TECH SHARE

Tech Share Program

PINPOINT

김성욱 / Observability Platform

Index

NAVER

What is an APM?

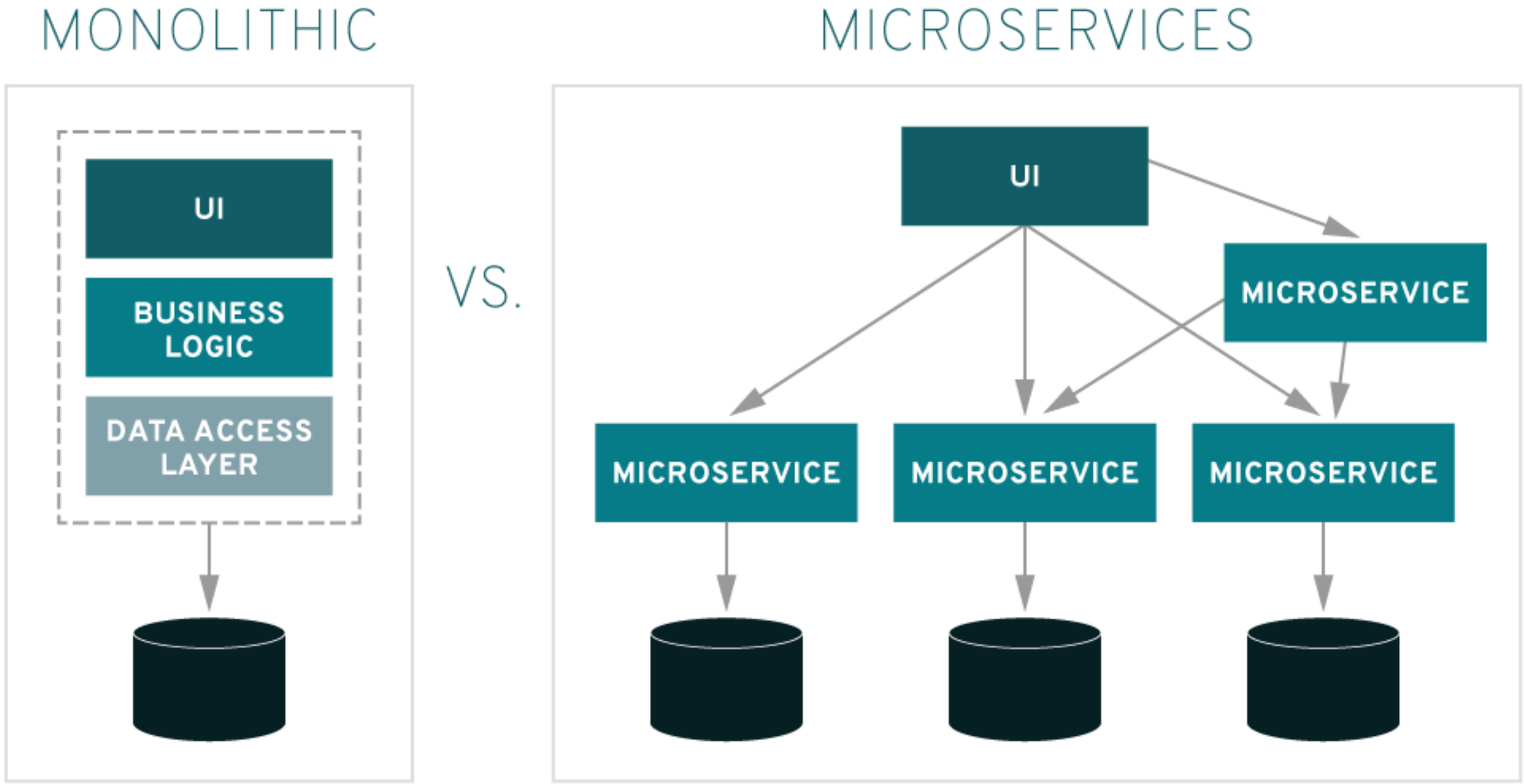
Wikipedia

> **Application Performance Management (APM)** is the monitoring and management of performance and availability of software applications.

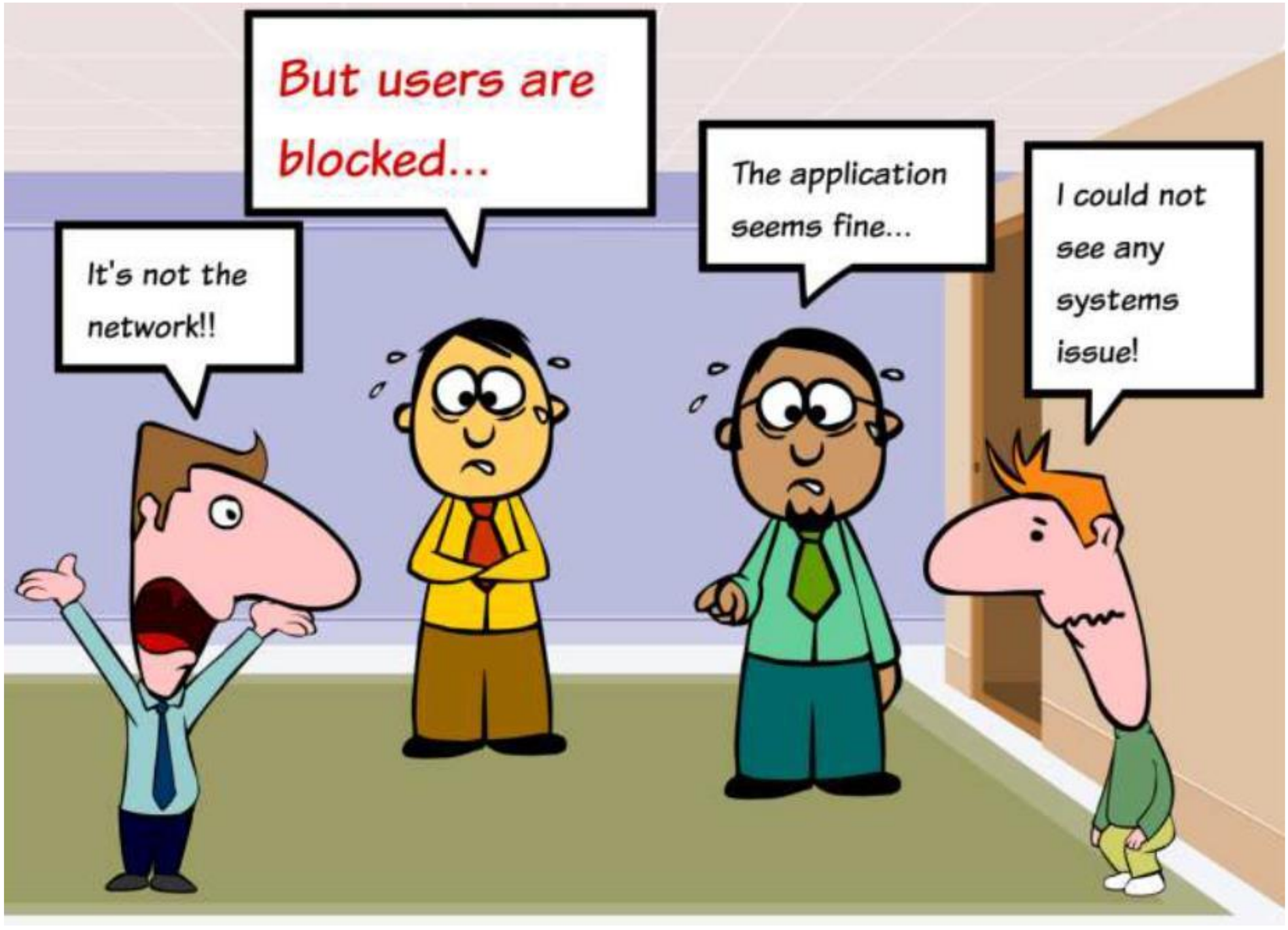
Pinpoint Github

> Pinpoint is an open source APM (Application Performance Management) tool for **large-scale distributed systems** written in Java.

Why need an APM?



Why need an APM?

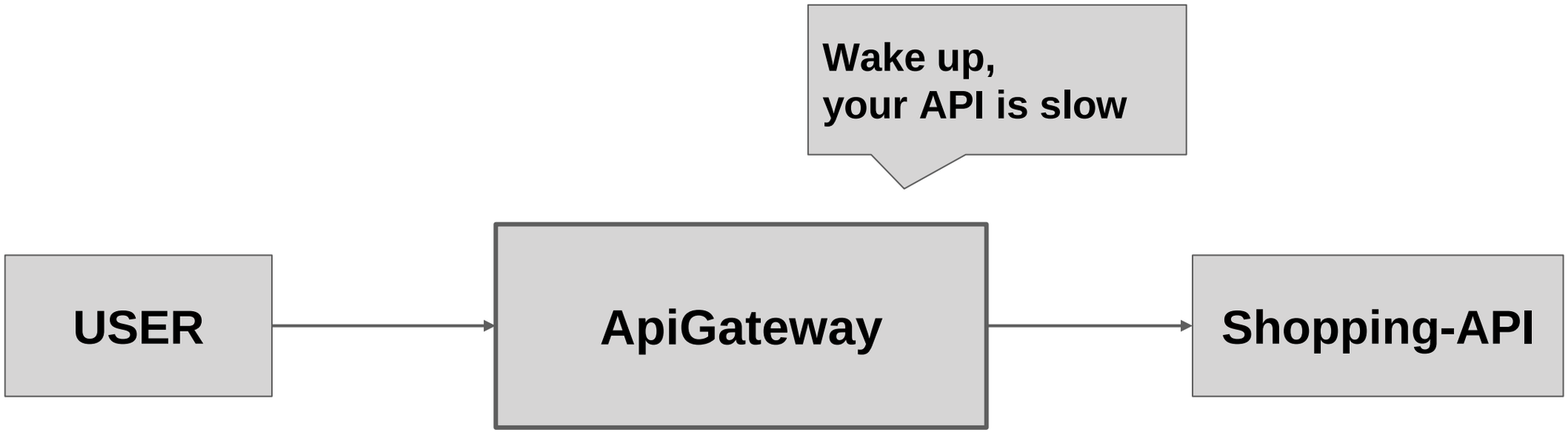


Why need an APM?

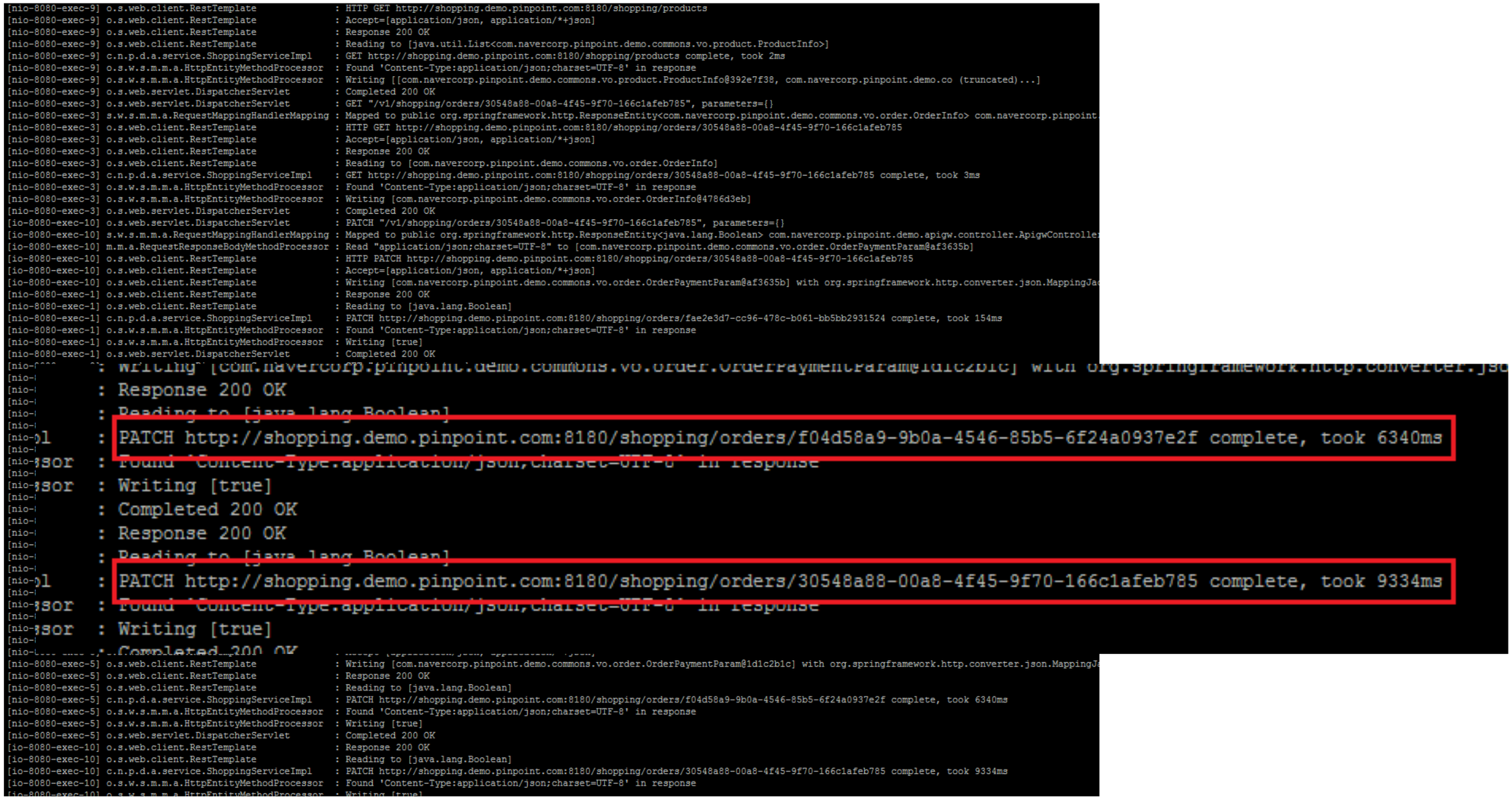
- 수십개의 서비스 수천대의 서버에 적용
- 개발 -> QA -> 운영 단계 까지 연속적인 모니터링
- 서버맵을 통한 정상 구축 여부 판단
- 응답 시간이 느린 구간 판단
- 프로파일링 데이터 확보
- 병목 구간 판단
- 성능 패턴 데이터 확보
- ...

Why need an APM?

Why need an APM?

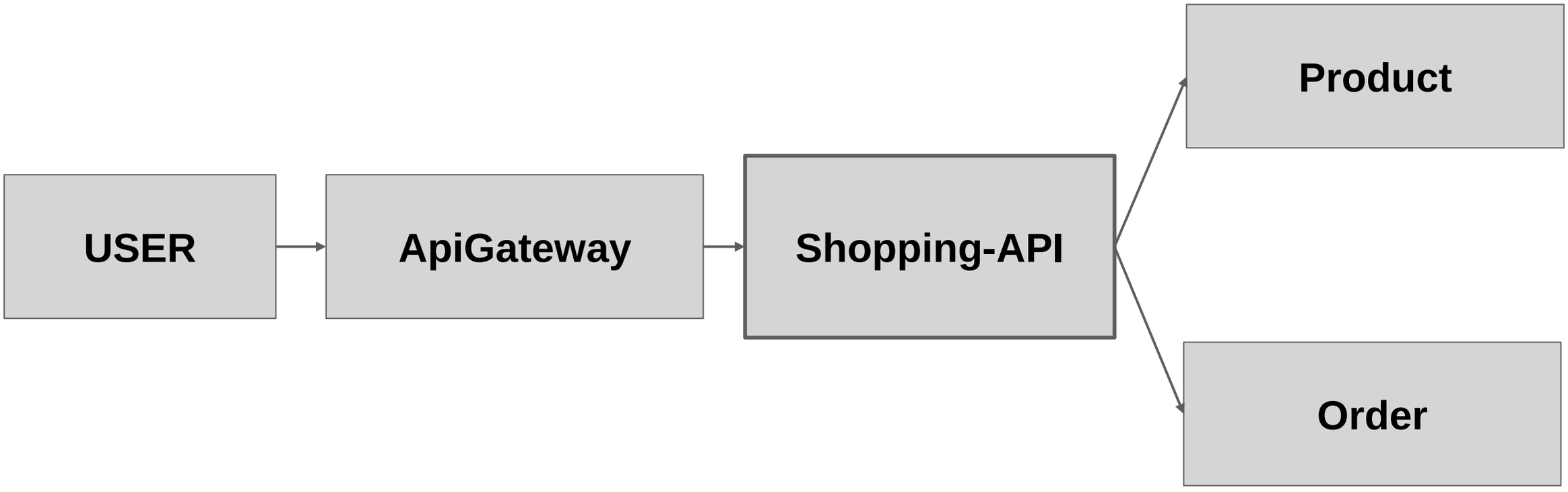


Why need an APM?

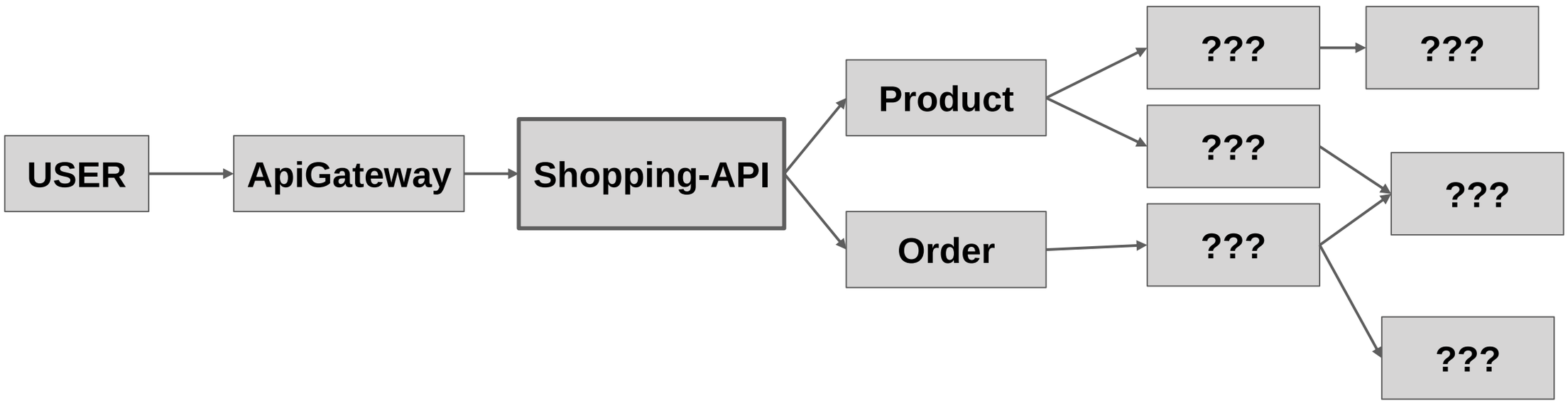


NAVER

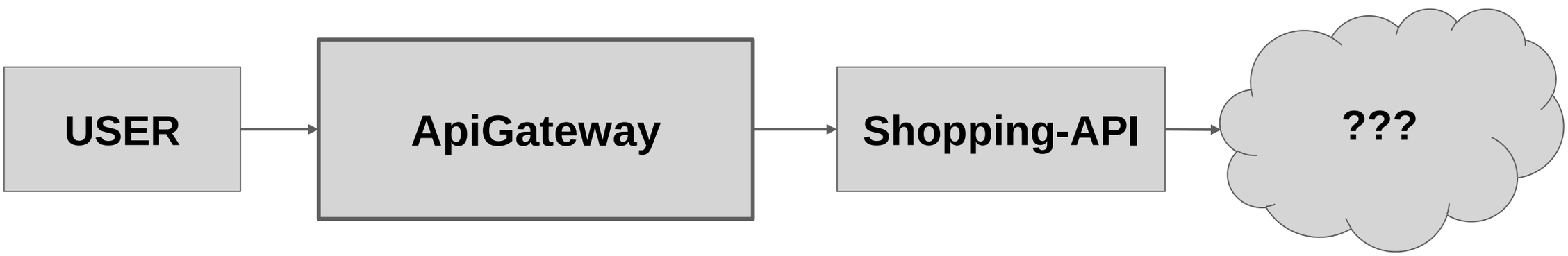
Why need an APM?



Why need an APM?



Why need an APM?



- Logs are distributed
- Delays and failures are often caused by other nodes, as well as edges in the call graph
- Need visibility to the whole architecture to identify root cause

Why need an APM?

- **Our little scenario using [pinpoint]**

NAVER

Features

PINPOINT

Bird Eye View

Finding Slow Transactions

Distributed Tracing

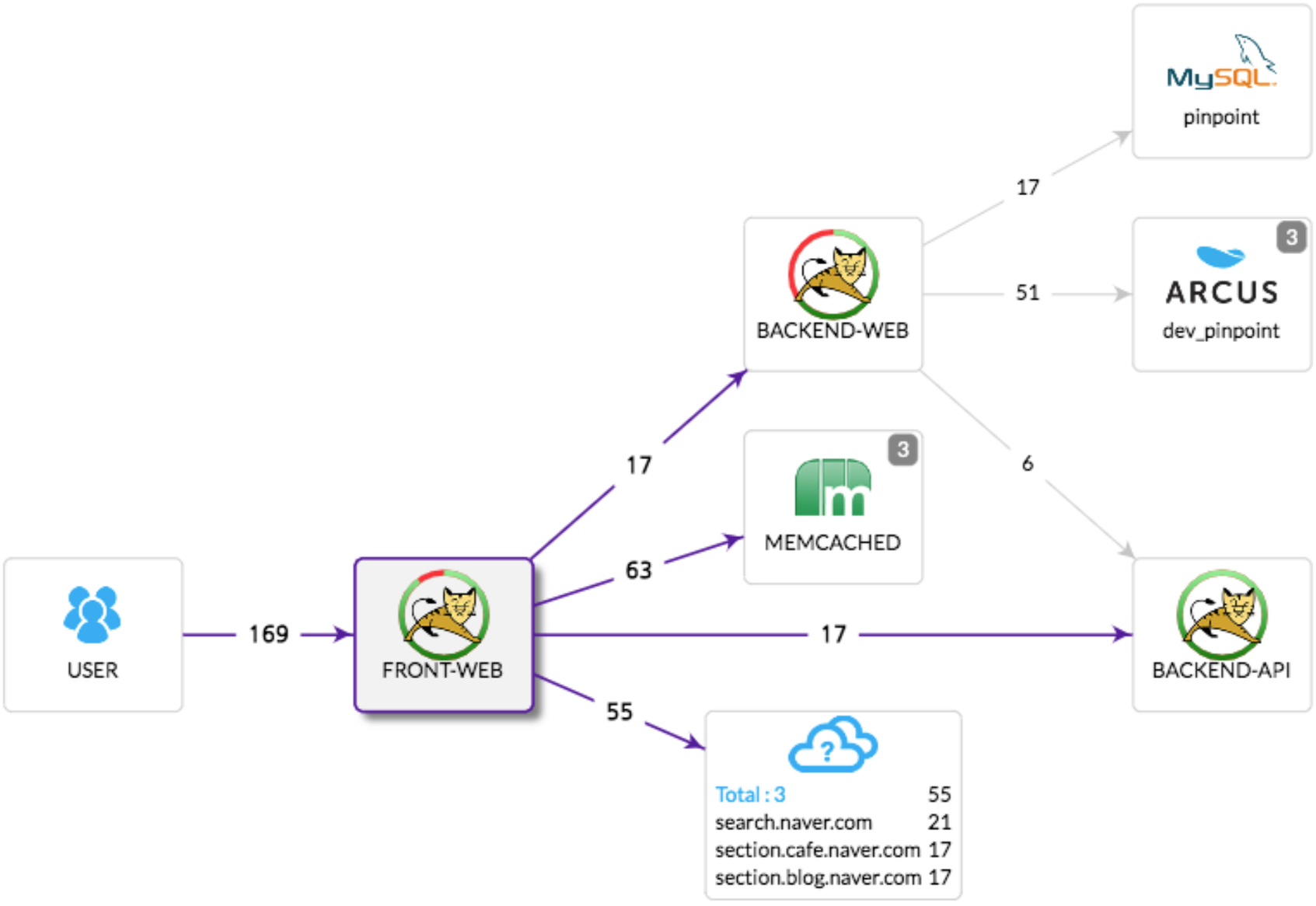
DevOps

Scalable

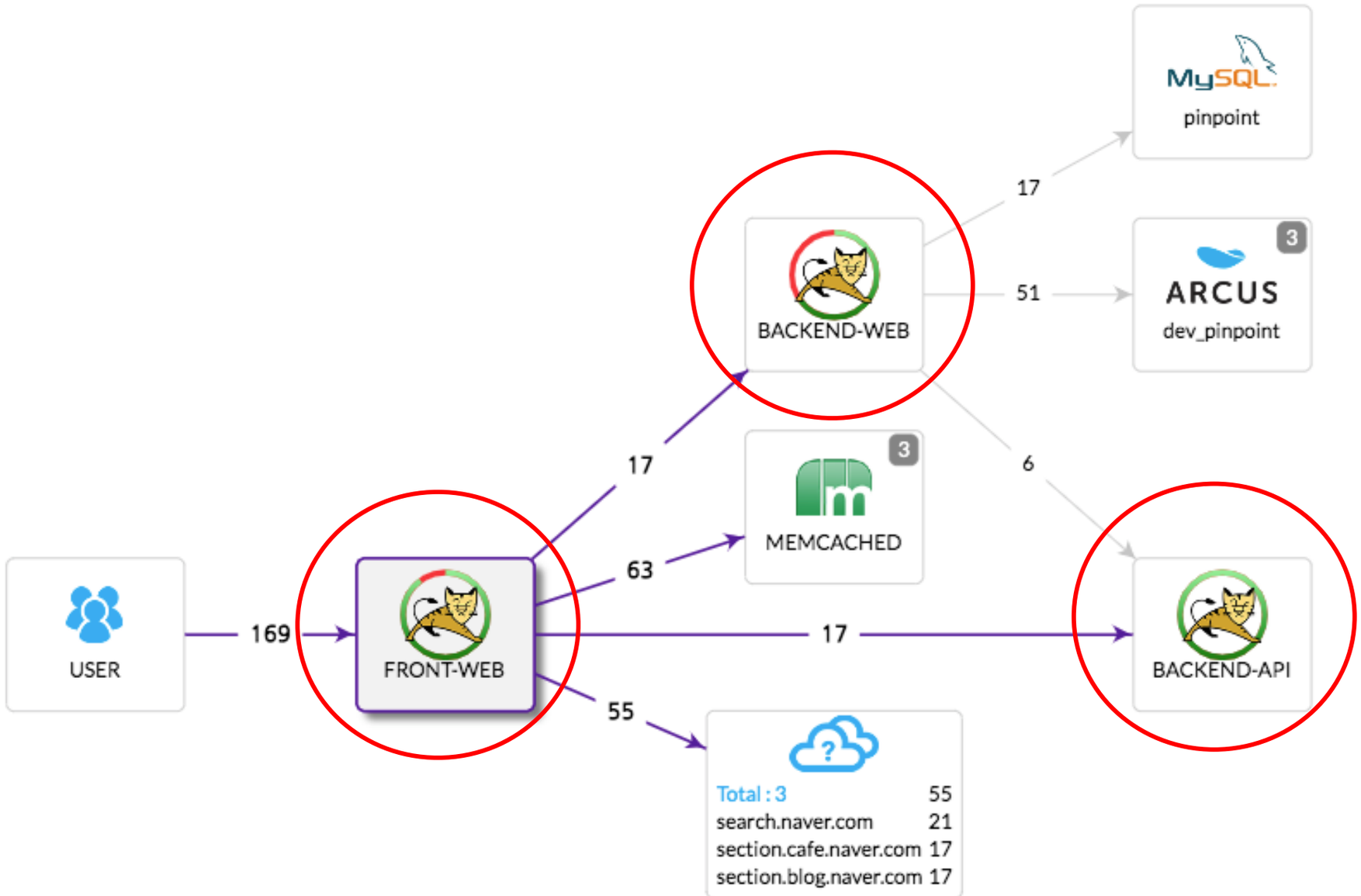
Minimum Overload

NAVER

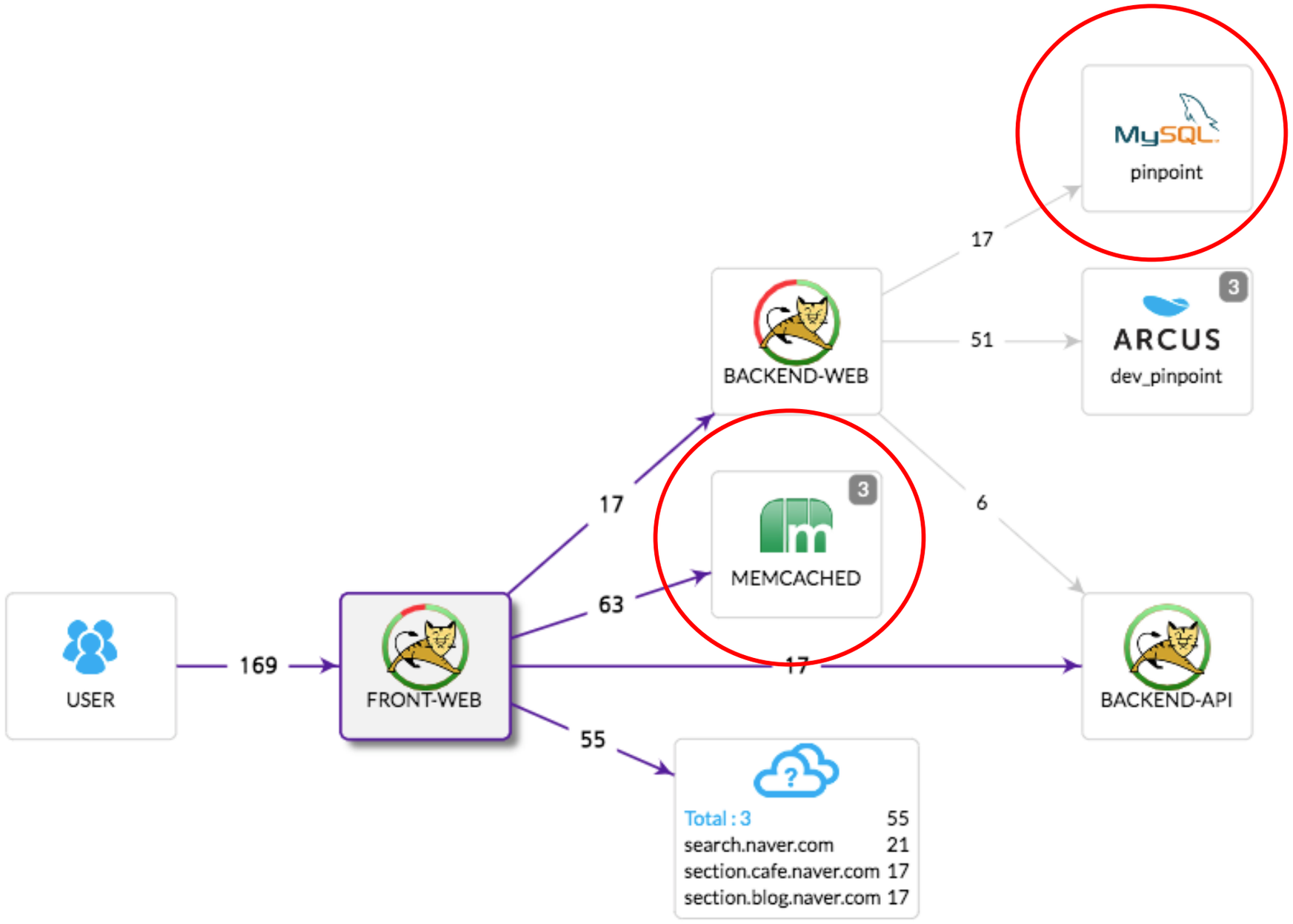
Features


MySQL
pinpoint
17
3
ARCUS
dev_pinpoint
51
BACKEND-WEB
6
3
MEMCACHED
17
63
USER
169
FRONT-WEB
17
BACKEND-API
55
Total : 3 55
search.naver.com 21
section.cafe.naver.com 17
section.blog.naver.com 17

Features


MySQL
pinpoint
17
BACKEND-WEB
51
3
ARCUS
dev_pinpoint
17
3
MEMCACHED
6
63
USER
169
FRONT-WEB
17
BACKEND-API
55
Total : 3 55
search.naver.com 21
section.cafe.naver.com 17
section.blog.naver.com 17

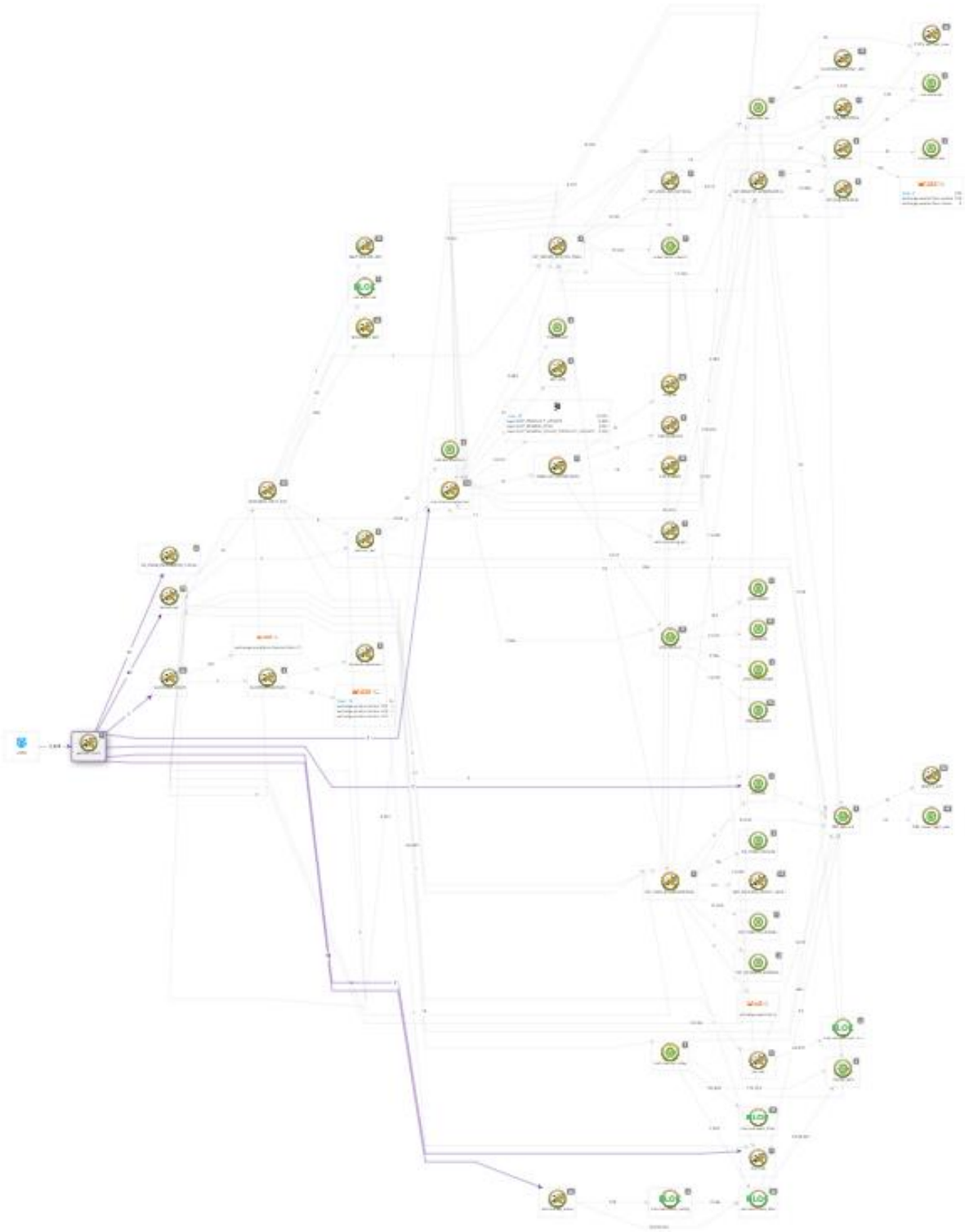
Features


MySQL
pinpoint
17
3
ARCUS
dev_pinpoint
51
BACKEND-WEB
6
3
MEMCACHED
17
63
USER
169
FRONT-WEB
17
BACKEND-API
55
Total : 3 55
search.naver.com 21
section.cafe.naver.com 17
section.blog.naver.com 17

Features

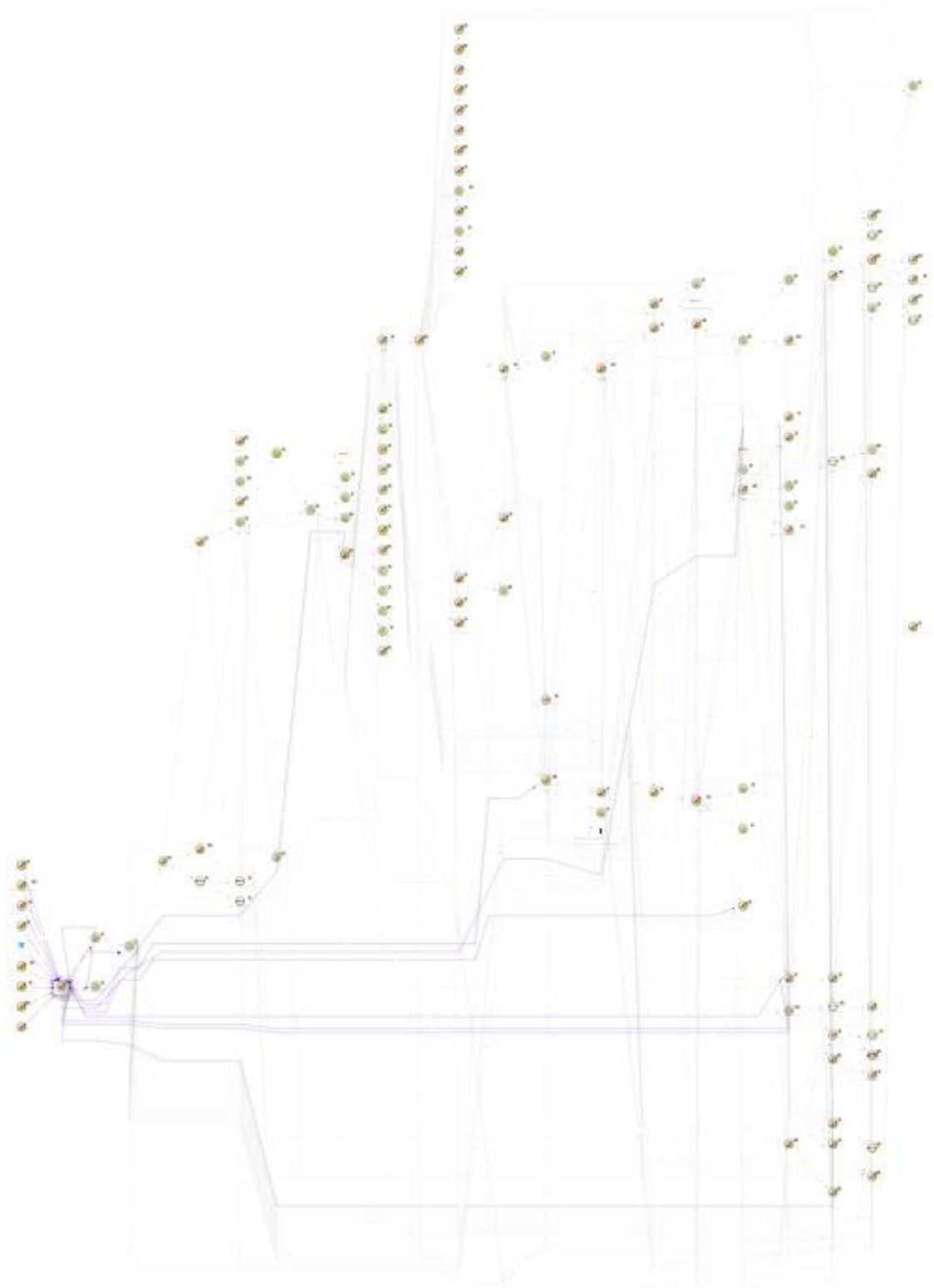

Shopping-Product
1,758
product
1,282
USER
1,446
ApiGateway
1,446
Shopping-Api
1,403
Shopping-Order
267
Shopping-Payment
267
vendor.payment.card.com:8179
2,370
order

Features



NAVER

Features



Features

PINPOINT

Bird Eye View

Finding Slow Transactions

Distributed Tracing

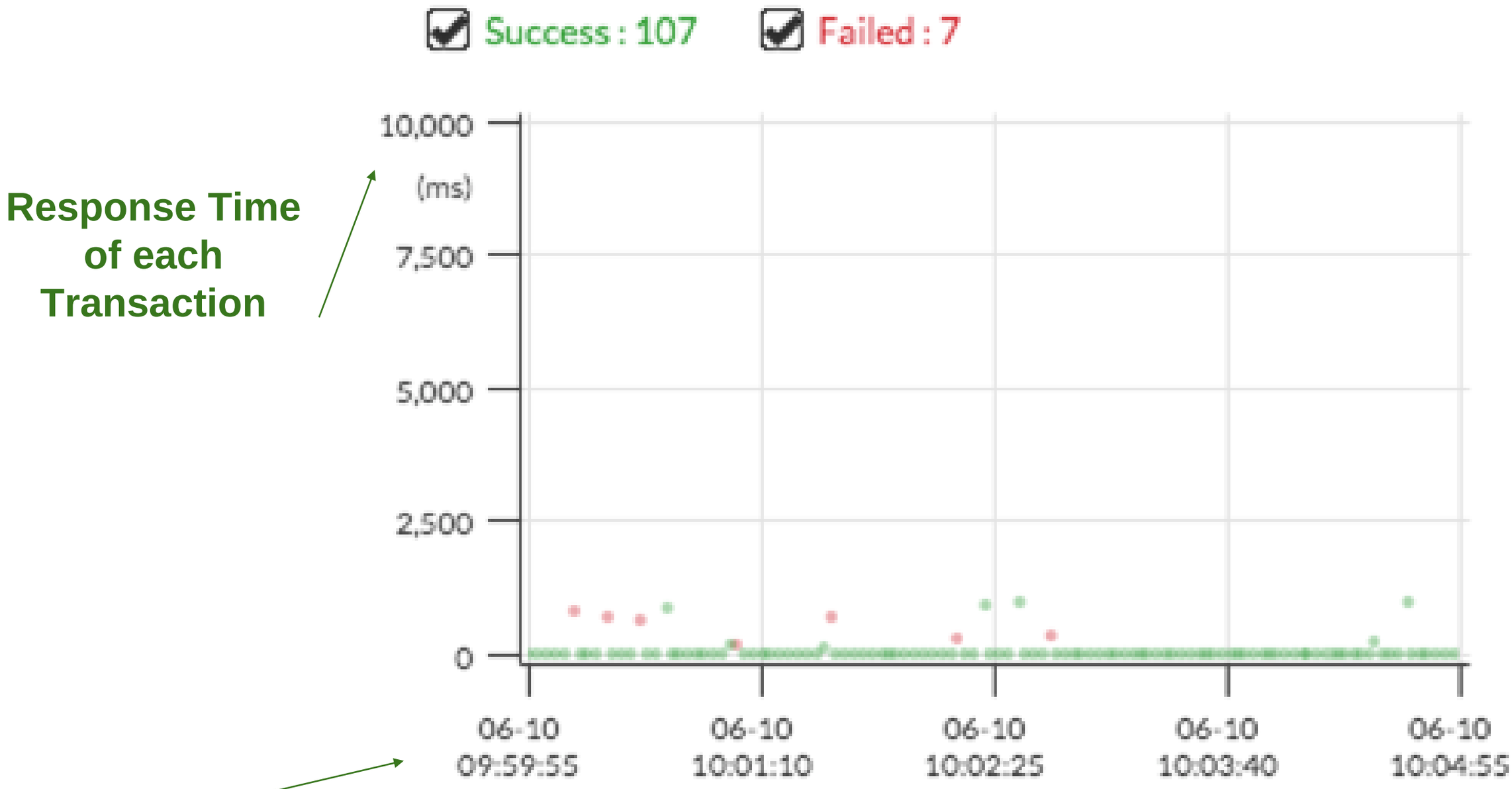
DevOps

Scalable

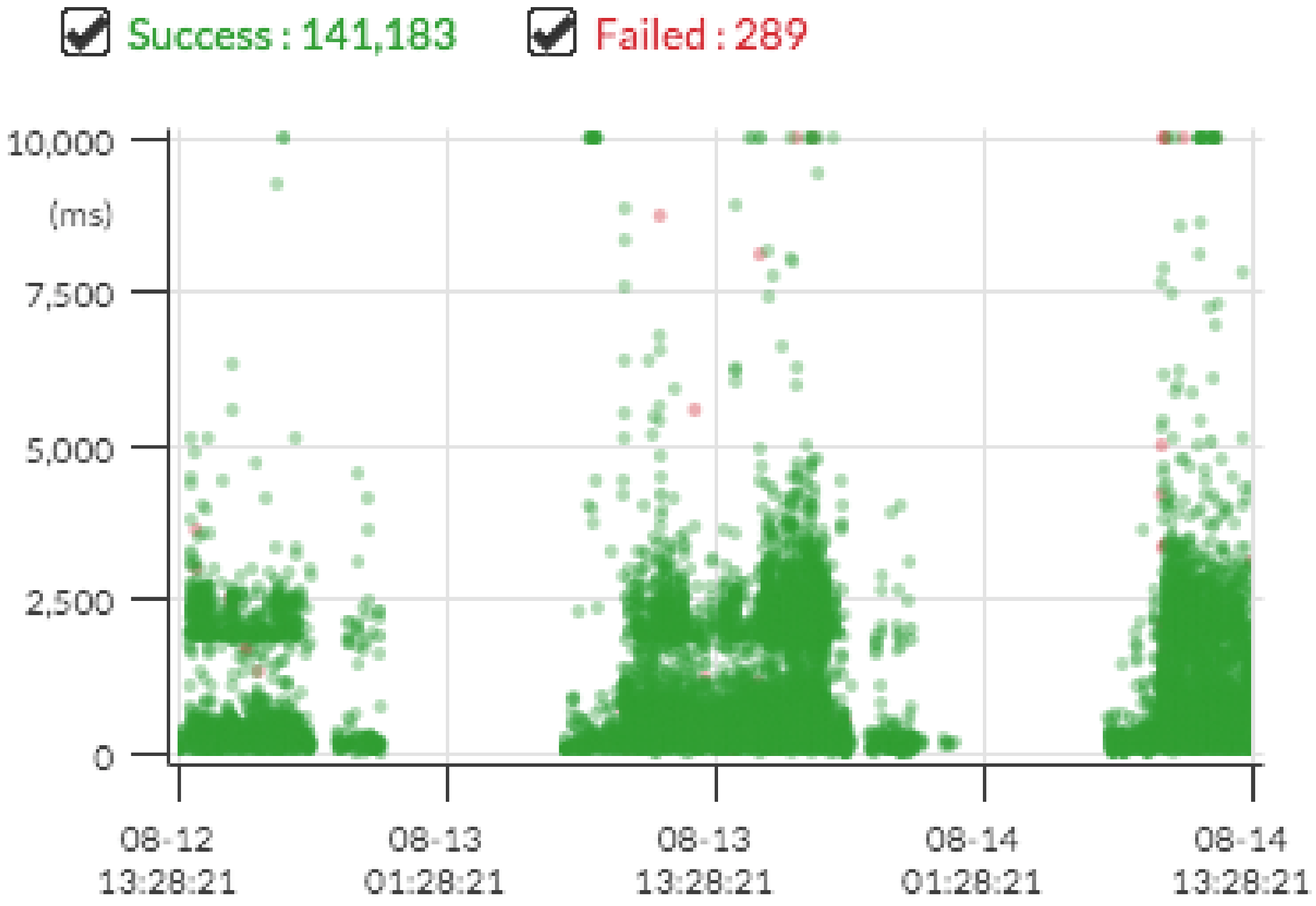
Minimum Overload

NAVER

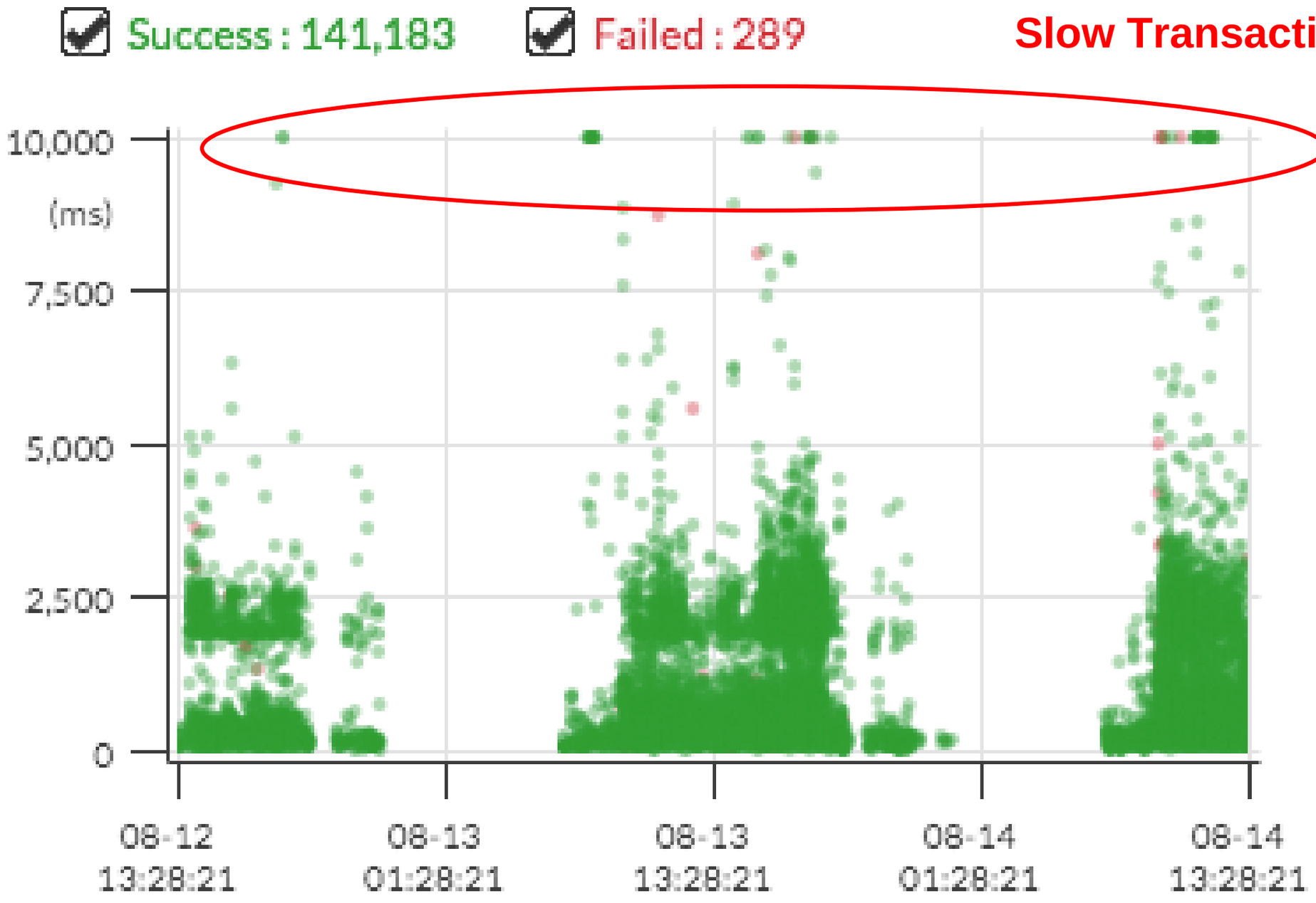
Features


Success : 107
Failed : 7
10,000
(ms)
7,500
5,000
2,500
0
06-10 09:59:55
06-10 10:01:10
06-10 10:02:25
06-10 10:03:40
06-10 10:04:55
Response Time of each Transaction
Date & Time

Features


Success : 141,183
Failed : 289
10,000
(ms)
7,500
5,000
2,500
0
08-12
13:28:21
08-13
01:28:21
08-13
13:28:21
08-14
01:28:21
08-14
13:28:21

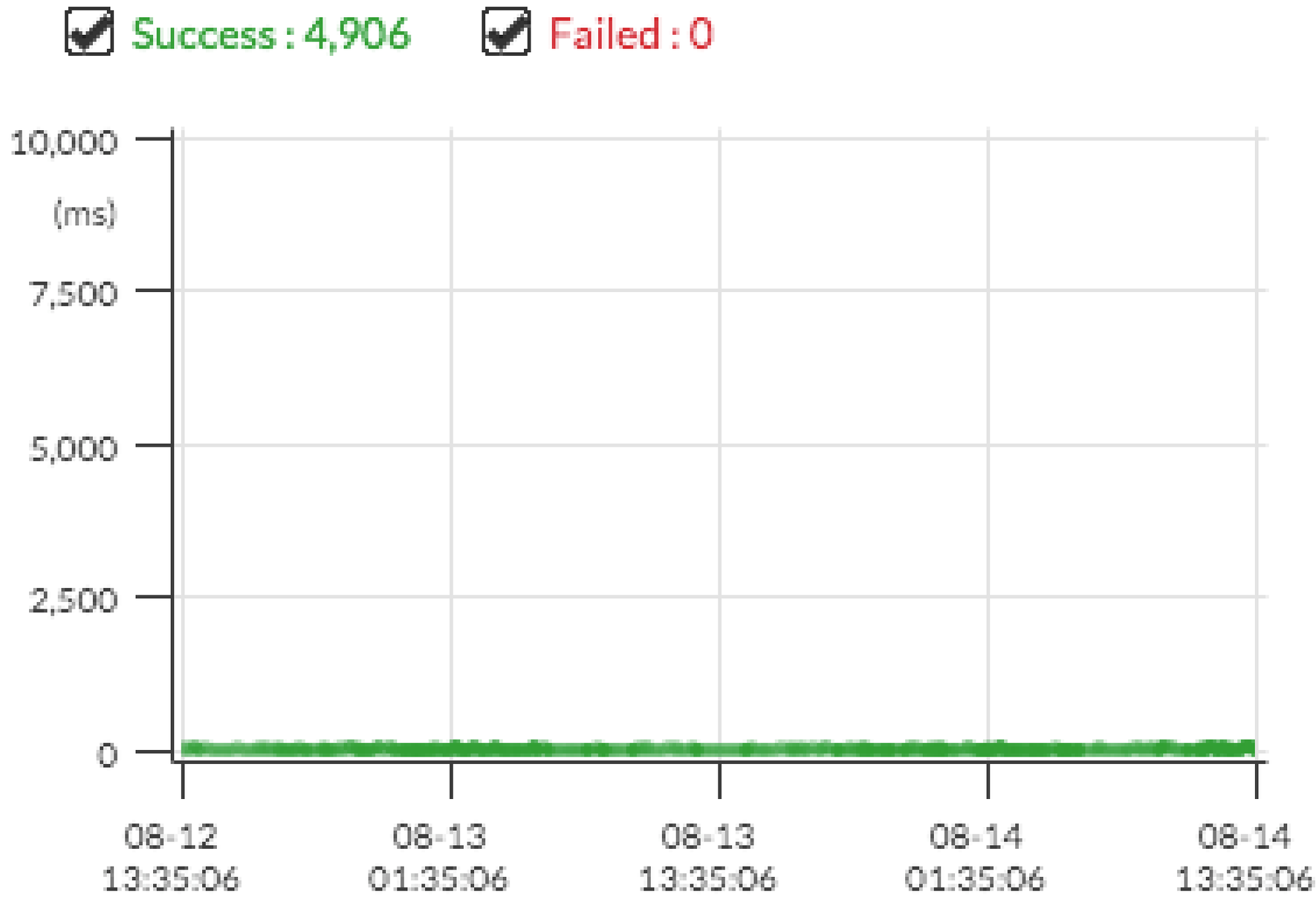
Features


Success : 141,183
Failed : 289
Slow Transactions
10,000
(ms)
7,500
5,000
2,500
0
08-12
13:28:21
08-13
01:28:21
08-13
13:28:21
08-14
01:28:21
08-14
13:28:21

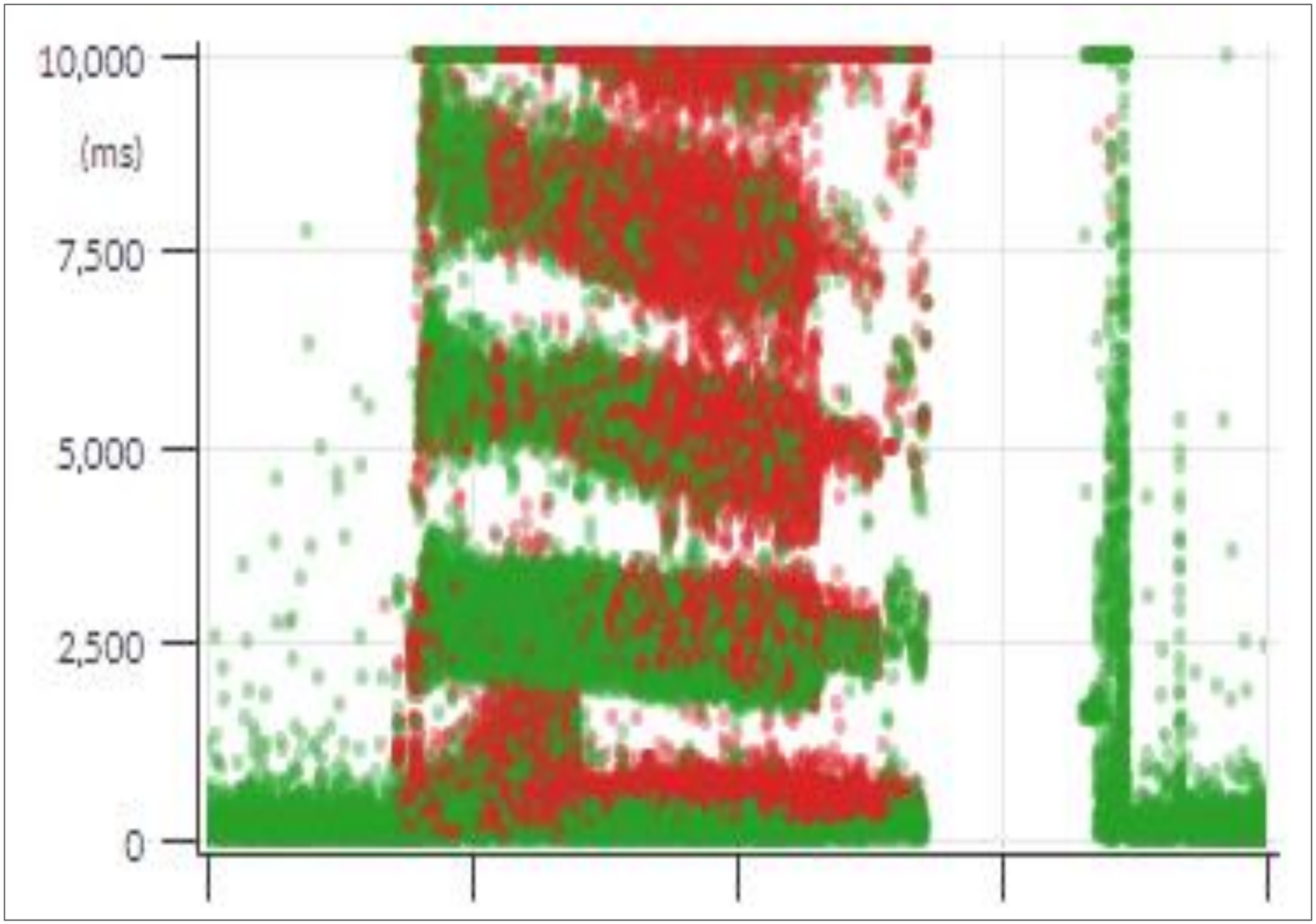
Features


Success : 3,895
Failed : 2
10,000
(ms)
7,500
5,000
2,500
0
08-12
13:32:39
08-13
01:32:39
08-13
13:32:39
08-14
01:32:39

Features

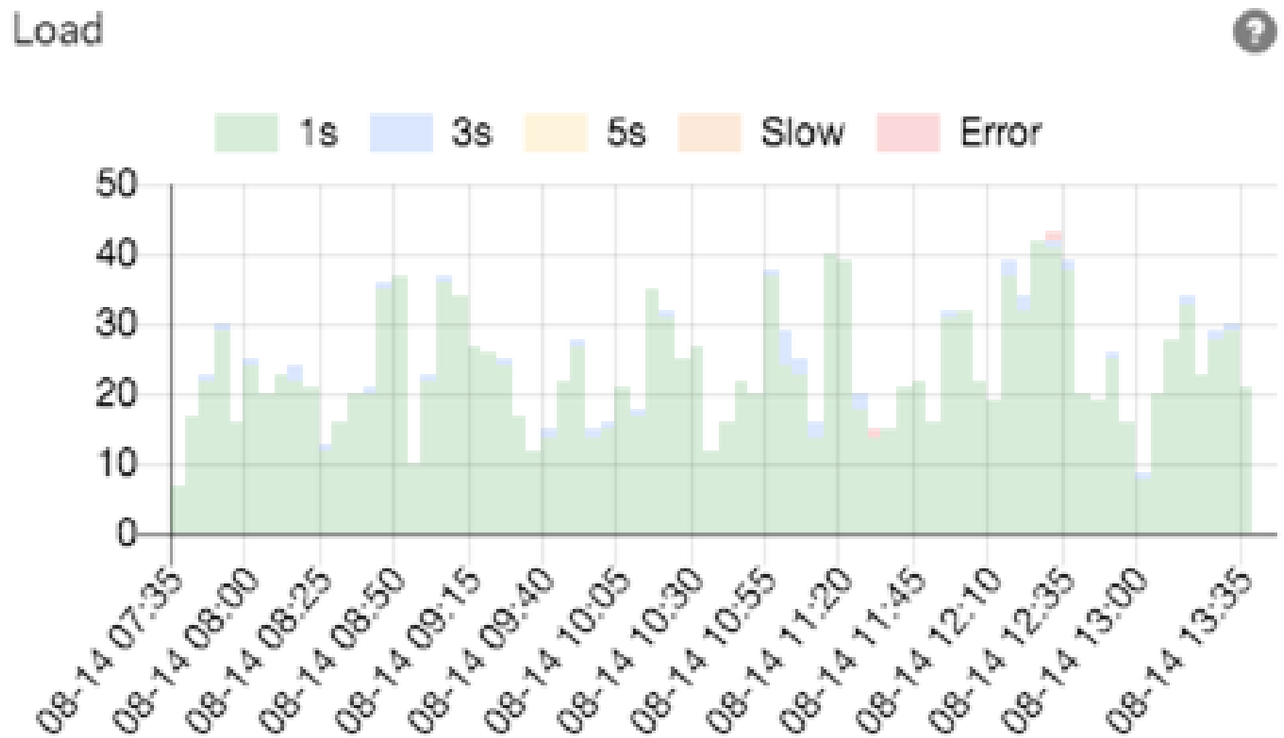

Success : 4,906
Failed : 0
10,000
(ms)
7,500
5,000
2,500
0
08-12
13:35:06
08-13
01:35:06
08-13
13:35:06
08-14
01:35:06
08-14
13:35:06

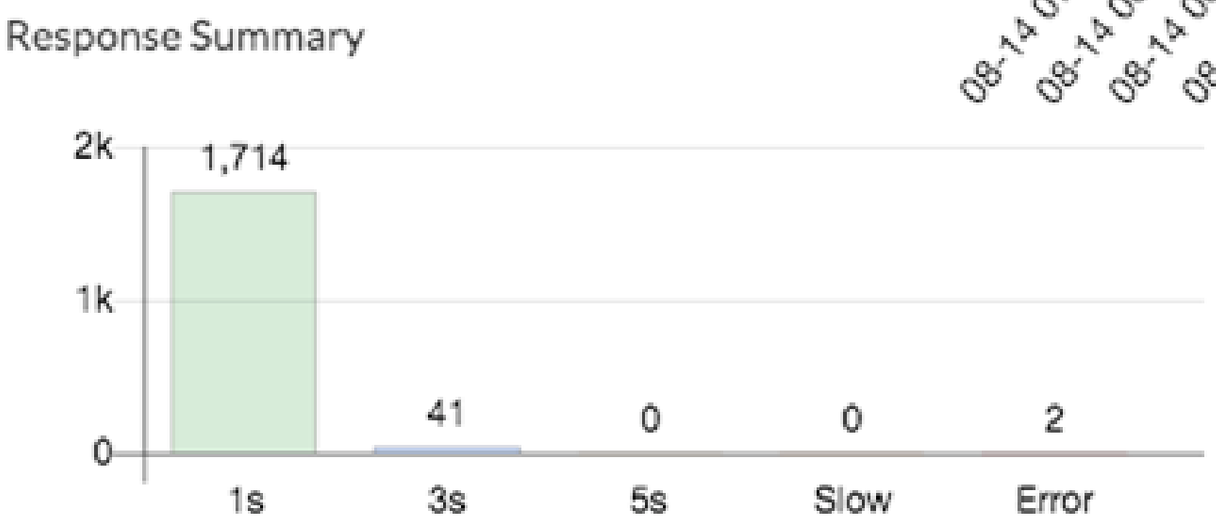
Features



Features

- **Response Summary chart**
- **Load chart**





NAVER

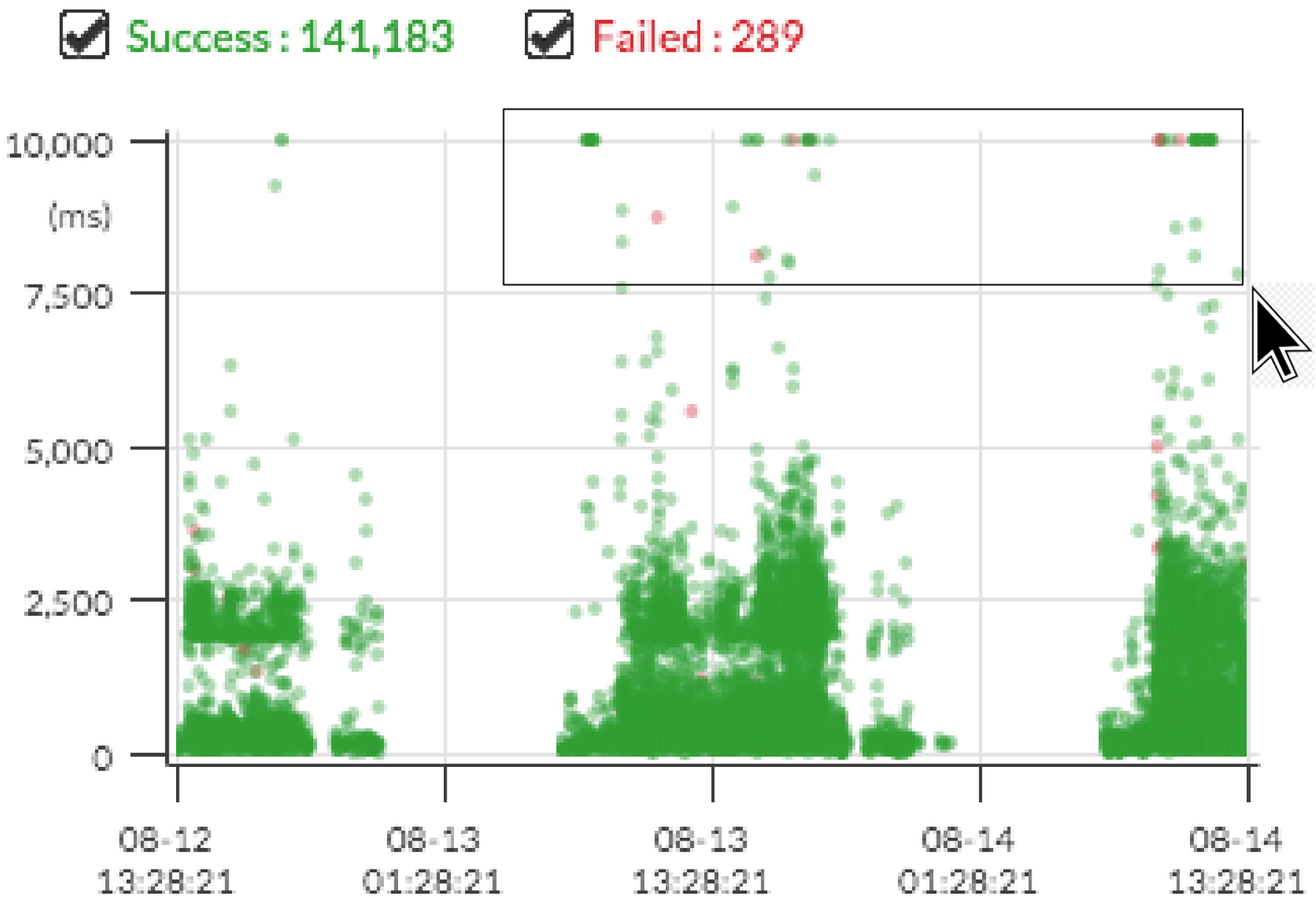
Features

PINPOINT

Bird Eye View
Finding Slow Transactions
Distributed Tracing
DevOps
Scalable
Minimum Overload

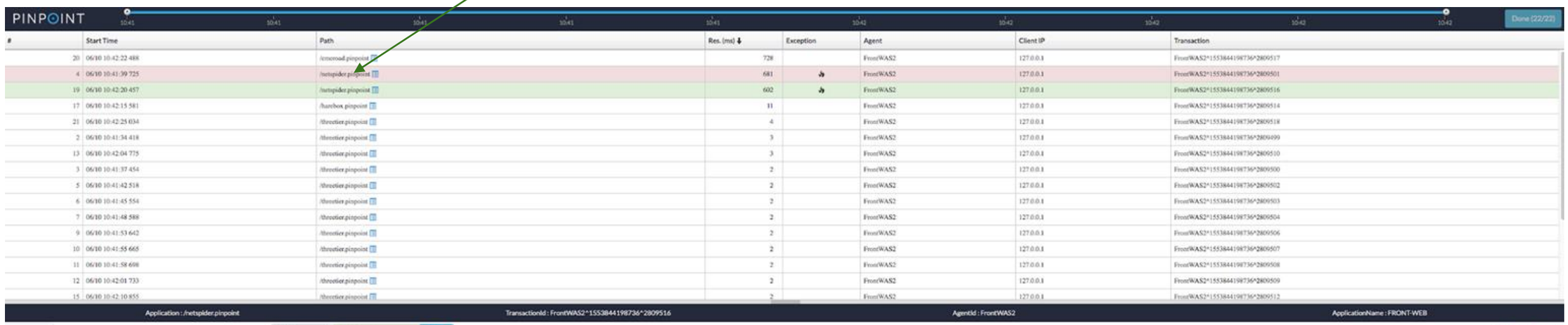
NAVER

Features

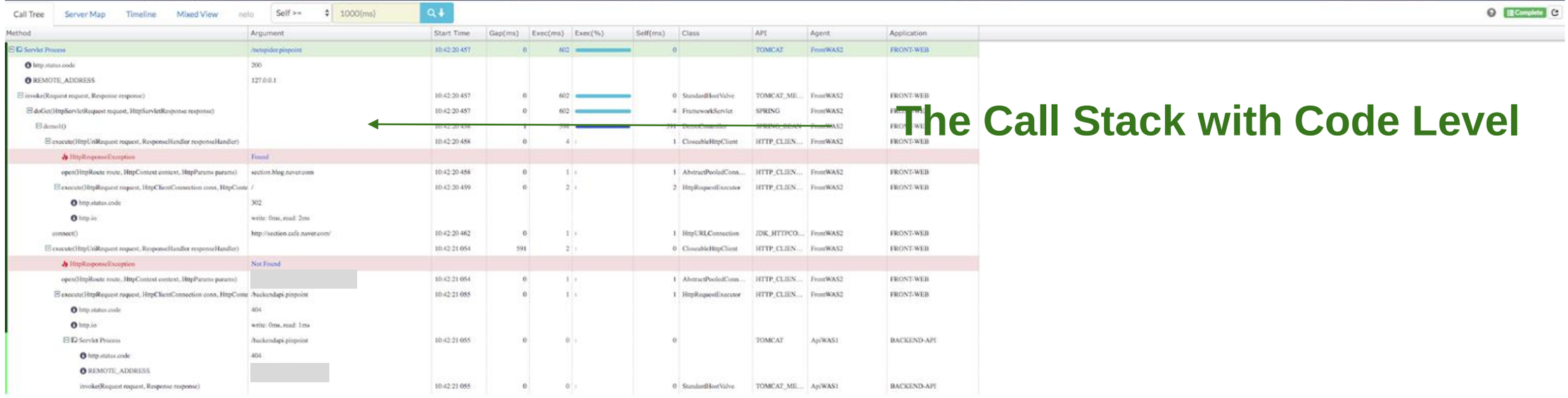

Success : 141,183
Failed : 289
10,000
(ms)
7,500
5,000
2,500
0
08-12
13:28:21
08-13
01:28:21
08-13
13:28:21
08-14
01:28:21
08-14
13:28:21

Features

List of Selected Transaction



The Call Stack with Code Level



NAVER

Features

PINPOINT

12:22 12:22 12:22 12:23 12:23 12:23 12:23 12:23 12:23 12:23

Done (7/7)

#	Start Time	Path	Res. (ms) ↓	Exception	Agent	Client IP	Transaction
2	08/17 12:23:32 480	/v1/shopping/orders/1340cbae-b9e8-4a41-a36b-57206ab17443	7,087		apigw01	127.0.0.1	apigw01^1565160016090^3378633
4	08/17 12:23:16 925	/v1/shopping/orders/6ac3cb68-23c8-4b76-955f-4c479672715a	6,968		apigw01	127.0.0.1	apigw01^1565160016090^3378558
3	08/17 12:23:24 881	/v1/shopping/orders/12dcfefb-683e-49ee-9443-1b8dddcf022b	6,056		apigw01	127.0.0.1	apigw01^1565160016090^3378577
7	08/17 12:22:59 601	/v1/shopping/orders/24b01dfe-0345-4c8d-995a-c8e392136e68	5,867		apigw01	127.0.0.1	apigw01^1565160016090^3378478
5	08/17 12:23:14 958	/v1/shopping/orders/674cebf8-0b41-4caa-8212-b84124cb94fd	5,170		apigw01	127.0.0.1	apigw01^1565160016090^3378545
1	08/17 12:23:36 629	/v1/shopping/orders/b6dea01f-3063-4bd3-bece-69ff9c543019	5,039		apigw01	127.0.0.1	apigw01^1565160016090^3378641
6	08/17 12:23:03 896	/v1/shopping/orders/4eee0e4c-70c9-4379-90ae-5f76715493c1	4,929		apigw01	127.0.0.1	apigw01^1565160016090^3378480

Application : /v1/shopping/orders/1340cbae-b9e8-4a41-a36b-57... TransactionId : apigw01^1565160016090^3378633 AgentId : apigw01 ApplicationName : ApiGateway

Call Tree | Server Map | Timeline | Mixed View

Complete

Features

PINPOINT

12:22 12:22 12:22 12:23 12:23 12:23 12:23 12:23 12:23 12:23

Done (7/7)

#	Start Time	Path	Res. (ms) ↓	Exception	Agent	Client IP	Transaction
2	08/17 12:23:32 480	/v1/shopping/orders/1340cbae-b9e8-4a41-a36b-57206ab17443	7,087		apigw01	127.0.0.1	apigw01^1565160016090^3378633
4	08/17 12:23:16 925	/v1/shopping/orders/6ac3cb68-23c8-4b76-955f-4c479672715a	6,968		apigw01	127.0.0.1	apigw01^1565160016090^3378558
3	08/17 12:23:24 881	/v1/shopping/orders/12dcfefb-683e-49ee-9443-1b8dddcf022b	6,056		apigw01	127.0.0.1	apigw01^1565160016090^3378577
7	08/17 12:22:59 601	/v1/shopping/orders/24b01dfe-0345-4c8d-995a-c8e392136e68	5,867		apigw01	127.0.0.1	apigw01^1565160016090^3378478
5	08/17 12:23:14 958	/v1/shopping/orders/674cebf8-0b41-4caa-8212-b84124cb94fd	5,170		apigw01	127.0.0.1	apigw01^1565160016090^3378545
1	08/17 12:23:36 629	/v1/shopping/orders/b6dea01f-3063-4bd3-bece-69ff9c543019	5,039		apigw01	127.0.0.1	apigw01^1565160016090^3378641
6	08/17 12:23:03 896	/v1/shopping/orders/4eee0e4c-70c9-4379-90ae-5f76715493c1	4,929		apigw01	127.0.0.1	apigw01^1565160016090^3378480

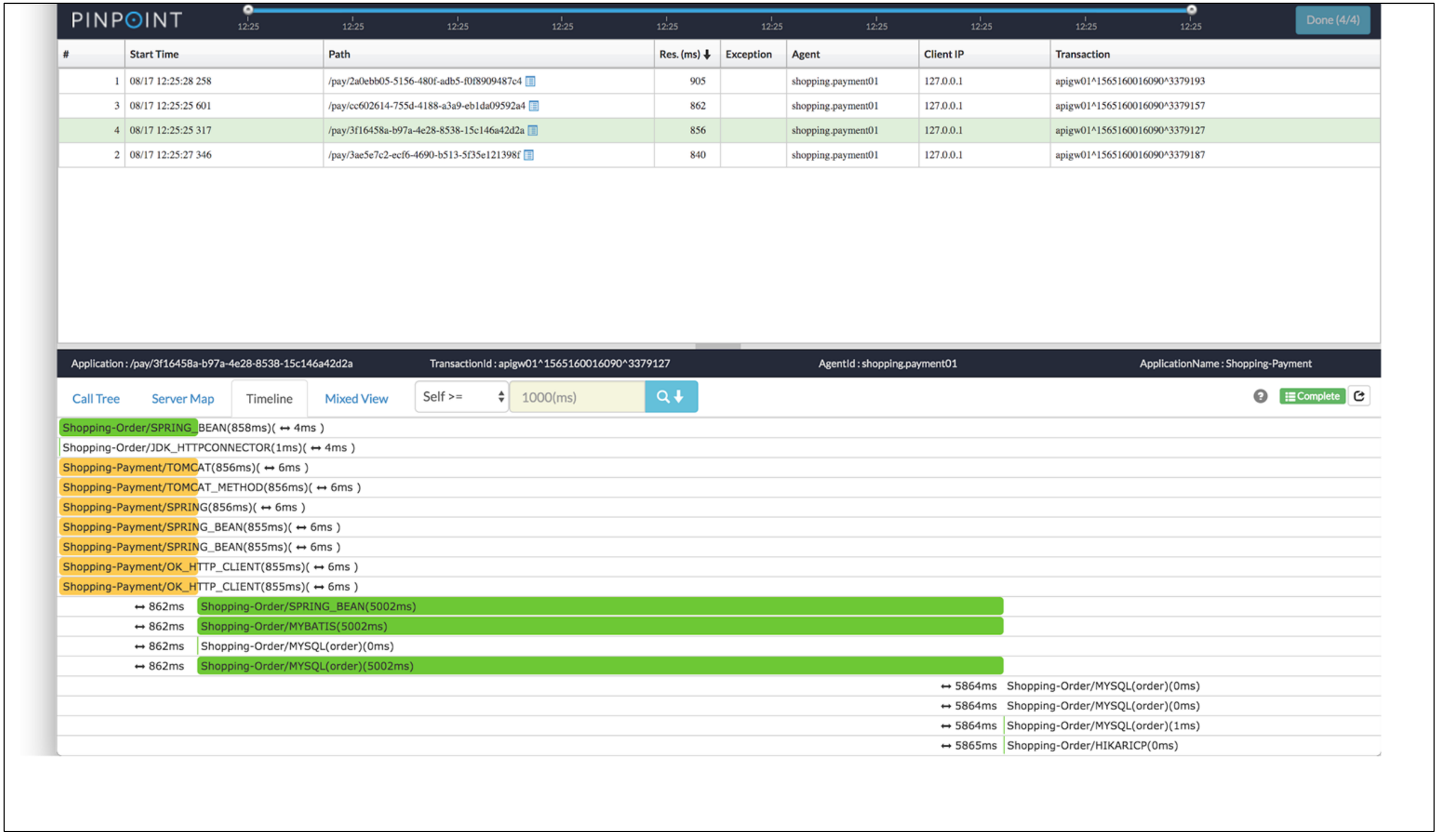
Application : /v1/shopping/orders/1340cbae-b9e8-4a41-a36b-57... TransactionId : apigw01^1565160016090^3378633 AgentId : apigw01 ApplicationName : ApiGateway

Call Tree | Server Map | Timeline | Mixed View

Complete

NAVER

Features



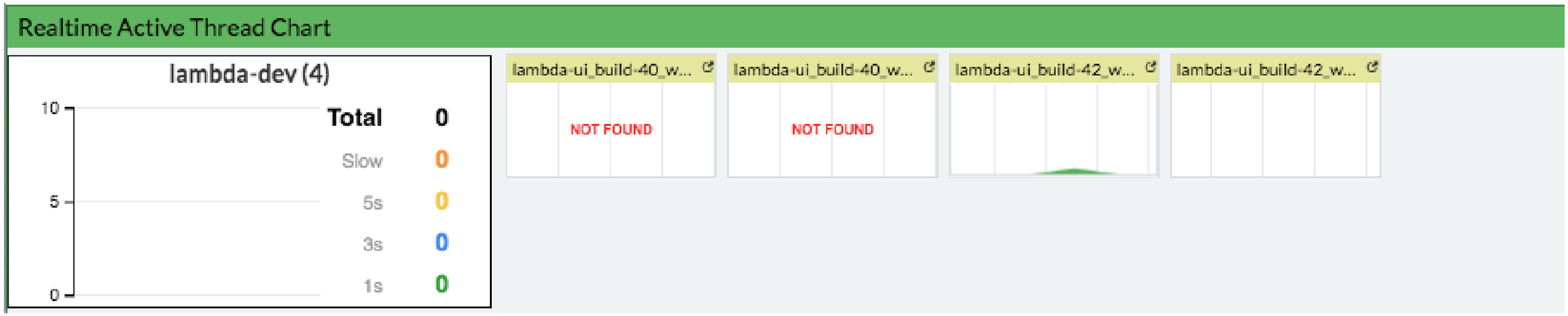
NAVER

Features

Bird Eye View
Finding Slow Transactions
Distributed Tracing
DevOps
Scalable
Minimum Overload

NAVER

Features



Can be used as HealthCheck

NAVER

Features

NAVER

Features

NAVER

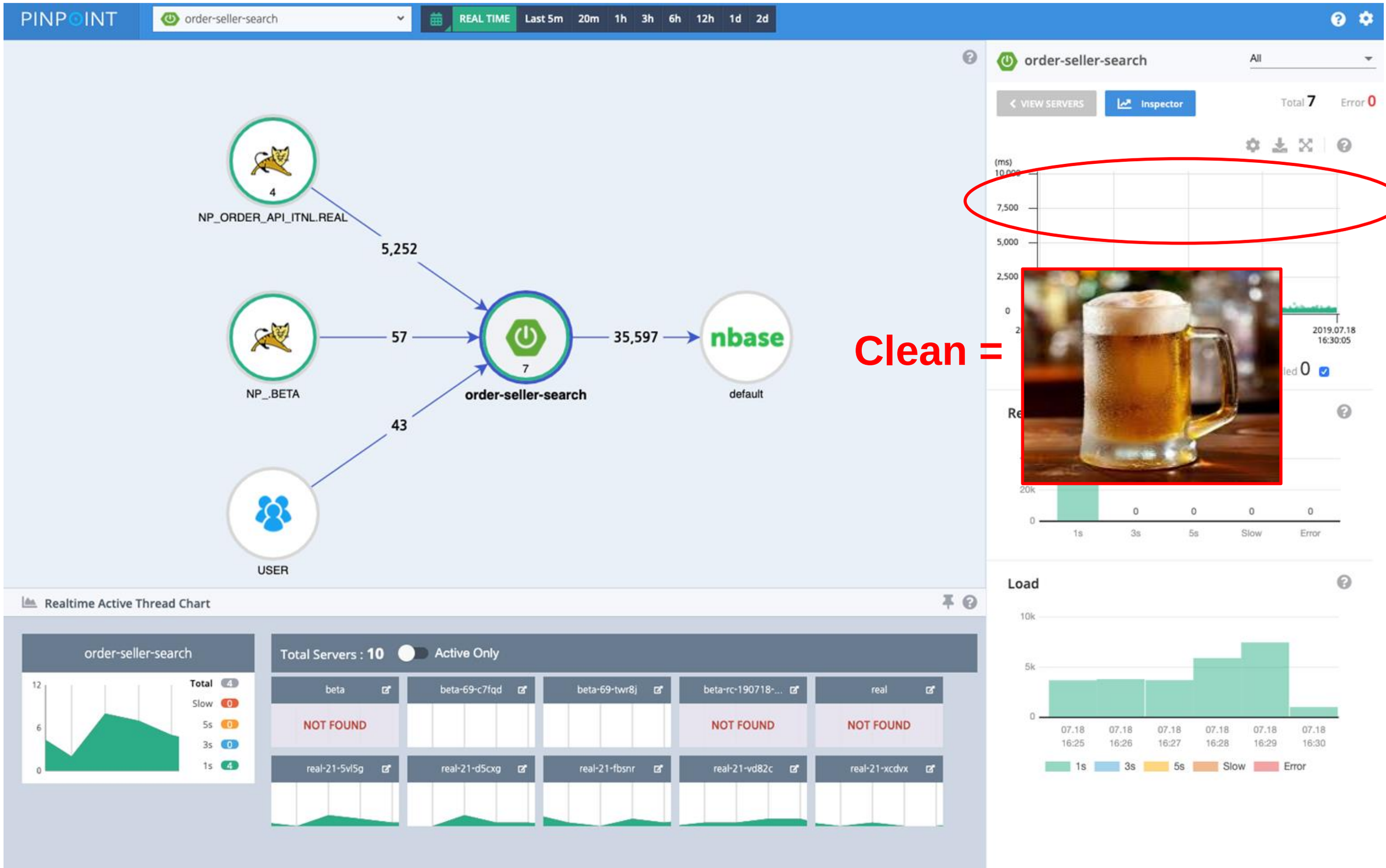
Features


PINPOINT
order-seller-search
REAL TIME
Last 5m
20m
1h
3h
6h
12h
1d
2d
4
NP_ORDER_API_ITNL.REAL
5,252
NP_.BETA
57
7
order-seller-search
35,597
nbase
default
43
USER
order-seller-search
All
VIEW SERVERS
Inspector
Total 7
Error 0
(ms)
10,000
7,500
5,000
2,500
0
2019.07.18 16:25:05
2019.07.18 16:26:20
2019.07.18 16:27:35
2019.07.18 16:28:50
2019.07.18 16:30:05
Success 24,746
Failed 0
Response Summary
40k
20k
0
25,374
0
0
0
0
1s
3s
5s
Slow
Error
Load
10k
5k
0
07.18 16:25
07.18 16:26
07.18 16:27
07.18 16:28
07.18 16:29
07.18 16:30
1s
3s
5s
Slow
Error
Realtime Active Thread Chart
order-seller-search
12
6
0
Total 4
Slow 0
5s 0
3s 0
1s 4
Total Servers : 10
Active Only
beta
beta-69-c7fqd
beta-69-twr8j
beta-rc-190718-...
real
NOT FOUND
NOT FOUND
NOT FOUND
real-21-5vl5g
real-21-d5cxg
real-21-fbsnr
real-21-vd82c
real-21-xcdvx

Features


PINPOINT
order-seller-search
REAL TIME
Last 5m
20m
1h
3h
6h
12h
1d
2d
4
NP_ORDER_API_ITNL.REAL
5,252
NP_.BETA
57
7
order-seller-search
35,597
nbase
default
43
USER
Realtime Active Thread Chart
order-seller-search
Total 4
Slow 0
5s 0
3s 0
1s 4
Total Servers : 10
Active Only
beta
beta-69-c7fqd
beta-69-twr8j
beta-rc-190718-...
real
NOT FOUND
NOT FOUND
NOT FOUND
real-21-5vl5g
real-21-d5cxg
real-21-fbsnr
real-21-vd82c
real-21-xcdvx
order-seller-search
All
VIEW SERVERS
Inspector
Total 7
Error 0
(ms)
7,500
5,000
2,500
0
2019.07.18 16:25:05
2019.07.18 16:26:20
2019.07.18 16:27:35
2019.07.18 16:28:50
2019.07.18 16:30:05
Success 24,746
Failed 0
Response Summary
40k
20k
0
25,374
1s
3s
5s
Slow
Error
Load
10k
5k
0
07.18 16:25
07.18 16:26
07.18 16:27
07.18 16:28
07.18 16:29
07.18 16:30
1s
3s
5s
Slow
Error

Features



NAVER

Features

- Heap, Non-Heap Memory
- JVM/SYSTEM CPU
- JVM GC
- TPS, Active Thread
- Response Time
- File Descriptor
- Direct/Mapped Buffer
- Data Source

NAVER

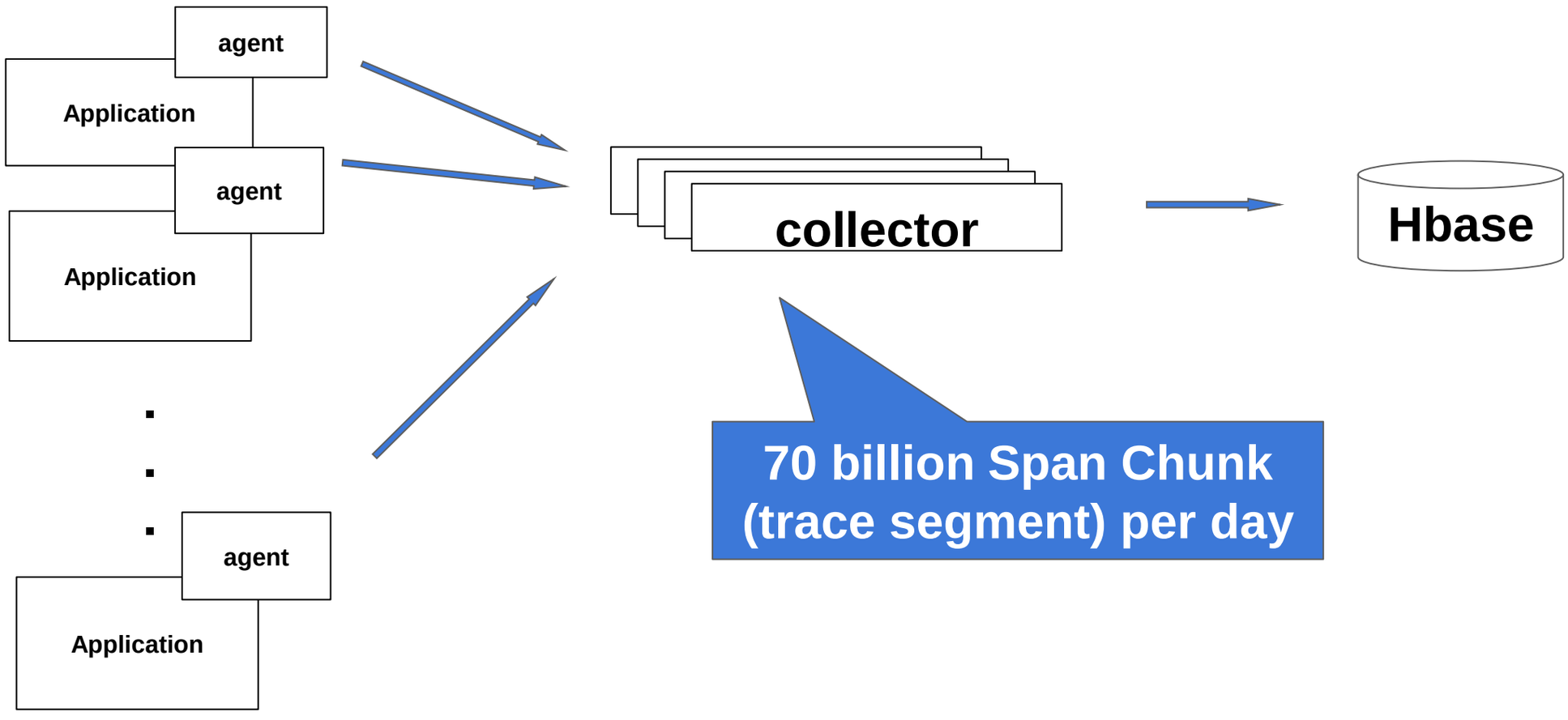
Features

PINPOINT

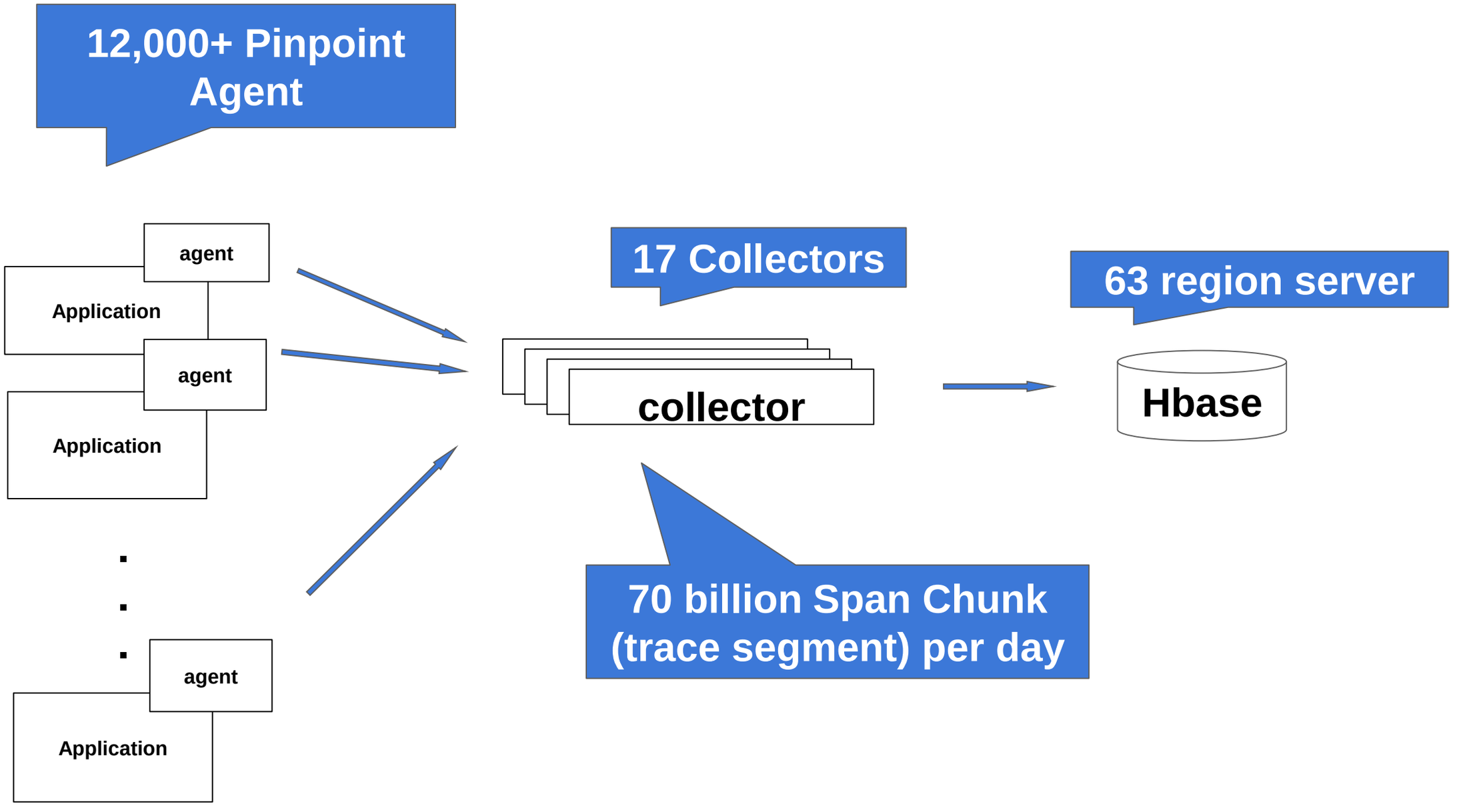
Bird Eye View
Finding Slow Transactions
Distributed Tracing
DevOps
Scalable
Minimum Overload

NAVER

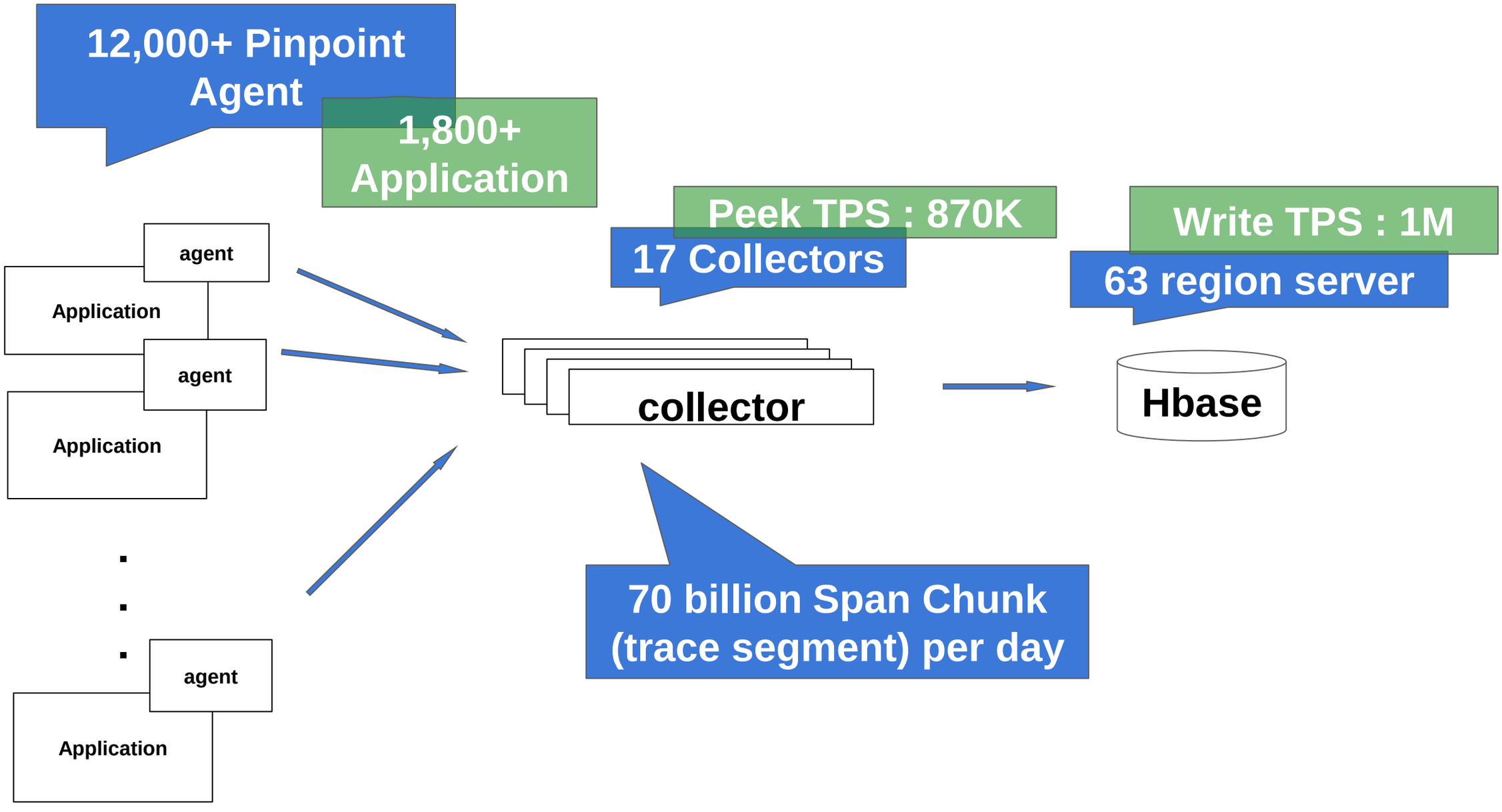
Features


agent
Application
agent
Application
agent
Application
collector
Hbase
70 billion Span Chunk
(trace segment) per day

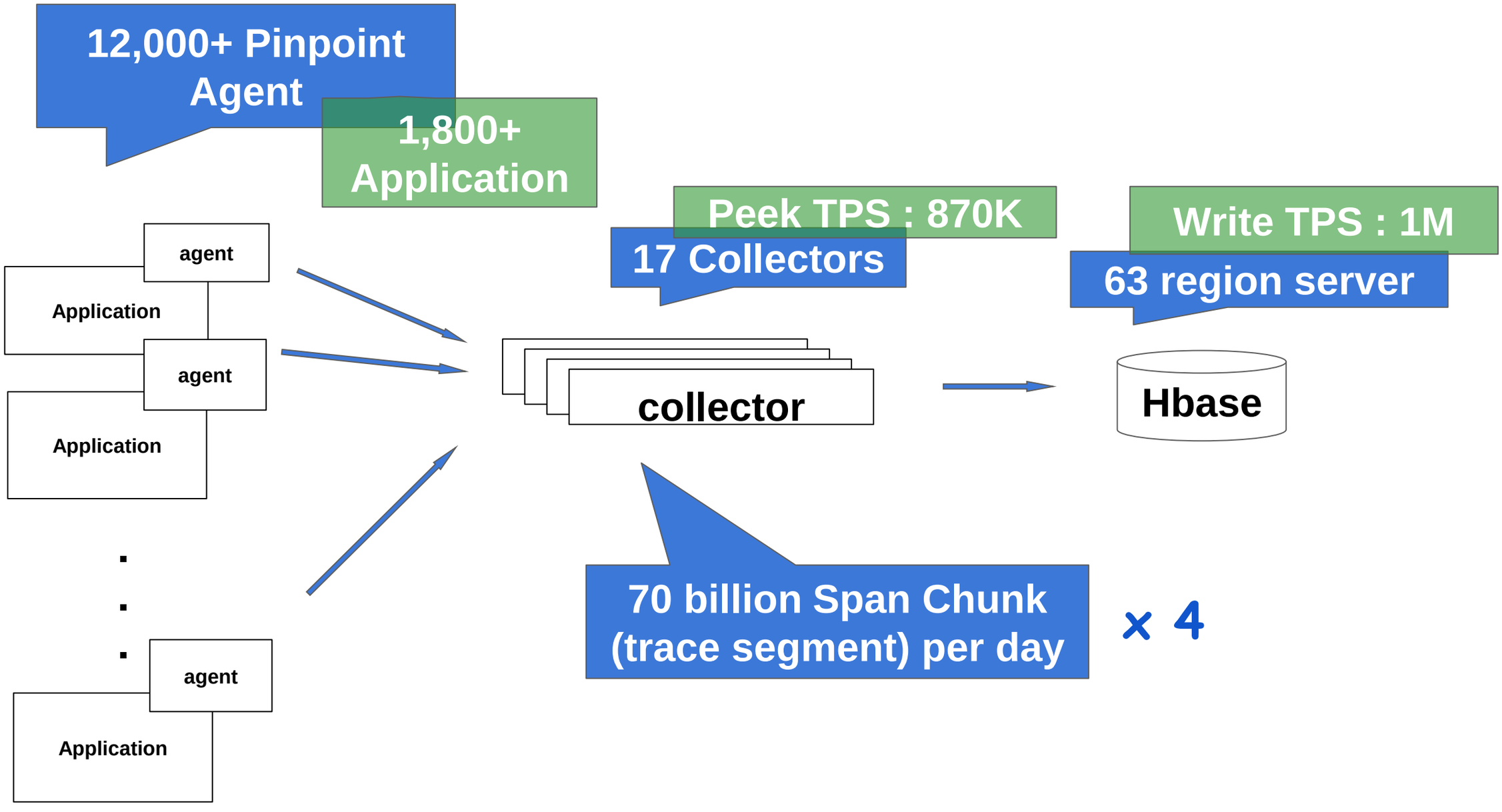
Features


12,000+ Pinpoint Agent
agent
Application
agent
Application
agent
Application
17 Collectors
collector
63 region server
Hbase
70 billion Span Chunk (trace segment) per day

Features


12,000+ Pinpoint Agent
1,800+ Application
Peek TPS : 870K
17 Collectors
Write TPS : 1M
63 region server
agent
Application
agent
Application
collector
Hbase
70 billion Span Chunk (trace segment) per day
agent
Application

Features


12,000+ Pinpoint Agent
1,800+ Application
Peek TPS : 870K
17 Collectors
Write TPS : 1M
63 region server
agent
Application
agent
Application
collector
Hbase
70 billion Span Chunk (trace segment) per day
× 4
agent
Application

Features

PINPOINT

Bird Eye View
Finding Slow Transactions
Distributed Tracing
DevOps
Scalable
Minimum Overload

NAVER

Features

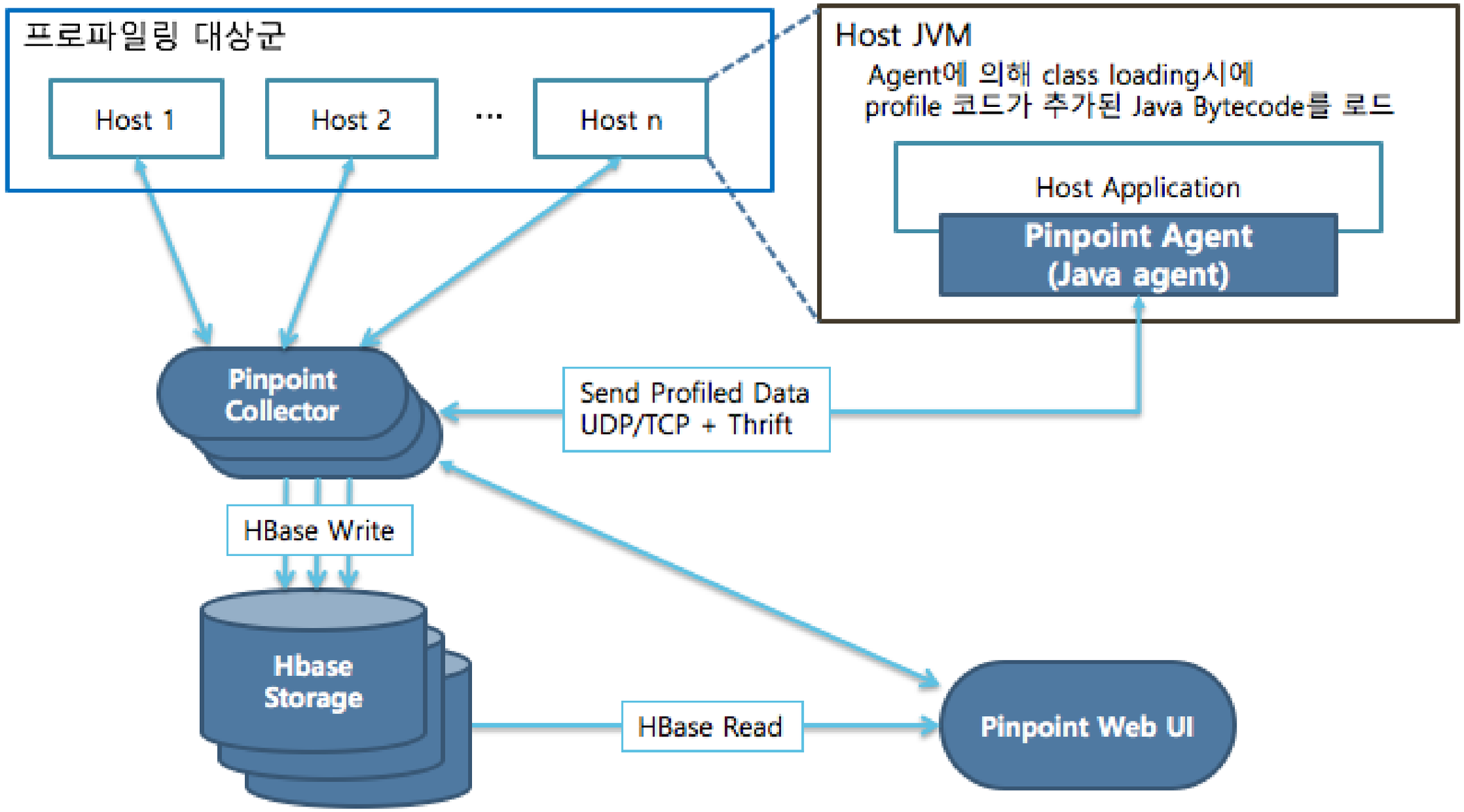
- **Execute Integration Tests Periodically**
  - **Less than 3% difference in performance**
  - **Sampling ‘No-Agent’, ‘5%’, ‘100%’**

Tomcat Only																					
VUser 4						VUser 32						VUser 64						VUser 128					
Duration (ms)	Tests	Error	Mean Test Time (ms)	TPS	nGrinder	Duration (ms)	Tests	Error	Mean Test Time (ms)	TPS	nGrinder	Duration (ms)	Tests	Error	Mean Test Time (ms)	TPS	nGrinder	Duration (ms)	Tests	Error	Mean Test Time (ms)	TPS	nGrinder
300000	135003	0	6.87	571.92	link	300000	421252	20	17.63	1784.54	link	300000	427943	11	34.78	1828.37	link	300000	427923	0	69.95	1828.08	link
300000	125282	0	7.42	530.74	link	300000	422774	23	17.51	1791.0	link	300000	415028	7	35.84	1773.2	link	300000	424081	0	70.61	1811.98	link
300000	127462	0	7.29	539.97	link	300000	427575	21	17.34	1811.3	link	300000	428504	8	34.75	1830.7	link	300000	403144	656	72.5	1722.34	link

NAVER

Technical Detail

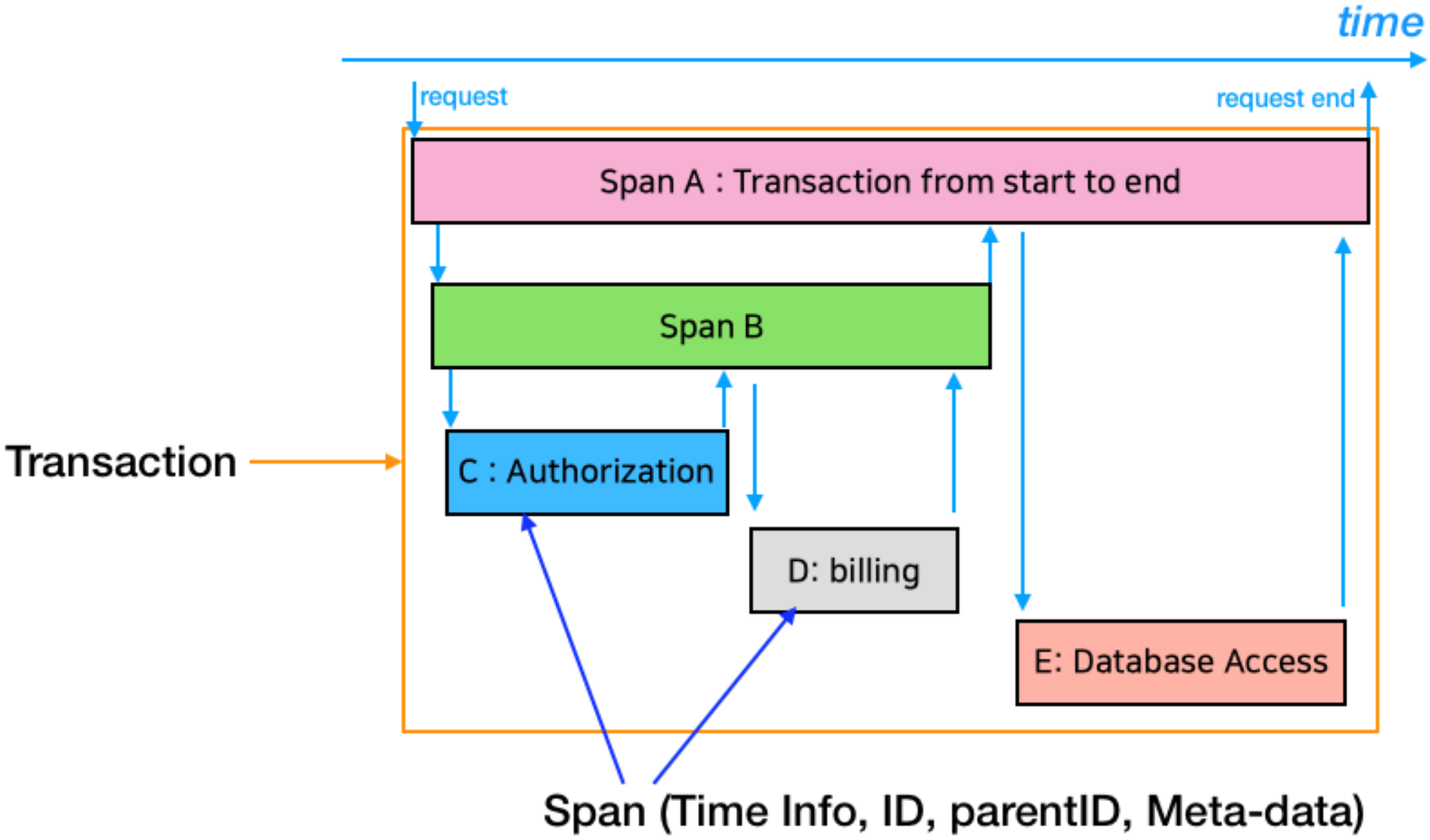
Architecture



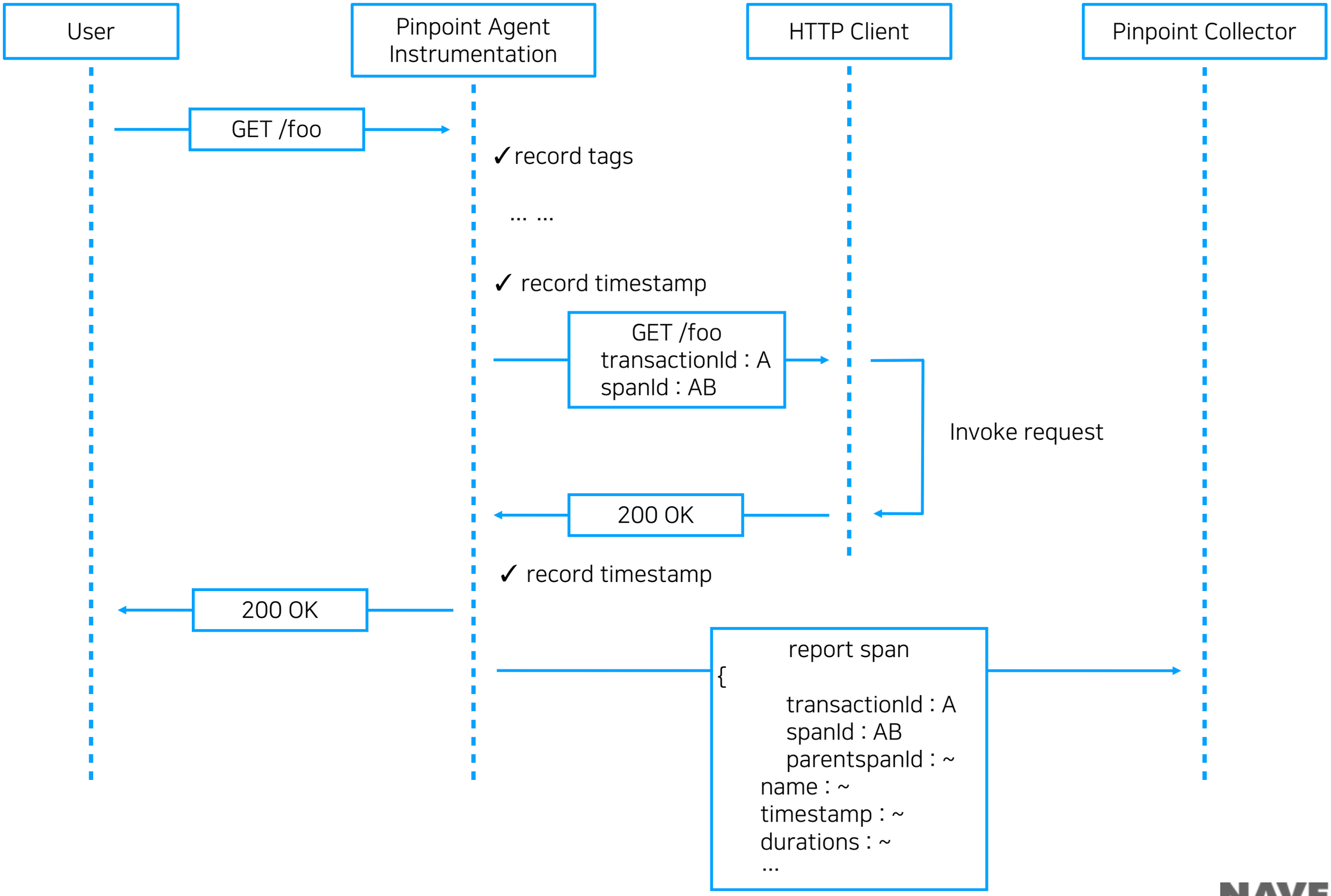
Technical Detail

Distributed Transaction Tracing

마이크로 서비스로 구성된 응용 프로그램의 장애 발생 위치나 Bottleneck 위치를 쉽게 파악 할 수 있도록 모니터링 하는 방법



Technical Detail



NAVER

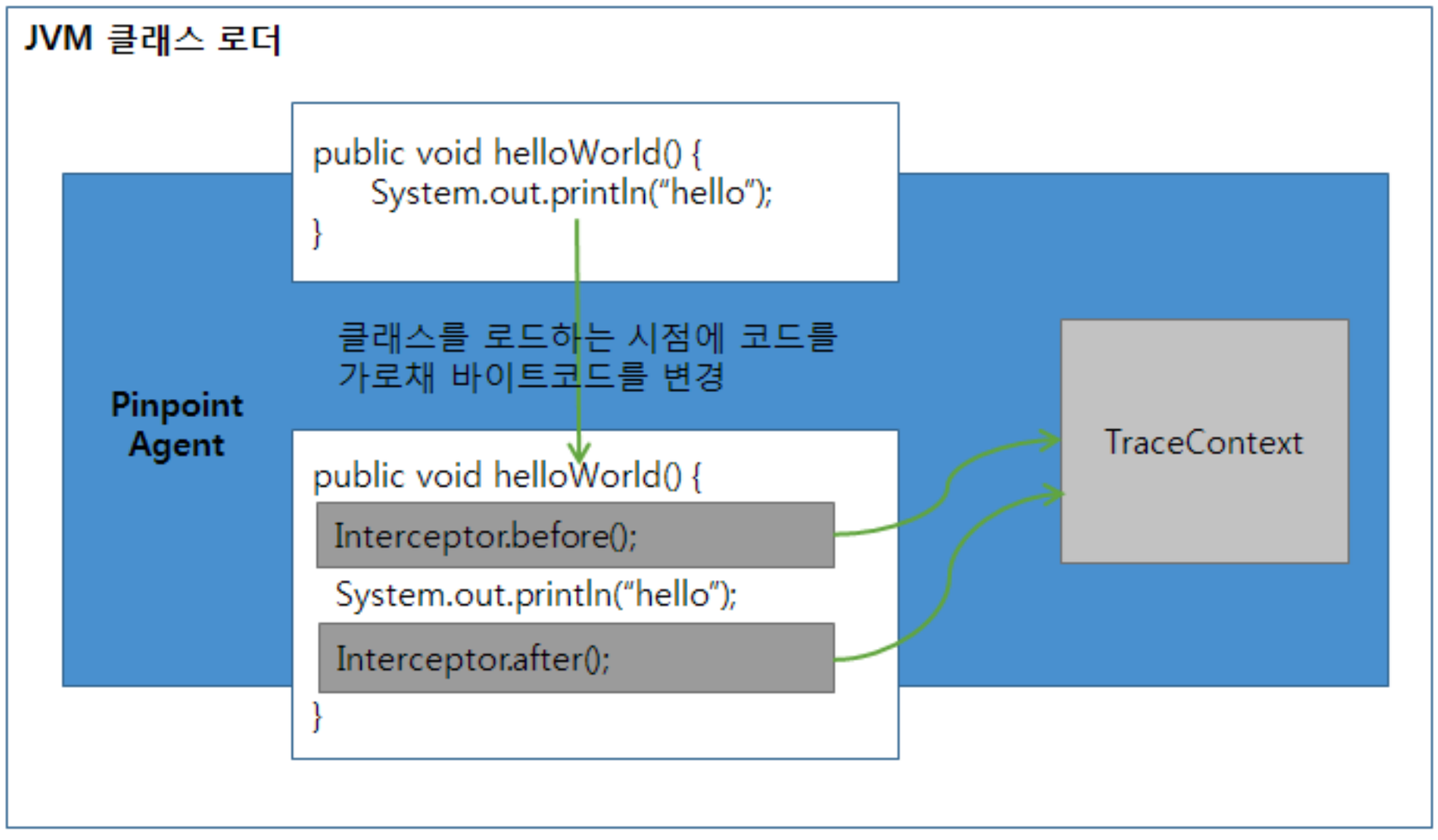
Technical Detail

```
public static void main(String[] args) {

    sayHello(“Pinpoint”);
}

private void sayHello(String str){
    Pinpoint.record Timestamp
    Pinpoint.record str

    System.out.println("Hello ” + str );

    Pinpoint.record Timestamp
}
```

Technical Detail

Byte Code Instrumentation

1. 클래스 로딩 시간에 Application 코드에 추적을 위한 코드를 개입시켜 정보 수집
2. Java 바이트 코드를 처리, 개발 위험 증가/생산성 감소
3. Application 에 코드를 직접적으로 추가할 필요X



Technical Detail

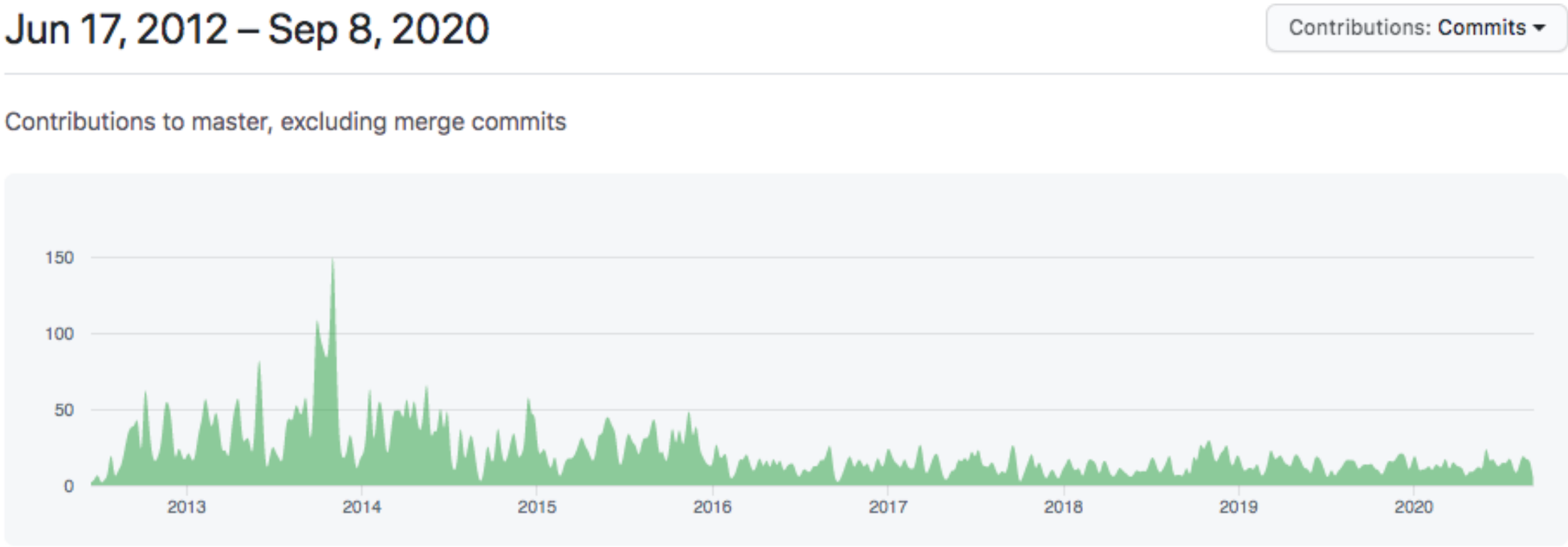
Installation

- javaagent: /pinpoint-agent/pinpoint-bootstrap-1.8.0.jar
- Dpinpoint.agentId=${PINPOINT_AGENT_ID}
- Dpinpoint.applicationName=${PINPOINT_APPLICATION_NAME}

"Pinpoint just magically works."
- Adrian Cole @pivotal (Zipkin leader)

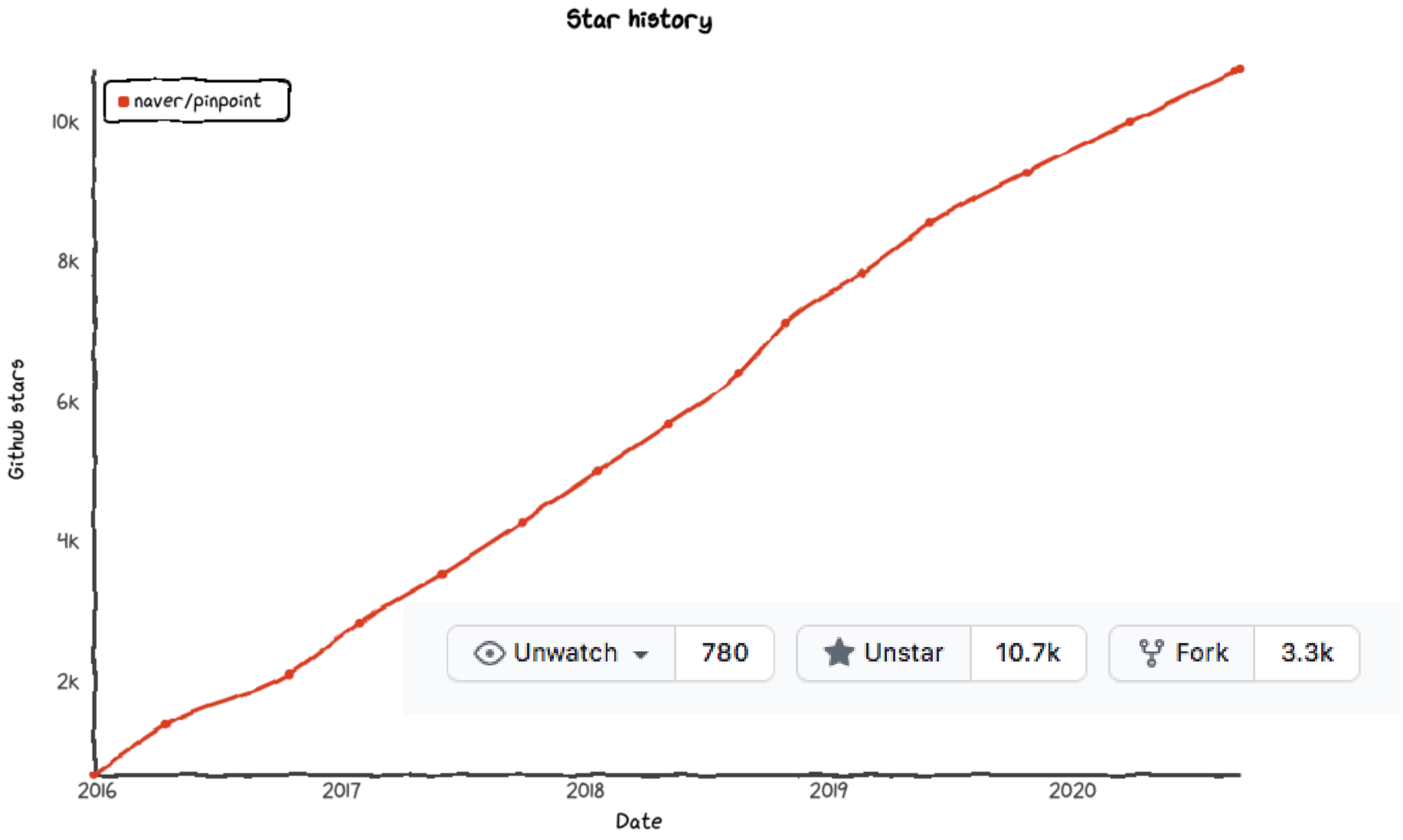
" We think Pinpoint, an open source tool in this space is worth investigating as an alternative to AppDynamics and Dynatrace"
- thoughtworks.com

Open source Pinpoint



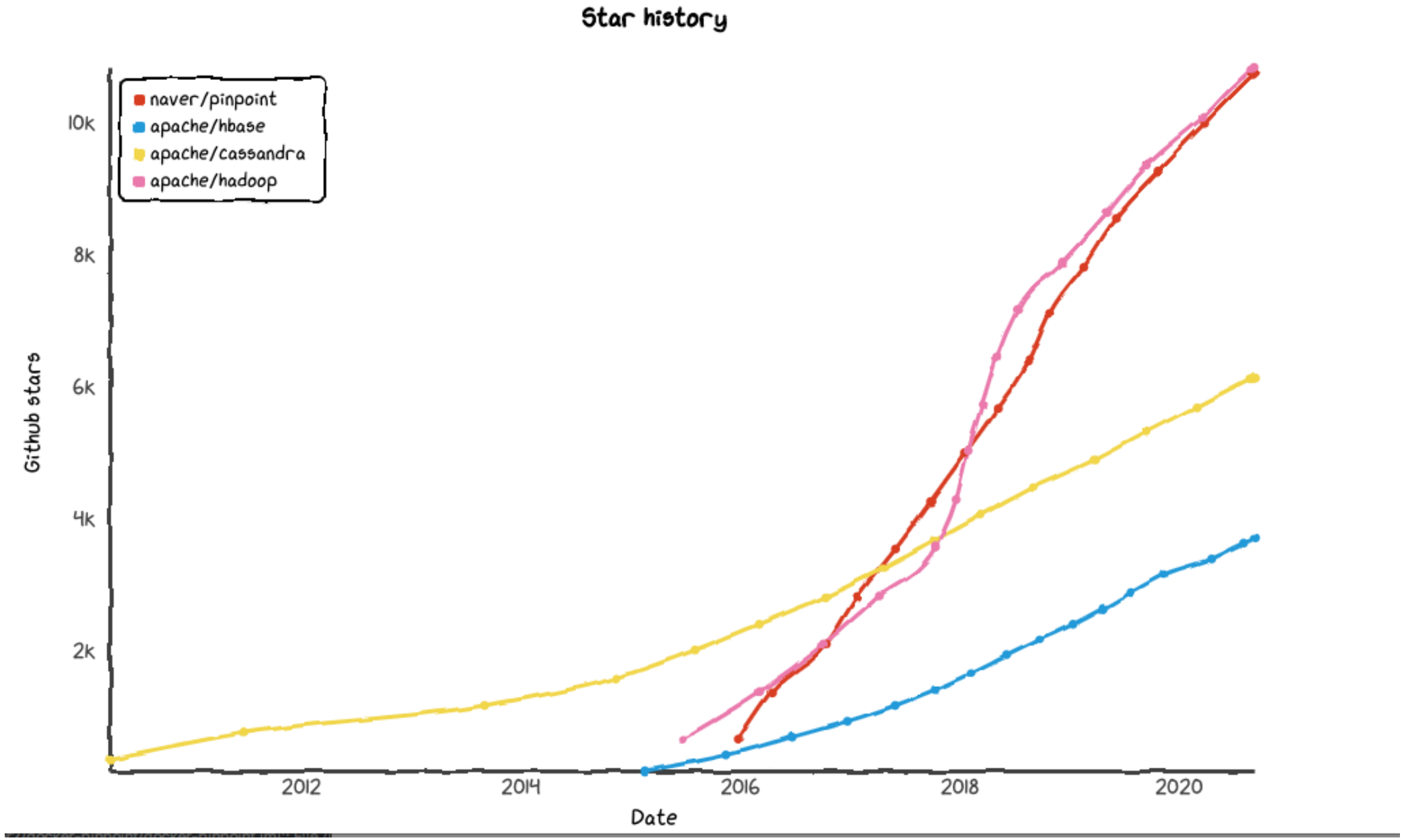
NAVER

Open source Pinpoint

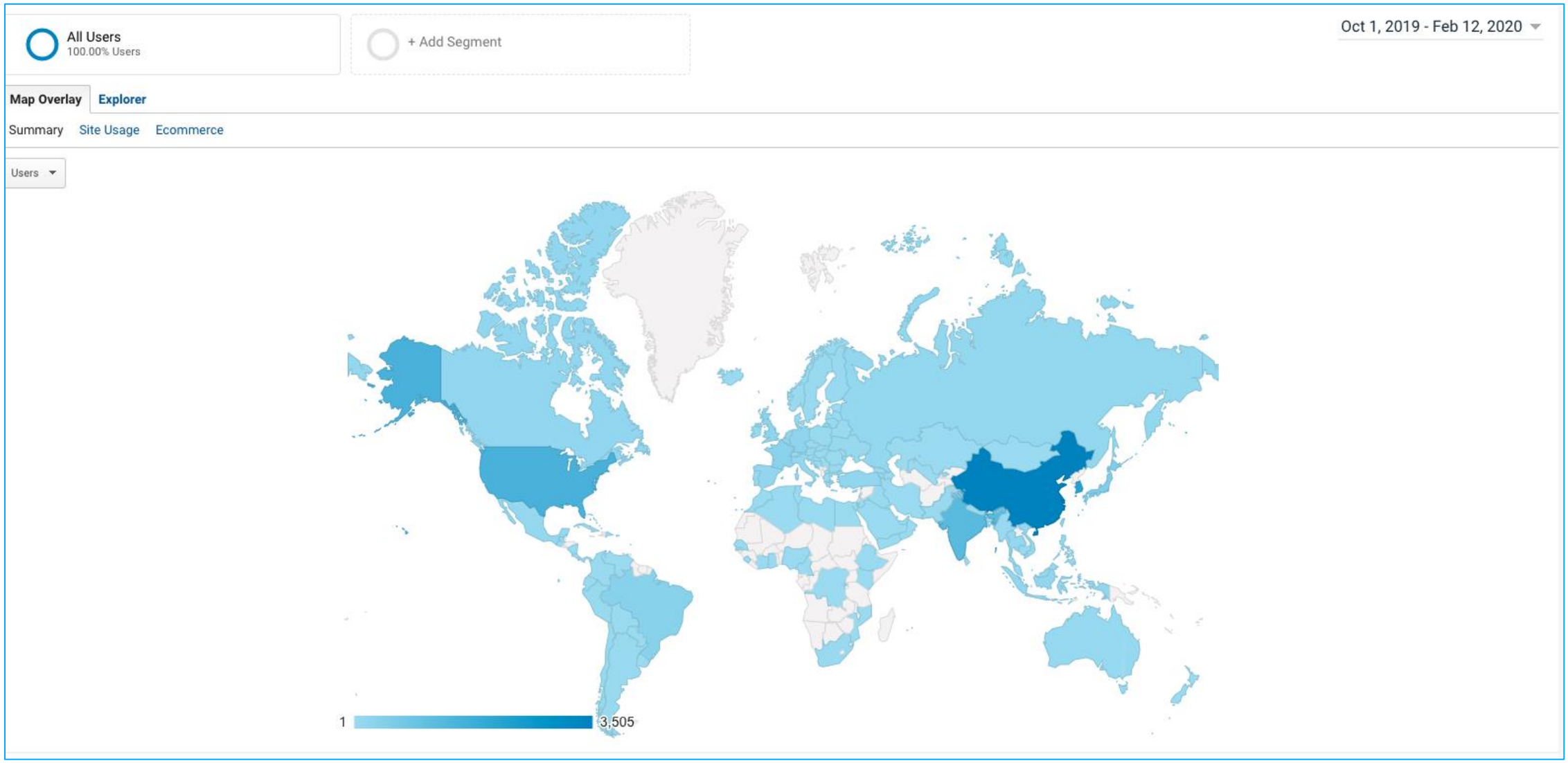


NAVER

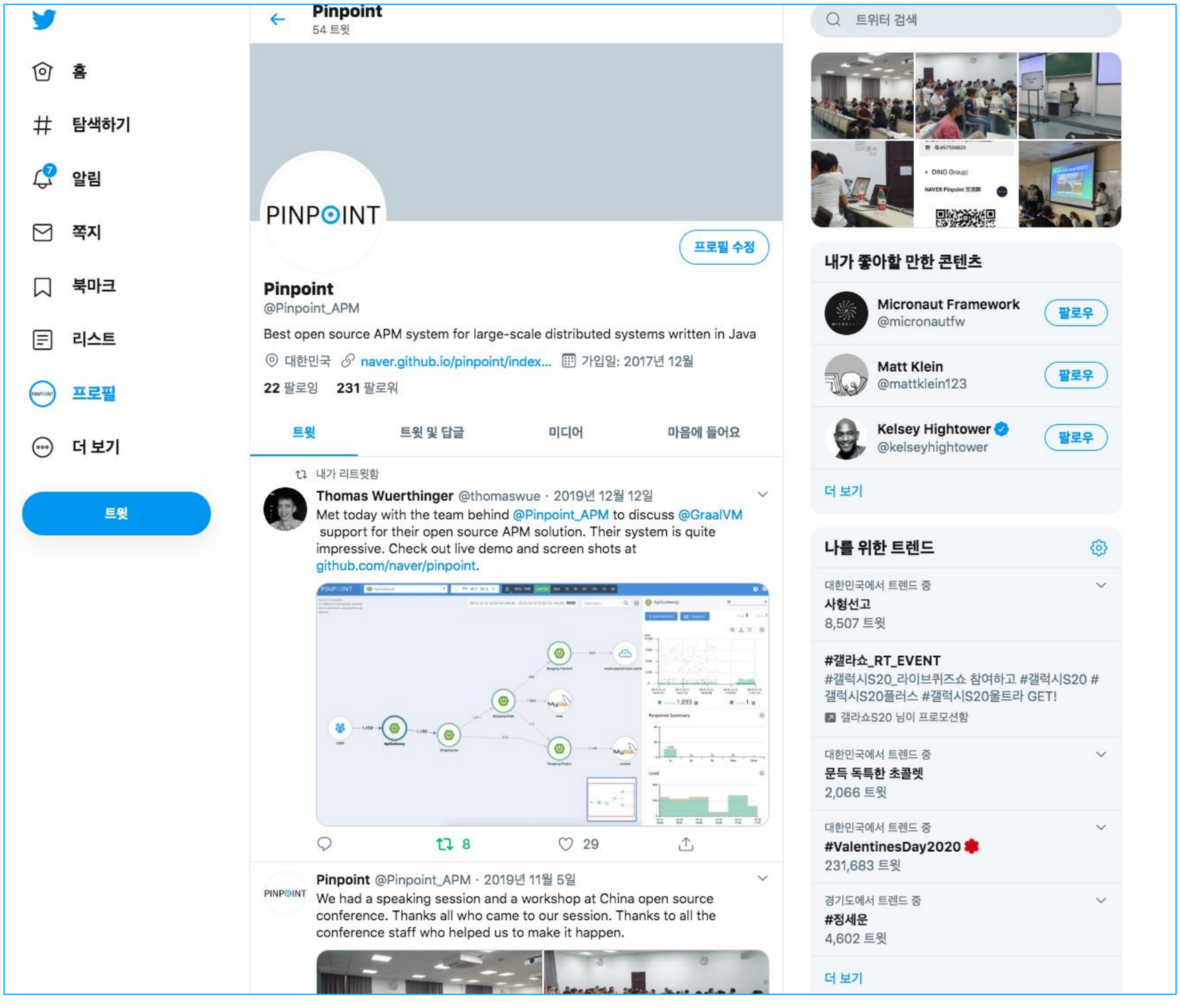
Open source Pinpoint



Open source Pinpoint

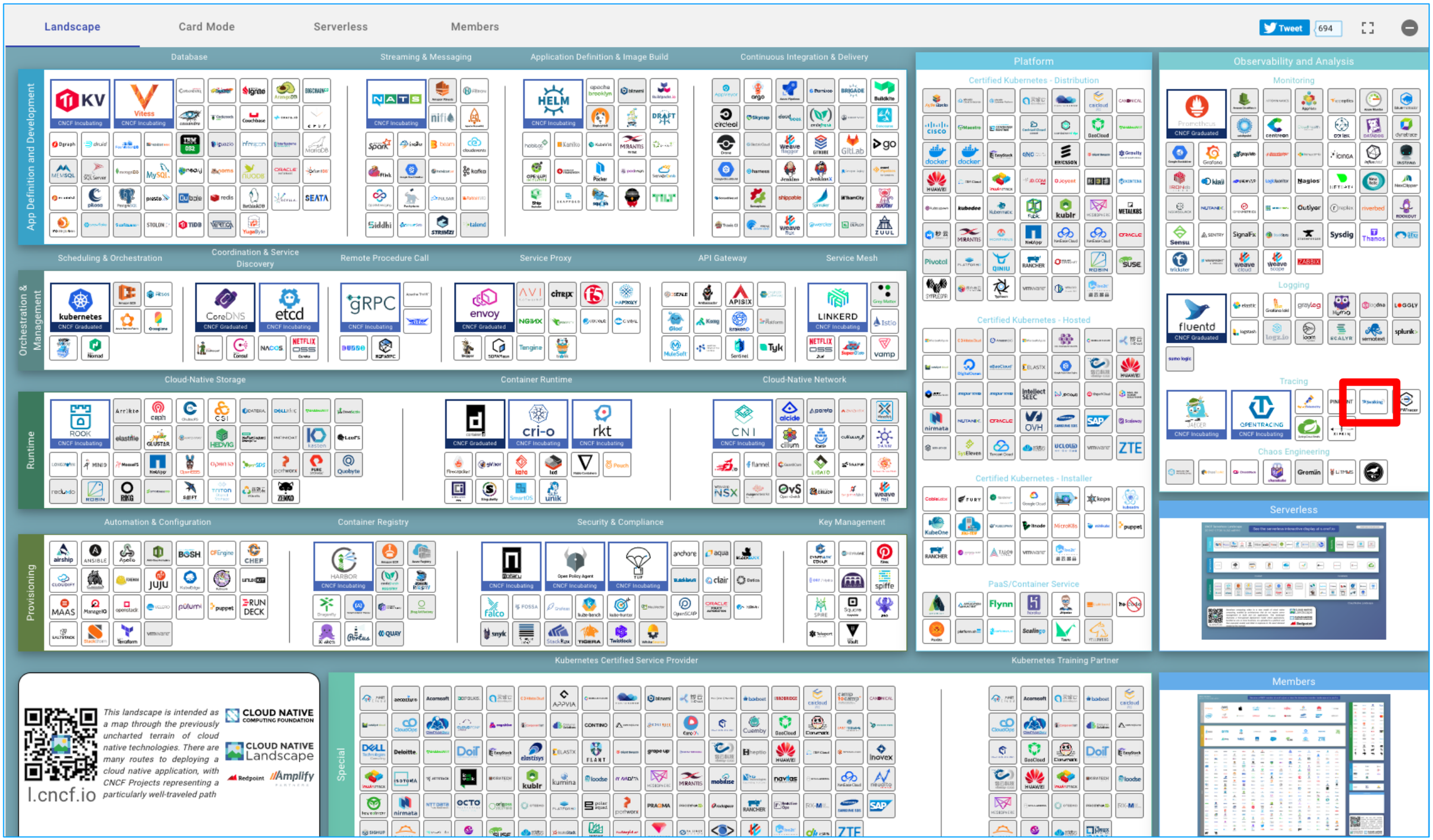


Open source Pinpoint



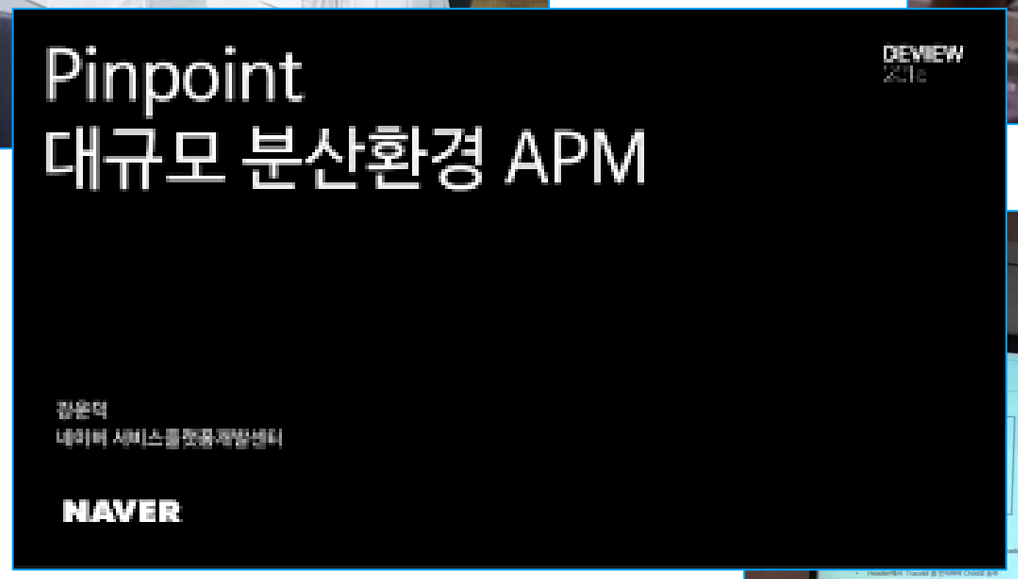
NAVER

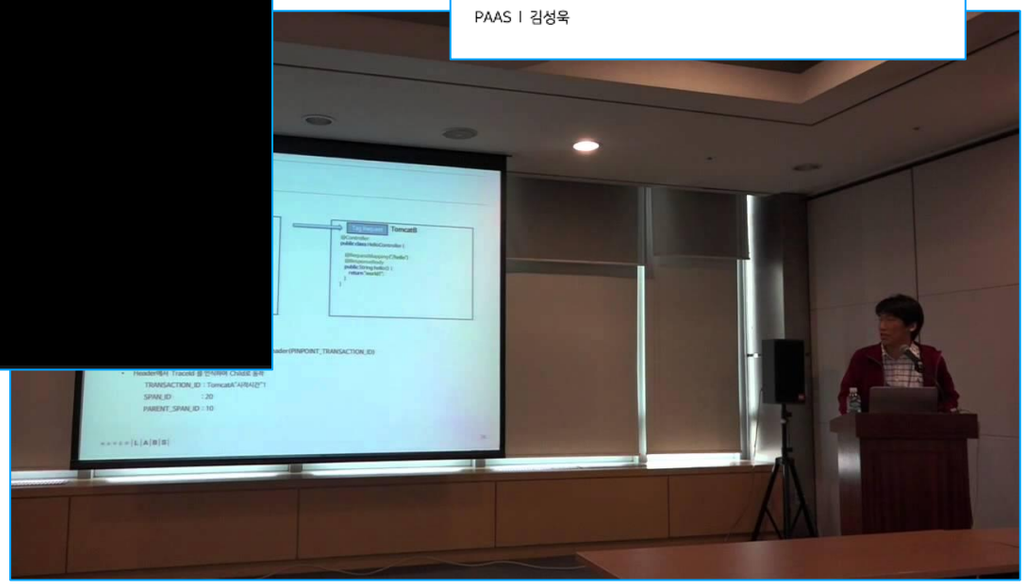
Open source Pinpoint



NAVER

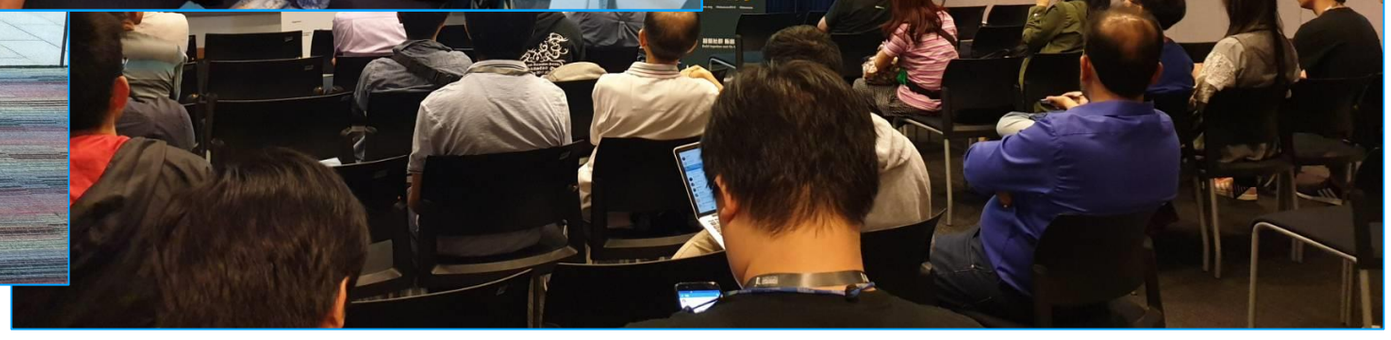
Open source Pinpoint





NAVER

Open source Pinpoint



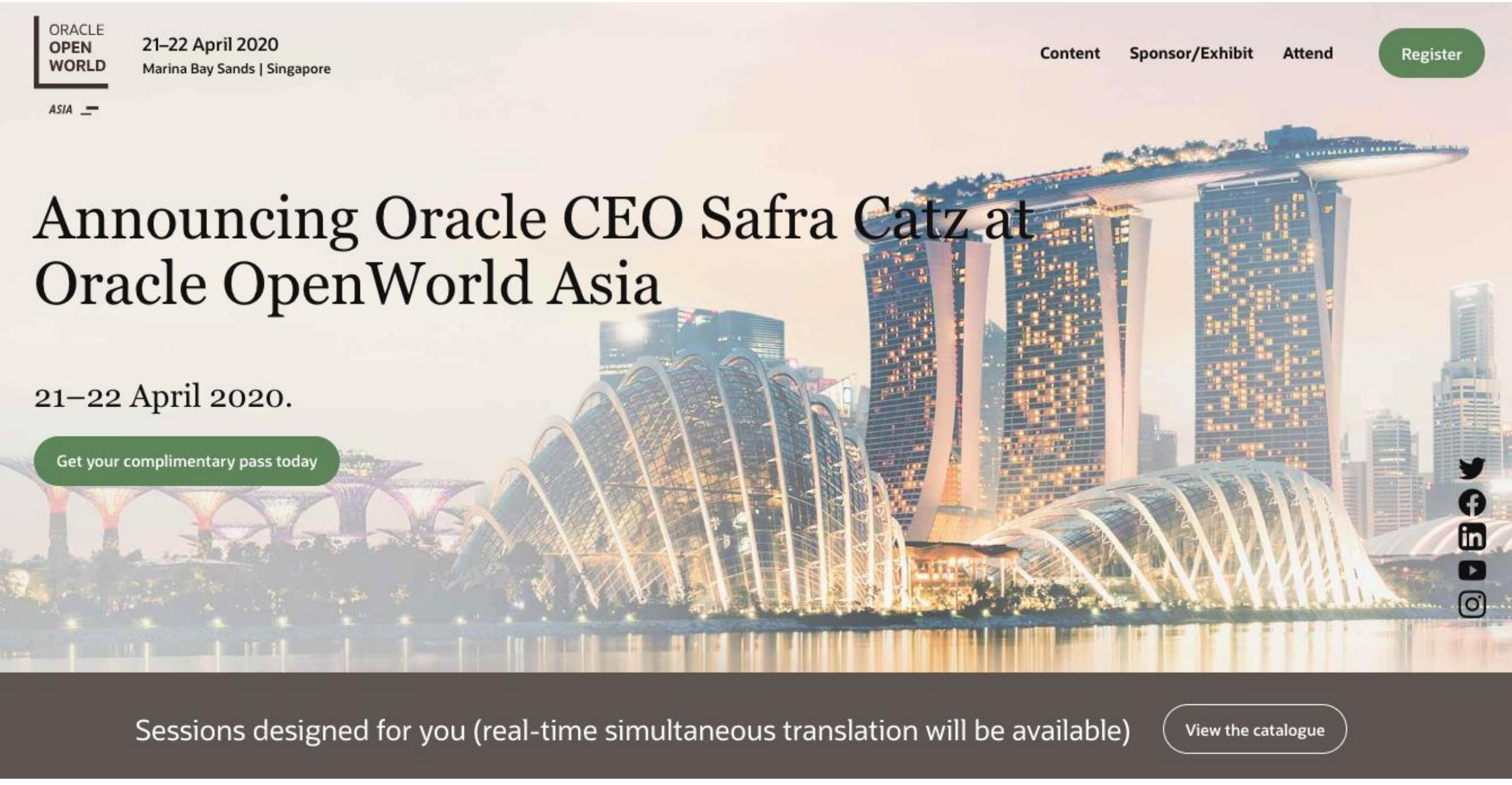
NAVER

Open source Pinpoint

NAVER

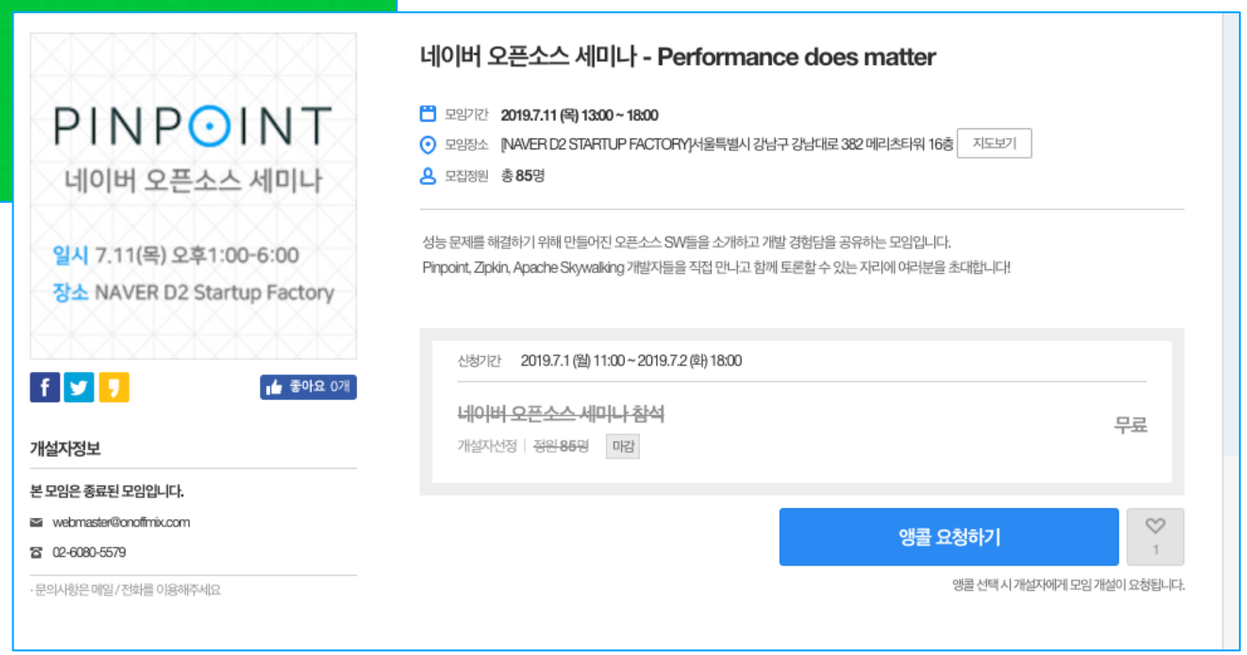
Open source Pinpoint

Open source Pinpoint



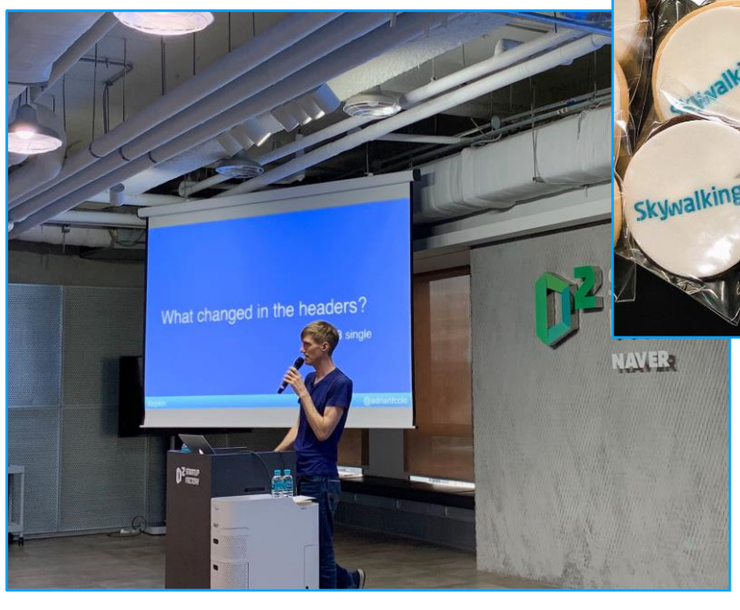
NAVER

Open source Pinpoint



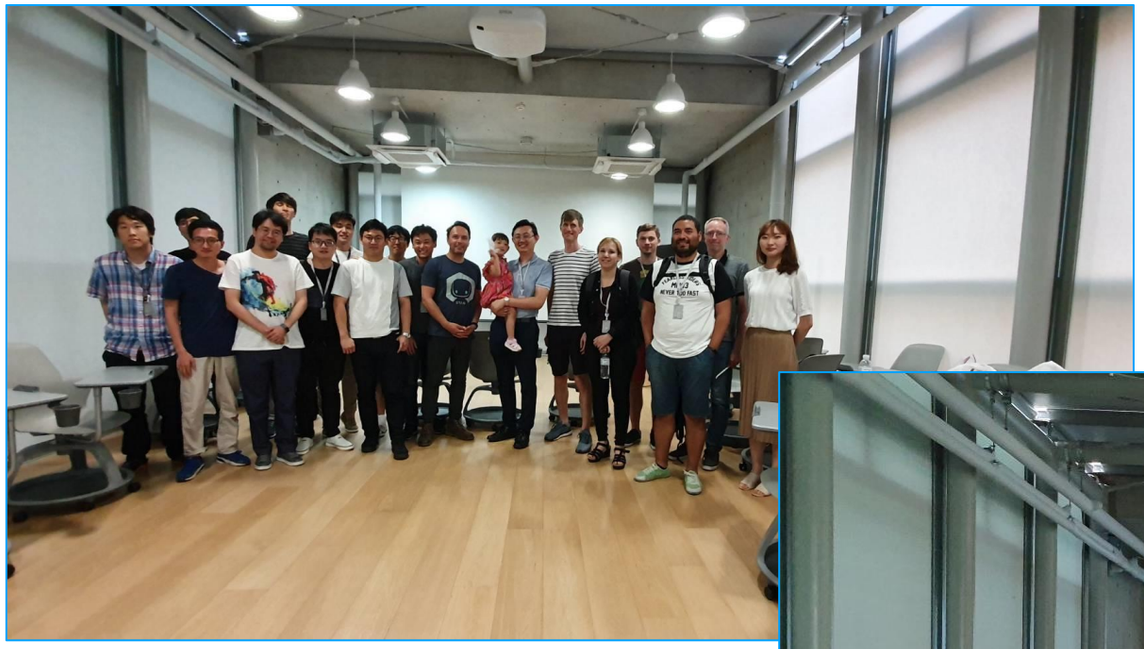
NAVER

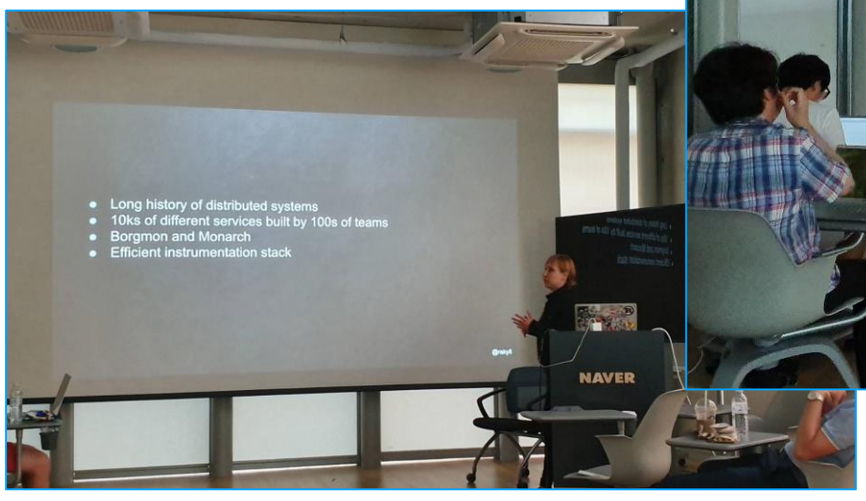
Open source Pinpoint



NAVER

Open source Pinpoint





Open source Pinpoint

받는사람 김성욱[Wook Kim Sung]<roy.kim@navercorp.com>

안녕하세요?
정말 아무생각 없이 세미나 참석 했었는데,
뜻하지 않게 보물을 발견한 느낌이었습니다.
직접 설치해 보고 확인해 보니 너무나 좋네요..
이렇게 좋은 프로그램을 공개해 주신 naver pinpoint 팀에게 너무나 감사드립니다

Sent: 2019-07-12 (금) 12:03:24 (GMT+09:00)
Subject: [from Cloud-Barista to PinPoint]

안녕하세요.
인사드렸던 ETRI [redacted]입니다.

어제 말씀드렸던 바와 같이 양측 커뮤니티 네트워킹을 위해서
일단, 저희 과제책임자 연락처 공유 드립니다.

- 프로젝트 리더 [redacted]
- 메일 [redacted]

감사합니다.
수고하세요.

넵, 감사합니다.

조만간 관련하여 자리를 한번 마련해보도록 하겠습니다.

감사합니다.
즐거운 하루 되세요.

삼성 같은곳에서도 이렇게 opensource인사를 초대해서 컨퍼런스를 진행하기가 힘든데. 대단하다.

행사의 라인업이 좋았다

NAVER

Open source Pinpoint

NAVER

Open source Pinpoint

"구글·아마존 부럽지 않네" 네이버 오픈소스 혁신 동참

강일용 기자 | 입력 : 2019-07-15 15:13

네이버, 직접 개발한 30여개 SW 오픈소스로 공개... '핀포인트' 프로젝트 등이 인기
경쟁사까지 초대한 열린 행사 개최, 시장 규모 확대하는 오픈소스 정신 강조

강운덕 네이버 핀포인트 프로젝트 리더가 '핀포인트 오픈 하우스' 행사에 참석한 전 세계 100여명의 개발자들에게 핀포인트 프로젝트의 비전을 설명하고 있다.[사진=네이버 제공]

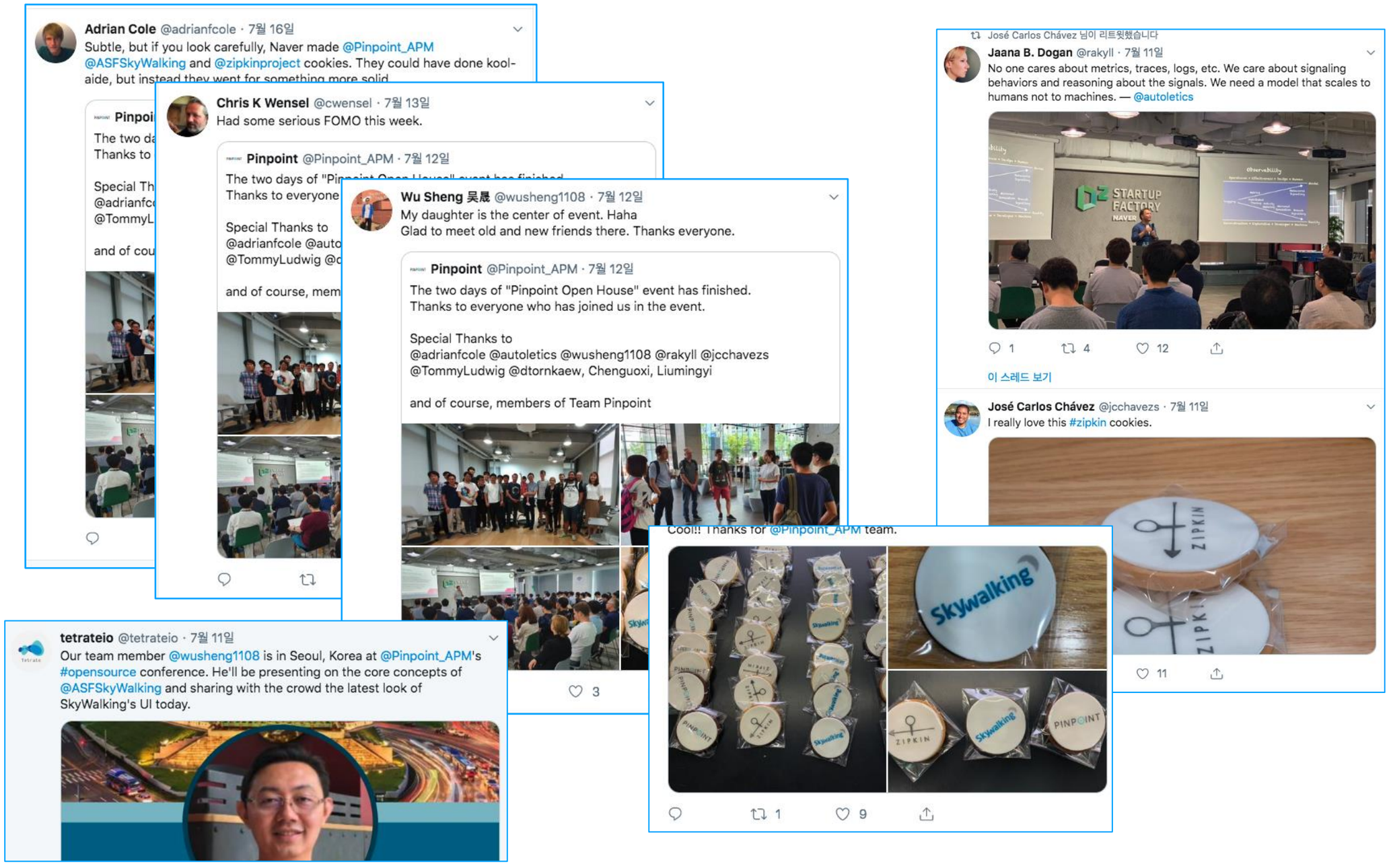
네이버가 글로벌 IT 기업이 추진 중인 '오픈소스 혁신' 전략에 본격적으로 동참한다.

오픈소스란 기업의 기술 자산을 외부에 공개하는 것을 말한다. 구글, 마이크로소프트, 아마존 등 글로벌 IT 기업들은 10여년 전부터 기초 기술을 오픈소스로 공개하고, 고급 기술이나 기술 자문을 클라우드에서 제공함으로써 시장 규모를 확대하고 기업 고객을 확보하는 정책을 추진하고 있다. 세 회사가 전 세계 시총 1위를 두고 접전을 펼칠 수 있었던 비결로 이렇게 시장 규모를 키우는 오픈소스 기반 사업 구조가 꼽힐 정도다.

지난 11일 네이버는 서울 강남구 D2 스타트업 팩토리에서 전 세계 오픈소스 개발자를 초청해 '핀포인트 오픈 하우스' 행사를 진행했다. 행사에는 네이버가 만든 오픈소스 APM(앱 상황 모니터링) 소프트웨어(SW) '핀포인트(Pinpoint)'를 포함해 '집킨(Zipkin)', '스카이워킹(Skywalking)' 등 전 세계 주요 오픈소스 APM 개발자와 국내

NAVER

Open source Pinpoint



Open source Pinpoint

Open source Pinpoint

Open source Pinpoint

Pinpoint Demo

http://125.209.240.10:10123/#/main/ApiGateway@SPRING_BOOT/5m/2020-02-14-14-03-29

Installing Pinpoint

Pinpoint Agent 만 붙이면 끝!

- javaagent: /pinpoint-agent/pinpoint-bootstrap-1.8.0.jar
- Dpinpoint.agentId=${PINPOINT_AGENT_ID}
- Dpinpoint.applicationName=${PINPOINT_APPLICATION_NAME}

참고 링크

Registry :

https://registry.navercorp.com/webapp/#/artifacts/browse/tree/General/pinpoint/naver-agent

Guide :

https://yobi.navercorp.com/pinpoint/posts/184

http://naver.github.io/pinpoint/

roy.kim@navercorp.com