基于大数据平台搭建移动端 APM 实践

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七牛云

关于七牛云

国内企业级云服务商

- 围绕海量数据提供创新的云服务PaaS平台，
- 加速产品成功，创造数据价值。

500人的服务团队

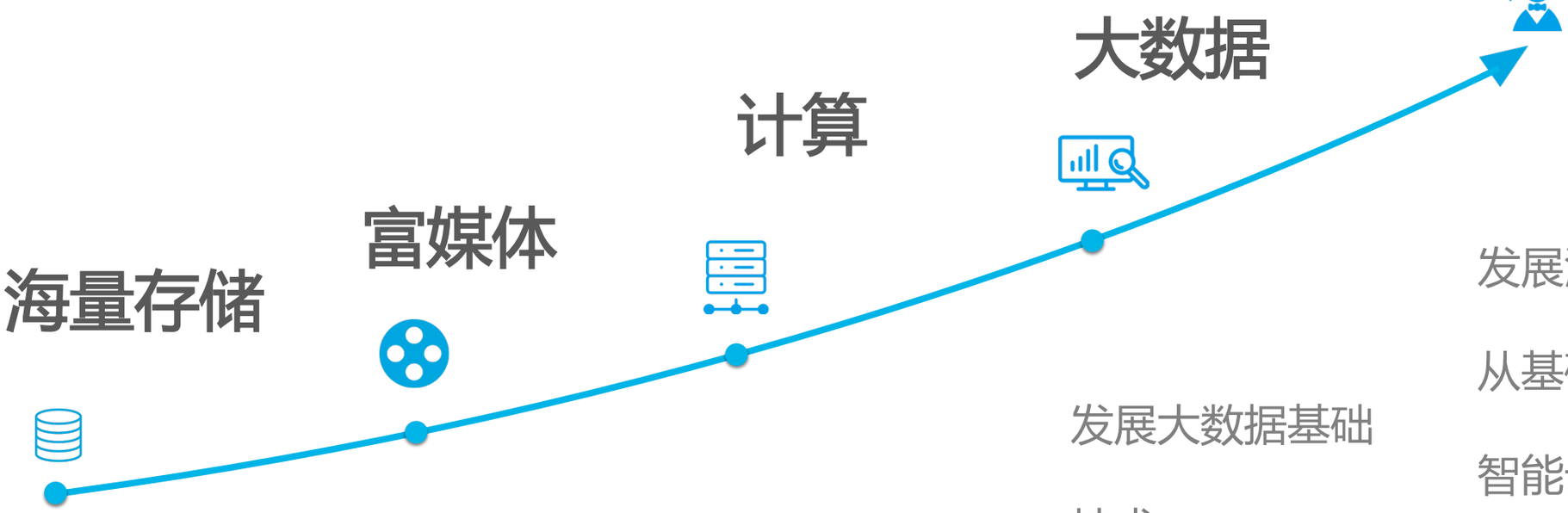
- 创立于2011年，总部位于上海张江
- 北京、深圳、广州、成都、杭州、厦门、武汉设有研发团队和办事处

支持超过70万家用户

- 文件数超过2000亿，每日新增文件20亿，
- 间接服务全国超过80%网民

不断颠覆和创新是七牛成功的基石

市场创新的速度远超于人脑的预判



以数据处理和内容分发的存储PaaS切入云计算市场

从图片管理扩充为支持视频点播和直播的富媒体云

用容器化计算服务来将之前的服务通用化，并推进基于微服务架构的DevOps理念

发展大数据基础技术

将重心从数据的存储和处理转向数据的价值挖掘

发展深度学习技术，从基础设施云转向智能云服务

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议程

- APM 简介
- 产品实践及遇到的问题
- 展望

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APM

Application Performance Management

- 数字化体验监控 — Digital Experience Monitoring
- 应用程序发现、跟踪和诊断 — Application discovery, tracing and diagnostics
- 应用程序分析 — Application Analytics

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架构的纠结

数据可视化

批量/实时计算

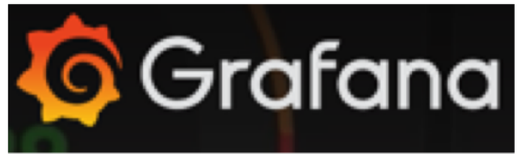
集群调度

Yarn

存储

HDFS

监控



Zookeeper

高可用

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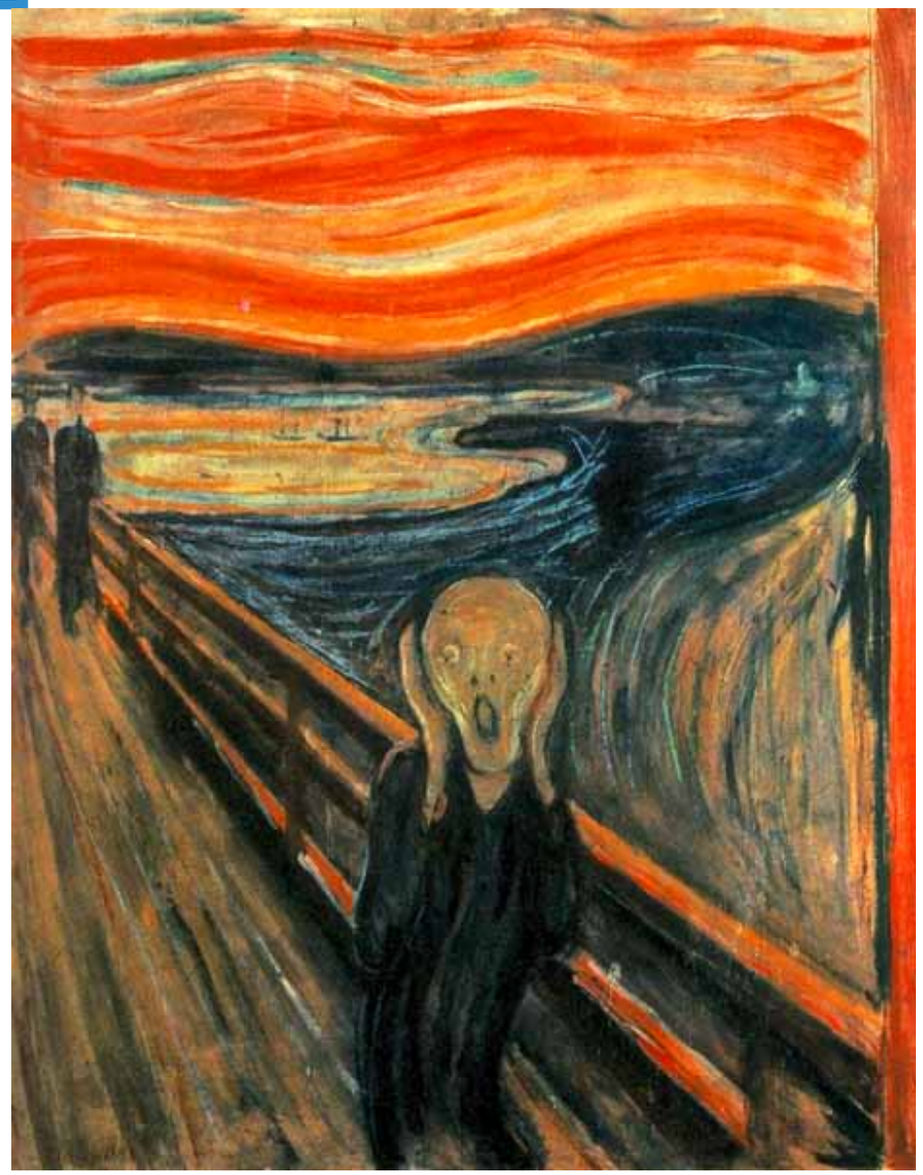
架构的纠结



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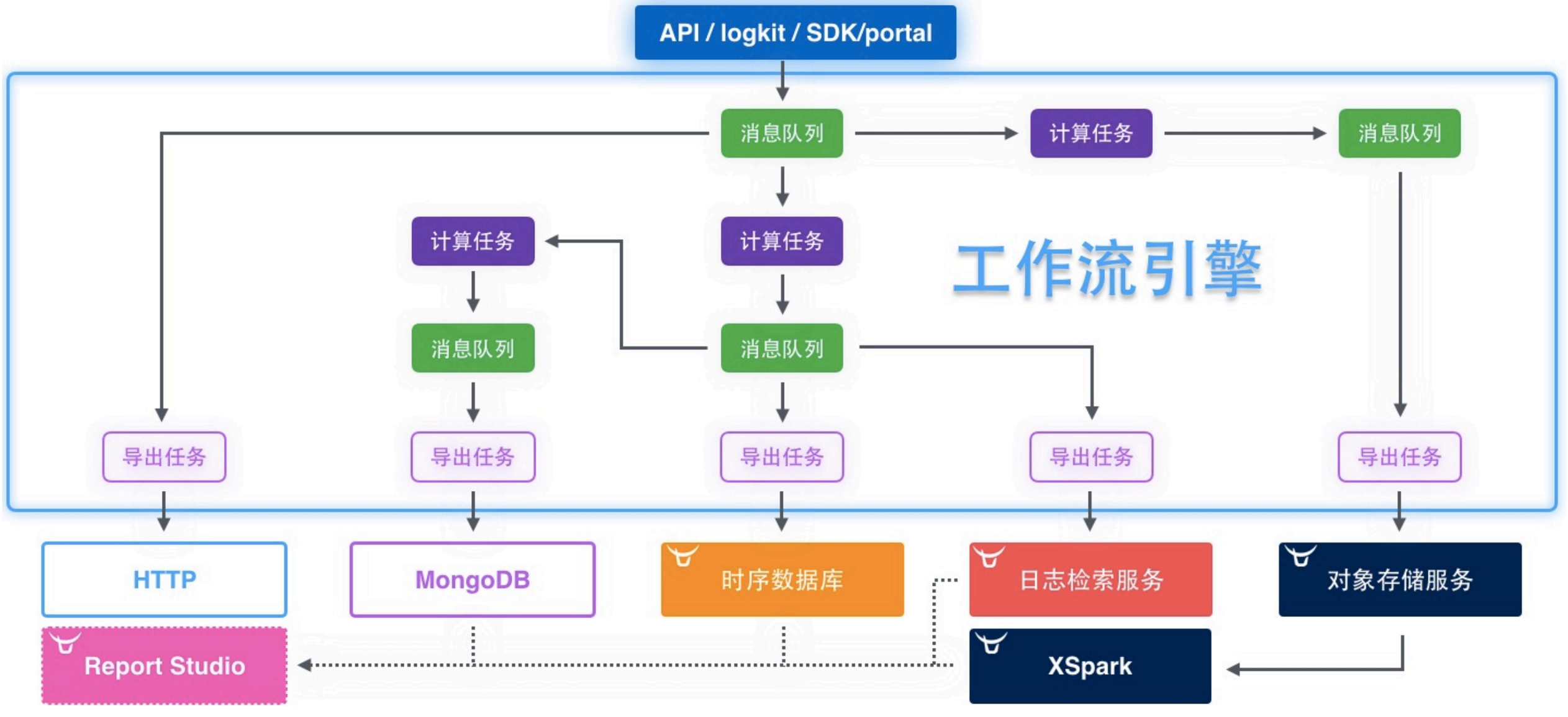
七牛大数据平台 — Pandora

- 从存储到数据可视化，全栈的大数据分析产品
- 用户使用 Workflow 管理自己的数据流，无需大数据背景
- Workflow 实现可视化数据流监控，降低运维成本
- 集成优秀社区组件，优化并做到更好

简单·可信赖

Pandora架构图



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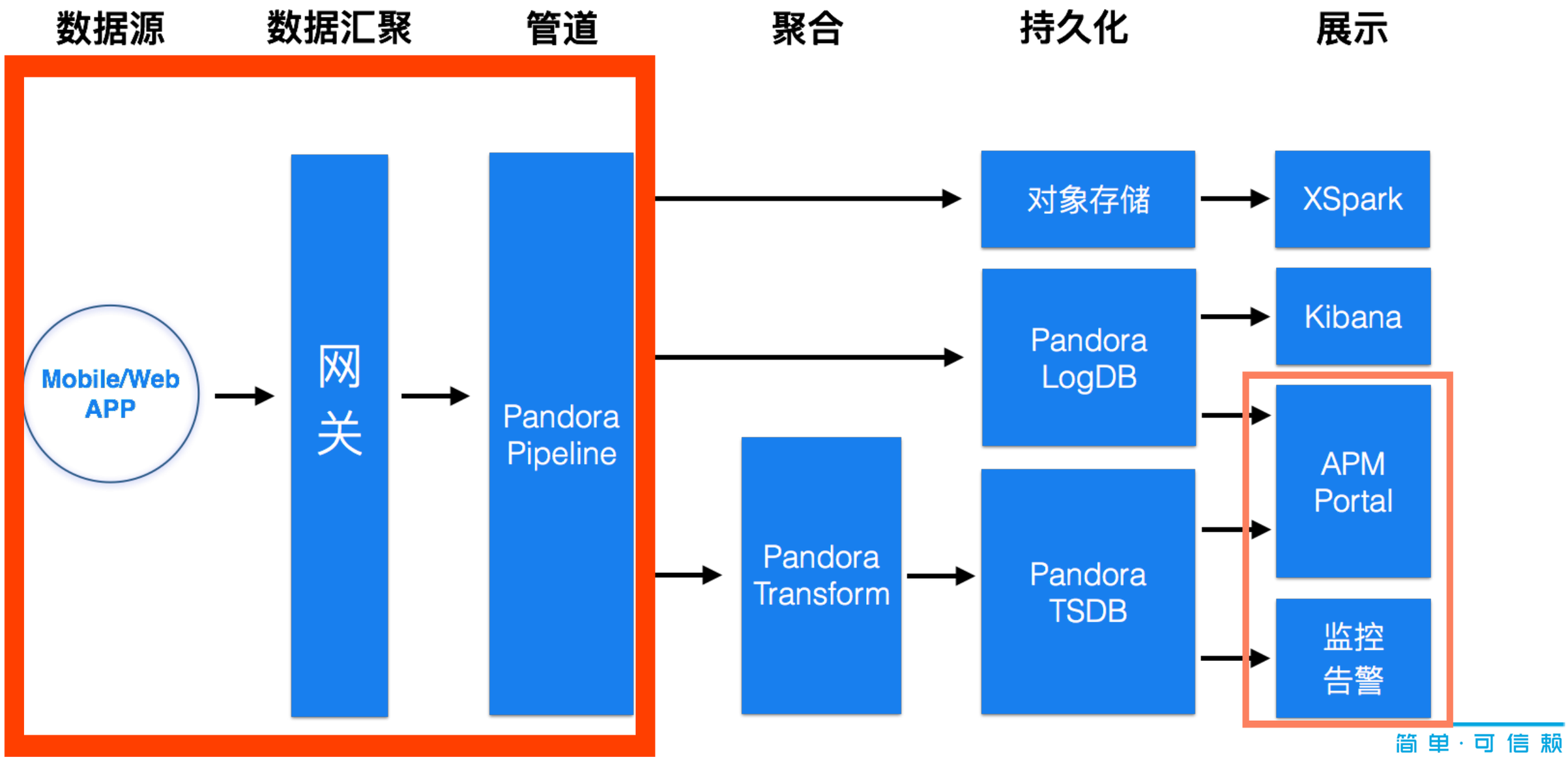
总体架构


数据源
数据汇聚
管道
聚合
持久化
展示
Mobile/Web APP
网关
Pandora Pipeline
Pandora Transform
对象存储
Pandora LogDB
Pandora TSDB
XSpark
Kibana
APM Portal
监控告警

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监控哪些指标？

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移动APP常见痛点

崩溃定位

- 快速暴露、发现、定位、修复
- 统计错误，报警
- 长时间保存
- 机器学习分析

交互响应慢

- ANR 定位
- 界面卡顿
- API 调用慢

网络问题

- 连接超时
- 网络错误
- CDN问题
- 客户端网络信息收集

日志分析

- 客户端上报日志
- 长时间保存
- 机器学习分析

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目标

- 与业务解耦，实现无埋点嵌码
- 监控不影响宿主 app 的性能和稳定性
- 不出现数据截断或漏报错报的情况

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App 崩溃日志收集

- 支持收集包括 Objective-C，swift，java，c/c++ 在内 crash 信息

- 支持 dump crash 时的调用堆栈以及进行堆栈的符号化

- 本地缓存轮询上报

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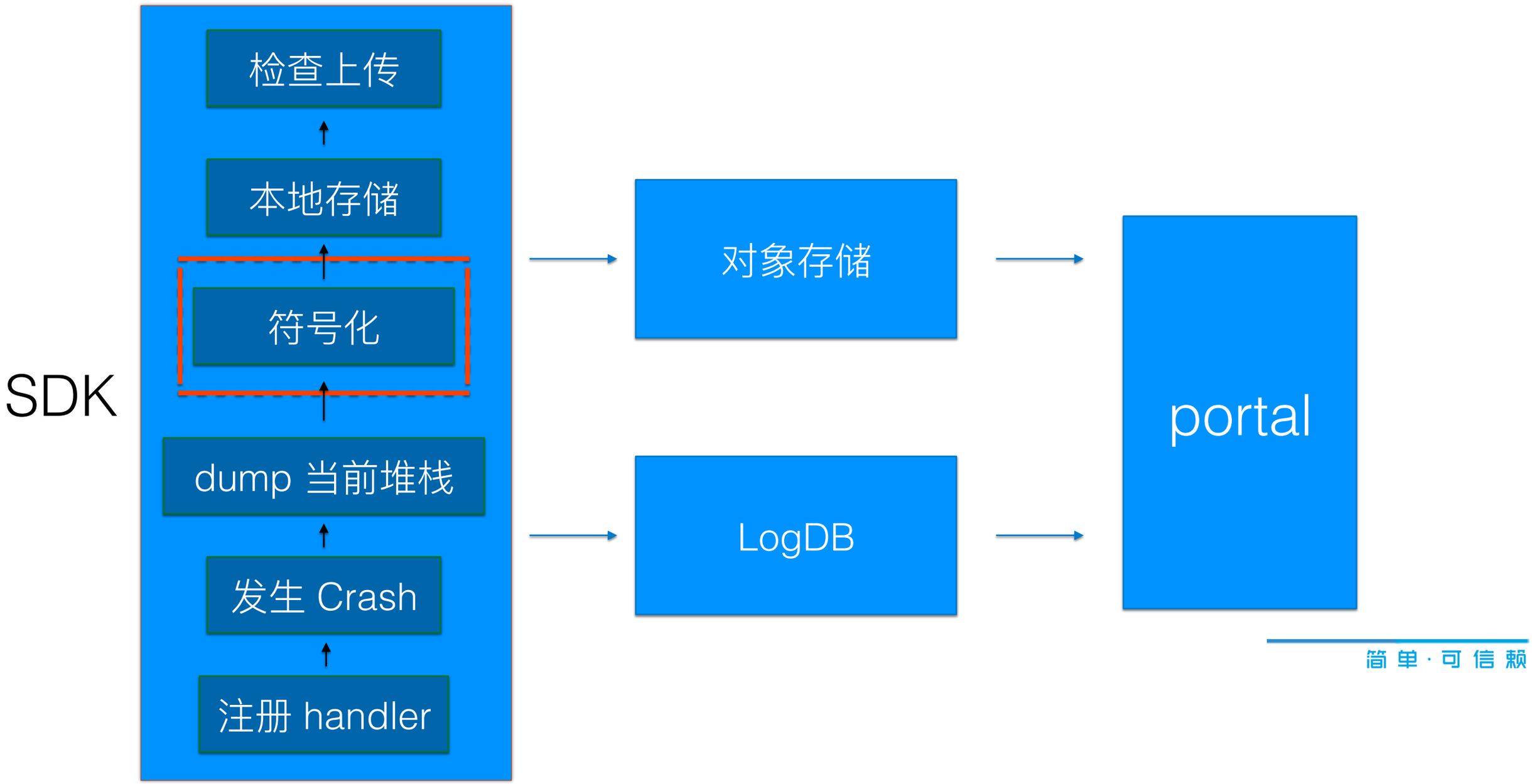
App 崩溃日志收集



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App 崩溃日志收集

```
- (void)startManager {
    [self registerObservers];

    if (!_isSetup) {
        static dispatch_once_t plcrPredicate;
        dispatch_once(&plcrPredicate, ^{
            /* Configure our reporter */

            PLCrashReporterSignalHandlerType signalHandlerType = PLCrashReporterSignalHandlerTypeBSD;

            PLCrashReporterSymbolicationStrategy symbolicationStrategy =
                PLCrashReporterSymbolicationStrategyNone;
            if (self.isOnDeviceSymbolicationEnabled) {
                symbolicationStrategy = PLCrashReporterSymbolicationStrategyAll;
            }

            PREPLCrashReporterConfig *config = [[PREPLCrashReporterConfig alloc] initWithSignalHandlerType:
                signalHandlerType
                                                                                    symbolicationStrategy:
                                                                        symbolicationStrategy];
            self.plCrashReporter = [[PREPLCrashReporter alloc] initWithConfiguration: config];

            // Check if we previously crashed
            if ([self.plCrashReporter hasPendingCrashReport]) {
                _didCrashInLastSession = YES;
                [self handleCrashReport];
            }
```

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App 崩溃日志收集

```
- (void) handleCrashReport {
    PREDLogVerbose(@"Handling crash report");
    NSError *error = NULL;

    if (!self.plCrashReporter) return;

    // Try loading the crash report
    NSData *crashData = [[NSData alloc] initWithData:[self.plCrashReporter
        loadPendingCrashReportDataAndReturnError: &error]];

    if (crashData == nil) {
        PREDLogError(@"Could not load crash report: %@", error);
    } else {
        NSString *cacheFilename = [NSString stringWithFormat: @"%.0f", [NSDate
            timeIntervalSinceReferenceDate]];
        [crashData writeToFile:[_crashesDir stringByAppendingPathComponent: cacheFilename] atomically:YES];
    }
    [self.plCrashReporter purgePendingCrashReport];
}
```

App 崩溃日志收集

```objc
- (void)createCrashReportForAppKill {
    NSString *fakeReportUUID = PREDHelper.UUID ?: @"???";
    NSString *fakeReporterKey = PREDHelper.UUID ?: @"???";

    NSString *fakeReportAppBundleIdentifier = PREDHelper.appBundleId;
    NSString *fakeReportDeviceModel = PREDHelper.deviceModel ?: @"Unknown";

    NSString *fakeSignalName = kPREDCrashKillSignal;

    NSMutableString *fakeReportString = [NSMutableString string];

    [fakeReportString appendFormat:@"Incident Identifier: %@\n", fakeReportUUID];
    [fakeReportString appendFormat:@"CrashReporter Key:   %@\n", fakeReporterKey];
    [fakeReportString appendFormat:@"Hardware Model:      %@\n", fakeReportDeviceModel];
    [fakeReportString appendFormat:@"Identifier:      %@\n", fakeReportAppBundleIdentifier];

    NSString *fakeReportAppVersionString = [NSString stringWithFormat:@"%@ (%@)", PREDHelper.appVersion,
        PREDHelper.appBuild];

    [fakeReportString appendFormat:@"Version:         %@\n", fakeReportAppVersionString];
    [fakeReportString appendString:@"Code Type:       ARM\n"];
    [fakeReportString appendString:@"\n"];

    NSLocale *enUSPOSIXLocale = [[NSLocale alloc] initWithLocaleIdentifier:@"en_US_POSIX"];
    NSDateFormatter *rfc3339Formatter = [[NSDateFormatter alloc] init];
    [rfc3339Formatter setLocale:enUSPOSIXLocale];
    [rfc3339Formatter setDateFormat:@"yyyy'-'MM'-'dd'T'HH':'mm':'ss'Z'"];
    [rfc3339Formatter setTimeZone:[NSTimeZone timeZoneForSecondsFromGMT:0]];
    NSString *fakeCrashTimestamp = [rfc3339Formatter stringFromDate:[NSDate date]];

    // we use the current date, since we don't know when the kill actually happened
    [fakeReportString appendFormat:@"Date/Time:       %@\n", fakeCrashTimestamp];
    [fakeReportString appendFormat:@"OS Version:      %@\n", PREDHelper.osVersion];
    [fakeReportString appendString:@"Report Version:  104\n"];
    [fakeReportString appendString:@"\n"];
    [fakeReportString appendFormat:@"Exception Type:  %@\n", fakeSignalName];
    [fakeReportString appendString:@"Exception Codes: 00000020 at 0x8badf00d\n"];
    [fakeReportString appendString:@"\n"];
    [fakeReportString appendString:@"Application Specific Information:\n"];
    [fakeReportString appendString:@"The application did not terminate cleanly but no crash occured."];
    if (self.didReceiveMemoryWarningInLastSession) {
        [fakeReportString appendString:@" The app received at least one Low Memory Warning."];
    }
    [fakeReportString appendString:@"\n\n"];
```

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App 崩溃日志收集

```
/**
 * Registers the exception handler.
 */
private static void registerHandler(WeakReference<Context> weakContext, boolean ignoreDefaultHandler) {
    if (!TextUtils.isEmpty(AppBean.APP_VERSION) && !TextUtils.isEmpty(AppBean.APP_PACKAGE)) {
        // Get current handler
        Thread.UncaughtExceptionHandler currentHandler = Thread.getDefaultUncaughtExceptionHandler();
        if (currentHandler != null) {
            LogUtils.d("Current handler class = " + currentHandler.getClass().getName());
        }

        Thread.setDefaultUncaughtExceptionHandler(new ExceptionHandler(currentHandler, ignoreDefaultHandler));
    } else {
        LogUtils.d("Exception handler not set because version or package is null.");
    }
}
```

App 崩溃日志收集

时间区间 2017/07/23 ~ 2017/07/29

AppBundleId	AppId	AppName	AppVersion	CrashLogKey	CrashTime
pre-engineering.PreDemObjcDemo	00000002	PreDemObjcDemo	1.0.0	00000002/crash/3761be760faf402b8cac8332dce5c262	2017-07-13
pre-engineering.PreDemObjcDemo	00000002	PreDemObjcDemo	1.0.0	00000002/crash/50025277520ee62c968	

Crash log 展

APP 信息 | 平台信息 | 设备信息 | 返回

appBundled	appName	appVersion	sdkId	sdkVersion
qiniu.predem.example	AndroidPreDem	1.0.0	PreDemSDK	1.0.0

崩溃信息

```
at java.lang.VMThread.sleep(Native Method)
    at java.lang.Thread.sleep(Thread.java:1013)
    at java.lang.Thread.sleep(Thread.java:995)
    at qiniu.predem.example.MainActivity.SleepAMinute(MainActivity.java:55)
    at qiniu.predem.example.MainActivity.access$300(MainActivity.java:33)
    at qiniu.predem.example.MainActivity$7.onClick(MainActivity.java:182)
    at android.view.View.performClick(View.java:4438)
    at android.view.View$PerformClick.run(View.java:18422)
    at android.os.Handler.handleCallback(Handler.java:733)
    at android.os.Handler.dispatchMessage(Handler.java:95)
    at android.os.Looper.loop(Looper.java:136)
    at android.app.ActivityThread.main(ActivityThread.java:5001)
```

LogDB 检索

Http 及 Webview 请求分析 - iOS

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- 利用 iOS runtime 的特性代理 NSURLConnection 和 NSURLSession 的请求
- 采集所代理请求的性能信息并上报 Pandora
- 使用 Pandora 计算任务进行聚合并导出到 tsdb
- 相关信息的展示及分析告警

Http 及 Webview 请求分析 - iOS

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```objc
+ (void)enableHTTPDem {
    if (PREDHTTPMonitorSender.isEnabled) {
        return;
    }
    // 可拦截 [NSURLSession defaultSession] 以及 UIWebView 相关的请求
    [NSURLProtocol registerClass:self.class];

    // 拦截自定义生成的 NSURLSession 的请求
    if (![PREDURLSessionSwizzler isSwizzle]) {
        [PREDURLSessionSwizzler load];
    }

    PREDHTTPMonitorSender.enable = YES;
}

+ (void)disableHTTPDem {
    if (!PREDHTTPMonitorSender.isEnabled) {
        return;
    }
    [NSURLProtocol unregisterClass:self.class];
    if ([PREDURLSessionSwizzler isSwizzle]) {
        [PREDURLSessionSwizzler unload];
    }
    PREDHTTPMonitorSender.enable = NO;
}
```

Http 及 Webview 请求分析 - iOS


```
+ (BOOL)canInitWithRequest:(NSURLRequest *)request {
    if (![request.URL.scheme isEqualToString:@"http"] &&
        ![request.URL.scheme isEqualToString:@"https"]) {
        return NO;
    }

    // SDK主动发送的数据
    if ([NSURLProtocol propertyForKey:@"PREDInternalRequest" inRequest:request] ) {
        return NO;
    }

    return YES;
}
```

Http 及 Webview 请求分析 - iOS


```objc
+ (NSURLRequest *)canonicalRequestForRequest:(NSURLRequest *)request {
    NSMutableURLRequest *mutableRequest = [request mutableCopy];
    if (mutableRequest.URL.path.length == 0) {
        mutableRequest.URL = [NSURL URLWithString:@"/" relativeToURL:mutableRequest.URL];
    }
    [NSURLProtocol setProperty:@YES
                        forKey:@"PREDInternalRequest"
                     inRequest:mutableRequest];
    [NSURLProtocol setProperty:mutableRequest.URL
                        forKey:@"PREDOriginalURL"
                     inRequest:mutableRequest];
    if ([request.URL.scheme isEqualToString:@"http"]) {
        NSMutableArray *resolvers = [[NSMutableArray alloc] init];
        [resolvers addObject:[QNResolver systemResolver]];
        [resolvers addObject:[[QNResolver alloc] initWithAddress:DNSPodsHost]];
        QNDnsManager *dns = [[QNDnsManager alloc] init:resolvers networkInfo:[QNNetworkInfo normal]];
        NSTimeInterval dnsStartTime = [[NSDate date] timeIntervalSince1970];
        NSURL *replacedURL = [dns queryAndReplaceWithIP:mutableRequest.URL];
        NSTimeInterval dnsEndTime = [[NSDate date] timeIntervalSince1970];
        NSError *err;
        NSRegularExpression *regex = [NSRegularExpression regularExpressionWithPattern:@"^[0-9]+\\.[0-9]+\\.
            [0-9]+" options:0 error:&err];
        NSInteger number = [regex numberOfMatchesInString:replacedURL.host options:0 range:NSMakeRange(0,
            [replacedURL.host length])];
        if (number == 0) {
            return mutableRequest;
        }
        [NSURLProtocol setProperty:@((dnsEndTime - dnsStartTime)*1000)
                            forKey:@"PREDDNSTime"
                         inRequest:mutableRequest];
        [NSURLProtocol setProperty:replacedURL.host
                            forKey:@"PREDHostIP"
                         inRequest:mutableRequest];
        [mutableRequest setValue:request.URL.host forHTTPHeaderField:@"Host"];
        mutableRequest.URL = replacedURL;
    }
    return mutableRequest;
}
```

Http 及 Webview 请求分析 - iOS


```objc
- (void)startLoading {
    NSURLSessionConfiguration *sessionConfig = NSURLSessionConfiguration.ephemeralSessionConfiguration;
    NSURLSession *session = [NSURLSession sessionWithConfiguration:sessionConfig delegate:self
        delegateQueue:[NSOperationQueue new]];
    self.task = [session dataTaskWithRequest:self.request];
    [self.task resume];

    HTTPMonitorModel = [[PREDHTTPMonitorModel alloc] init];
    NSURL *originURL = [NSURLProtocol propertyForKey:@"PREDOriginalURL" inRequest:self.request];
    HTTPMonitorModel.domain = originURL.host;
    HTTPMonitorModel.path = originURL.path;
    HTTPMonitorModel.method = self.request.HTTPMethod;
    HTTPMonitorModel.hostIP = [NSURLProtocol propertyForKey:@"PREDHostIP" inRequest:self.request];
    HTTPMonitorModel.startTimestamp = [[NSDate date] timeIntervalSince1970] * 1000;
    HTTPMonitorModel.endTimestamp = [[NSDate date] timeIntervalSince1970] * 1000;
    HTTPMonitorModel.DNSTime = [[NSURLProtocol propertyForKey:@"PREDDNSTime" inRequest:self.request]
        unsignedIntegerValue];
}
```

Http 及 Webview 请求分析 - Android

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- 当宿主 app 使用 HttpURLConnection、OkHttp2、Okhttp3 或 Webview 产生 HTTP 请求时，SDK 使用 AOP 方式，在编译的时候无侵入的进行相关信息的采集与上报。
- 使用 Pandora 计算任务进行聚合并导出到 tsdb
- 相关信息的展示及分析告警

Http 及 Webview 请求分析 - Android


```
buildscript {
    repositories {
        jcenter()
    }
    dependencies {
        classpath 'com.android.tools.build:gradle:2.3.3'
        classpath 'com.hujiang.aspectjx:gradle-android-plugin-aspectjx:1.0.10'
        classpath 'org.aspectj:aspectjtools:1.8.9'

        // NOTE: Do not place your application dependencies here; they belong
        // in the individual module build.gradle files
    }
}
```

```
apply plugin: 'com.android.application'
apply plugin: 'android-aspectjx'
```

Http 及 Webview 请求分析 - Android


```
@Around("call(* java.net.URL+.openConnection(..))")
public Object onHttpURLOpenConnect(ProceedingJoinPoint joinPoint) throws Throwable {
    if (!Configuration.httpMonitorEnable || joinPoint.getArgs().length != 0) {
        return joinPoint.proceed();
    }

    try {
        if (!joinPoint.getTarget().toString().startsWith("http://") && !joinPoint.getTarget().toString().startsWith("https://")) {
            return joinPoint.proceed();
        }

        URL url = (URL) joinPoint.getTarget();

        //判断是否需要收集url信息
        if (GlobalConfig.isExcludeHost(url.getHost()) || ProbeWebClient.isExcludeIPs(url.getHost())) {
            return joinPoint.proceed();
        }

        HttpURLConnection conn;

        LogBean bean = LogBean.obtain();
        bean.setStartTimestamp(System.currentTimeMillis());
        conn = (HttpURLConnection)joinPoint.proceed();
        // 判断host是否是IP
        Matcher matcher = MatcherUtil.IP_Pattern.matcher(url.getHost());
        if (matcher.find()) {
            bean.setHostIP(url.getHost());
            bean.setDnsTime(0);
            bean.setDomain(url.getHost());
            bean.setPath(url.getPath());
        } else {
            String hostIp = null;
            if (Configuration.dnsEnable) {
                long stime = System.currentTimeMillis();
                try {
                    bean.setHostIP(InetAddress.getByName(url.getHost()).getHostAddress());
                } catch (UnknownHostException e) {
```

Http 及 Webview 请求分析 - Android

```
@Around("call(* java.net.URLConnection+.getInputStream(..))")
public Object onHttpURLConnectInput(ProceedingJoinPoint joinPoint) throws Throwable {
    if (!Configuration.httpMonitorEnable) {
        return joinPoint.proceed();
    }
    try {
        URLConnection conn = (URLConnection) joinPoint.getTarget();

        URL url;
        if (conn instanceof HttpURLConnection) {
            url = ((HttpURLConnection) joinPoint.getTarget()).getURL();
        } else {
            return joinPoint.proceed();
        }

        if (GlobalConfig.isExcludeHost(url.getHost()) || ProbeWebClient.isExcludeIPs(url.getHost())) {
            return joinPoint.proceed();
        }

        try {
            synchronized (reportMap) {
                int key = conn.hashCode();
                if (reportMap.containsKey(key)) {
                    LogBean urlTraceRecord = reportMap.get(key);
                    reportMap.remove(key);
                    if (GlobalConfig.isExcludeHost(urlTraceRecord.getDomain()) || ProbeWebClient.isExcludeIPs(urlTraceRecord.getDomain())) {
                        return joinPoint.proceed();
                    }

                    urlTraceRecord.setResponseTimestamp(System.currentTimeMillis());
                    urlTraceRecord.setStatusCode(((HttpURLConnection) conn).getResponseCode());
                    return ProbeInputStream.obtain((InputStream) joinPoint.proceed(), urlTraceRecord);
                } else {
                    LogBean urlTraceRecord = LogBean.obtain();
                    urlTraceRecord.setDomain(url.getHost());
                    urlTraceRecord.setPath(url.getPath());
                    urlTraceRecord.setMethod(((HttpURLConnection)conn).getRequestMethod());
                    urlTraceRecord.setDnsTime(0);
```

Http 及 Webview 请求分析

UI 卡顿及 ANR 监控

- 在主线程 Looper 或 Runloop 安放探针，监控调度到主线程的单个任务及连续多个任务的执行时间

- 当任务执行事件一定阈值之后会表现为 UI 卡顿，一旦其超过阈值 SDK 将收集系统当前的一些状态以及程序调用的堆栈信息进行上报

- 相关信息的展示、检索及分析告警

UI 卡顿及 ANR 监控

```objc
- (void)registerObserver {
    CFRunLoopObserverContext context = {0,(__bridge void*)self,NULL,NULL};
    _observer = CFRunLoopObserverCreate(kCFAllocatorDefault,
                                        kCFRunLoopAllActivities,
                                        YES,
                                        0,
                                        &runLoopObserverCallBack,
                                        &context);
    CFRunLoopAddObserver(CFRunLoopGetMain(), _observer, kCFRunLoopCommonModes);

    // 创建信号
    _semaphore = dispatch_semaphore_create(0);

    // 在子线程监控时长
    dispatch_async(dispatch_get_global_queue(0, 0), ^{
        while (YES) {
            // 假定连续5次超时50ms认为卡顿(当然也包含了单次超时250ms)
            long st = dispatch_semaphore_wait(_semaphore, dispatch_time(DISPATCH_TIME_NOW, 50*NSEC_PER_MSEC)
                );
            if (st != 0) {
                if (_activity==kCFRunLoopBeforeSources || _activity==kCFRunLoopAfterWaiting) {
                    if (++_countTime < 5)
                        continue;
                    [self sendLagStack];
                }
            }
            _countTime = 0;
        }
    });
}
```

UI 卡顿及 ANR 监控

```
- (void)sendLagStack {
    NSError *err;
    NSData *data = [_reporter generateLiveReportAndReturnError:&err];
    if (err) {
        return;
    }

    PREPLCrashReport *report = [[PREPLCrashReport alloc] initWithData:data error:&err];
    if (err) {
        return;
    }
    if ([PREDCrashReportTextFormatter isReport:report euivalentWith:_lastReport]) {
        return;
    }
    _lastReport = report;
    [self uploadCrashLog:report retryTimes:0];
}
```

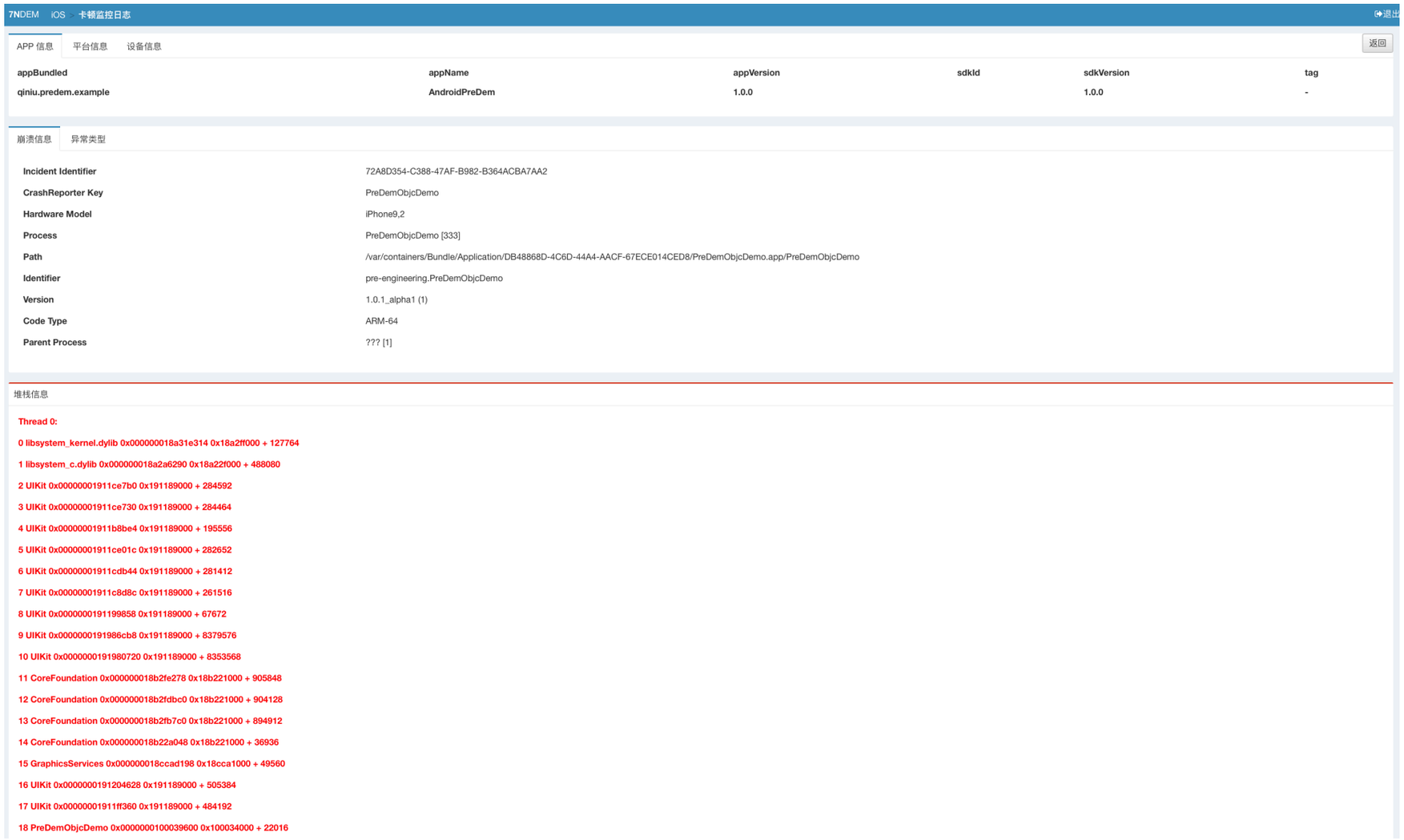
UI 卡顿及 ANR 监控

```
public void run() {
    int lastTick;
    while(!stop){
        lastTick = _tick;
        long startTime = System.currentTimeMillis();
        _uiHandler.post(_ticker);
        try {
            Thread.sleep(_timeoutInterval);
        } catch (InterruptedException e) {
            e.printStackTrace();
            return;
        }

        if (_tick == lastTick){
            //产生ANR, 获取stackInfo
            TraceInfo info = new TraceInfo();
            info.mStartTime = startTime;
            info.mEndTime = System.currentTimeMillis();
            info.mLog = stackTraceToString(Looper.getMainLooper().getThread().getStackTrace());
            mList.add(info);
            if (count > 3 && fileName == null){
                fileName = UUID.randomUUID().toString();
                //保存到文件
                FileUtil.getInstance().writeAnrReport(fileName,info);
            }
            count++;
        }else if (_tick != lastTick && fileName != null){
            //恢复 删除文件
            deleteStackTrace(weakContext,fileName);
            fileName = null;
            count = 0;
        }

        //进入后台后停止进度
        if (Functions.isBackground(mContext)){
            stopTrace();
            return;
        }
        if(mList.size()>SIZE){
            mList.remove(0);
        }
    }
```

UI 卡顿及 ANR 监控


7NDEM iOS 卡顿监控日志
退出
APP 信息
平台信息
设备信息
返回
appBundled
appName
appVersion
sdkId
sdkVersion
tag
qiniu.predem.example
AndroidPreDem
1.0.0
1.0.0
-
崩溃信息
异常类型
Incident Identifier 72A8D354-C388-47AF-B982-B364ACBA7AA2
CrashReporter Key PreDemObjcDemo
Hardware Model iPhone9,2
Process PreDemObjcDemo [333]
Path /var/containers/Bundle/Application/DB48868D-4C6D-44A4-AACF-67ECE014CED8/PreDemObjcDemo.app/PreDemObjcDemo
Identifier pre-engineering.PreDemObjcDemo
Version 1.0.1_alpha1 (1)
Code Type ARM-64
Parent Process ??? [1]
堆栈信息
Thread 0:
0 libsystem_kernel.dylib 0x000000018a31e314 0x18a2ff000 + 127764
1 libsystem_c.dylib 0x000000018a2a6290 0x18a22f000 + 488080
2 UIKit 0x00000001911ce7b0 0x191189000 + 284592
3 UIKit 0x00000001911ce730 0x191189000 + 284464
4 UIKit 0x00000001911b8be4 0x191189000 + 195556
5 UIKit 0x00000001911ce01c 0x191189000 + 282652
6 UIKit 0x00000001911cdb44 0x191189000 + 281412
7 UIKit 0x00000001911c8d8c 0x191189000 + 261516
8 UIKit 0x0000000191199858 0x191189000 + 67672
9 UIKit 0x0000000191986cb8 0x191189000 + 8379576
10 UIKit 0x0000000191980720 0x191189000 + 8353568
11 CoreFoundation 0x000000018b2fe278 0x18b221000 + 905848
12 CoreFoundation 0x000000018b2fdbc0 0x18b221000 + 904128
13 CoreFoundation 0x000000018b2fb7c0 0x18b221000 + 894912
14 CoreFoundation 0x000000018b22a048 0x18b221000 + 36936
15 GraphicsServices 0x000000018ccad198 0x18cca1000 + 49560
16 UIKit 0x0000000191204628 0x191189000 + 505384
17 UIKit 0x00000001911ff360 0x191189000 + 484192
18 PreDemObjcDemo 0x0000000100039600 0x100034000 + 22016

七牛云

网络诊断信息

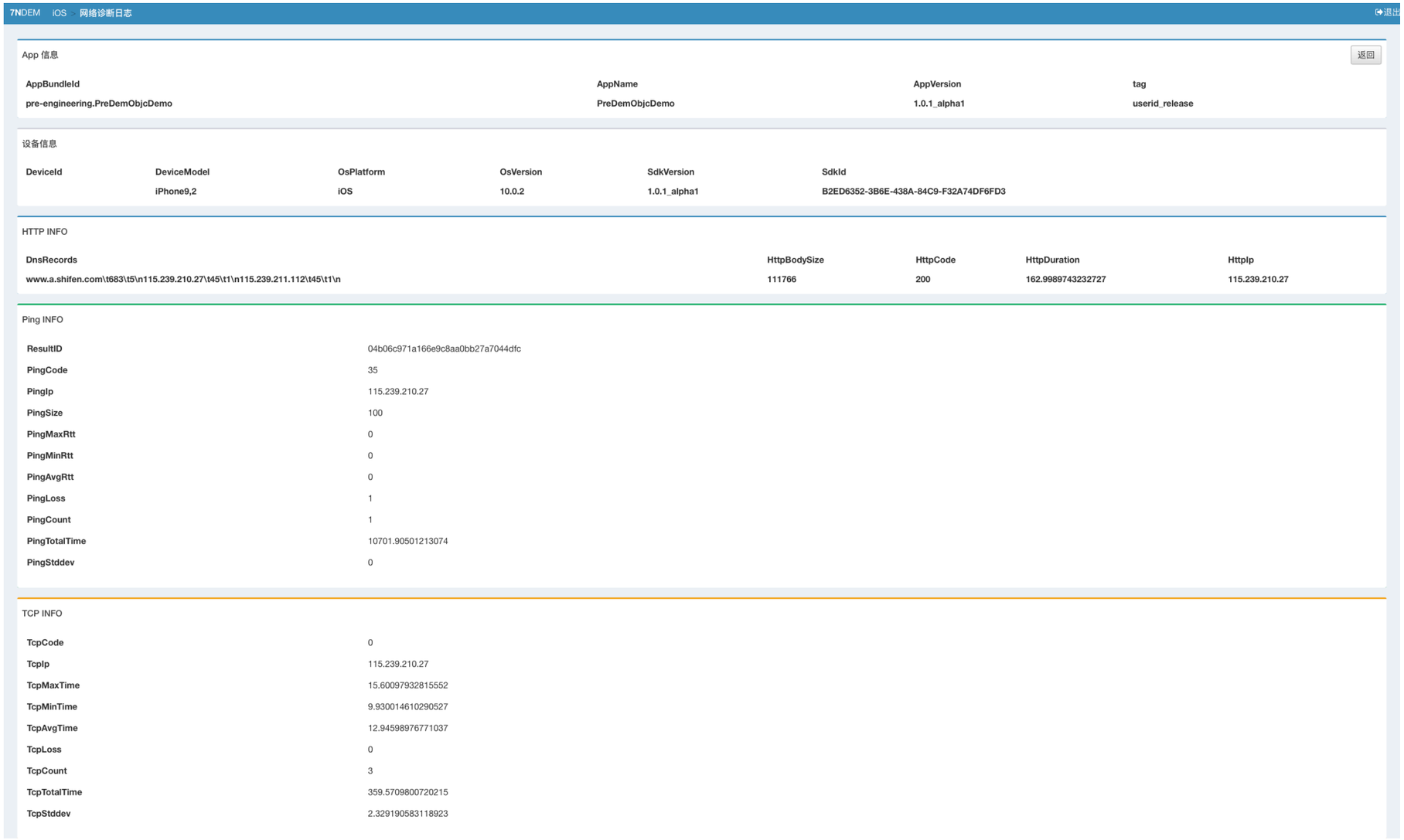
- 获取 Ping，Tcp Ping，http request，DNS 上报
- 相关信息的展示、检索及分析告警

七牛云

网络诊断信息

```objc
+ (void)diagnose:(NSString *)host
       netClient:(PREDNetworkClient *)client
        complete:(PREDNetDiagCompleteHandler)complete {
    NSString *httpHost;
    if ([host hasPrefix:@"http://"] || [host hasPrefix:@"https://"]) {
        httpHost = host;
        host = [[host componentsSeparatedByString:@"//"] lastObject];
    } else {
        httpHost = [NSString stringWithFormat:@"http://%@", host];
    }
    PREDNetDiagResult *result = [[PREDNetDiagResult alloc] initWithComplete:complete netClient:client];
    [QNNPing start:host size:64 output:nil complete:^(QNNPingResult *r) {
        [result gotPingResult:r];
    }];
    [QNNTcpPing start:host output:nil complete:^(QNNTcpPingResult *r) {
        [result gotTcpResult:r];
    }];
    [QNNTraceRoute start:host output:nil complete:^(QNNTraceRouteResult *r) {
        [result gotTrResult:r];
    }];
    [QNNNslookup start:host output:nil complete:^(NSArray *r) {
        [result gotNsLookupResult:r];
    }];
    [QNNHttp start:httpHost output:nil complete:^(QNNHttpResult *r) {
        [result gotHttpResult:r];
    }];
}
```

网络诊断信息

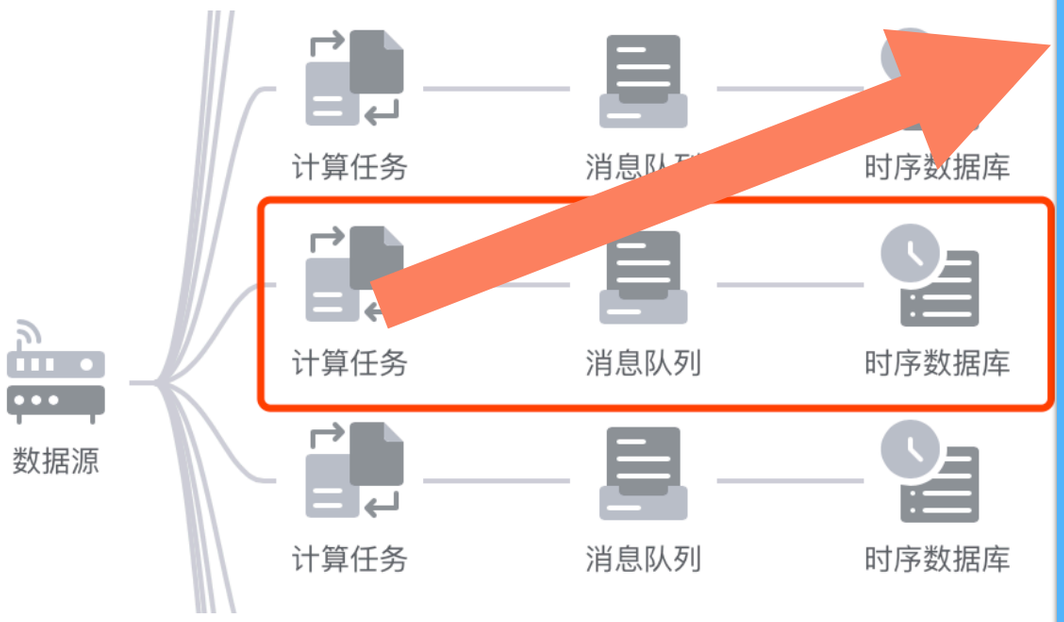

7NDEM iOS > 网络诊断日志
退出
App 信息
返回
AppBundleId
pre-engineering.PreDemObjcDemo
AppName
PreDemObjcDemo
AppVersion
1.0.1_alpha1
tag
userid_release
设备信息
DeviceId
DeviceModel
iPhone9,2
OsPlatform
iOS
OsVersion
10.0.2
SdkVersion
1.0.1_alpha1
SdkId
B2ED6352-3B6E-438A-84C9-F32A74DF6FD3
HTTP INFO
DnsRecords
www.a.shifen.com\t683\t5\n115.239.210.27\t45\t1\n115.239.211.112\t45\t1\n
HttpBodySize
111766
HttpCode
200
HttpDuration
162.9989743232727
HttpIp
115.239.210.27
Ping INFO
ResultID
04b06c971a166e9c8aa0bb27a7044dfc
PingCode
35
PingIp
115.239.210.27
PingSize
100
PingMaxRtt
0
PingMinRtt
0
PingAvgRtt
0
PingLoss
1
PingCount
1
PingTotalTime
10701.90501213074
PingStddev
0
TCP INFO
TcpCode
0
TcpIp
115.239.210.27
TcpMaxTime
15.60097932815552
TcpMinTime
9.930014610290527
TcpAvgTime
12.94598976771037
TcpLoss
0
TcpCount
3
TcpTotalTime
359.5709800720215
TcpStddev
2.329190583118923

七牛云

自定义上报

- 接收宿主 app 传入的数据模型直接进行序列化并上报
- 利用 Pandora 强大的分析功能进行自定义分析与展示

七牛云




```
select
    cast(cast(time as bigint) / 5 as bigint) * 5
as time,
    cdn,
    country,
    province,
    isp,
    platform,
    sum(v4) as total,
    count(v4) as number
from stream
where
    tag = 'monitor’
group by
    cast(cast(time as bigint) / 5 as
bigint) * 5,  cdn, country, province,
isp, platform
```

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开放分析-数据流

- 树状拓扑
- 每个分支代表一个统计计算或数据导出功能
- 可以导出到Http，Logdb，Tsdb，存储
- 实时，离线

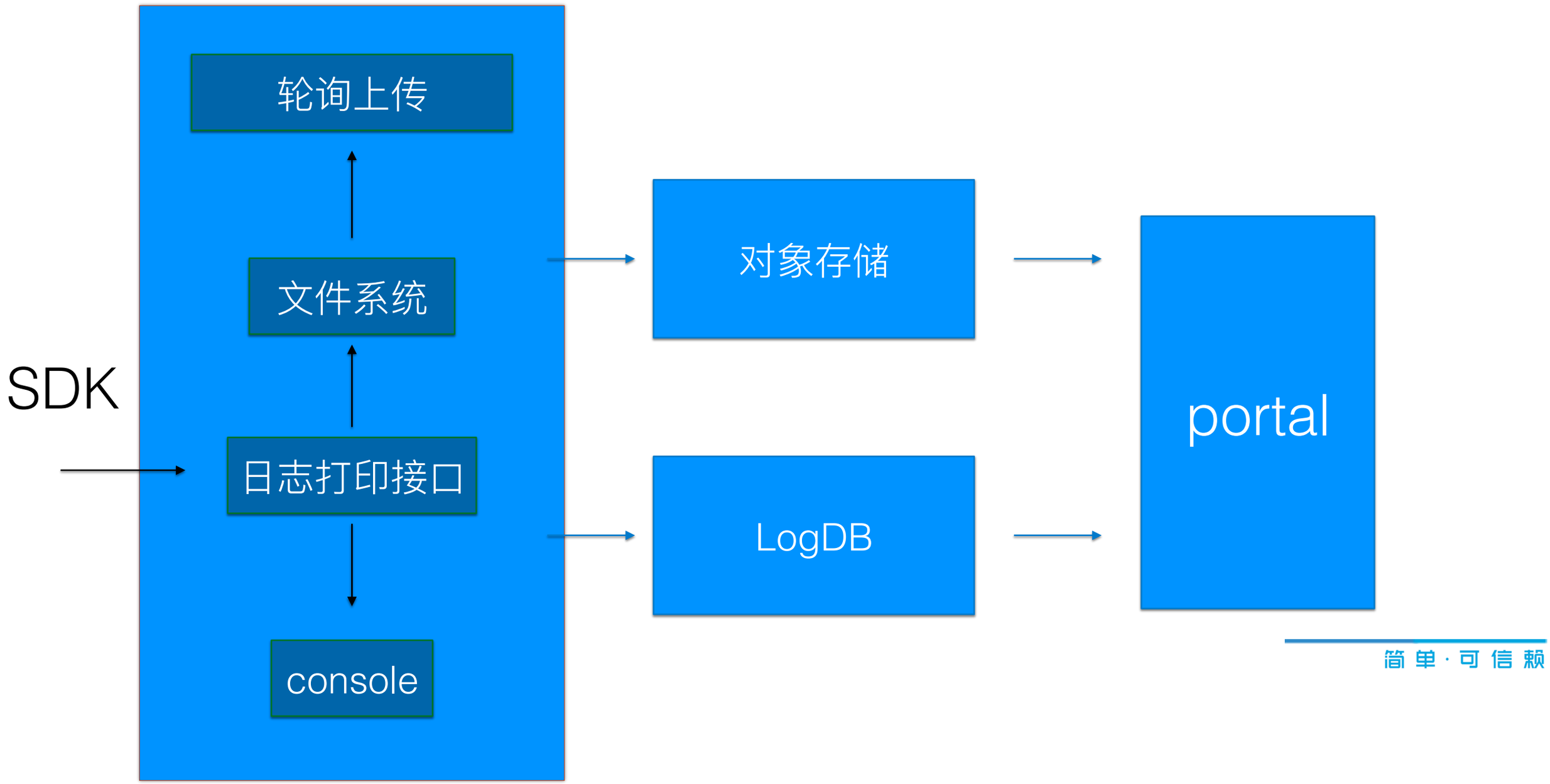
七牛云

日志上报

- 支持区按照级别过滤打印
- 支持自定义将 log 进行本地保存及上传

七牛云

日志上报



七牛云

日志上报

```
+ (void)startCaptureLogWithLevel:(PREDLogLevel)logLevel {
    if (_fileLogger && _fileLogLevel == logLevel) {
        return;
    }
    _fileLogLevel = logLevel;
    [self stopCaptureLog];
    PREDLogFileManager *fileManager = [[PREDLogFileManager alloc] init];
    _fileLogger = [[DDFileLogger alloc] initWithLogFileManager:fileManager]; // File Logger
    _fileLogger.rollingFrequency = 0;
    [DDLog addLogger:_fileLogger withLevel:(DDLogLevel)logLevel];
    _logStartTime = [NSDate date];
}

+ (void)stopCaptureLog {
    if (_fileLogger) {
        [DDLog removeLogger:_fileLogger];
        _fileLogger = nil;
    }
}
```

日志上报

七牛云

```objc
- (void)didArchiveLogFile:(NSString *)logFilePath {
    NSLog(@"%s: %@", __PRETTY_FUNCTION__, logFilePath);
    [self uploadLog:logFilePath startTime:[_rfc3339Formatter stringFromDate:_logStartTime] endTime:
        [_rfc3339Formatter stringFromDate:[NSDate date]] retryTimes:0];
    _logStartTime = [NSDate date];
}

- (void)didRollAndArchiveLogFile:(NSString *)logFilePath {
    NSLog(@"%s, %@", __PRETTY_FUNCTION__, logFilePath);
    [self uploadLog:logFilePath startTime:[_rfc3339Formatter stringFromDate:_logStartTime] endTime:
        [_rfc3339Formatter stringFromDate:[NSDate date]] retryTimes:0];
    _logStartTime = [NSDate date];
}
```

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Web SDK

- 窗口性能分析
- AJAX 分析
- 错误拦截

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智能异常报告

- 根据历史推断阈值进行告警，发现异常模式

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机器学习

- 利用机器学习对崩溃等信息进行自动分析

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更丰富的图表展示

- Http 请求分析多维度聚合
- 崩溃信息多维度聚合

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完全开源，和大家一起演进

- 开放的心态，一起成长
- Android 地址：
  https://github.com/pre-dem/pre-dem-android
- iOS 地址：
  https://github.com/pre-dem/pre-dem-objc

七牛云
QINIU.COM

简单·可信赖

Q&A

网络服务接入优化

梁海龙

今天不讨论APP质量与服务端质量，
聚焦两者通信的问题。

目录

CONTENTS

QINIU

数据

靠数据来发现和权衡问题，而不是感觉。

你的失败数据要包括哪些?

用户终止	密码错误	余额不足
无法解析主机域名	403	404
5xx	网络超时	返回结果为空

数据方案

口径

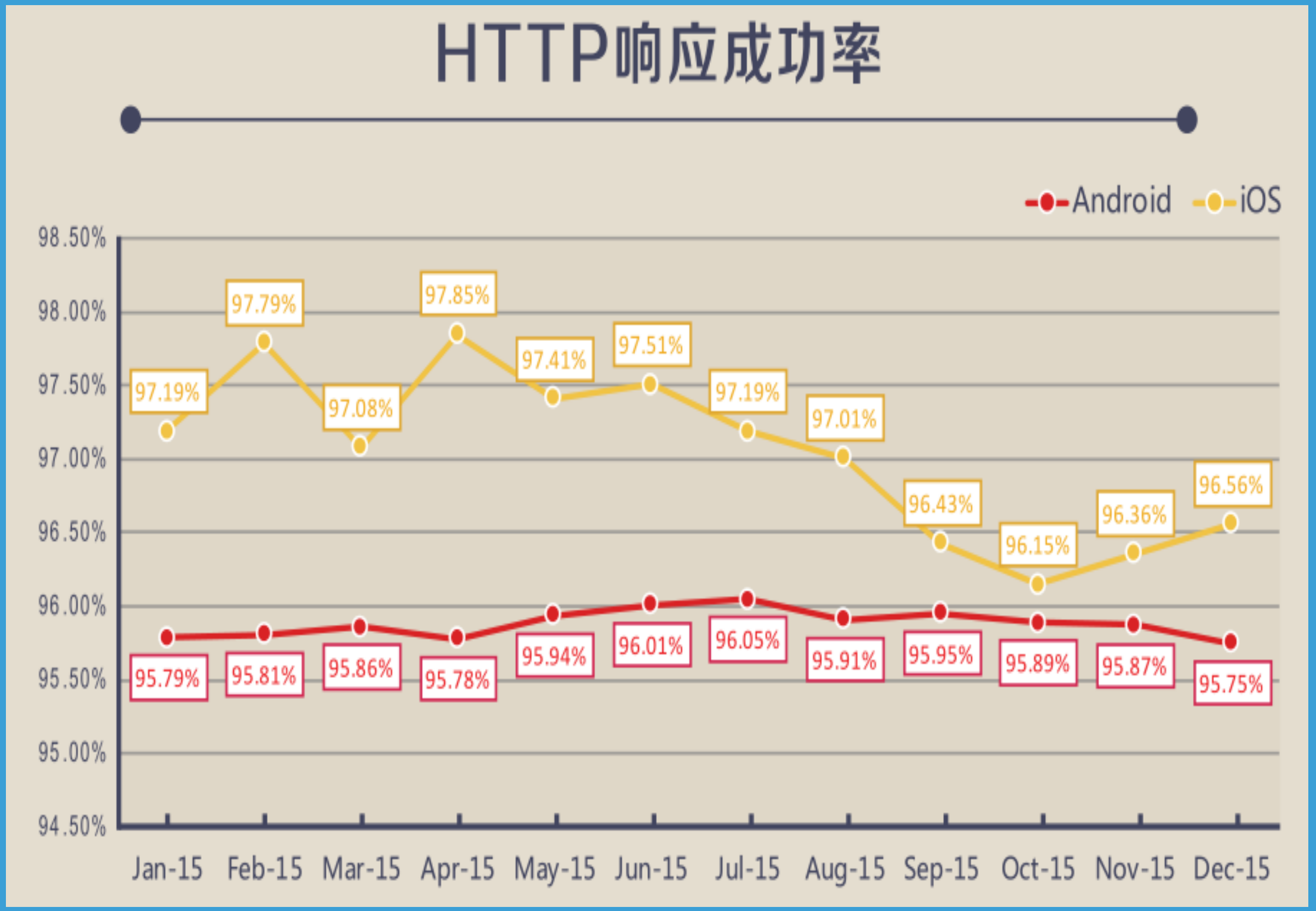
抽样

即时性

网络路径

别人的数据不能对比，只具有参考价值。

HTTP响应成功率，听云自皮书数据



QINIU

原因

DNS，某家电商均值2%-3%

good	bad
•易用 •CDN •浏览器	•不能解析 •发布慢 •劫持

内容劫持

发现

暗标记

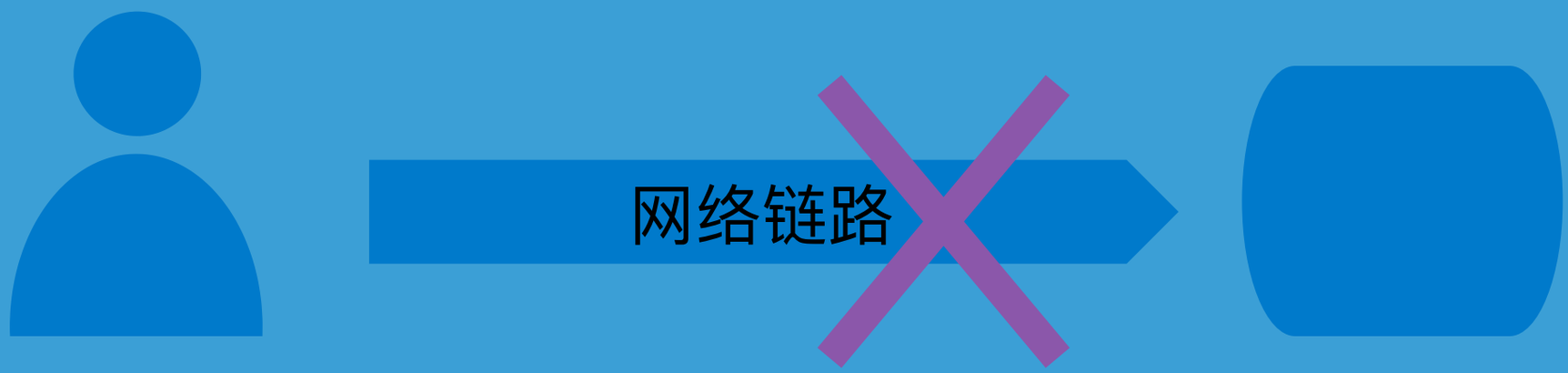
网页检测

解决

https

私有加密

网络故障



用户

机房

CDN

good

- 快
- 减轻重大故障影响
- 防DDOS

bad

- 不实时
- 故障

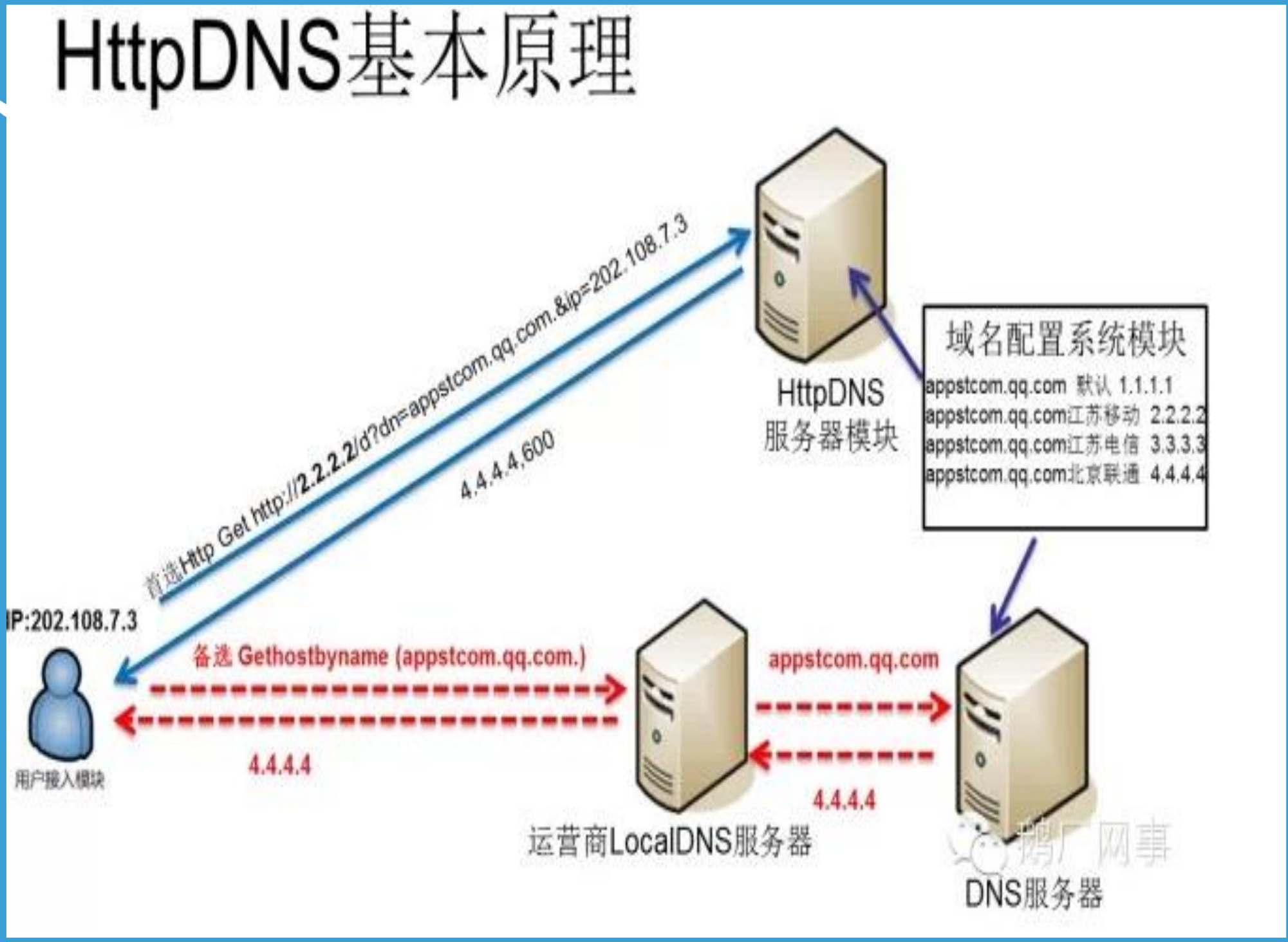
2G/3G/4G，以及某些小运营商

问题	解决
基站踢	维持
连接限制	长连接
拥塞丢弃	不要搞特殊
公共IP	小心IP误杀

QINIU

方案讨论

HTTP DNS


HttpDNS基本原理
首选Http Get http://2.2.2.2/d?dn=appstcom.qq.com.&ip=202.108.7.3
4.4.4.4,600
IP:202.108.7.3
用户接入模块
备选 Gethostbyname (appstcom.qq.com.)
4.4.4.4
HttpDNS
服务器模块
域名配置系统模块
appstcom.qq.com 默认 1.1.1.1
appstcom.qq.com江苏移动 2.2.2.2
appstcom.qq.com江苏电信 3.3.3.3
appstcom.qq.com北京联通 4.4.4.4
appstcom.qq.com
4.4.4.4
运营商LocalDNS服务器
DNS服务器

HTTP DNS 酷狗实践

APP配置列表，同步更新

- 安装包默认配置
- 同步服务IP+域名
- 定时同步

不同业务不同策略

- 多域名
- IP优先
- 容灾网关

“这个接口不能重试。”

幂等

所有的接口都可以改造成幂等的接口。

HTTPS 的优化

长连接

握手优化

加密优化

等等

长连接，多路复用

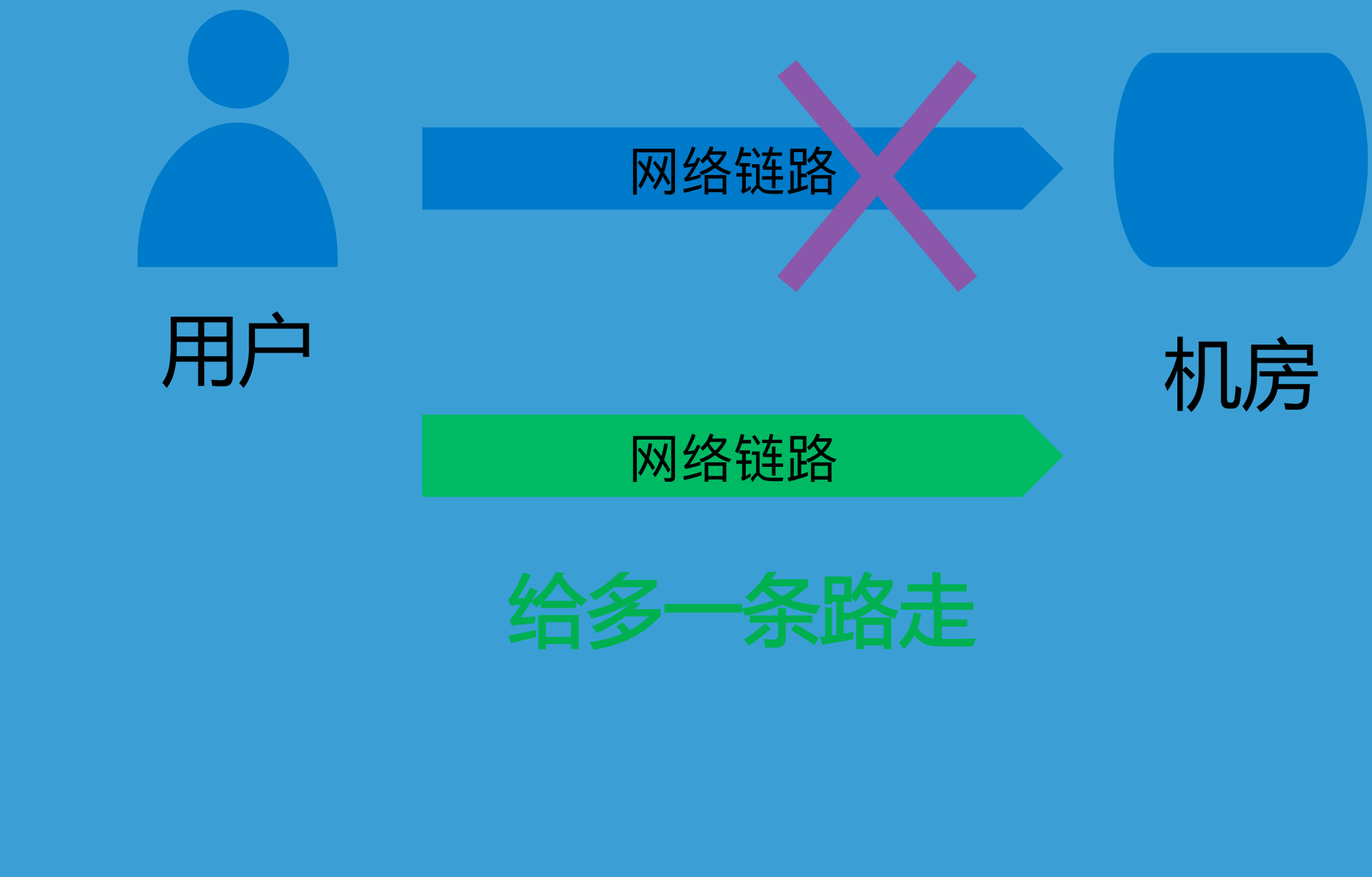
HTTP 1.0

HTTP 1.1

HTTP 2

SPDY

网络故障的应对



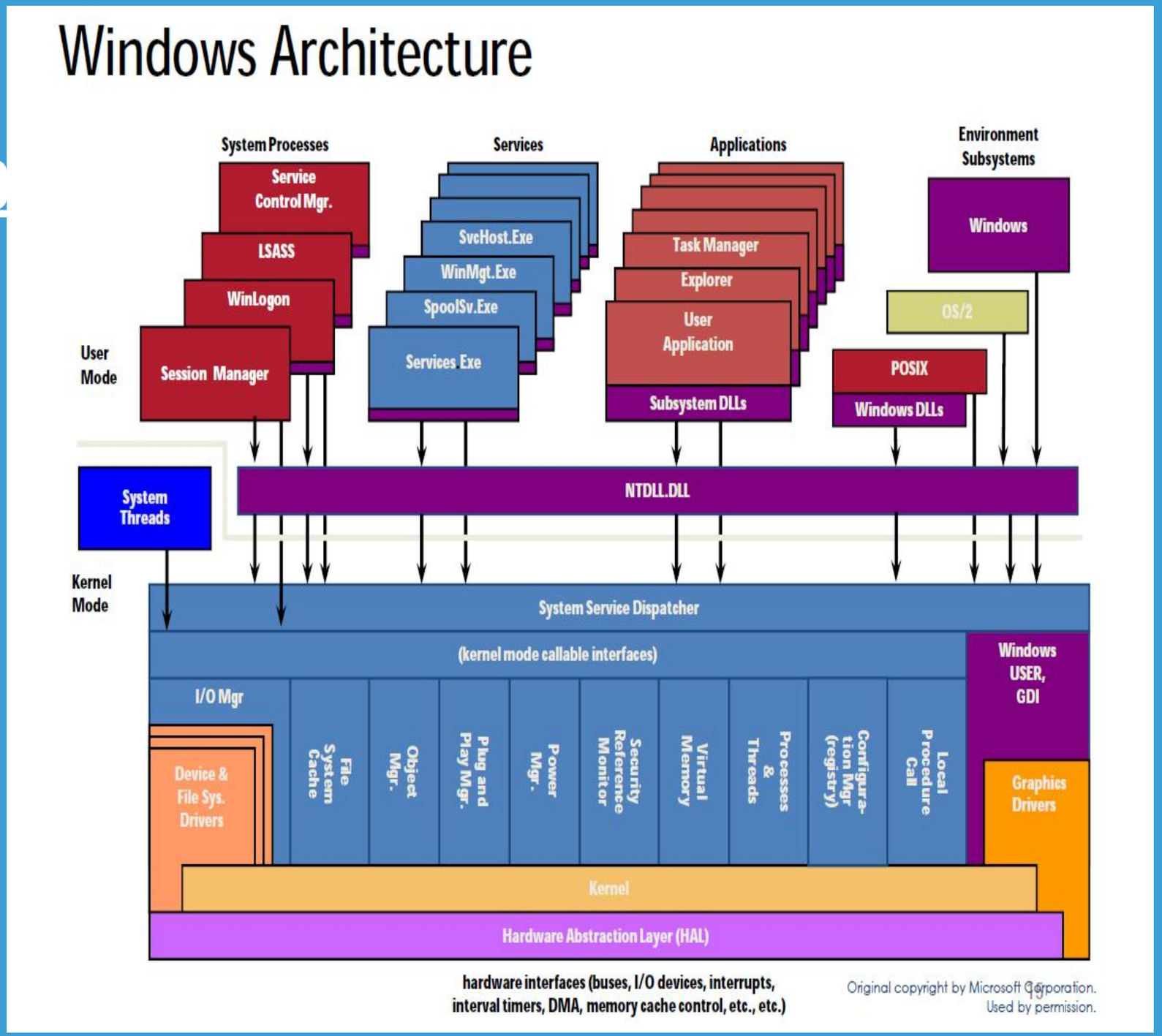
给多一条路走策略

东西、南北机房

CDN、备用CDN、源站

公网、网关+专线

APP架构模式


Windows Architecture
System Processes
Service Control Mgr.
LSASS
WinLogon
Session Manager
Services
SvcHost.Exe
WinMgt.Exe
SpoolSv.Exe
Services.Exe
Applications
Task Manager
Explorer
User Application
Subsystem DLLs
Environment Subsystems
Windows
OS/2
POSIX
Windows DLLs
User Mode
System Threads
NTDLL.DLL
Kernel Mode
System Service Dispatcher
(kernel mode callable interfaces)
I/O Mgr
Device & File Sys. Drivers
File System Cache
Object Mgr.
Plug and Play Mgr.
Power Mgr.
Security Reference Monitor
Virtual Memory
Processes & Threads
Configuration Mgr (registry)
Local Procedure Call
Windows USER, GDI
Graphics Drivers
Kernel
Hardware Abstraction Layer (HAL)
hardware interfaces (buses, I/O devices, interrupts, interval timers, DMA, memory cache control, etc., etc.)
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最后还有一句话

业务合适的才是真的好

Q&A

THANK YOU