

# Cloud Native & NAVER Opensource



NAVER PaaS 김성관

Cloud Native ?

## 핵심 개념

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Cloud native technologies empower organizations to build and run **scalable applications in modern, dynamic environments** such as public, private, and hybrid clouds.

Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

<https://github.com/cncf/toc/blob/master/DEFINITION.md>

## 핵심 속성

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- **loosely coupled**

전체 시스템 컴포넌트 간 의존성 최소화

- **resilient**

장애에 스스로 대응하고 회복

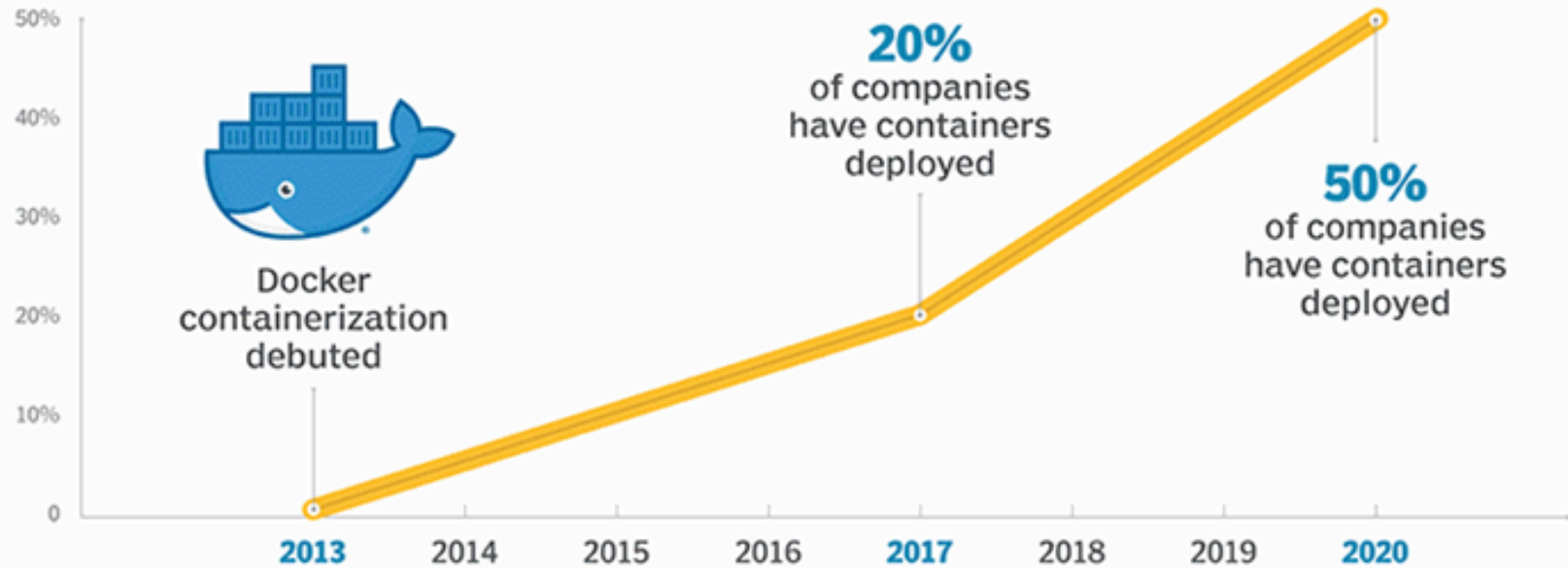
- **observable**

시스템 노드 및 컨테이너의 monitoring 요소 관찰

- **manageable**

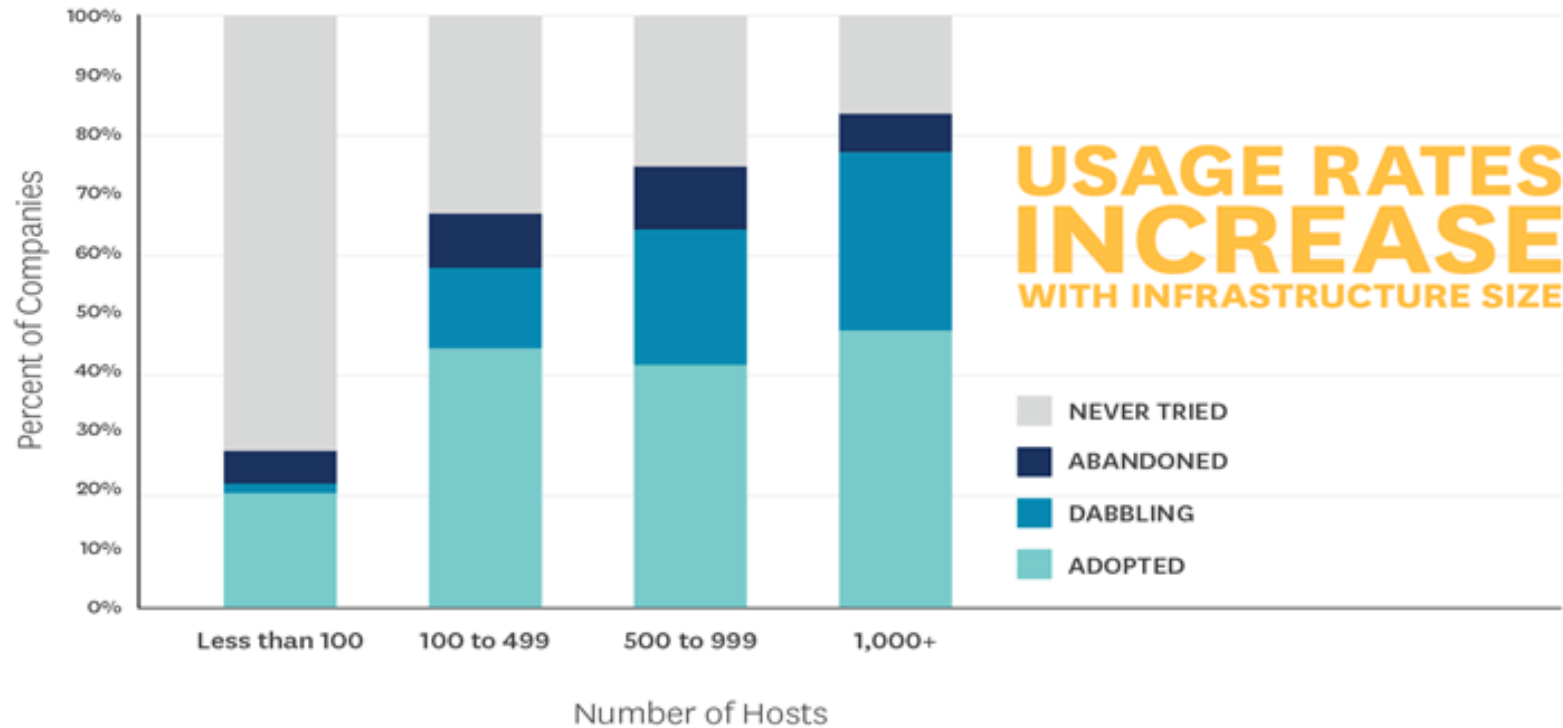
쉽고 안정적인 관리

## Containerization timeline



SOURCE: GARTNER

### Docker Adoption Status by Infrastructure Size



Source: Datadog

# CNCF (Cloud Native Computing Foundation)

The landscape is organized into several main categories:

- App Definition and Development:** Database, Streaming & Messaging, Application Definition & Image Build, Continuous Integration & Delivery.
- Orchestration & Management:** Scheduling & Orchestration, Coordination & Service Discovery, Remote Procedure Call, Service Proxy, API Gateway, Service Mesh.
- Runtime:** Cloud Native Storage, Container Runtime, Cloud Native Network.
- Provisioning:** Automation & Configuration, Container Registry, Security & Compliance, Key Management.
- Platform:** Certified Kubernetes - Distribution, Certified Kubernetes - Hosted, Certified Kubernetes - Installer, PaaS/Container Service.
- Observability and Analysis:** Monitoring, Logging, Tracing, Chaos Engineering, Serverless.
- Special:** A dedicated section for special projects.
- Members:** A list of CNCF members.
- Other:** Kubernetes Certified Service Provider and Kubernetes Training Partner.

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.

**l.cncf.io**

**CLOUD NATIVE COMPUTING FOUNDATION**

**CLOUD NATIVE Landscape**

Redpoint // Amplify

<https://landscape.cncf.io>

# NAVER 에서의 Cloud Native



# Private and Public Cloud

<b>컴퓨팅</b> <ul style="list-style-type: none"><li>Ncloud Cloud Service for Development</li><li>shipdock Will be deprecated (use NCC)</li><li>Lambda Serverless Computing Platform</li><li><b>ncc</b> NAVER Container Cluster</li></ul>	<b>개발자 도구</b> <ul style="list-style-type: none"><li>Opensource Opensource Portal</li><li>OSS Git Repository</li><li>nDeploy Build &amp; Deployment Automation Framework</li><li>Yobi Collaboration Platform</li><li>Jenkins Farm Continuous Integration Farm</li><li>nGrinder Distributed Performance Testing</li><li>registry docker registry</li></ul>	<b>모니터링</b> <ul style="list-style-type: none"><li>nsight Infra Monitoring System for Large Cluster</li><li>NELO2 Log Collection and Search System</li><li>NPOT Time Series Metric Collection System</li><li>Pinpoint APM Tool for Large-Scale Distributed Systems</li></ul> <b>보안 &amp; 인증</b> <ul style="list-style-type: none"><li>A A</li><li>N U</li><li>N IV</li><li>n Si D</li><li>III In Tc</li><li>A A Si</li></ul>	<b>데이터베이스</b> <ul style="list-style-type: none"><li>Elasticsearch On Demand Elasticsearch Cluster</li><li>CUBRID Open Source RDBMS - Seamless, Scalable, Stable and Free</li><li>nBase-T Elastic DB Sharding Middleware</li><li>nbase-arc Distributed Memory Store Based on Redis</li><li>Arcus Memory Cache Cloud based on Memcached</li></ul> <b>모바일 서비스</b> <ul style="list-style-type: none"><li>NPUSH Push Notification Platform</li><li>nMobile Remote Mobile Solution</li><li>App Download Download Mobile Apps</li></ul>	<b>서비스 컴포넌트</b> <ul style="list-style-type: none"><li>Common Comment 2.0 Comment Hosting Service</li><li>Like NAVER Common Like Platform</li><li>MEX SMS/LMS/MMS Message Delivery Platform</li></ul> <b>어플리케이션 서비스</b> <ul style="list-style-type: none"><li>PRISM Live Cloud Live Broadcast Platform</li><li>API Gateway API Management &amp; Analytics Platform</li><li>Social Gateway Integrated Gateway for various SNSs</li><li>Kaleido Data Synchronization Back-end as a Service</li><li>session-io Chatting API Gateway &amp; Session Server Platform</li></ul>
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• Private Cloud : NAVER 서비스 개발에 사용되는 PaaS & SaaS

# Private and Public Cloud

NAVER CLOUD PLATFORM

소개 서비스 솔루션 요금 고객센터 파트너 가이드센터

로그인 회원가입 Languages Console

## 네이버 클라우드 플랫폼 사용자 여기 모두 모여라!

클라우드 사용 꿀팁을 공유하는 사용자 그룹에 여러분을 초대합니다.

[자세히 보기](#)

- 네이버 클라우드 플랫폼 할인 크레딧 제공
- 네이버 지도 API 'Maps' 이용 안내
- 체계적인 회사 되는 솔루션 WORKPLACE 웨비나 다시보기
- 네이버 클라우드 플랫폼의 '데이터 센터' 둘러 보기

### 나에게 필요한 네이버 클라우드 플랫폼

- 교육 / 행사 신청
- 서비스 소식
- 온라인 문의
- 요금 계산기
- 공공기관용
- 공식블로그

### 공지사항

- 서비스: Simple & Easy Notification Service에서 제공하는 카카오톡 비즈니스(지메일) 템플릿 ... 2019-09-03
- 서비스: AI NAVER API 서비스 기준 타임 변경 (UTC 0 -> UTC 9) 2019-08-30
- 작업공지: 일본 라전 및 독일 라전 네트워크 장비 점검 작업 안내(9/4) 2019-08-28
- 서비스: "webmin" 보안 취약점 및 업데이트 안내 2019-08-27

## Products & Services

### Compute

- Server [Update](#)
- SSD Server
- GPU Server [Update](#)
- Virtual Dedicated Server
- Bare Metal Server [Update](#)
- Auto Scaling
- Cloud Functions [Update](#)
- HPC(High Performance Computing)
- Container Registry [Update](#)
- Kubernetes Service [New](#)

### Storage

- Object Storage
- Archive Storage
- File Storage
- Block Storage
- NAS
- Backup
- Data Teleporter

### Networking

- Load Balancer
- DNS
- Global Internet Service
- CDN+ [Update](#)
- Global CDN [Update](#)
- IPsec VPN
- NAT Gateway
- Global Route Manager

### Database

- Cloud DB for MySQL [Update](#)
- Cloud DB for Redis [Update](#)
- Cloud DB for MSSQL
- MSSQL
- MySQL
- CUBRID
- Redis
- PostgreSQL
- MariaDB

### Security

- Secure Zone [Update](#)
- Basic Security
- ACG
- App Safer
- Site Safer
- File Safer
- Security Monitoring
- SSL VPN
- Web Security Checker [Update](#)
- System Security Checker
- App Security Checker

### AI Service

- Clova Speech Recognition(CSR)
- Clova Speech Synthesis(CSS)
- Clova Face Recognition(CFR)
- Papago NMT [Update](#)
- Papago Korean Name Romanizer
- TensorFlow Server [Update](#)
- TensorFlow Cluster
- Clova Chatbot [Update](#)
- Pose Estimation [New](#)
- Object Detection [New](#)

### Application Service

- GeoLocation
- Maps [Update](#)
- CAPTCHA
- nShortURL
- Simple & Easy Notification Service [Update](#)
- API Gateway
- Search Trend
- RabbitMQ
- Simple RabbitMQ Service
- Cloud Outbound Mailer [Update](#)
- Pinpoint

### Media

- VOD Transcoder
- Image Optimizer [Update](#)
- Live Station [New](#)

### Dev Tools

- Jenkins
- SourceCommit [Update](#)
- SourceBuild [Update](#)
- SourceDeploy

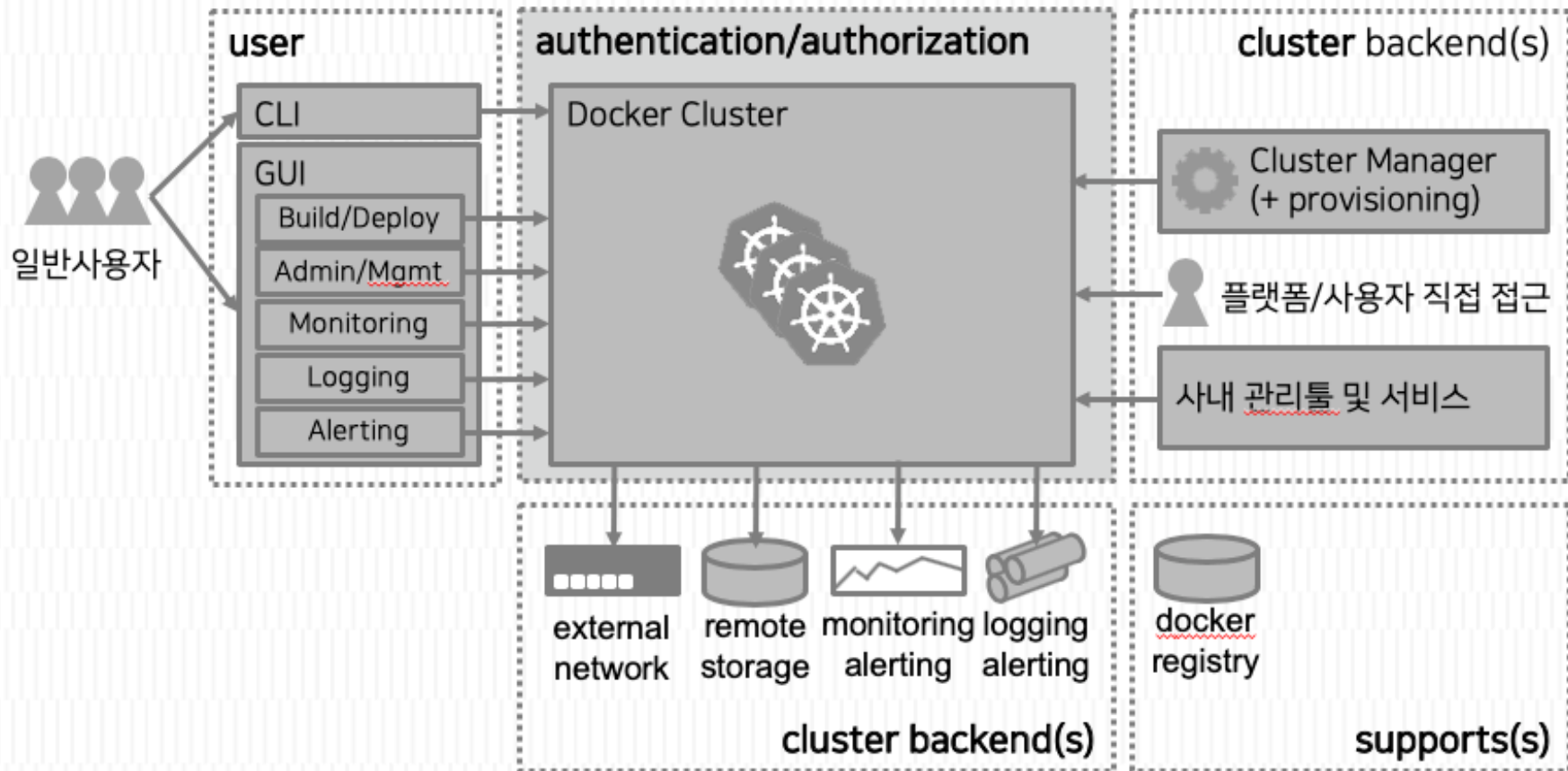
- Public Cloud : Naver Cloud Platform (<https://www.ncloud.com>)

## NAVER Container Cluster

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- CNCF의 오픈소스 최대한 활용
  - Kubernetes, Harbor, Ceph, Prometheus, Grafana, ...
- 수년 간 기술 내재화 및 시행착오를 거쳐 2019년부터 주요 서비스 및 플랫폼에 적용
- Stateless / Stateful 서비스 중
- Network, Remote Storage, ACL, Security, Monitoring ...

# NAVER Container Cluster



NAVER open source

## Opensource 전략

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- **최대한 활용**

네이버의 거의 모든 서비스에 오픈소스 사용

- **개선이 필요한 경우**

- 과거 : fork & 자체 개선 , 미공개

- 현재 : upstream contribution & committer 양성

- **오픈소스 공개**

- <https://github.com/naver>



# Naver Open source

The screenshot displays the GitHub profile for Naver. At the top, there is a navigation bar with links for Pull requests, Issues, Marketplace, and Explore. The main header shows the Naver logo, the name 'NAVER', and contact information: Republic of Korea, a website URL (http://developers.naver.com), and an email address (opensource@navercorp.com). Below this, repository statistics are shown: 150 Repositories, Packages, 178 People, 64 Teams, and Projects. A search bar and filters for Type and Language are present. The main content area lists several repositories with their descriptions, tags, and activity metrics:

- claf**: CLaF: Open-Source Clova Language Framework. Tags: nlp, language, natural-language-processing, framework, pytorch, clova. Language: Python. License: MIT. 16 forks, 164 stars, 1 issue, 0 pull requests. Updated 42 minutes ago.
- pinpoint**: APM, (Application Performance Management) tool for large-scale distributed systems written in Java. Tags: agent, performance, monitoring, apm, tracing, distributed-tracing. Language: Java. License: Apache-2.0. 2,846 forks, 9,272 stars, 99 issues (1 needs help), 22 pull requests. Updated 8 hours ago.
- arcus-memcached**: Arcus memory cache server. Language: C. 39 forks, 34 stars, 22 issues, 8 pull requests. Updated 17 hours ago.
- billboard.js**: Re-usable, easy interface JavaScript chart library based on D3 v4+. Tags: d3, svg, chart, graph, data-visualization. Language: JavaScript. License: MIT. 232 forks, 3,654 stars, 74 issues (4 need help), 0 pull requests. Updated yesterday.

On the right side, there are three summary boxes:

- Top languages**: JavaScript, Java, Python, C++, CSS.
- Most used topics**: egjs, javascript, agent, naver, typescript.
- People**: 178 contributors, shown as a grid of profile pictures.

# Naver Open source

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 billboard.js

 nGrinder



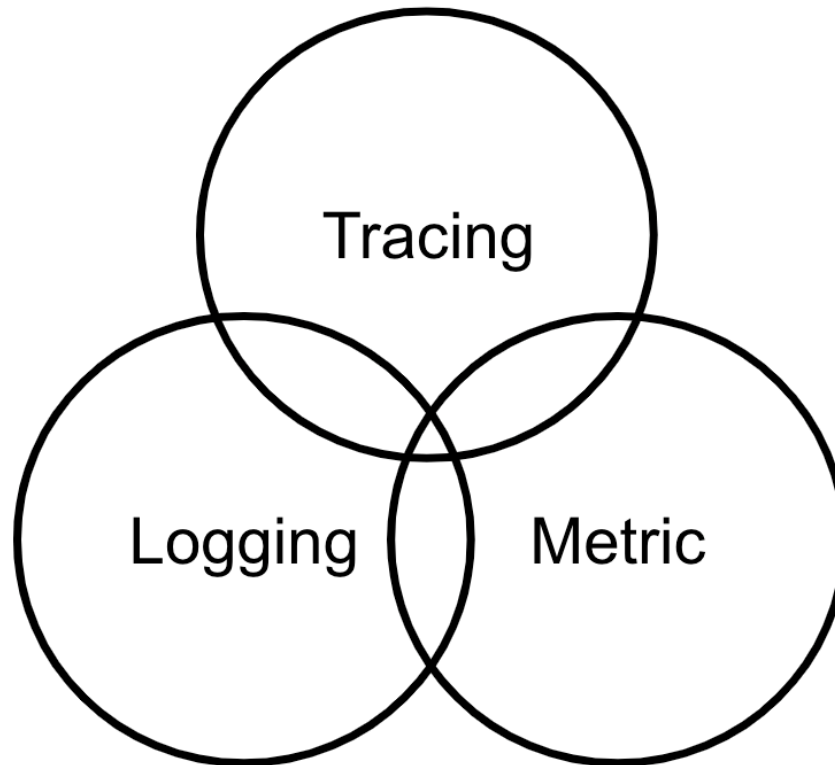
nbase-arc

PINPOINT



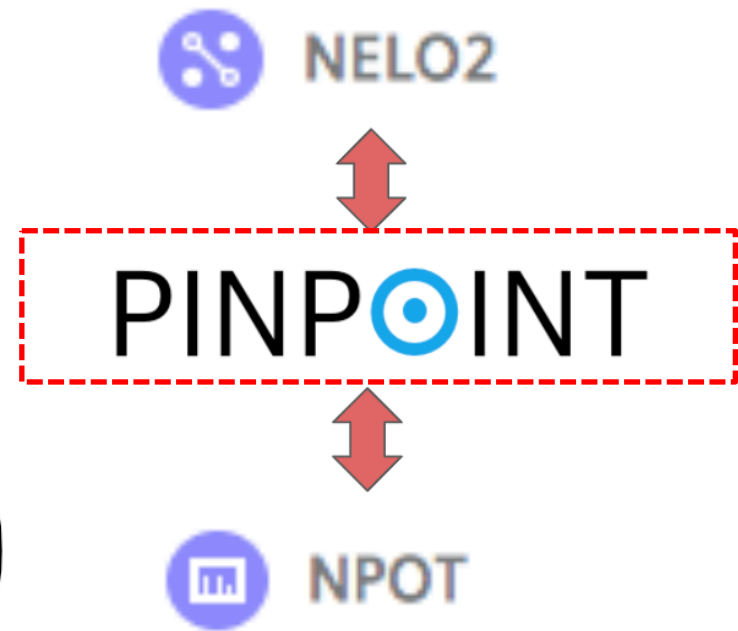
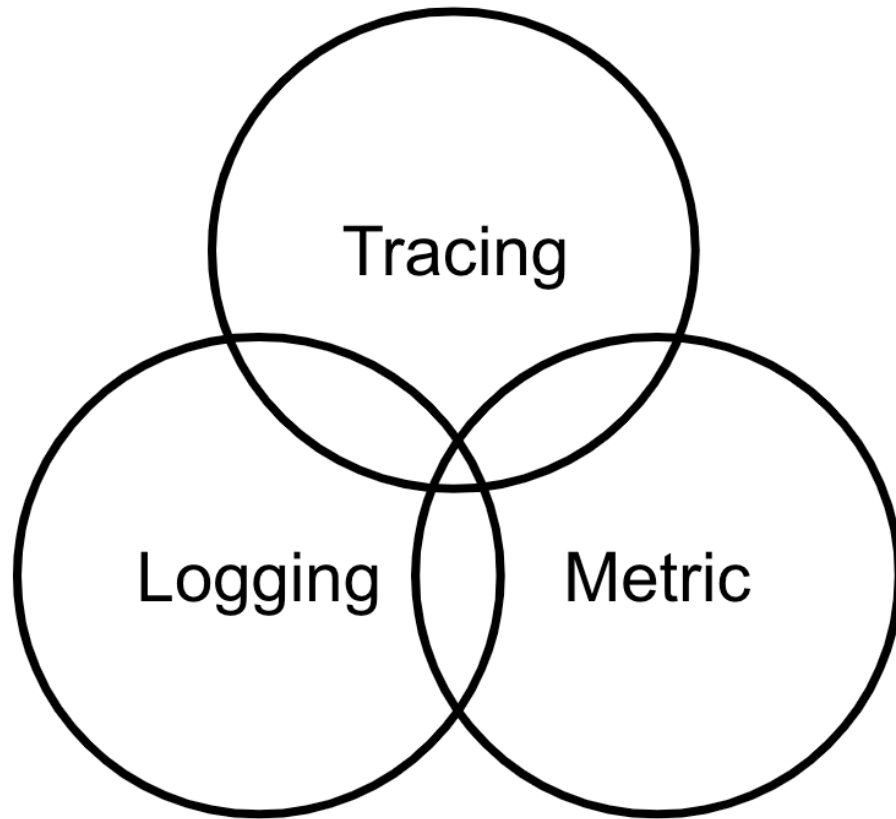


## Observability



- MSA/EDA 기반의 서비스
- 난이도 , 중요도 Up

# Observability



- 네이버의 대표적인 오픈소스 APM

PINPOINT

Bird Eye View

Finding Slow Transactions

Distributed Tracing

DevOps

Scalable

Minimum Overload

- github : <https://github.com/naver/pinpoint/>
- home : <https://naver.github.io/pinpoint/>
- demo : <http://125.209.240.10:10123/#/main>



# Open source Pinpoint



naver / pinpoint

Unwatch

790

Unstar

9,272

Fork

2,846

Code

Issues 99

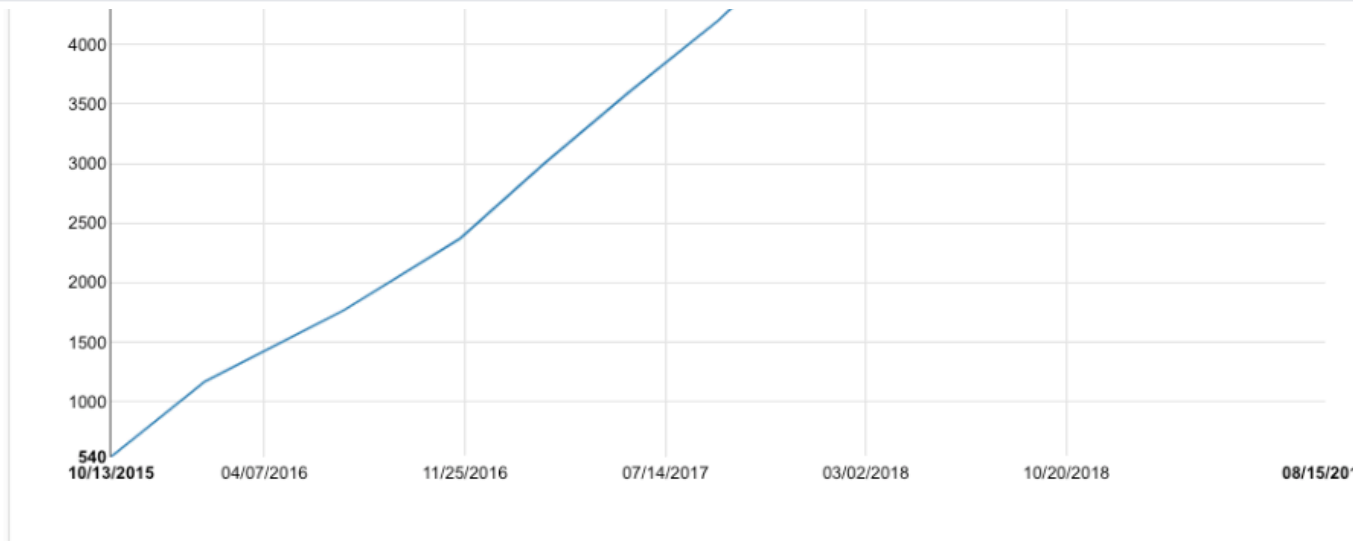
Pull requests 22

Wiki

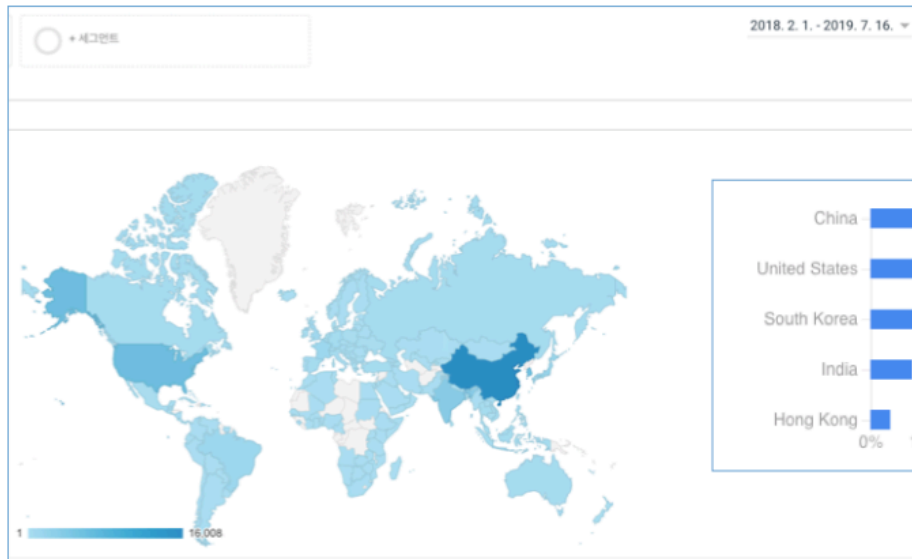
Security

Insights

Settings

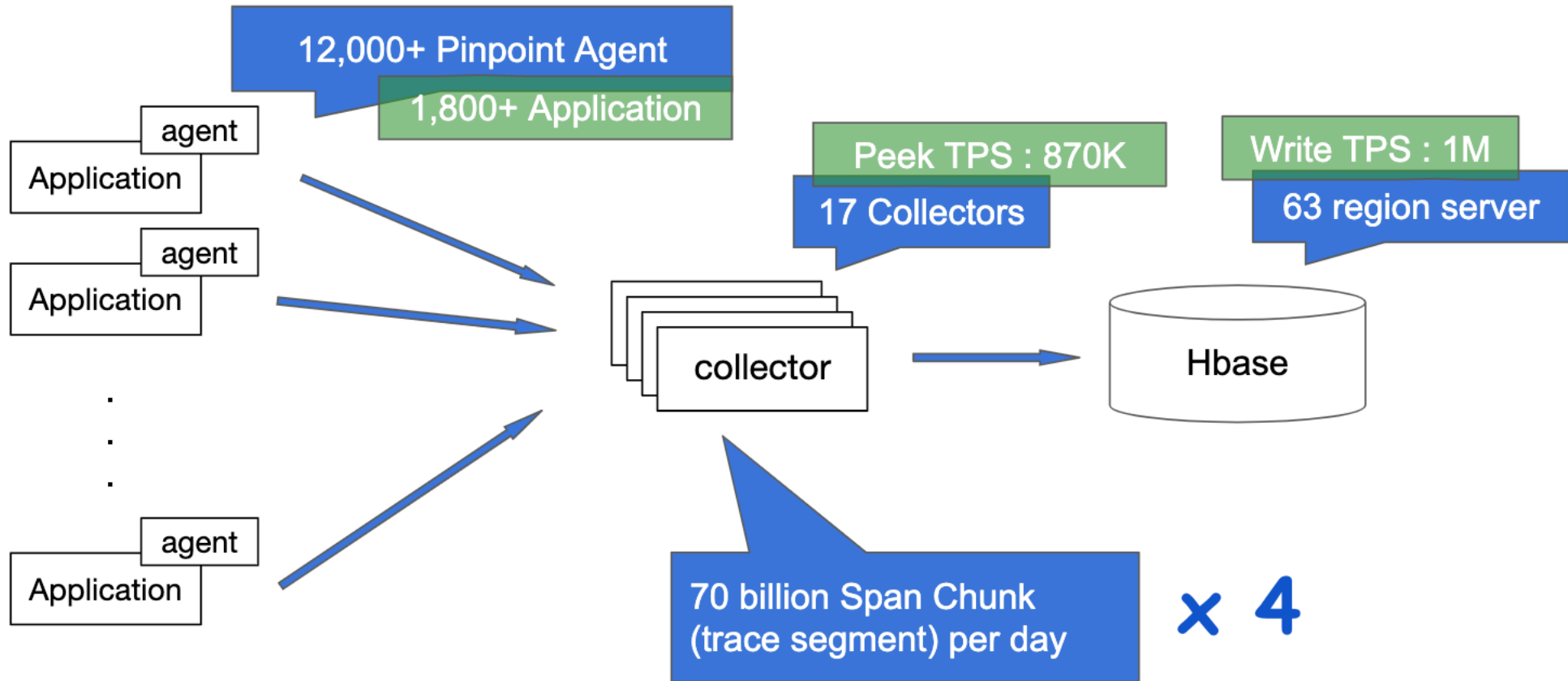


# Open source Pinpoint



- Most of Top 10 IT companies in China
- Global enterprises in Korea
- Various IT companies in USA
- Companies in Financial Industry

# Opensource Pinpoint



# Pinpoint & CNCF

App Definition and Development

Orchestration & Management

Runtime

Provisioning

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.

**CLOUD NATIVE COMPUTING FOUNDATION**

**CLOUD NATIVE Landscape**

**Pinpoint Amplify**

[i.cncf.io](https://i.cncf.io)

Database Streaming & Messaging Application Definition & Image Build Continuous Integration & Delivery

Platform

Certified Kubernetes - Distribution

Observability and Analysis

Monitoring

Logging

Scheduling & Orchestration Coordination & Service Discovery Remote Procedure Call Service Proxy API Gateway Service Mesh

Cloud Native Storage Container Runtime Cloud Native Network

Automation & Configuration Container Registry Security & Compliance Key Management

Kubernetes Certified Service Provider

Kubernetes Training Partner

Certified Kubernetes - Installer

PaaS/Container Service

Serverless

# PINPOINT



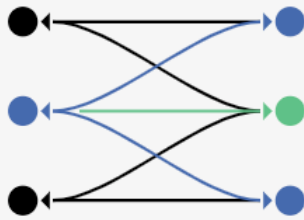
Members

# Pinpoint & Istio



## Istio

Connect, secure, control, and observe services.



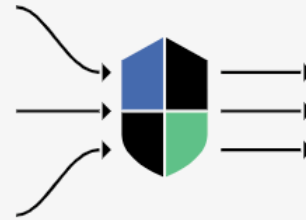
### Connect

Intelligently control the flow of traffic and API calls between services, conduct a range of tests, and upgrade gradually with red/black deployments.



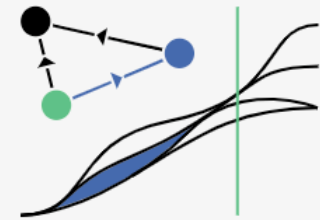
### Secure

Automatically secure your services through managed authentication, authorization, and encryption of communication between services.



### Control

Apply policies and ensure that they're enforced, and that resources are fairly distributed among consumers.



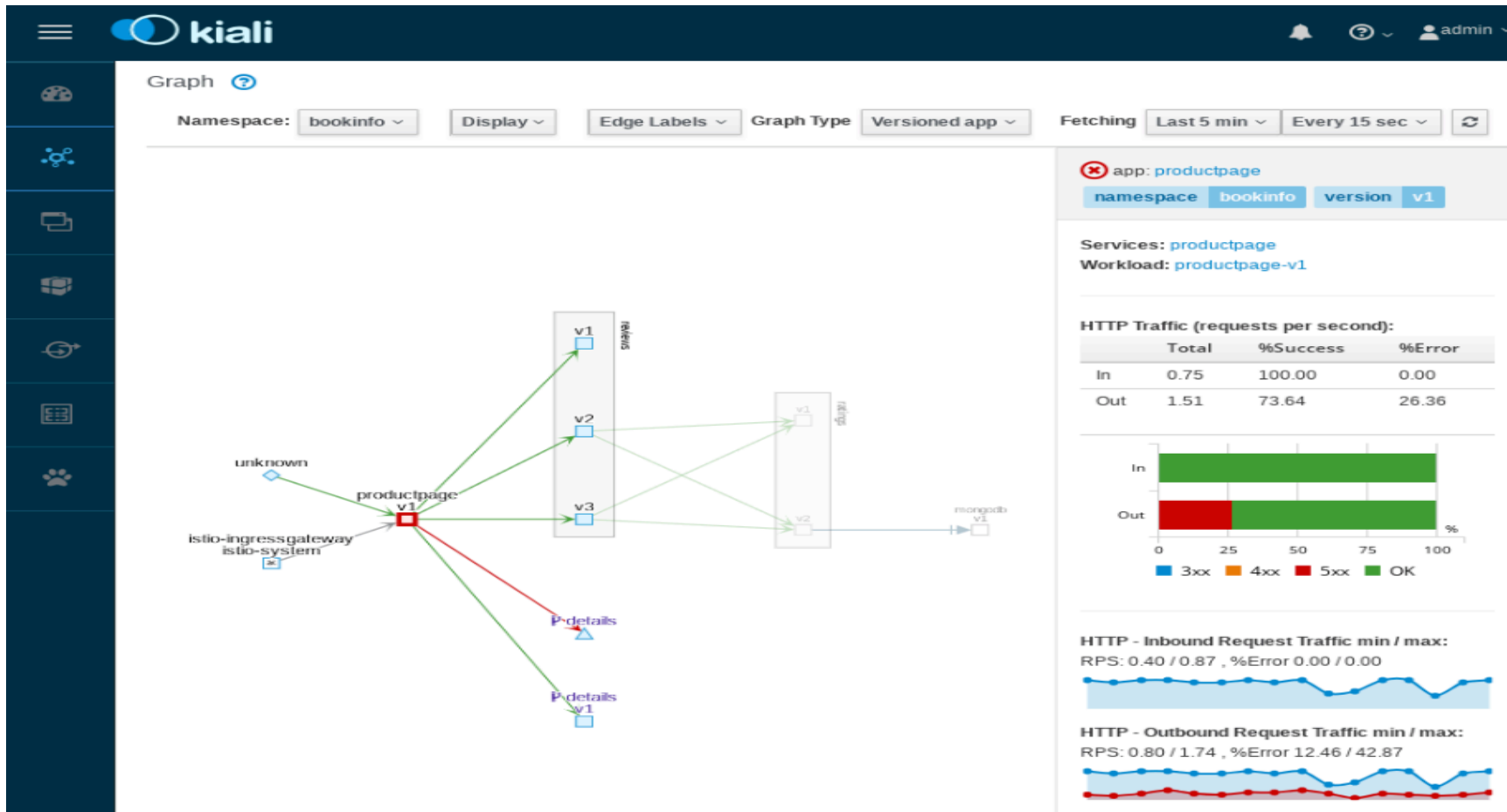
### Observe

See what's happening with rich automatic tracing, monitoring, and logging of all your services.



# Pinpoint & Istio

- Istio의 default tool 보다 더 좋은 tool을 쓰고 싶다.



# Pinpoint + Istio

- Istio의 default tool 보다 더 좋은 tool을 쓰고 싶다.

The screenshot displays the Jaeger UI interface. On the left, the 'Find Traces' sidebar includes filters for Service (productpage.default), Operation (all), Tags (http.status\_code=200 error=true), Lookback (Last Hour), Min Duration, Max Duration, and Limit Results (20). The main area shows a 'Duration' graph and a list of 10 traces. The top trace is selected, showing its details: 'istio-ingressgateway: productpage.default.svc.cluster.local:9080/productpage' with a duration of 38.21ms. The trace details include 8 spans: details.default (1), istio-ingressgateway (1), productpage.default (3), ratings.default (1), and reviews.default (2). The trace is timestamped 'Today | 2:37:33 pm' and is 'a few seconds ago'.

## Pinpoint + Istio

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- DEMO

- Cloud Native로의 전환은 피할 수 없고,
- NAVER도 Cloud Native 적용에 속도를 내고 있으며,
- NAVER는 오픈소스를 최대한 활용하고 기여하며
- 특히 Observability 개선에 많은 노력을 하고 있음

## Appendix

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- billboard.js
- Apache Openwhisk contribution

# billboard.js



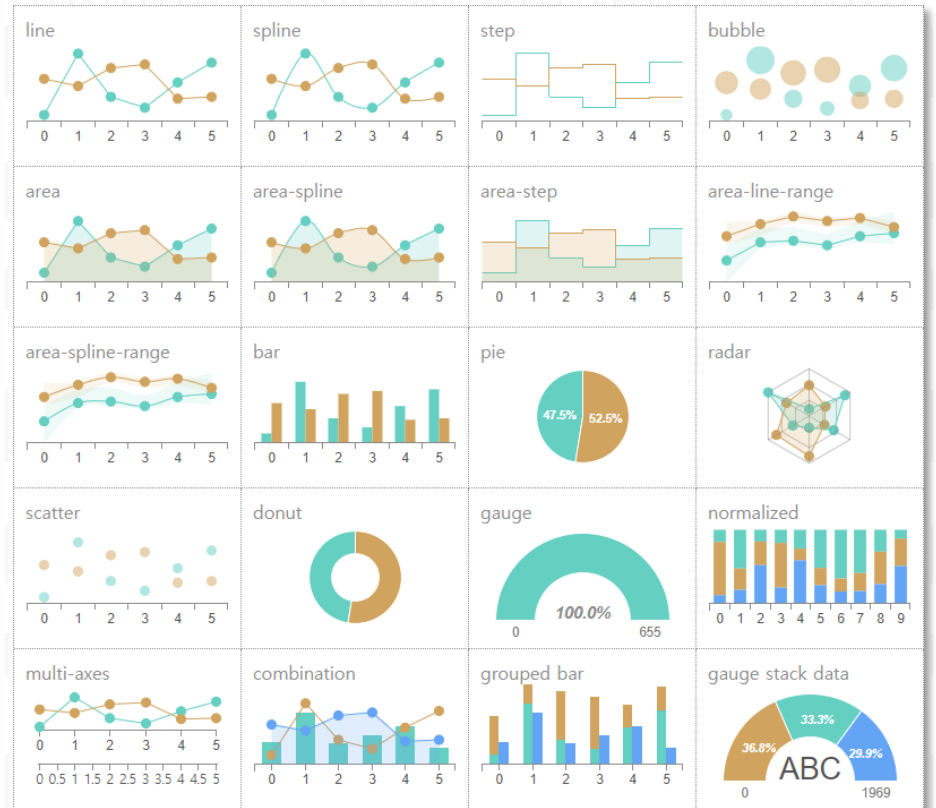
<https://github.com/naver/billboard.js>

2017년 6월 공개한 재사용과 자유로운 커스터마이징 가능한 쉬운 인터페이스를 제공하는 벡터 기반 차트 라이브러리

## 주요 특징:

- 15개 유형의 차트 지원
- 270 여개의 옵션을 통한 다양한 기능 조합 설정
- 200 여개의 풍부한 예제 제공
- 네이버의 다양한 서비스에 적용

[DataLab](#), [스마트스토어 통계](#)(BizAdvisor) 등



# Global Recognition

2019.9월 기준, GitHub starts **3.6K**  
첫 릴리스 직후, GitHub Trending - JavaScript 언어 부문 3위 Rank

일간 전세계적으로 **600**건의 다운로드 발생 (월간 13K+)  
<https://npm-stat.com/charts.html?package=billboard.js>

JavaScript 대표 기술 메일링 매체 "JavaScript Weekly" 소개  
JavaScript Weekly Issues: [#338](#), [#353](#), [#416](#), [#428](#)

**JavaScript Weekly**

[billboard.js: A Chart Library, based on D3 v4+](#)  
A [fork of C3.js](#) focusing on ease of use and working with the latest D3. There are [over 80 examples here](#).

NAVER CORP

[billboard.js: A Simple Chart Library Based on D3 V4](#) [CODE](#)  
v1.1.0 has [just been released](#).

NAVER CORP

Trending in open source  
See what the GitHub community is most excited about today.

Repositories Developers Trending: today All languages Unknown languages

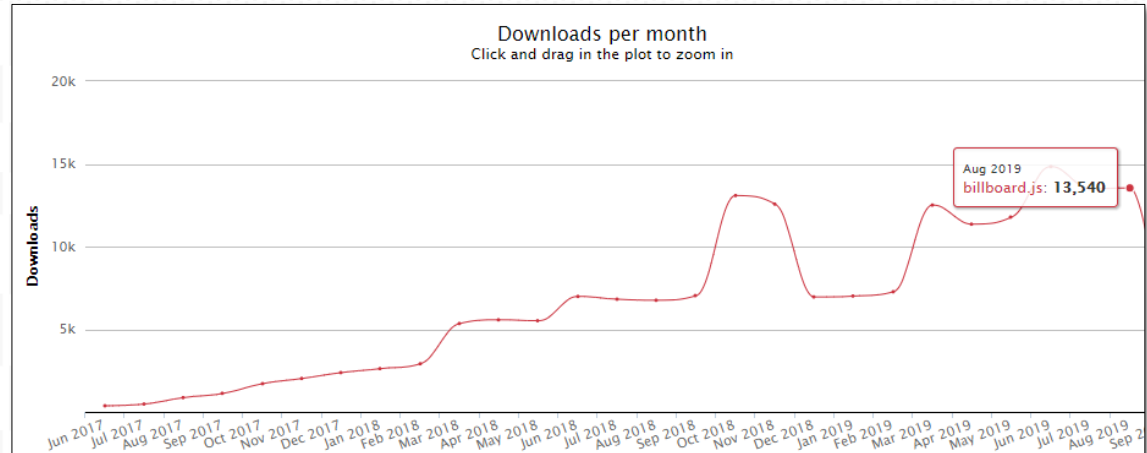
veltman / flubber  
Tools for smoother shape animations.  
JavaScript 1,933 29 781 stars today

amark / gun  
A realtime, decentralized, offline-first, graph database engine.  
JavaScript 5,772 261 Built by Built by 276 stars today

**naver / billboard.js**  
Re-usable easy interface JavaScript chart library, based on D3 v4+  
JavaScript 767 1,145 Built by Built by 139 stars today

Other: Languages JavaScript

ProTip! Looking for most forked JavaScript repositories? Try this search



# Global Reference

커뮤니티 주도적 12개의 third-party 앱

<https://github.com/naver/billboard.js/wiki/Third-party-applications>

글로벌 사용 레퍼런스

<https://github.com/naver/billboard.js/wiki/Who's-using-billboard.js>



유명 기업용 엔터프라이즈 포털 도구인 Liferay에 포함

[https://portal.liferay.dev/docs/7-0/reference/-/knowledge\\_base/r/billboard-is-npm-portlet](https://portal.liferay.dev/docs/7-0/reference/-/knowledge_base/r/billboard-is-npm-portlet)



유명 CMS 오픈소수 솔루션인 Drupal v8의 차트 모듈

<https://www.drupal.org/project/charts>

LIFERAY PORTAL

Liferay 7.0

## BILLBOARD.JS NPM PORTLET

[Edit on GitHub](#)

**Important:** This sample works for Liferay DXP Fix Pack 30+ and Liferay Portal CE GA5+.

### WHAT DOES THIS SAMPLE DO WHEN IT'S DEPLOYED?

The Billboard.js npm Portlet sample provides a portlet that uses the Billboard.js framework to render its output.

Billboard.js Portlet

#### Billboard.js Portlet

##### An example from billboard.js

##### Default charts

Category	data1	data2
0	280	120
1	300	100
2	280	120

Charts | Drupal.org

https://www.drupal.org/project/charts

### Features (Drupal 8 version)

- Charts Blocks:** Available in 8.x-3.x-dev, this block plugin features fields for data input, so that you can chart data not already in your site without needing to use the API. [Please help to improve charts blocks.](#)
- New Libraries**
  - Billboard.js:** Billboard.js is a fork of the C3.js library (below), but that uses a more recent version of D3 and has more options.
  - C3.js:** C3.js makes it easy to generate D3-based charts by wrapping the code required to construct the entire chart.
  - Chart.js:** Chart.js is a simple yet flexible JavaScript charting for designers & developers.



# Apache OpenWhisk Contribution

# 주요 컨트리뷰션 현황 - 커밋

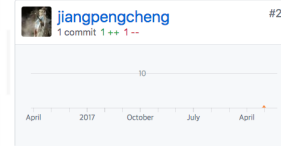
## [openwhisk](#)



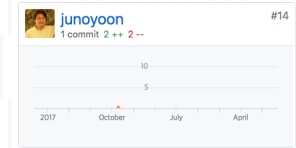
## [openwhisk-cli](#)



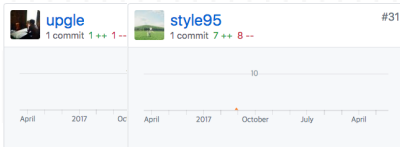
## [openwhisk-client-js](#)



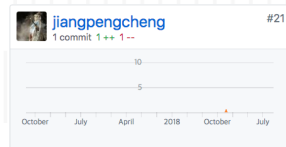
## [serverless-openwhisk](#)



## [openwhisk-runtime-java](#)



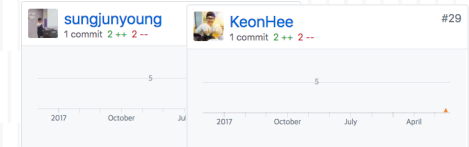
## [openwhisk-apigateway](#)



## [openwhisk-catalog](#)



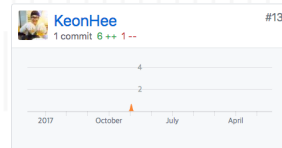
## [openwhisk-wskdeploy](#)



## [openwhisk-client-go](#)



## [openwhisk-package-alarms](#)

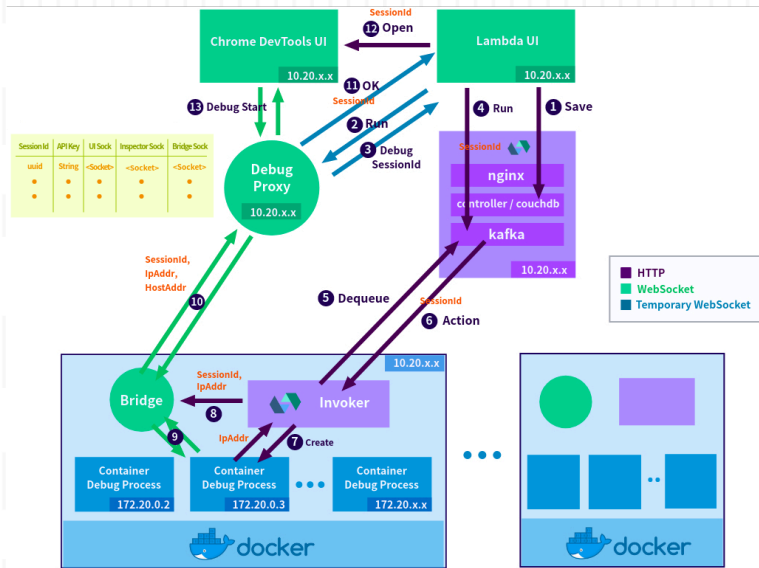


10개 repo참여, 55개 커밋 머지 완료  
현재 9개 추가 Pull requests 리뷰 중

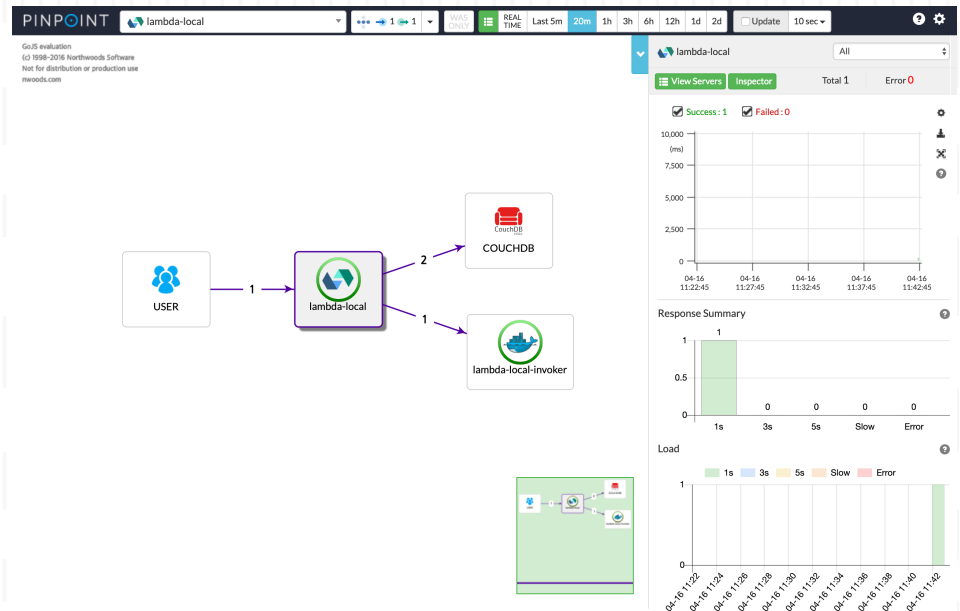
Committer/PMC member 1명



# 자체 개발 현황 - 추가 기능 개발



Chrome Devtools 기반 디버깅 기능 구현



Pinpoint 플러그인 개발 및 Tracing 기능 확보

기존 오픈소스 대비 추가 경쟁력 확보