

线上问题排查交流

@单农 - 挖财信用卡技术部

Agenda

- “汽车追尾”事故
- 快速响应线上问题
- 常见问题

汽车追尾



当事人



事故现场(道路)



交通警察

线上问题



代码



问题现场(服务器)



开发同学

快速响应线上问题

三步走：

1. 保存问题现场（快速分析）
2. 重启线上服务器
3. 线下定位问题代码

保存问题现场-1

工欲善其事，必先利其器

- [jps](#) - JVM Process Status Tool
- /data/program/<groupId>/<artifactId>/<version>/bin/service.sh dump
 - [jstat](#) - JVM Statistics Monitoring Tool
 - [jinfo](#) - Configuration Info for Java
 - [jstack](#) - Stack Trace for Java (Thread Dump)
 - [jmap](#) - Memory Map for Java (Heap Dump)
 - bin/service.sh heapdump

保存问题现场-2

- `jps -lmv | grep $appname`
- `jstat -gccapacity -h7 $pid 1s`、`jstat -gcutil -h7 $pid 1s`
- `jinfo $pid`
- `jstack $pid`
- `jmap -dump:live,format=b,file="$filename" $pid`
- `jmap -histo $pid`、`jmap -heap $pid`

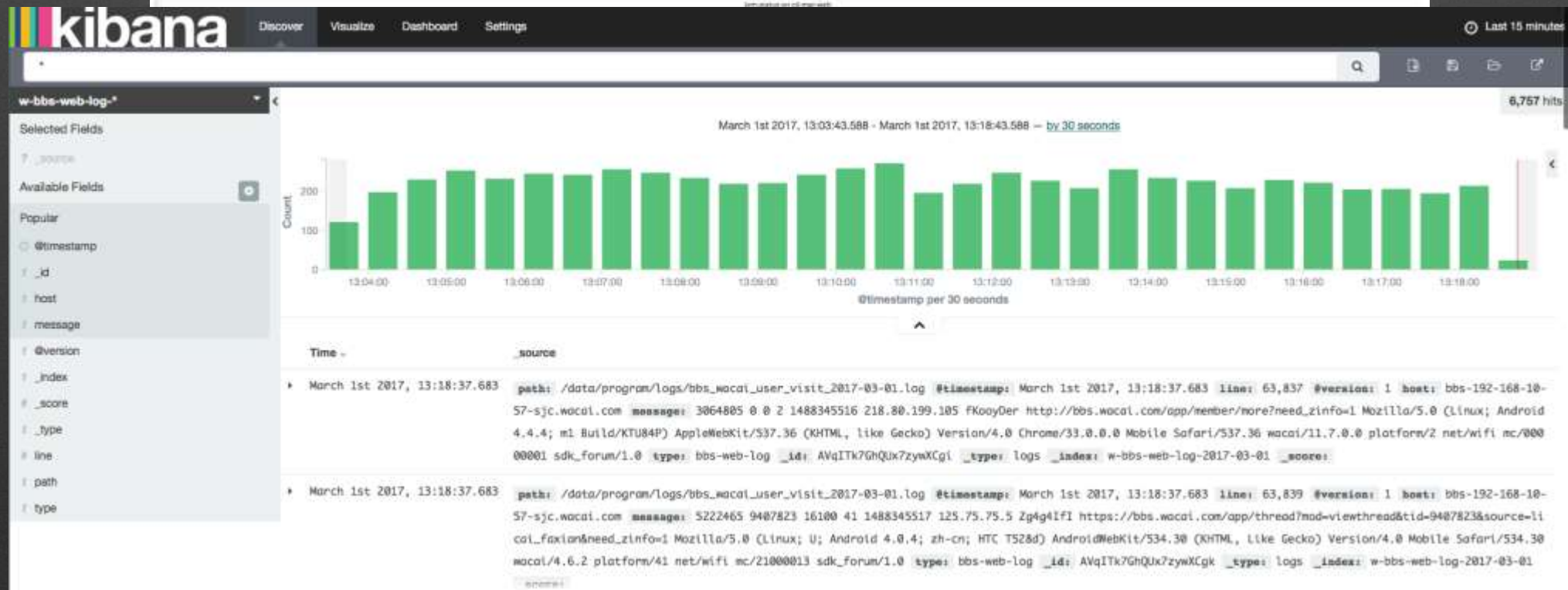
保存问题现场-3

- [top](#) - display Linux tasks
- [lsuf](#) - list open files
- [netstat](#) - Print network connections, routing tables, interface statistics, masquerade connections, and multicast memberships
- [iostat](#) - Report Central Processing Unit (CPU) statistics and input/output statistics for devices and partitions
- [mpstat](#) - Report processors related statistics
- [vmstat](#) - Report virtual memory statistics
- [free](#) - Display amount of free and used memory in the system
- [sar](#) - Collect, report, or save system activity information
- [uptime](#) - Tell how long the system has been running

保存问题现场-4

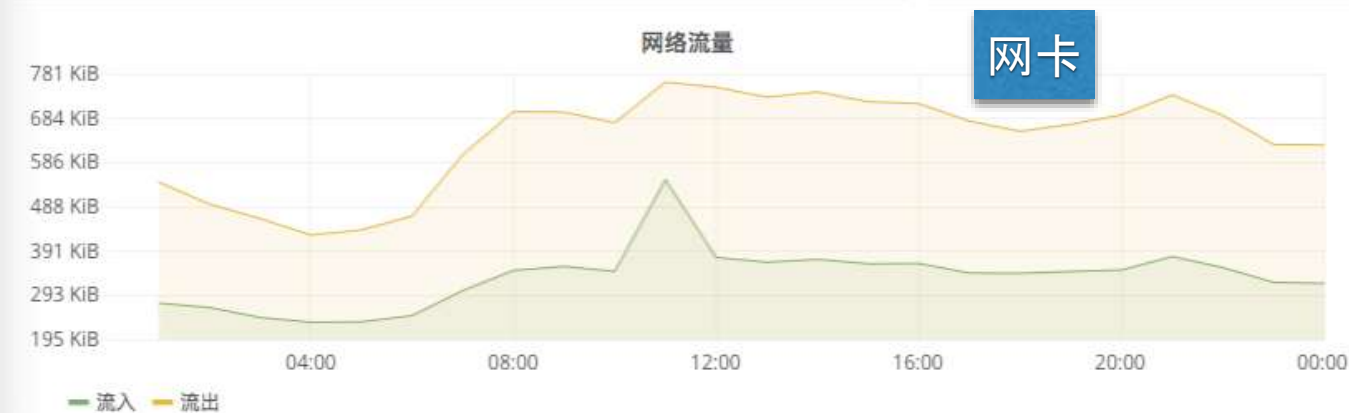
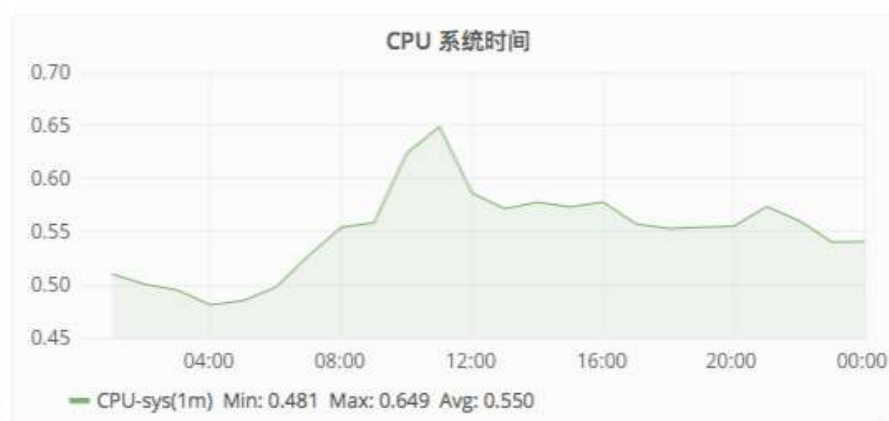
- `top -d 3 -u $username、 top -H`
- `lsdf -p $pid`
- `netstat -an`
- `iostat`
- `mpstat -P ALL 3`
- `vmstat -S M`
- `free -th`
- `sar`
- `uptime`

快速分析-监控体系



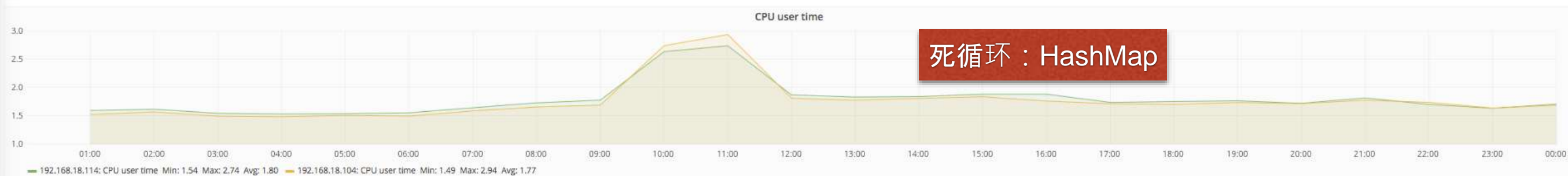
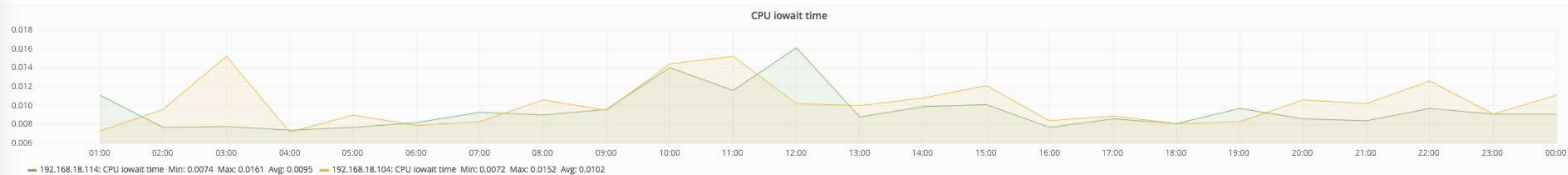
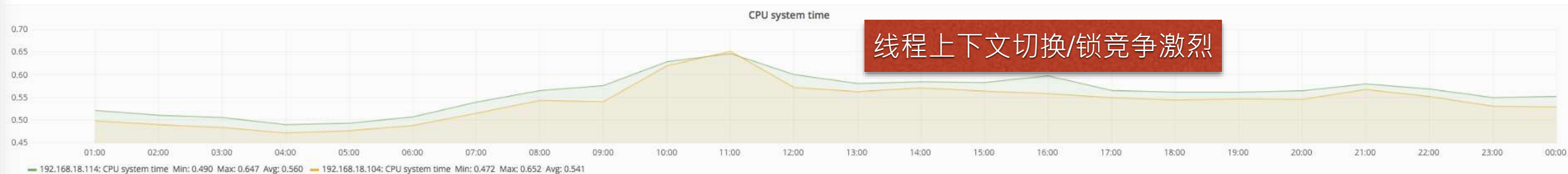
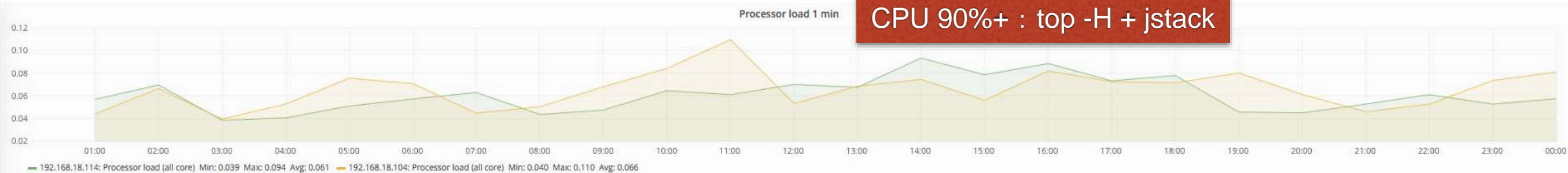
Grafana监控-系统概述

▼ 系统概览

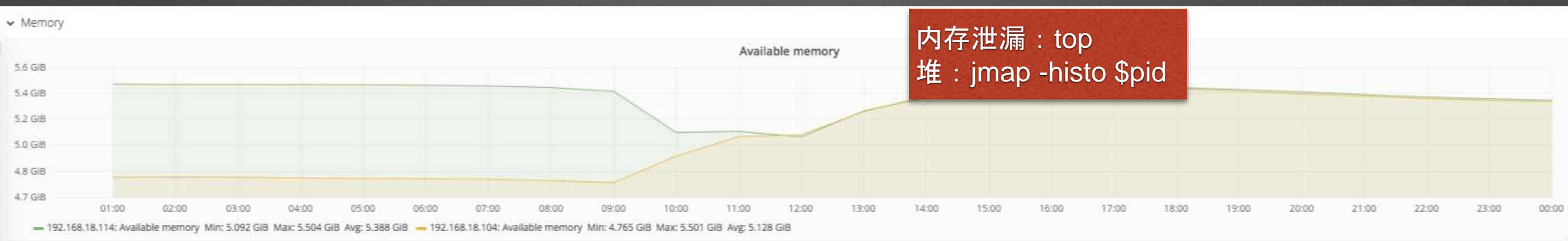


Grafana监控-CPU

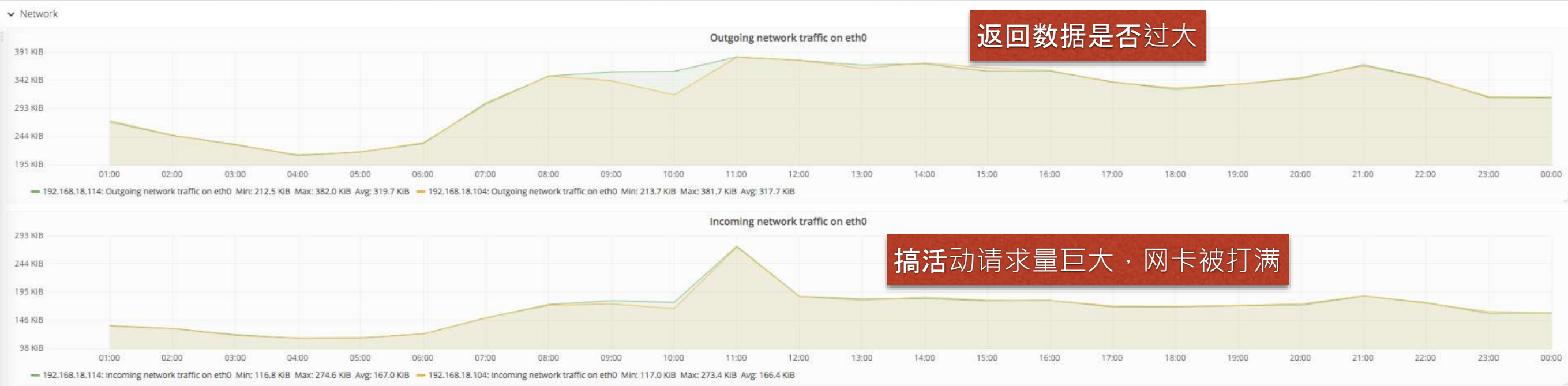
▼ CPU



Grafana监控-内存



Grafana监控-网络

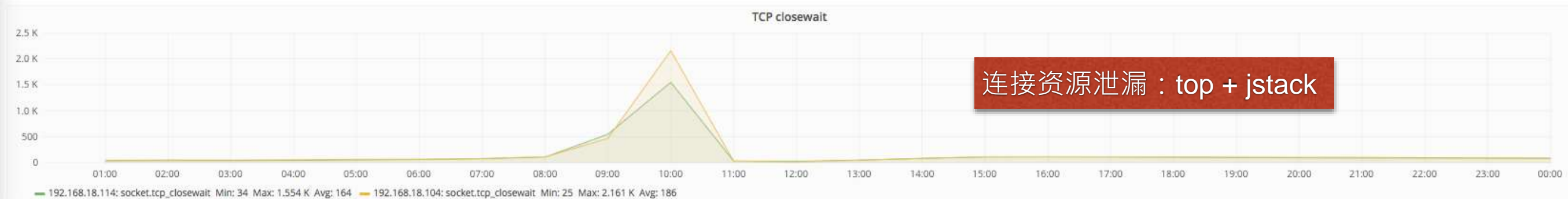
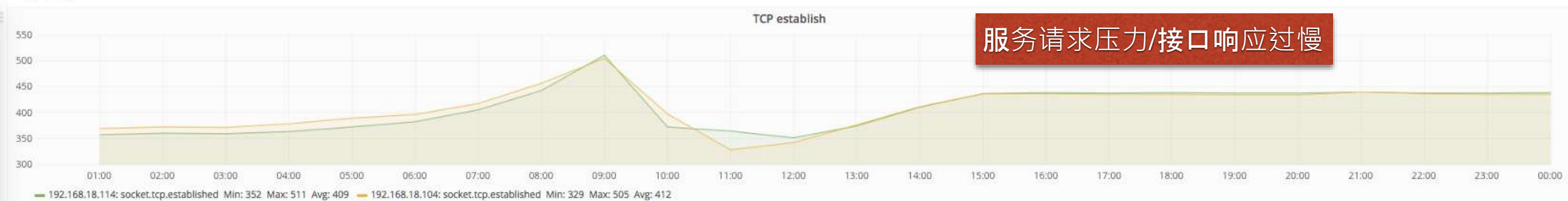


Grafana监控-磁盘

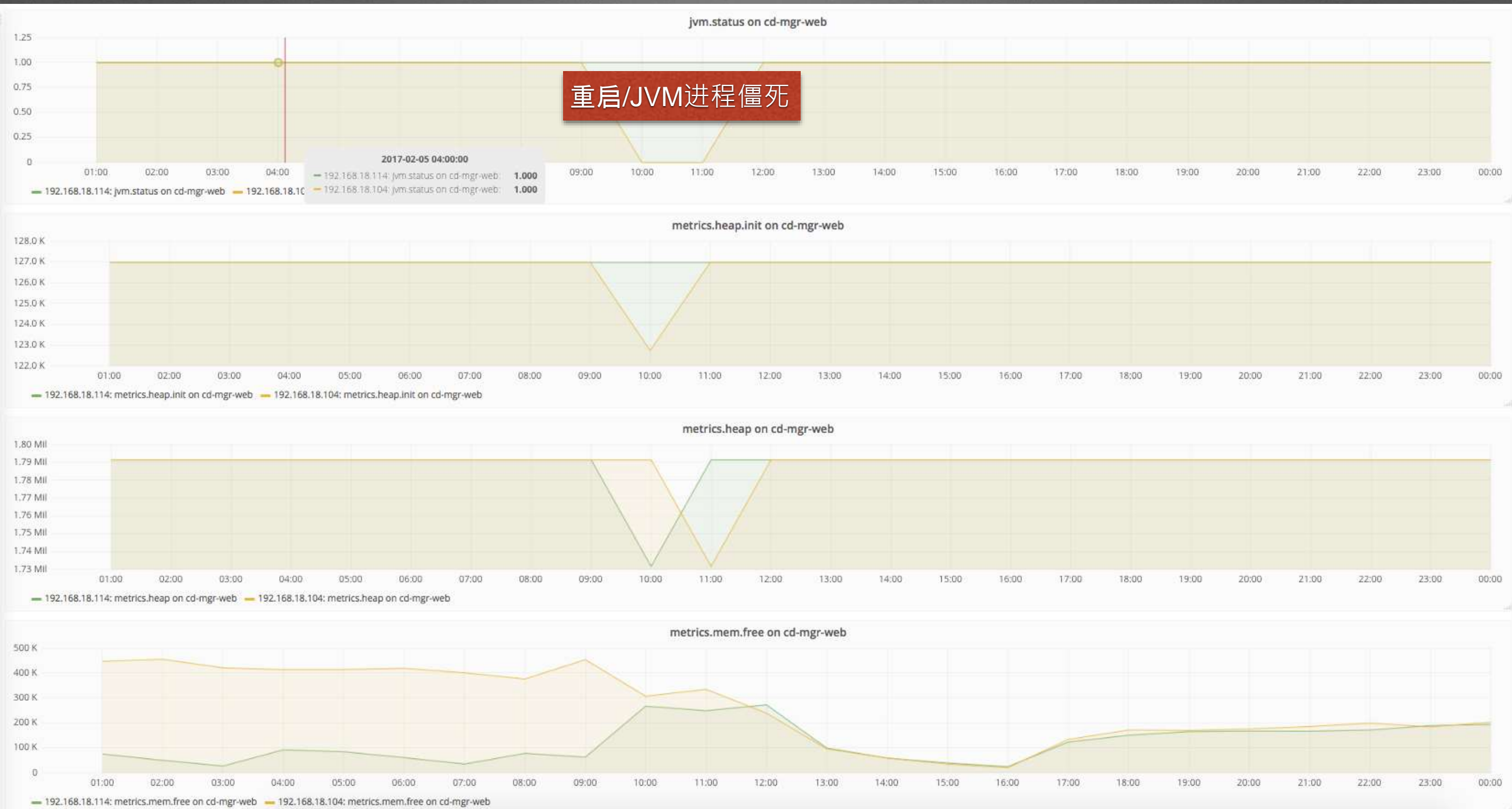


Grafana监控-TCP状态

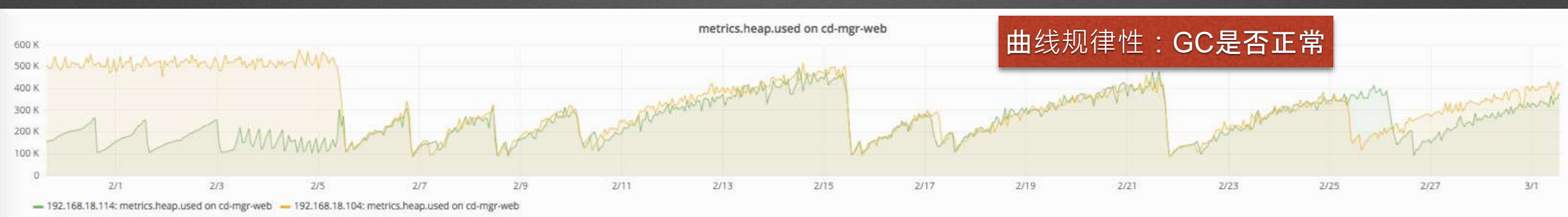
▼ TCP Status



Grafana监控-JVM

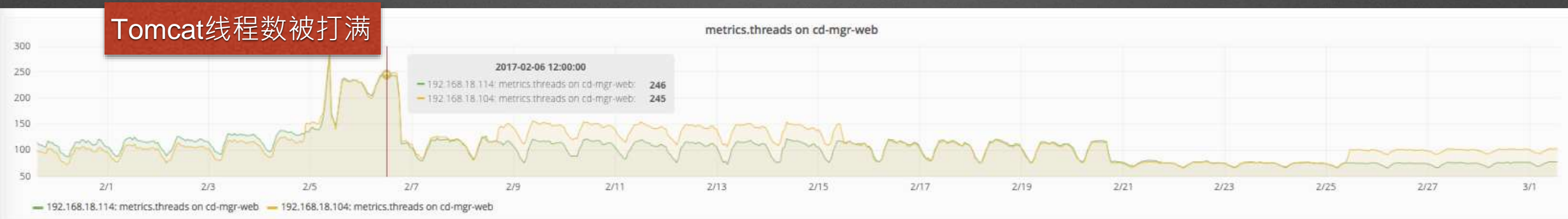


Grafana监控-GC

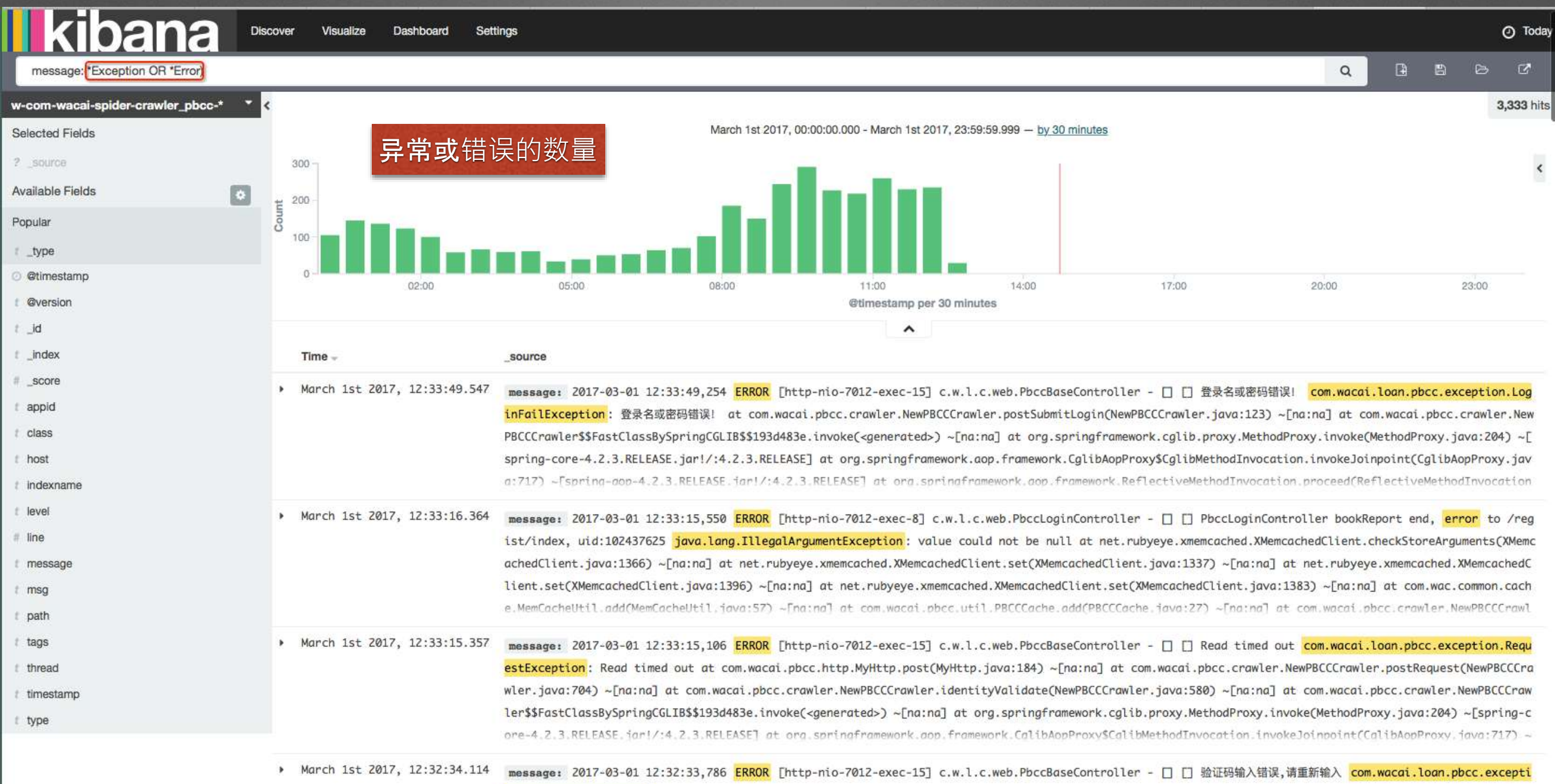


Grafana监控-Tomcat

Tomcat线程数被打满



Kibana-日志查询



重启线上服务器

- [Obelisk - 一键发布/部署平台](#)

线下定位问题代码

- [IBM Thread and Monitor Dump Analyze for Java](#): jstack
- [Eclipse Memory Analyzer \(MAT\)](#) - Java heap analyzer: jmap
- [BTrace](#) - dynamic tracing tool for Java: 在线定位
- `cat netstat.dump | awk '/^tcp/ {++S[$NF]} END {for(a in S) print a, S[a}]'`

Thread Dump List

IBM Thread and Monitor Dump Analyzer for Java

File Analysis View Help

Floatable

Thread Dump List

Name	Timestamp	Runnable/Total Threads	Free/Allocated Heap(Free%)	AF(SC)/GC Counter	Monitor Contention
creditcard-wap-jstack-25016.dump_1	一月 26 17:38:05 2017	37/542	unknown/unknown(unknown)	None	None

- File name : /Users/dannong/Documents/tools/jstack/creditcard-wap-jstack-25016.dump
- Timestamp : 2017-01-26 17:38:05
- Thread Status Analysis

Status	Number of Threads : 542	Percentage
Deadlock	0	0 (%)
Runnable	37	7 (%)
Waiting on condition	498	92 (%)
Waiting on monitor	0	0 (%)
Suspended	0	0 (%)
Object.wait()	5	1 (%)
Blocked	2	0 (%)
Parked	0	0 (%)

- Thread Method Analysis

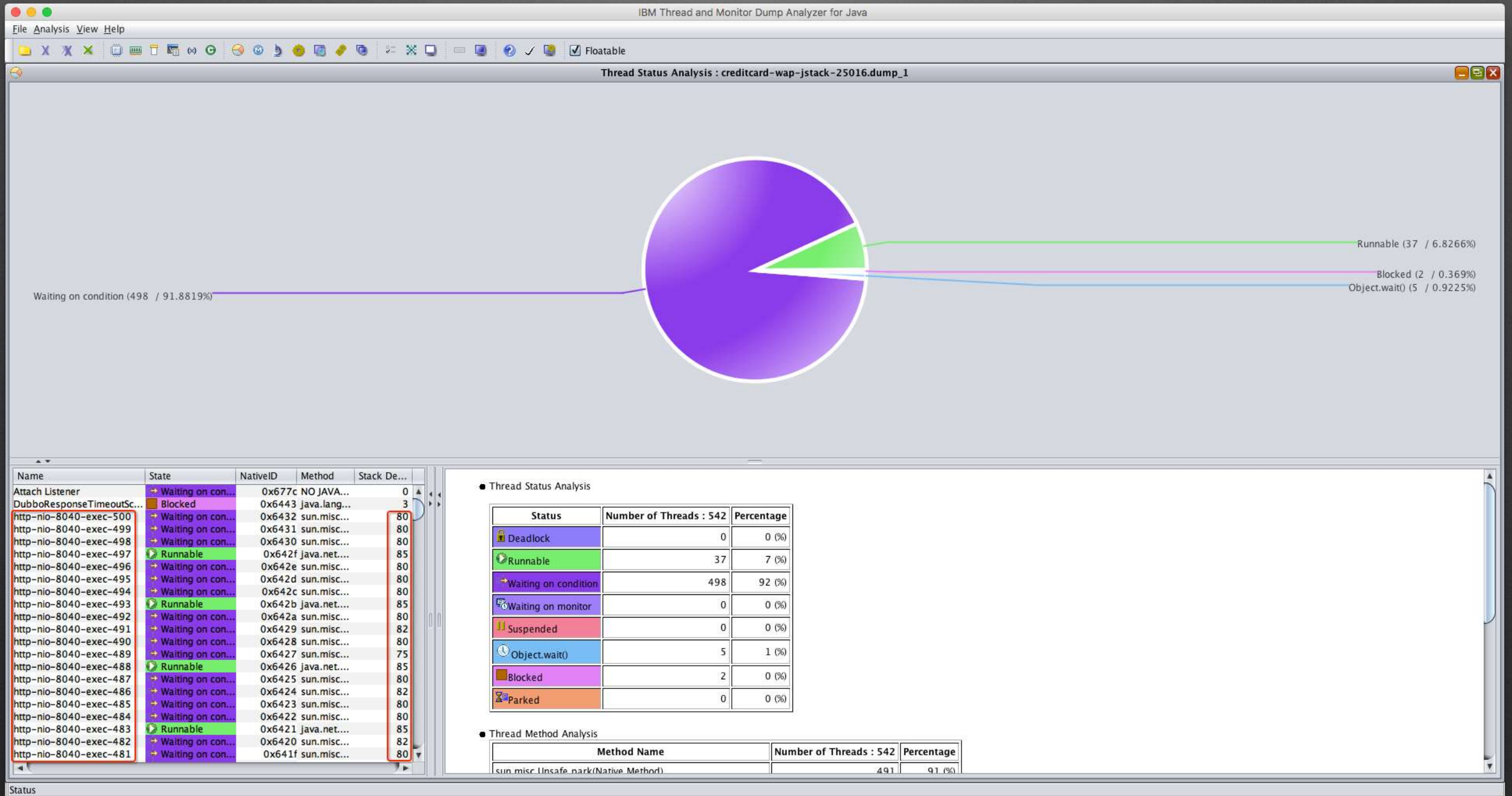
Method Name	Number of Threads : 542	Percentage
sun.misc.Unsafe.park(Native Method)	491	91 (%)
java.net.SocketInputStream.socketRead0(Native Method)	20	4 (%)
sun.nio.ch.EPollArrayWrapper.epollWait(Native Method)	10	2 (%)
NO JAVA STACK	7	1 (%)
java.lang.Thread.sleep(Native Method)	5	1 (%)
java.lang.Object.wait(Native Method)	5	1 (%)
java.net.PlainSocketImpl.socketAccept(Native Method)	3	1 (%)
sun.nio.ch.ServerSocketChannelImpl.accept0(Native Method)	1	0 (%)

- Thread Aggregation Analysis

Thread Type	Number of Threads : 542	Percentage
Thread	8	1 (%)

Status

Thread Status Analysis



常见问题

- 连接资源泄漏：连接超时未设置
 - TCP CLOSE_WAIT + top + jstack
- CPU高：死循环之HashMap
 - top -H + jstack
- 内存泄漏：
 - jmap

“敬畏线上的任何异常。”

—*Johnny Appleseed*

感谢同行的工作

- [JDK Tools and Utilities](#)
- [Linux Performance Analysis and Tools](#) - Brendan Gregg
- [Java常见问题排查](#) - 毕玄 (BlueDavy, 林昊)
- [高性能的Java代码编写及常见问题排查](#) - 毕玄
- [Java线上应用问题排查方法和工具](#) - 空望
- [IBM Thread and Monitor Dump Analyze for Java](#)
- [Eclipse Memory Analyzer \(MAT\)](#)
- [BTrace](#) - a safe, dynamic tracing tool for the Java platform

Q&A

Thanks!