網站上線了，然後呢？

陳小風



MVP
Microsoft®
Most Valuable
Professional

FRI.
TechPodcastNight

tw MVC

自我介紹

- 陳鋒逸（陳小風）
- 經歷
  - KKTIX 工程師
  - 微軟最有價值專家 （MVP）
  - SkillTree兼任講師
  - 社群研討會講師
    - TechPodcastNight
    - twMVC
    - AgileCommunity.tw
    - Javascript.tw





粉絲團: 愛流浪的小風


軟體和教堂非常類似
建成之後我們就開始祈禱...

Software in 2017

- 趨勢變化
- 競爭激烈
- 時間就是金錢







對產品的共識不一致



我們眼中的產品



老闆希望的產品



PM 想像的產品



股東理想中的產品



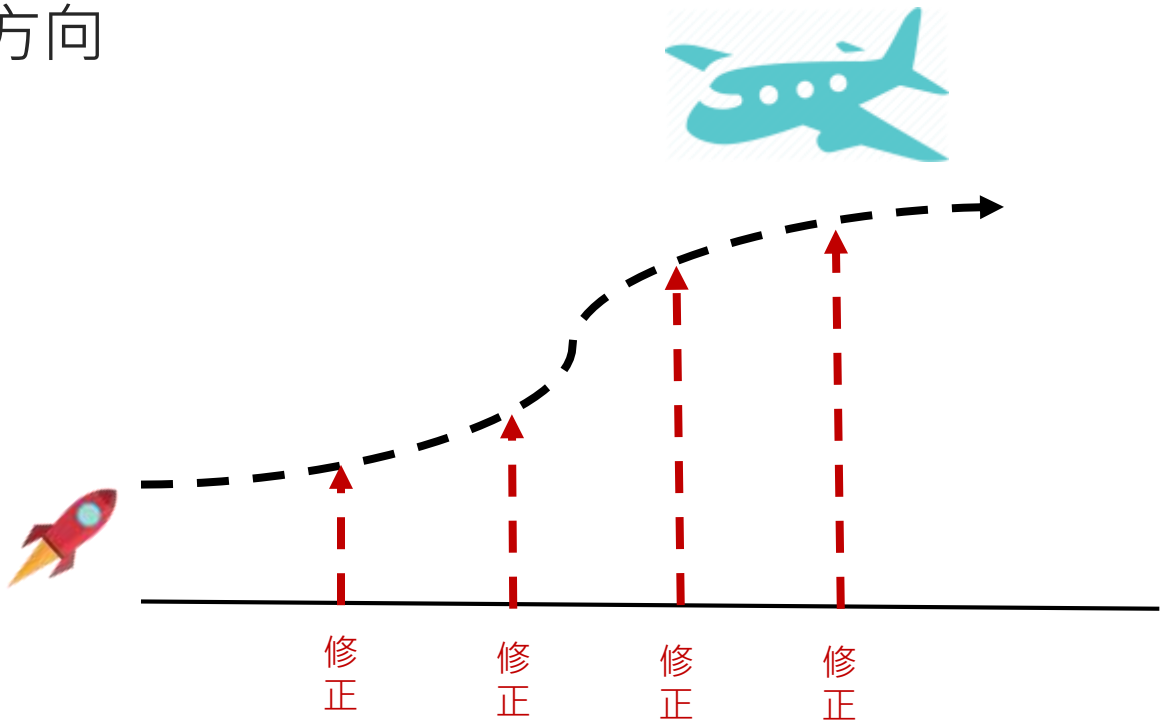
使用者用到的產品

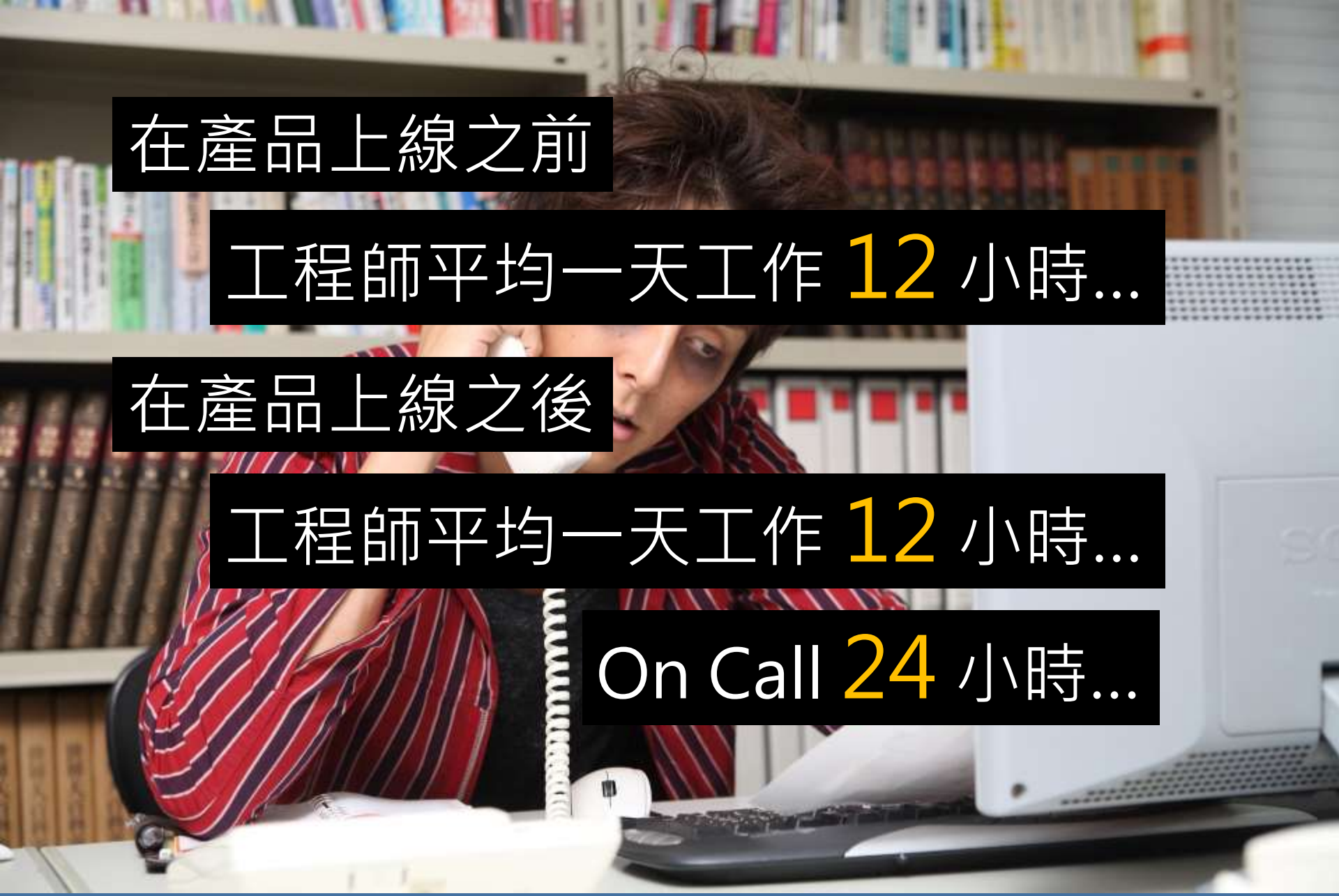


實際的產品

適應改變

- 提早確認
- 修正方向




在產品上線之前
工程師平均一天工作 12 小時...
在產品上線之後
工程師平均一天工作 12 小時...
On Call 24 小時...

產品團隊的挑戰

持續交付新產品

保持系統穩定

瞭解服務狀態

應付意外狀況

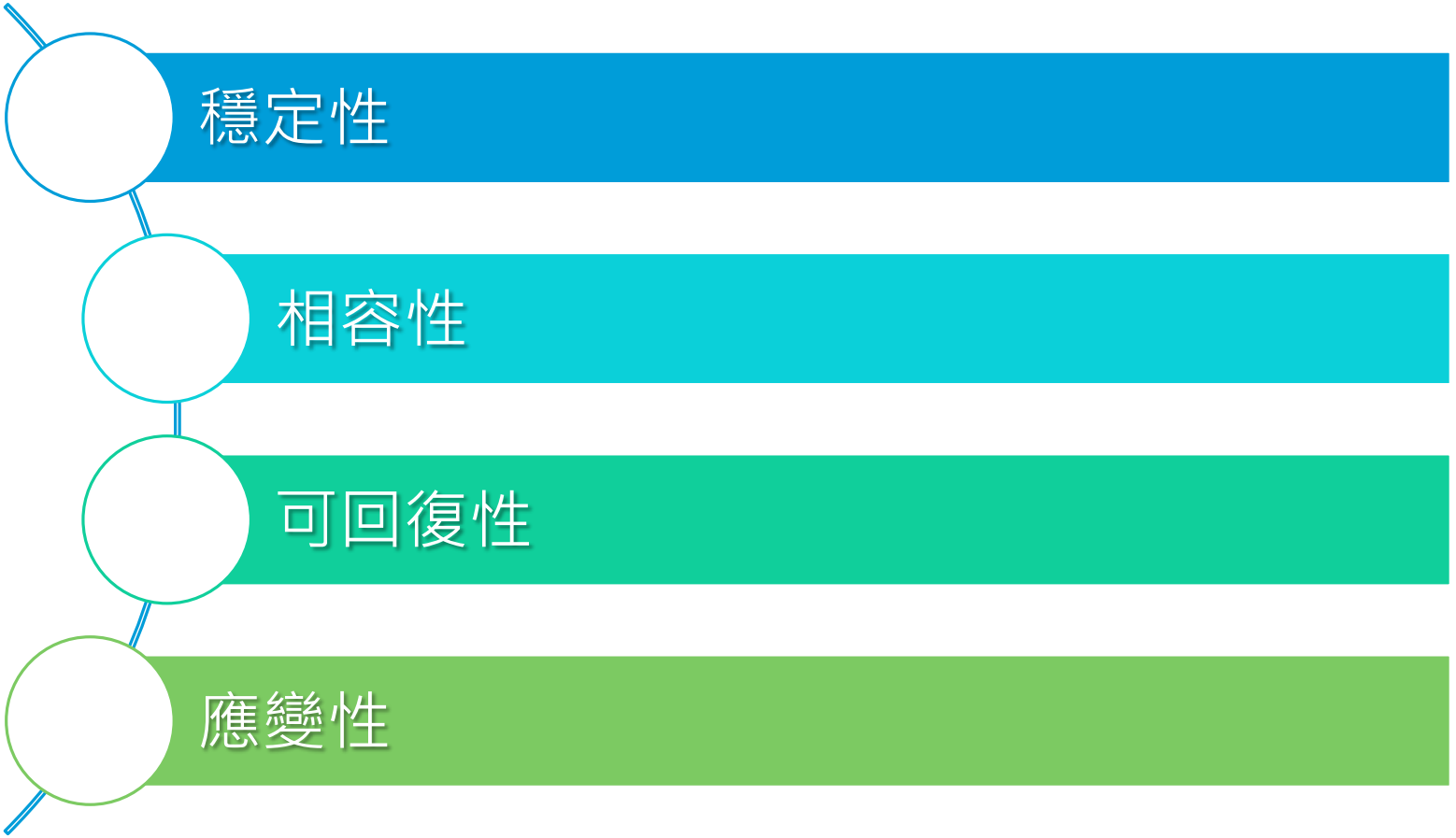
持續交付高品質軟體

對軟體開發來說

最困難的不是如何上線...

是如何快速、持續把新版本上線...

持續交付的痛點



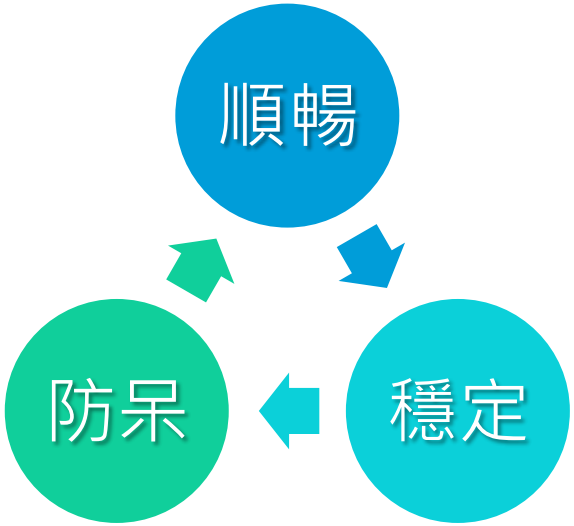
你有聽過測試嗎?

- 驗證結果符合預期
- 找出潛在問題
- 安全防護網
- 有重構的機會

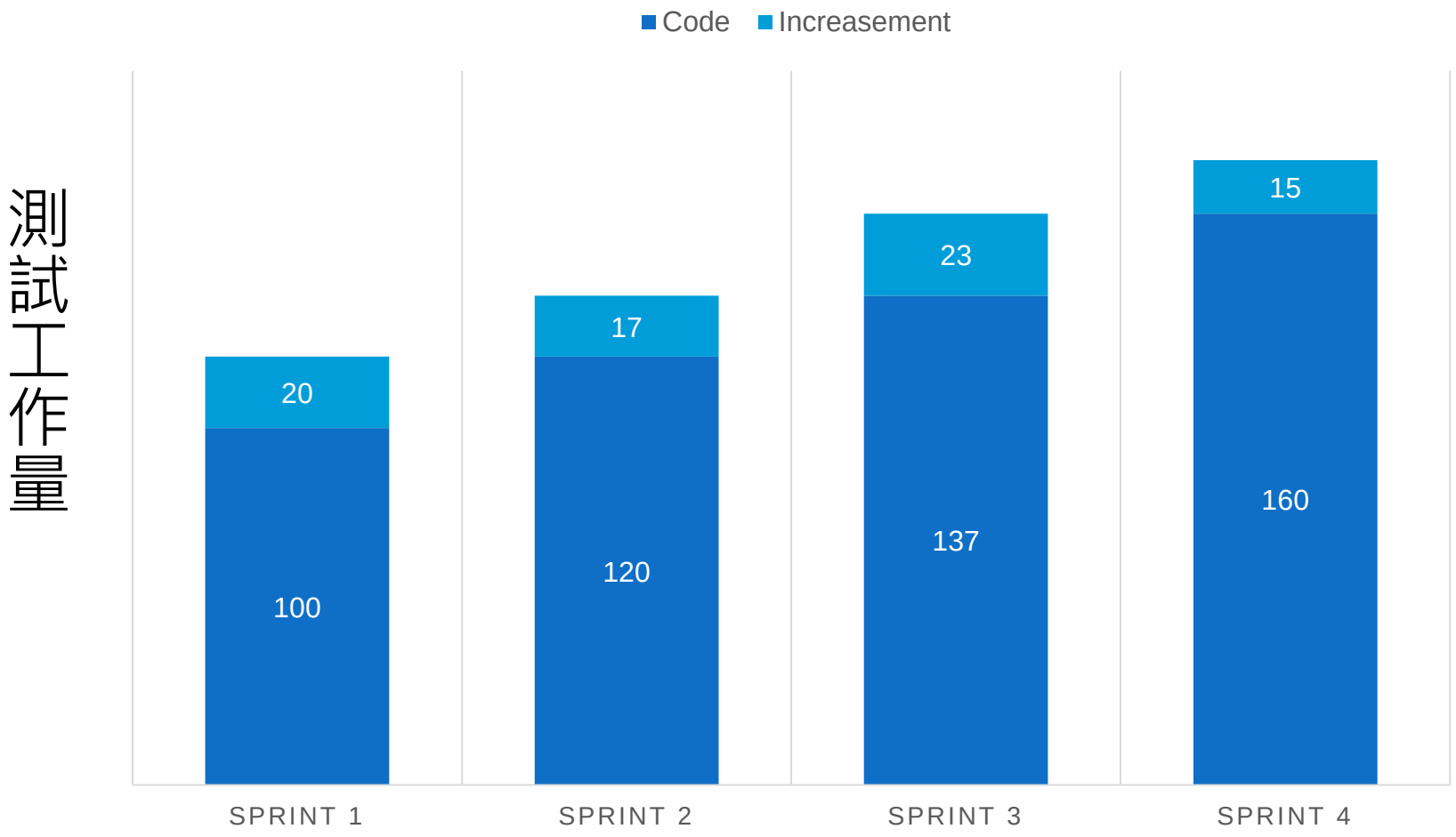


你做的是測試嗎?

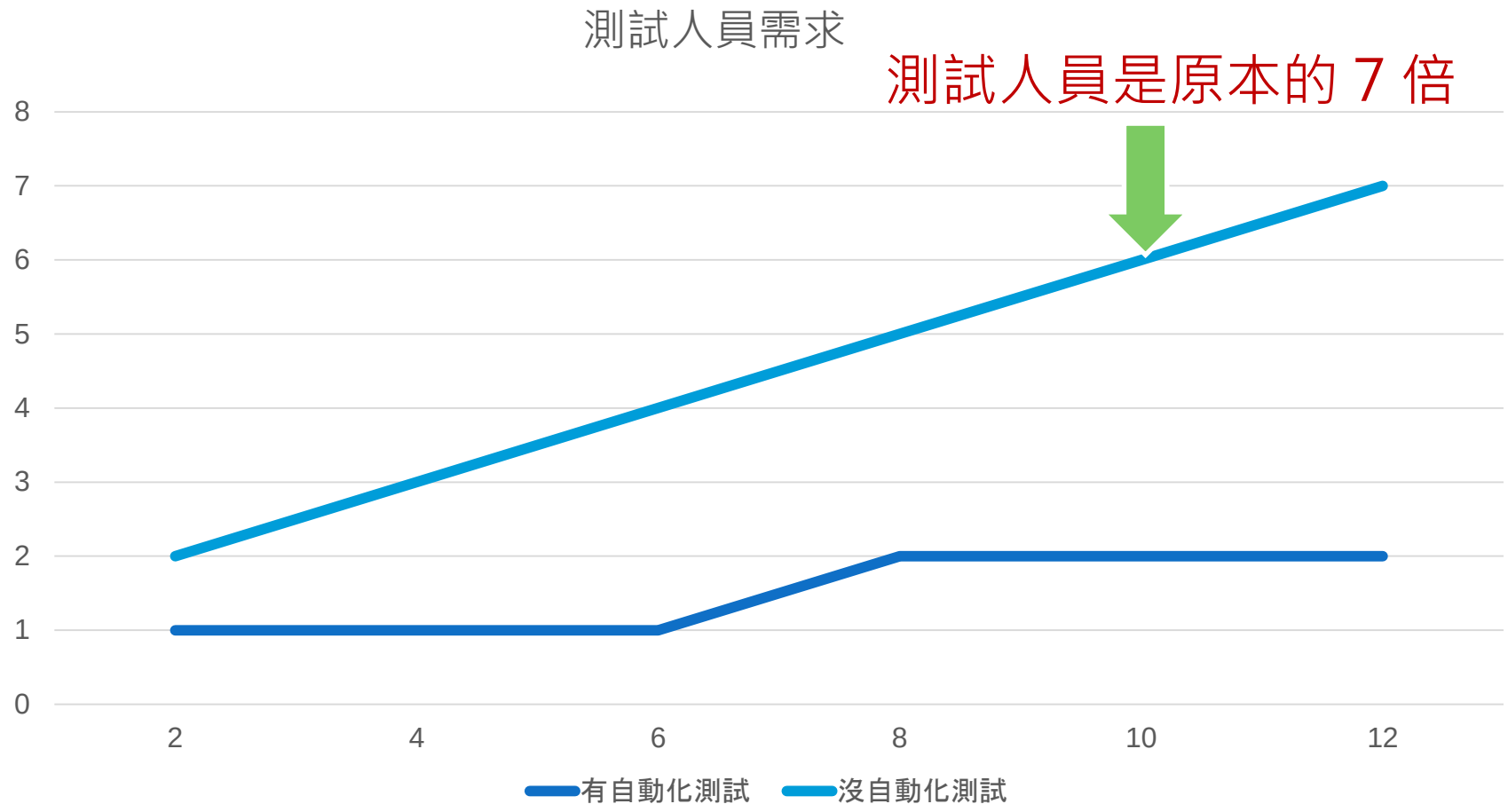
- 預期會發生的行為 => 驗證
- 找出意料外的行為 => 測試
- 讓 驗證 自動化



程式碼行數與測試需求


Code
Increasement
測試工作量
20
100
17
120
23
137
15
160
SPRINT 1
SPRINT 2
SPRINT 3
SPRINT 4

為什麼需要自動化測試



惡性循環

開發時間少

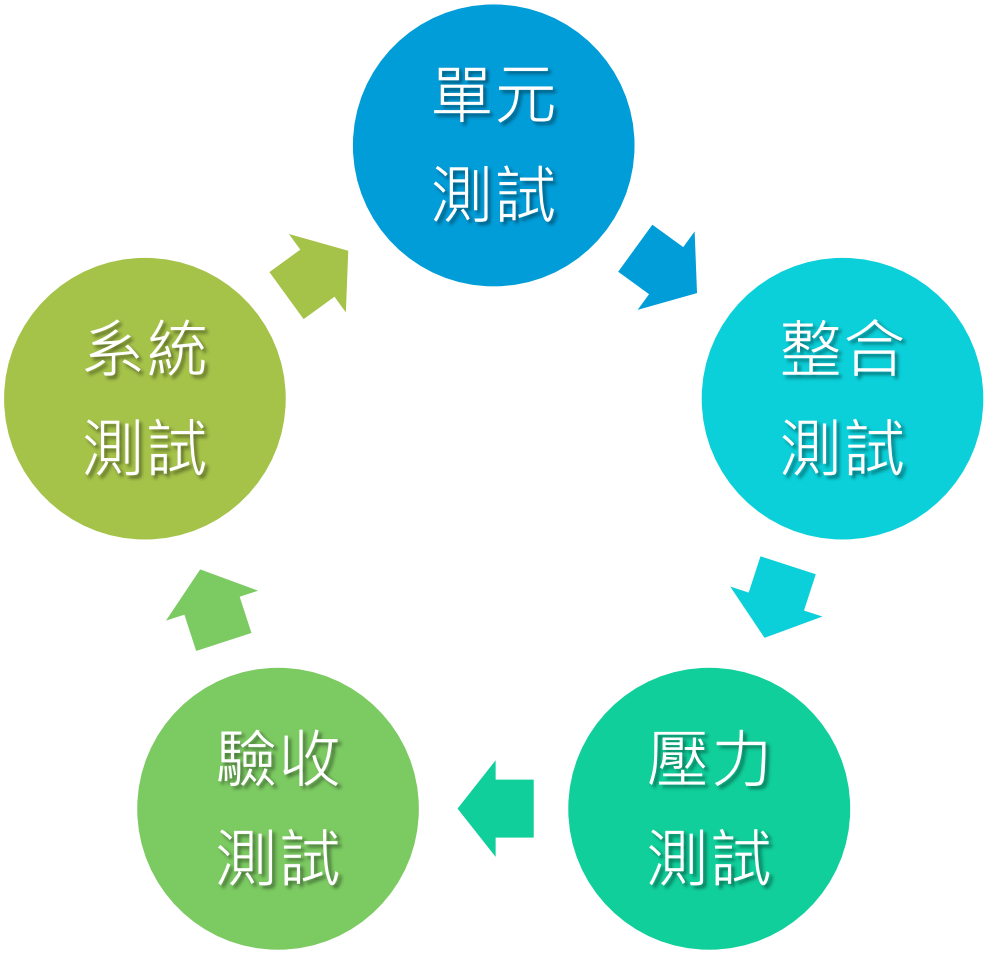
測試問題多

加班趕工上線

發現程式很難改

投入更多資源

讓測試自動化



有測試就安全了嗎?

涵蓋率

重複

安全性

風格

技術債



自動化部署

- 避免手誤
- 標準化流程
- 節省時間
- 減少人力介入

【工程師的手殘故事】Gitlab 員工意外刪除資料庫，漏夜開直播搶修 8 小時

2017/02/02



2 月 1 日，當大家在歡度年假最後一天時，工程師線上平台 Gitlab 正在收拾「rm -rf」慘劇。

簡單來說，就是內部工程師手殘刪除了數據庫內約 300G 的資料，在發現自己的手犯下滔天大錯的同時趕緊搶救，只救回了 4.5G 的資料。

持續交付流程



Source Code

Build



CI Server

Unit Test

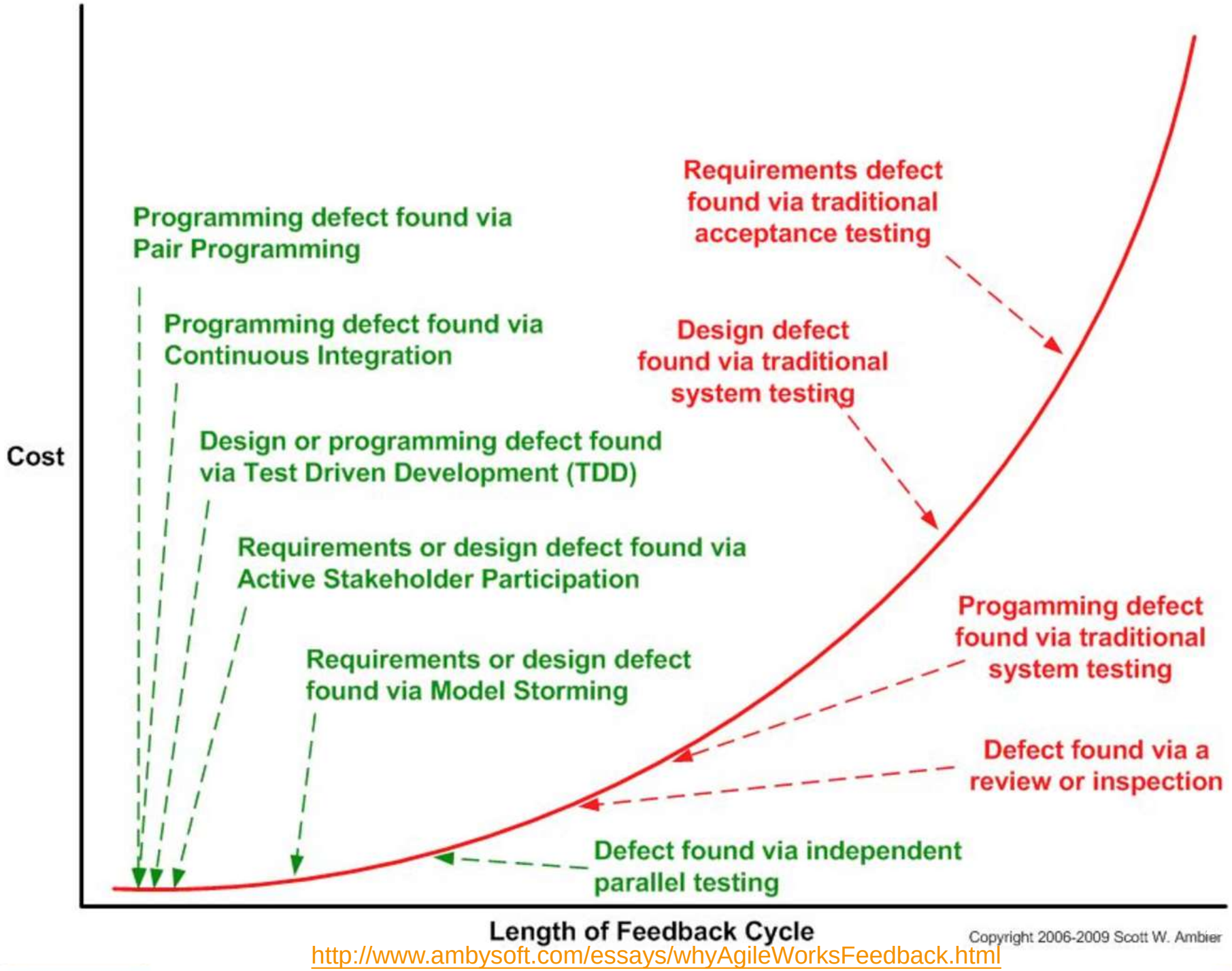
Integration Test

Code Analysis

Deploy



Production



http://www.ambysoft.com/essays/whyAgileWorksFeedback.html

Developer

- 工具不是萬能
- 人工確認
- Definition of Done
- 同步資訊

持續交付流程



Pair Programming



Source Code

Build

Unit Test

Integration Test

Code Analysis



CI Server



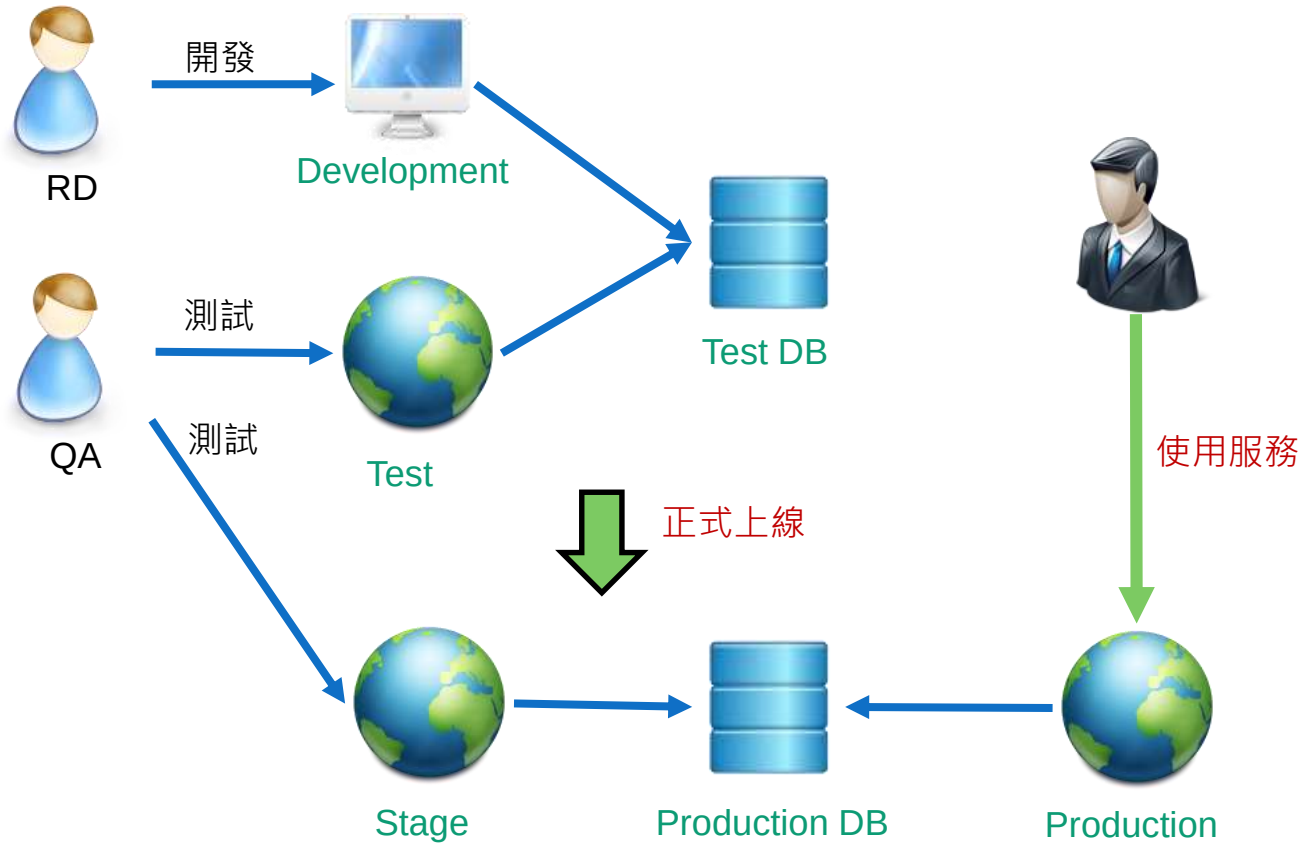
Code Review

Deploy



Production

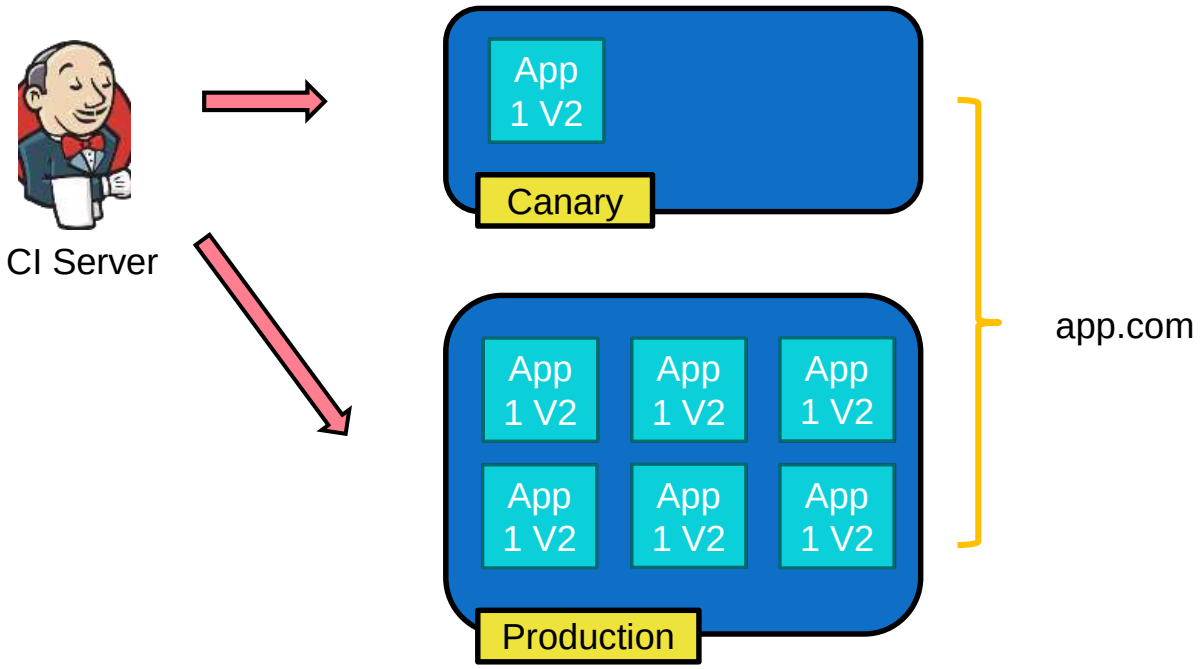
Multiple Stage



環境落差

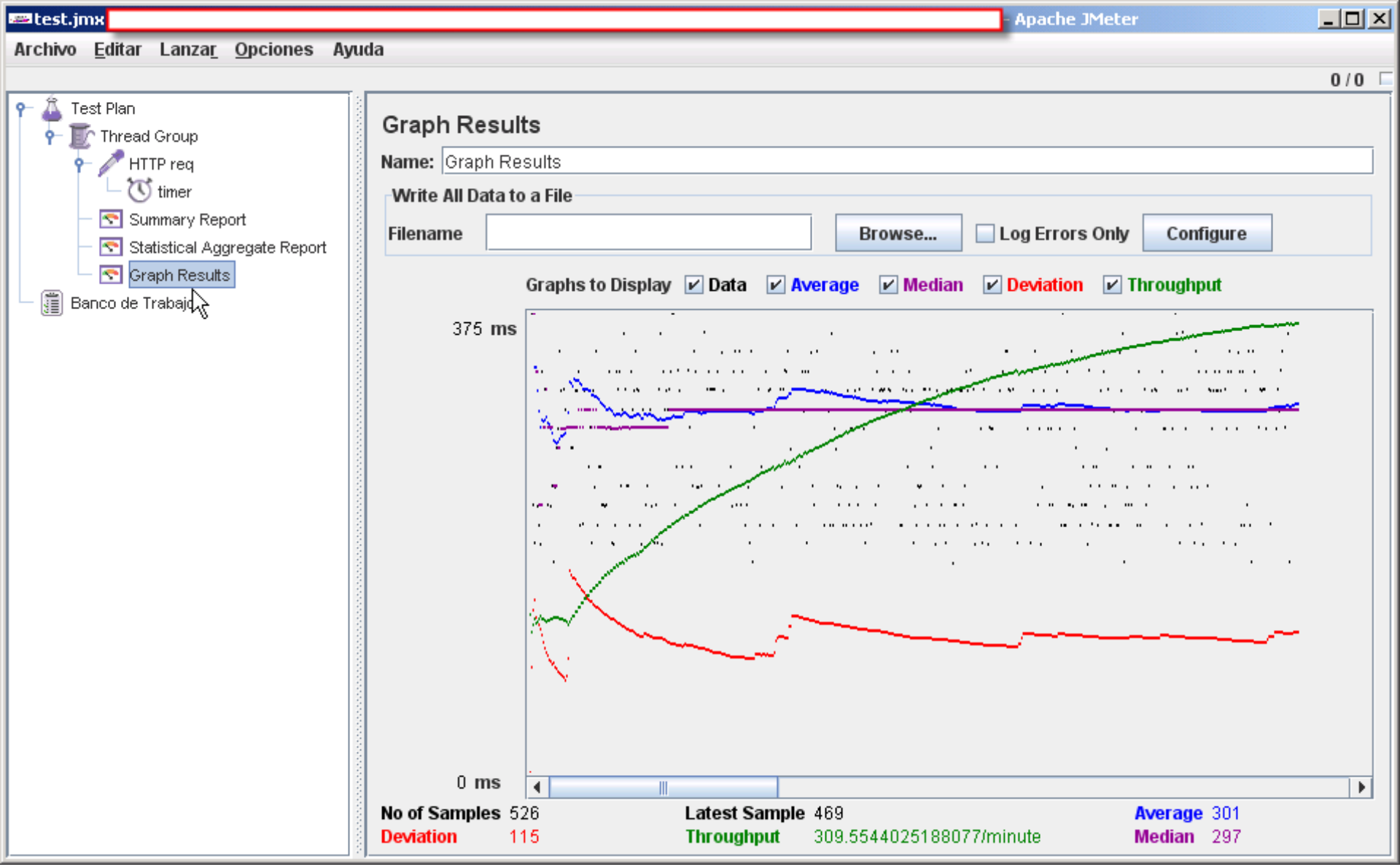
- 環境不一致
- 資料量大
- 資料複雜度高
- 效能問題
- 架構問題

Canary & Rolling Release

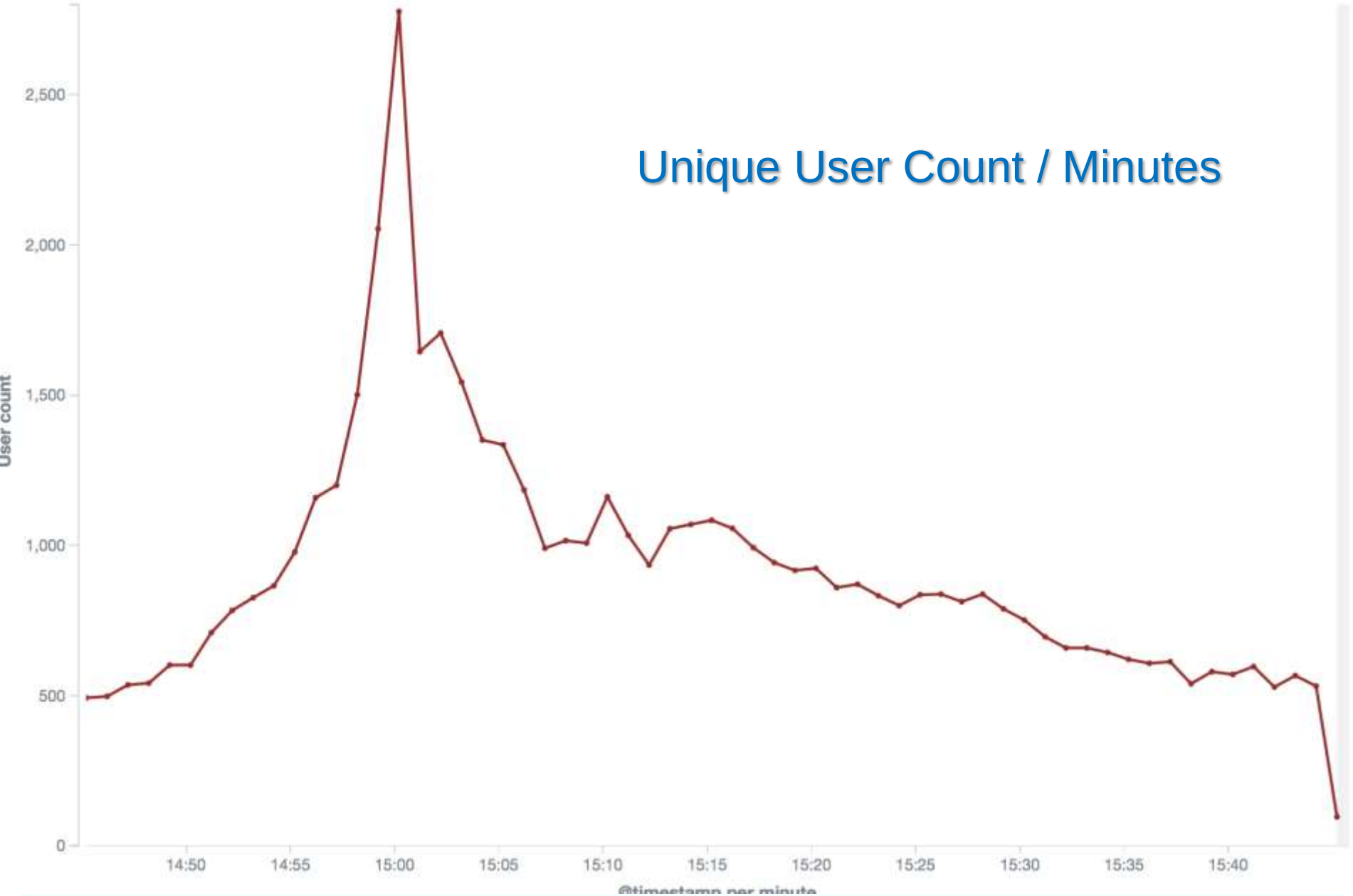


壓力測試的難題

- 與現實有落差
- 人類 vs 機器
- 測試的死角
- 瞬間的瓶頸


test.jmx
Apache JMeter
Archivo Editar Lanzar Opciones Ayuda
0 / 0
Test Plan
Thread Group
HTTP req
timer
Summary Report
Statistical Aggregate Report
Graph Results
Banco de Trabajo
Graph Results
Name: Graph Results
Write All Data to a File
Filename
Browse...
Log Errors Only
Configure
Graphs to Display
Data
Average
Median
Deviation
Throughput
375 ms
0 ms
No of Samples 526
Latest Sample 469
Average 301
Deviation 115
Throughput 309.5544025188077/minute
Median 297

Unique User Count / Minutes



模擬使用者行為

- PhantomJs
- 根據 Request Log
- 根據 GA
- 客制化腳本
- 同時發動





Customize Script

Runner



Admin







模擬使用者行為



Recap

- 確保品質
- 持續交付
- 避免意外
- 有效產出

Immutable Infrastructure

網站架構



WebSite

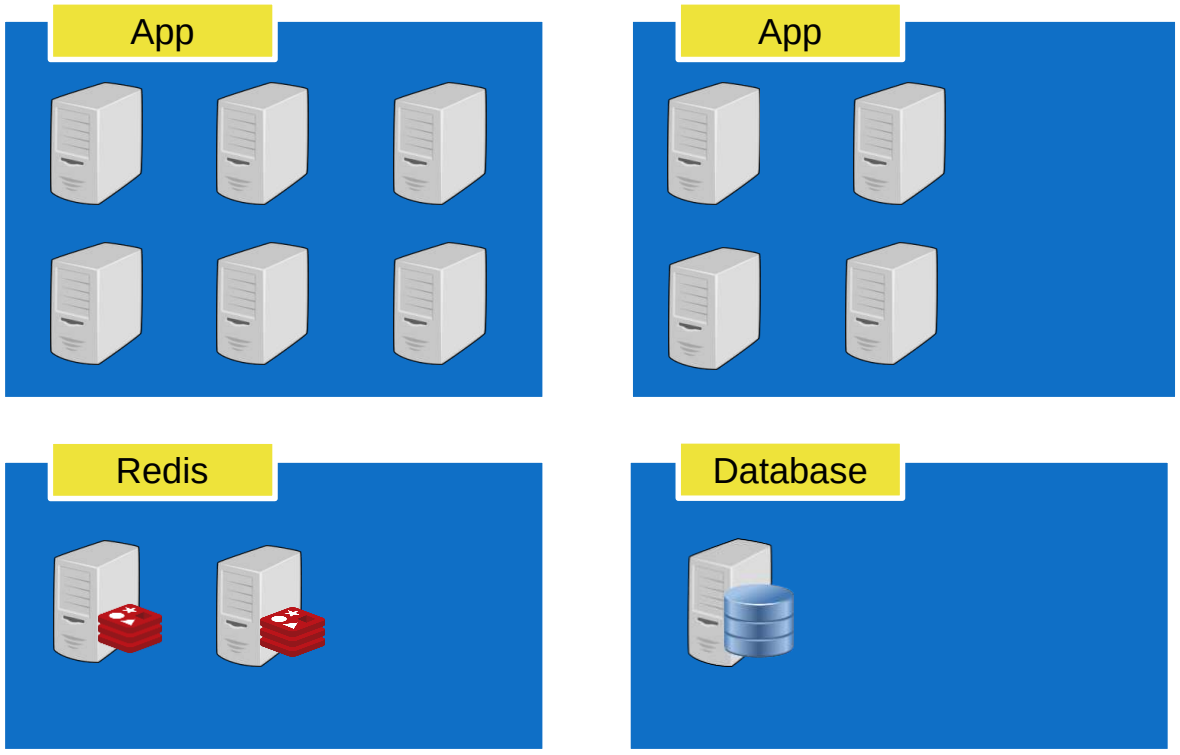


Database



Redis

Scalable Application



- Stateless
- Recoverable
- Reuse
- Scale out & Scale up

Maintainable

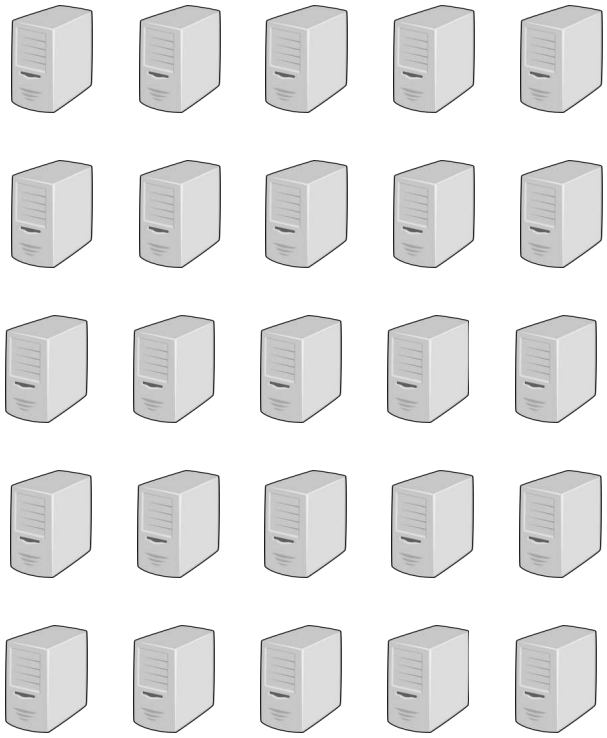




- Install
- Setup
- Maintain



Maintainable

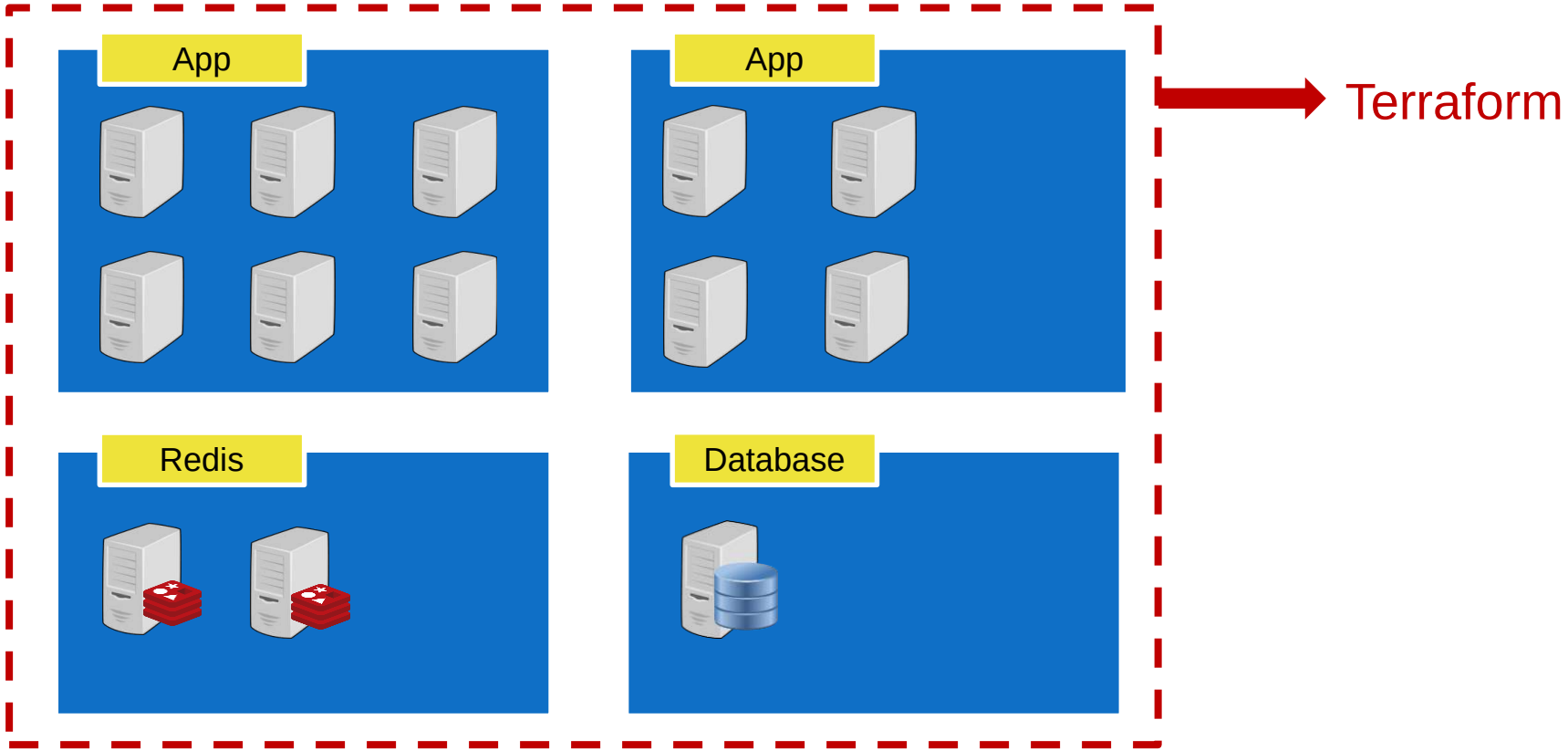




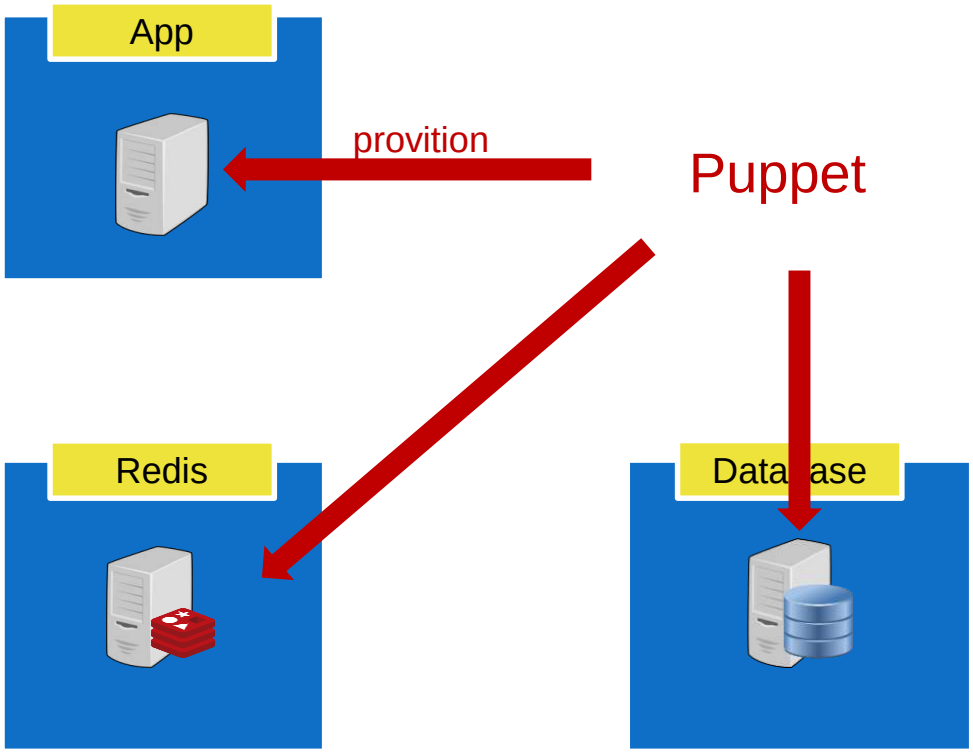
- Install
- Setup
- Maintain



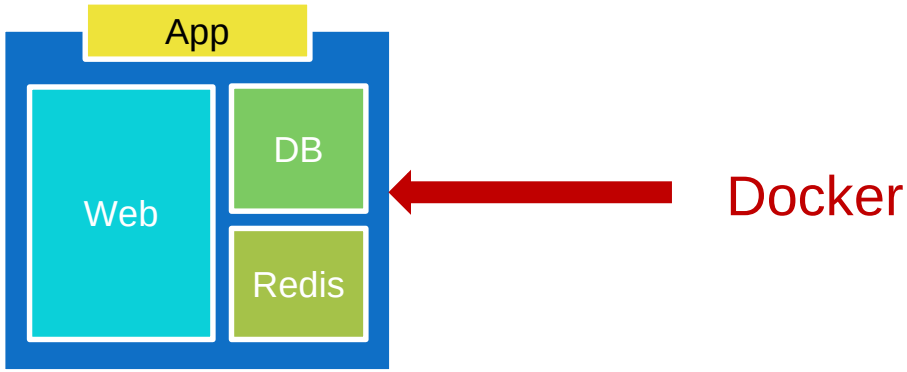
Infrastructure as Code



Infrastructure as Code

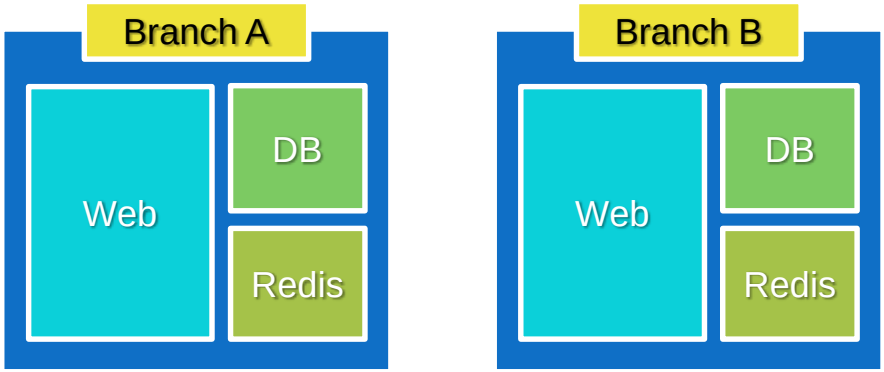


Infrastructure as Code

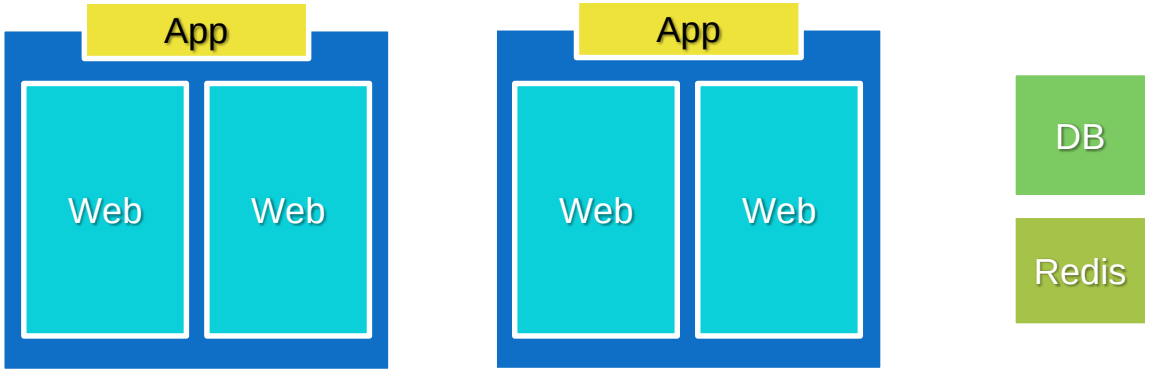


Infrastructure as Code

Testing Environment



Production Environment



Terraform

- 使用 HCL / JSON
- 容易閱讀
- 支援多平台
- 可匯入現有資源
- 搭配版本控管

```
# Specify the provider and access details
provider "aws" {
  region = "${var.aws_region}"
}

resource "aws_elb" "web-elb" {
  name = "terraform-example-elb"

  # The same availability zone as our instances
  availability_zones = ["${split(",", var.availability_zones)}"]

  listener {
    instance_port     = 80
    instance_protocol = "http"
    lb_port           = 80
    lb_protocol       = "http"
  }

  health_check {
    healthy_threshold   = 2
    unhealthy_threshold = 2
    timeout             = 3
    target              = "HTTP:80/"
    interval            = 30
  }
}
```

多平台









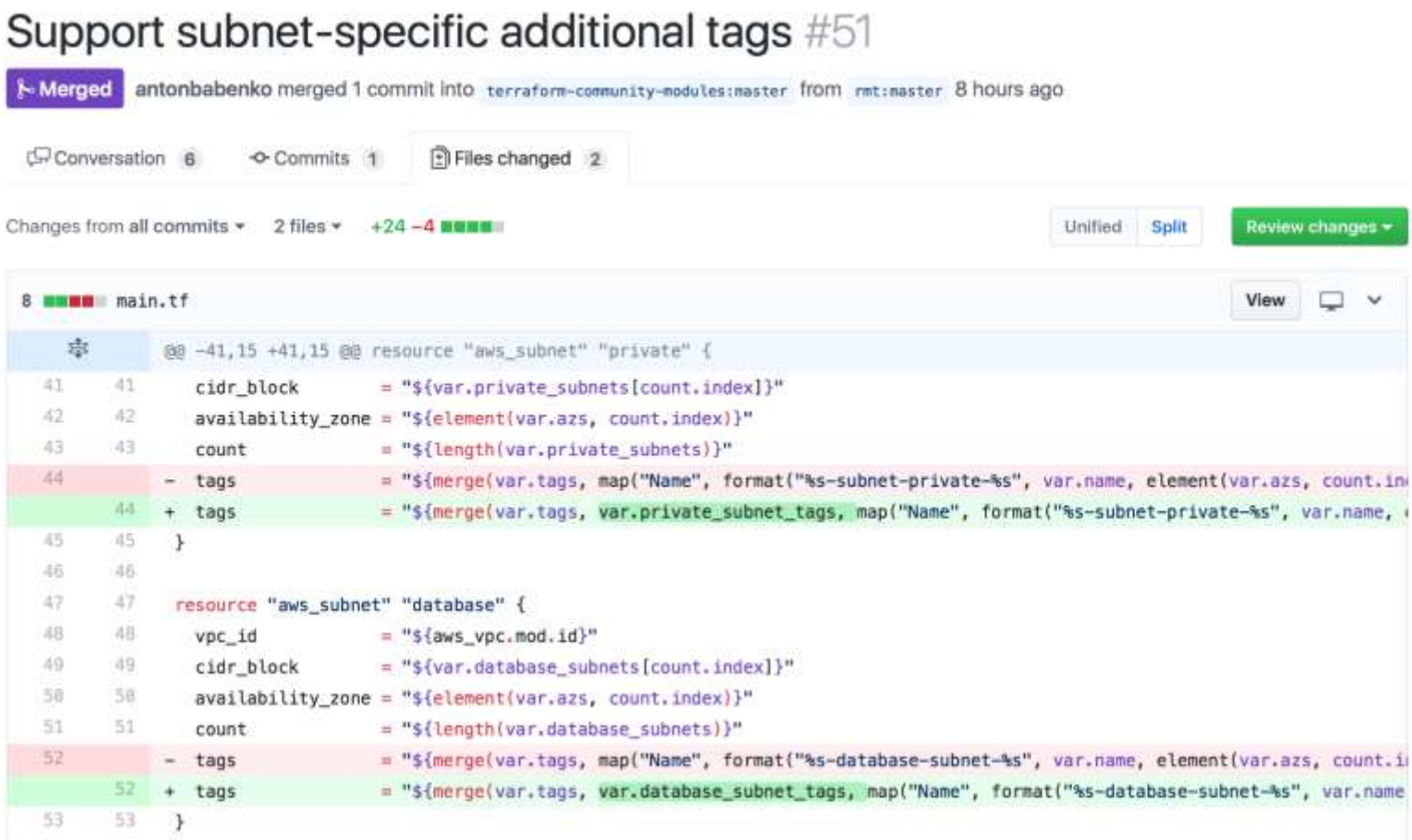




目前有 70 多個 Provider

https://www.terraform.io/docs/providers/

版本控管



Support subnet-specific additional tags #51

Merged antonbabenko merged 1 commit into `terraform-community-modules:master` from `rmt:master` 8 hours ago

Conversation 6 Commits 1 Files changed 2

Changes from all commits 2 files +24 −4 Unified Split Review changes

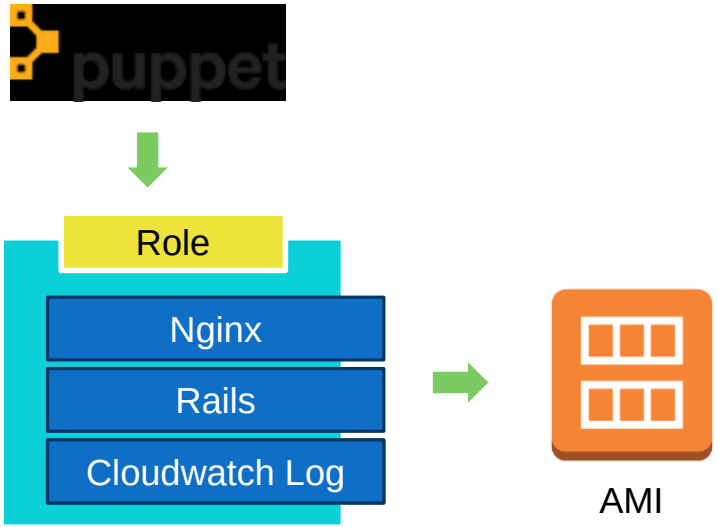
8 main.tf View

```
@@ -41,15 +41,15 @@ resource "aws_subnet" "private" {
  cidr_block        = "${var.private_subnets[count.index]}"
  availability_zone = "${element(var.azs, count.index)}"
  count             = "${length(var.private_subnets)}"
- tags              = "${merge(var.tags, map("Name", format("%s-subnet-private-%s", var.name, element(var.azs, count.in
+ tags              = "${merge(var.tags, var.private_subnet_tags, map("Name", format("%s-subnet-private-%s", var.name,
}

resource "aws_subnet" "database" {
  vpc_id            = "${aws_vpc.mod.id}"
  cidr_block        = "${var.database_subnets[count.index]}"
  availability_zone = "${element(var.azs, count.index)}"
  count             = "${length(var.database_subnets)}"
- tags              = "${merge(var.tags, map("Name", format("%s-database-subnet-%s", var.name, element(var.azs, count.i
+ tags              = "${merge(var.tags, var.database_subnet_tags, map("Name", format("%s-database-subnet-%s", var.name
}
```

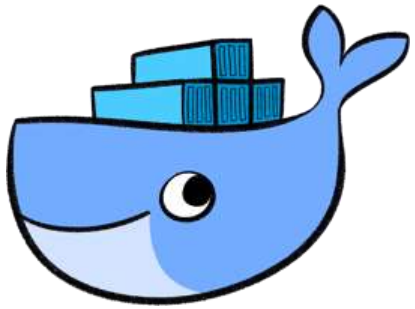
Puppet

- Provision
- Package AWS AMI
- Role Profile Pattern
- Easy Reuse
- Auto Scaling Group

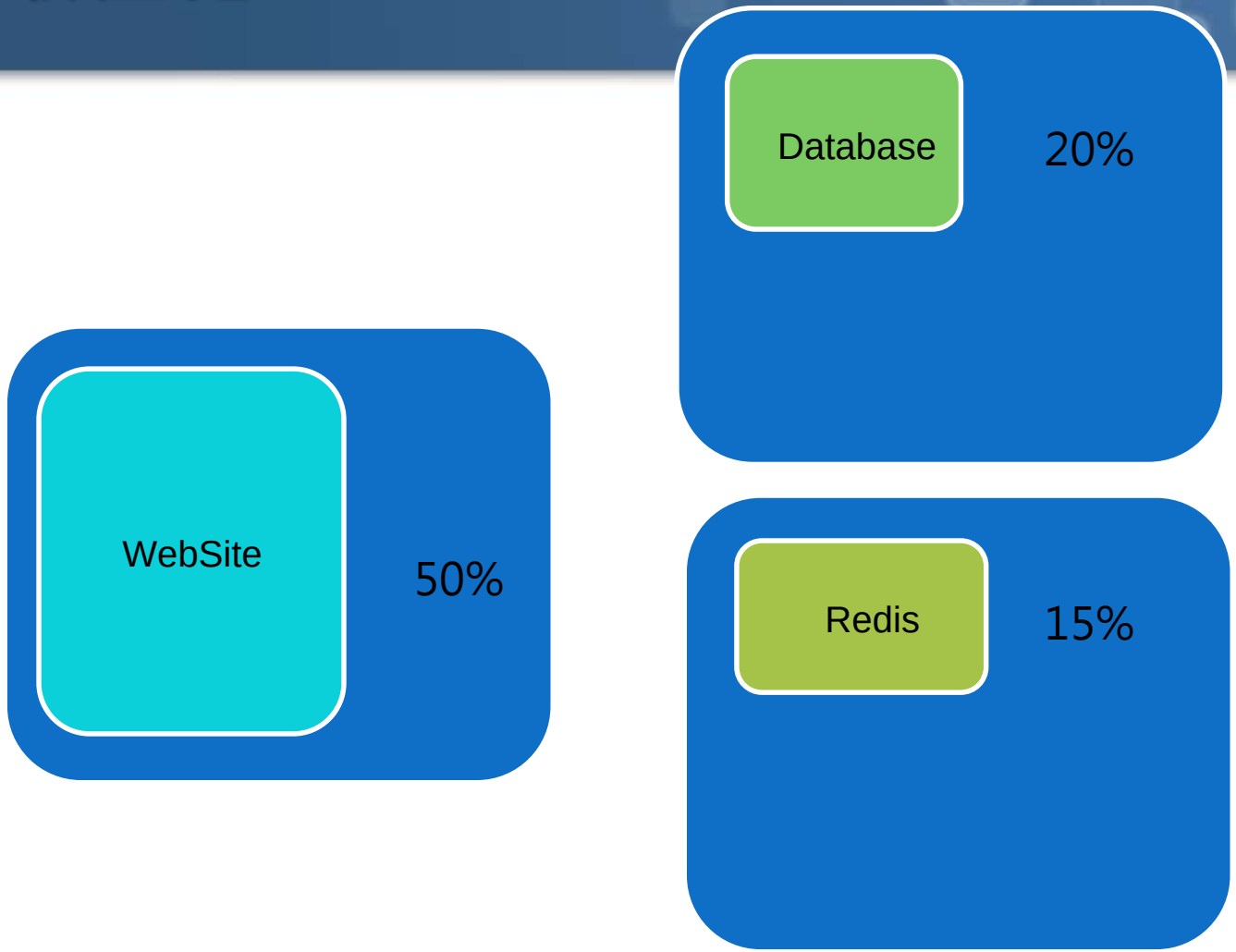


Docker

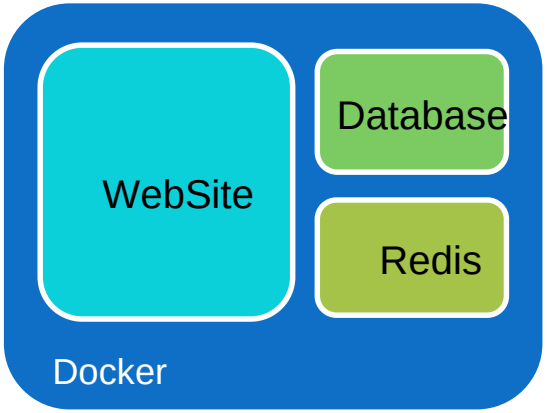
- 快速建置環境
- 開發與正式環境一致
- 環境隔離
- 資源有效利用
- 降低維運成本
- 比虛擬化更輕量



資源最佳化



Docker

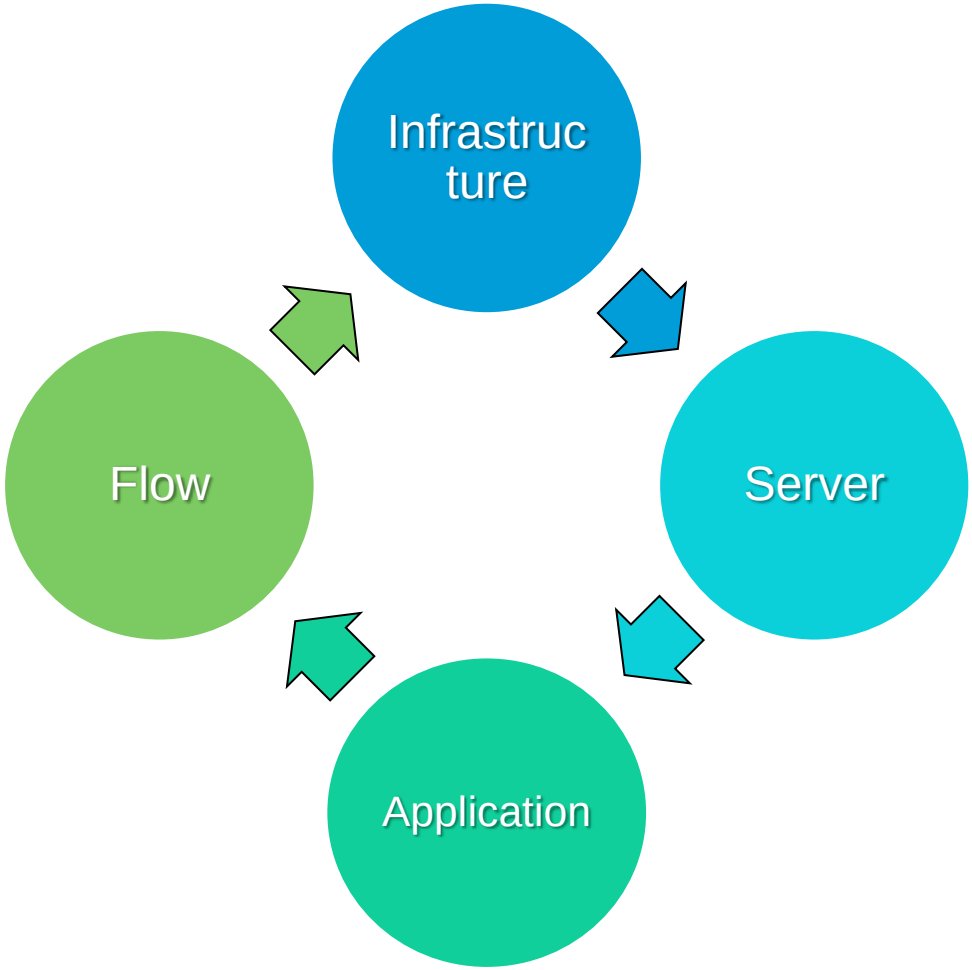


Recap

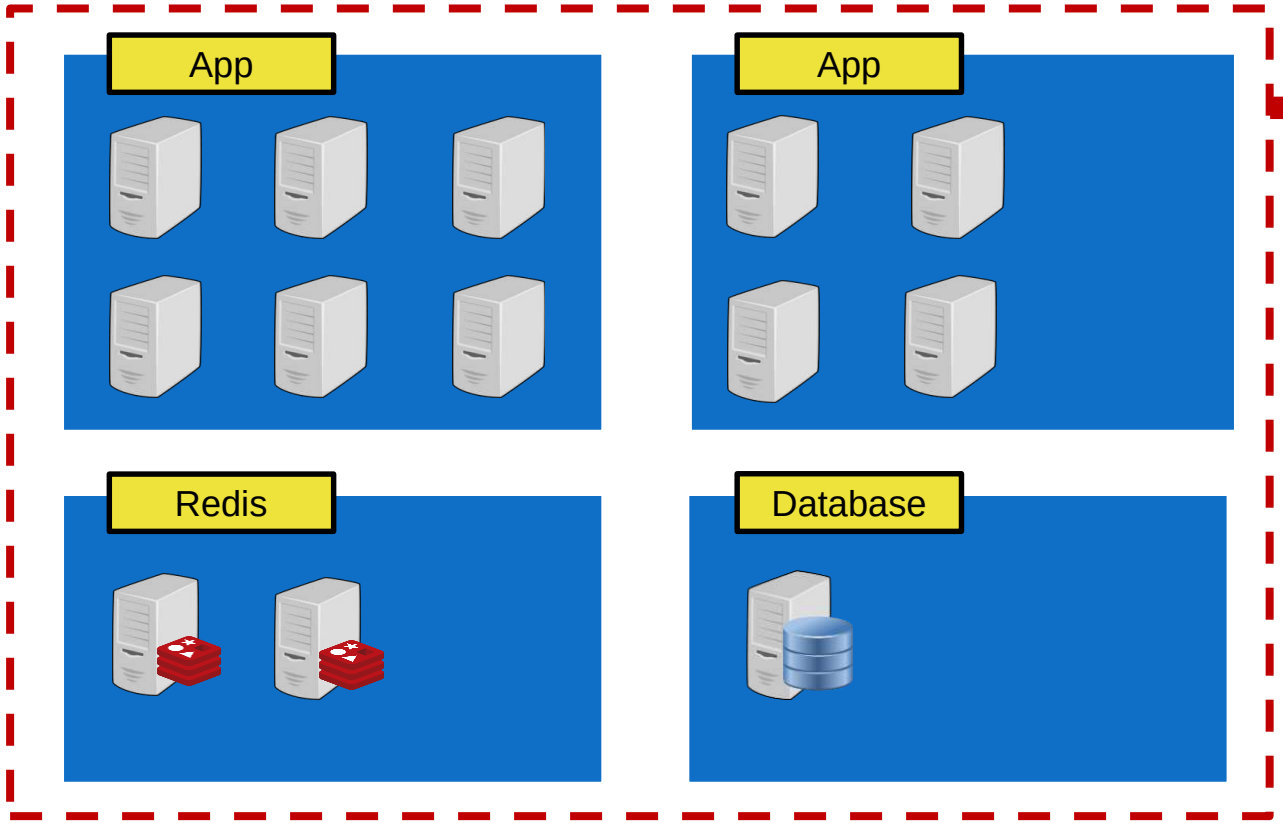
- Stateless
- Scalable
- Stable
- Reuseable

System Monitor and Profiling

監控維度



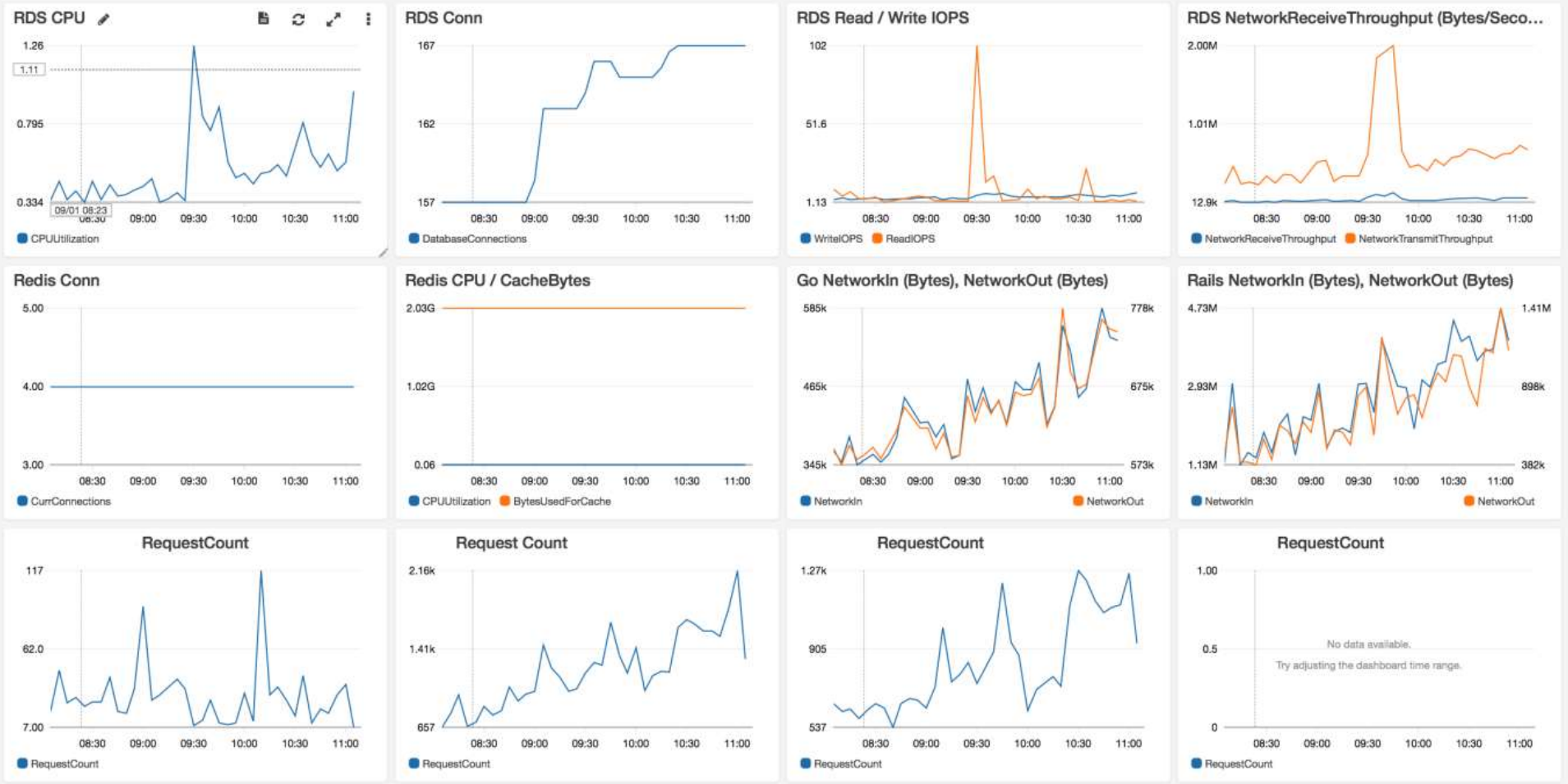
Intrastructure Status

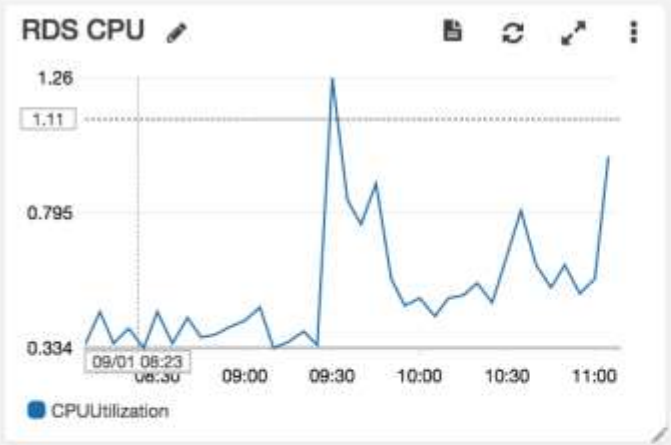


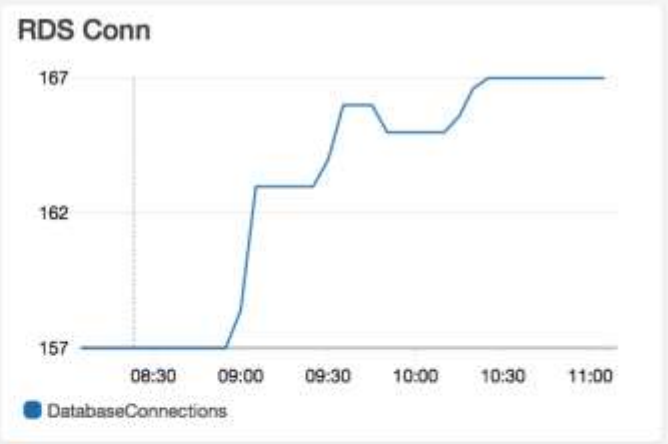
AWS CloudWatch

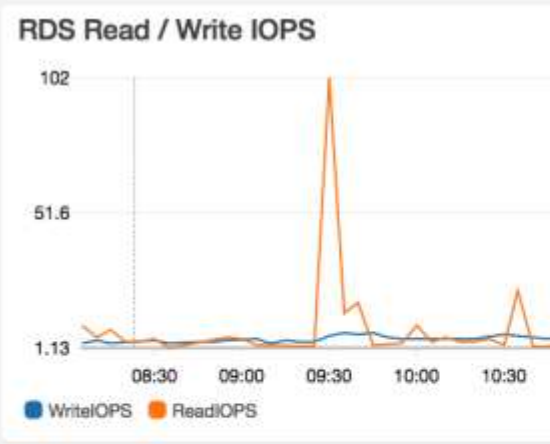
- ELB Request Count
- CPU Usage
- Network Thoughput
- Disk IO

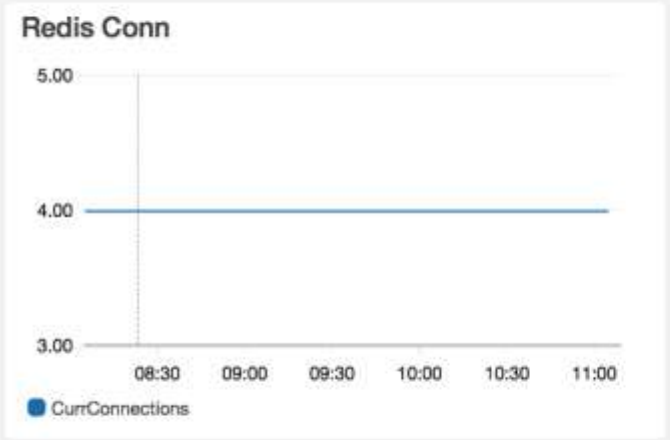
Cloudwatch Dashboard

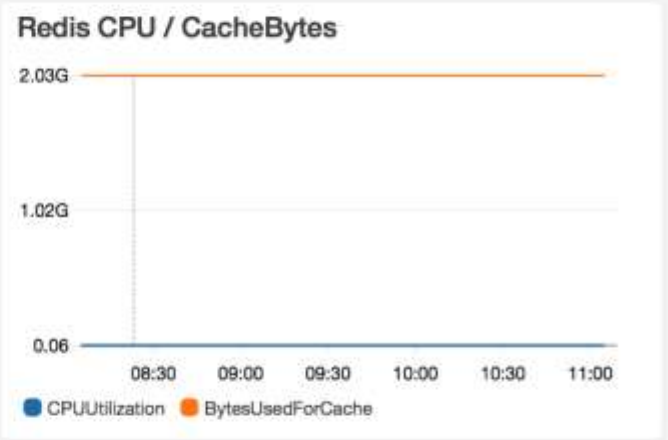


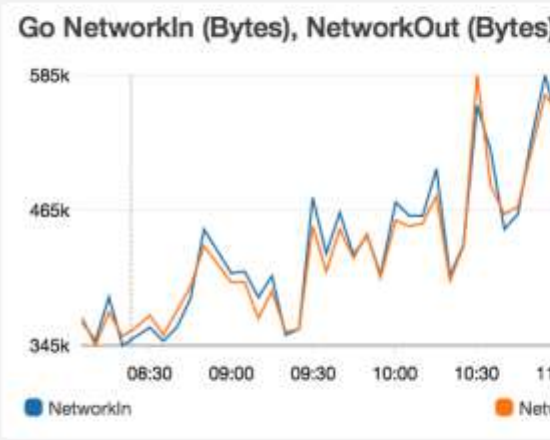

RDS CPU
1.26
1.11
0.795
0.334
09/01 08:23
09:00
09:30
10:00
10:30
11:00
CPUUtilization

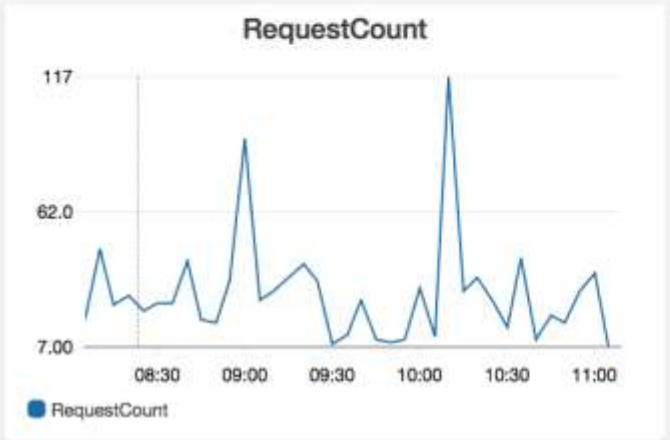

RDS Conn
167
162
157
08:30
09:00
09:30
10:00
10:30
11:00
DatabaseConnections

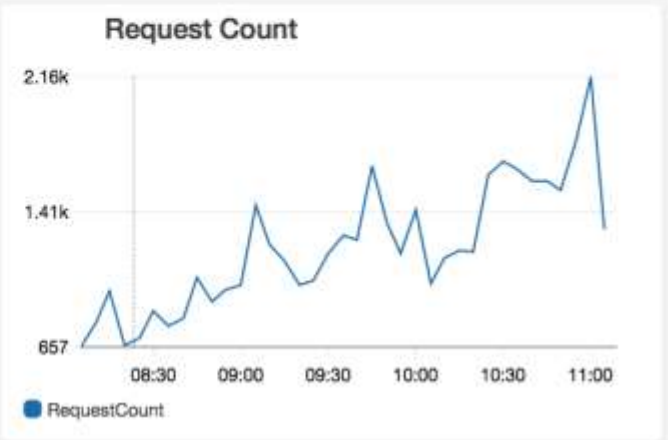

RDS Read / Write IOPS
102
51.6
1.13
08:30
09:00
09:30
10:00
10:30
WriteIOPS
ReadIOPS

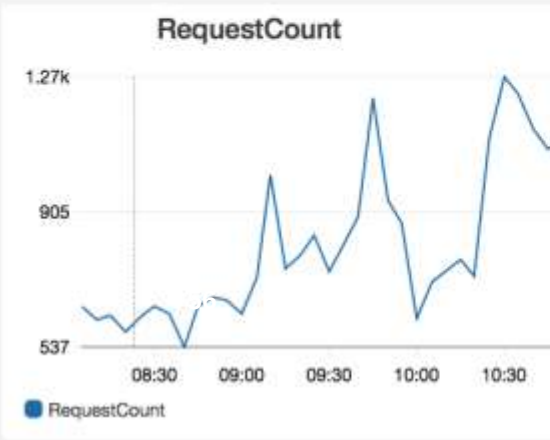

Redis Conn
5.00
4.00
3.00
08:30
09:00
09:30
10:00
10:30
11:00
CurrConnections


Redis CPU / CacheBytes
2.03G
1.02G
0.06
08:30
09:00
09:30
10:00
10:30
11:00
CPUUtilization
BytesUsedForCache

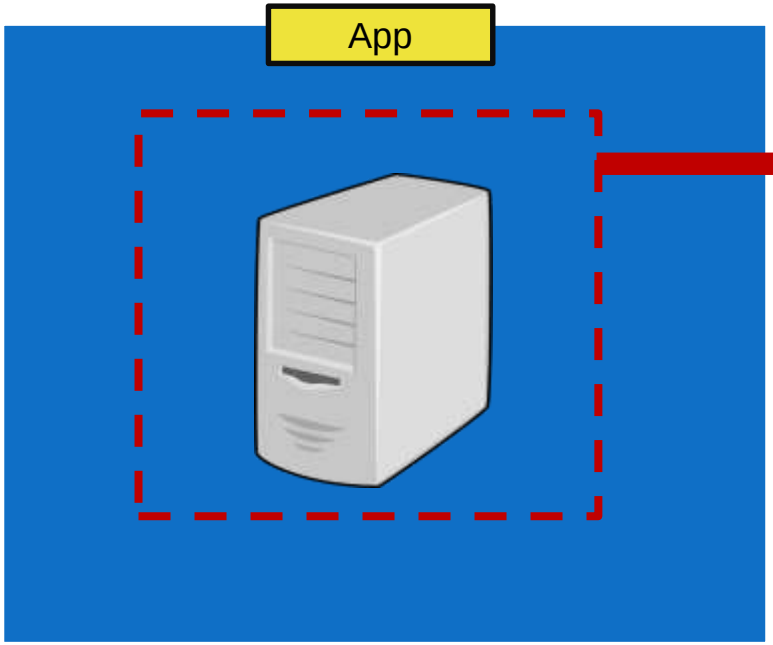

Go NetworkIn (Bytes), NetworkOut (Bytes)
585k
465k
345k
08:30
09:00
09:30
10:00
10:30
NetworkIn


RequestCount
117
62.0
7.00
08:30
09:00
09:30
10:00
10:30
11:00
RequestCount


Request Count
2.16k
1.41k
657
08:30
09:00
09:30
10:00
10:30
11:00
RequestCount


RequestCount
1.27k
905
537
08:30
09:00
09:30
10:00
10:30
RequestCount

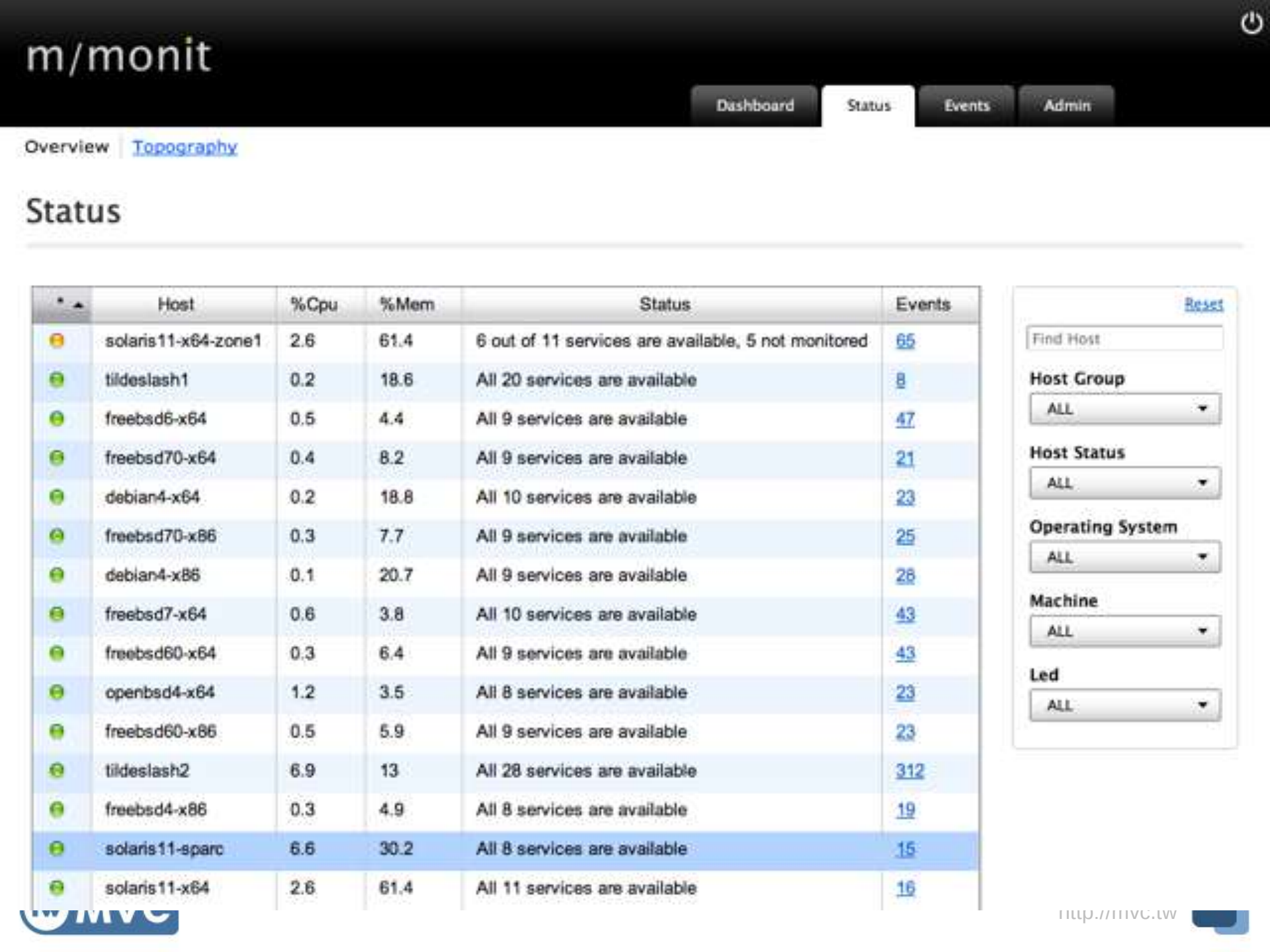
Server Status



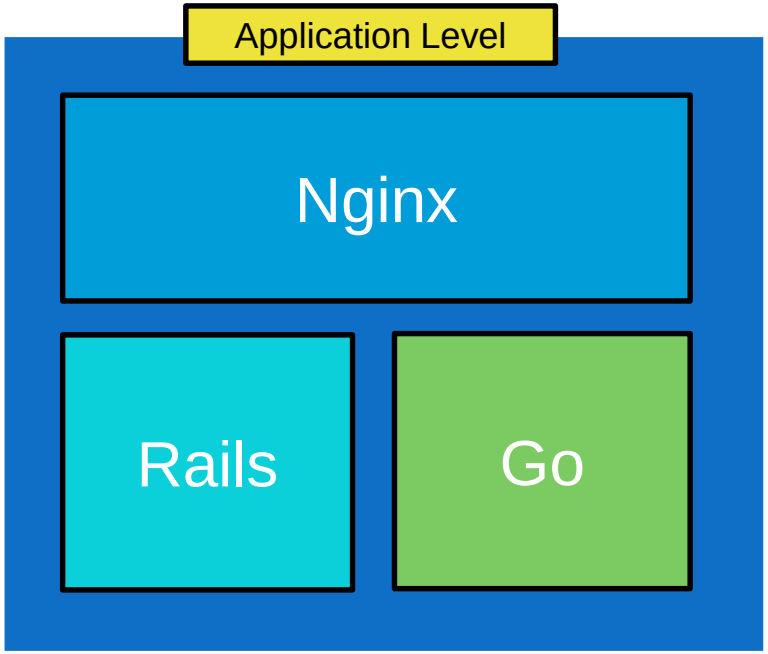


Monit

- CPU Usage
- Memory Usage
- Disk Usage
- Application Status
- Custom Script

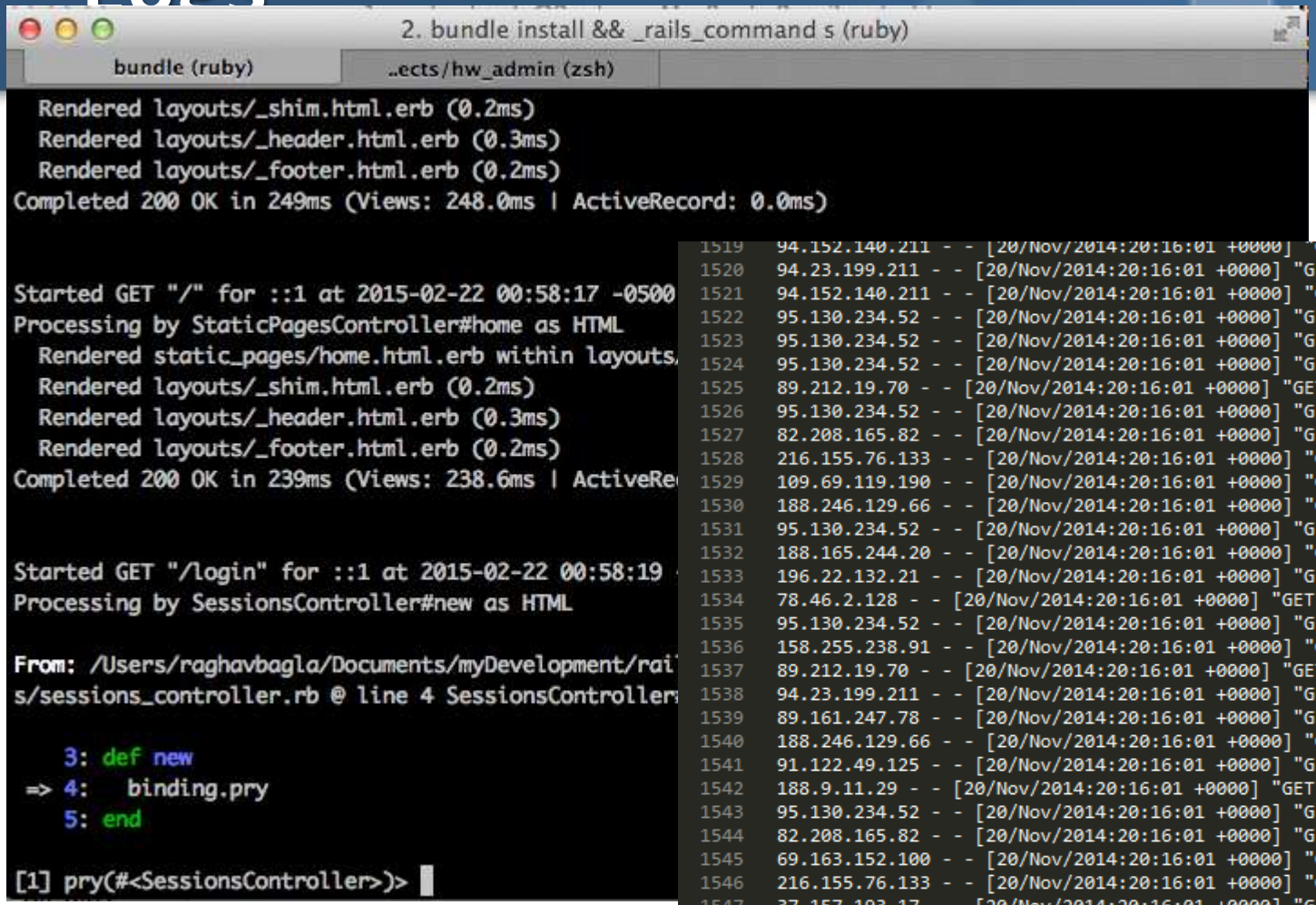

m/monit
Dashboard
Status
Events
Admin
Overview
Topography
Status
Host
%Cpu
%Mem
Status
Events
solaris11-x64-zone1
2.6
61.4
6 out of 11 services are available, 5 not monitored
65
tildeslash1
0.2
18.6
All 20 services are available
8
freebsd6-x64
0.5
4.4
All 9 services are available
47
freebsd70-x64
0.4
8.2
All 9 services are available
21
debian4-x64
0.2
18.8
All 10 services are available
23
freebsd70-x86
0.3
7.7
All 9 services are available
25
debian4-x86
0.1
20.7
All 9 services are available
26
freebsd7-x64
0.6
3.8
All 10 services are available
43
freebsd60-x64
0.3
6.4
All 9 services are available
43
openbsd4-x64
1.2
3.5
All 8 services are available
23
freebsd60-x86
0.5
5.9
All 9 services are available
23
tildeslash2
6.9
13
All 28 services are available
312
freebsd4-x86
0.3
4.9
All 8 services are available
19
solaris11-sparc
6.6
30.2
All 8 services are available
15
solaris11-x64
2.6
61.4
All 11 services are available
16
Reset
Find Host
Host Group
ALL
Host Status
ALL
Operating System
ALL
Machine
ALL
Led
ALL

Application Status



- Access Log
- Error Log
- Audit Log
- Others

Logs


2. bundle install && _rails_command s (ruby)
bundle (ruby)
..ects/hw_admin (zsh)
Rendered layouts/_shim.html.erb (0.2ms)
Rendered layouts/_header.html.erb (0.3ms)
Rendered layouts/_footer.html.erb (0.2ms)
Completed 200 OK in 249ms (Views: 248.0ms | ActiveRecord: 0.0ms)
Started GET "/" for ::1 at 2015-02-22 00:58:17 -0500
Processing by StaticPagesController#home as HTML
Rendered static_pages/home.html.erb within layouts/
Rendered layouts/_shim.html.erb (0.2ms)
Rendered layouts/_header.html.erb (0.3ms)
Rendered layouts/_footer.html.erb (0.2ms)
Completed 200 OK in 239ms (Views: 238.6ms | ActiveRe
Started GET "/login" for ::1 at 2015-02-22 00:58:19
Processing by SessionsController#new as HTML
From: /Users/raghavbagla/Documents/myDevelopment/rai
s/sessions_controller.rb @ line 4 SessionsController
3: def new
=> 4: binding.pry
5: end
[1] pry(#<SessionsController>)>

1519 94.152.140.211 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1520 94.23.199.211 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1521 94.152.140.211 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1522 95.130.234.52 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1523 95.130.234.52 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1524 95.130.234.52 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1525 89.212.19.70 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1526 95.130.234.52 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1527 82.208.165.82 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1528 216.155.76.133 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1529 109.69.119.190 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1530 188.246.129.66 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1531 95.130.234.52 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1532 188.165.244.20 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1533 196.22.132.21 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1534 78.46.2.128 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1535 95.130.234.52 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1536 158.255.238.91 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1537 89.212.19.70 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1538 94.23.199.211 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1539 89.161.247.78 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1540 188.246.129.66 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1541 91.122.49.125 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1542 188.9.11.29 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1543 95.130.234.52 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1544 82.208.165.82 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1545 69.163.152.100 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1546 216.155.76.133 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1547 37.157.193.17 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1548 109.69.119.190 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1549 82.77.0.73 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"
1550 94.23.199.211 - - [20/Nov/2014:20:16:01 +0000] "GET / HTTP/1.1" 000 0 "-" "-"

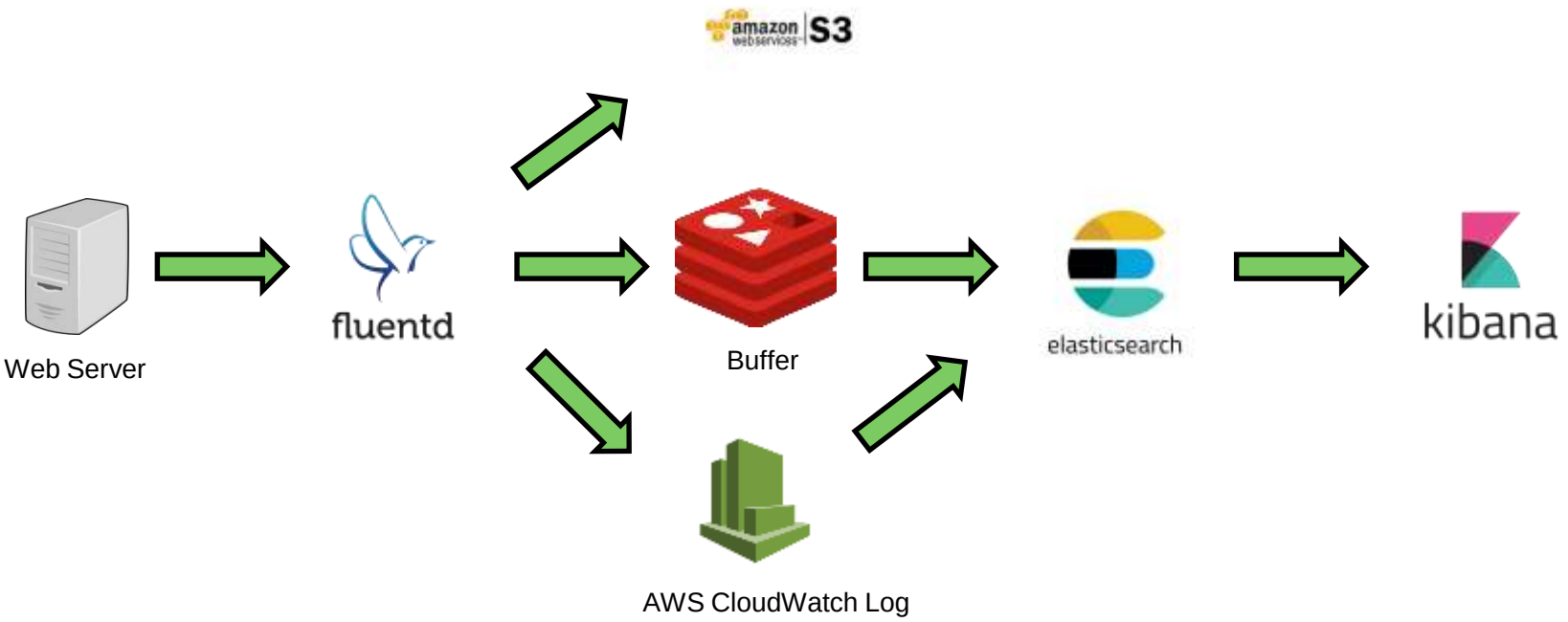
工程師就是要用 Terminal

替 Log 加分

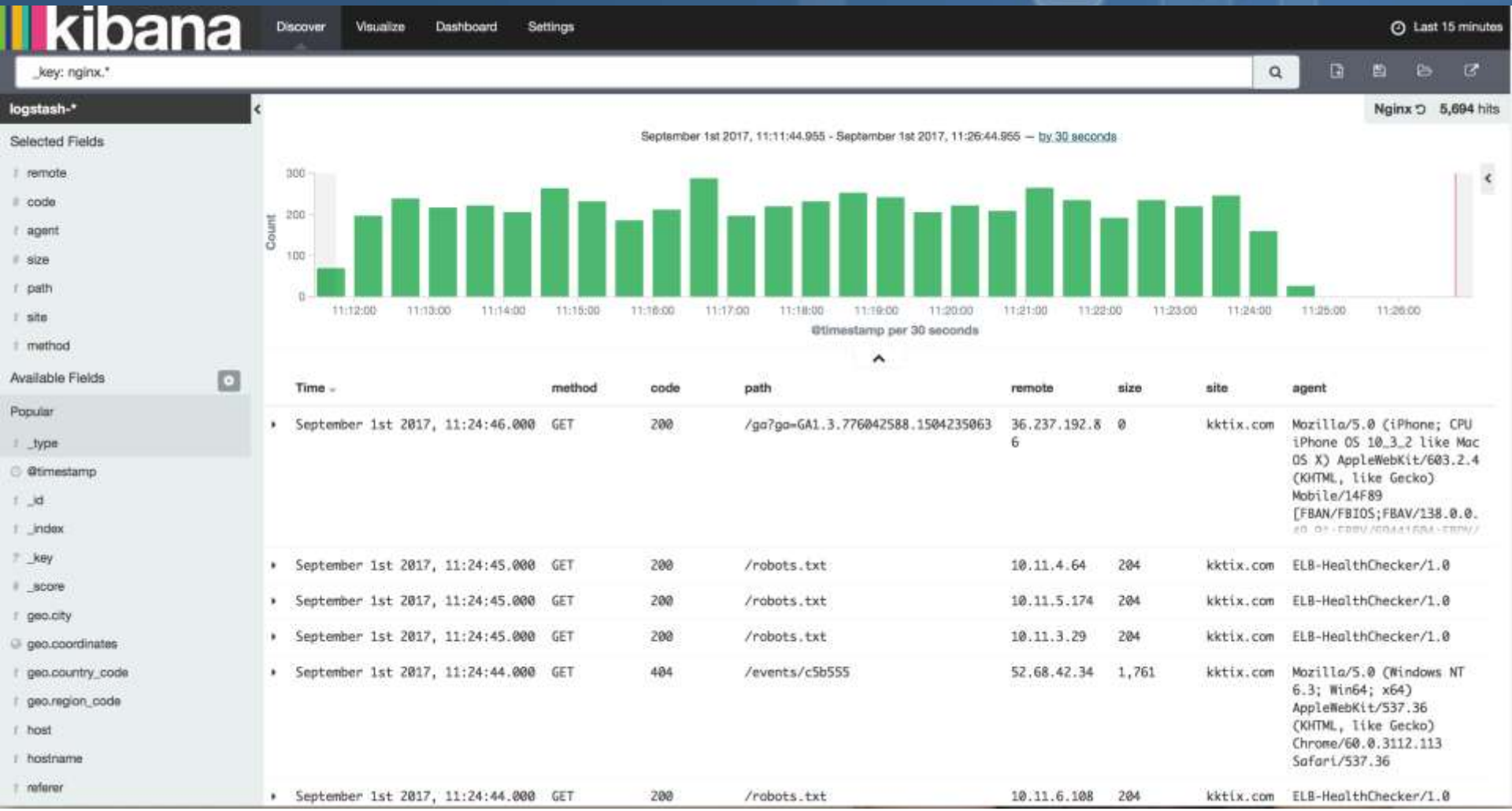
- Centralize
- 持續分析
- 資料視覺化
- 監控問題
- 預防異常



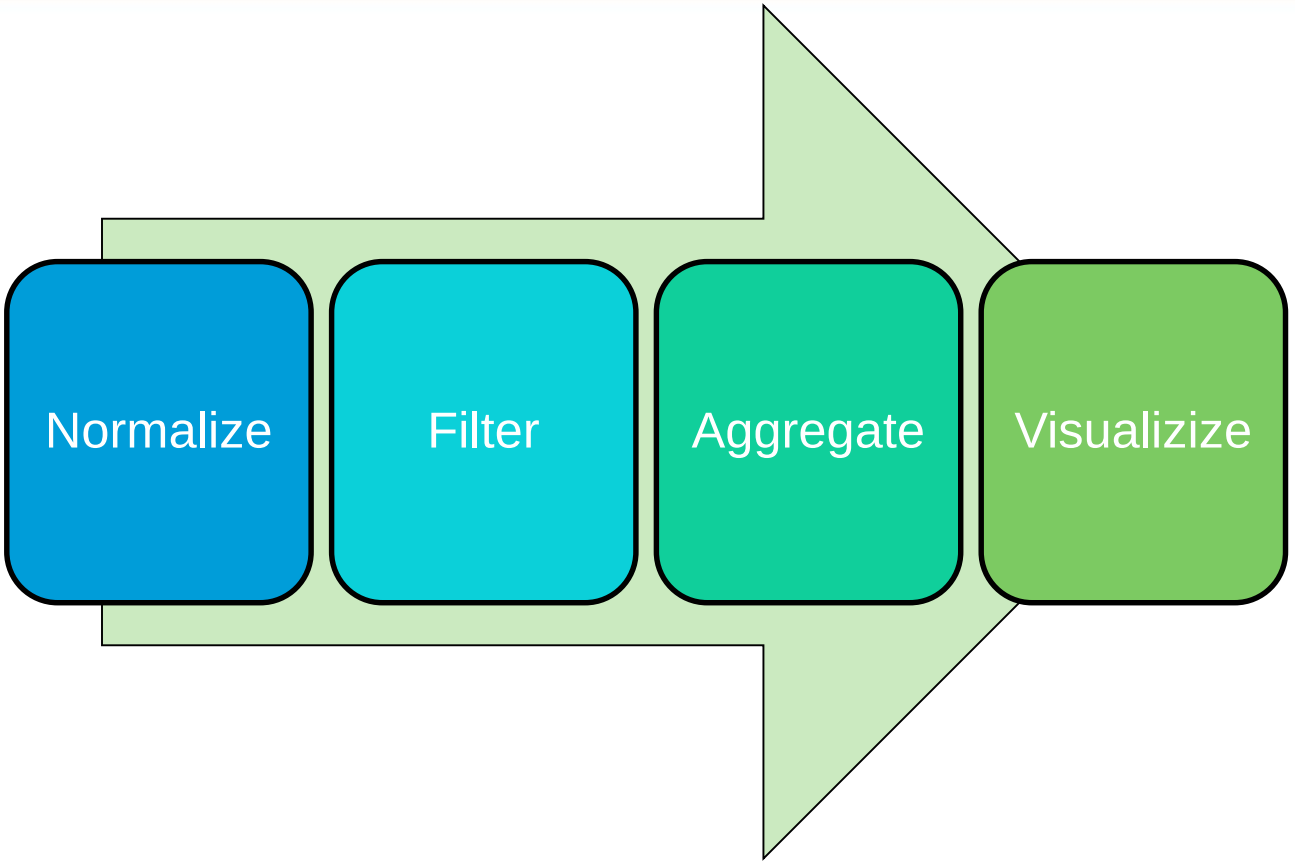
ELK


amazon web services S3
Web Server
fluentd
Buffer
elasticsearch
kibana
AWS CloudWatch Log

Kibana


kibana
Discover
Visualize
Dashboard
Settings
Last 15 minutes
_key: nginx.*
logstash-*
Selected Fields
remote
code
agent
size
path
site
method
Available Fields
Popular
_type
@timestamp
_id
_index
_key
_score
geo.city
geo.coordinates
geo.country_code
geo.region_code
host
hostname
referer
Nginx
5,694 hits
September 1st 2017, 11:11:44.955 - September 1st 2017, 11:26:44.955 — by 30 seconds
Count
300
200
100
0
11:12:00
11:13:00
11:14:00
11:15:00
11:16:00
11:17:00
11:18:00
11:19:00
11:20:00
11:21:00
11:22:00
11:23:00
11:24:00
11:25:00
11:26:00
@timestamp per 30 seconds
Time
method
code
path
remote
size
site
agent
September 1st 2017, 11:24:46.000 GET 200 /ga?ga=GA1.3.776042588.1504235063 36.237.192.86 0 kktix.com Mozilla/5.0 (iPhone; CPU iPhone OS 10_3_2 like Mac OS X) AppleWebKit/603.2.4 (KHTML, like Gecko) Mobile/14F89 [FBAN/FBIOS;FBAV/138.0.0.
September 1st 2017, 11:24:45.000 GET 200 /robots.txt 10.11.4.64 204 kktix.com ELB-HealthChecker/1.0
September 1st 2017, 11:24:45.000 GET 200 /robots.txt 10.11.5.174 204 kktix.com ELB-HealthChecker/1.0
September 1st 2017, 11:24:45.000 GET 200 /robots.txt 10.11.3.29 204 kktix.com ELB-HealthChecker/1.0
September 1st 2017, 11:24:44.000 GET 404 /events/c5b555 52.68.42.34 1,761 kktix.com Mozilla/5.0 (Windows NT 6.3; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.113 Safari/537.36
September 1st 2017, 11:24:44.000 GET 200 /robots.txt 10.11.6.108 204 kktix.com ELB-HealthChecker/1.0

Log Processing



Log as Dashboard





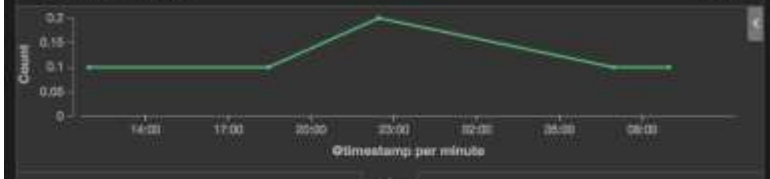
301	51,(
302	26,(
304	5,2(
401	3,2(
201	2,5(
400	454



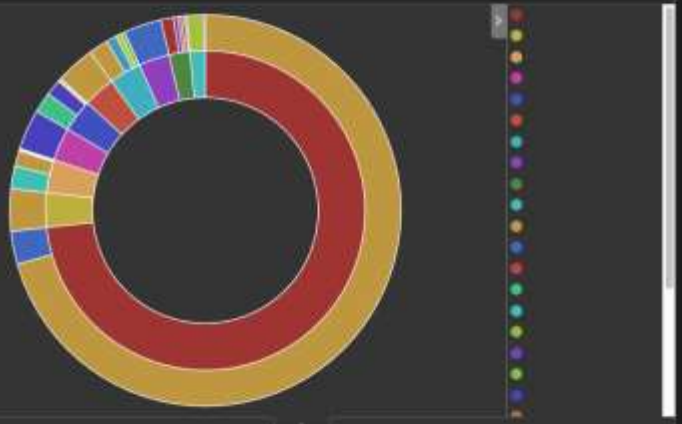
Errors Count (Nginx)



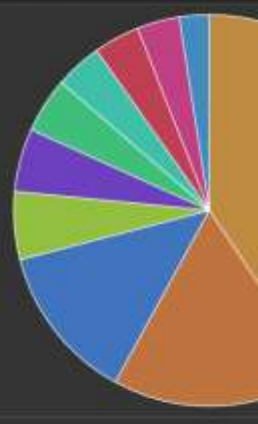
Errors Count(Rails)



Top Request Percent (Rails)



User Agents (Nginx)

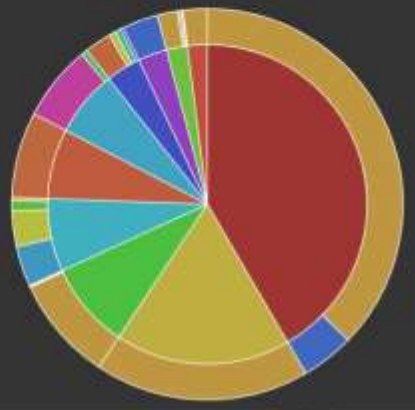


Top Request (Rails)

Controller	Action	Count	Avg. Duration	Avg. DB	Sum. Duration	Sum. DB
events		154,460	40.	25.		352.93
events		5,978	12.	31.		1.05
events		16	64.	35.		
events		3	9.3	0		
user		7,617	39.	12.		0.1
pages		3,975	58.	33.		7.69
pages		2,806	16.	0.1		
pages		217	15.	0.7		
pages		165	10.	0.4		
pages		46	17.	0.7		

Export: Raw Formatted

Top DB Sum Durations Percentage (Rails)



Top Request (

path.raw: Descen
/robo
/
/favic
/even
/cloud
/user
/fami
/even
/fami
/even

Export: Raw Fo

Top Errors (Rails)

Controller	Action	Error	Count	Duration	DB
users/registrations	create	ActiveRecord::RecordNotUnique:PG::UniqueViolation: ERROR:	2	1,737.705	1,728.165

Top Request (Go)

Path	Count	Avg. Duration	Sum. Duration
/g	45,911	0	
/g	16,893	1.9	
/g	2,933	9.6	
/g	1,496	60.	

Top 500 Requ

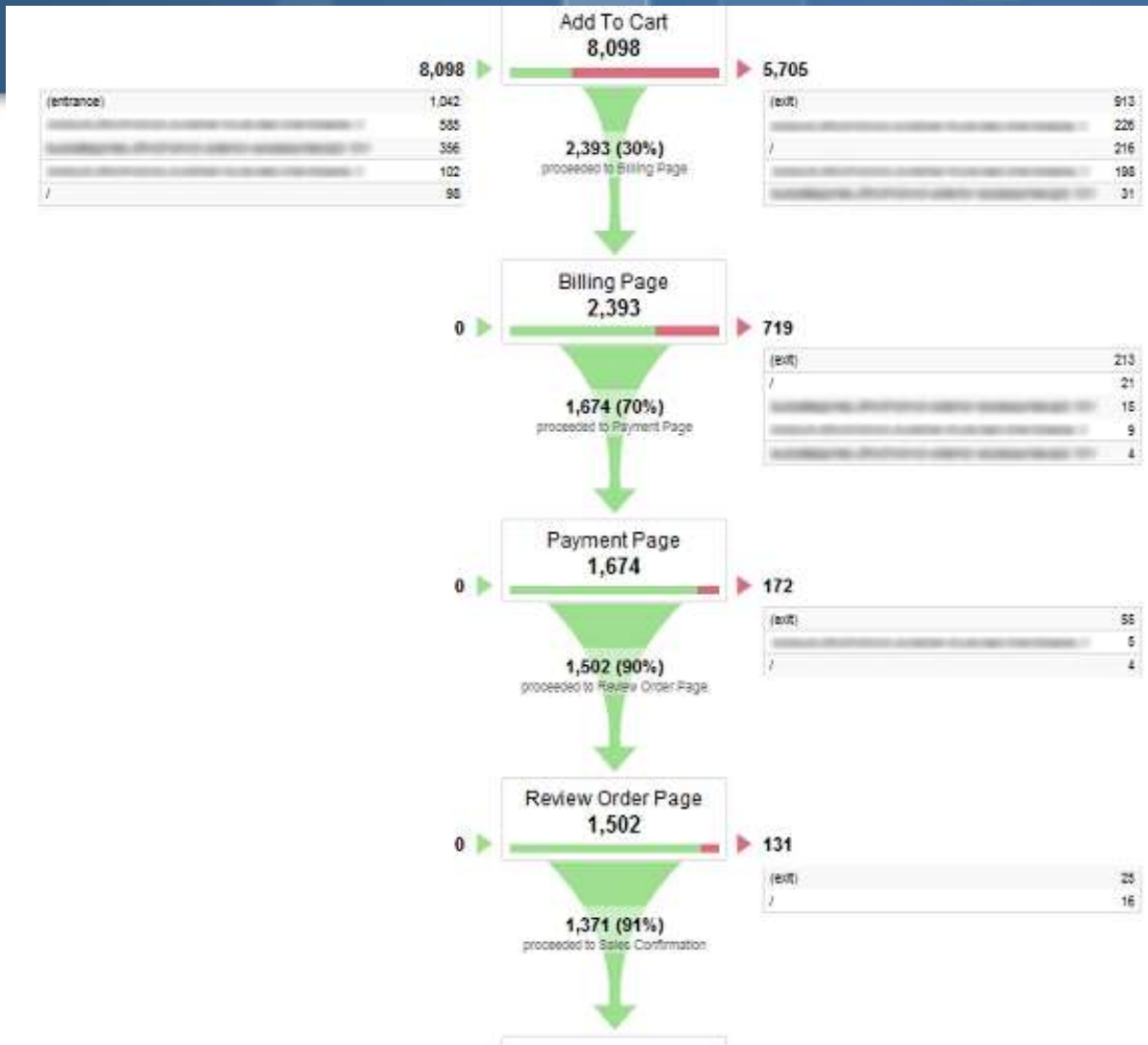
path.raw: Descen
/use
/api/
os=(
/api/

Flow Status

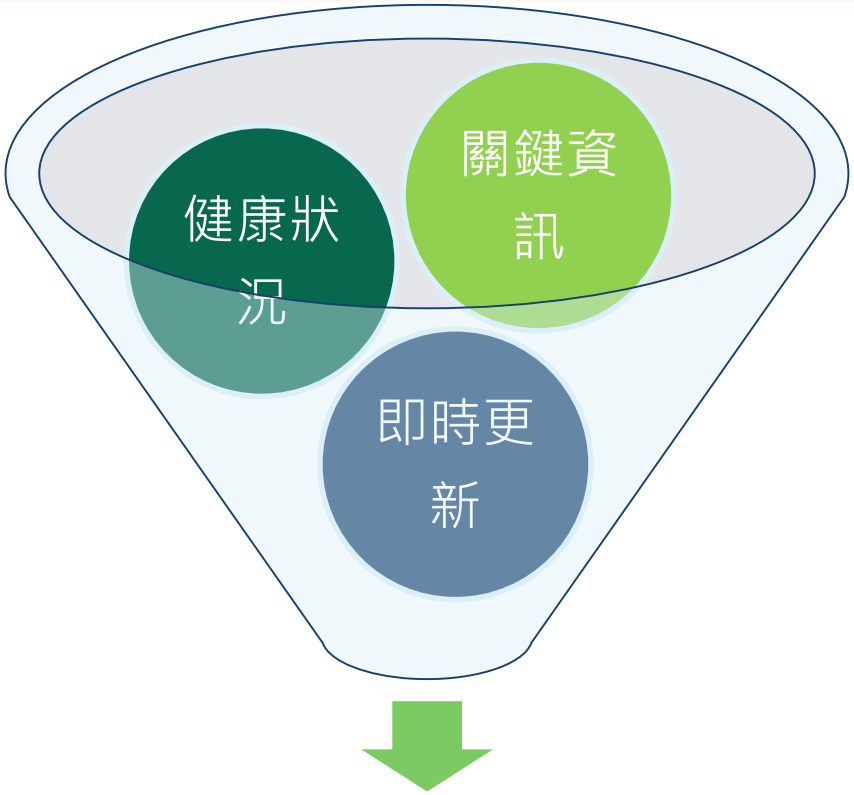
- 服務流程是否正常
- 交易中斷
- 無法登入
- 歷史數據比較
- 可透過 Google Analytics 實現



Flow Status


Add To Cart
8,098
8,098
5,705
(entrance) 1,042
555
356
102
/ 98
(exit) 913
226
/ 216
198
31
2,393 (30%)
proceeded to Billing Page
Billing Page
2,393
0
719
(exit) 213
/ 21
15
9
4
1,674 (70%)
proceeded to Payment Page
Payment Page
1,674
0
172
(exit) 55
6
/ 4
1,502 (90%)
proceeded to Review Order Page
Review Order Page
1,502
0
131
(exit) 25
/ 16
1,371 (91%)
proceeded to Sales Confirmation

資訊整合



Dashboard


App


App 2


DB


Redis


Network


App 3


App 4

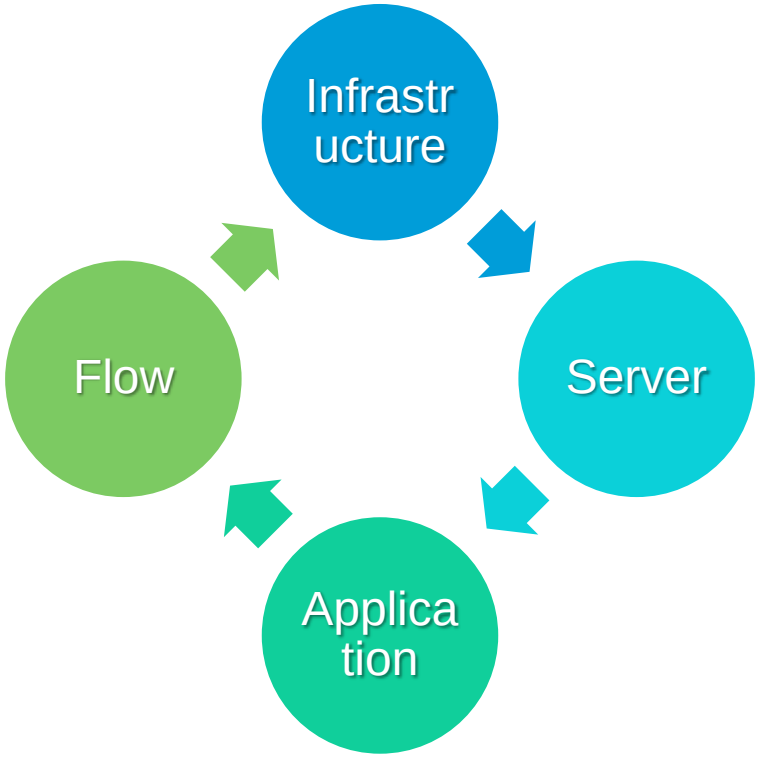
App 5


Request

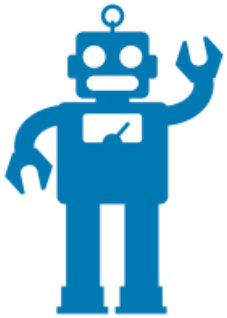

Cache

Profiling

- 特定時間
- 狀態分析
- 資訊記錄
- 效能改善
- 系統優化

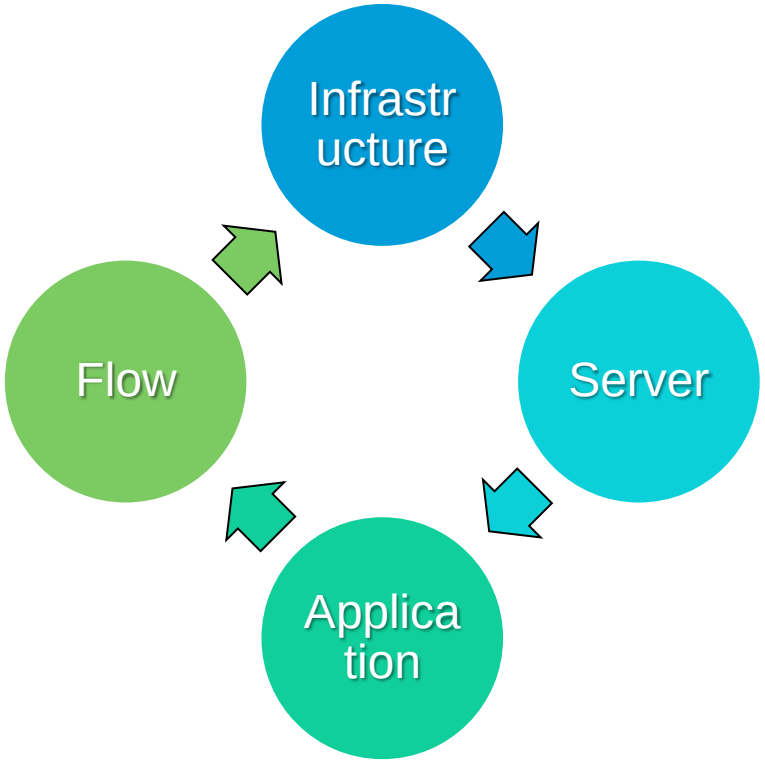


Analysis Event

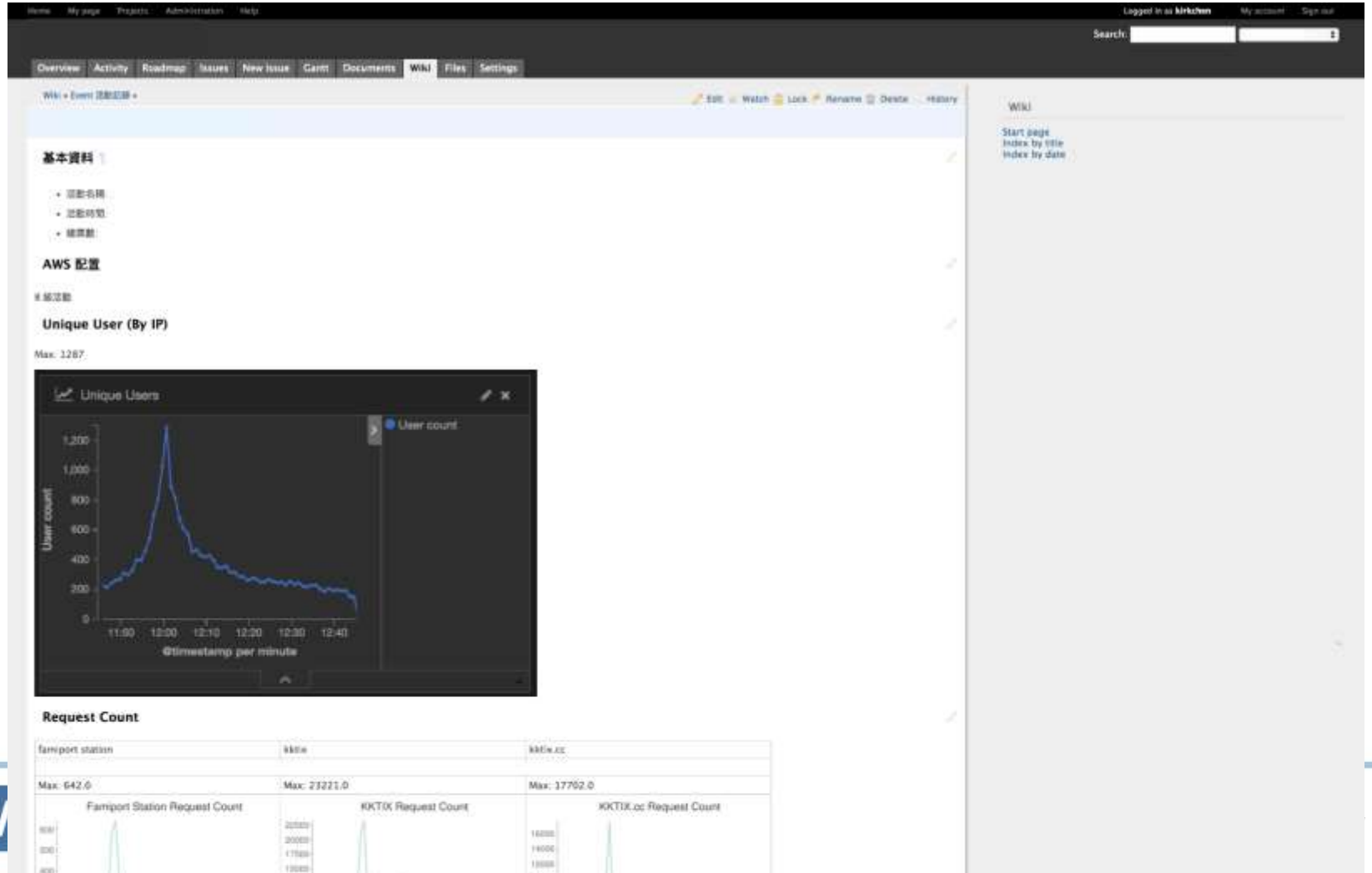


Cron Job

Collect Data



Profile Record



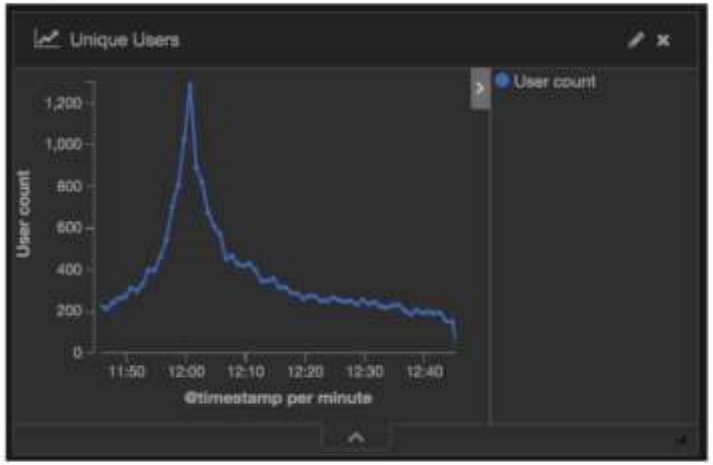
- 活動時間:
- 總票數:

AWS 配置

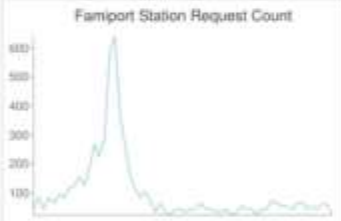
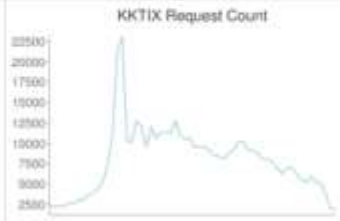
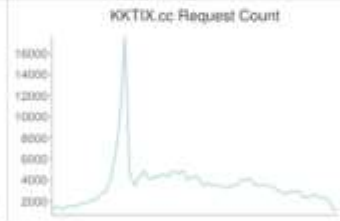
8 個活動

Unique User (By IP)

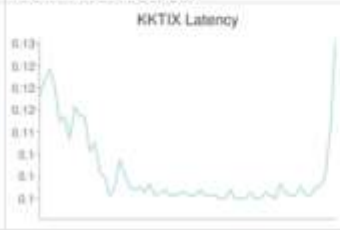
Max: 1287



Request Count

famiport station	kktix	kktix.cc
Max: 642.0	Max: 23221.0	Max: 17702.0
		

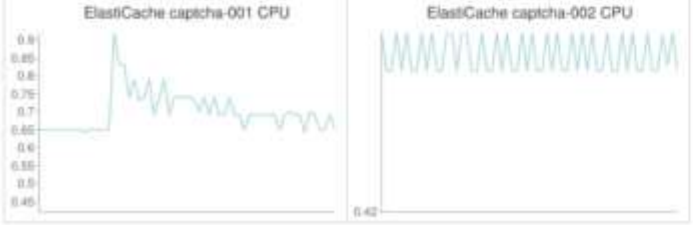
Latency

famiport station	kktix	kktix.cc
		



ElastiCache

captcha-001	captcha-002
CPUUtilization	CPUUtilization
Max: 0.92	Max: 0.42



ELK



Recap

- 資訊收集
- 分析應用
- 關注重點

Chatops

Notification



CI Server



Infrastructure



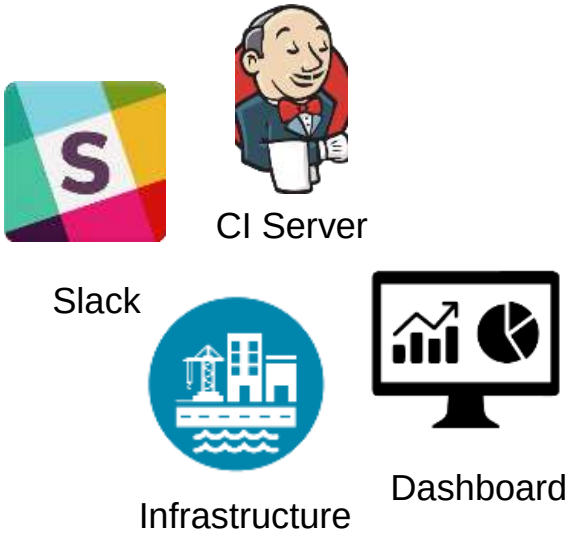
Slack



Dashboard

Notification

- 即時通知
- 信箱不會爆炸
- 盡量避免雜訊
- 重要訊息
- 減少干擾



Notification

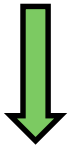
- 即時通知
- 信箱不會爆炸
- 盡量避免雜訊
- 重要訊息
- 減少干擾



Interaction



CI Server





Infrastructure





Slack





Dashboard

Interaction



CI Server





Infrastructure





Slack



Robot





Dashboard

Robot

- 不需要介面
- 指令操作
- 權限管理
- 隨時隨地



Query Log Aggregation



Slack



Robot





Dashboard

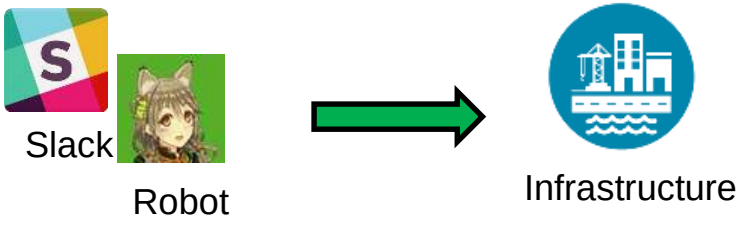

kirkchen 8:26 AM
@kktix-lita aws status hot-events
kktix-lita APP 8:26 AM
/events/2017jkfpoolparty 有 41 位鄉民正在圍觀
jkf.kktix.cc
2017 JKF VIP Pool Party
炎炎酷暑，就是屬於比基尼辣妹的日子！今年夏天最奢華的JKF POOL PARTY集結「音樂、啤酒、比基尼」就是要讓您體會腎上腺素瞬間飆升的快感！！ (445kB)
VIP POOL PARTY
SATURDAY 19 TH AUGUST

主動查詢


Dashboard APP 4:55 PM
(1056) 暴民們插起了箭塔！
1
Dashboard APP 4:56 PM
(2053) 暴民士氣高漲
1
2 replies Last reply 9 days ago
Dashboard APP 5:10 PM
(1828) 暴民的士氣潰散了
(3023) 暴民士氣高漲

被動提醒

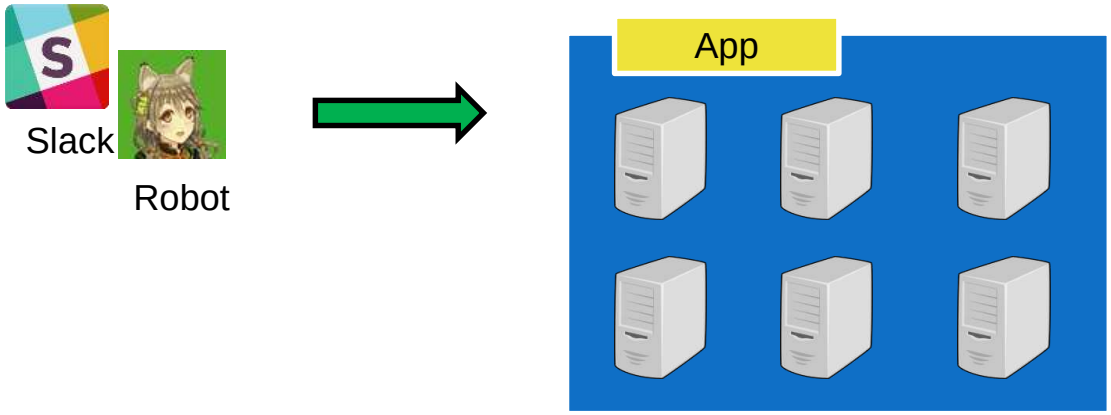
Apply Infrastructure





設定系統機器數量

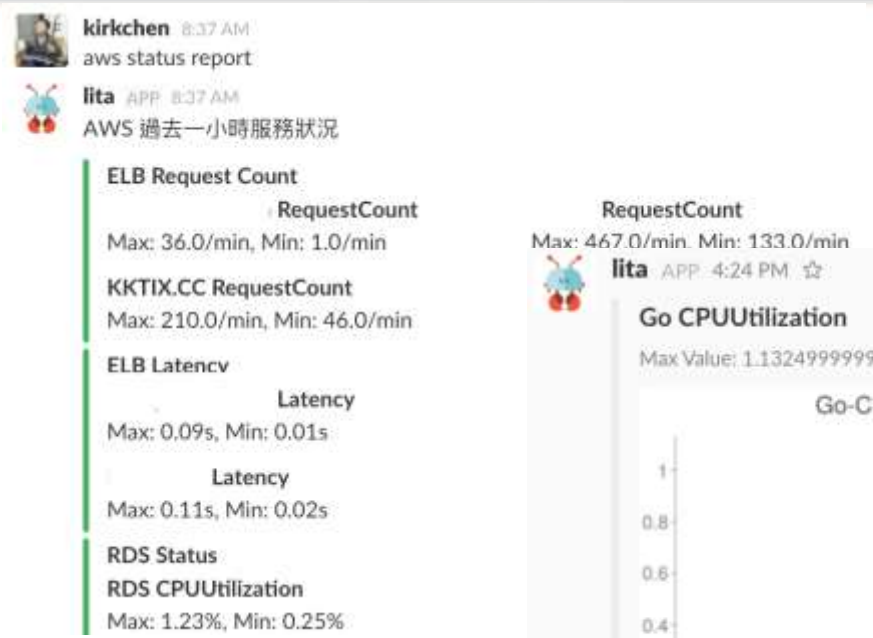
Apply Infrastructure



Query Server Status







綜合應用



Dashboard





Slack Robot

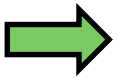




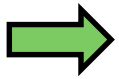
Infrastructure

User

Request



機器數量不足



是否加開機器?

Recap

- 降低門檻
- 方便操作
- 重點提示
- 改善流程

總結

- 有效利用資源
- 減少重複工作
- 可靠度
- 穩定性
- 解決問題
- 預防問題
- 工具只是輔助
- 持續改善

團隊文化

- 減少浪費
- 達成目標
- 消除瓶頸
- 解決問題

人 > 工具

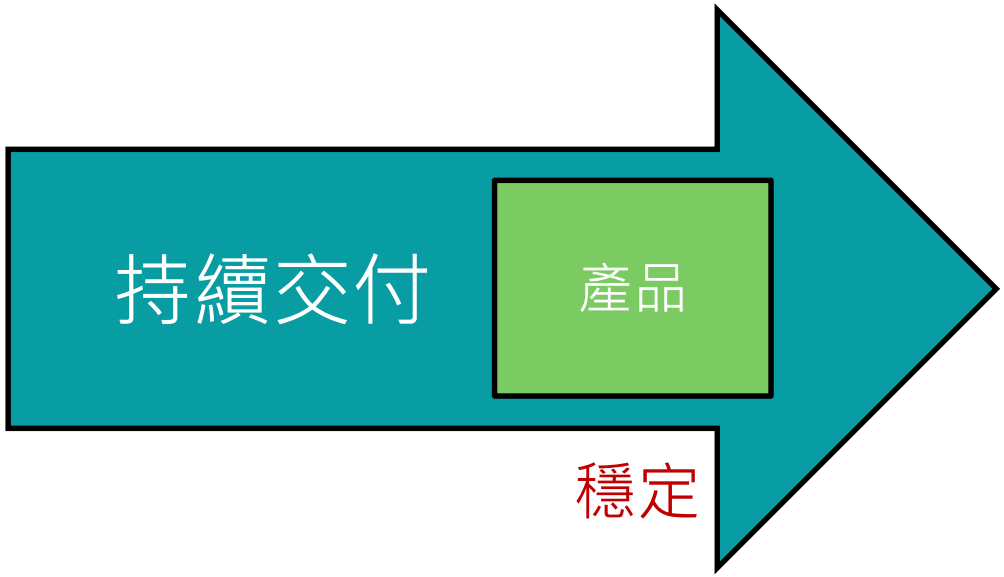
Too busy to improve?

Need more slack in your system!



Henrik Kniberg

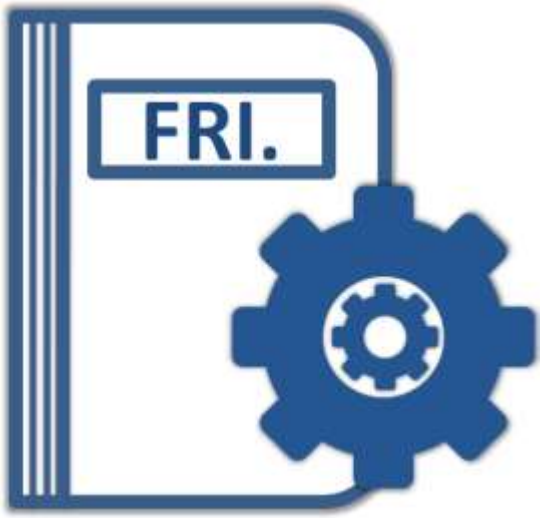

版本控制
結對編程
不可變架構
Bash
Fluentd
Alarm
實例化需求
Code Review
架構即代碼
Automation
Kibana
Chatops
敏捷開發
持續集成
Terraform
自動延展
Cloud Watch
Notification
代碼風格
單元測試
Puppet
高可用性
Monit
Operation
自動部署
整合測試
Docker
Elastic Search
Dashboard
產品


持續交付
產品
穩定

謝 謝 大 家

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