

Tech Share Program

PINPOINT

김성욱 / Observability Platform

Index

- What is an APM?
- Why need an APM?
- Features
- How does Pinpoint work?
- Open source Pinpoint
- Pinpoint Demo
- Installing Pinpoint

What is an APM?

Wikipedia

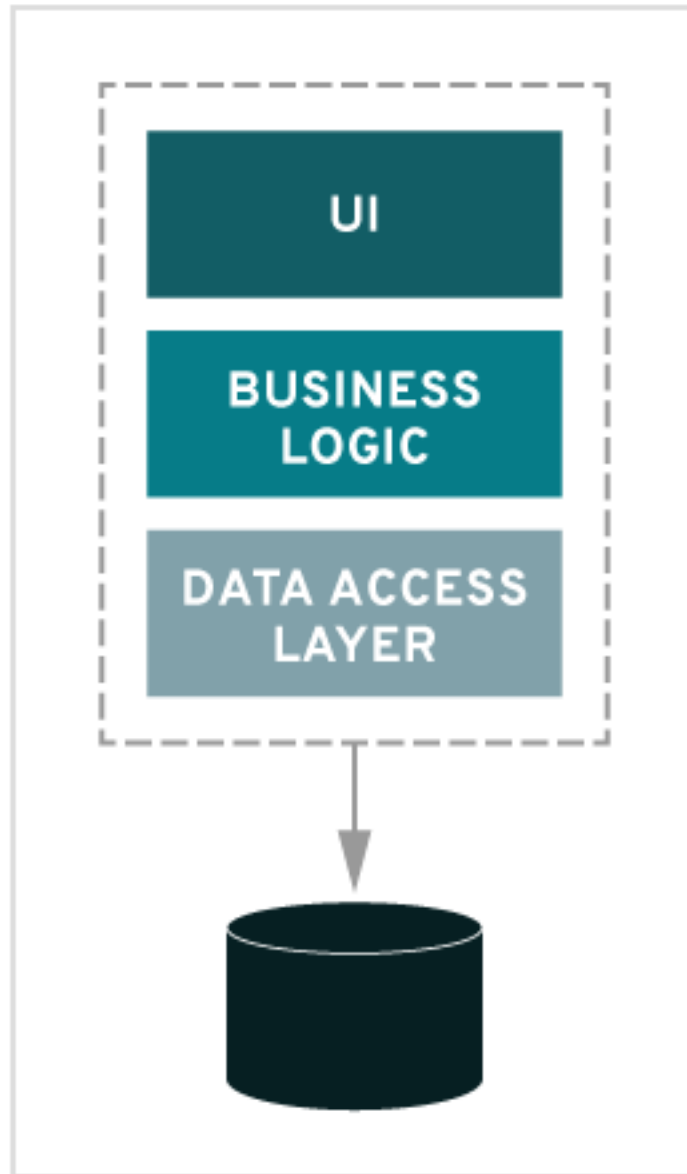
Application Performance Management (APM) is the monitoring and management of performance and availability of software applications.

Pinpoint Github

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

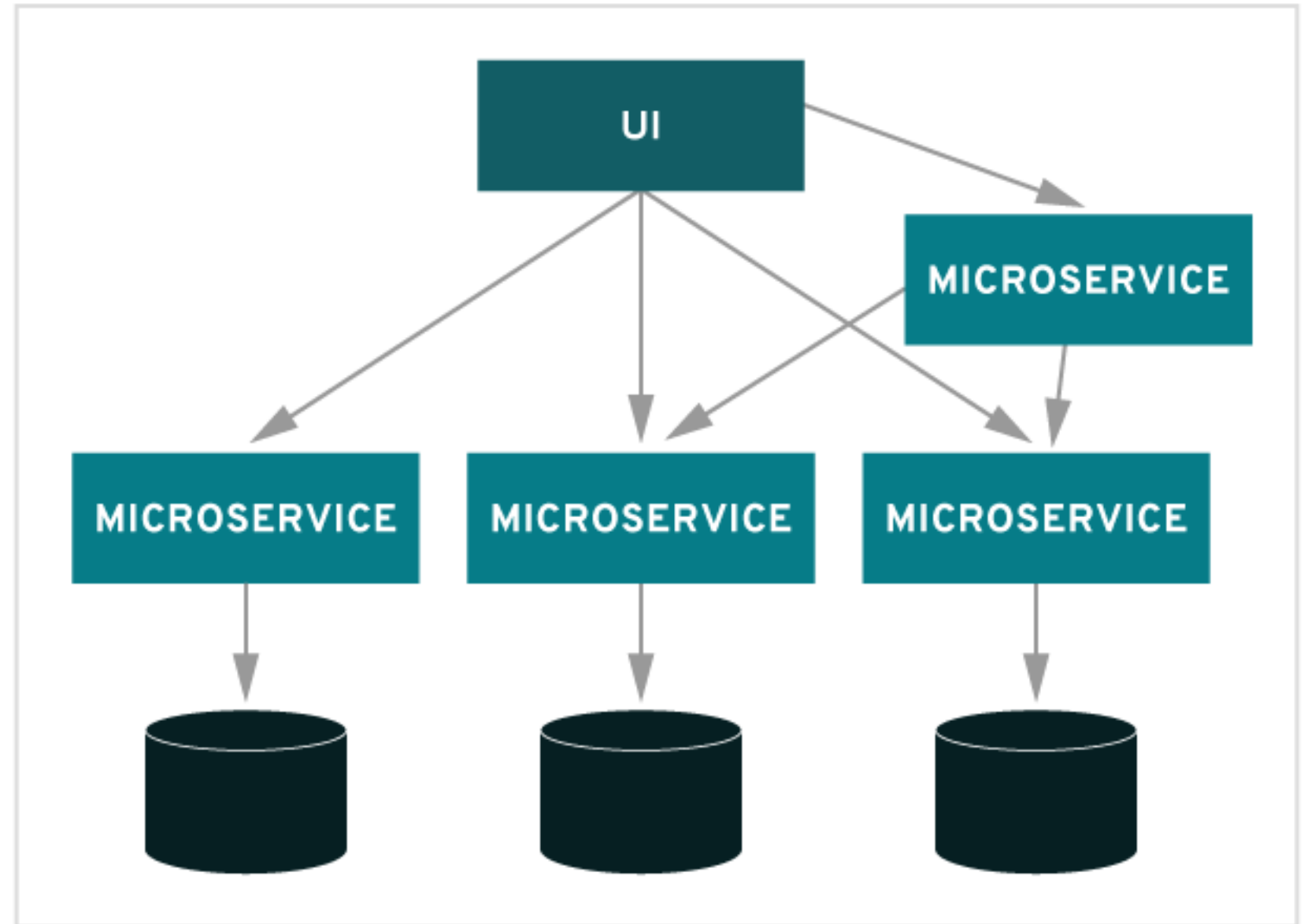
Why need an APM?

MONOLITHIC

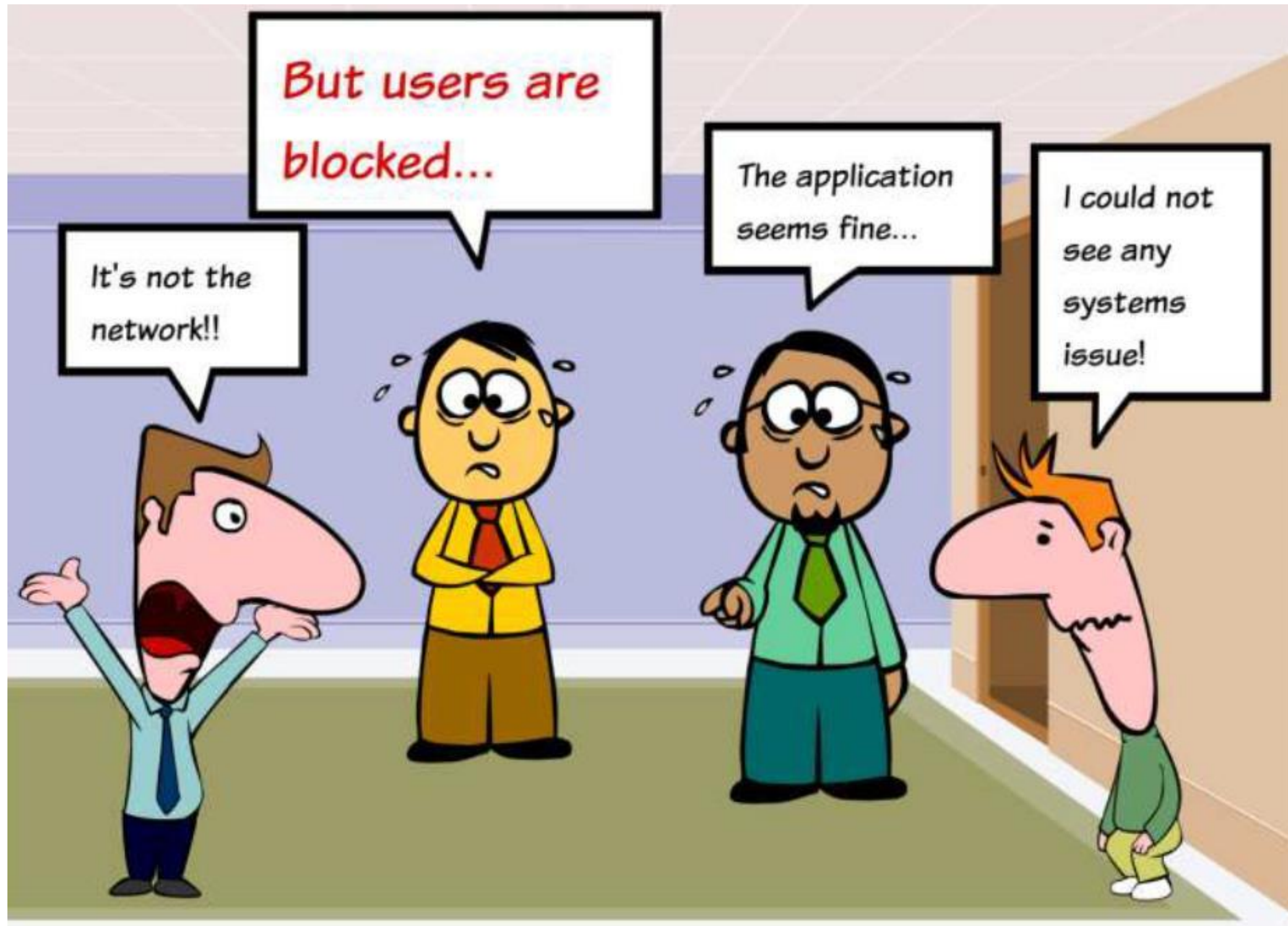


VS.

MICROSERVICES



Why need an APM?



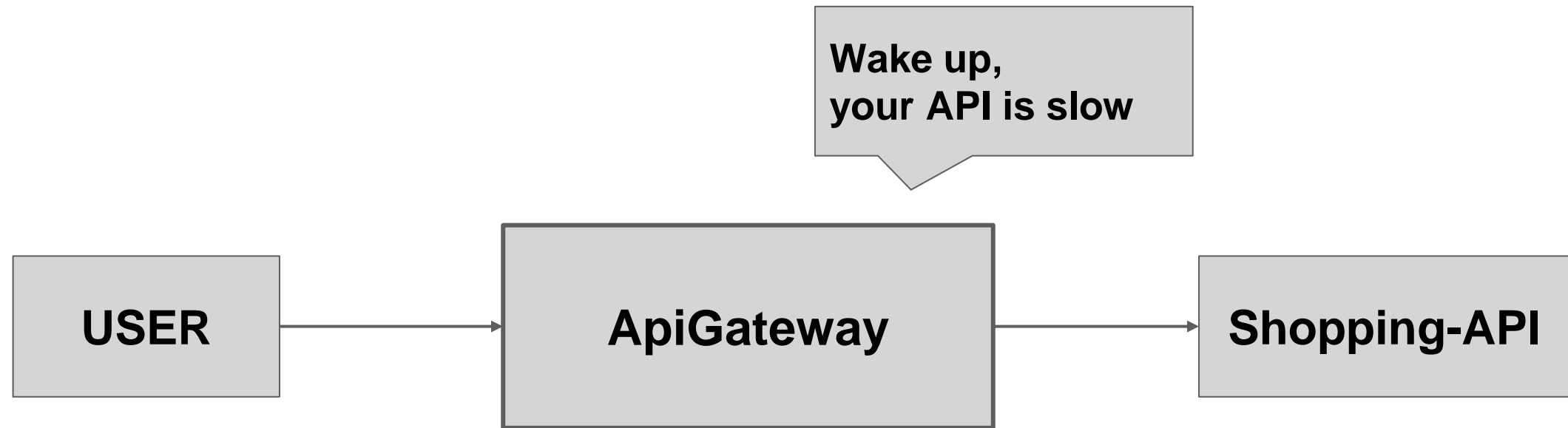
Why need an APM?

- 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?



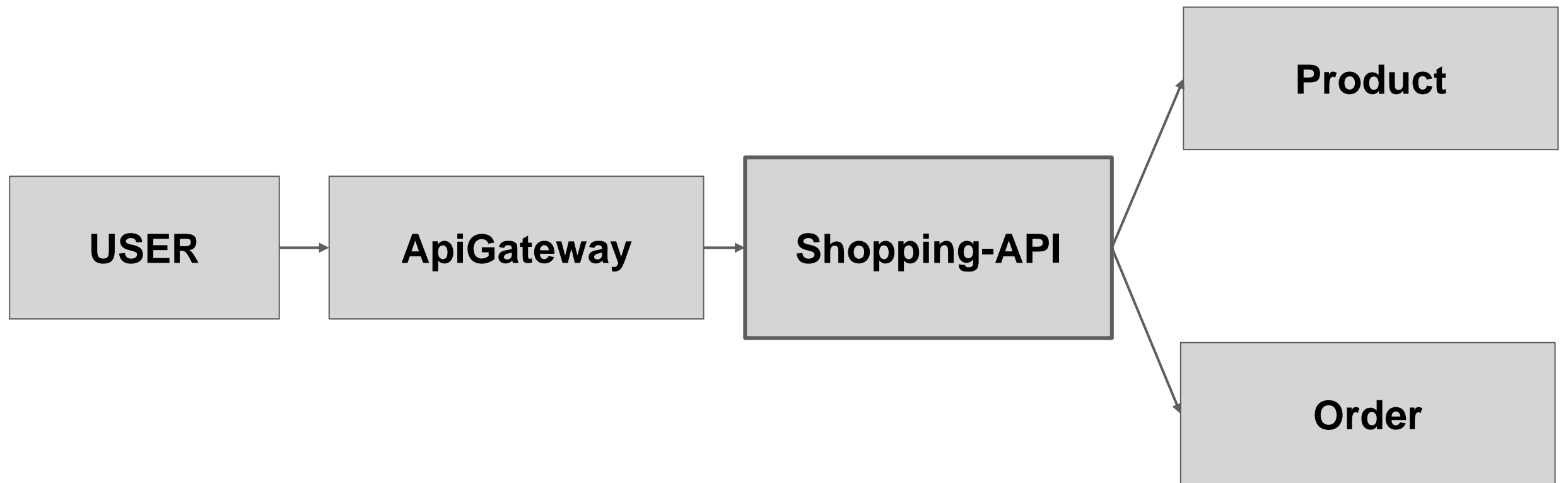
Why need an APM?



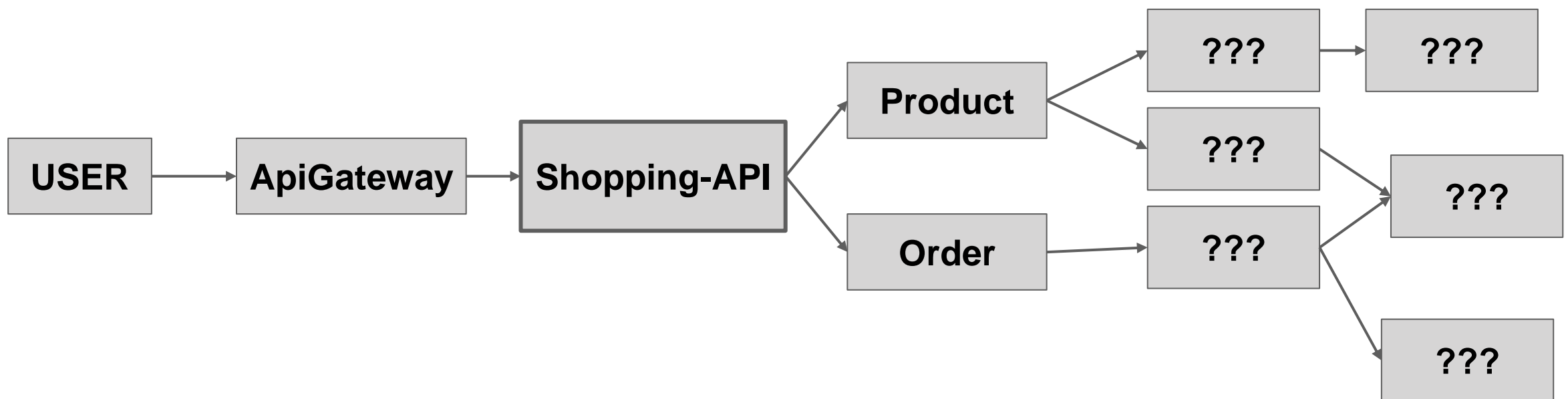
Why need an APM?

```
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[nio-8080-exec-9] o.s.web.client.RestTemplate : Accept=[application/json, application/*+json]
[nio-8080-exec-9] o.s.web.client.RestTemplate : Response 200 OK
[nio-8080-exec-9] o.s.web.client.RestTemplate : Reading to [java.util.List<com.navercorp.pinpoint.demo.commons.vo.product.ProductInfo>]
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[nio-8080-exec-1] : Completed 200 OK
[nio-8080-exec-1] : Response 200 OK
[nio-8080-exec-1] : Reading to [java.lang.Boolean]
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[nio-8080-exec-5] o.s.web.client.RestTemplate : Reading to [java.lang.Boolean]
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[nio-8080-exec-5] o.s.web.servlet.DispatcherServlet : Completed 200 OK
[nio-8080-exec-10] o.s.web.client.RestTemplate : Response 200 OK
[nio-8080-exec-10] o.s.web.client.RestTemplate : Reading to [java.lang.Boolean]
[nio-8080-exec-10] c.n.p.d.a.service.ShoppingServiceImpl : PATCH http://shopping.demo.pinpoint.com:8180/shopping/orders/30548a88-00a8-4f45-9f70-166c1afeb785 complete, took 9334ms
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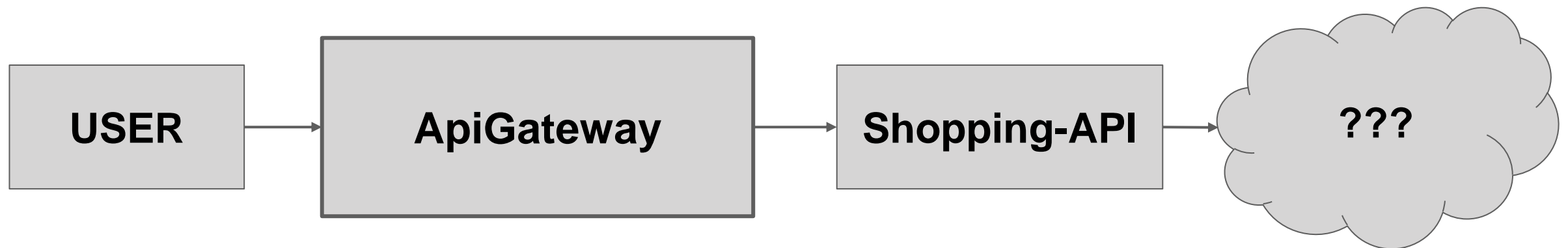
Why need an APM?



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](#)

PINPOINT

Bird Eye View

Finding Slow

Transactions

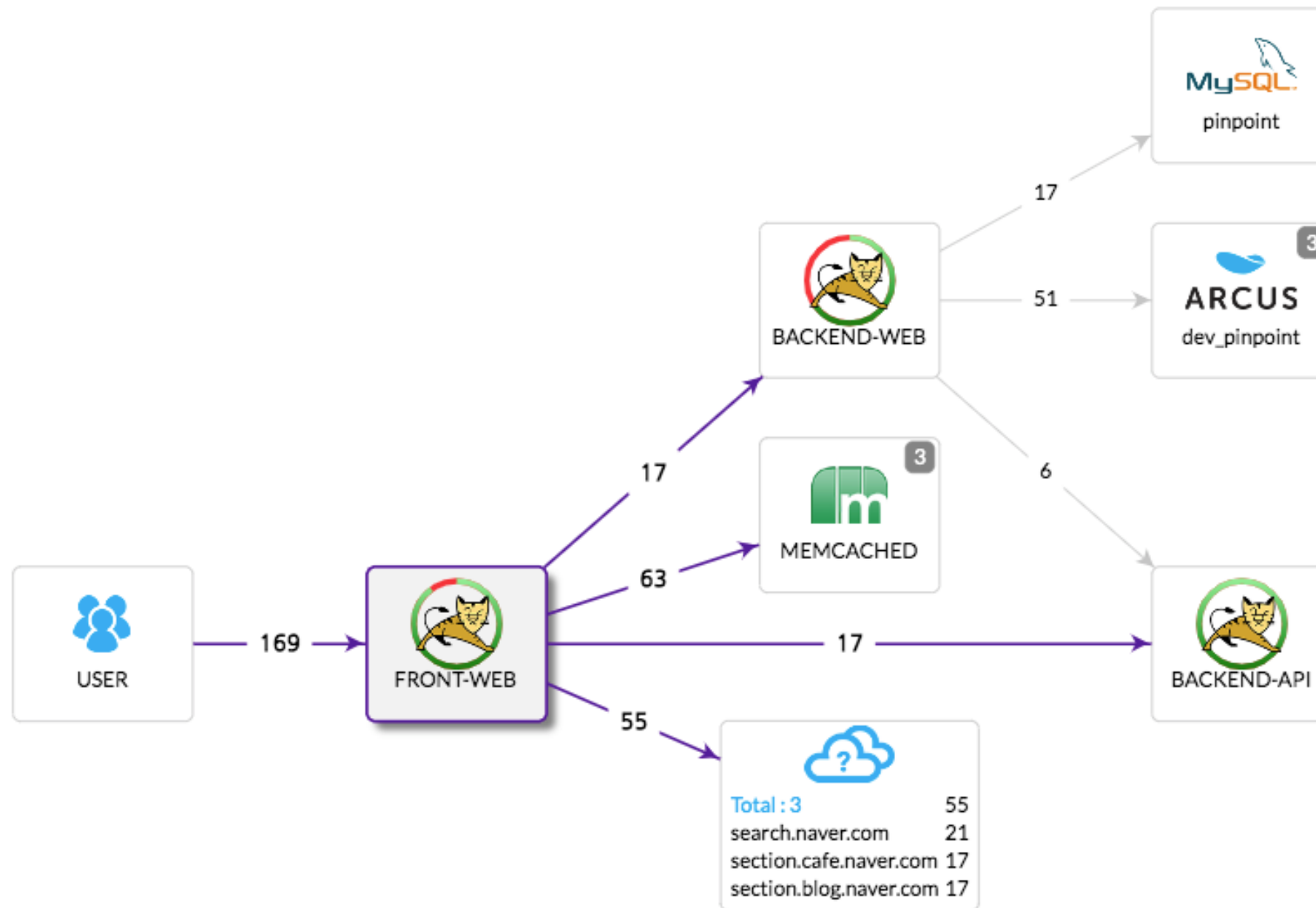
Distributed Tracing

DevOps

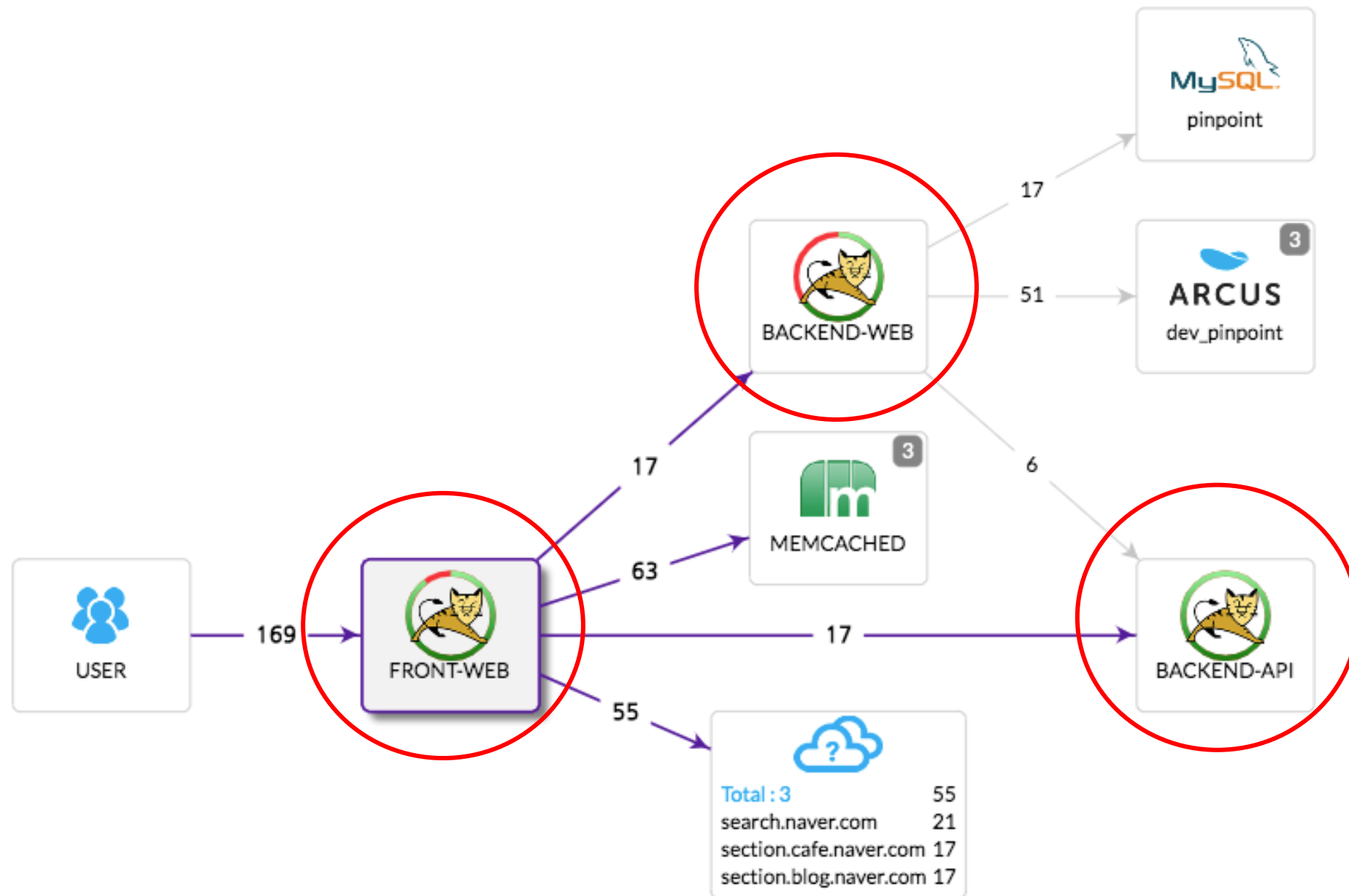
Scalable

Minimum Overload

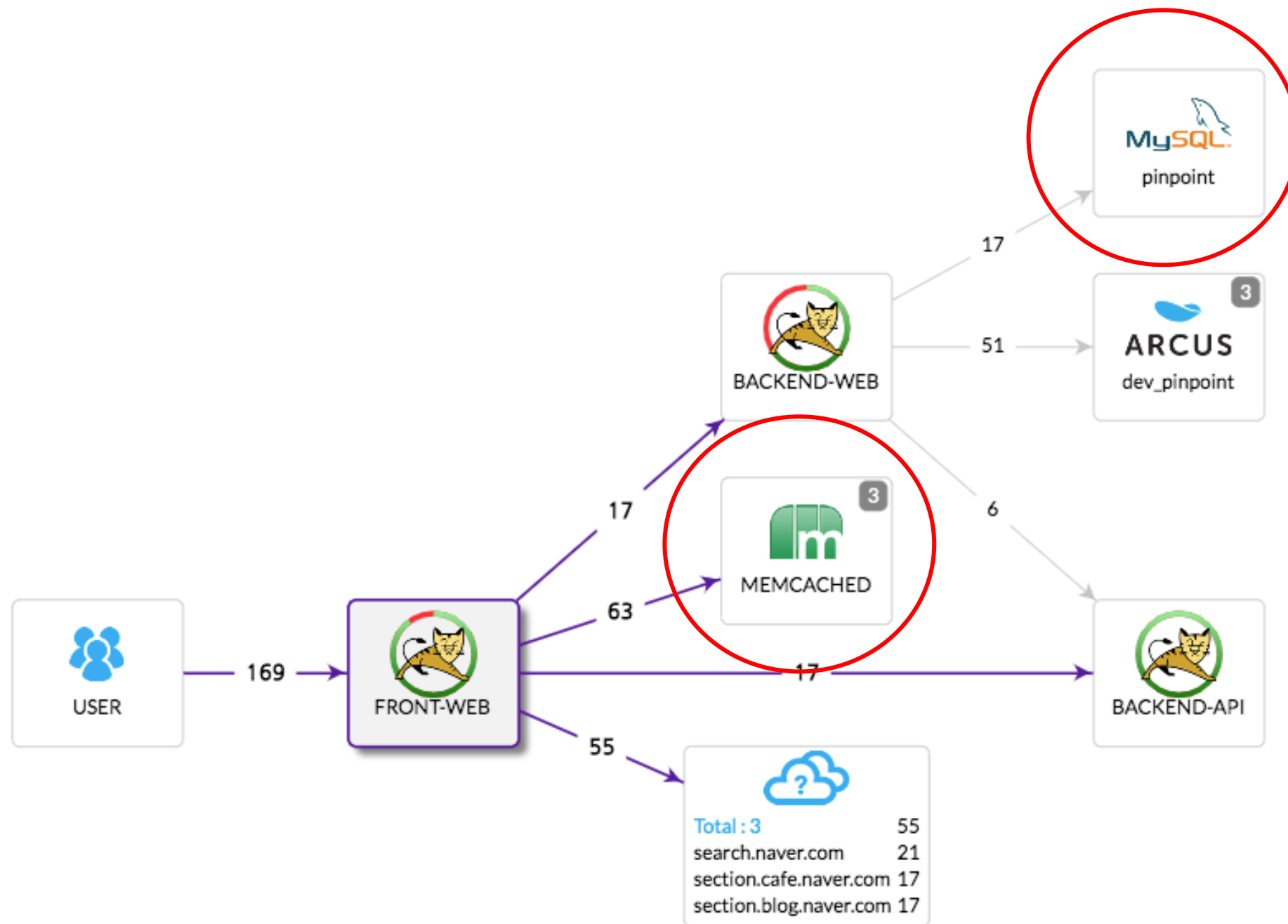
Features



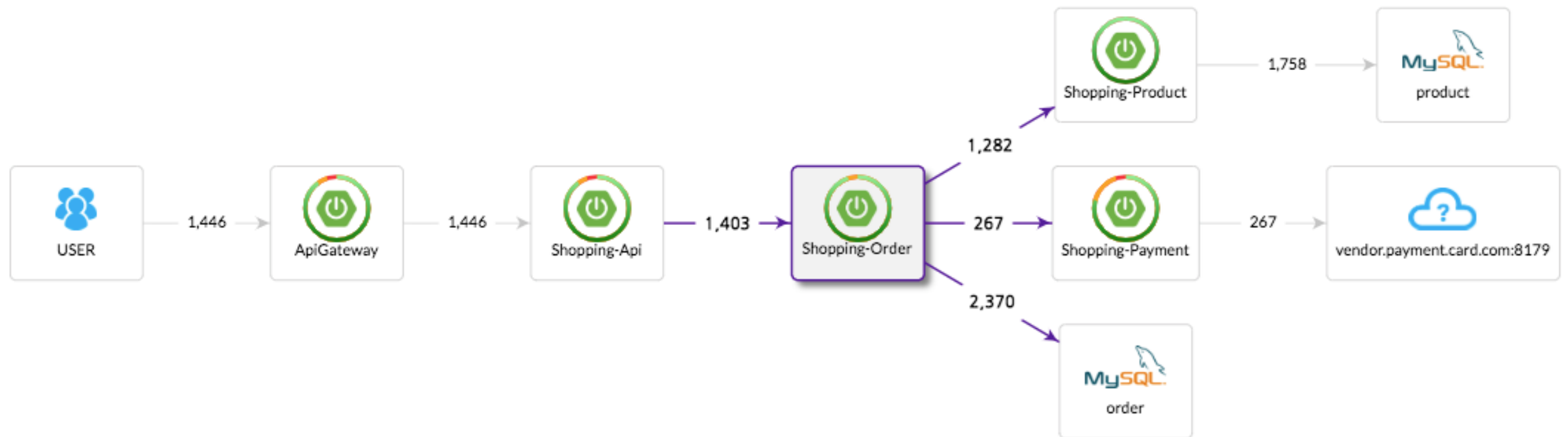
Features



Features



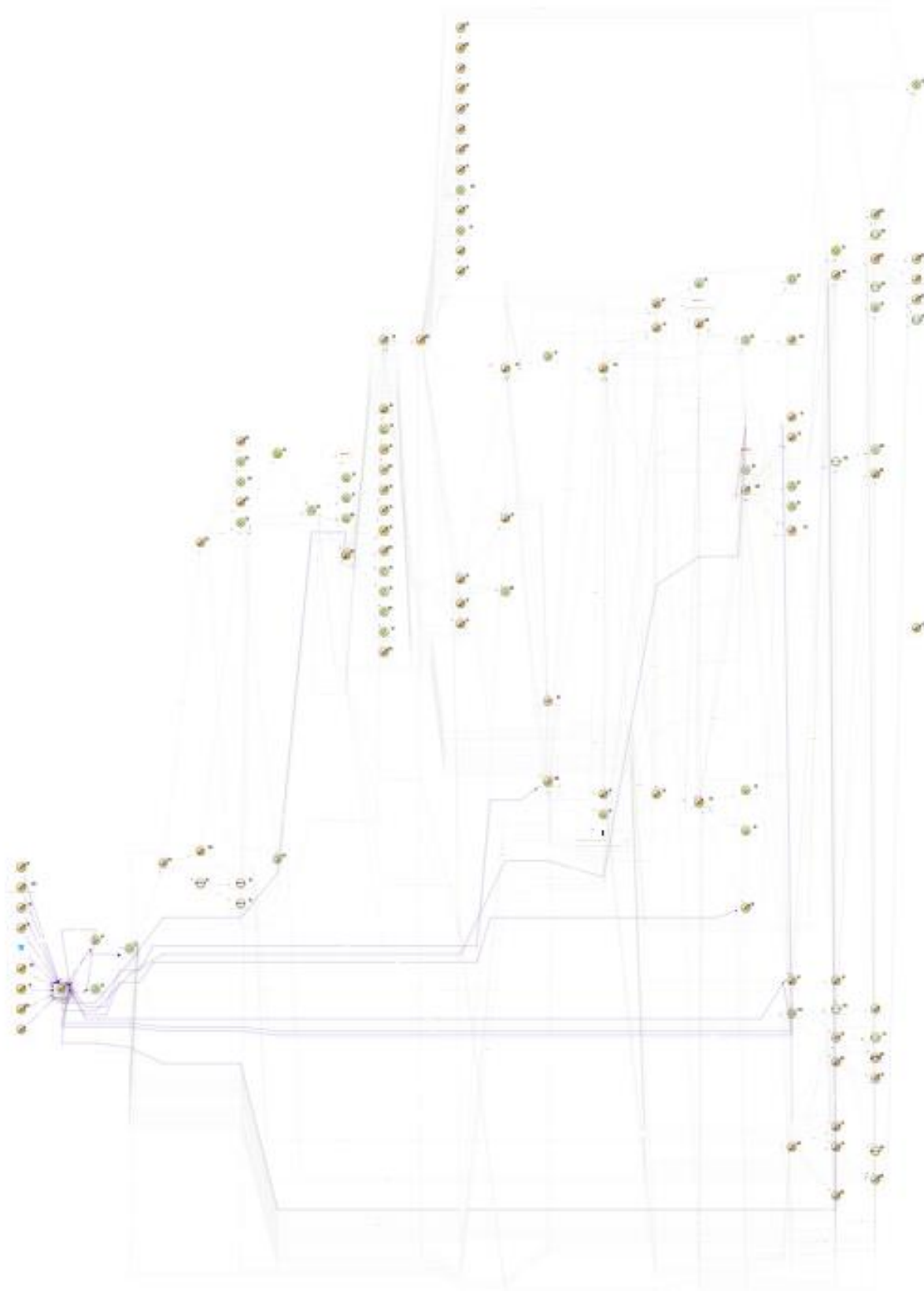
Features



Features



Features



PINPOINT

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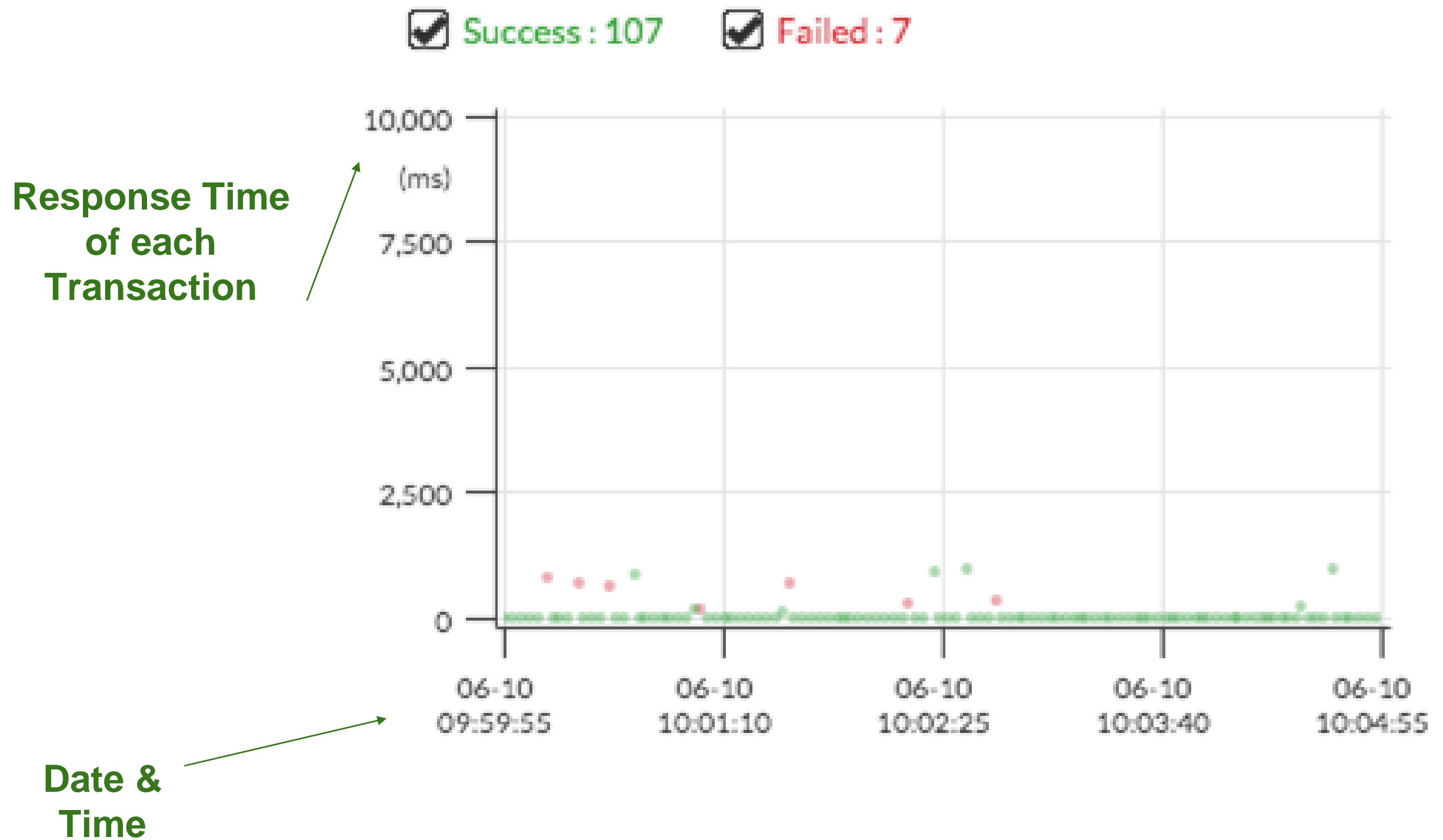
Distributed Tracing

DevOps

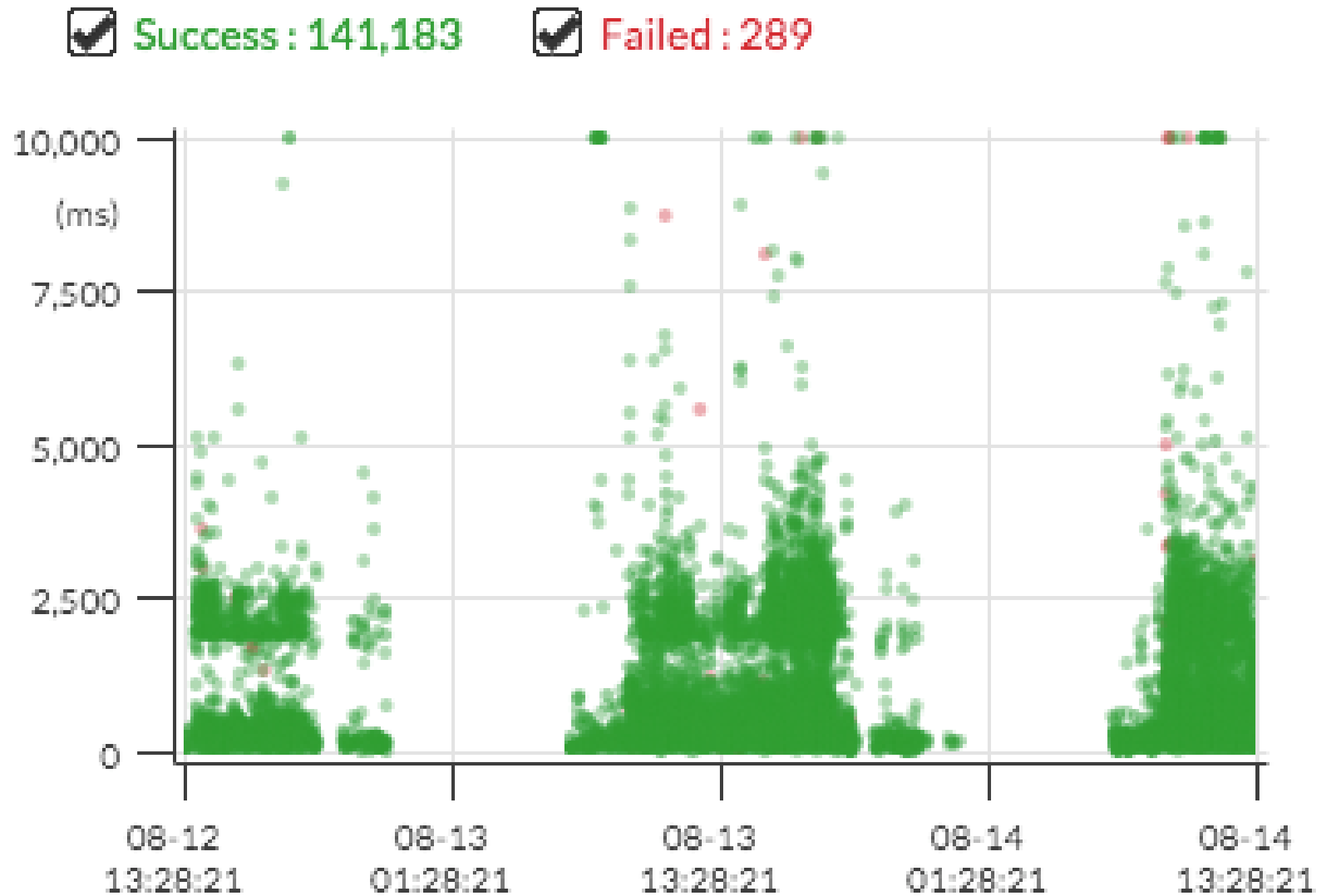
Scalable

Minimum Overload

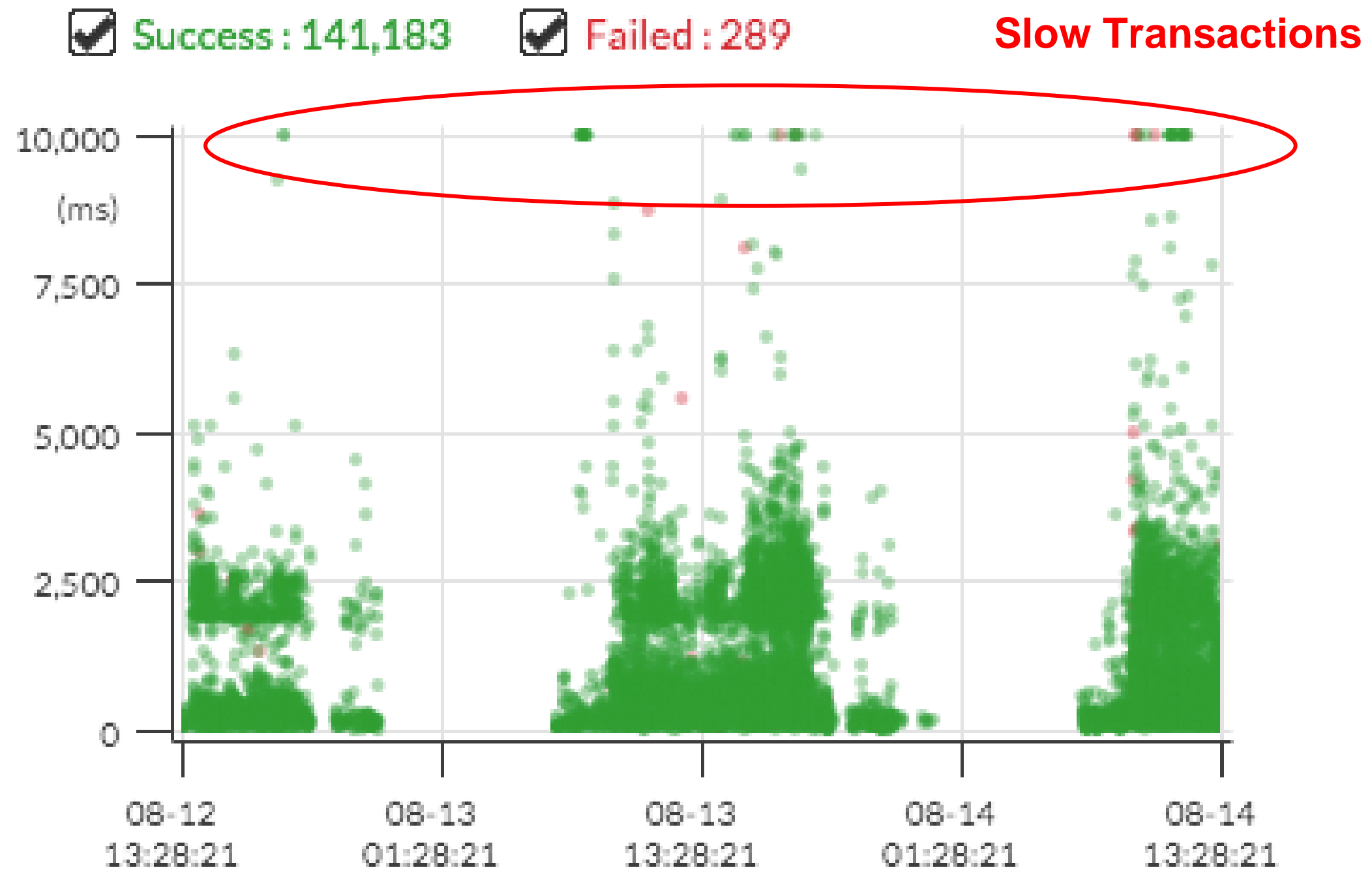
Features



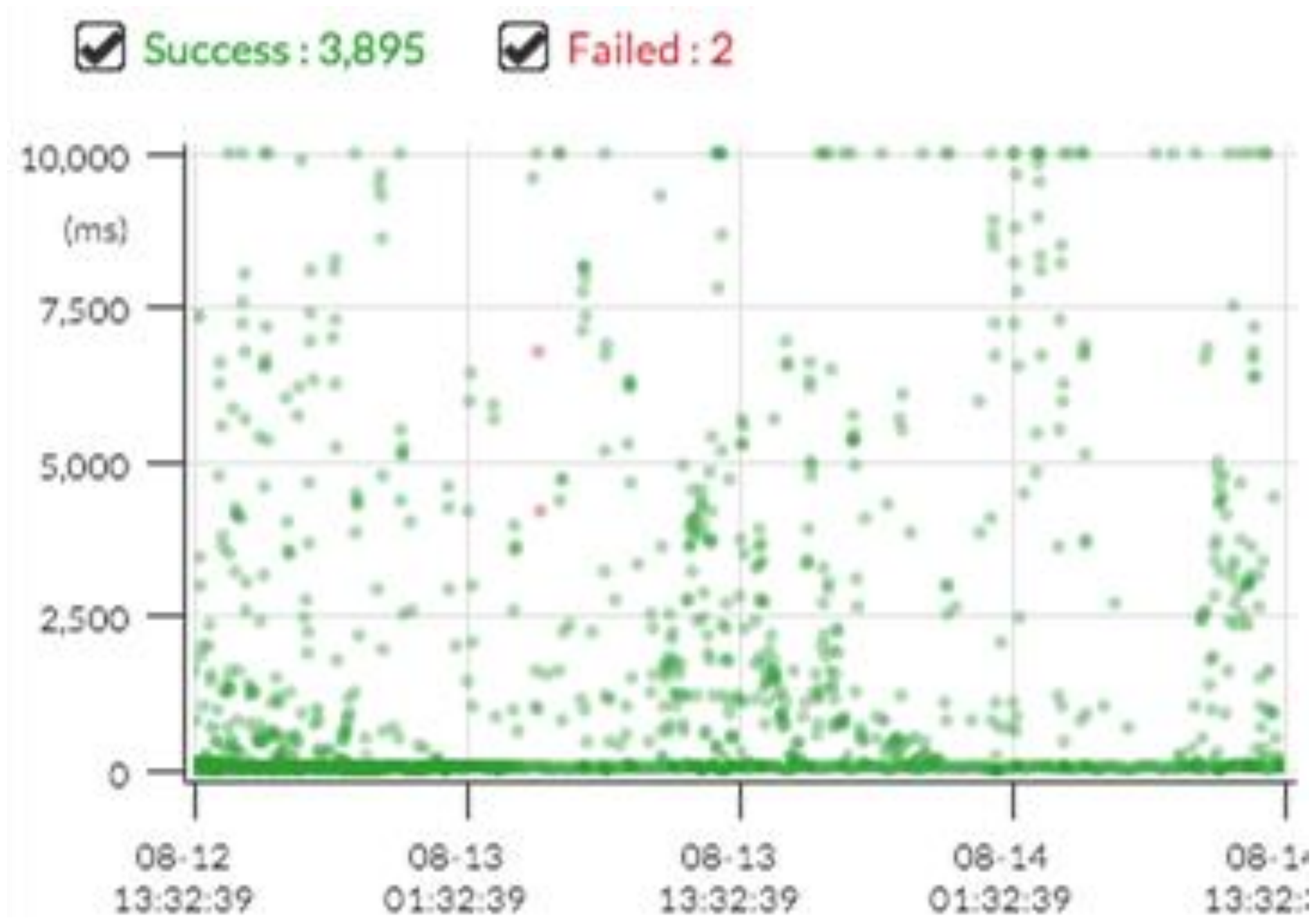
Features



Features

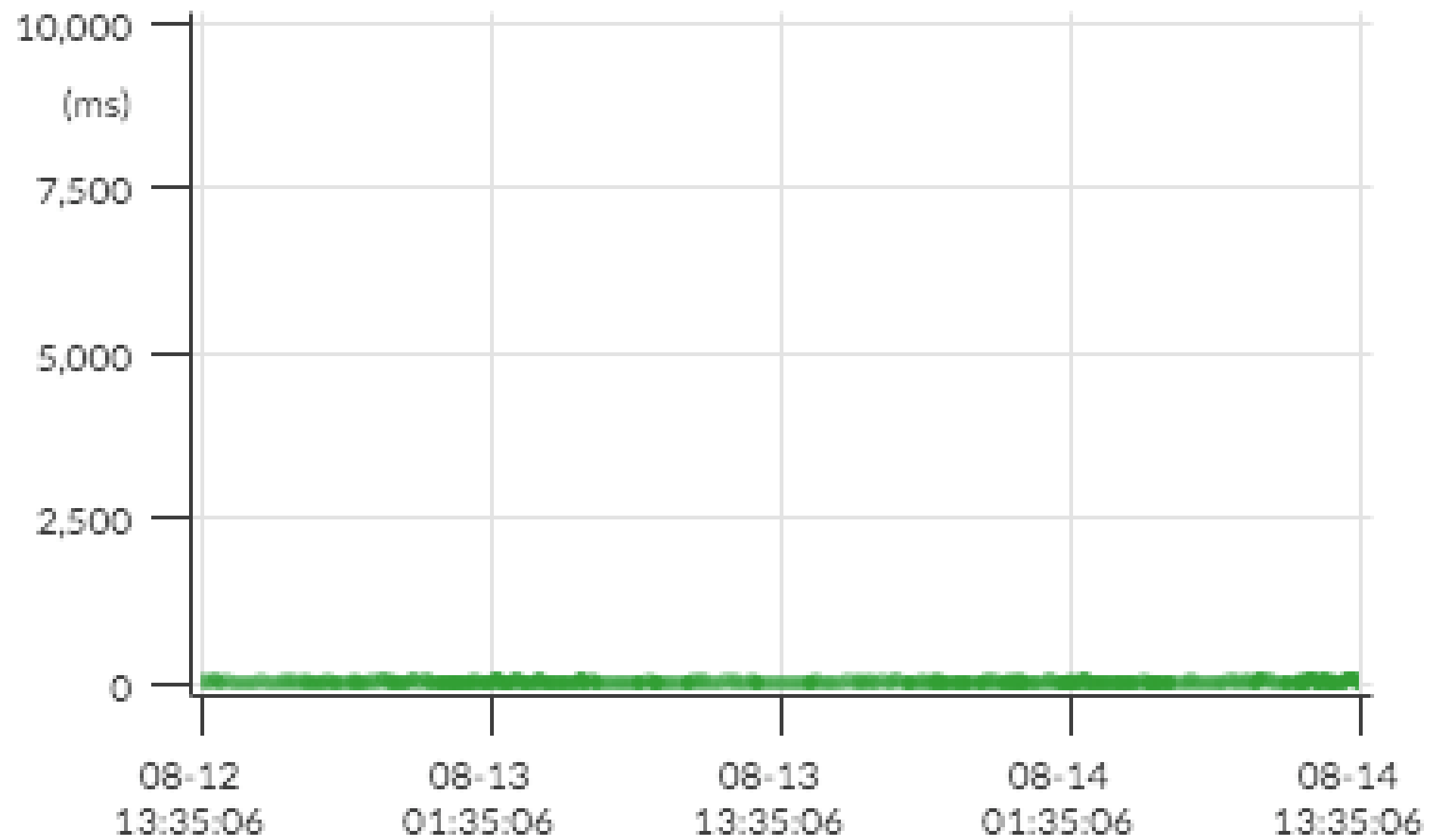


Features

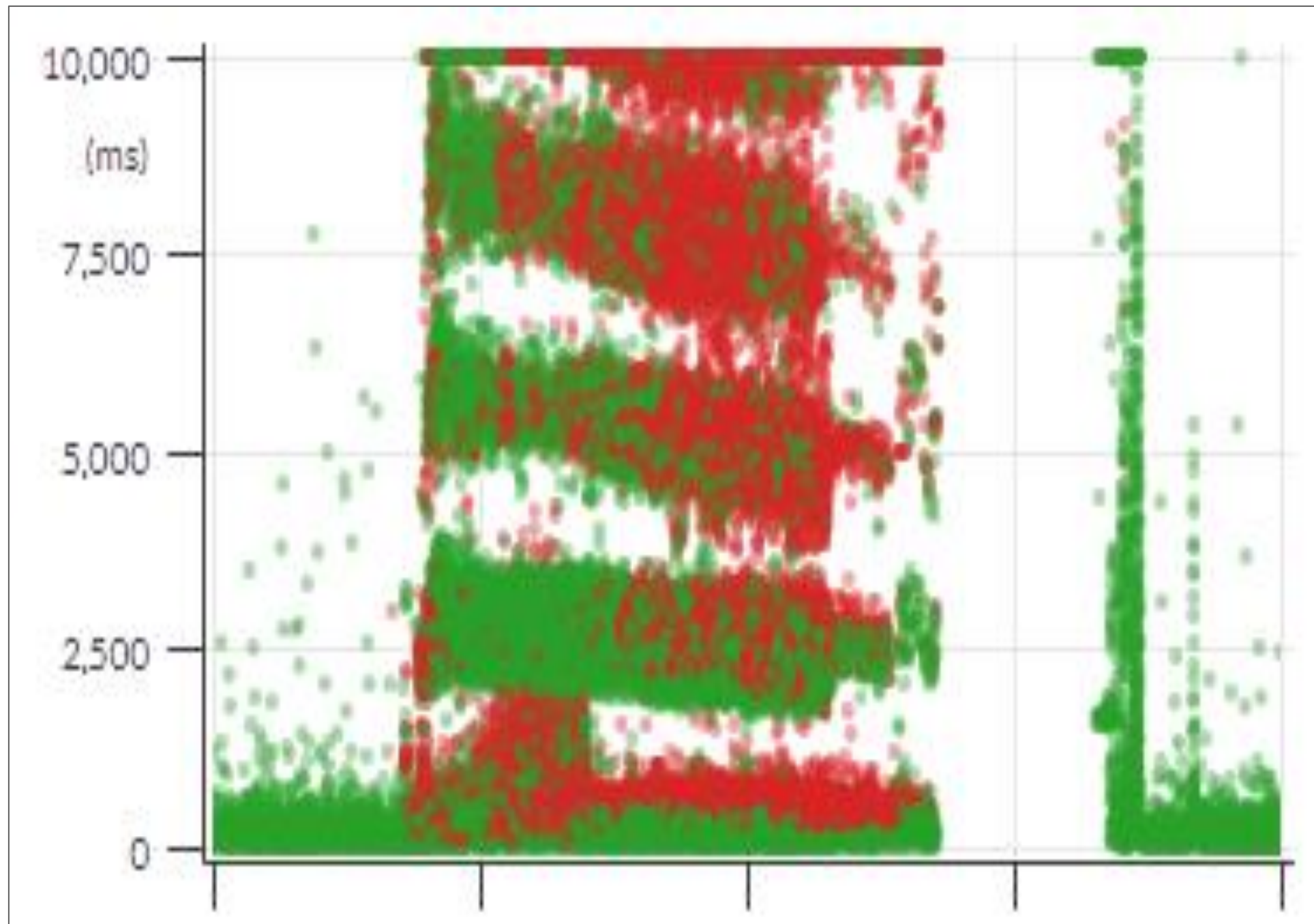


Features

☑ Success : 4,906 ☑ Failed : 0



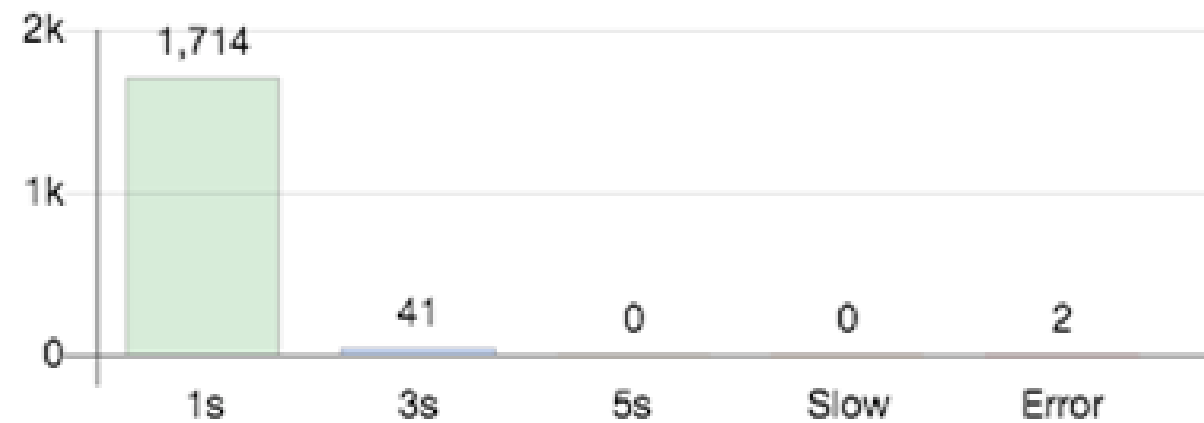
Features



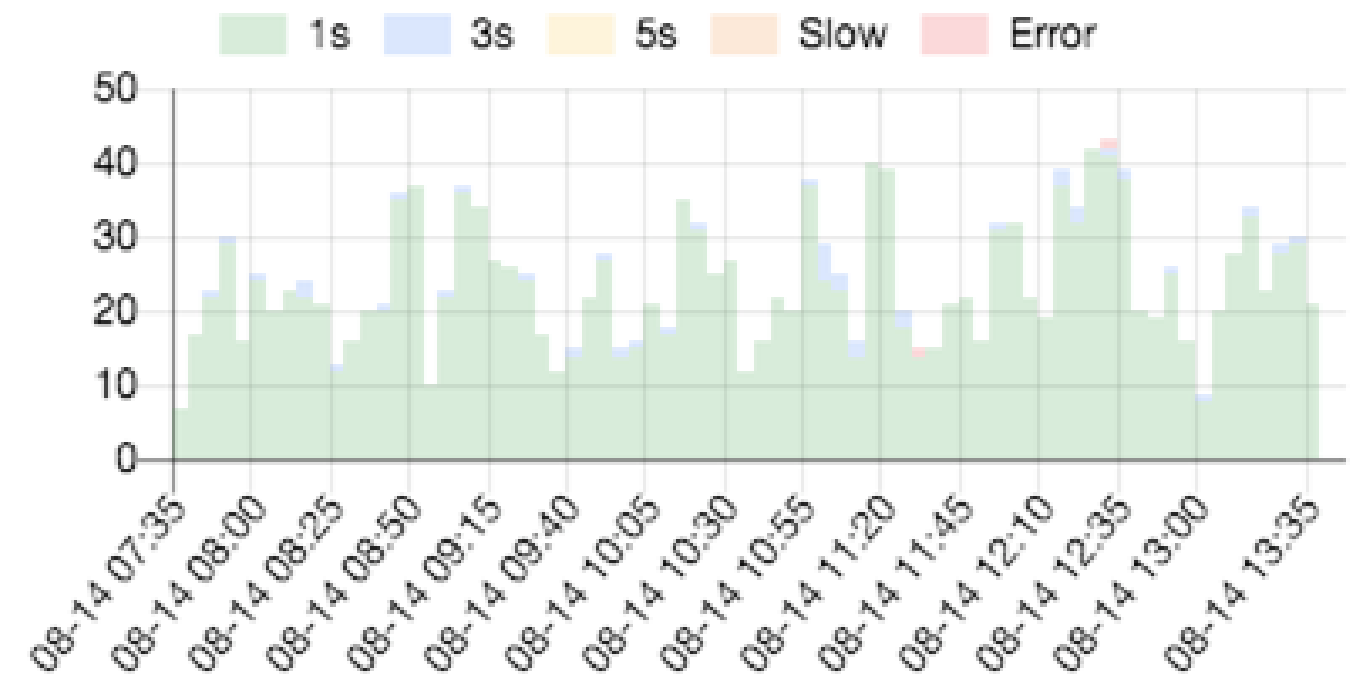
Features

- Response Summary chart
- Load chart

Response Summary



Load



PINPOINT

Bird Eye View

Finding Slow

Transactions

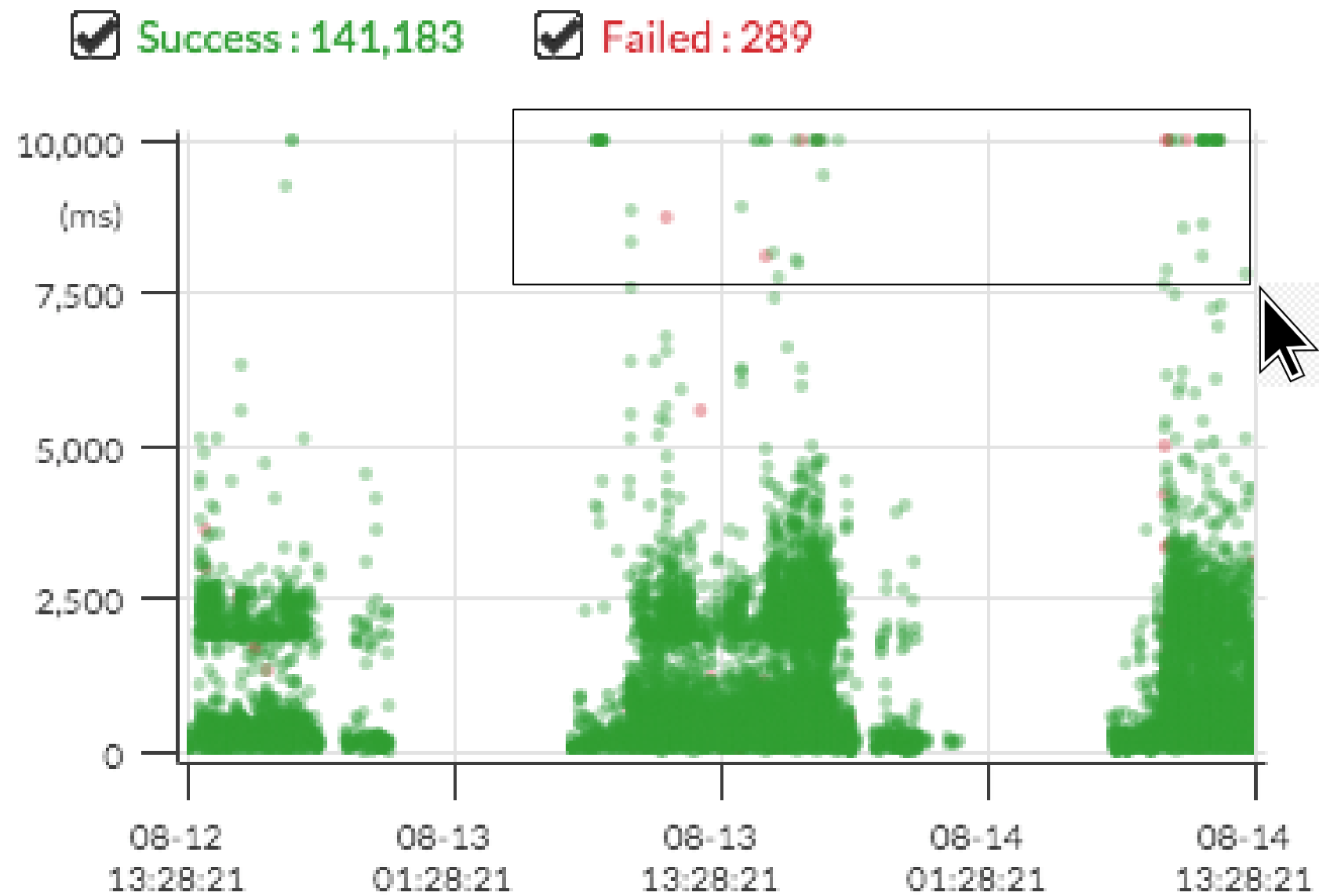
Distributed Tracing

DevOps

Scalable

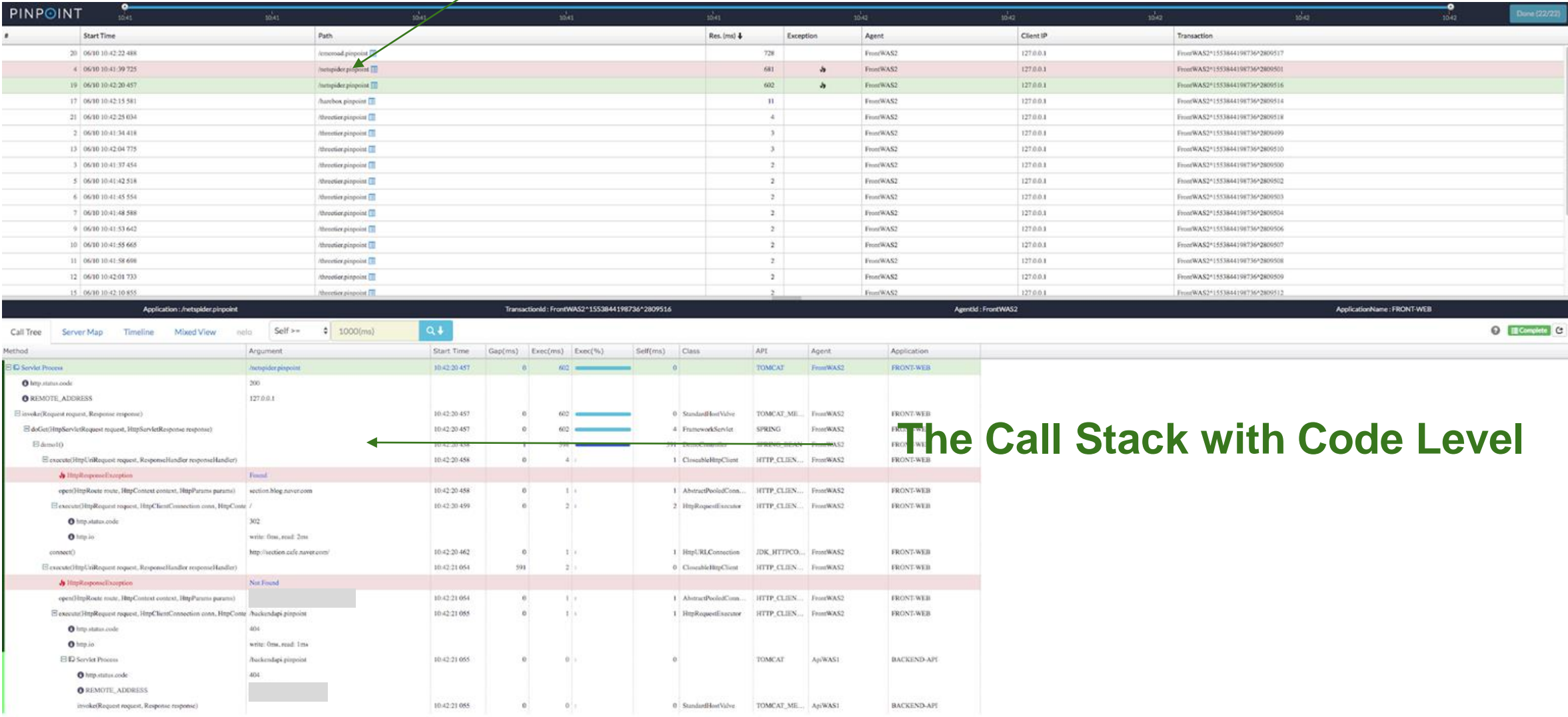
Minimum Overload

Features

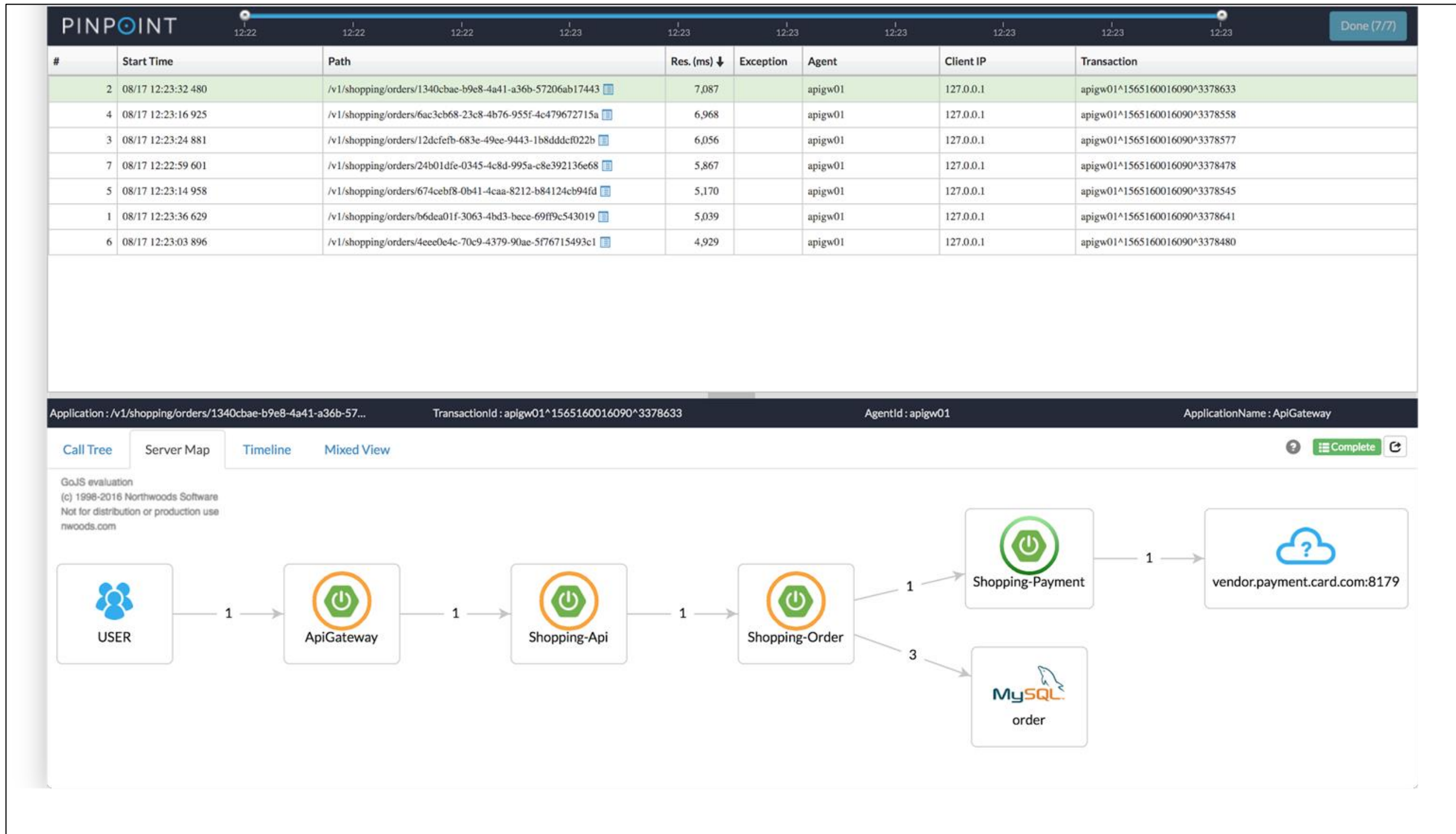


Features

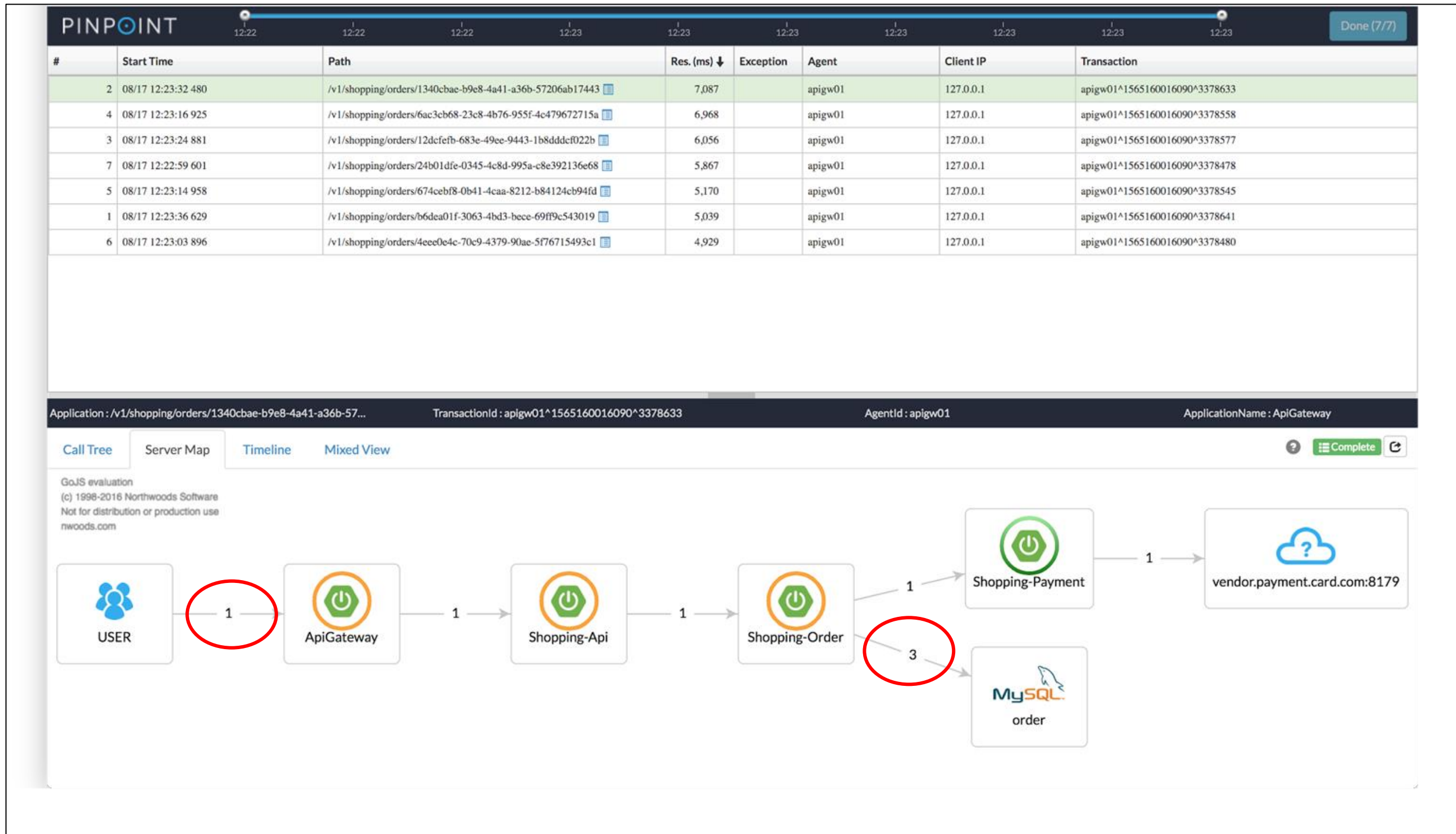
List of Selected Transaction



Features



Features



Features

PINPOINT

12:2512:2512:2512:2512:2512:2512:2512:2512:25

Done (4/4)

#	Start Time	Path	Res. (ms) ↓	Exception	Agent	Client IP	Transaction
1	08/17 12:25:28 258	/pay/2a0ebb05-5156-480f-adb5-f0f8909487c4	905		shopping.payment01	127.0.0.1	apigw01^1565160016090^3379193
3	08/17 12:25:25 601	/pay/cc602614-755d-4188-a3a9-eb1da09592a4	862		shopping.payment01	127.0.0.1	apigw01^1565160016090^3379157
4	08/17 12:25:25 317	/pay/3f16458a-b97a-4e28-8538-15c146a42d2a	856		shopping.payment01	127.0.0.1	apigw01^1565160016090^3379127
2	08/17 12:25:27 346	/pay/3ae5e7c2-ecf6-4690-b513-5f35e121398f	840		shopping.payment01	127.0.0.1	apigw01^1565160016090^3379187

Application : /pay/3f16458a-b97a-4e28-8538-15c146a42d2aTransactionId : apigw01^1565160016090^3379127AgentId : shopping.payment01ApplicationName : Shopping-Payment

Call TreeServer MapTimelineMixed View

Self >=1000(ms)

Q↓

Complete

Shopping-Order/SPRING_BEAN(858ms)(↔ 4ms)

Shopping-Order/JDK_HTTPCONNECTOR(1ms)(↔ 4ms)

Shopping-Payment/TOMCAT(856ms)(↔ 6ms)

Shopping-Payment/TOMCAT_METHOD(856ms)(↔ 6ms)

Shopping-Payment/SPRING(856ms)(↔ 6ms)

Shopping-Payment/SPRING_BEAN(855ms)(↔ 6ms)

Shopping-Payment/SPRING_BEAN(855ms)(↔ 6ms)

Shopping-Payment/OK_HTTP_CLIENT(855ms)(↔ 6ms)

Shopping-Payment/OK_HTTP_CLIENT(855ms)(↔ 6ms)

↔ 862ms Shopping-Order/SPRING_BEAN(5002ms)

↔ 862ms Shopping-Order/MYBATIS(5002ms)

↔ 862ms Shopping-Order/MYSQL(order)(0ms)

↔ 862ms Shopping-Order/MYSQL(order)(5002ms)

↔ 5864ms Shopping-Order/MYSQL(order)(0ms)

↔ 5864ms Shopping-Order/MYSQL(order)(0ms)

↔ 5864ms Shopping-Order/MYSQL(order)(1ms)

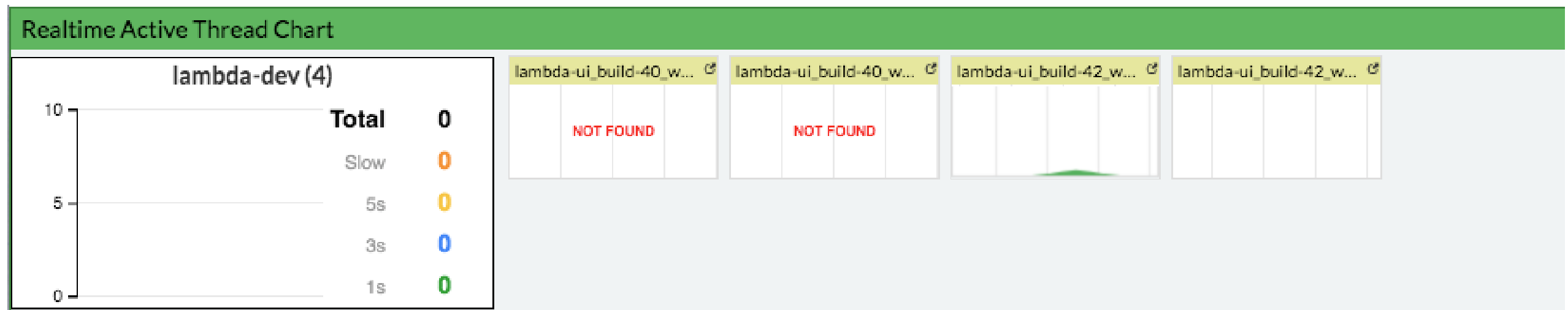
↔ 5865ms Shopping-Order/HIKARICP(0ms)

NAVER

PINPOINT

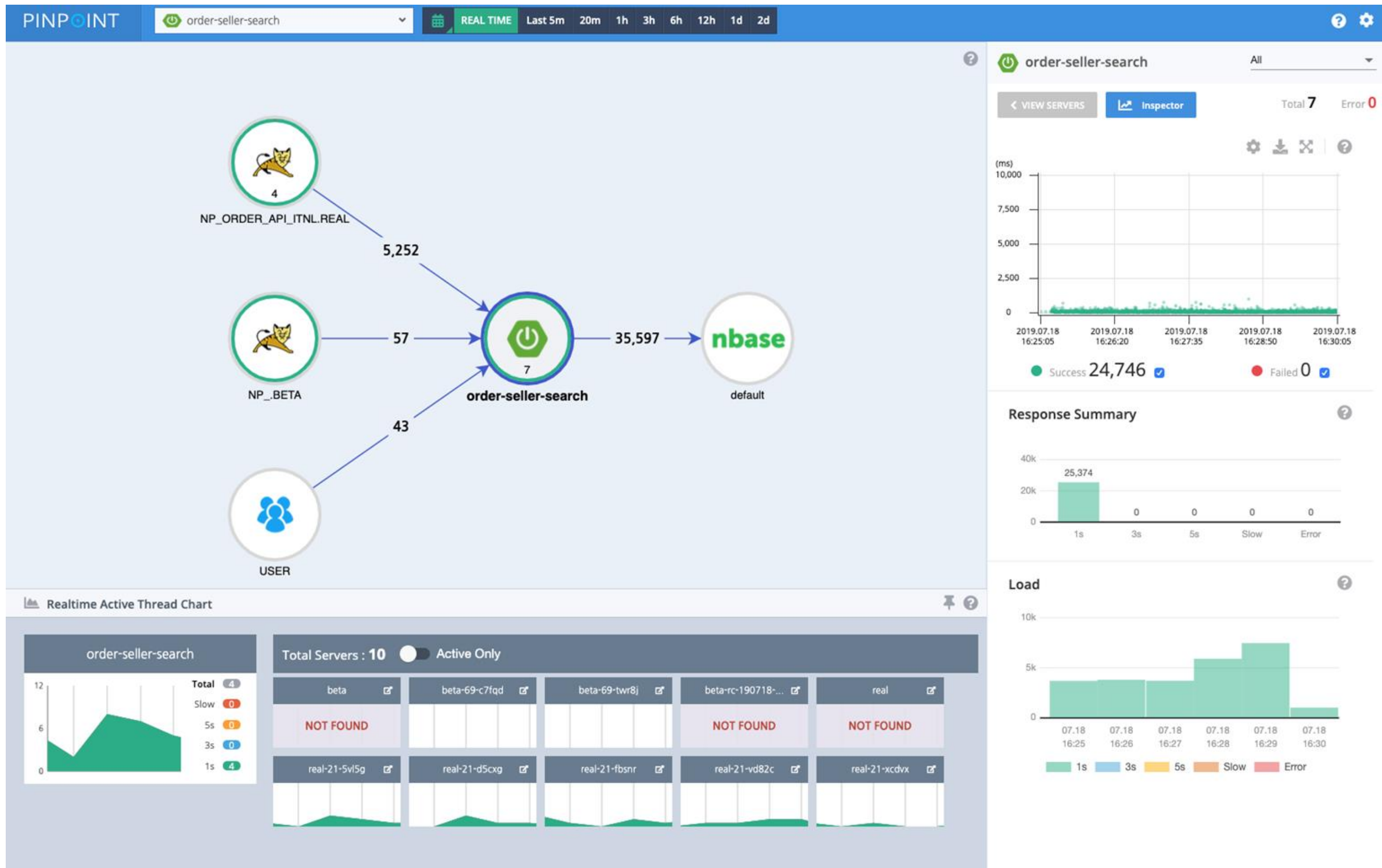
Bird Eye View
Finding Slow
Transactions
Distributed Tracing
DevOps
Scalable
Minimum Overload

Features



Can be used as HealthCheck

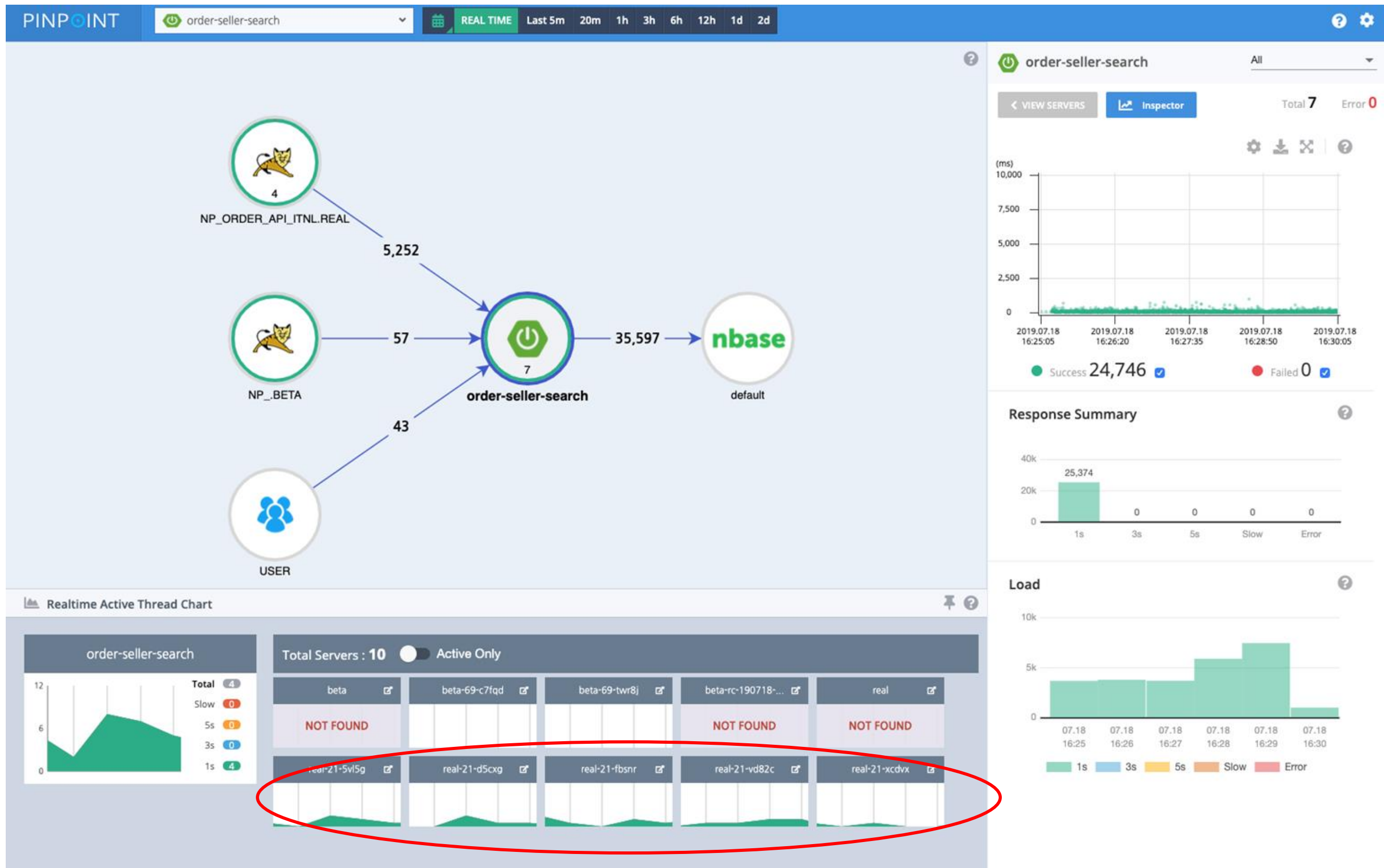
Features



Features



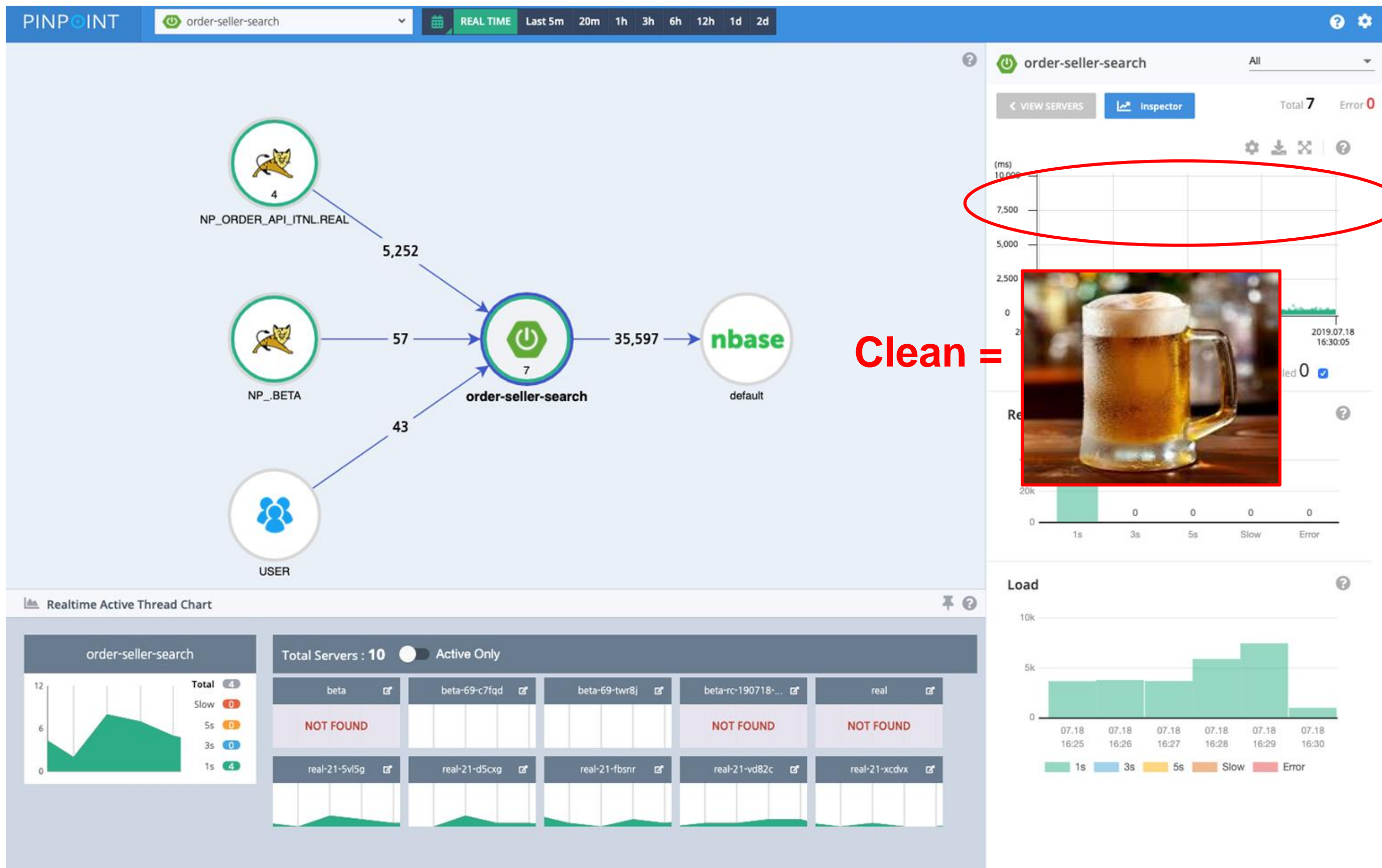
Features



Features



Features



Features

Basic Info of the Instance



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

PINPOINT

Bird Eye View

Finding Slow

Transactions

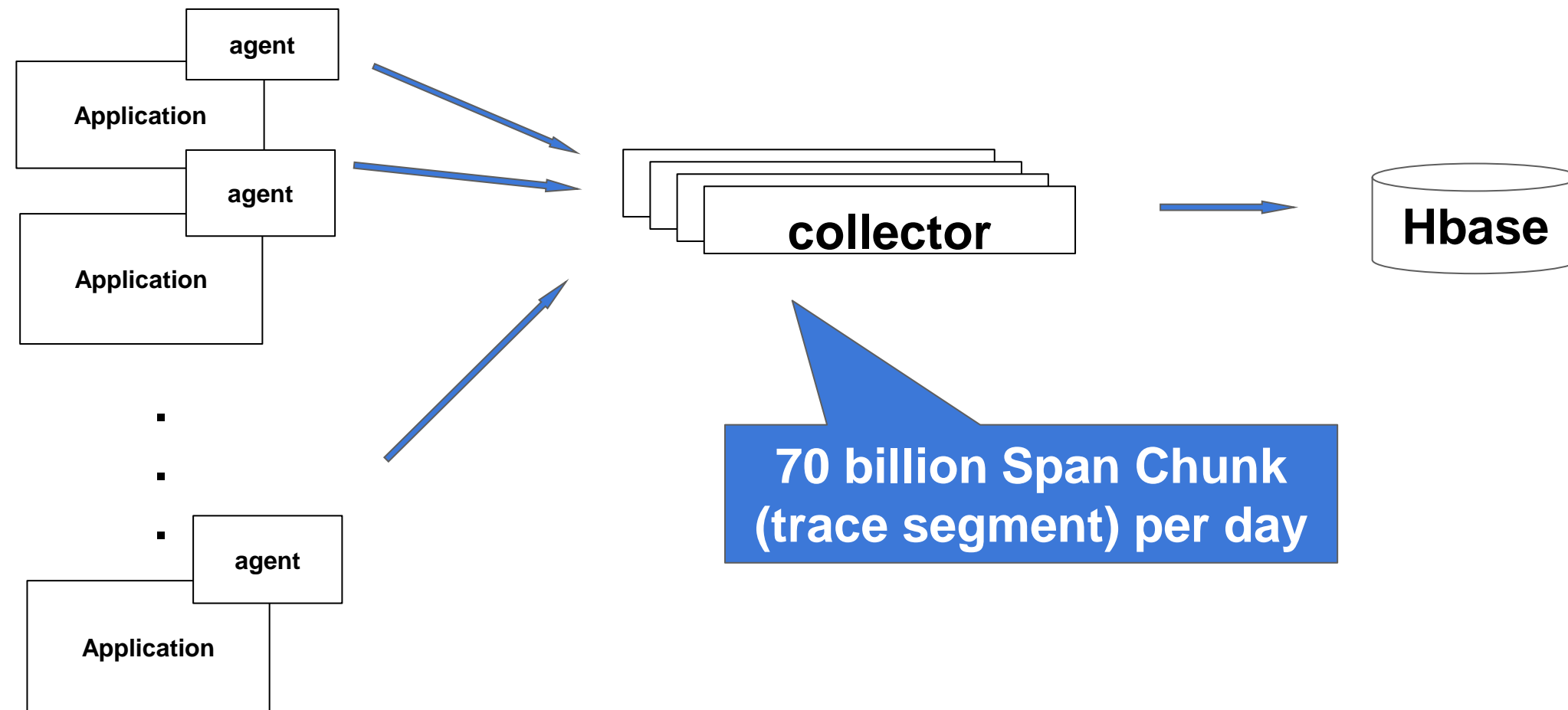
Distributed Tracing

DevOps

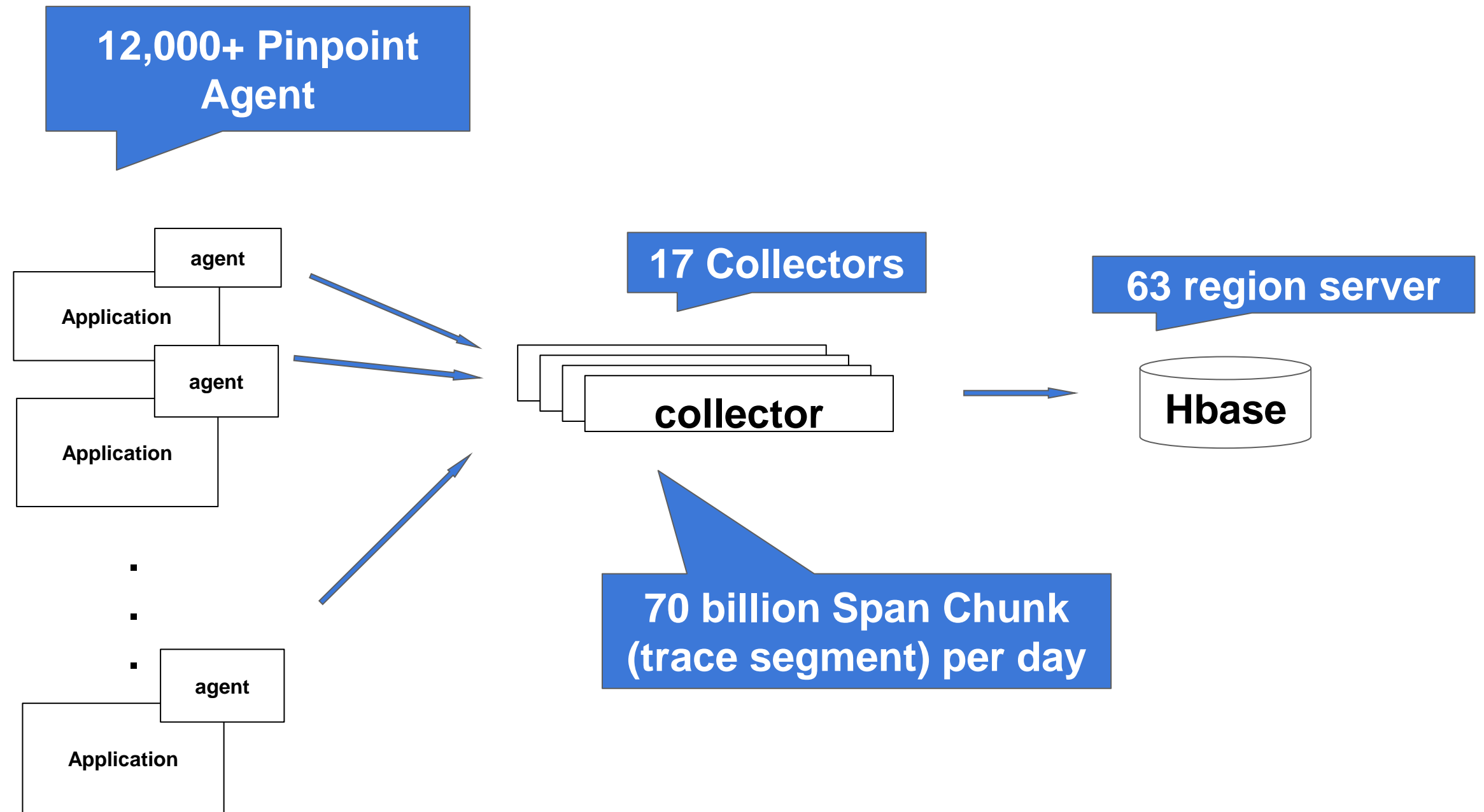
Scalable

Minimum Overload

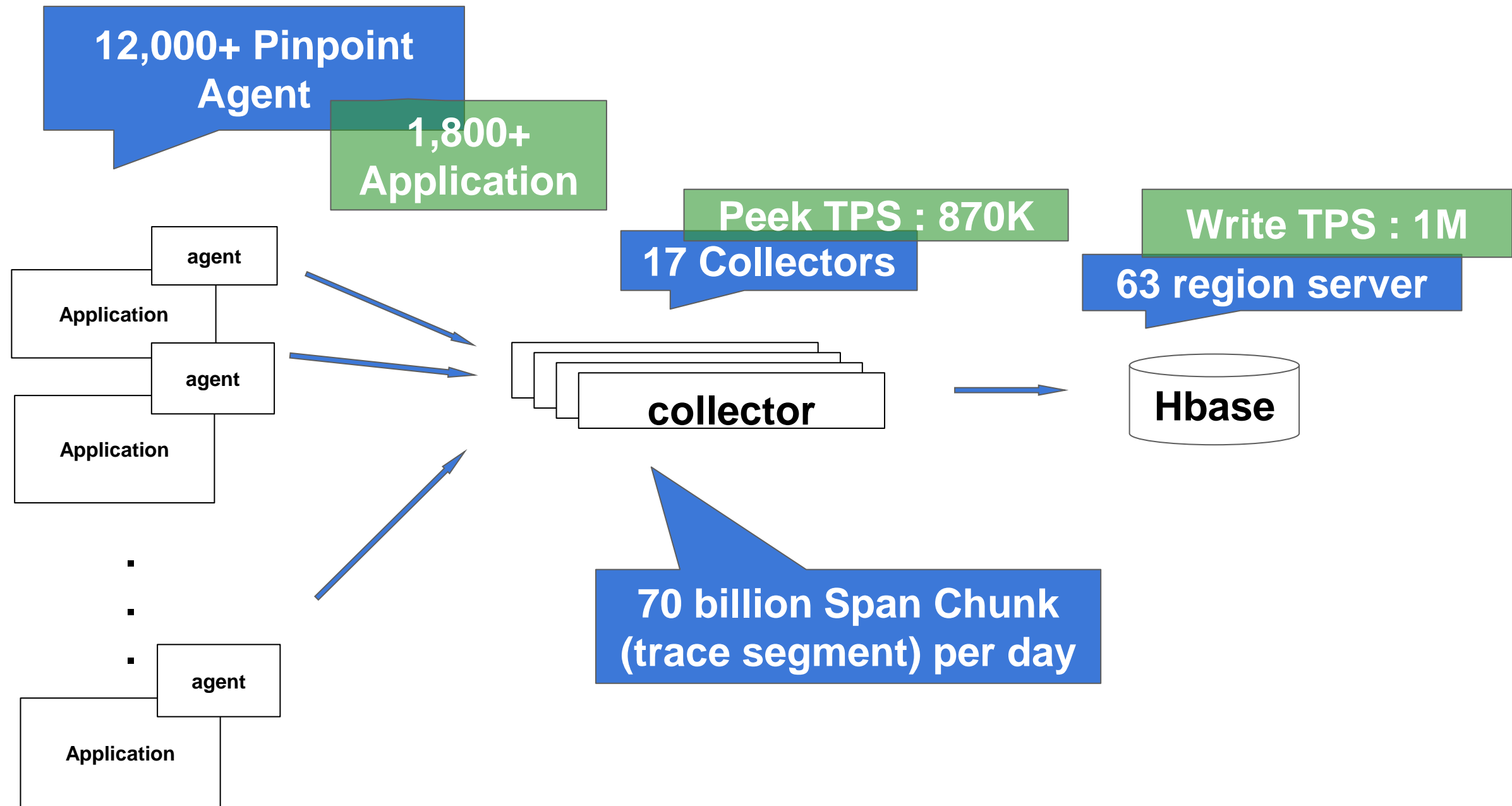
Features



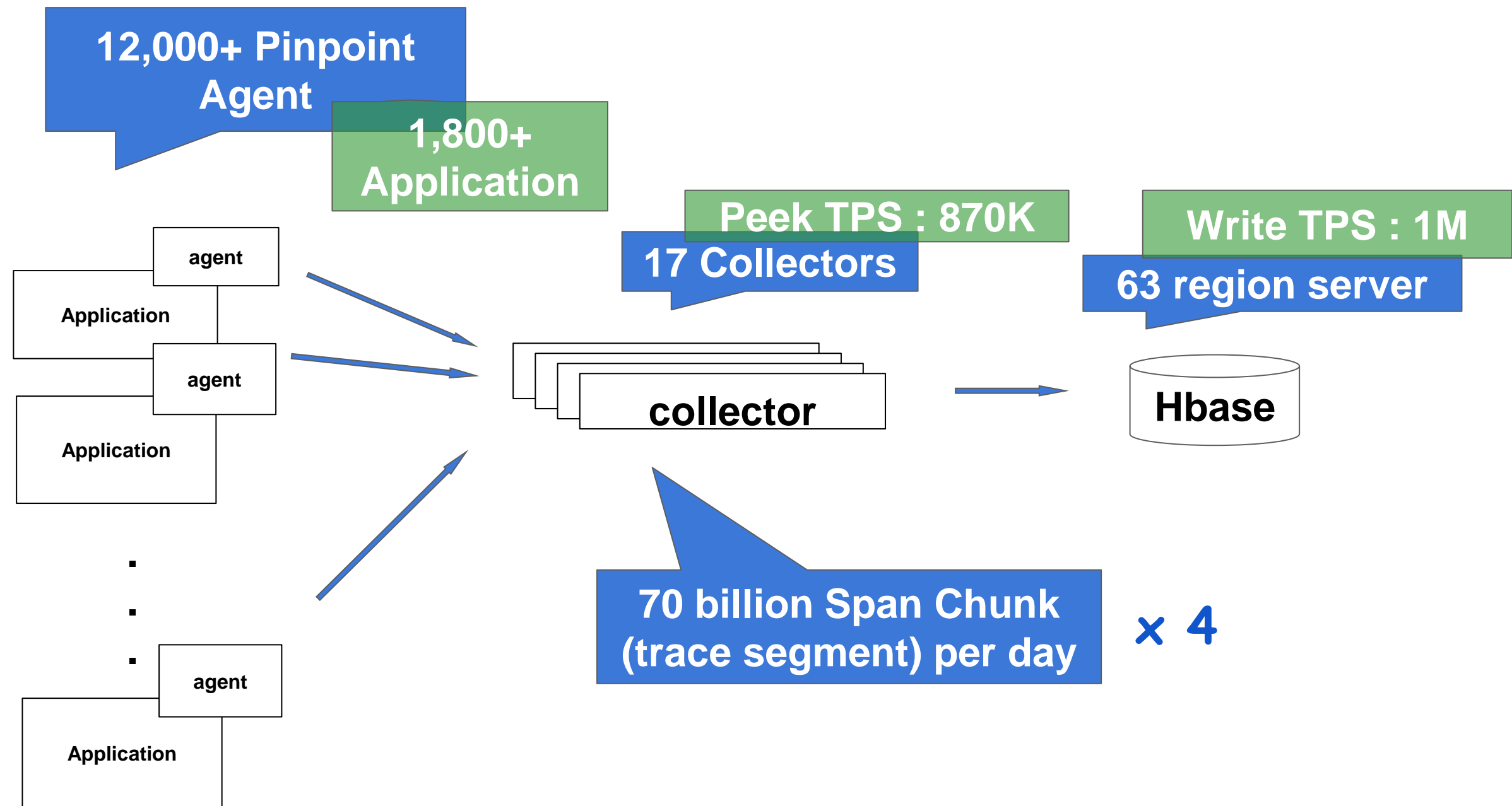
Features



Features



Features



PINPOINT

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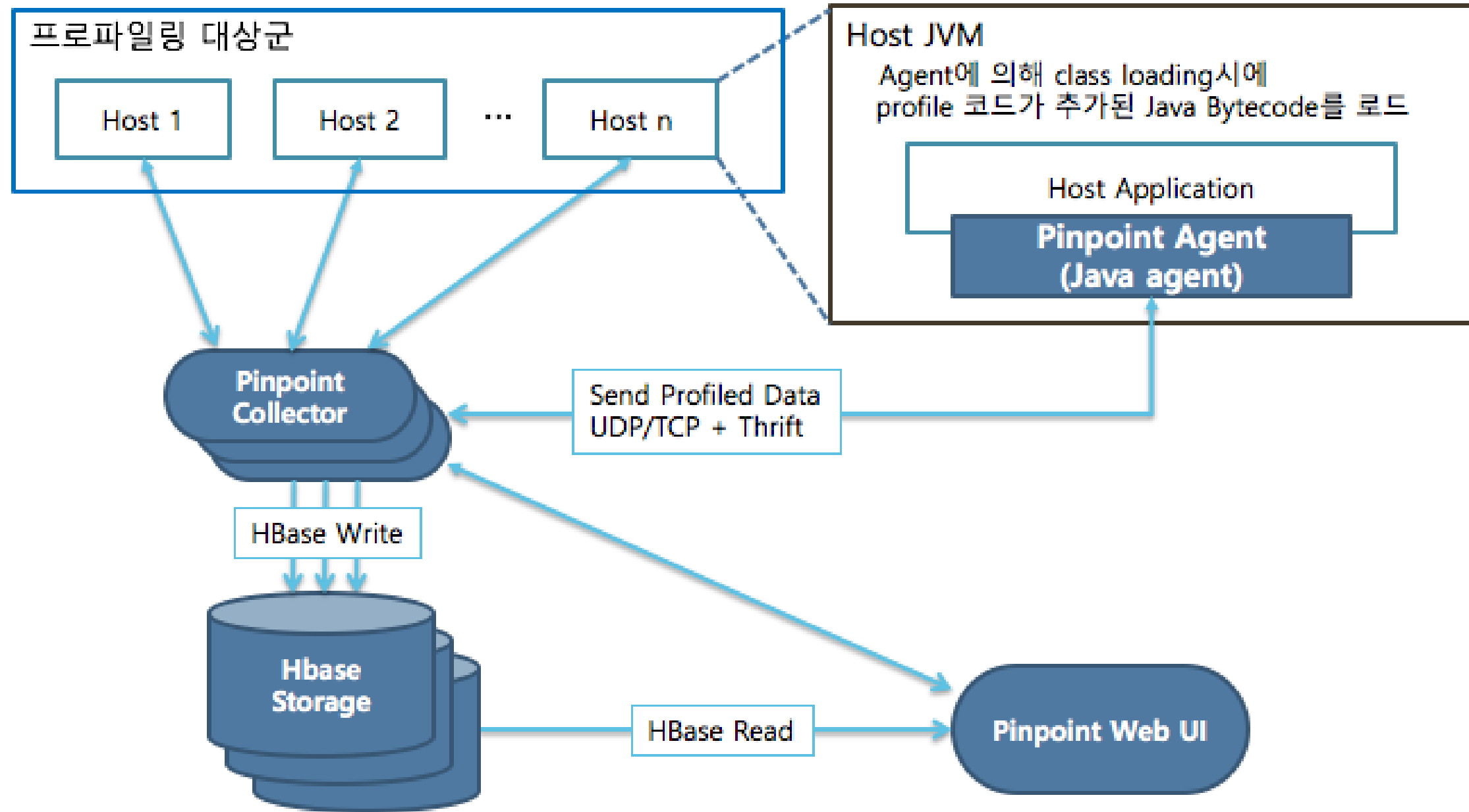
Features

- 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

Technical Detail

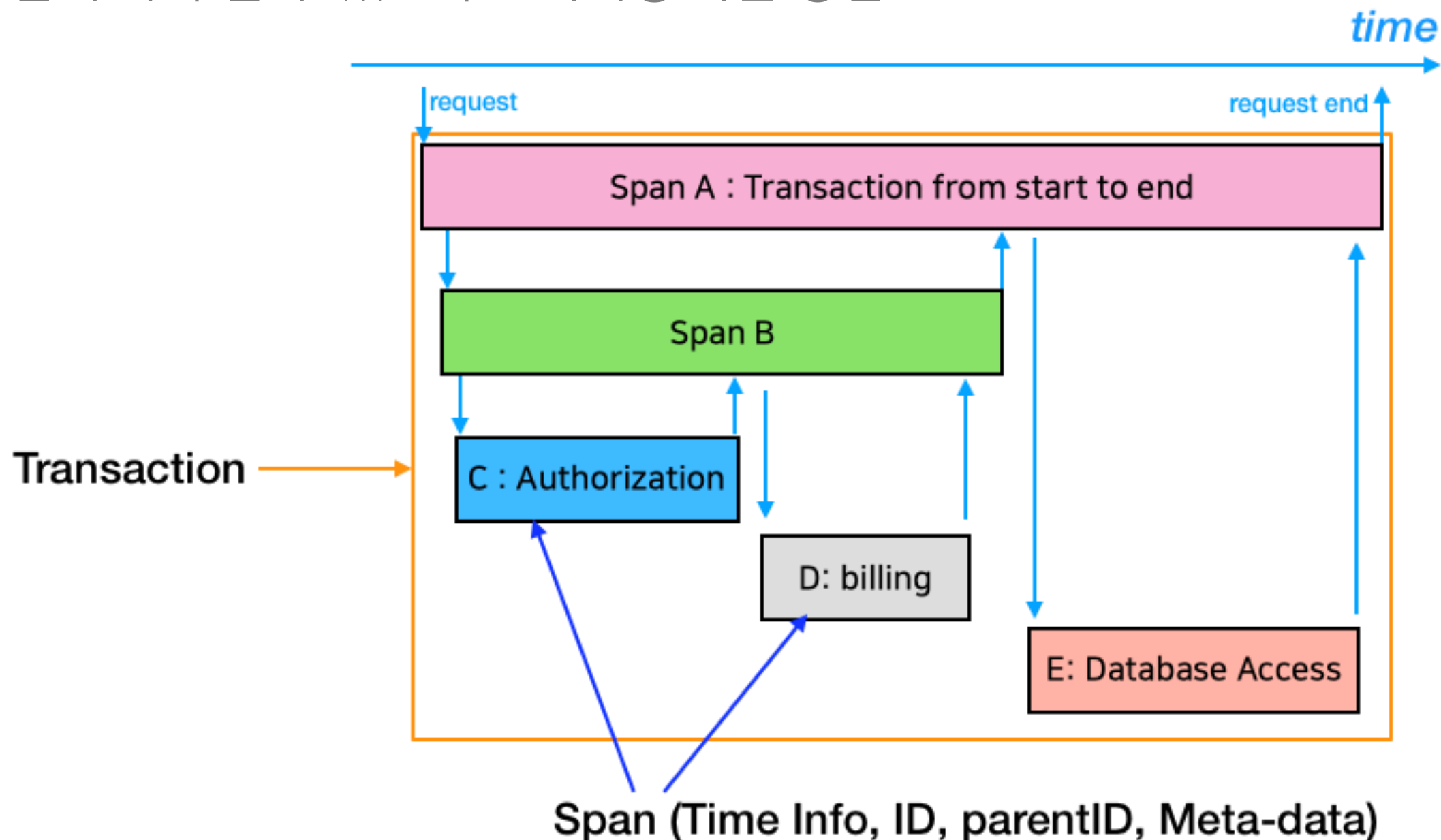
Architecture



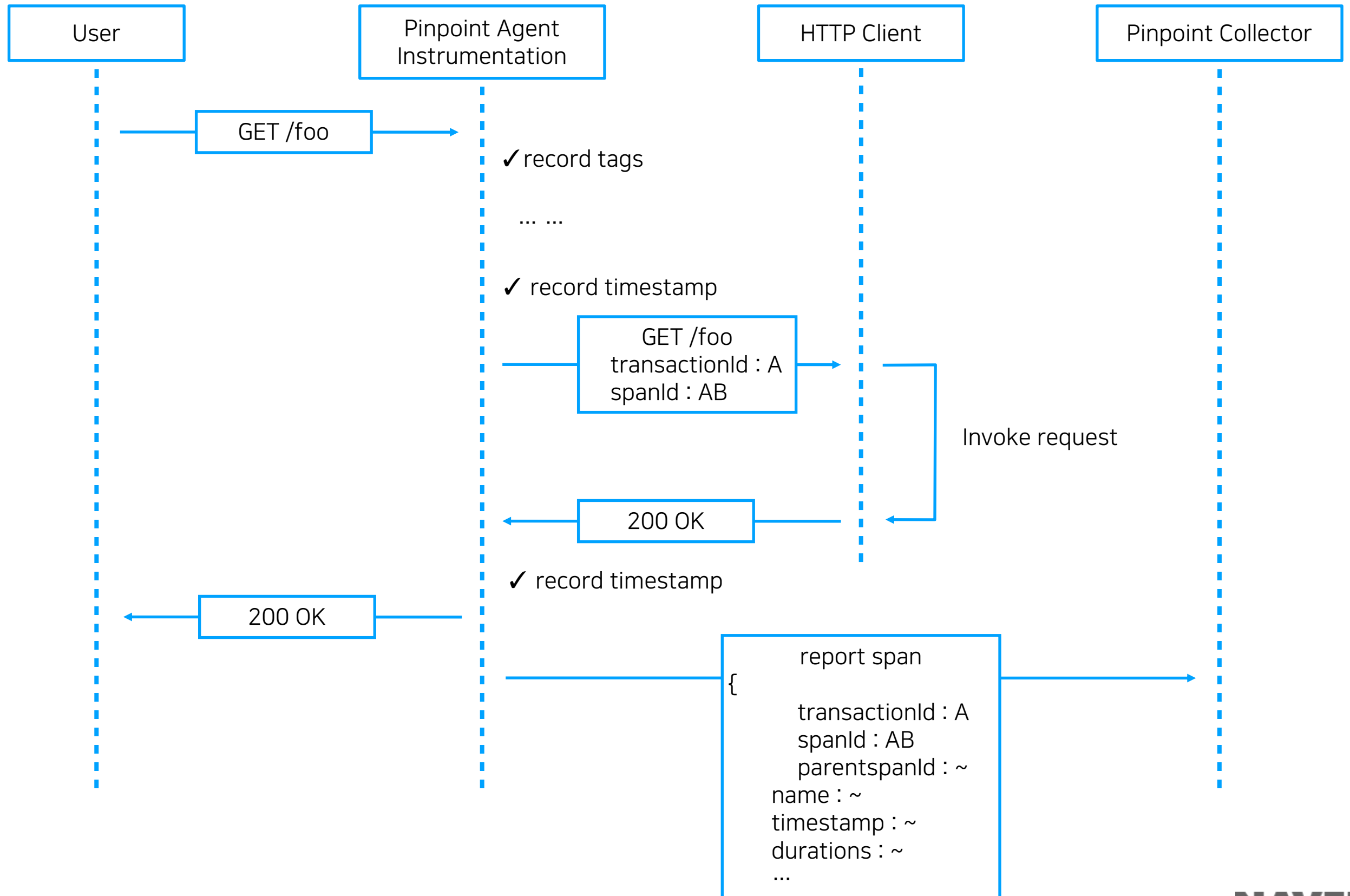
Technical Detail

Distributed Transaction Tracing

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



Technical Detail



Technical Detail

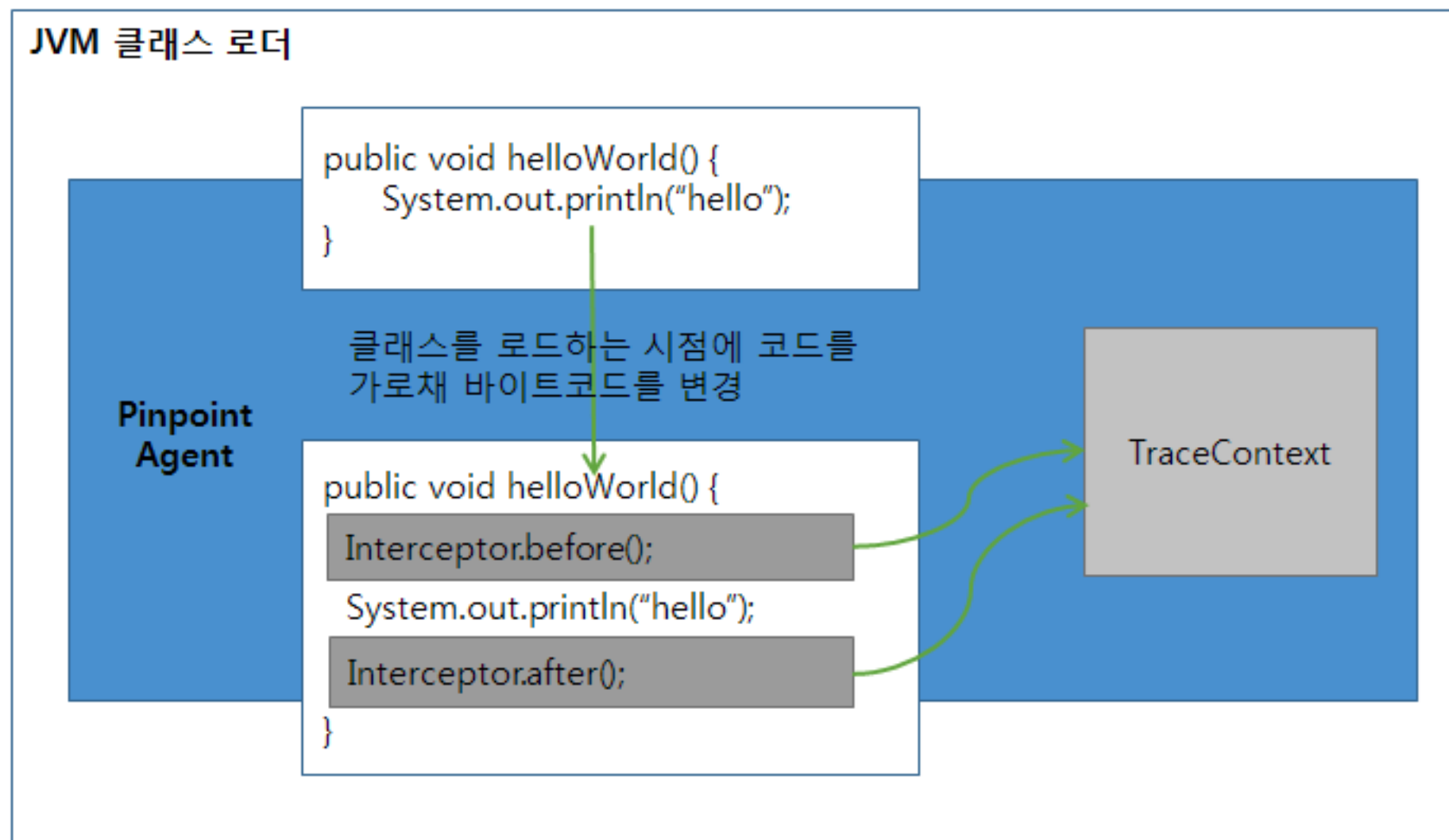
```
public static void main(String[] args) {  
    sayHello("Pinpoint");  
}
```

```
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)

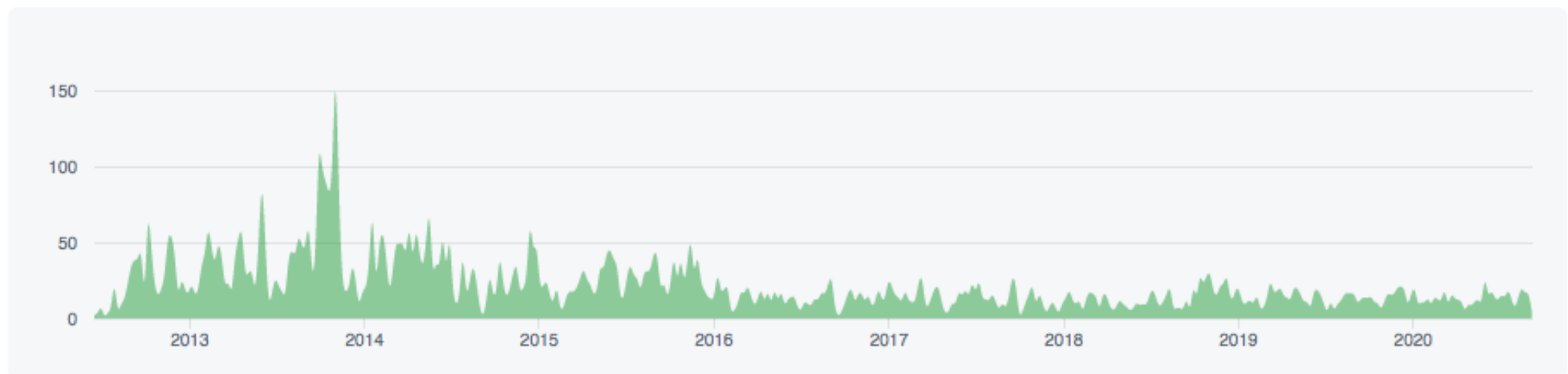
" We think **Pinpoint**, an open source tool in this space is worth investigating as an **alternative to AppDynamics and Dynatrace**"
- thoughtworks.com

Open source Pinpoint

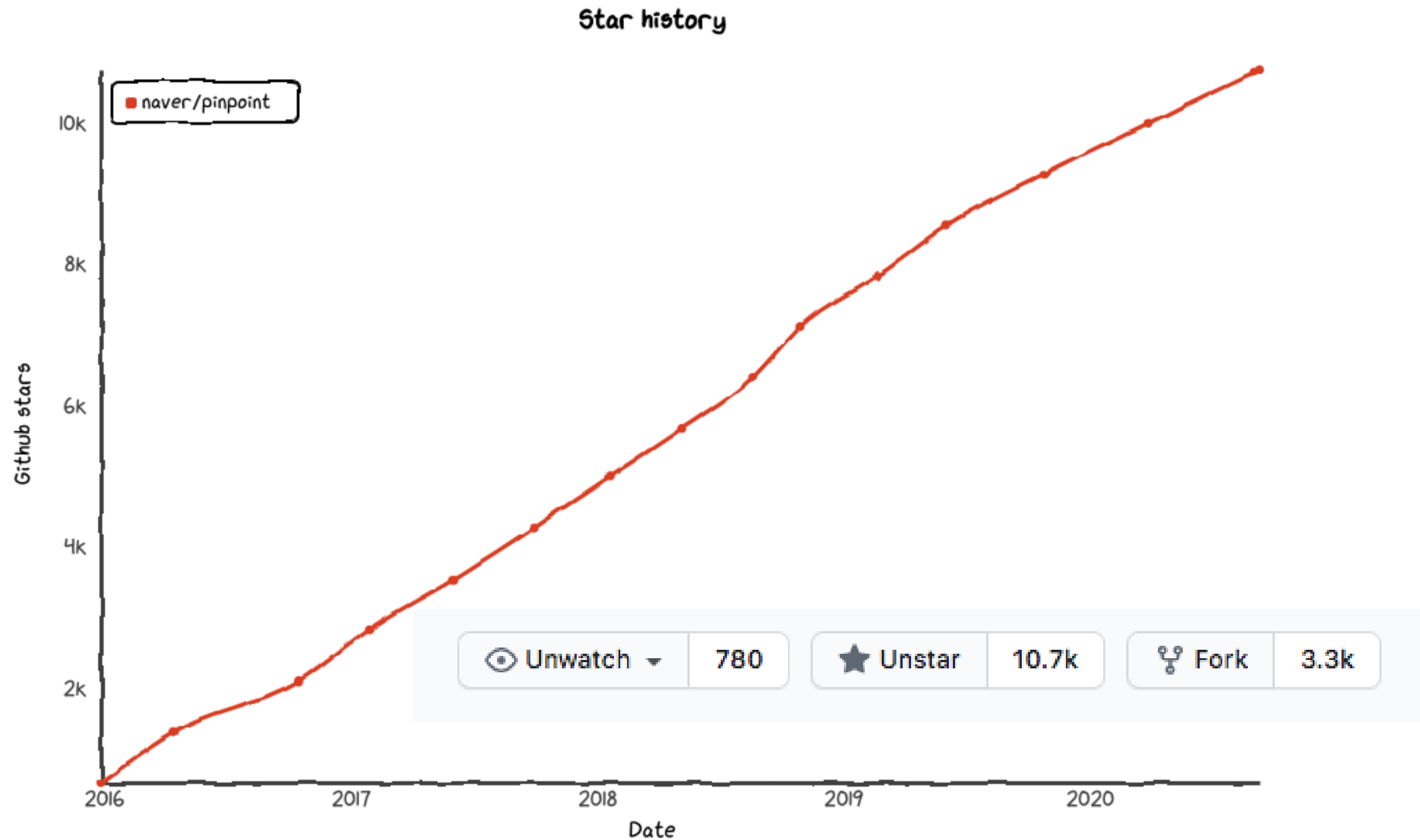
Jun 17, 2012 – Sep 8, 2020

Contributions: **Commits** ▼

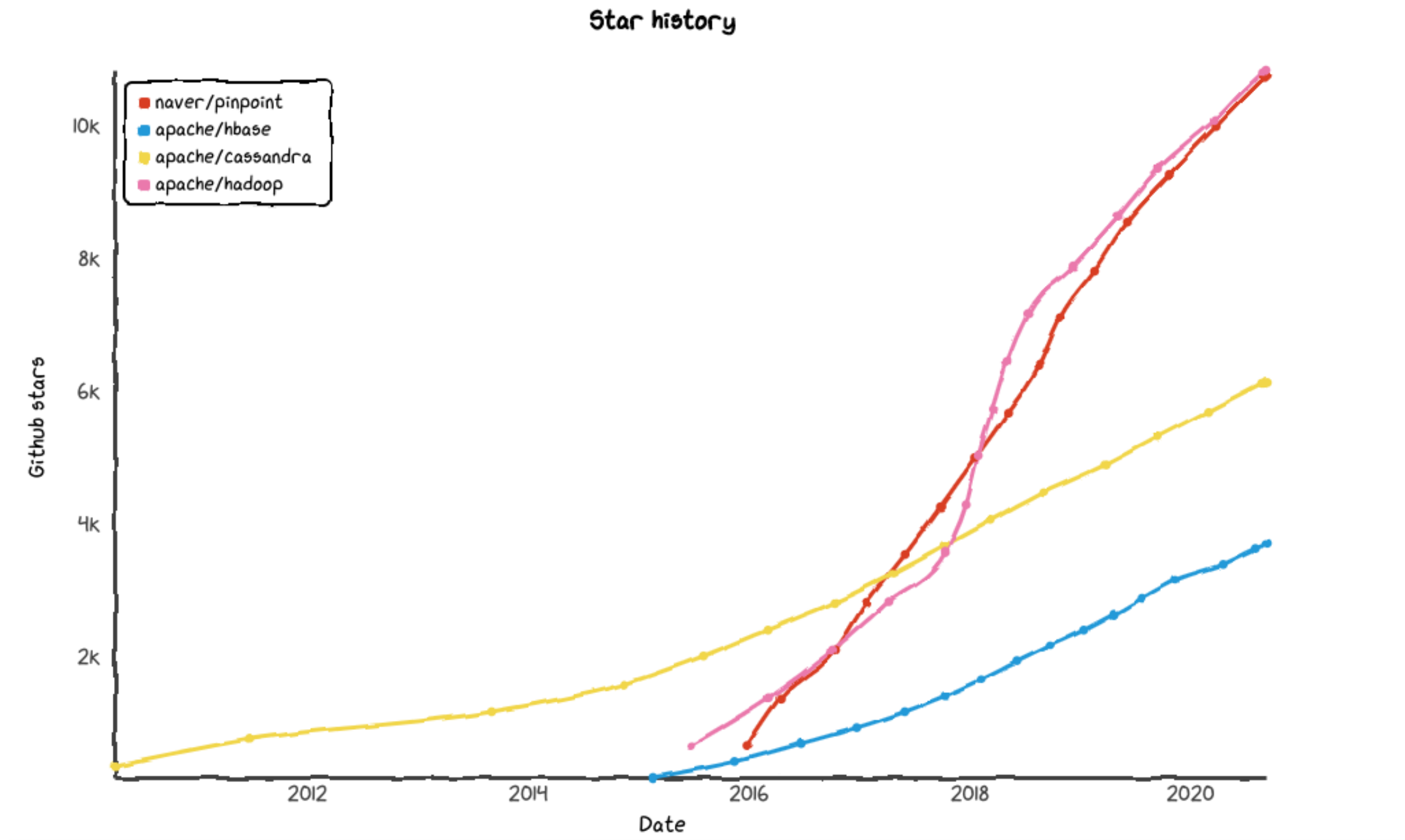
Contributions to master, excluding merge commits



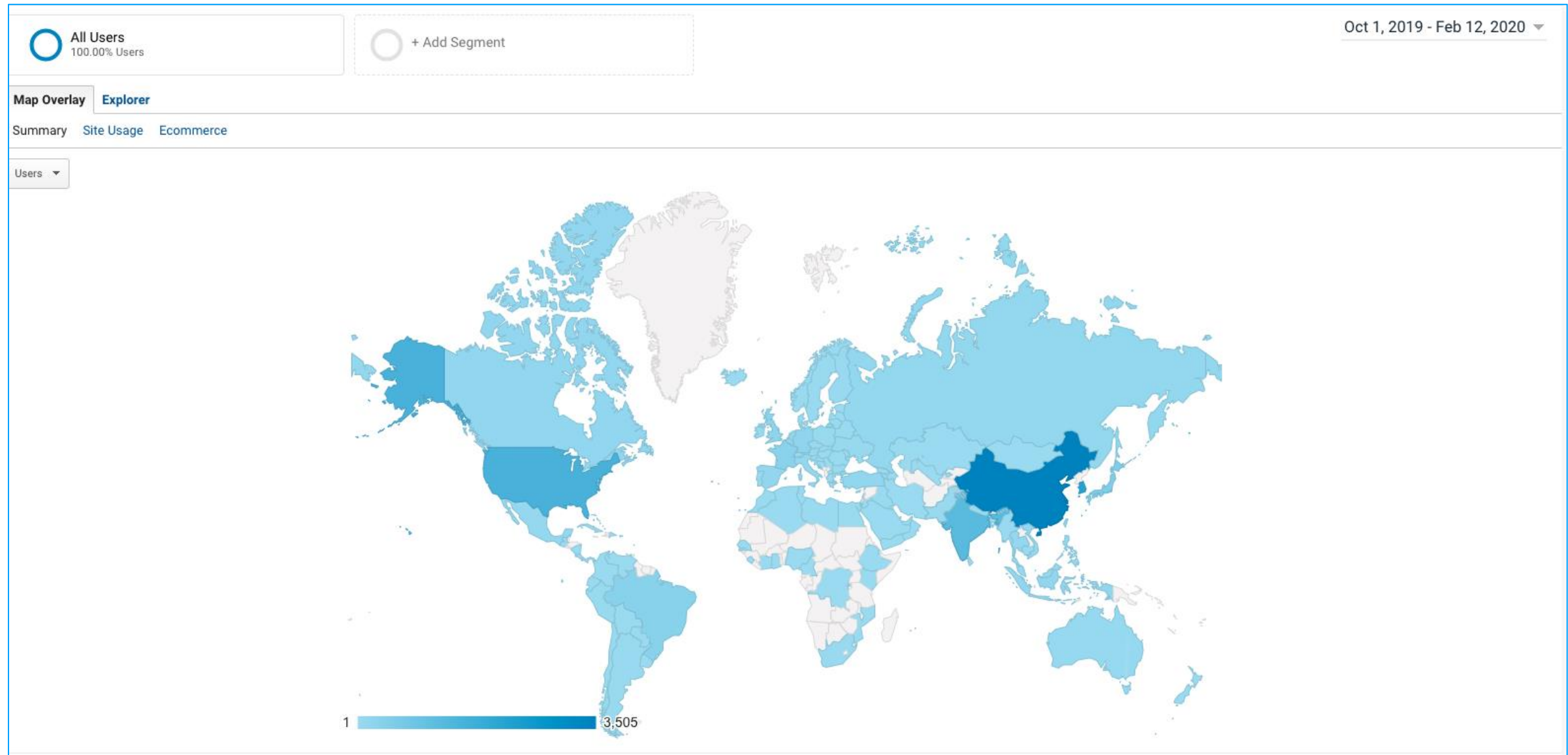
Open source Pinpoint




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Open source Pinpoint





Open source Pinpoint



-  홈
-  탐색하기
-  알림 7
-  쪽지
-  북마크
-  리스트
-  **프로필**
-  더 보기

트윗

**Pinpoint**
54 트윗





프로필 수정

Pinpoint
@Pinpoint_APM
Best open source APM system for large-scale distributed systems written in Java
대한민국 naver.github.io/pinpoint/index... 가입일: 2017년 12월
22 팔로잉 231 팔로워


트윗 트윗 및 답글 미디어 마음에 들어요


내가 리트윗함

**Thomas Wuerthinger** @thomaswue · 2019년 12월 12일
Met today with the team behind @Pinpoint_APM to discuss @GraalVM support for their open source APM solution. Their system is quite impressive. Check out live demo and screen shots at github.com/naver/pinpoint.




8 29


**Pinpoint** @Pinpoint_APM · 2019년 11월 5일
We had a speaking session and a workshop at China open source conference. Thanks all who came to our session. Thanks to all the conference staff who helped us to make it happen.




트위터 검색




내가 좋아할 만한 콘텐츠

**Micronaut Framework**
@micronautfw

팔로우

**Matt Klein**
@mattklein123

팔로우

**Kelsey Hightower** ✓
@kelseyhightower

팔로우

더 보기

나를 위한 트렌드

대한민국에서 트렌드 중
사형선고
8,507 트윗

#갤럭시_RT_EVENT
#갤럭시S20 라이브퀴즈쇼 참여하고 #갤럭시S20 #갤럭시S20플러스 #갤럭시S20울트라 GET!
갤럭시S20님이 프로모션함

대한민국에서 트렌드 중
문득 독특한 초콜렛
2,066 트윗

대한민국에서 트렌드 중
#ValentinesDay2020 🌸
231,683 트윗

경기도에서 트렌드 중
#정세운
4,602 트윗

더 보기

Cloud Native Computing Foundation (CNCF) Landscape

This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path.

Categories:

- App Definition and Development:** Includes projects like Helm, K8s, and various database and messaging solutions.
- Orchestration & Management:** Includes Kubernetes, Docker, and various orchestration tools.
- Runtime:** Includes various runtime environments and container management tools.
- Automation & Configuration:** Includes Ansible, Puppet, and other configuration management tools.
- Provisioning:** Includes Terraform, Pulumi, and other provisioning tools.
- Database:** Includes various database solutions like PostgreSQL, MySQL, and Redis.
- Streaming & Messaging:** Includes Kafka, RabbitMQ, and other messaging solutions.
- Application Definition & Image Build:** Includes Helm, Docker, and other application definition tools.
- Continuous Integration & Delivery:** Includes Jenkins, GitLab, and other CI/CD tools.
- Platform:** Includes various platform solutions like OpenShift and Kubernetes.
- Observability and Analysis:** Includes Prometheus, Grafana, and other observability tools.
- Members:** Lists various member organizations.

Special: A section highlighting specific projects or initiatives.

Footer: Includes the CNCF logo and the URL l.cncf.io.

Open source Pinpoint



Pinpoint 대규모 분산환경 APM

DEVVIEW
2018

김운덕
네이버 서비스 플랫폼개발센터

NAVER

O2 CAMPUS
FEST

오픈 소스의 미래와
네이버의 오픈 소스,
PINPOINT

PAAS | 김성욱

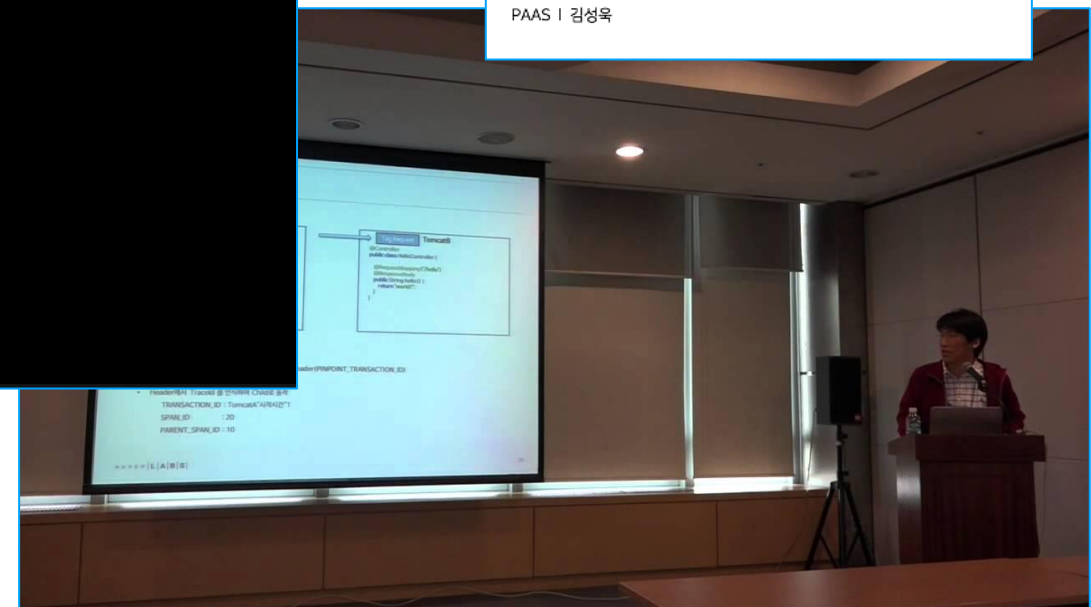
NAVER
OPEN SEMINAR
X
POSTECH

네이버 엔지니어가 들려주는 기술이야기

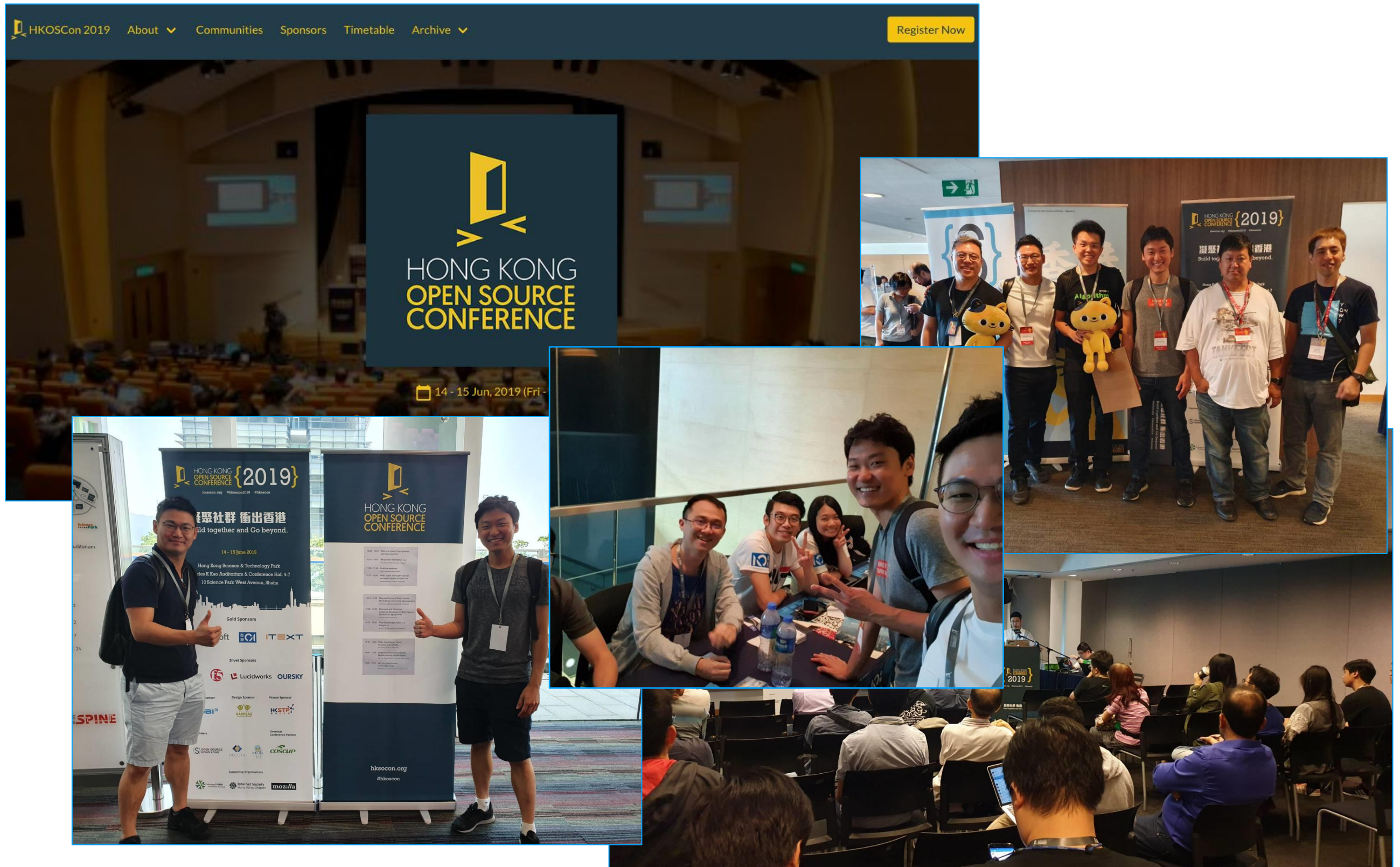
네이버는 기술이 소통과 공유를 통해 발전해 나간다고 생각합니다. 사내 개발자들이 아이디어를 자유롭게 선보일 수 있는 다양한 시스템을 진행하며, 성장시키는 기술과 연구 경험을 외부 인재를 적극적으로 소용하고 공유하고 있습니다.

그중 올해 진행한 네이버 오픈세미나(openseminar.com/2018/08)에서 학생 참여자가 큰 도움이 되었다고 선포해주신 기술 강연을 더 많은 학생 개발자들과 나누기 위해 네이버 엔지니어가 POSTECH로 찾아왔습니다.

주요강제	일시	장소
OpenSource APM, Pinpoint	2018. 10. 1 (월) 국제관 중회의실	
오픈소스 도구들 알아 볼만해요	오후 4:00-6:00	
Naver Engineering 소개	*사전신청필요	
Networking party		



Open source Pinpoint



Open source Pinpoint

**CONFERENCE
FOR
OPEN SOURCE
CODERS, USERS
&
PROMOTERS.**

COSCUP 2019

August 17-18, 2019

NTUST

Registration

Certification exam



COSCon 2019 Coming!

📅 Date 2019-11-02 09:00 ~ 11-03 17:00

📍 Location East China Normal University (Zhongshan North Road Campus), Putuo District, Shanghai, Putuo, Shanghai

The event is organized by KAIYUANSHE

[REGISTER](#)

[Event Information](#) [Speakers](#) [Call for Proposal](#) [Agenda](#) [Partnership](#) [History](#) [Location](#) [Dashboard](#) [中文](#) [REGISTER](#)

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WORLD

21–22 April 2020
Marina Bay Sands | Singapore

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ASIA

Announcing Oracle CEO Safra Catz at Oracle OpenWorld Asia

21–22 April 2020.

Get your complimentary pass today

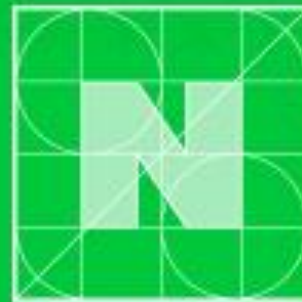
Twitter Facebook LinkedIn YouTube Instagram

Sessions designed for you (real-time simultaneous translation will be available)

[View the catalogue](#)

Open source Pinpoint

네이버 오픈소스 세미나
Performance does matter.



2019.07.11 (목) 13:00 ~ 18:00

PINPOINT

네이버 오픈소스 세미나

일시 7.11(목) 오후 1:00-6:00

장소 NAVER D2 Startup Factory



좋아요 0개

개설자정보

본 모임은 종료된 모임입니다.

✉ webmaster@onofnmx.com

☎ 02-6080-5579

·문의사항은 메일/전화를 이용해주세요

네이버 오픈소스 세미나 - Performance does matter

모임기간 2019.7.11 (목) 13:00 ~ 18:00

모임장소 [NAVER D2 STARTUP FACTORY]서울특별시 강남구 강남대로 382 메리츠타워 16층 [지도보기](#)

모집정원 총 85명

성능 문제를 해결하기 위해 만들어진 오픈소스 SW들을 소개하고 개발 경험담을 공유하는 모임입니다.
Pinpoint, Zipkin, Apache Skywalking 개발자들을 직접 만나고 함께 토론할 수 있는 자리에 여러분을 초대합니다!

신청기간 2019.7.1 (월) 11:00 ~ 2019.7.2 (화) 18:00

네이버 오픈소스 세미나 참석

개설자신청 | 정원 85명

미감

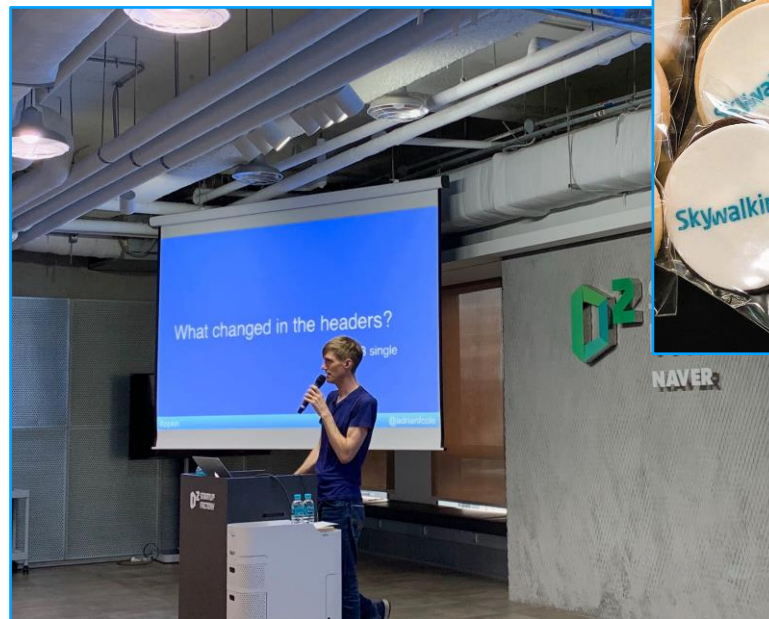
무료

앵콜 요청하기

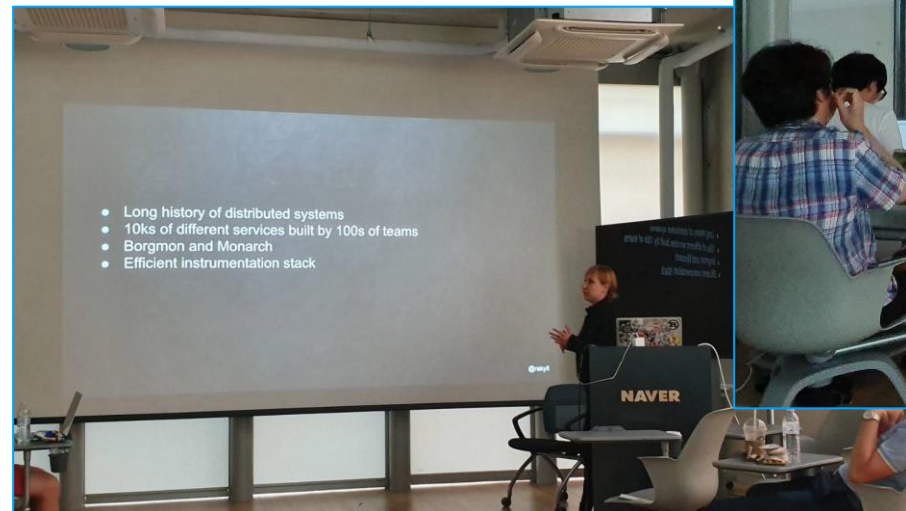
1

앵콜 선택 시 개설자에게 모임 개설이 요청됩니다.

Open source Pinpoint



Open source Pinpoint



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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

Open source Pinpoint



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"구글·아마존 부럽지 않네" 네이버 오픈소스 혁신 동향

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



강일용 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




Open source Pinpoint

**Adrian Cole** @adriancole · 7월 16일

Subtle, but if you look carefully, Naver made @Pinpoint_APM @ASFSkyWalking and @zipkinproject cookies. They could have done kool-aid, but instead they went for something more solid.


**Chris K Wensel** @cwensel · 7월 13일


Had some serious FOMO this week.

**Pinpoint** @Pinpoint_APM · 7월 12일


The two days of "Pinpoint Open House" event has finished. Thanks to everyone.

Special Thanks to @adriancole @autoletics @TommyLudwig @c and of course,




**Wu Sheng** 吴晨 @wusheng1108 · 7월 12일


My daughter is the center of event. Haha Glad to meet old and new friends there. Thanks everyone.

**Pinpoint** @Pinpoint_APM · 7월 12일


The two days of "Pinpoint Open House" event has finished. Thanks to everyone who has joined us in the event.

Special Thanks to @adriancole @autoletics @wusheng1108 @rakyll @jcchavezs @TommyLudwig @dtornkaew, Chenguoxi, Liumingyi and of course, members of Team Pinpoint




**Jaana B. Dogan** @rakyll · 7월 11일

No one cares about metrics, traces, logs, etc. We care about signaling behaviors and reasoning about the signals. We need a model that scales to humans not to machines. — @autoletics




1 4 12


[이 스레드 보기](#)

**José Carlos Chávez** @jcchavezs · 7월 11일


I really love this #zipkin cookies.





11

**tetratio** @tetratio · 7월 11일

Our team member @wusheng1108 is in Seoul, Korea at @Pinpoint_APM's #opensource conference. He'll be presenting on the core concepts of @ASFSkyWalking and sharing with the crowd the latest look of SkyWalking's UI today.



3



Cool!!! Thanks for @Pinpoint_APM team.

1 9

NAVER

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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