



# PHP7, 大象真会飞~

微博移动服务集群 PHP7 升级部署经验分享

@胡波\_

# 关于我

- 现在负责微博移动应用服务
- 经历过两次创业
- 打拼了十多年的老码农
- 微博: @胡波\_



# 关于移动应用服务

- 直接面向用户，需求变动频繁还要求能快速相应
- 微博最大的流量入口，每天过百亿的 Hits
- 突发热点事件，极端峰值，QPS 峰值过80万
- 三节（元旦、圣诞、春节）超高峰值
- 面向移动客户端，网络接入环境复杂且不稳定
- 背负着几十个线上版本

## NGINX

Dispatch

Rewrite

Request ID

Access control



PHP Scripts

Zend Optimizer Plus



Yaf Application Framework

Weibo Conf

Weibo Utils

Gettext

Yac

Msgpack

Memcached

Yar RPC Framework

Weibo Log

...

## Data & Services

Cache

Yar Java API

Yar C Service

Yar PHP Service



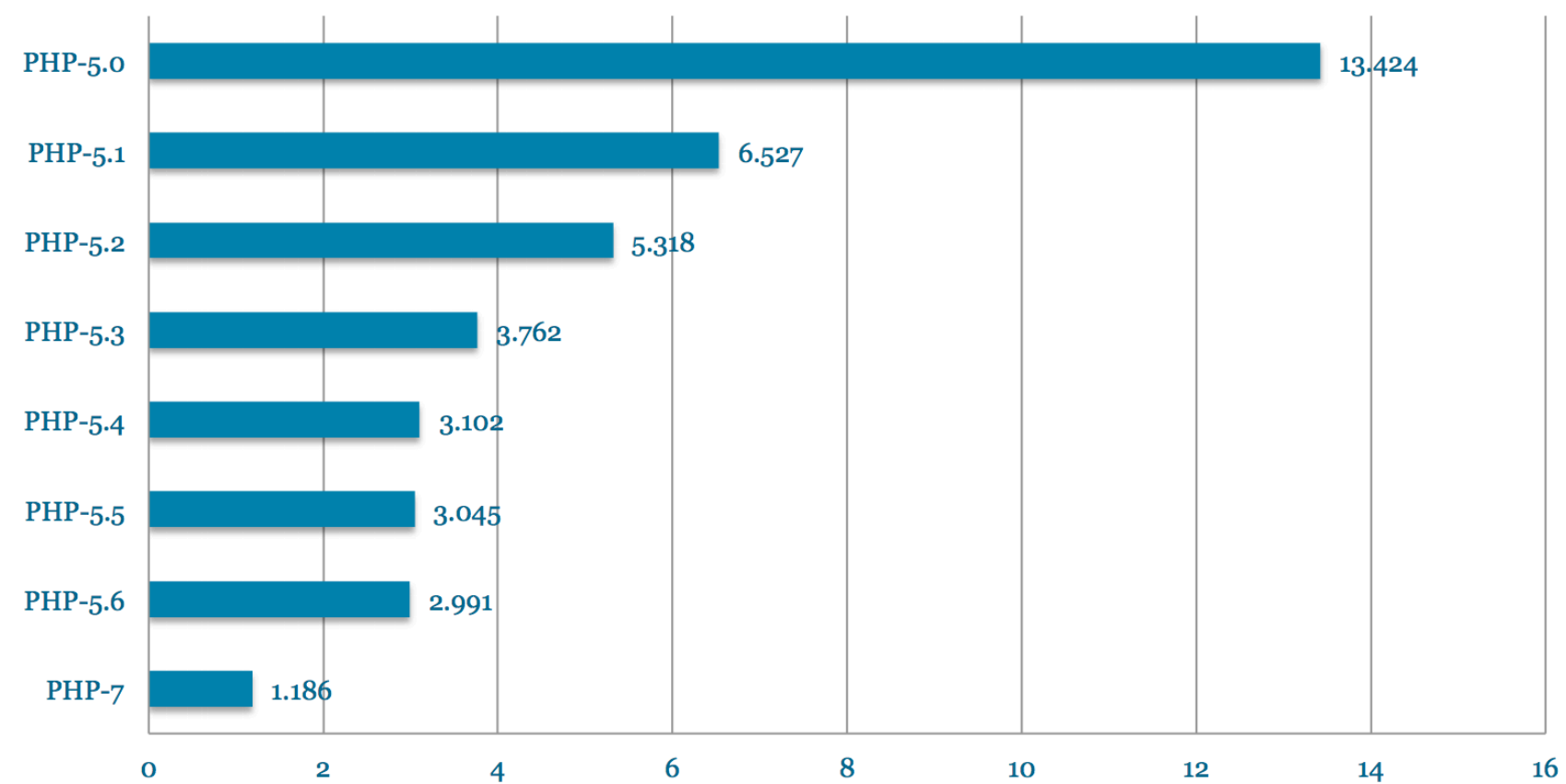
# PHP7 新特性

- PHP NG , 新一代引擎
- 抽象语法树
- 标量类型声明、返回值类型声明、强类型、Int64
- 新操作符符 `<=>` , `**` , `??` , `\u{xxxx}`
- `define()` 常量支持数组, 匿名类, `Closure::call()`
- 核心错误可以通过异常捕获了
- .....

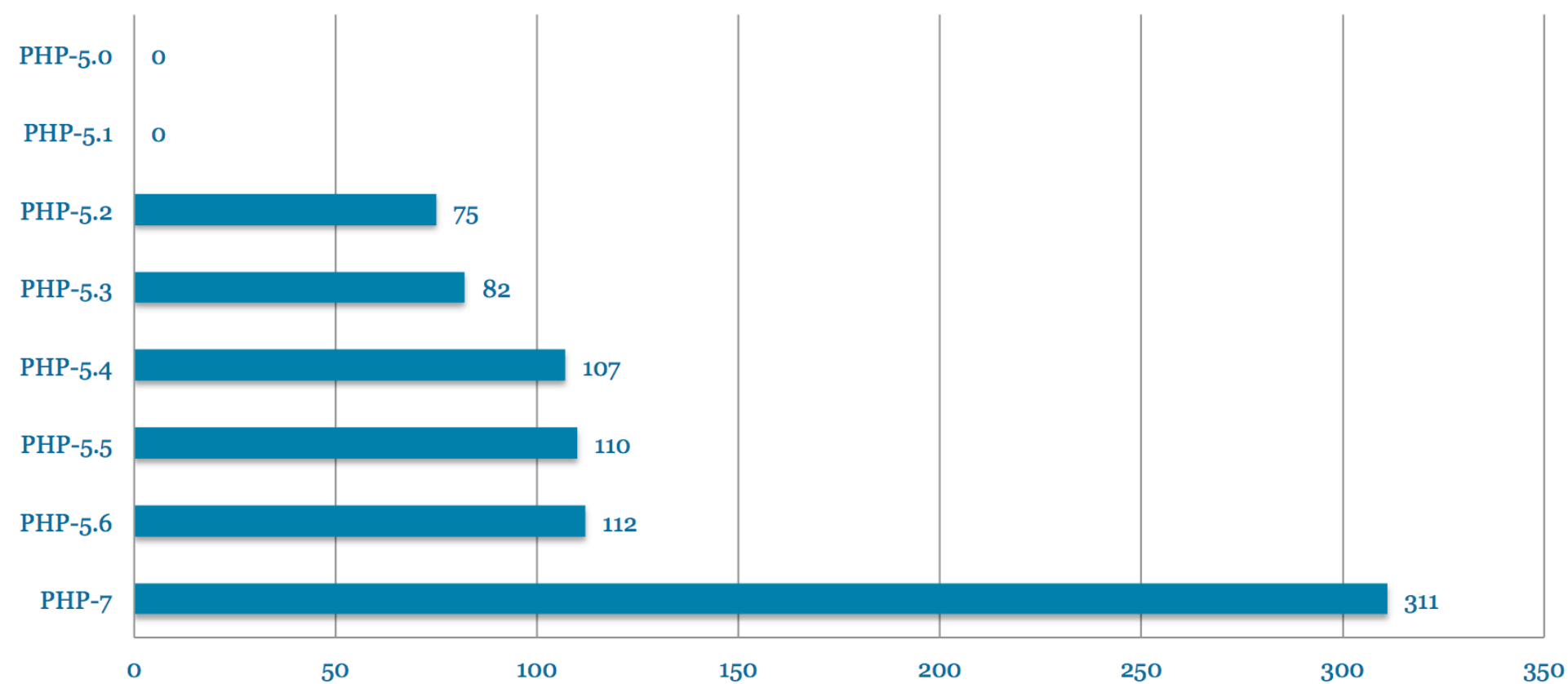
# 为什么升级 PHP7

# 为什么升级 PHP7

bench.php(sec)



wordpress 3.0.1 home page qps





# 为什么升级 PHP7

压测的服务器硬件配置:

Intel(R) Xeon(R) CPU E5-2620 0 @ 2.00GH 内存16GB

PHP:

PHP 7.0.0 (cli) (built: Dec 8 2015 16:02:26) ( NTS )

Copyright (c) 1997-2015 The PHP Group

Zend Engine v3.0.0, Copyright (c) 1998-2015 Zend Technologies

with Zend OPcache v7.0.6-dev, Copyright (c) 1999-2015, by Zend Technologies

```
155707 fetches, 1000 max parallel, 2.64702e+06 bytes, in 300 seconds
17 mean bytes/connection
519.023 fetches/sec, 8823.39 bytes/sec
msecs/connect: 97.437 mean, 15041 max, 0.705 min
msecs/first-response: 1822.86 mean, 5709.07 max, 111.829 min
HTTP response codes:
code 200 -- 155707 @沐然的爸爸
```

```
300281 fetches, 1000 max parallel, 5.10478e+06 bytes, in 300 seconds
17 mean bytes/connection
1000.94 fetches/sec, 17015.9 bytes/sec
msecs/connect: 0.955741 mean, 1003.47 max, 0.691 min
msecs/first-response: 996.069 mean, 6483.76 max, 718.78 min
HTTP response codes:
code 200 -- 300281 @沐然的爸爸
```

```
332385 fetches, 1000 max parallel, 5.65054e+06 bytes, in 300 seconds
17 mean bytes/connection
1107.95 fetches/sec, 18835.1 bytes/sec
msecs/connect: 0.976977 mean, 1003.22 max, 0.693 min
msecs/first-response: 899.899 mean, 4784.08 max, 362.209 min
HTTP response codes:
code 200 -- 332385 @沐然的爸爸
```

- PHP5.4 : 519
- PHP7 : 1000 +93%
- PHP7+hugepage : 1107 +113%



胡波\_ ★

2015-12-10 19:26 来自 微博 weibo.com

我要申请所有PHP前端机都在万兆区，老板会不会把我掐死呢😂//@Laruce: 瓶颈转移了🐱

@胡波\_ ★📷

让@沐然的爸爸 和@苏满\_ 搞FEED 在 PHP7 压测，居然，把网卡带宽打满了，idle 还有50呢

@Laruce 🍷

2015-12-10 19:22 来自 微博 weibo.com

阅读 0 | 34 | 3 | 3

阅读 0 推广

4

评论

赞



# 为什么升级 PHP7

- PHP7比 PHP5.4 性能提升一倍以上
- 微博移动应用服务依赖的扩展都已经支持 PHP7
- 业务增长迅速，DAU 同比增长60%（晚高峰 idle<25%）
- V5 项目，升级到 PHP5.4, 节省了777台服务器
- 穷，三节马上到了.....

# 我们升级的后盾

- 单元测试：覆盖率 >85%
- 持续集成：Gitlab-CI , PHPUnit , PHPCS , PHPMD , QuickBuild...
- 监控和日志检索：Rsyslog , Elasticsearch, Kibana , Zabbix , Graphite , plog , kafka , hangout
- 配置管理及异常反馈系统：AOE , SLA
- 有鸟哥的大力支持 😊



# Unit Testing

## Insufficient Coverage

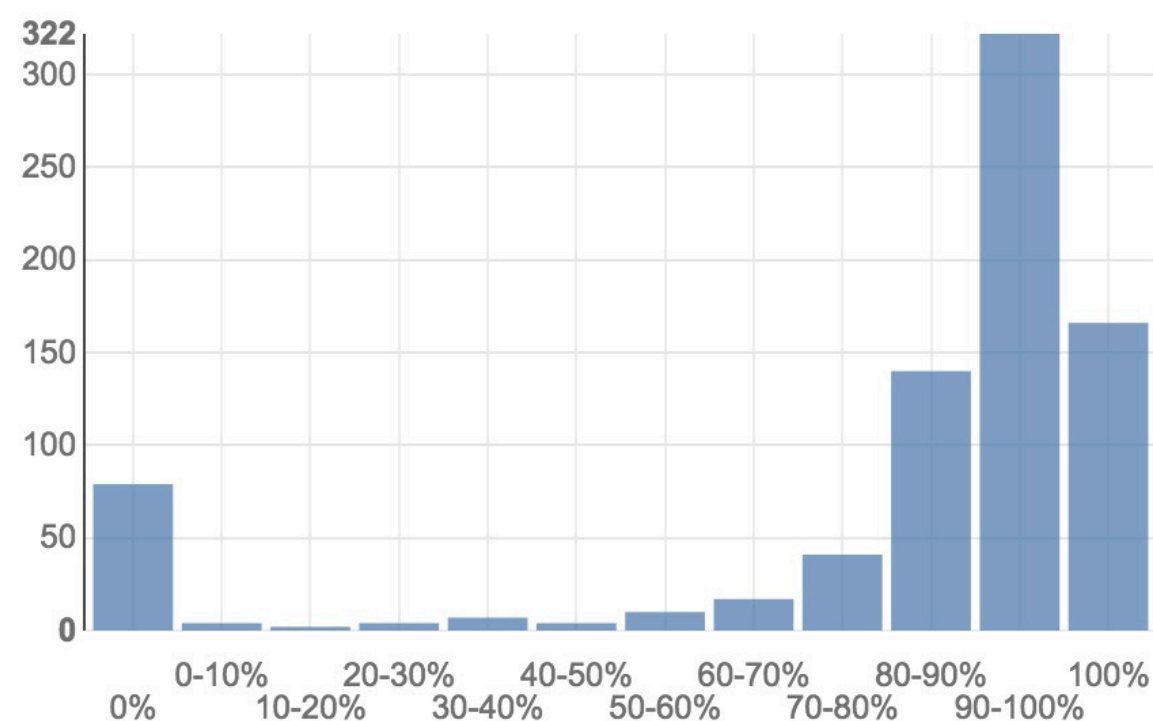
Tool_Flexihash	82%
Sdk_Miaopai_ThemeController	82%
Users_Filter_CreateController	82%
Map_DataController	82%
Account_Mobile_UpdateController	82%
Login_Gsidv4	82%
PageController	82%
Health_TrackModel	82%
Suggestions_Groups_SuggestionController	82%

## Project Risks

Profile_CoversController	110
Health_User_AddcardController	110
Statuses_Unread_Hot_TimelineController	110
Messages_FanscallController	110
Health_CheckInModel	110
Guest_LoginController	103
Codepay_OrderinfoController	102
Register_SendcodeController	99
Groupchat_Query_Affiliated_GroupController	95

## Classes

### Coverage Distribution



### Complexity



# Unit Testing

## Insufficient Coverage

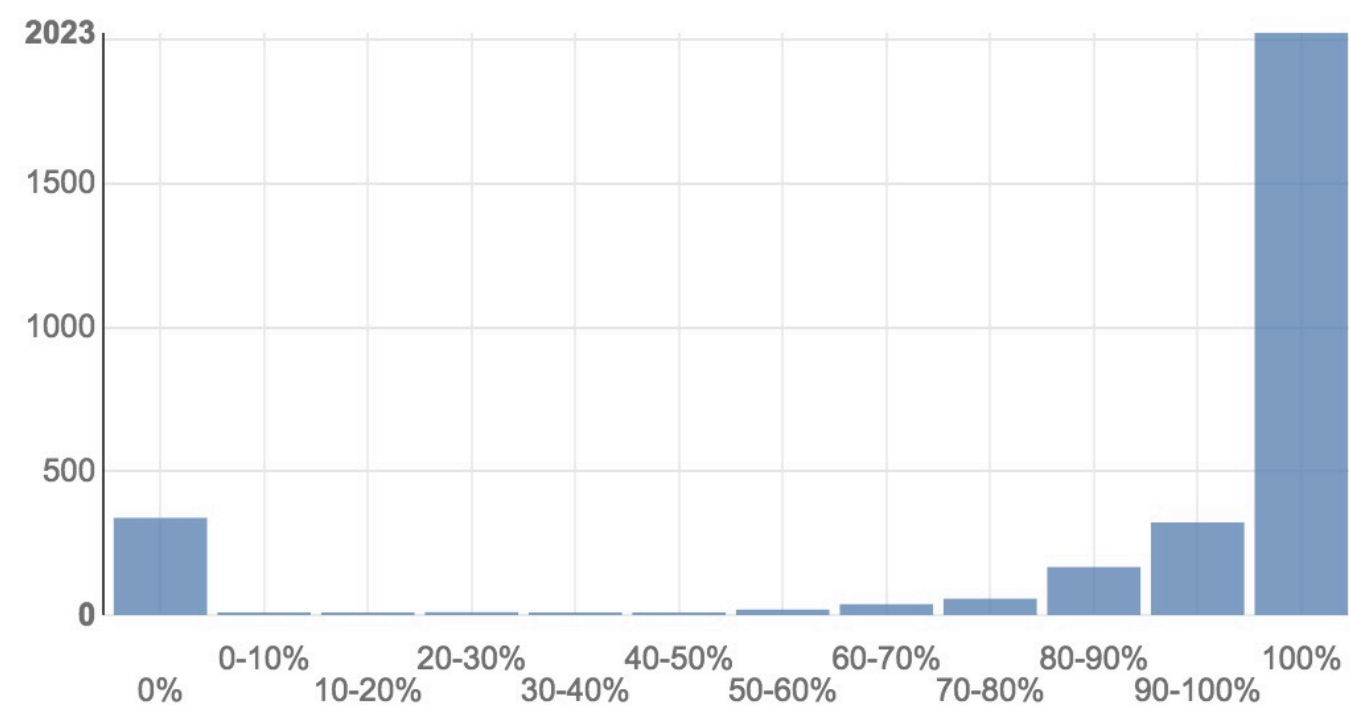
<a href="#">indexAction</a>	81%
<a href="#">indexAction</a>	81%
<a href="#">indexAction</a>	81%
<a href="#">getRankCard</a>	81%
<a href="#">_mergeFile</a>	81%
<a href="#">getMyFriends</a>	81%
<a href="#">getDemotion</a>	81%
<a href="#">indexAction</a>	82%
<a href="#">indexAction</a>	82%
<a href="#">indexAction</a>	82%

## Project Risks

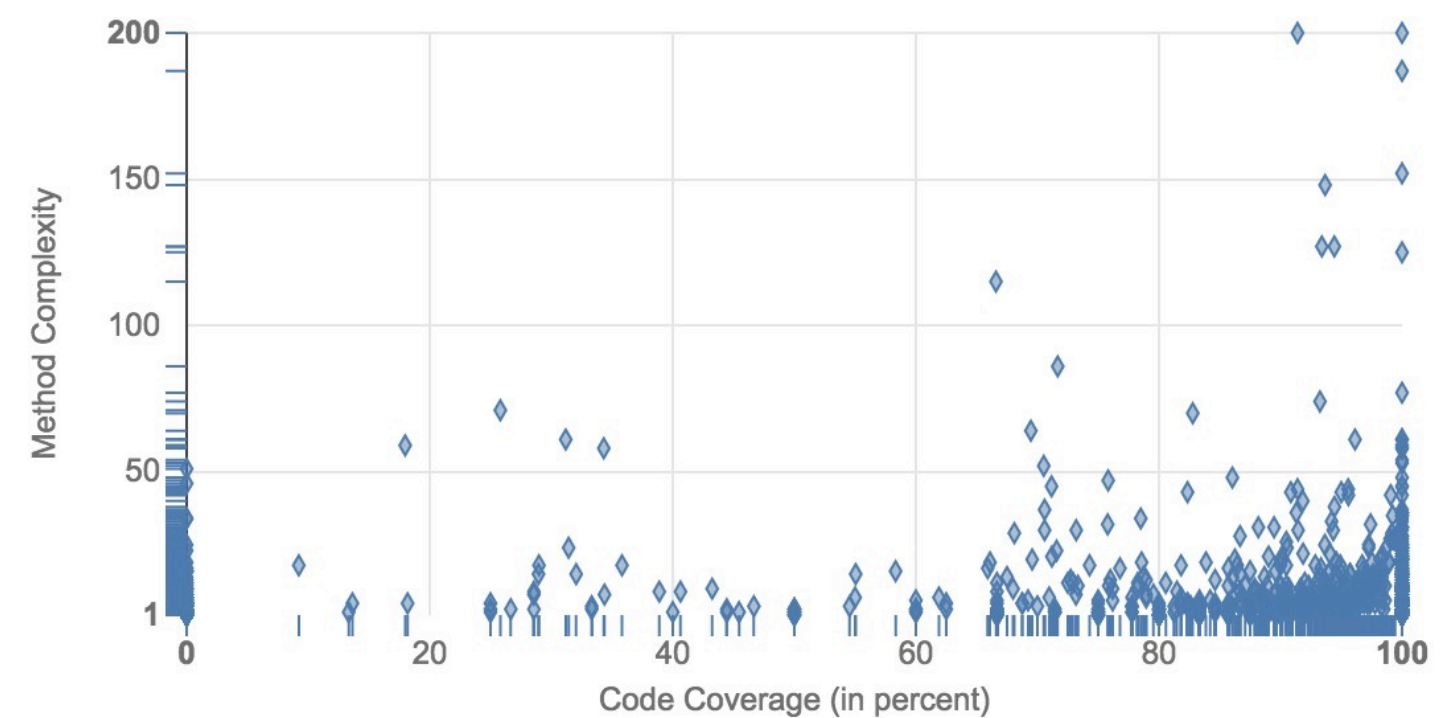
<a href="#">indexAction</a>	1010
<a href="#">getInterestFans</a>	650
<a href="#">getVisitorIndexNew</a>	608
<a href="#">upgradeClient</a>	552
<a href="#">getSpecialRecommendUser</a>	380
<a href="#">indexAction</a>	306
<a href="#">indexAction</a>	306
<a href="#">getFollowRecomendUsers</a>	272
<a href="#">getRecommendUsersAsyncWait</a>	272

## Methods

### Coverage Distribution



### Complexity





# Gitlab-CI

✓ success	#15268	b8d125f1	v5.16.05.12.5	build	job_phpunit	53 seconds	about 22 hours ago	🔗
✗ failed	#15265	b8d125f1	master	build	job_phpcs	6 seconds	about 22 hours ago	🔗
✓ success	#15266	b8d125f1	master	build	job_phpunit	56 seconds	about 22 hours ago	🔗
✗ failed	#15263	ee81dbb8	master	build	job_phpcs	12 seconds	about 22 hours ago	🔗
✓ success	#15264	ee81dbb8	master	build	job_phpunit	1 minute 30 seconds	about 22 hours ago	🔗
✓ success	#15258	c68059dd	v5.16.05.12.4	build	job_phpcs	1 second	about 23 hours ago	🔗
✓ success	#15259	c68059dd	v5.16.05.12.4	build	job_phpunit	55 seconds	about 23 hours ago	🔗
✓ success	#15257	c68059dd	master	build	job_phpunit	1 minute 24 seconds	about 23 hours ago	🔗
✓ success	#15256	c68059dd	master	build	job_phpcs	12 seconds	about 23 hours ago	🔗
✓ success	#15248	7e649308	master	build	job_phpcs	2 seconds	about 24 hours ago	🔗
✓ success	#15249	7e649308	master	build	job_phpunit	1 minute 13 seconds	about 24 hours ago	🔗
✓ success	#15234	9562cb5c	v5.16.05.12.3	build	job_phpcs	8 seconds	a day ago	🔗
✗ failed	#15235	9562cb5c	v5.16.05.12.3	build	job_phpunit	51 seconds	a day ago	🔗
✗ failed	#15232	9562cb5c	master	build	job_phpcs	3 seconds	a day ago	🔗
✗ failed	#15233	9562cb5c	master	build	job_phpunit	2 minutes 3 seconds	a day ago	🔗

# Kibana





# Kibana

mweibo\_total 欢迎您, hubo3 [安全退出] an hour ago to a few seconds ago

QUERY FILTERING

### 每条日志条数

View | Zoom Out | (92237305) count per 1s | (92237305 hits)

16:40:00 16:42:00 16:44:00 16:46:00 16:48:00 16:50:00 16:52:00 16:54:00 16:56:00 16:58:00 17:00:00 17:02:00 17:04:00 17:06:00 17:08:00 17:10:00 17:12:00 17:14:00 17:16:00 17:18:00 17:20:00 17:22:00 17:24:00 17:26:00 17:28:00 17:30:00 17:32:00 17:34:00 17:36:00 17:38:00

Term	Count	Action
mweibo_client_net_fatal_error		Q
mweibo_common_check_error_log		Q
mweibo_checklimit		Q
mweibov4_weibo_h5_view_upstream		Q
mweibo_webinf		Q
mweibo_webinf_curl_debug		Q
mweibo_client_traffic		Q
mweibo_v6_weibo_h5_view_upstream		Q
mweibov4_webinf		Q
mweibo_client_upstream		Q
mweibo_client_local_error		Q
php-fpm		Q
php-error		Q

### NGINX-V5日志展示模版链接

- mweibo\_nginx-all
- mweibo日志展示模版链接
- mweibo\_mapi-dashboard
- mweibo
- mweibo\_checklimit
- mweibo\_client\_crash
- mweibo\_client\_crash\_Android
- mweibo\_client\_crash\_IOS
- mweibo\_client\_message
- mweibo\_total
- mweibo\_total-cardlist
- mweibo\_client\_local\_error
- www\_流量统计
- nginx\_error
- weibo\_img\_app\_log
- weibo\_img\_client\_error
- weibo\_img\_down\_error
- weibo\_img\_up\_error
- weibo
- weibocamera client crash

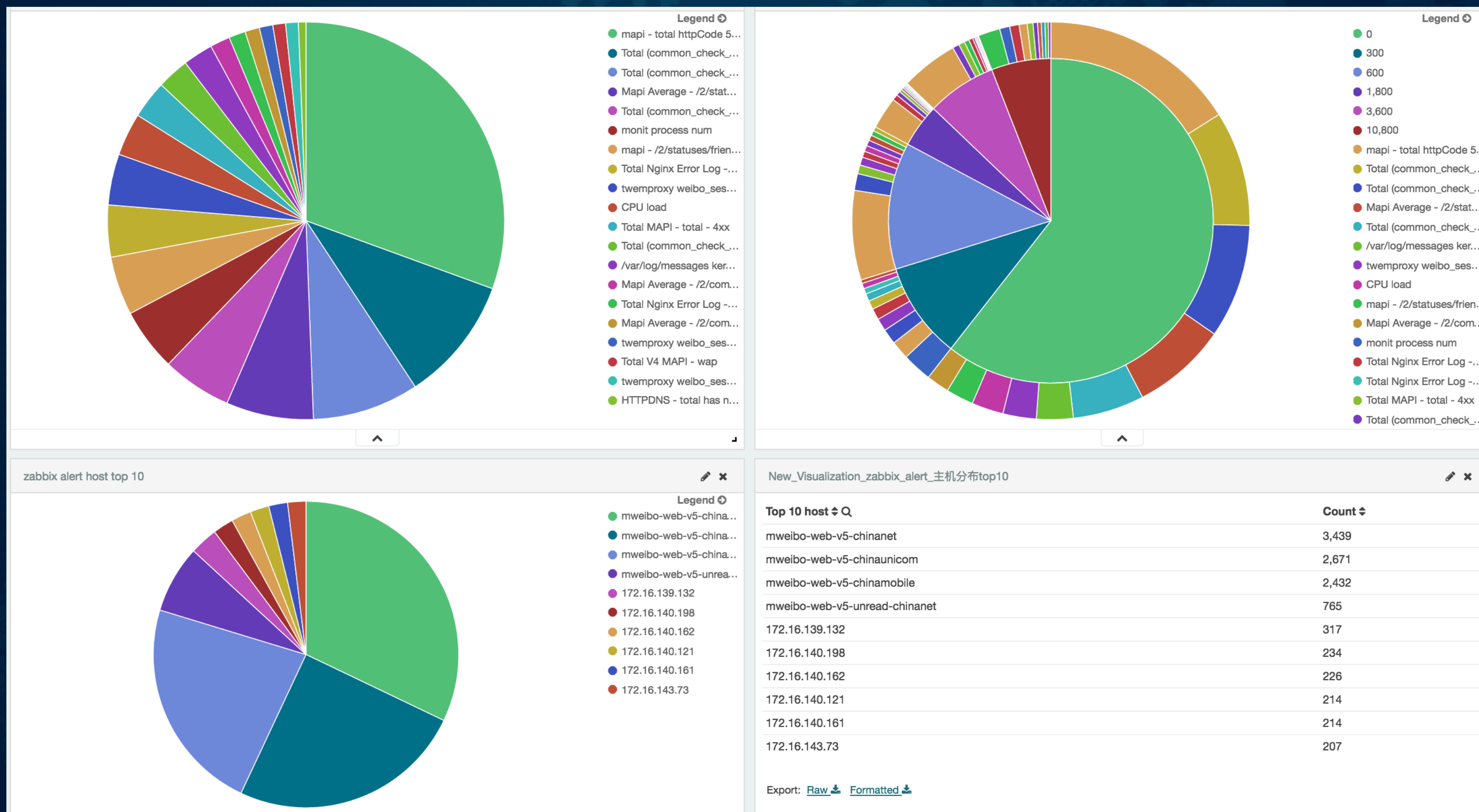
### 日志数据流向图及日志数据流向概览

[日志数据流向图及日志数据流向概览](#)

### 告示

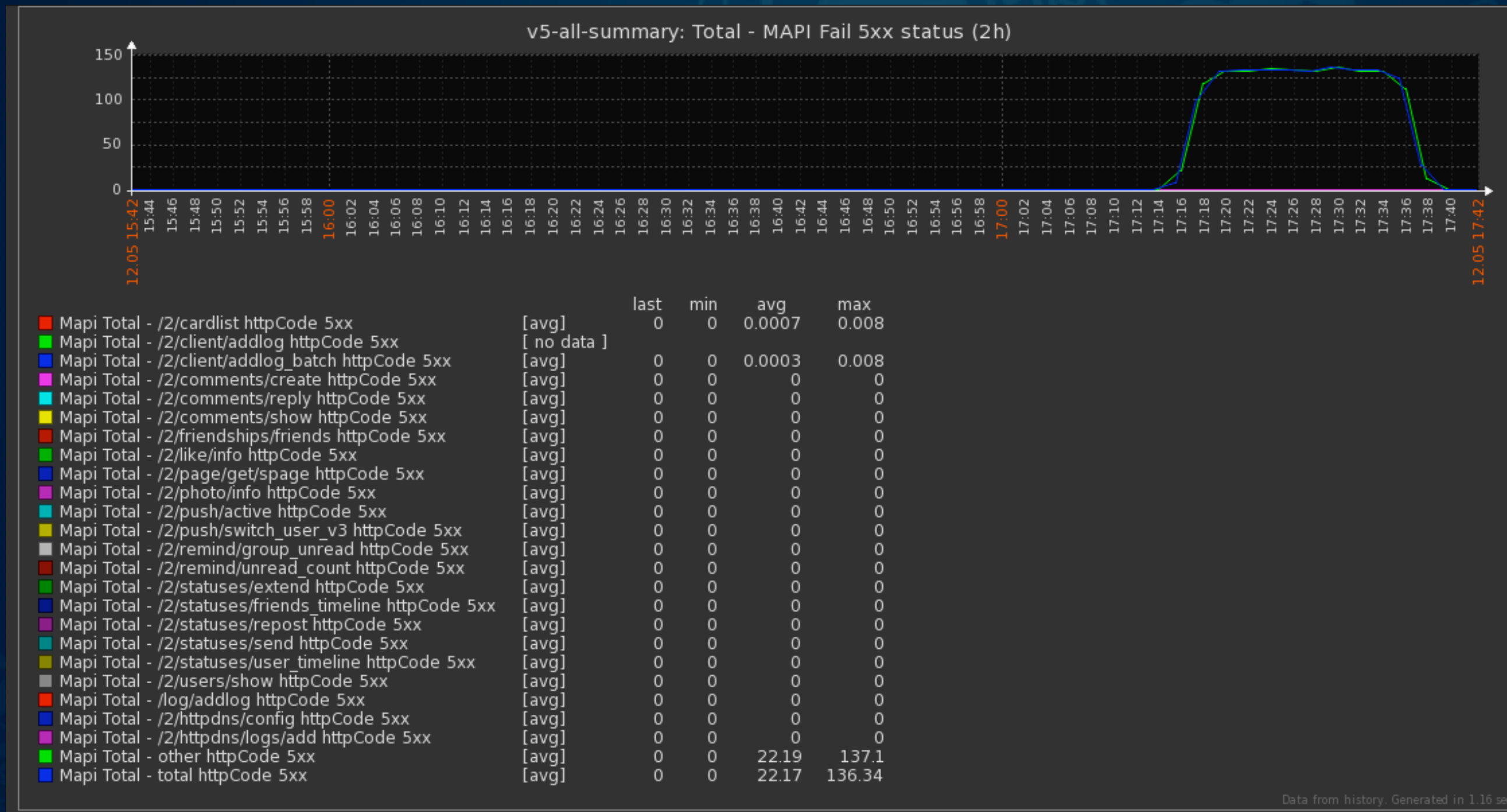
- 手机微博日志查询方面的问题, 欢迎联系饶琛琳。
- 复杂查询, 点击"高级"按钮, 输入 ES 查询语句, 支持语法请阅读[官方文档](#)。

# Kibana

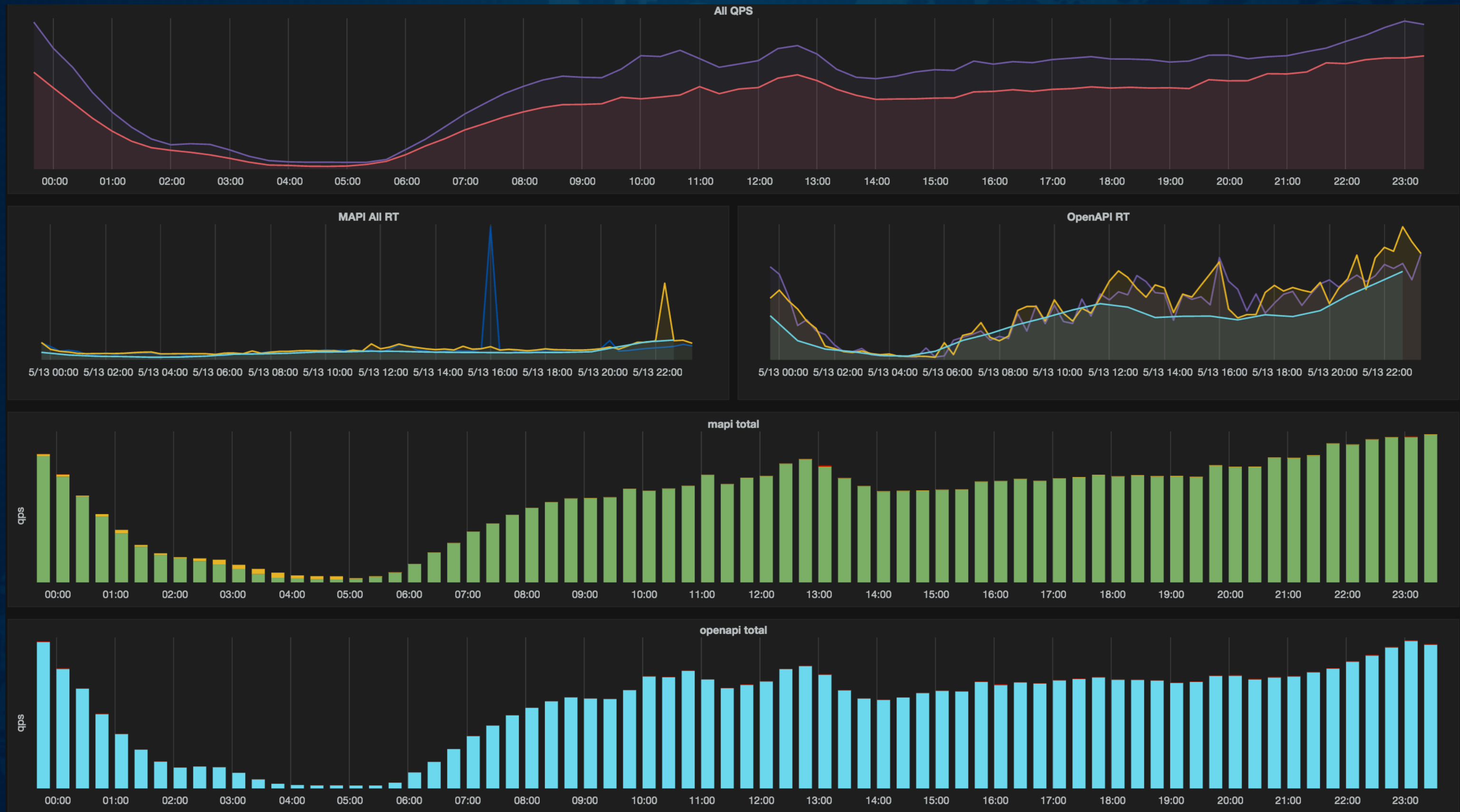




# Zabbix

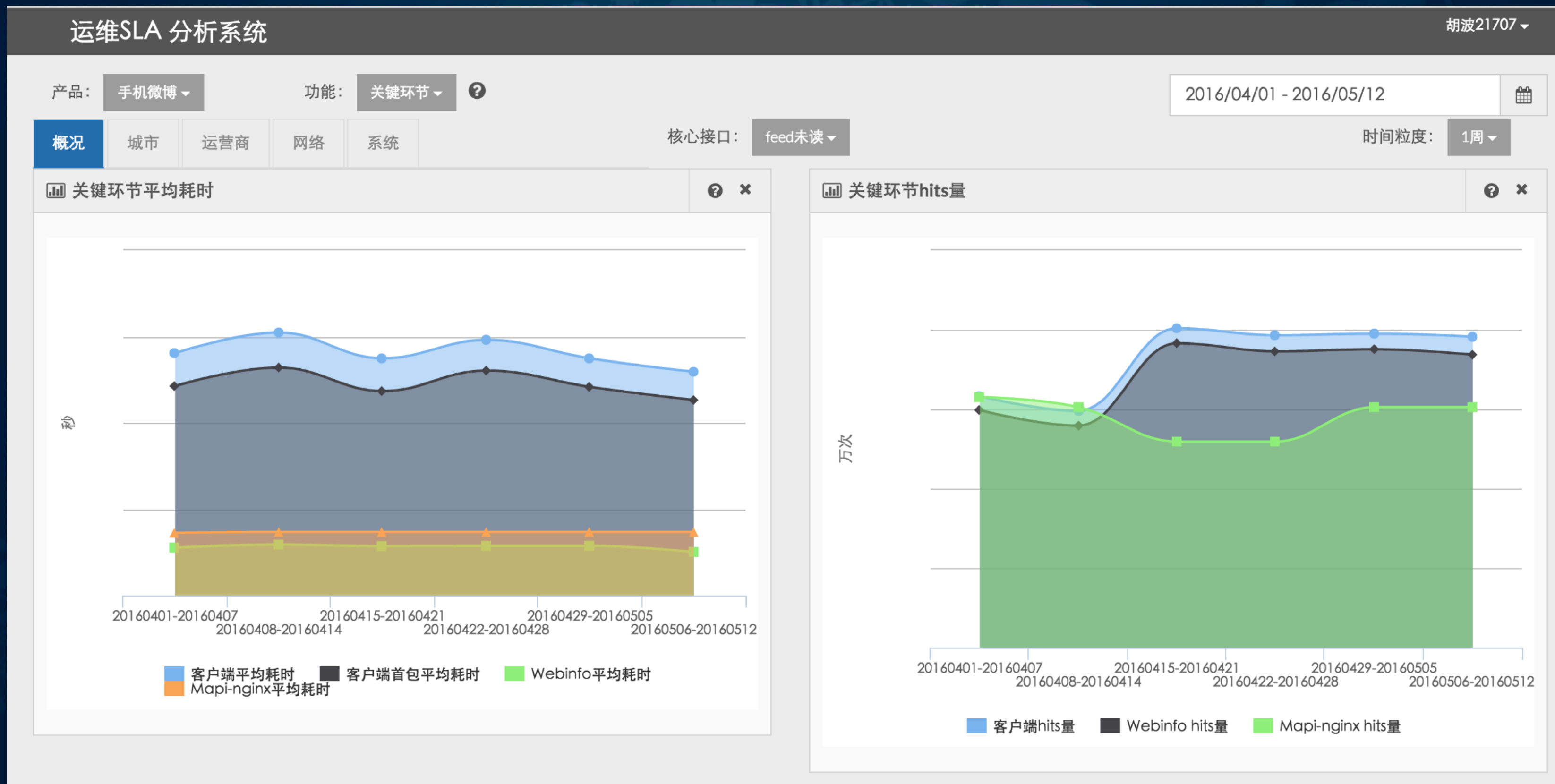


# Graphite





# SLA分析系统



# 依赖梳理

- mysql × (改成mysql<sub>i</sub>即可)
- opcache √ (PHP7内置支持)
- php-json √ (已经被PHP7收编)
- redis : 有一个PHP7分支, 测试没发现问题
- memcached √
- iplookup / fcache √ (升级自己的扩展)
- weibo\_util × (依赖度低, 用PHP实现了)
- yaf / yar / yaconf √
- msgpack √



# 升级代码

## 从PHP 5.6.x 移植到 PHP 7.0.x

Change language: Chinese (Simplified)

[Edit](#) [Report a Bug](#)

### Table of Contents

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- [Deprecated features in PHP 7.0.x](#)
- [变更的函数](#)
- [New functions](#)
- [New Classes and Interfaces](#)
- [New Global Constants](#)
- [Removed Extensions and SAPIs](#)
- [Other Changes](#)

尽管PHP7.0是一个新的大版本，我们仍将致力于使迁移变得平缓。这个版本主要消除在之前版本中不推荐使用的内容，使得语言变得更加通用一致。

这儿有一些值得关注的 [少量的兼容性调整](#) 以及 [新的特性](#)，同时在生产环境切换PHP版本之前，应该对代码进行测试

参见 PHP 版本迁移指南 [5.0.x](#), [5.1.x](#), [5.2.x](#), [5.3.x](#), [5.4.x](#), [5.5.x](#) 和 [5.6.x](#).

<http://php.net/manual/zh/migration70.php>

# 升级代码

- 编写替代类和函数
  - Base62\_Encode
  - jsond\_encode() , jsond\_decode()
  - Weibo\_conf 封装 yaconf
- 使用脚本批量扫描替换
  - mcrypt\_cbc() , mcrypt\_cfb() , mcrypt\_ecb() , mcrypt\_ofb()
  - preg\_replace() 中的 /e 修饰符被废弃
  - Mysqli
  - \$HTTP\_RAW\_POST\_DATA → php://input
- 完善单元测试 , 单元测试覆盖率一直保持 >85%
- Gitlab-CI 做持续集成、自动化测试



# 升级系统

- AOE：批量部署和配置工具，保证快速在多版本系统和软件间快速切换
  - V5-PHP5.4
  - V5-PHP7
- PHP5.4 和 PHP7 的主软件包及其依赖扩展包
- 支持大规模并发变更操作

# 灰度部署

- 内网灰度，大量 VIP 全功能用户，时间最长，填坑
- 单机房灰度30%
- 单运营商机房全量
- 全站全量



# 坑？

- PHP7 没有坑！PHP7 没有坑！PHP7 没有坑！
- 几个小插曲
  - msgpack 0.5.5 和 msgpack2.0.0不兼容
  - yaconf 1.0.0 “段错误”
  - memcached.serializer = "igbinary"
  - json\_encode : JSON\_ERROR\_RECURSION



# 配置、优化

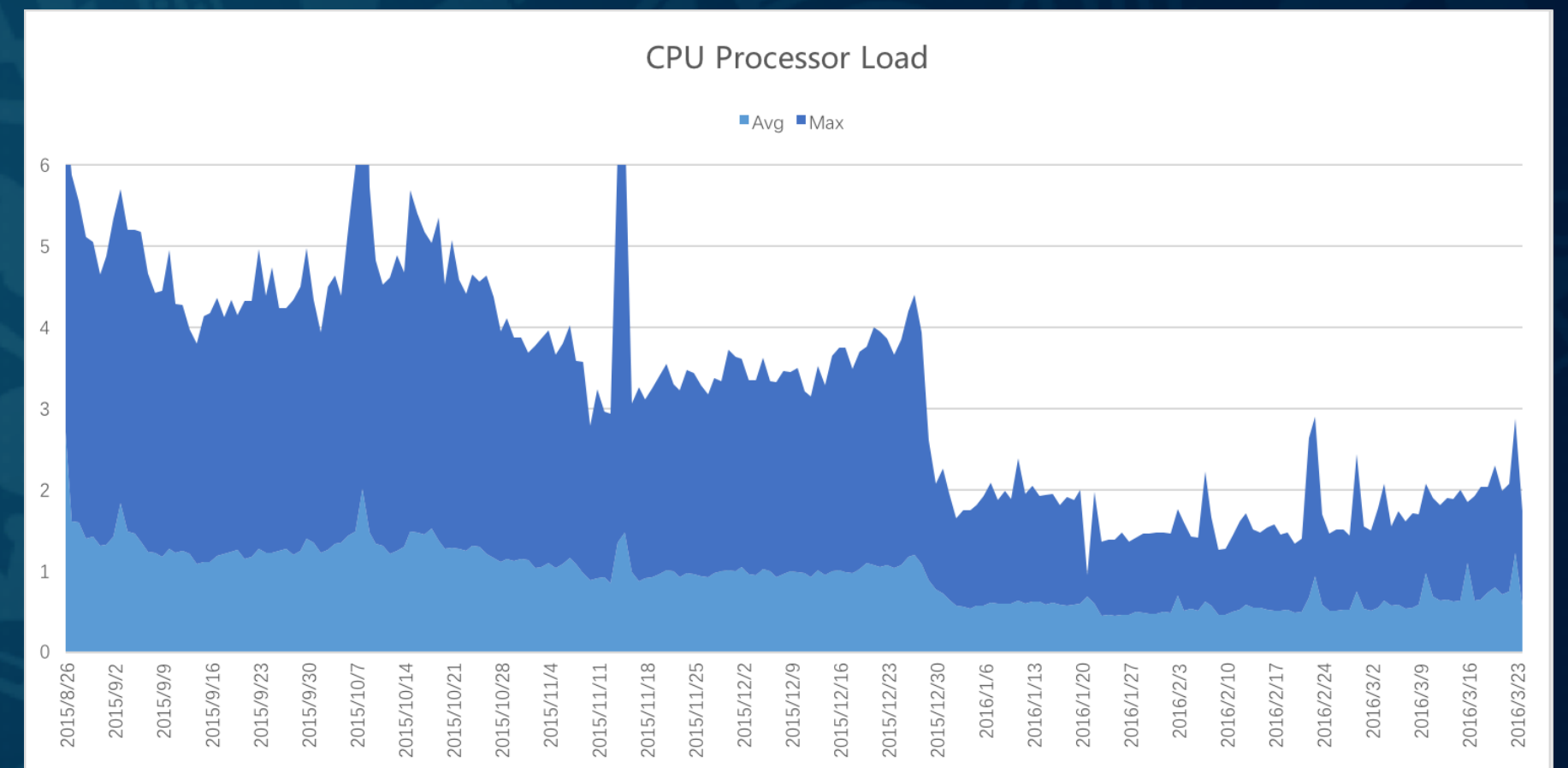
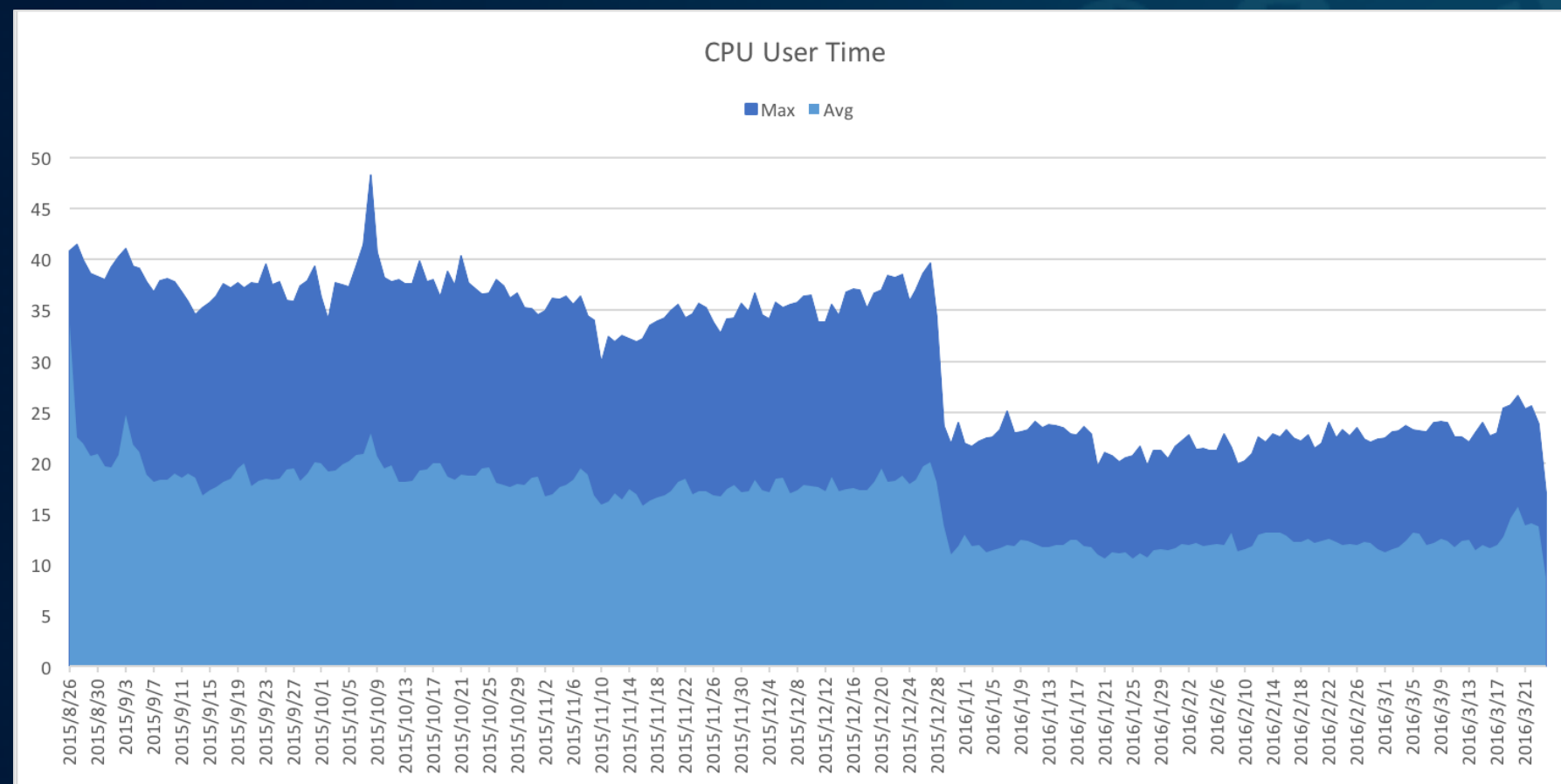
- `listen = /dev/shm/php-fpm.sock`
- `pm = static`
- `pm.max_children = 400`
- `pm.max_request = 1500`
- `listen.backlog = 8191`
- `opcache.enable=1`



# 配置、优化

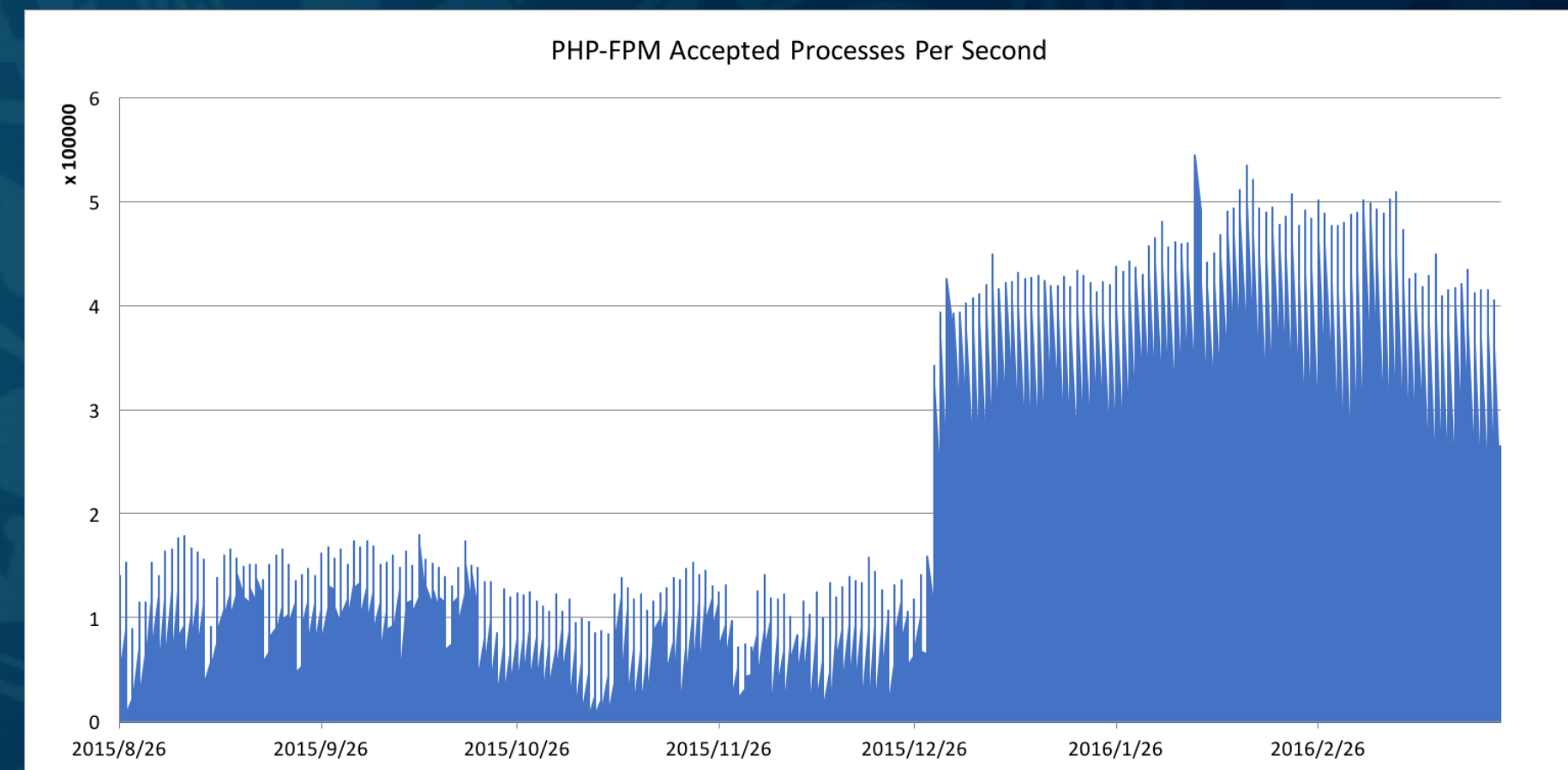
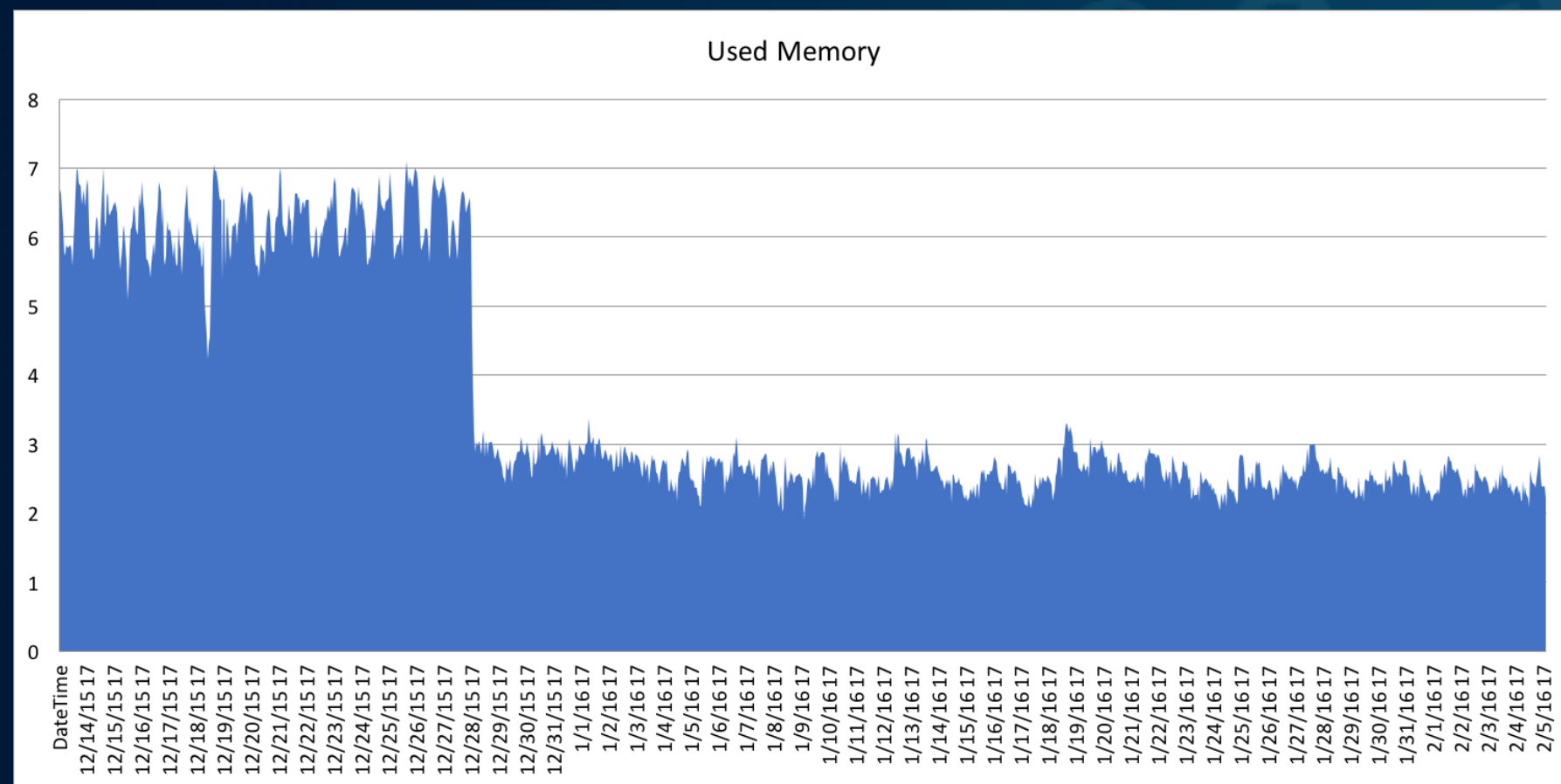
- `opcache.enable=1`
- `opcache.huge_code_pages=1`
- GCC 4.8以上编译器
- PGO(Profile Guided Optimization)

# 成果





# 成果



- Docker
- PGO
- Microservices
- Composer
- Ab Testing Gateway

What's  
Next?



欢迎加入微博，一起撸！

谢谢！

@胡波\_

hubo3@staff.weibo.com