



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

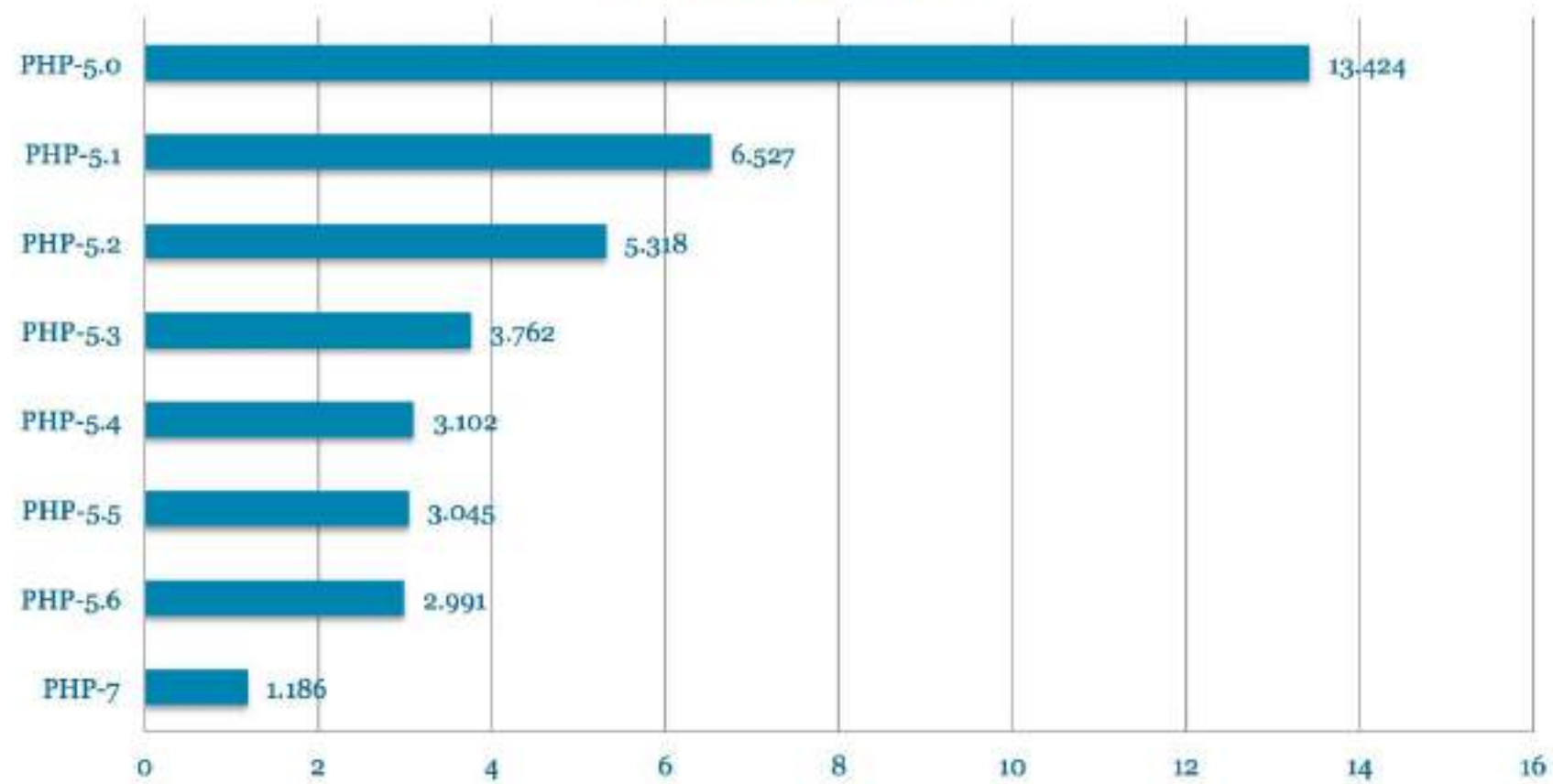
PHP7 新特性

- 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
-

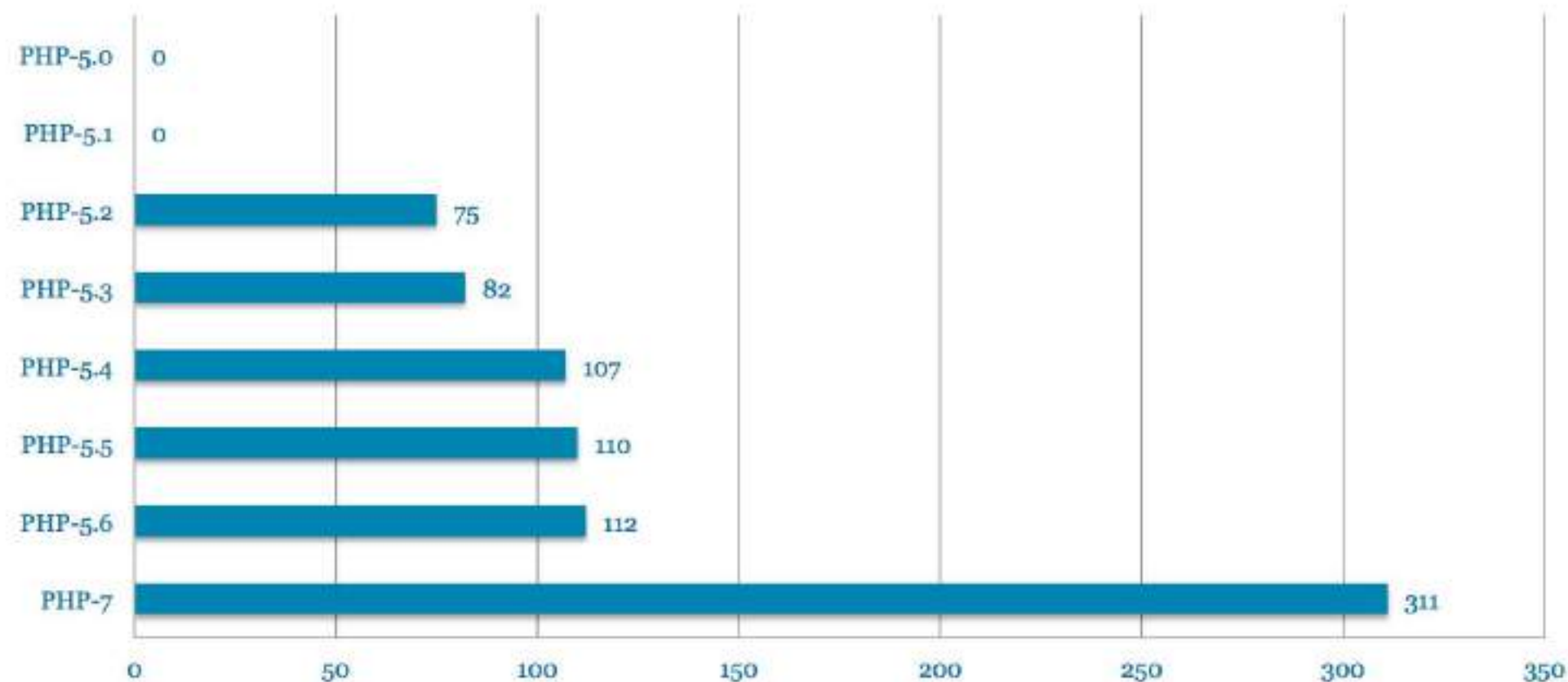
为什么升级 PHP7

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😂//@Larurence: 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

@Larurence 👍

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

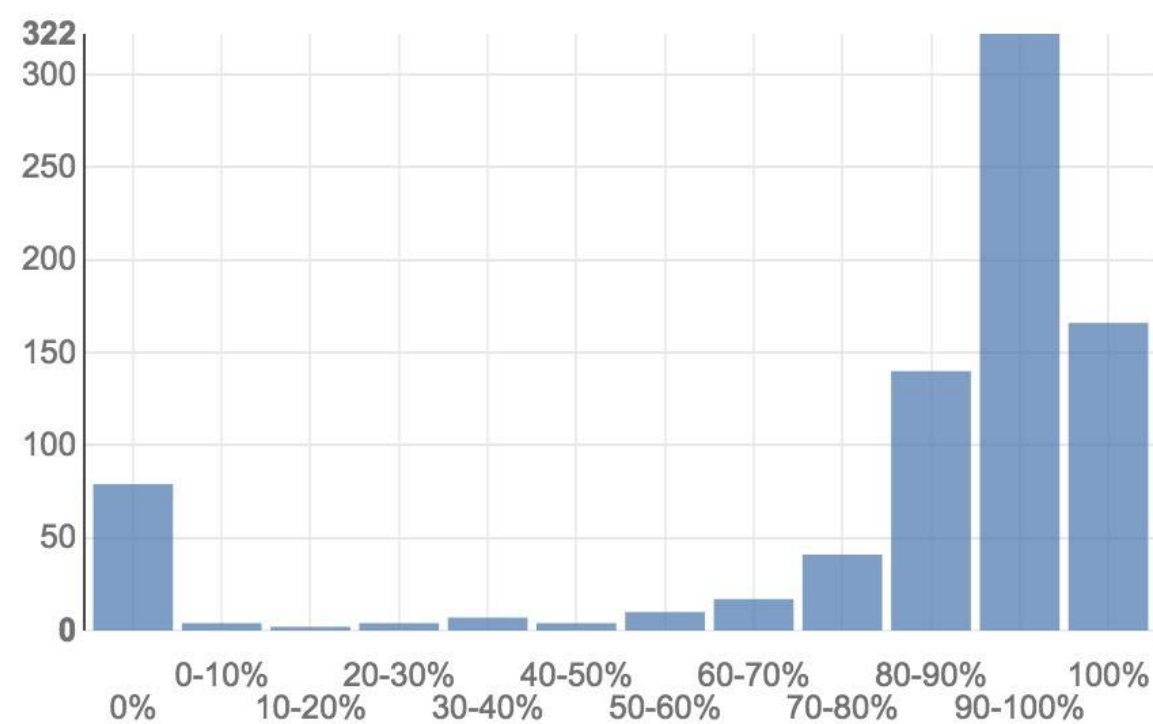
Tool_Flexihash	82%
Sdk_Miaopai_ThemeController	82%
Users_Filter_CreateController	82%
Map_DataController	82%
Account_Mobile_UpdateController	82%
Login_Gsidv4	82%
PageController	82%
Health_TrackModel	82%
Suggestions_Groups_SuggestionController	82%

Project Risks

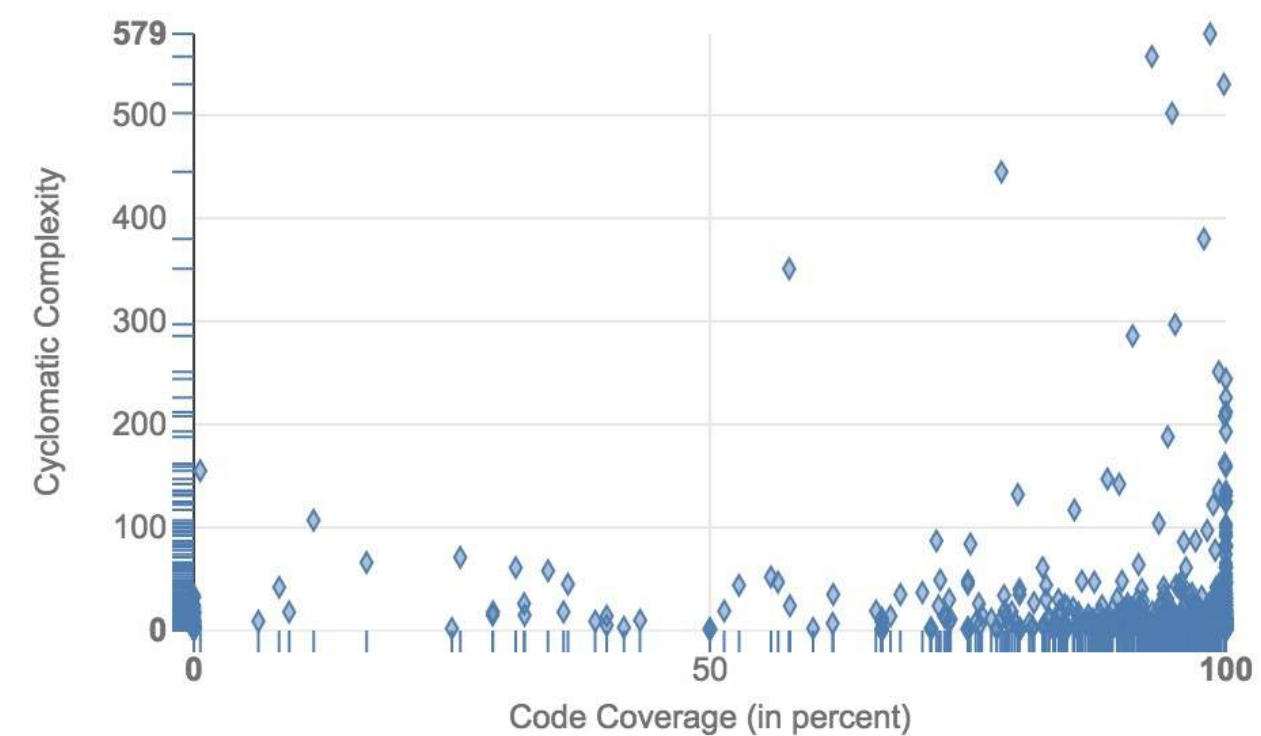
Profile_CoversController	110
Health_User_AddcardController	110
Statuses_Unread_Hot_TimelineController	110
Messages_FanscallController	110
Health_CheckInModel	110
Guest_LoginController	103
Codepay_OrderinfoController	102
Register_SendcodeController	99
Groupchat_Query_Affiliated_GroupController	95

Classes

Coverage Distribution



Complexity



Unit Testing

Insufficient Coverage

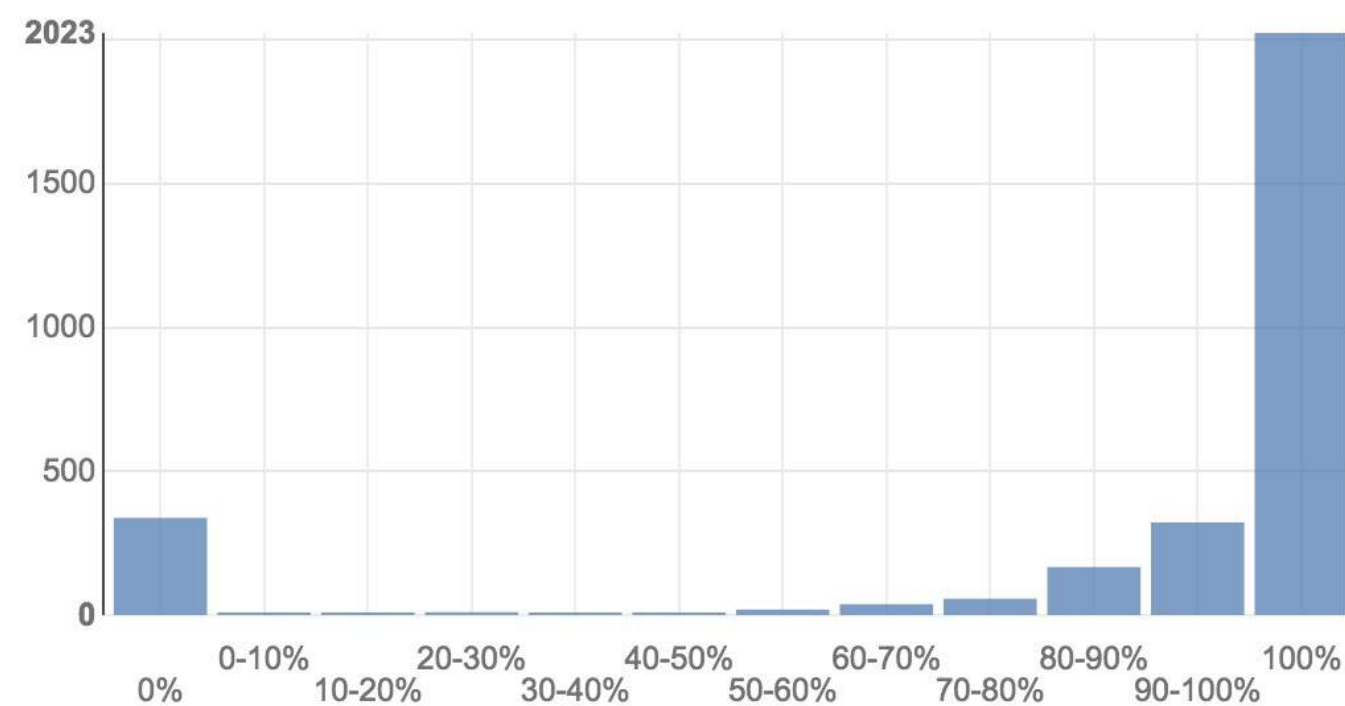
indexAction	81%
indexAction	81%
indexAction	81%
getRankCard	81%
_mergeFile	81%
getMyFriends	81%
getDemotion	81%
indexAction	82%
indexAction	82%
indexAction	82%

Project Risks

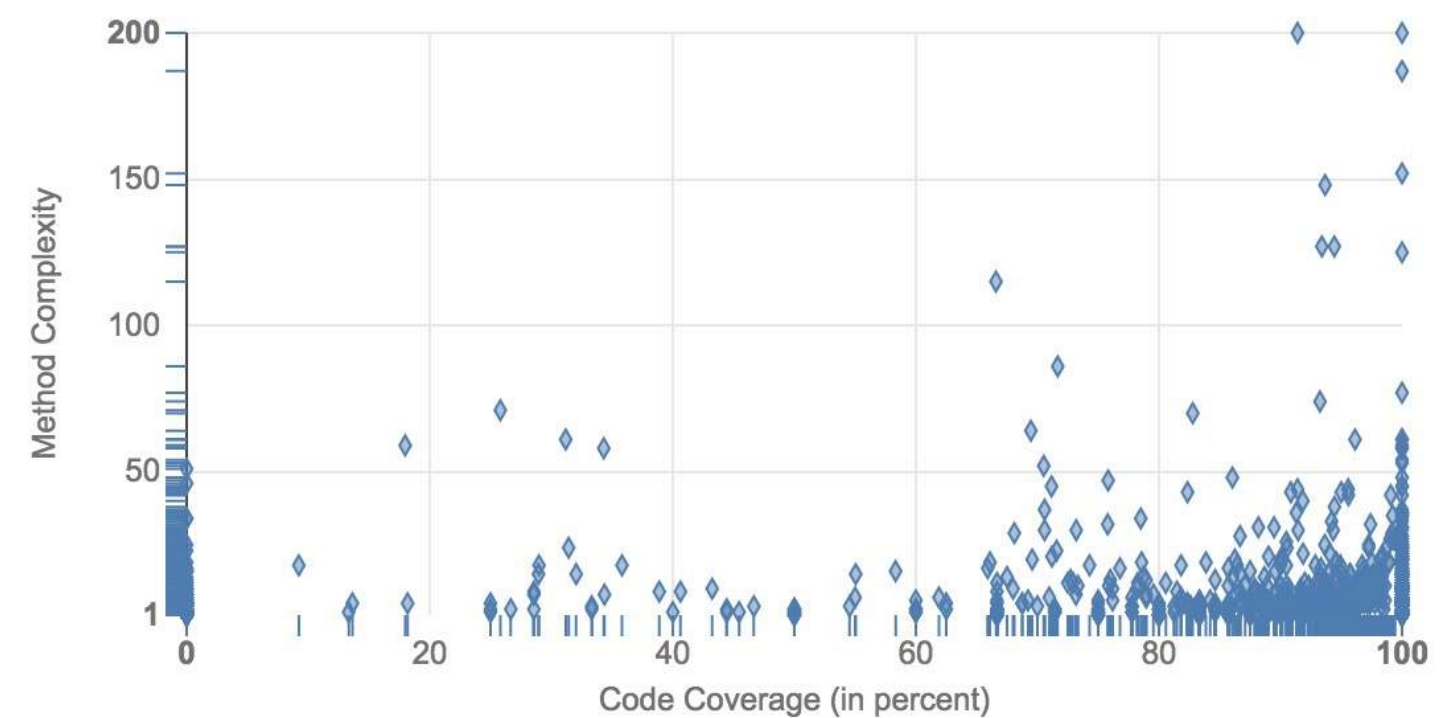
indexAction	1010
getInterestFans	650
getVisitorIndexNew	608
upgradeClient	552
getSpecialRecommendUser	380
indexAction	306
indexAction	306
getFollowRecomendUsers	272
getRecommendUsersAsyncWait	272

Methods

Coverage Distribution



Complexity



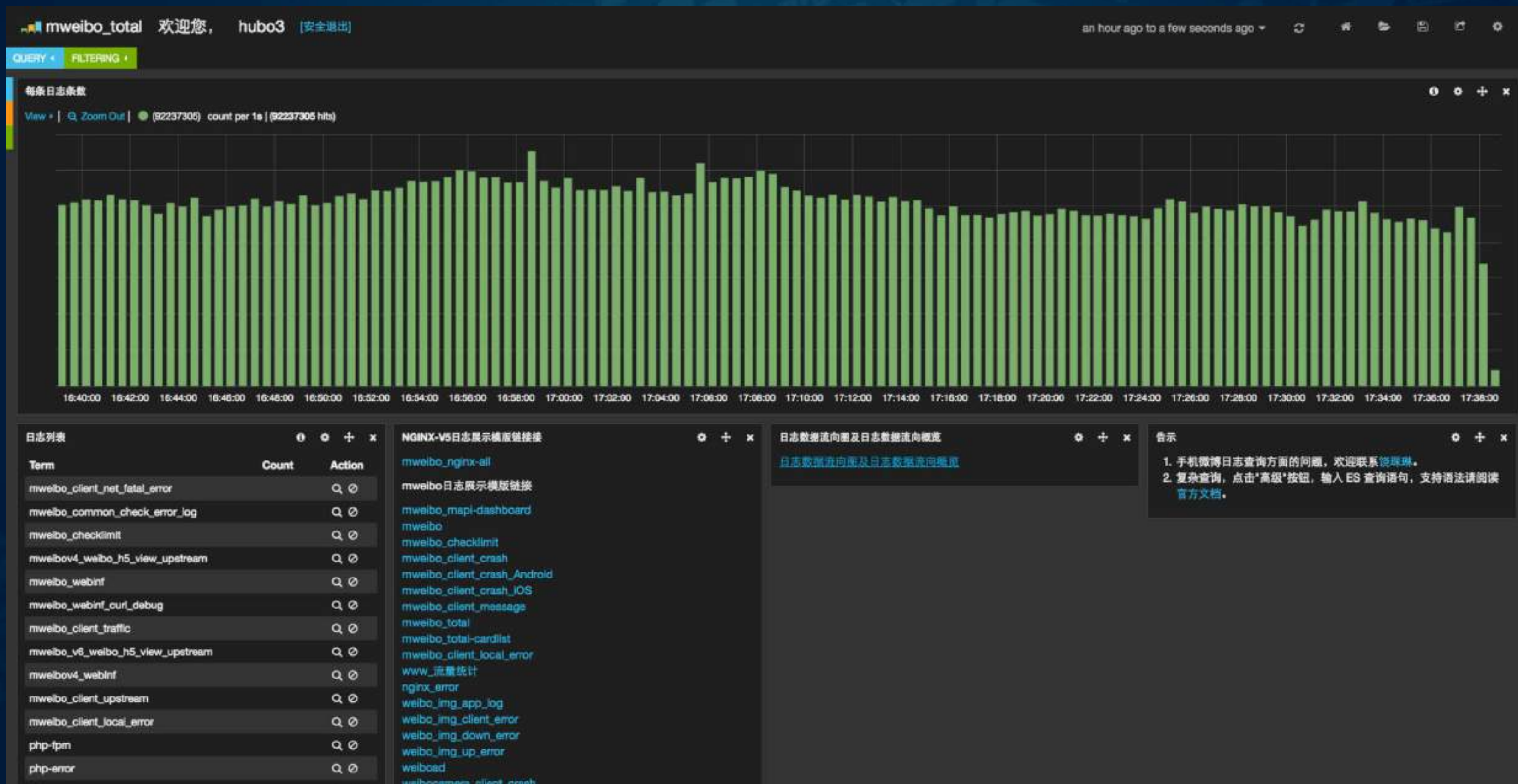
Gitlab-CI

✓ 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	🔗

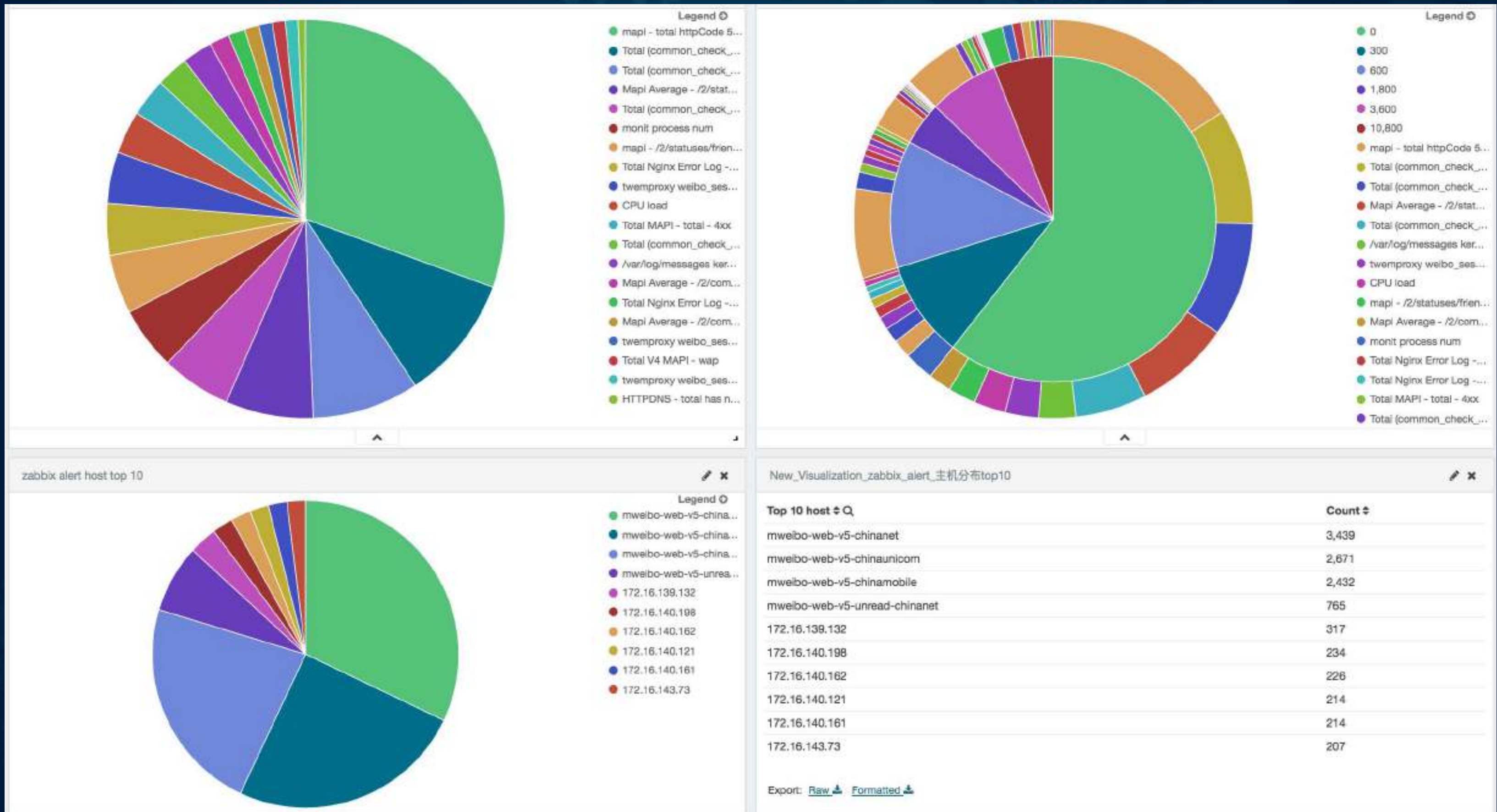
Kibana



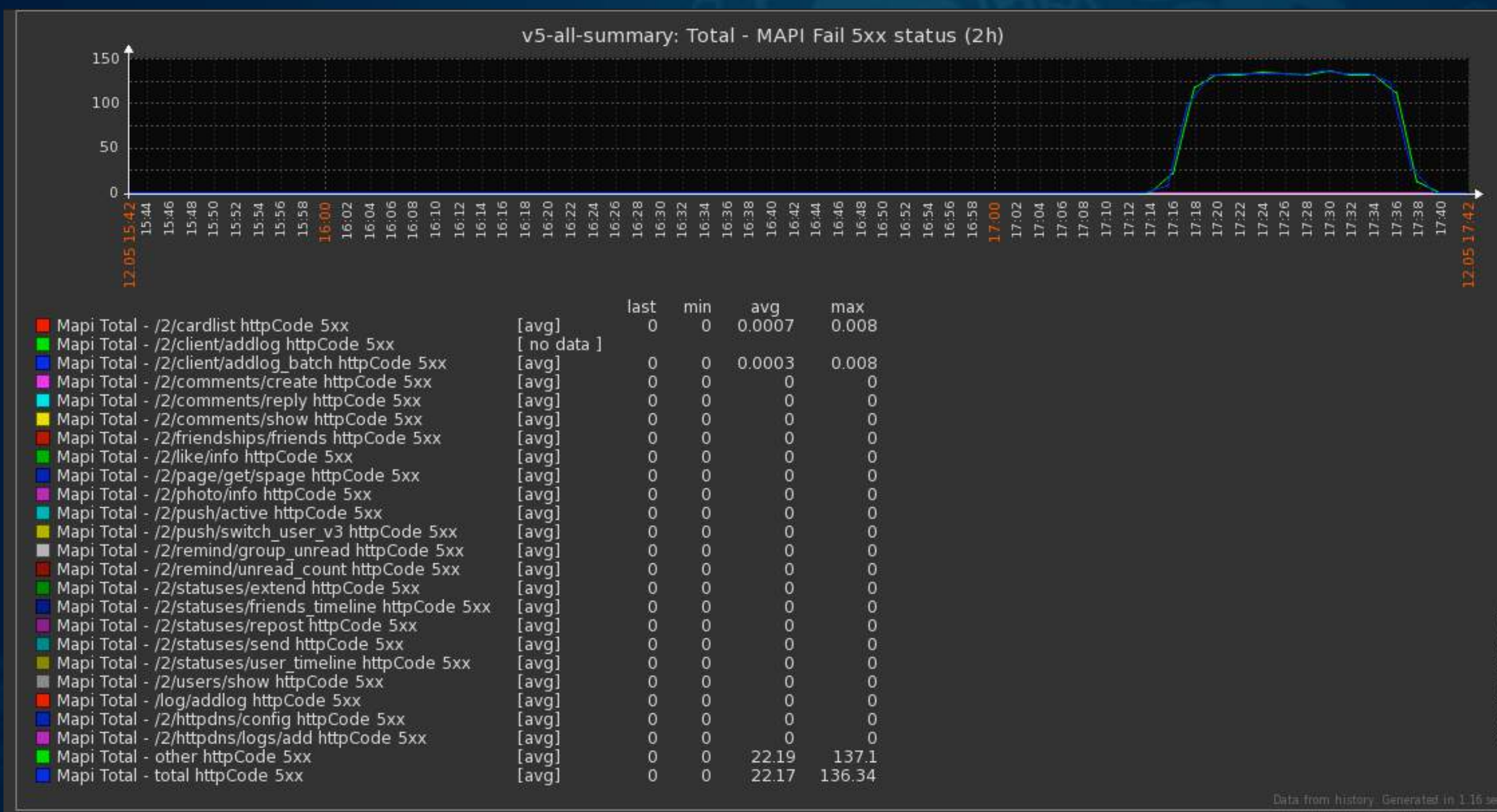
Kibana



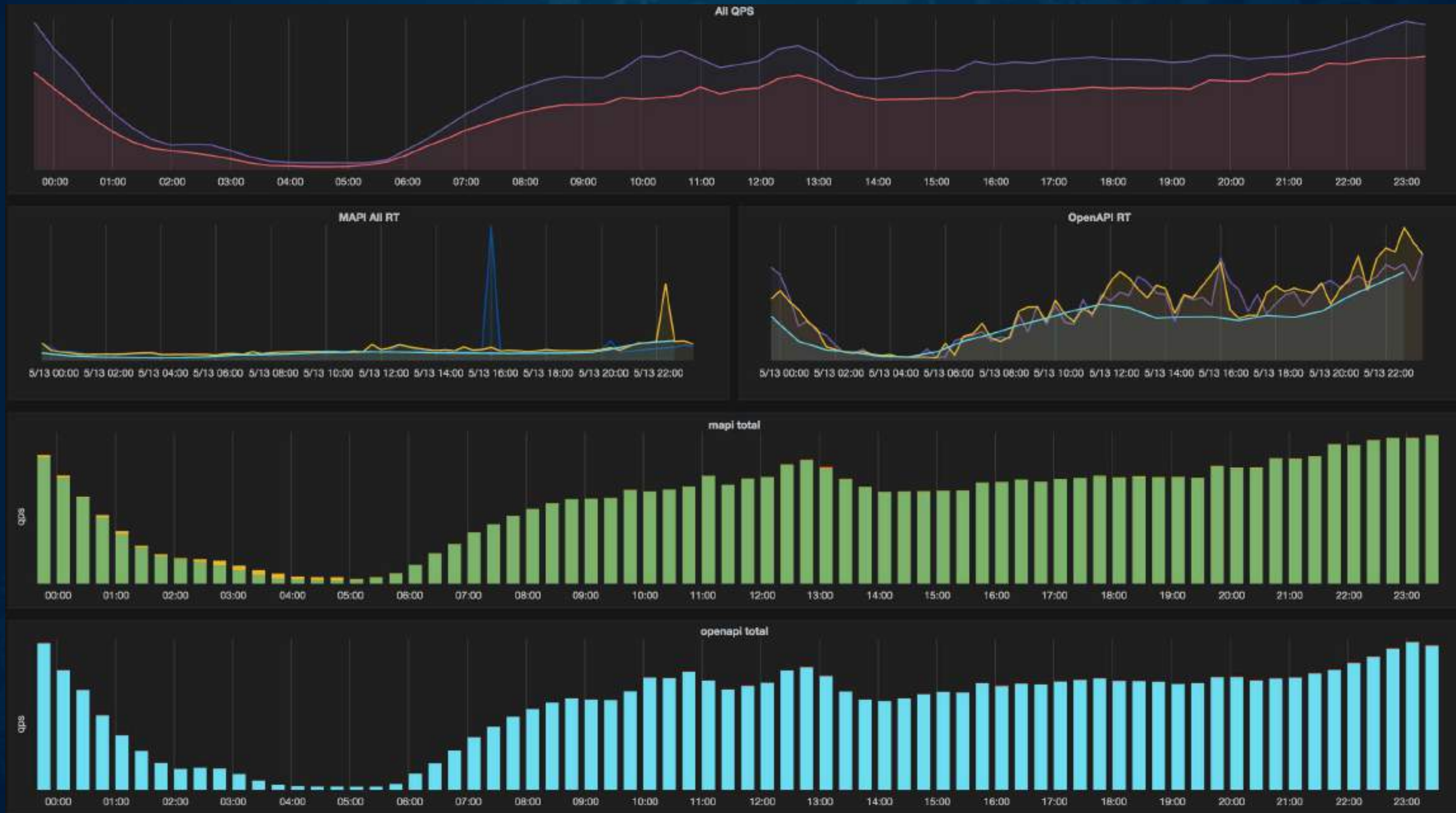
Kibana



Zabbix



Graphite



SLA分析系统



依赖梳理

- mysql × (改成mysql_i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

- [不向后兼容的变更](#)
- [新特性](#)
- [Changes in SAPI Modules](#)
- [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)

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

What's
Next?