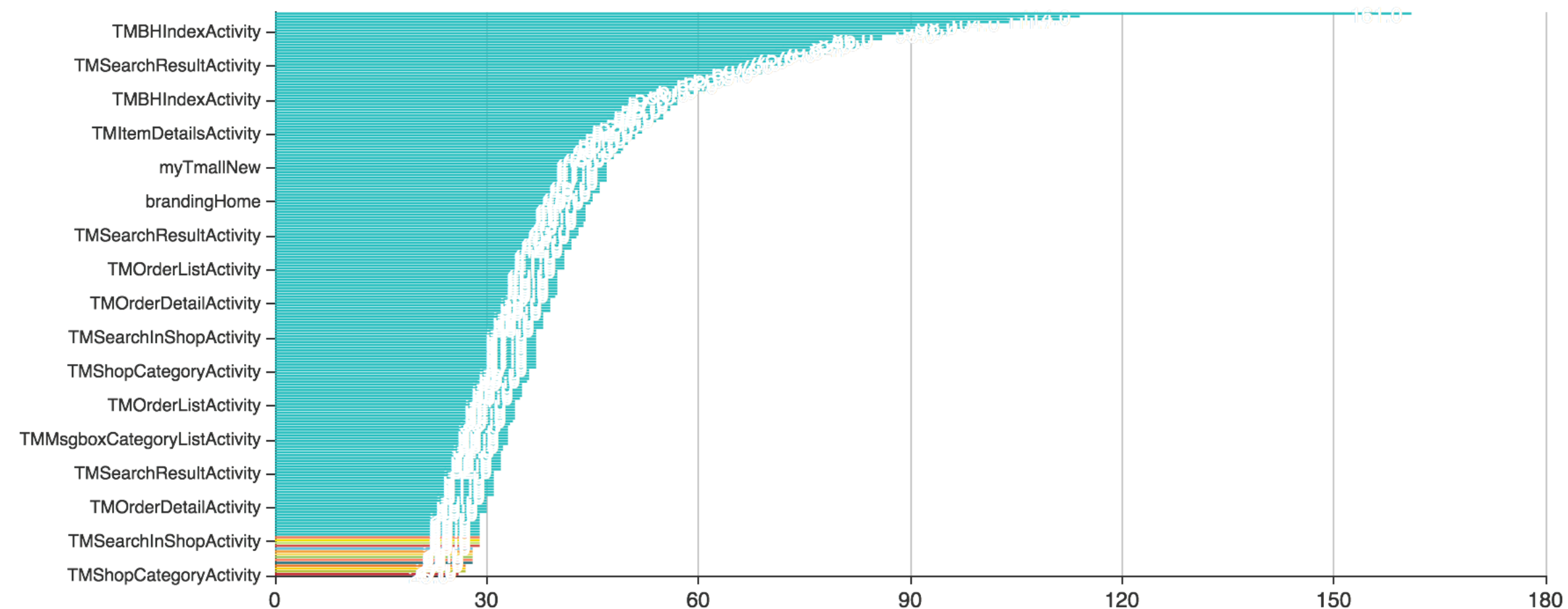
启动时序



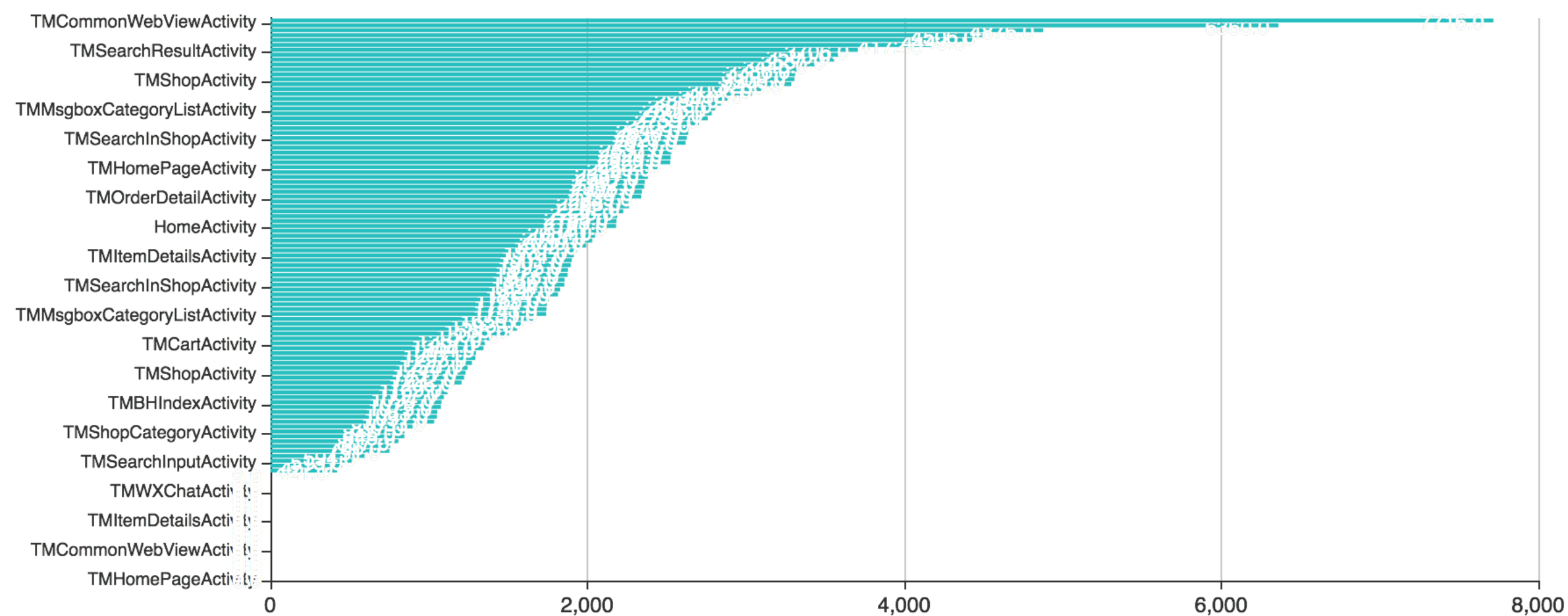
移动端高可用度量 多维视角



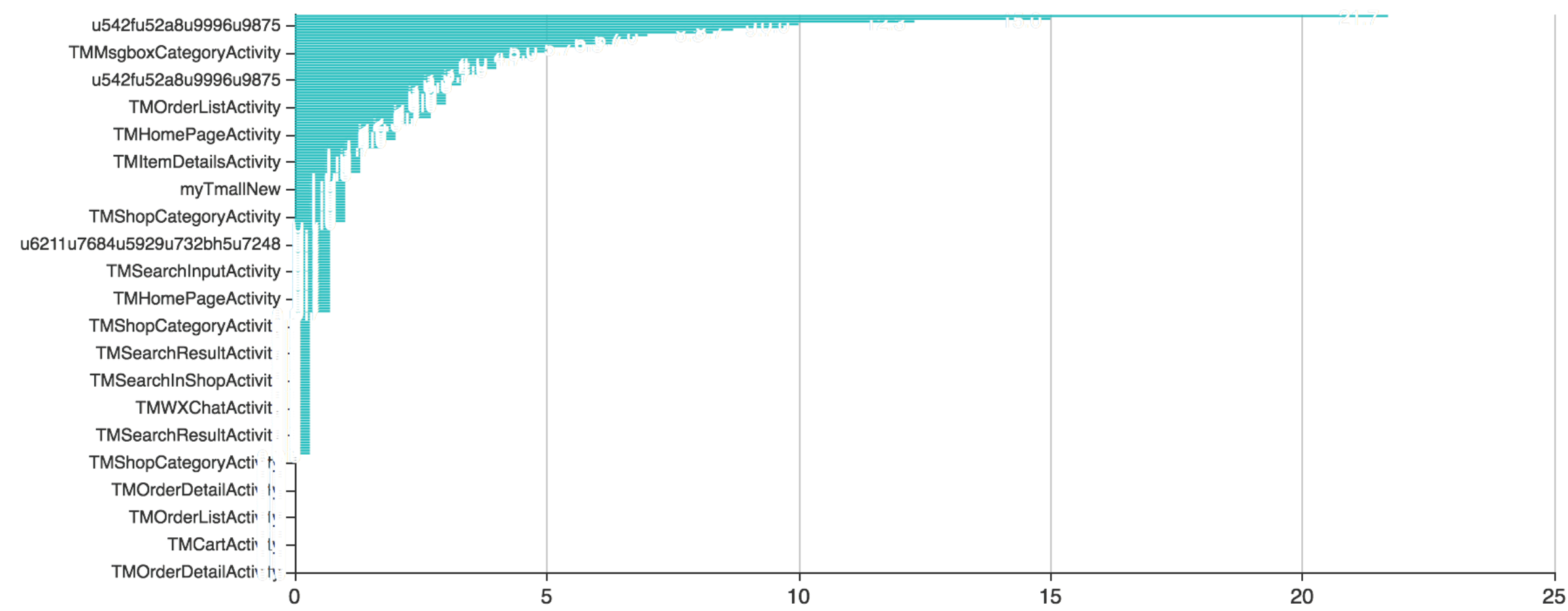
综合帧率



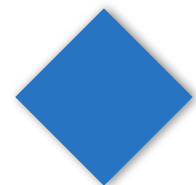
内存用量



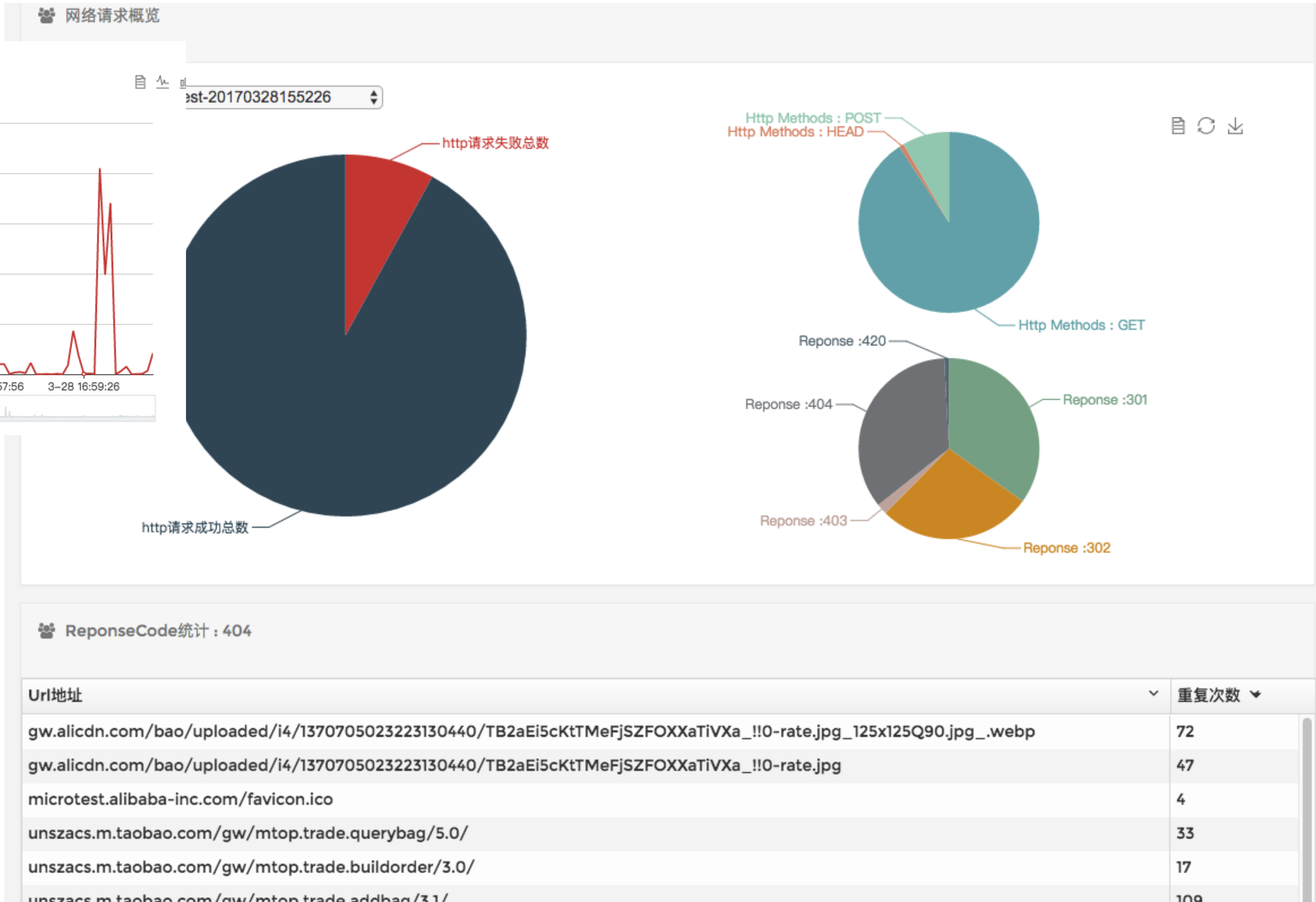
页面响应



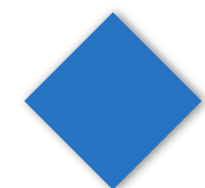
静默CPU



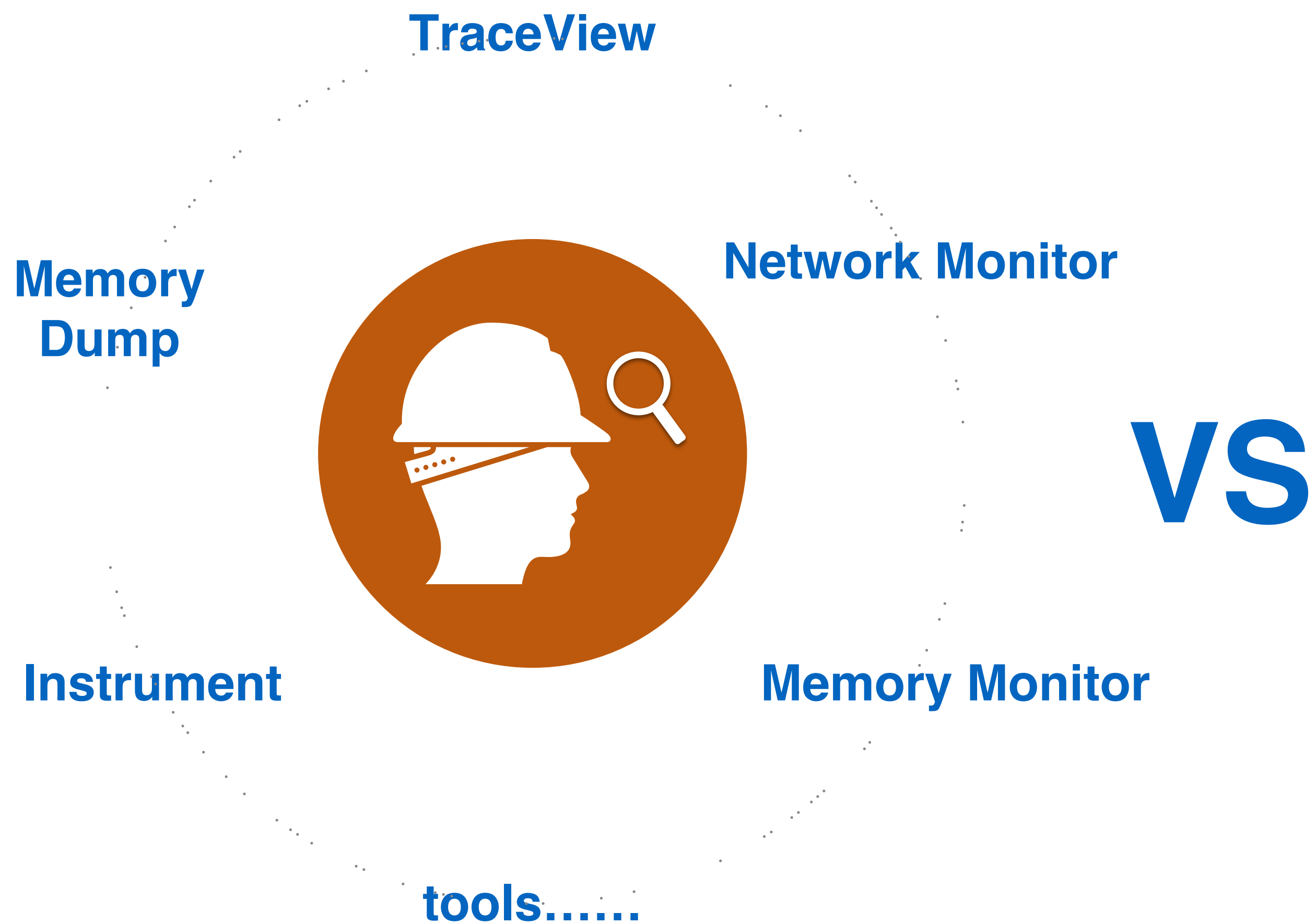
移动端高可用度量 多维视角



网络监控与错误请求

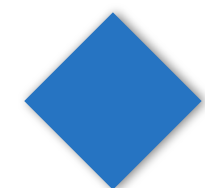


高可用保障体系-性能稳定性问题自动检测

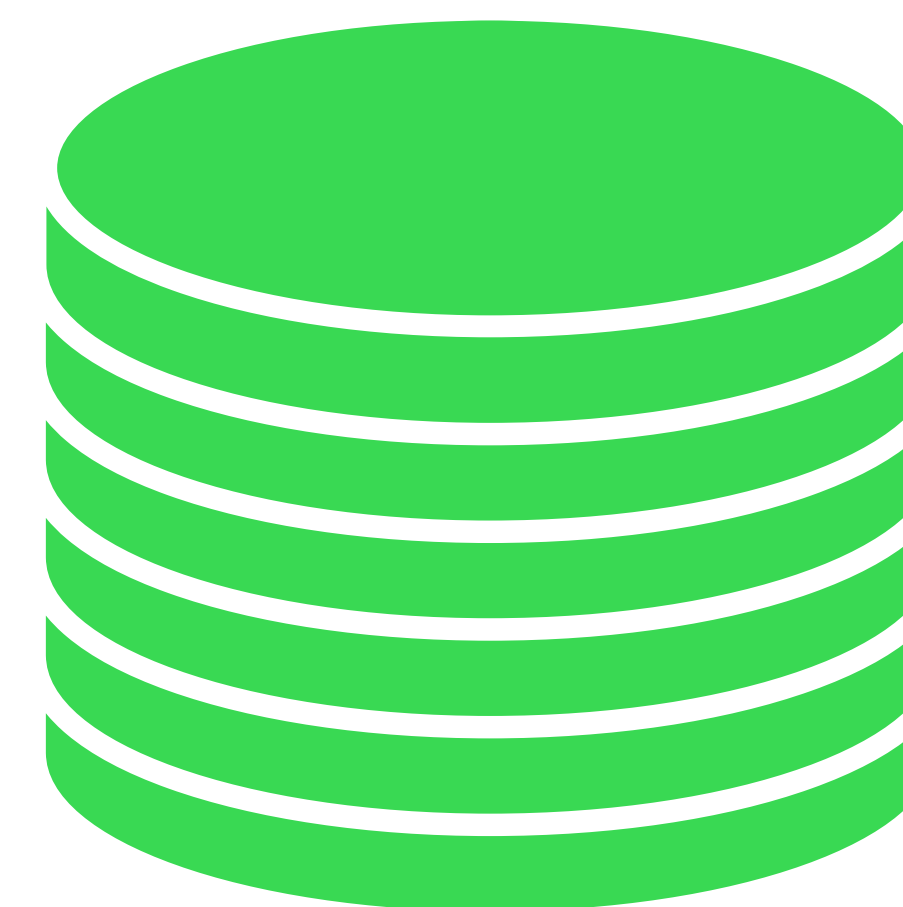
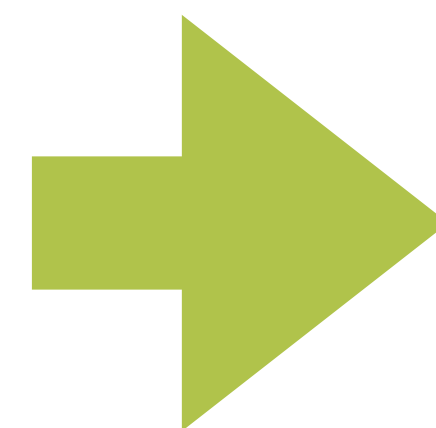


自动化检测与问题定位

也许，查找一个性能问题要用上**3**个工具，**2**天时间

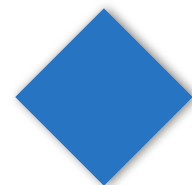


高可用保障体系-性能稳定性问题自动检测



问题堆栈

运行时问题检测引擎



移动端高可用度量-性能稳定性问题自动检测

127.0.0.1:7001/datasheet/view/taskoverview/memory_leak_detail?id=58ad2bcc4120736c4ffdc51d&app_key=tmall_android

内存泄露详情

性能概览

TaskId: 964552a9-f0b2-42e4-9e06-5ea1468ac9bf	时间: Wed Feb 22 2017 14:09:39 GMT+0800 (CST)	平台: Android
系统版本:6.0.1	天猫版本:5.30.0.1	天猫账号:jqwu_csu

泄露类:com.tmall.wireless.livePlay.horizontal.TMVideoHorizontalActivity@a2cf5c

页面浏览堆栈

```
com.tmall.wireless.detail.ui.TMItemDetailsActivity@118b0e
com.tmall.wireless.shop.TMShopActivity@8154bc2
com.tmall.wireless.brand.index.TMBrandFeedIndexActivity@79d575
com.tmall.wireless.fun.tangram.activity.TMLiveHomepageActivity@db369ce
com.tmall.wireless.livePlay.horizontal.TMVideoHorizontalActivity@a2cf5c
```

应用堆栈

- * GC ROOT static com.tmall.wireless.viewtracker.internal.process.biz.expouse.ExposureManager.instance
- * references com.tmall.wireless.viewtracker.internal.process.biz.expouse.ExposureManager.currentViews
- * references java.util.concurrent.ConcurrentHashMap.table
- * references array java.util.concurrent.ConcurrentHashMap\$Node[],[14]
- * references java.util.concurrent.ConcurrentHashMap\$Node.val
- * references com.tmall.wireless.viewtracker.internal.ui.model.ExposureView.view
- * references com.tmall.wireless.ui.widget.TMImageView.mContext
- * leaks com.tmall.wireless.livePlay.horizontal.TMVideoHorizontalActivity instance

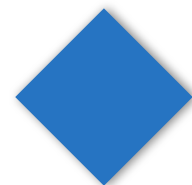
大图片详情

大图片详情

TaskId: 964552a9-f0b2-42e4-9e06-5ea1468ac9bf	时间: Wed Feb 22 2017 14:11:43 GMT+0800 (CST)	平台: Android
机型:samsung	系统版本:6.0.1	客户端版本:5.30.0.1
图片大小:4384260	是否主线程解析:true	当前页面:
		用户账号:jqwu_csu

大图片创建堆栈

```
java.lang.Throwable
  at com.tmall.galileo.internal.plugins.mem.bitmap.BitmapMonitor.dumpStack(BitmapMonitor.java:51)
  at android.graphics.BitmapFactory.nativeDecodeAsset(Native Method)
  at android.graphics.BitmapFactory.decodeStream(BitmapFactory.java:856)
  at android.graphics.BitmapFactory.decodeResourceStream(BitmapFactory.java:675)
  at android.graphics.drawable.Drawable.createFromResourceStream(Drawable.java:2228)
  at android.content.res.Resources.loadDrawableForCookie(Resources.java:4211)
  at android.content.res.Resources.loadDrawable(Resources.java:4085)
  at android.content.res.Resources.loadDrawable(Resources.java:3935)
  at android.content.res.TypedArray.getDrawable(TypedArray.java:886)
  at android.view.View.<init>(View.java:4230)
  at android.widget.TextView.<init>(TextView.java:955)
  at android.widget.TextView.<init>(TextView.java:949)
  at android.widget.TextView.<init>(TextView.java:945)
  at java.lang.reflect.Constructor.newInstance(Native Method)
  at android.view.LayoutInflater.createView(LayoutInflater.java:631)
  at com.android.internal.policy.PhoneLayoutInflater.onCreateView(PhoneLayoutInflater.java:58)
  at android.view.LayoutInflater.onCreateView(LayoutInflater.java:706)
  at android.view.LayoutInflater.createViewFromTag(LayoutInflater.java:774)
```



移动端高可用度量-性能稳定性问题自动检测

资源泄漏详情

👤 页面执行概述

上传mapping文件

重新反混淆

Task Id: 1506046133847

时间: 2017-9-22 10:10:20

触发人:

触发方式: 4.2.2

设备型号: HUAWEI

系统版本: 4.2.2

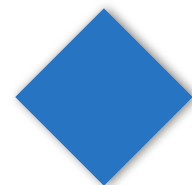
客户端版本: 6.4.4

客户端账号:

泄漏次数: 2

☰ 堆栈详情

```
java.lang.Throwable: Explicit termination method 'release' not called
  at dalvik.system.CloseGuard.open(CloseGuard.java:184)
  at android.view.Surface.<init>(Surface.java:291)
  at android.view.SurfaceView.<init>(SurfaceView.java:102)
  at android.opengl.GLSurfaceView.<init>(GLSurfaceView.java:236)
  at c8.sjg.<init>(HardWareInfo.java:1271)
  at c8.ujg.getGpuInfo(HardWareInfo.java:188)
  at c8.pjg.onActivityCreated(ActivityLifecycleCallback.java:104)
  at android.app.Application.dispatchActivityCreated(Application.java:155)
  at android.app.Activity.onCreate(Activity.java:908)
  at com.tmall.wireless.splash.TMSplashActivity.onCreate(TMSplashActivity.java:52)
  at android.app.Activity.performCreate(Activity.java:5168)
  at android.app.Instrumentation.callActivityOnCreate(Instrumentation.java:1150)
  at android.taobao.atlas.runtime.InstrumentationHook.callActivityOnCreate(InstrumentationHook.java:649)
  at android.app.ActivityThread.performLaunchActivity(ActivityThread.java:2322)
  at android.app.ActivityThread.handleLaunchActivity(ActivityThread.java:2410)
  at android.app.ActivityThread.access$600(ActivityThread.java:168)
  at android.app.ActivityThread$H.handleMessage(ActivityThread.java:1376)
  at c8.Vn.handleMessage(ActivityThreadHook.java:269)
```

移动端高可用度量-性能稳定性问题自动检测

线程生命周期检测

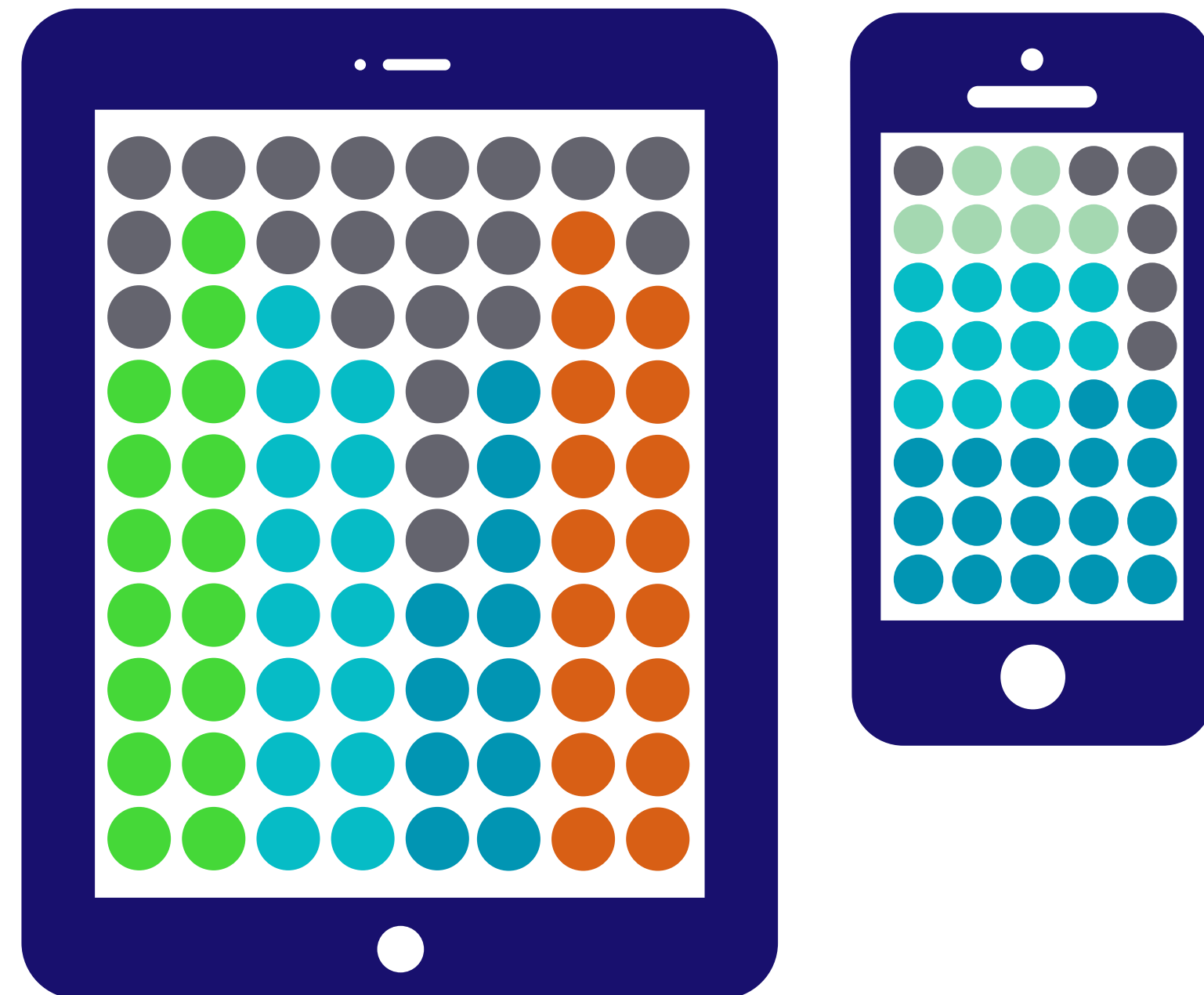
TaskId: a36cb1affe95ca7a89865d5f656905f3	时间: 2017-9-22 11:8:56	平台: Android	触发人: Android
机型:samsung	系统版本:6.0.1	客户端版本:6.4.4	用户账号:
TID::12255 STIME: 78	创建时间: 2017-9-22 11:8:56	存活时间:132713	UTIME: 156

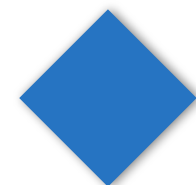
线程名称	线程创建堆栈	g状态
main	java.lang.Throwable	Bug
RenderThread	at com.tmall.galileo.internal.plugins.thread.ThreadCreateHook\$HookedList.add(ThreadCreateHook.java:62) at com.tmall.galileo.internal.plugins.thread.ThreadCreateHook\$HookedList.add(ThreadCreateHook.java:55)	Bug
AWCN Worker(H)1	at java.lang.ThreadGroup.addThread(ThreadGroup.java:708) at java.lang.Thread.create(Thread.java:437) at java.lang.Thread.<init>(Thread.java:237)	Bug
AWCN Worker(H)2	at c8.qA.newThread(ThreadPoolExecutorFactory.java:26) at java.util.concurrent.ThreadPoolExecutor\$Worker.<init>(ThreadPoolExecutor.java:583)	Bug
AWCN Worker(H)3	at java.util.concurrent.ThreadPoolExecutor.addWorker(ThreadPoolExecutor.java:896) at java.util.concurrent.ThreadPoolExecutor.execute(ThreadPoolExecutor.java:1328)	Bug
system_compoment:sa	at java.util.concurrent.AbstractExecutorService.submit(AbstractExecutorService.java:82) at c8.nA.run(DispatcherTask.java:41)	Bug
WeexJSBridgeThread	at java.util.concurrent.Executors\$RunnableAdapter.call(Executors.java:423) at java.util.concurrent.FutureTask.run(FutureTask.java:237)	Bug
pool-11-thread-1	at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1113) at java.util.concurrent.ThreadPoolExecutor\$Worker.run(ThreadPoolExecutor.java:588)	Bug
system_compoment:an	at c8.gUh.run(IdleThreadDetectPlugin.java:248) at java.lang.Thread.run(Thread.java:818)	Bug
RepeaterThread:1		Bug
RepeaterThread:0		Bug
MTOPSDK CallbackPool1 Thread:0	a36... 2017-9-22 1... 132317 12 27 Live	提交Bug



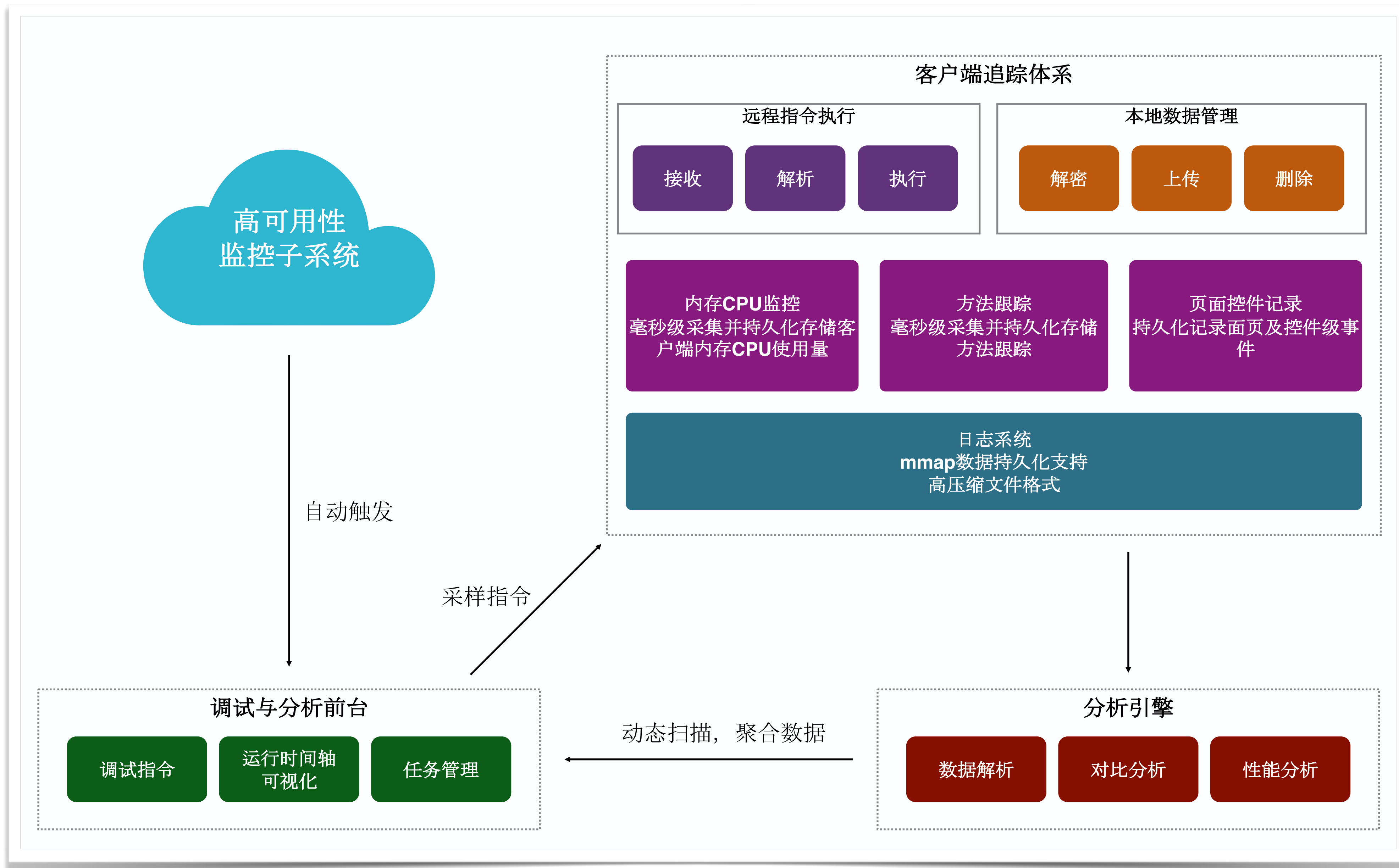
基于大数据智能化分析

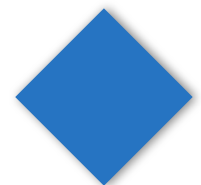
- 疑难问题定位
- 性能优化中模糊问题



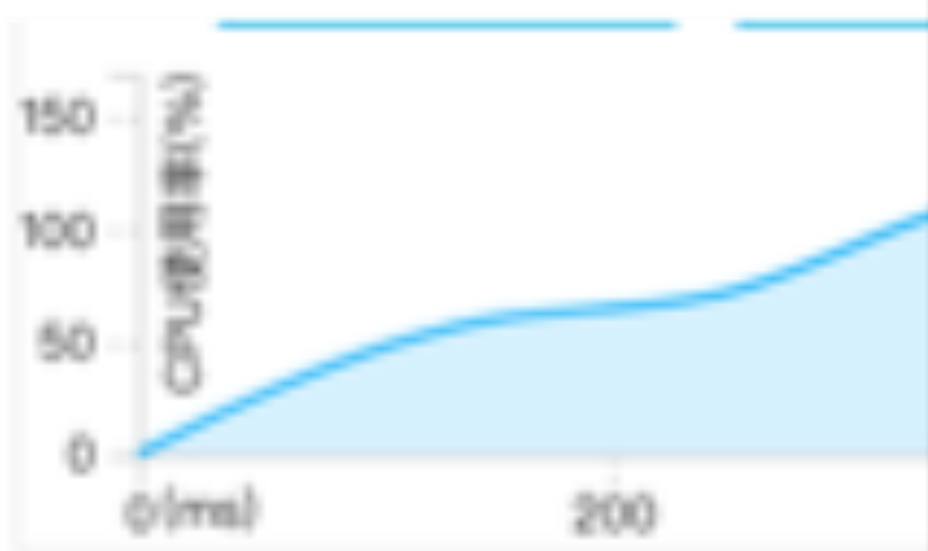


高可用保障体系-数据采集

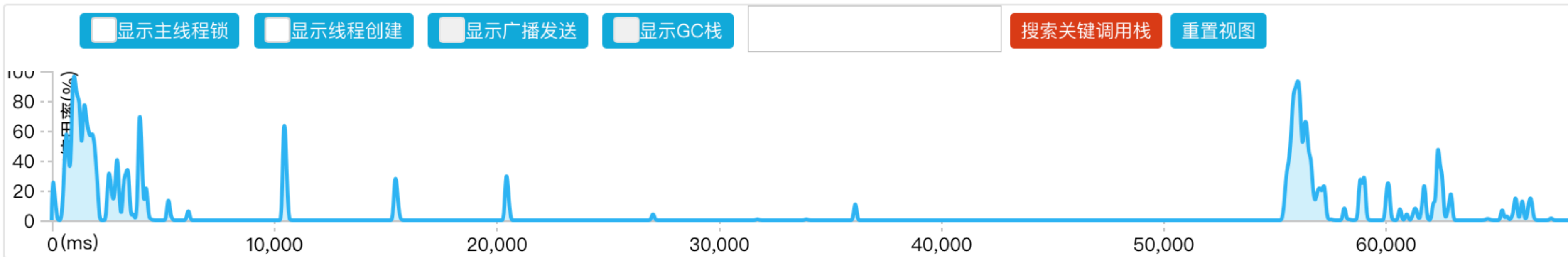




高可用保障体系-数

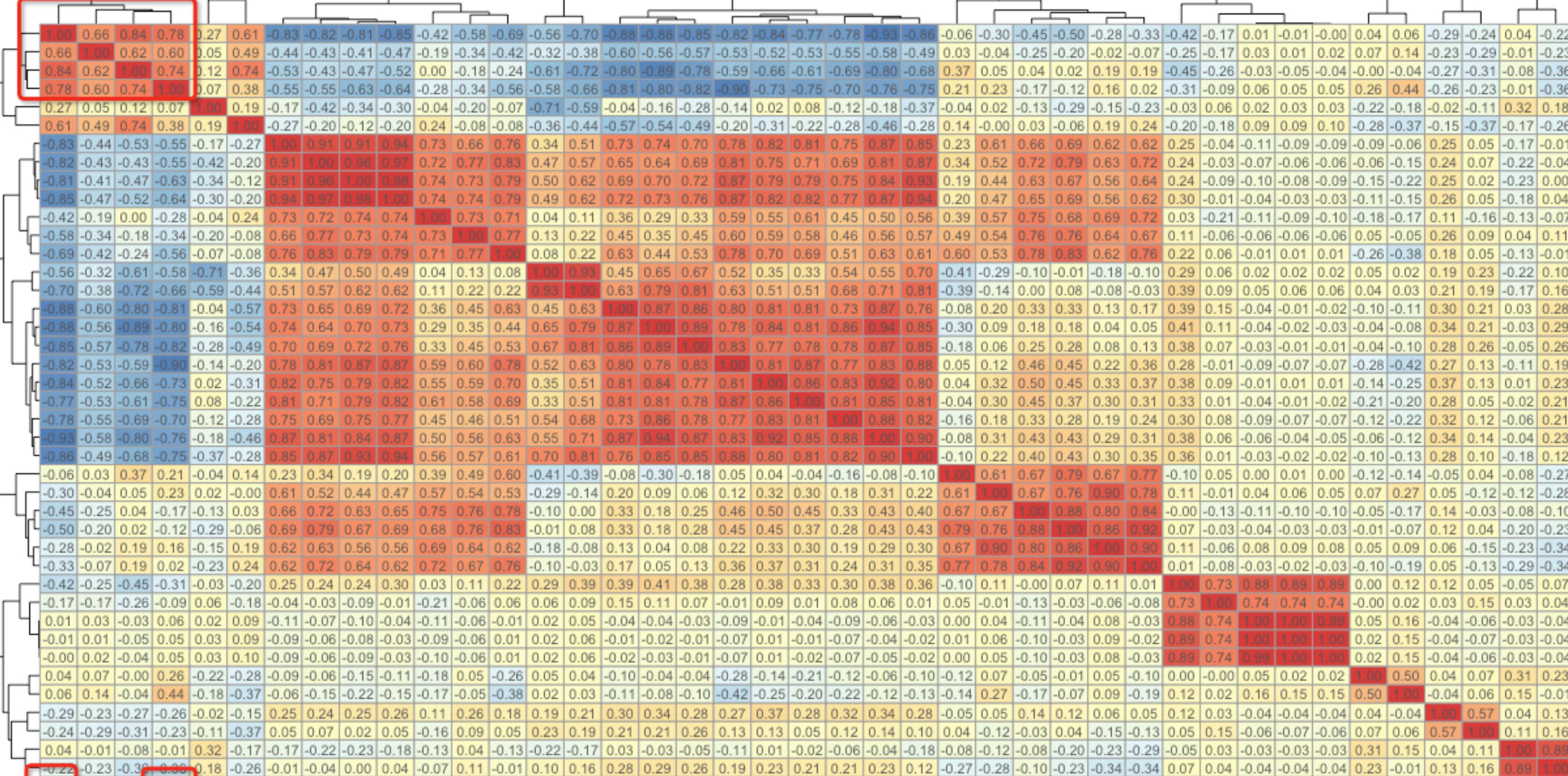


- [25387] main
- [25393] ReferenceQueueDaemon
- [25398] HeapTaskDaemon
- [25401] Timer-0
- [25403] FakeFinalizerDaemon
- [25404] FakeFinalizerWatcher
- [25405] bundle_installer
- [25408] AsyncTask #1
- [25412] ACC50
- [25421] AsyncTask #2



Process ID	Process Name	Thread Name	Stack Frame
[2567]	[2567]		
(0x1813a85b8)			
(0x100101760)			
(0x101cdaaa4)			
	UIKit.UIApplicationMain	:208 (in UIKit)	
	UIKit.UIKit-[UIApplication _run]	:684 (in UIKit)	
	Cor...GraphicsServices._GSEventRunModal	:180 (in GraphicsServices)	
	Cor...CoreFoundation._CFRunLoopRunSpecific	:444 (in CoreFoundation)	Core..CcCoreFoundati..
	Cor...CcCoreFoundation.__CFRunLoopRun	:1660 (in CoreFoundation)	Co.. Co.. Cor...
	Cor...CcCoreFoundation.__CFRUNLOOP_IS_SERVICING_THE_MAIN_DISPATCH_QUEUE__	:12 (in Co...)	Co.. Co.. Cor...
	Fro...	(0.(0x1096d2060)	(0.. (0.. (0x...
	Fro...	(0.(0x1096cf304)	(0.. (0.. (0x...
	Fro...	(c.(0x1096e7fa8)	(c.. (c.. (co...
	UIK...	(0x1096d93a8)	
	UIK...	(0x1096cd21c)	
	UIK...	(0x100104338)	
	UIK...	Foundation.+[NSThread sleepForTimeInterval:]	:136 (in Foundation)
	UIK...	(0x1813d827c)	
	(0x...	(0x1814ba314)	
	(0x...	(context switch)	
	(0x...	(context switch)	
	(0x...	Real time(ms): 49992.758	
	(0x...	Cpu time(ms): 0	
	(0x...	Exclusive Cpu Time(ms): 0	
	(0x...	Exclusive Real Time(ms): 49992.758	
	(0x...		
	(0x...		
	(0x...		
	(0x...		
	(0x...		
	(0x...		
	(0x...		
	(0x...		
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	(0x...		
	(0x...		
	(0x...		
	(0x...		
	(0x...		
	(0x...		

与目标变量相关系数超过0.6的矩阵表



- @MiddlewareInit_avg
- total_avg **目标变量**
- TBCrashReporterInitialize_avg
- TBHomePageInitialize_avg
- AliSpotLifeCycle_avg
- TBAppRootVCInitialize_avg
- TBWindowInitialize_avg
- TBCrashCushionBundleInitialize_avg
- @TBWopcnInitialize_avg
- TBLiveAppLifeCycle_avg
- @TBPrivateDidFinishLaunchingNotificationHandler_avg
- TBSearchInitialize_avg
- TBUTInitialize_avg
- TBOceanInitialize_avg
- GeofenceInitialize_avg
- TBMyTaobaoAppDidFinishLaunchingNotificationHandler_avg
- TBLoginAppDidFinishLaunchingNotificationHandler_avg
- TBABTestLaunch_avg
- TBACDSInitialize_avg
- TBDWDIdFinishLaunchingNotificationHandler_avg
- TBPopLayerAppDidFinishLaunchingNotificationHandler_avg
- TBDetailAppDidFinishLaunchingNotificationHandler_avg
- TBWeAppPlusDidFinishLaunchingNotificationHandler_avg
- TBPowerMsgInitialize_avg
- TBAppStatusMonitorInitialize_avg
- TBHomePageProvideViewLifeCycle_avg
- @TBShareDidFinishLaunchingNotificationHandler_avg
- TBLBSInitialize_avg
- TBMContainerInitialize_avg
- TBHomePageDataSourceLifeCycle_avg
- TBDataTransferInitialize_avg
- @TBWeTaoAppDidFinishLaunchingNotificationHandler_avg
- TBConfigCenterInitialize_avg
- @TBHuiChangAppDidFinishLaunchingNotificationHandler_avg
- TBMTOPConnectionInitialize_avg
- TBAppWindowInitialize_avg
- TBEscortInitialize_avg
- TBBootImageLifeCycle_avg
- TBBootImageDoAppFinish_avg
- final_avg
- final_interval_90



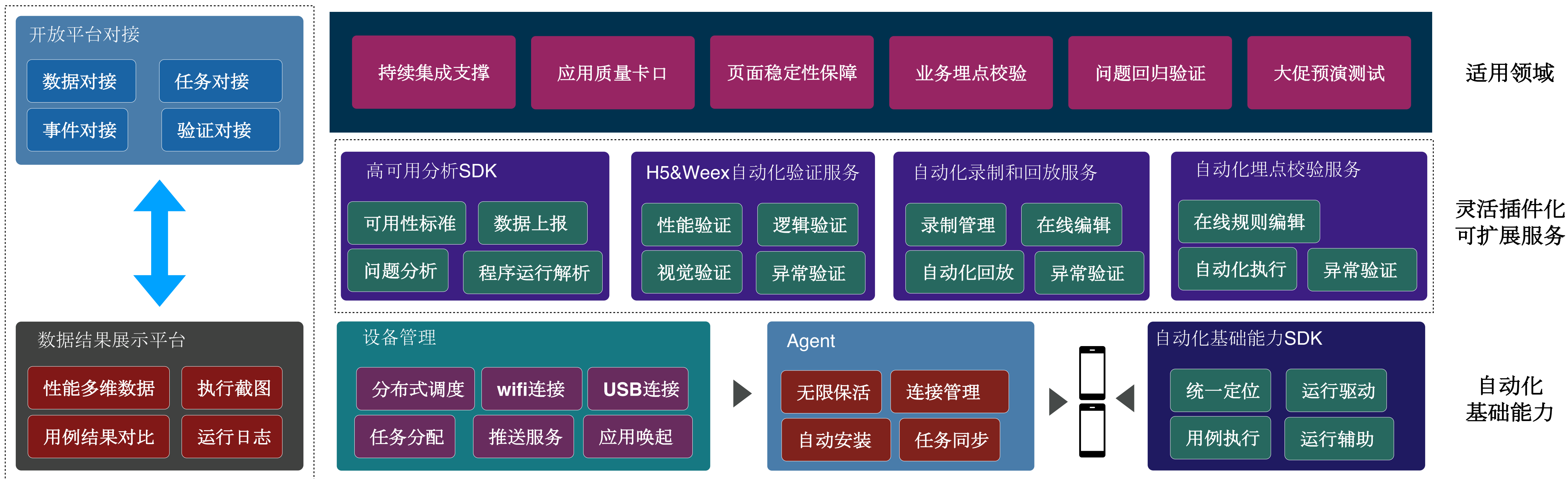
性

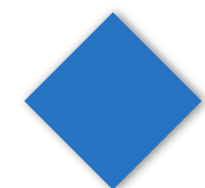
- @MiddlewareInit_avg
- total_avg
- TBCrashReporterInitialize_avg
- AliSpotLifeCycle_avg
- TBAppRootVCInitialize_avg
- TBWindowInitialize_avg
- TBCrashCushionBundleInitialize_avg
- @TBWopcnInitialize_avg
- TBLiveAppLifeCycle_avg
- @TBPrivateDidFinishLaunchingNotificationHandler_avg
- TBSearchInitialize_avg
- TBUTInitialize_avg
- TBOceanInitialize_avg
- GeofenceInitialize_avg
- TBMyTaobaoAppDidFinishLaunchingNotificationHandler_avg
- TBLoginAppDidFinishLaunchingNotificationHandler_avg
- TBABTestLaunch_avg
- TBACDSInitialize_avg
- TBDWDIdFinishLaunchingNotificationHandler_avg
- TBPopLayerAppDidFinishLaunchingNotificationHandler_avg
- TBDetailAppDidFinishLaunchingNotificationHandler_avg
- TBWeAppPlusDidFinishLaunchingNotificationHandler_avg
- TBPowerMsgInitialize_avg
- TBAppStatusMonitorInitialize_avg
- TBHomePageProvideViewLifeCycle_avg
- @TBShareDidFinishLaunchingNotificationHandler_avg
- TBLBSInitialize_avg
- TBMContainerInitialize_avg
- TBHomePageDataSourceLifeCycle_avg
- TBDataTransferInitialize_avg
- @TBWeTaoAppDidFinishLaunchingNotificationHandler_avg
- TBConfigCenterInitialize_avg
- @TBHuiChangAppDidFinishLaunchingNotificationHandler_avg
- TBMTOPConnectionInitialize_avg
- TBAppWindowInitialize_avg
- TBEscortInitialize_avg
- TBBootImageLifeCycle_avg
- TBBootImageDoAppFinish_avg
- final_avg
- final_interval_90

降维之后的主要成分



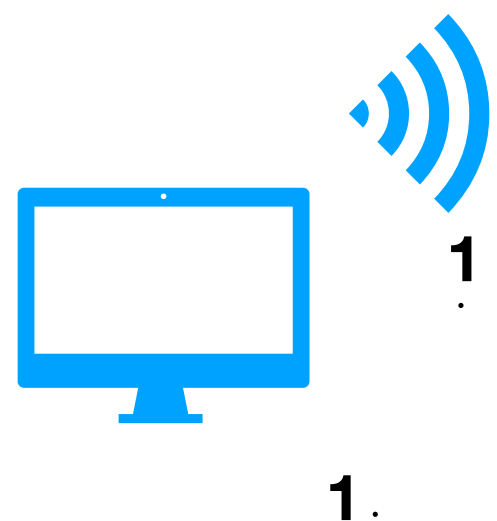
移动端高可用保障-自动化驱动



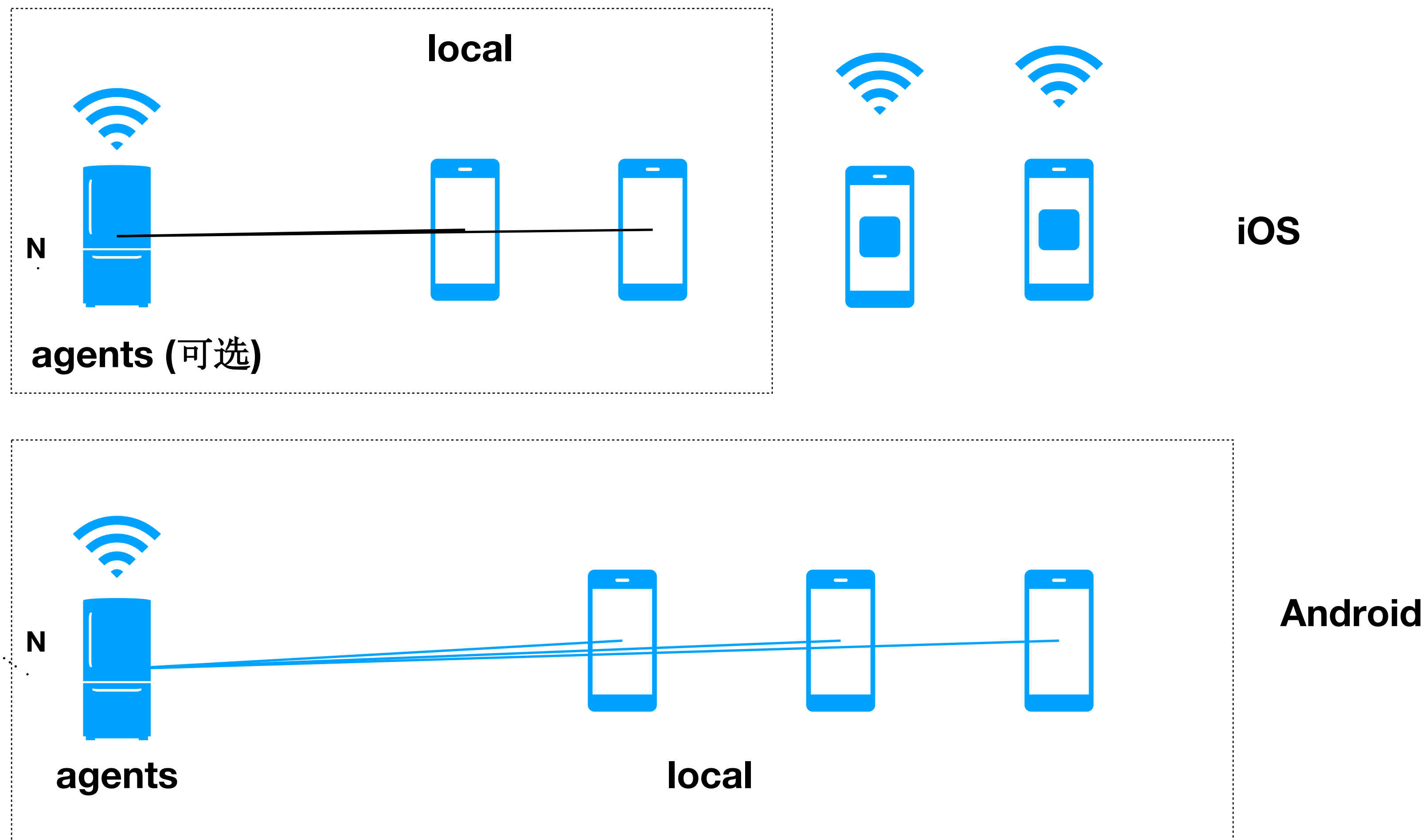


高可用保障体系-自动化驱动

自动化服务器



自动化驱动拓扑模型



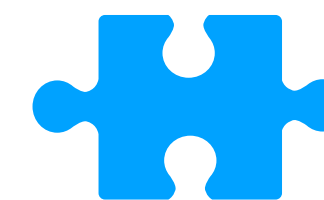
软件系统



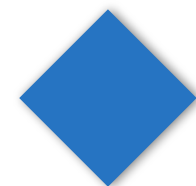
设备管理与结果展示



保活, 连接, 安装



驱动与校验



高可用保障体系-自动化驱动

22:16 创建 开始 暂停 恢复 停止 销毁 脚本

回放 强制模式 自动跳转 次数 1 defau

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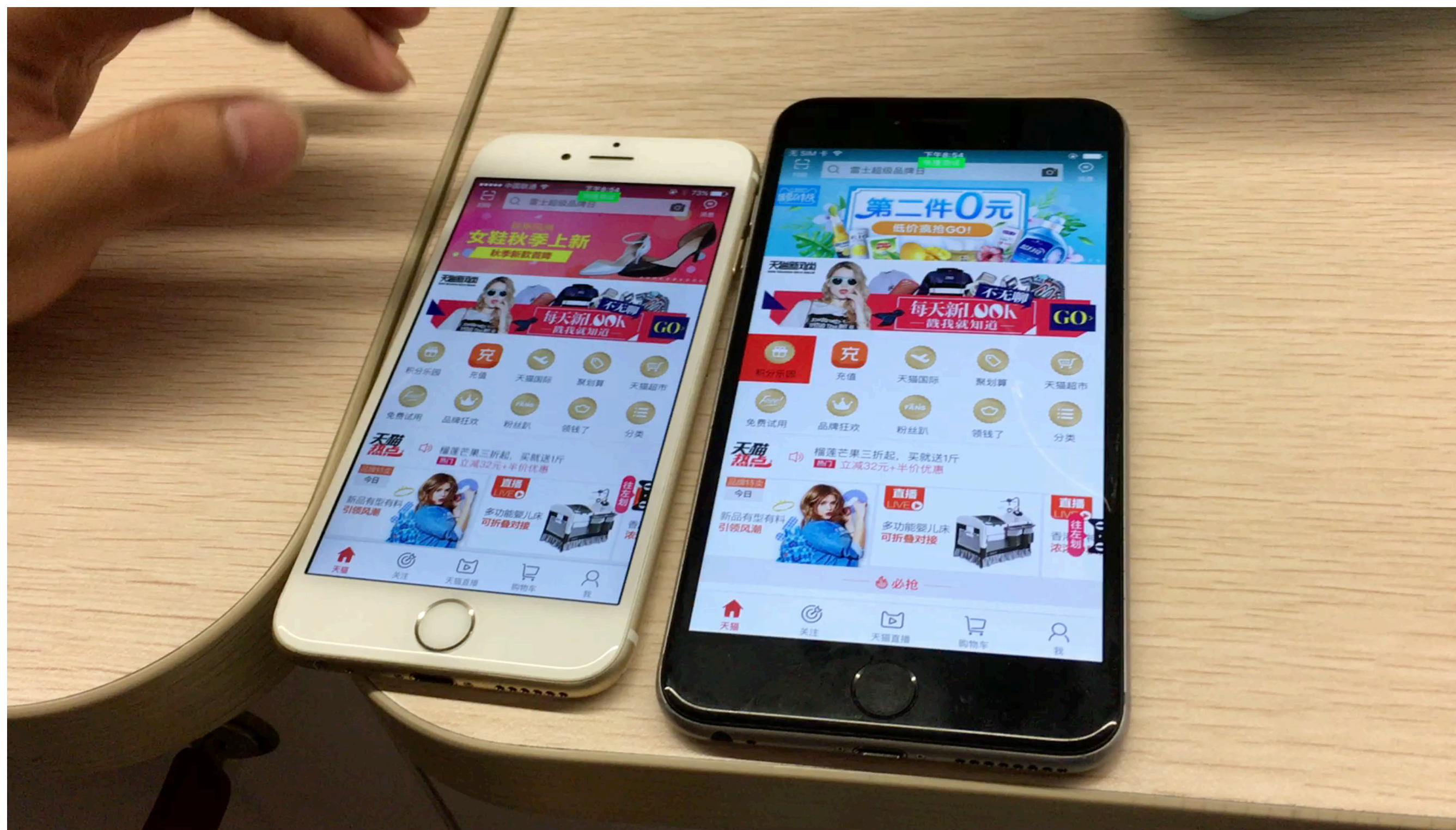
苏宁易购 天猫超市 天猫国际 聚划算 分类

MY HOME 预约安装 55" 55寸4K低至2899 SHOP NOW

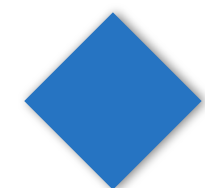
天猫热点 160仙女, 向王子文学习P图式拉腿穿搭 小黄人预警拉响, 带这堆萌物一起看黄人们

Braun 德国 每日优选 Daniel Wellington 瑞典 全球品牌动态

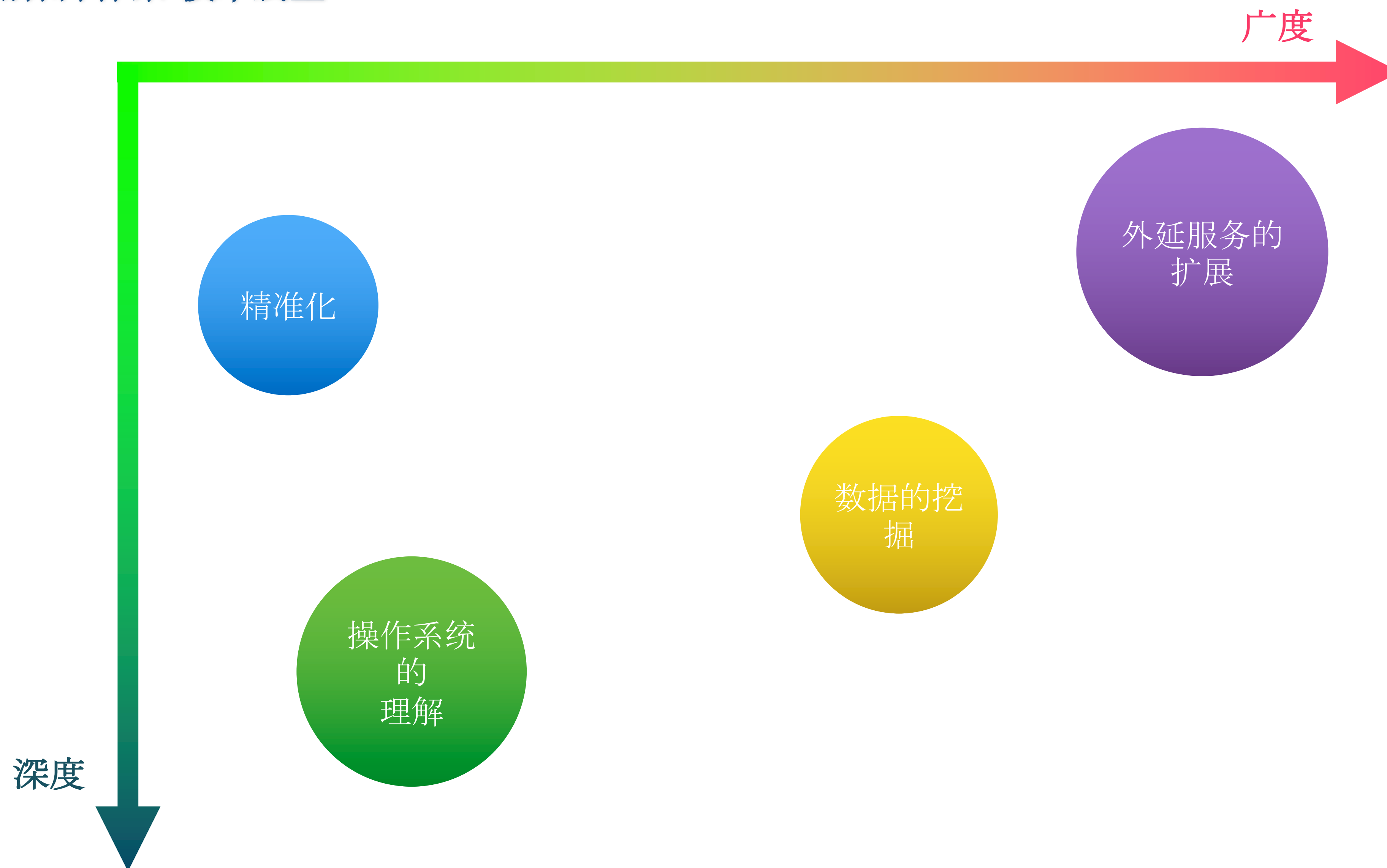
Spider 网络配置 会员 文件配置 购物车 最小化

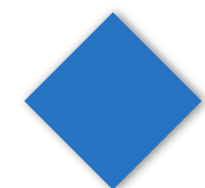


展望
Future



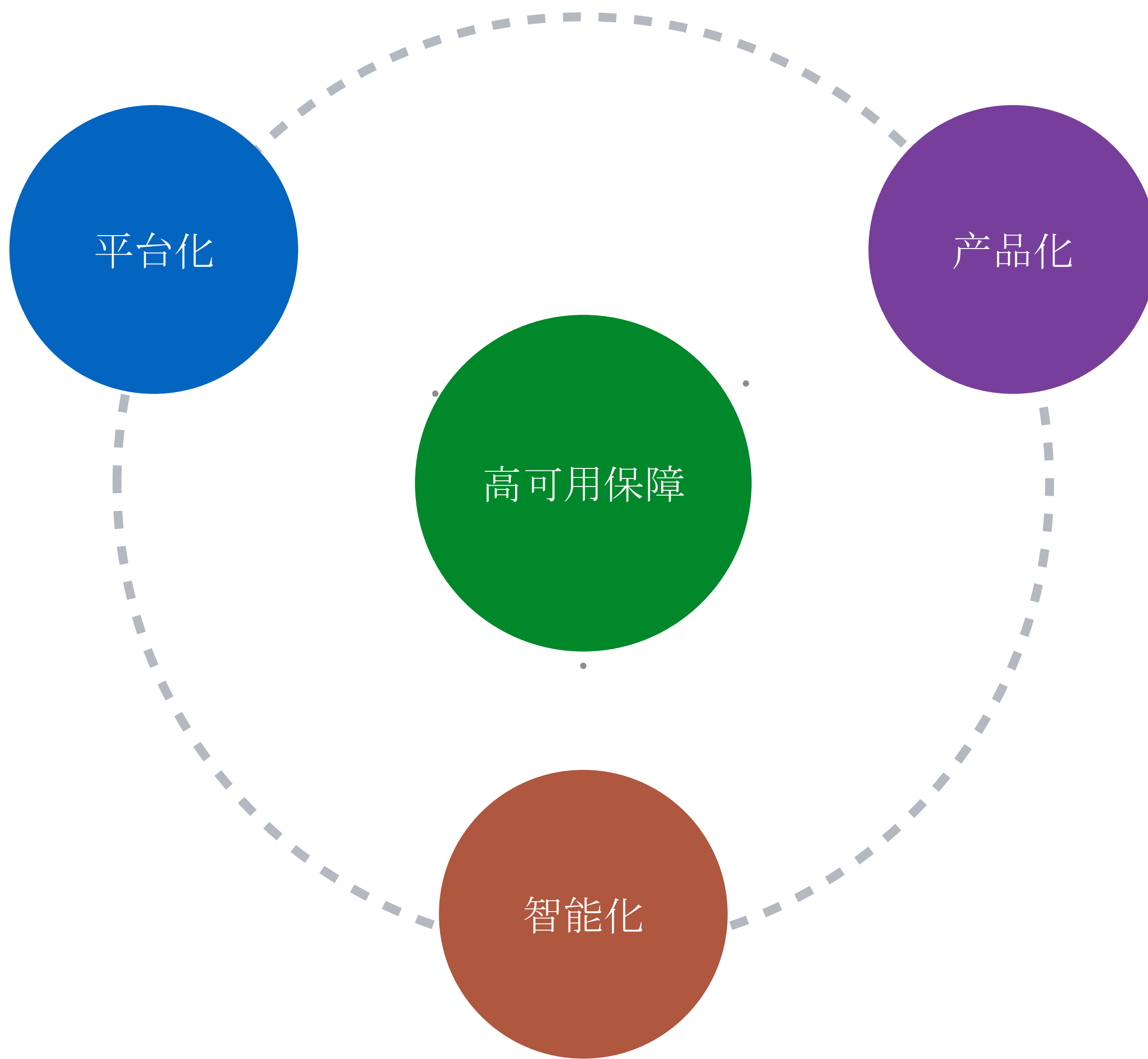
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