DATADOG

Datadog In-depth Session (Day 1)

2:00 PM에 시작합니다!

SKT 2 days 교육 일정

시간	Day1
14:00 ~ 14:50 (정영석 부장)	**Datadog Overview** - 기본 소개 및 전체 제품 구성 안내 - 계정 접속 및 ORG 구성/권한 - 기본 비용 체계 - Q&A **Infrastructure monitoring** - 개요 및 설명
14:50 ~ 15:00	**Break**
15:00 ~ 15:50 (정영석 부장)	**Infrastructure monitoring** - 설치 및 구성 방법 - 최적화 사용 방안 - Q&A
15:50 ~ 16:00	**Break**
16:00 ~ 17:00 (이성욱 부장)	**Log Management** - 설치 및 구성 방법 - 최적화 사용 방안 - Q&A

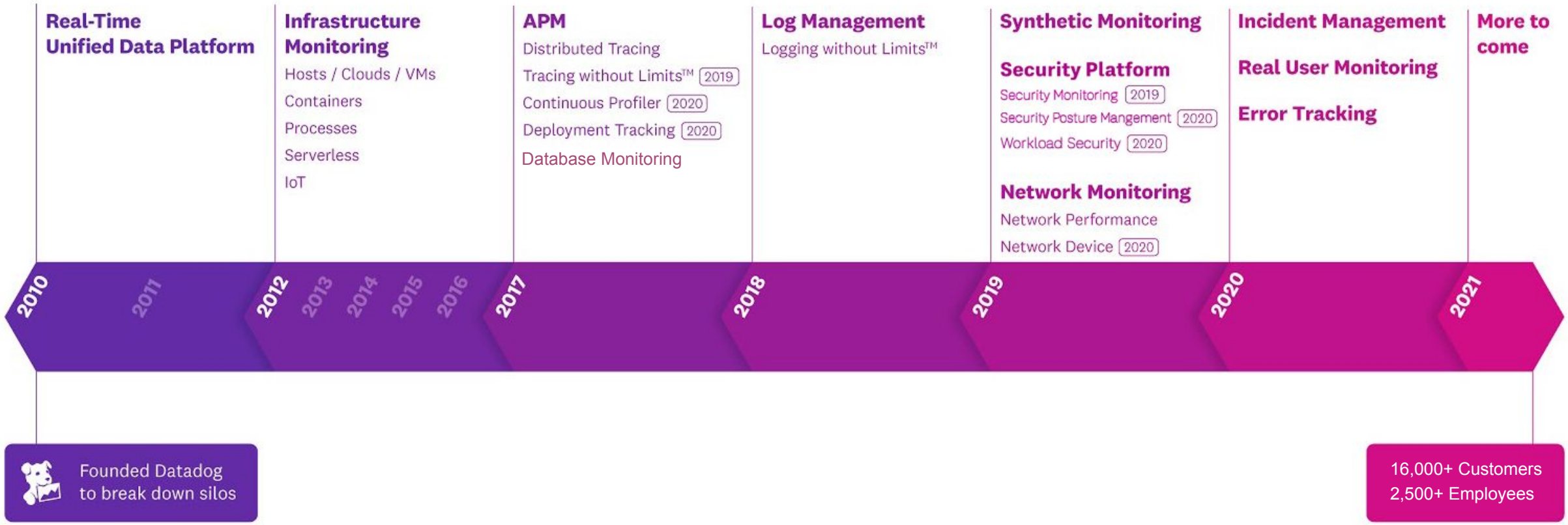
시간	Day2
14:00 ~ 14:50 (이성욱 부장)	**Application Performance Monitoring (Back End)** - 개요 및 설명 - 설치 및 구성 방법 - 최적화 사용 방안 - Q&A
14:50 ~ 15:00	**Break**
15:00 ~ 15:50 (정영석 부장)	**Real User Monitoring (Front End)** - 개요 및 설명 - 설치 및 구성 방법 - 최적화 사용 방안
15:50 ~ 16:00	**Break**
16:00 ~ 17:00	**Q&A Session**

Datadog Overview

- 기본 소개 및 전체 제품 구성 안내
- 기본 비용 체계
- 계정 접속 및 ORG 구성/권한

Datadog 제품 구성

Datadog 제품 구성



Datadog은 SaaS기반의 통합 모니터링 플랫폼으로 다음의 가치를 추구합니다

- 최소한의 운영 인력으로 모니터링에 필요한 데이터를 손쉽게 수집
- 운영, 개발, 보안 및 기획팀 사이의 원만한 협업 (같은 데이터를 보며 커뮤니케이션)
- 이슈 분석 시간을 최소화

Datadog 기본 비용 체계

Real-Time Unified Data Platform

Infrastructure Monitoring
- Hosts / Clouds / VMs
- Containers
- Processes
- Serverless
- IoT

APM
- Distributed Tracing
- Tracing without Limits™ 2019
- Continuous Profiler 2020
- Deployment Tracking 2020
- Database Monitoring

Log Management
- Logging without Limits™

Synthetic Monitoring

Security Platform
- Security Monitoring 2019
- Security Posture Mangement 2020
- Workload Security 2020

Network Monitoring
- Network Performance
- Network Device 2020

Incident Management

Real User Monitoring

Error Tracking

Infrastructure 과금단위
- 호스트 수
- 컨테이너 수 (호스트 하나당 10개 컨테이너 무료 포함)
- ECS Fargate는 Task 수
- EKS Fargate는 Pod 수

ADD-ONS		
AWS Fargate (serverless containers)	$1 per task	$1 per task
IoT Device Monitoring	$5 per device	$5 per device

Infrastructure

See inside any stack, any app, at any scale, anywhere

Free	Pro	Enterprise
$ 0	$ 15	$ 23
	Per host, per month*	Per host, per month*
Core collection and visualization features	Centralize your monitoring of systems, services, and serverless functions	Advanced features and administrative controls
– **Discussion group supported** – **1-day metric retention** – **Up to 5 hosts**	– **450+ integrations** – **Out-of-the-box dashboards** – **15-month metric retention** *Billed annually or $18 on-demand	– **Machine learning–based alerts** – **Live Processes** – **Premium support** *Billed annually or $27 on-demand 100 host minimum

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Error Tracking

Serverless

Monitor, detect, and resolve bottlenecks and errors

STARTING AT

$ 5

Per million invocations, per month*

START FREE TRIAL

Real-time serverless metrics
15-month metric retention
Trace function invocations
Out-of-the-box Service Map
Connect traces across hosts and functions
150k Indexed Spans and 5 custom metrics included

*Billed annually or $7.20 on-demand. See docs for more information

Serverless 과금단위
- Lambda 호출 수

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APM 과금단위
- 호스트 수
- AWS Fargate는 Task 수
- EKS Fargate는 Pod 수
- Indexed span (호스트 당 1M indexed span 무료제공)
  - 초과시 1 Million span 당 약 $1.7 과금 (15-day retention 기준)
- Ingested span (호스트 당 150 GB 무료제공)
  - 초과시 $0.10/GB

APM & Continuous Profiler

End-to-end distributed tracing with no sampling and always-on production code profiling

APM	APM & Continuous Profiler
STARTING AT	STARTING AT
$ 31	$ 40
Per host, per month*	Per host, per month*
Monitor every service, every code deployment, and every request	Optimize code performance in production with minimal overhead
– **Correlate traces with metrics, logs, processes, network data, and more**	– **Everything included in APM**
– **15-minute live search & analytics**	– **Code level visibility for every request**
– **15-day historical search & analytics**	– **Optimize bottlenecks in your code to reduce resource consumption and cloud costs**
– **15-month metric retention**	– **Actionable insights with automatic code analysis**
*Billed annually or $36 on-demand	*Billed annually or $48 on-demand

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Error Tracking

Database Monitoring

Surface slow performing queries and optimize application performance

STARTING AT

$ 70

Per database host, per month*

START FREE TRIAL

Track normalized query performance trends using database-generated metrics
Correlate query performance with database infrastructure metrics
Access all of your database insights, database hosts, clusters, and applications
Extract valuable data without compromising database security

*Billed annually or $84 per host on-demand

DB Monitoring 과금단위
- 호스트 수

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Log Management

Analyze and explore log data in context with flexible retention

Ingest	Retain or Rehydrate
STARTING AT	15-DAY RETENTION
$ 0.10	$ 1.70
Per ingested or scanned GB, per month*	Per million log events per month*
Ingest, process, live tail, and archive all logs	Retain logs based on their value and rehydrate from archives on-demand
– **Enrich and structure log data** – **Parse on ingestion** – **Generate log-based metrics** – **Self-hosted archives, with the option to rehydrate** – **Dynamic index routing**	– **Define log retention based on tags or facets** – **Simplified pricing based on retention for better cost control** – **Log patterns and analytics** – **Log Rehydration™ for audits and historical analysis**
*Per GB of uncompressed data ingested for processing, or compressed data scanned for rehydrating.	*Billed annually or $2.55 on-demand

Log 과금단위

- 인덱싱(Retain)한 로그 수 (검색을 위해서는 로그 인덱싱 필요)
- 인덱싱을 하지 않을 경우 Ingest 비용 과금

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Synthetic Monitoring

API and Browser Tests for proactive, end-to-end visibility

API Tests	Browser Tests
STARTING AT	STARTING AT
$ 5	$ 12
Per ten thousand test runs, per month*	Per thousand test runs, per month*
Proactively monitor site availability	Easily monitor critical user journeys
– **Monitor uptime SLAs and SLOs** – **Globally managed locations** – **Sophisticated alerting capabilities**	– **Record tests without code** – **Intelligent, self-maintaining tests** – **View screenshots and front-end errors for every step**
*Billed annually or $7.20 on-demand	*Billed annually or $18 on-demand

Synthetic 과금단위

- Synthetic 테스트가 실행된 수

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Security Monitoring

Detect and investigate security threats in real time

STARTING AT

$ 0.20

Per GB of analyzed logs, per month*

START FREE TRIAL

Out-of-the-box and custom detection rules

Threat detection across all ingested data, regardless of retention

Security signals explorer and analytics

15-month retention of security signals

*Billed annually or $0.30 on-demand

Security Monitoring 과금단위

- Security 검사가 진행된 로그의 GB 양

Datadog 기본 비용 체계

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Error Tracking

Cloud Security Posture Management

Continuous configuration audits across cloud accounts, hosts, and containers

STARTING AT

$ 7.50

Per host, per month*

START FREE TRIAL

Configuration rules for cloud, containers, and kubernetes
Visibility into your configuration status at any given point in time
Notify and alert on new misconfigurations
CIS, PCI-DSS, HIPAA, GDPR, and other standards

*Billed annually or $9 on-demand

Security Posture Monitoring 과금단위

- Security Posture 검사되고 있는 호스트 수

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Real User Monitoring

Error Tracking

Cloud Workload Security

Real-time threat detection across hosts and containers

STARTING AT

$ 15

Per host, per month*

START FREE TRIAL

Detect threats to your hosts and containers in real-time

Deep file & process activity monitoring

Performant, in-kernel, eBPF-powered analysis

Easy setup with the unified Datadog agent

*Billed annually or $18 on-demand

Workload Security 과금단위

- 검사되고 있는 호스트 수

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Real User Monitoring

Error Tracking

Network Monitoring

Monitor devices and traffic flows for complete network visibility

Network Performance Monitoring	Network Device Monitoring
STARTING AT	STARTING AT
$ 5	$ 7
Per host, per month*	Per device, per month*
Understand network traffic patterns and search with tags	Monitor the health and performance of on-premise network devices
– **Visualize flows on the network map** – **Slice-and-dice traffic by host, process, container, service, AZ, and more** – **Analyze system-wide DNS performance**	– **Out-of-the-box metrics collected from switches, routers, firewalls and more** – **Visualize interface bandwidth and utilization, disk, fan, and other hardware health** – **Comprehensive and customizable alerts**
*Billed annually or $7.20 on-demand	*Billed annually or $10.20 on-demand

Network Performance Monitoring 과금단위

- 호스트 수

Network Device Monitoring 과금단위

- Network 장비 수

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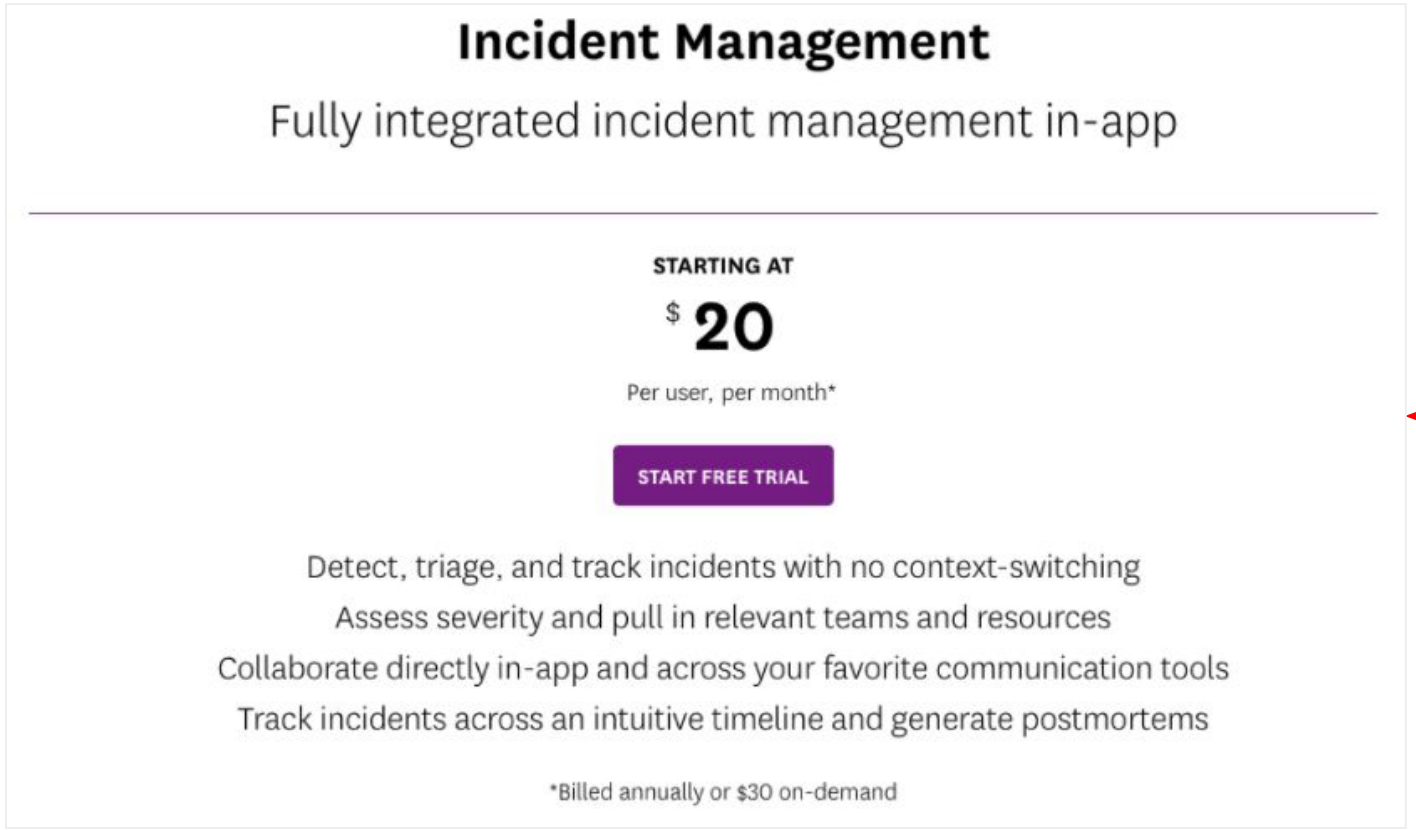
Real User Monitoring

Error Tracking



Incident Management 과금단위

- Incident Management 사용한 Active User 수

Datadog 기본 비용 체계

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Incident Management

Real User Monitoring

Error Tracking

Real User Monitoring

Measure end-to-end user experience on web and mobile applications

STARTING AT

$ 15

Per 10k sessions, per month*

START FREE TRIAL

Identify, troubleshoot and resolve performance issues

Collect and track application errors and crashes with Error Tracking

Automatically link frontend requests to backend APM traces

*Billed annually or $18 on-demand

Real User Monitoring 과금단위

- 사용자 세션 수 (접속 사용자 별로 세션이 생성됨)

비용 걱정 없이 사용 가능한 부분

- Dashboard 생성
- Dashboard Public Share
- Dashboard 조회
- Datadog 사용자 수 (Incident Management Product 제외)
- 알람 생성
- 알람 트리거
- Datadog API 호출
- Notebook 생성 및 사용 (저장된 메트릭을 이용하여 이슈 분석 노트를 만들수 있는 기능)
- 450+ Integration을 통한 메트릭 수집은 대부분 추가 비용이 없습니다.
  - AWS, Azure 과 같이 Host가 탐지되어 메트릭을 수집하는 부분은 Host 과금이 있습니다.
  - Redis, Kafka 와 같은 Integration은 추가 비용없이 메트릭 수집이 됩니다

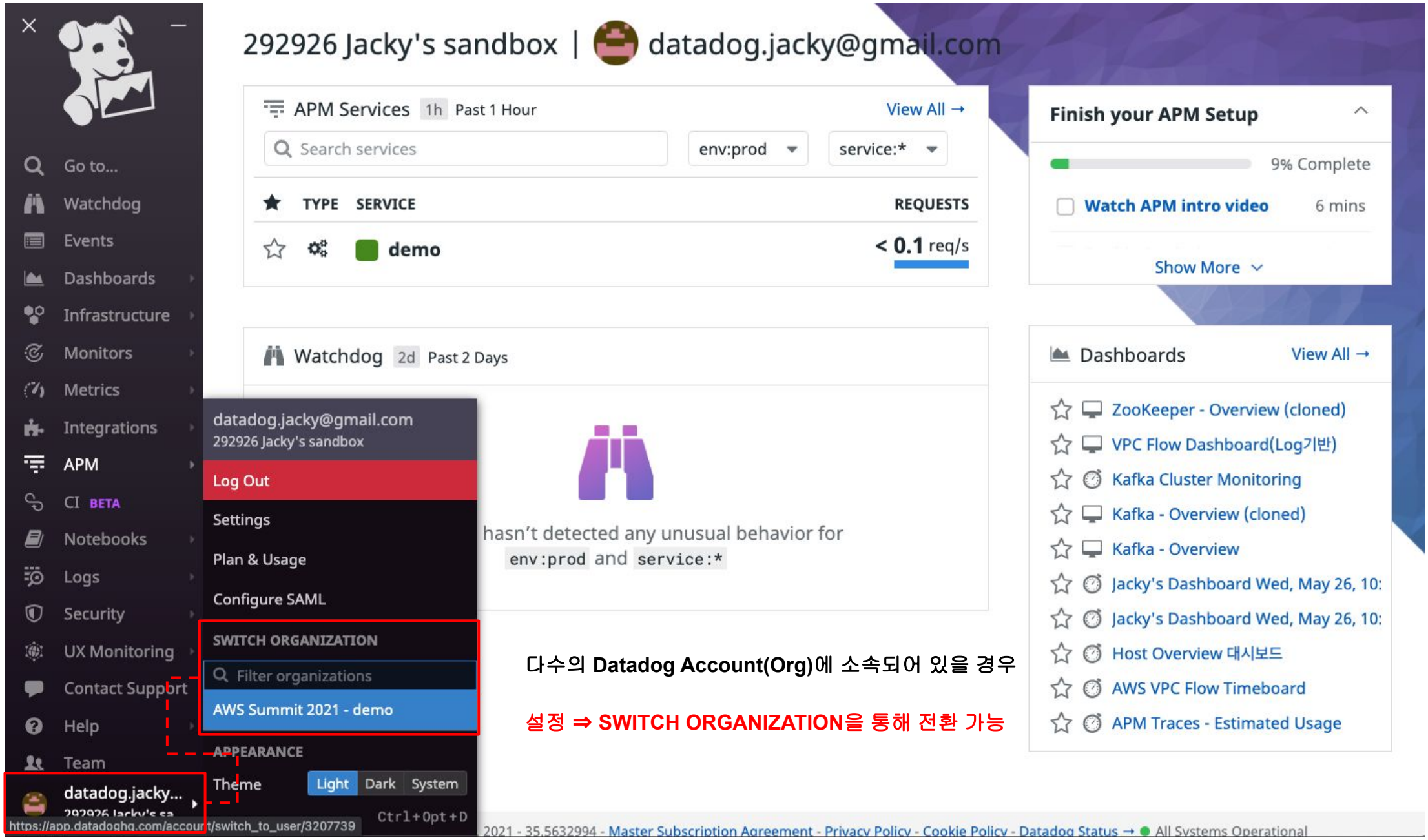
Datadog 계정 접속

1. ID/PW를 이용한 로그인

2. SSO 계정 연동을 이용한 로그인

- **SAML을 지원하는 SSO 솔루션 연동 가능**
- **SSO 연동 솔루션 예**
  - Active Directory
  - Auth0
  - Azure
  - Google
  - NoPassword
  - Okta
  - SafeNet
  - AWS SSO
- 부가 기능
  - SAML Attribute를 Datadog Role에 연동
  - Just in time provisioning (SSO 로그인시 자동으로 Datadog 계정 생성)
  - SAML Strict (SSO를 통해서만 로그인 하도록 강제 설정)

Datadog 계정 전환

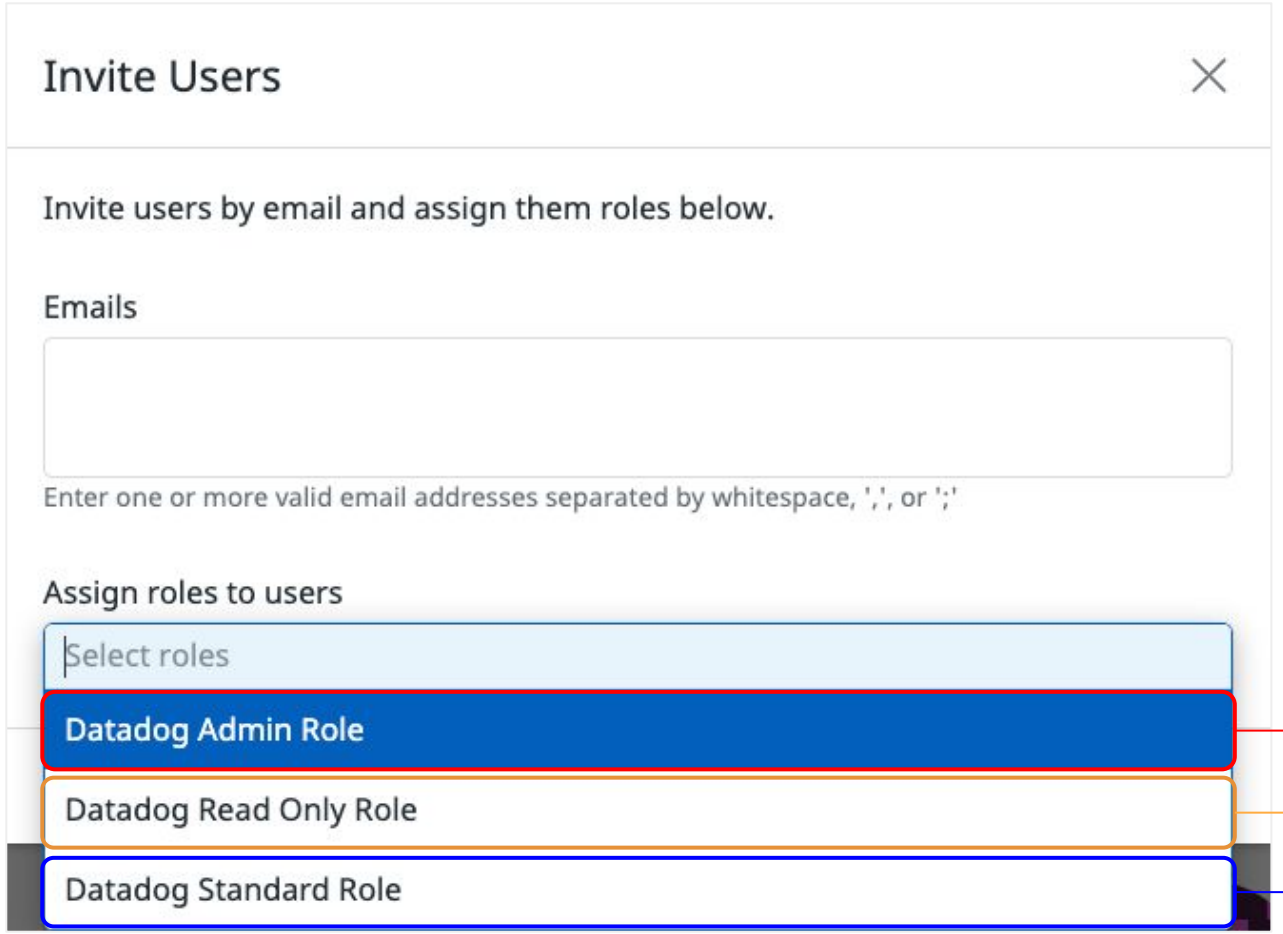


다수의 **Datadog Account(Org)**에 소속되어 있을 경우

설정 ⇒ **SWITCH ORGANIZATION**을 통해 전환 가능

Datadog 접근 권한(기본 ROLE)

사용자 초대하는 화면에서 보시면.. **(Team ⇒ Invite Users)**



- ❏ Billing(사용량) 페이지 접근
- ❏ 사용자 관리
- ❏ API Key 관리
- ❏ + Standard User의 기능 포함

- ❏ Datadog에서 모든 기능에 대해 볼 수 있는 권한만 제공.
- ❏ 수정 불가

- ❏ Datadog에서 제공하는 모든 기능에 대해 생성 및 사용 가능

Datadog 접근 권한(Custom ROLE)

Custom Role을 통해 세밀한 권한 제어가 가능합니다

참고

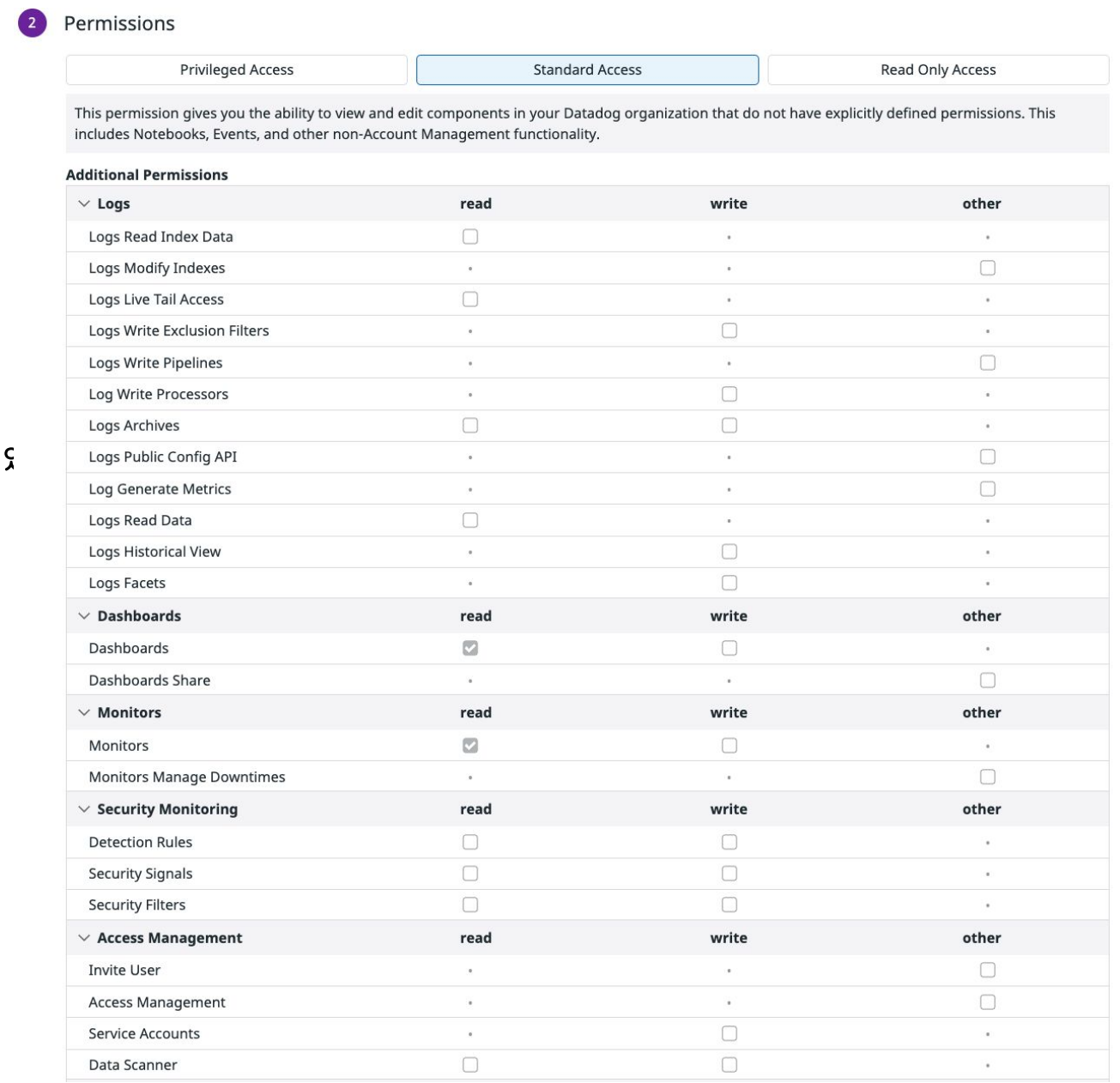
- support@datadoghq.com 으로 다음과 같이 보내주시면 됩니다.

  Subject: Enable custom roles

  Please enable custom roles in our account. The organization name is XXX.

  (서포트팀에서 Admin 인지 확인 후 활성화 진행해드립니다)

- **Enterprise** 라이센스 기능으로 라이센스 정책에 따라 향후 사용이 제한될 수 있

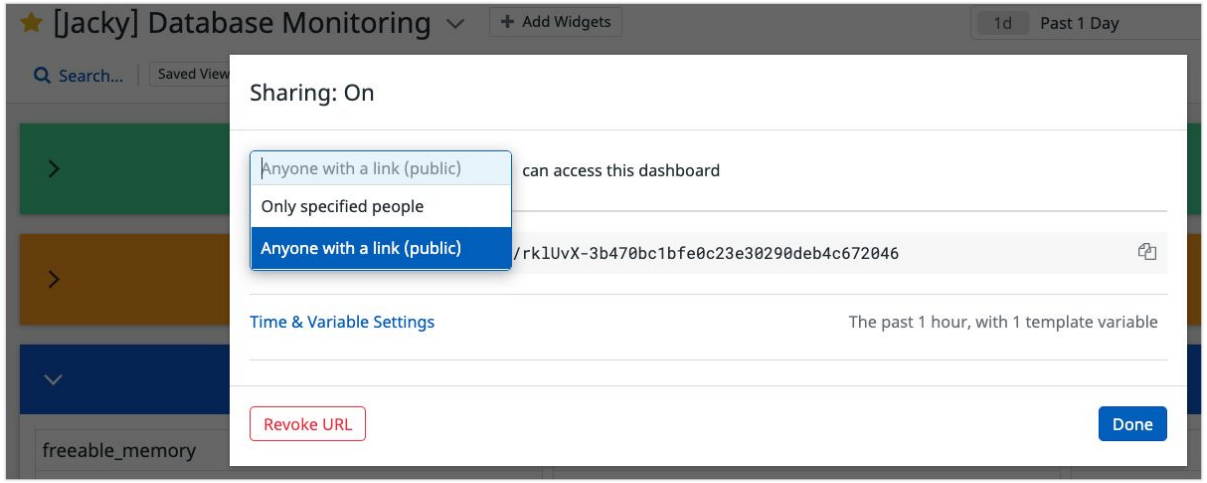


Datadog 접근 권한

Datadog 계정 초대없이 Dashboard만 공유 하고 싶은 경우라면?

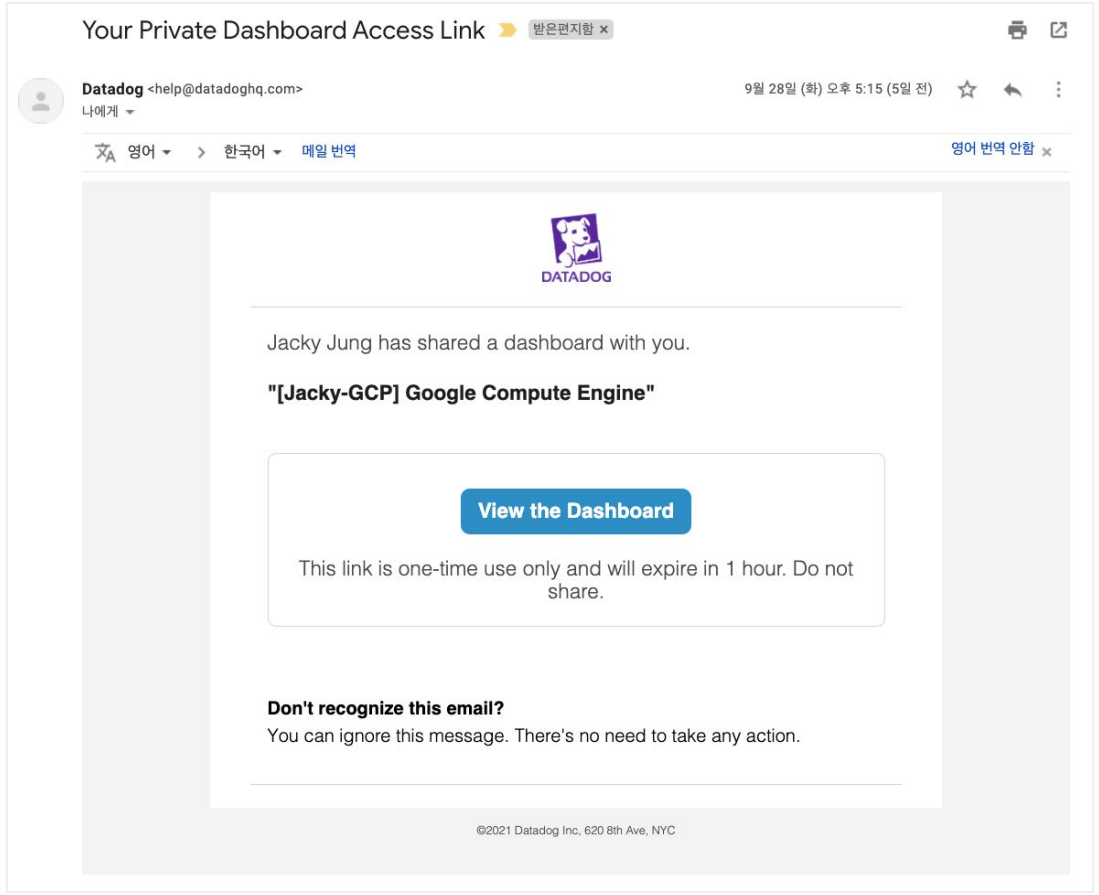
1. Dashboard를 Public share하여 URL을 통해 볼 수 있도록 제공

- **Dashboard 화면 ⇒ 설정 ⇒ Configure Sharing 선택**



2. Public Share가 보안상 우려가 된다면 Email 기반 인증 share를 활용

- One time Link를 이용해 담당자에게 안전하게 Dashboard 공유 가능



Infrastructure Monitoring

- 개요 및 설명
- 설치 및 구성 방법
- 최적화 사용 방안

1. Infrastructure Monitoring 개요

운영 엔지니어로부터 어떤 모니터링 니즈가 있을까요?

1. **Host의 시스템 메트릭 수집**
   - CPU/Memory/Network/Disk
2. **Process Monitoring**
   - 개별 Process에 대한 모니터링
3. **Public Cloud에 대한 가시성 확보**
   - AWS/Azure/GCP 의 메트릭 수집
   - Ex) Loadbalancer, PaaS DB, CDN 등
4. **Container Orchestration 환경에서의 상태 메트릭 수집**
   - Container 시스템 자원
   - K8S, EKS, AKS, GKE, ECS
5. **운영중인 솔루션의 Key Metric 수집**
   - K8S, Redis, NGINX, mysql 등

Q1. 다음의 운영 환경에서 Datadog은 무엇에 대해 과금을 할까요? (선착순 두분께 Chat에 정답을 올려주신 분께 티셔츠를 제공해 드립니다)

1. EC2 100대 운영
2. EKS 클러스터 10대의 노드에 컨테이너 90개 정도 운영
3. 10개의 Fargate Task 운영
4. RDS 5대 운영
5. ALB 10대 운영

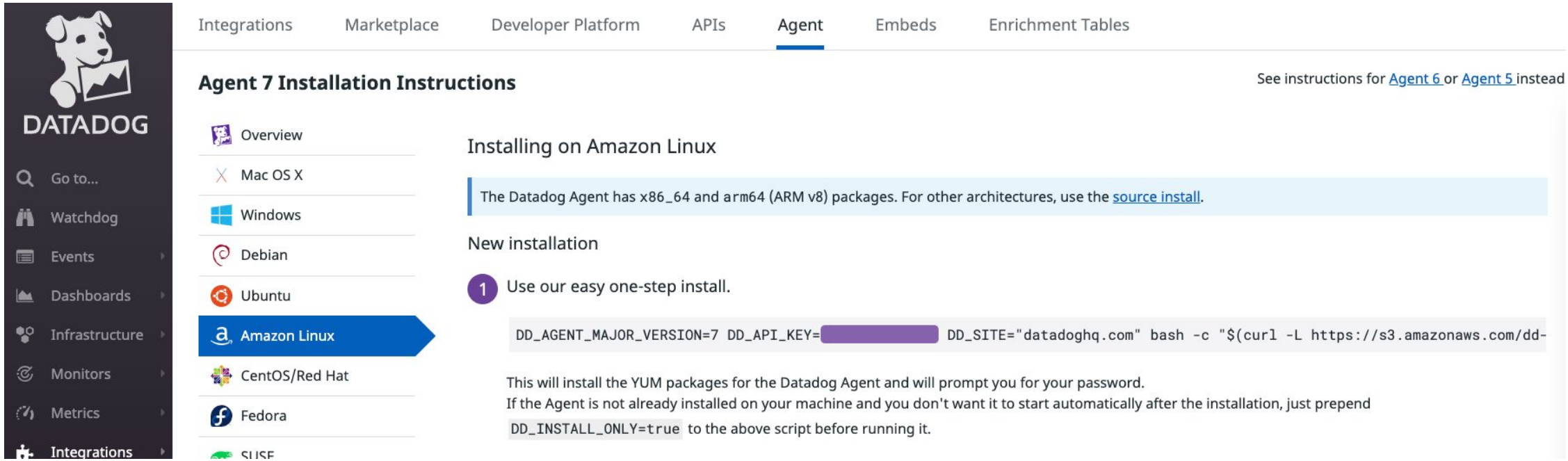
AWS 연동을 통해 EC2, RDS, ALB 메트릭을 수집하고, 각 Host와 Fargate Task에 Datadog 연동을 했을때 어떤 항목에 과금을 할까요?

정답) RDS 5대, EC2 100대, Fargate 10대, ALB 10대, Container 90개

1.1 Host의 시스템 메트릭 수집

Integration ⇒ Agent ⇒ OS 선택하면 상세 가이드가 보입니다 (링크)

- 모니터링을 희망하는 호스트에 아래 보이는 싱글라인 커맨드 이용해 Agent 설치 (바이너리 다운로드, 서비스 등록, 서비스 시작 진행)



참고 사항

- 업데이트를 희망하실 경우 동일 커맨드를 다시 실행하면 업데이트가 진행됩니다 (설정 파일은 그대로 유지)
- 마이너 버전에 대해 지정을 희망할 경우 DD_AGENT_MINOR_VERSION 옵션을 지정하여 실행합니다. (Datadog agent version 참고)
- S3(s3.amazonaws.com) 에대해 https 접근이 불가능할 경우 인스톨 바이너리를 받아올 수 없어 Agent 설치가 불가능합니다
- 폐쇄망의 경우 바이너리를 Datacenter에 다운로드 받아 패키지 설치를 진행합니다 (Package repo 참고)

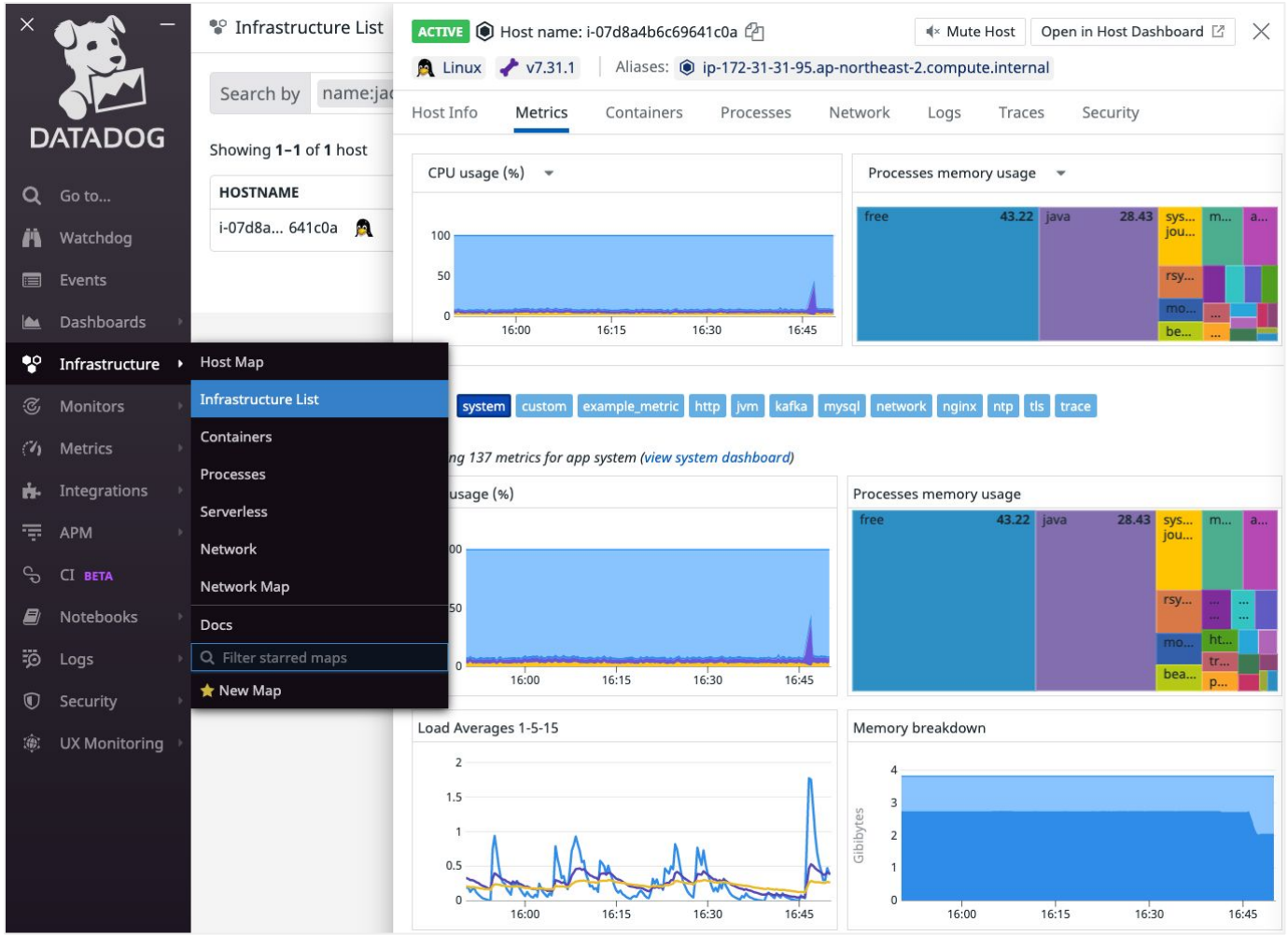
1.2 Host의 시스템 메트릭 (Agent 설치 후)

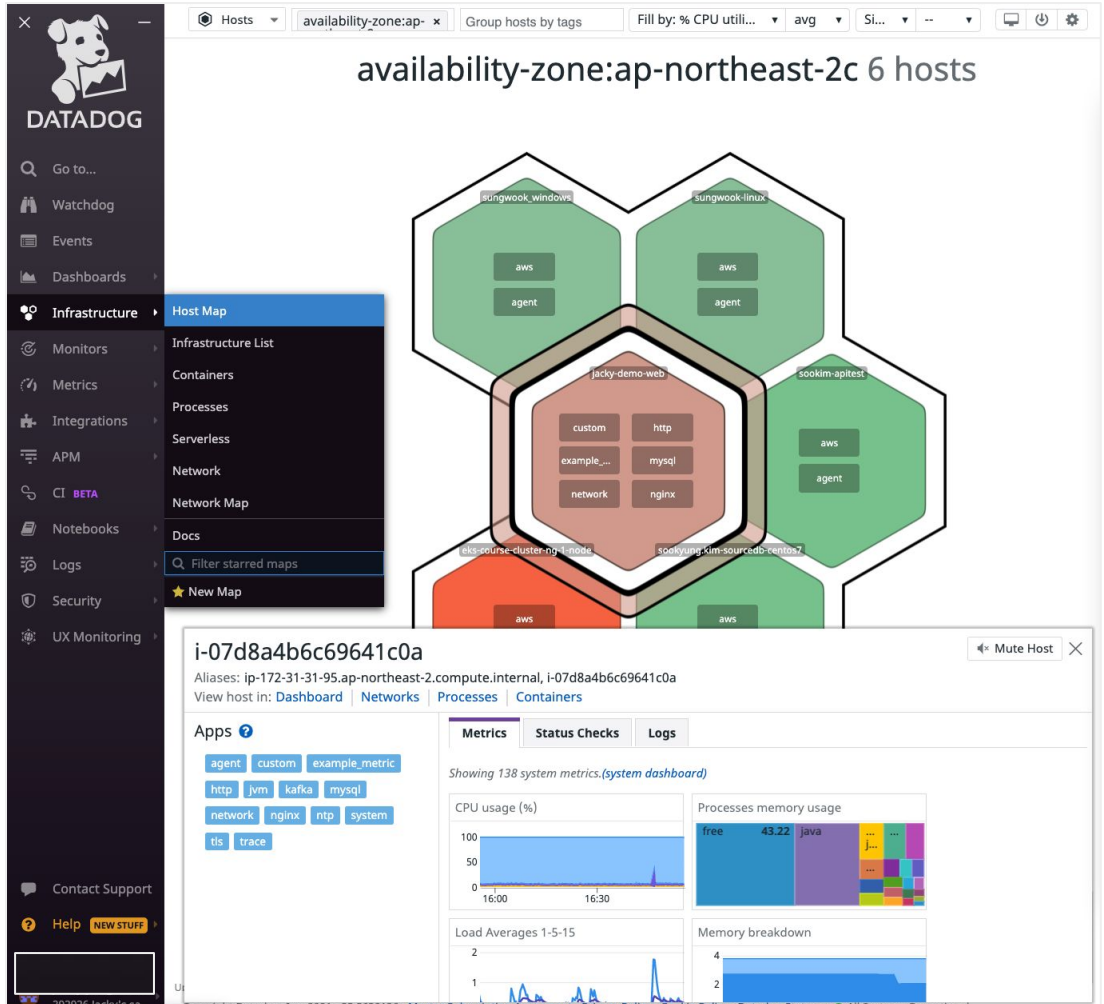
1) Infrastructure ⇒ Infrastructure List 를 통해 호스트 UP 확인

- 호스트에 대한 CPU, Memory, Disk, Network 등의 사용량에 대해 확인 가능
- Open in Host Dashboard를 통해 Time window 조정하며 메트릭 확인 가능
- 이후 로그, APM, NPM 등에 대해 연동시 각 Tab에서 연계 확인 가능

2) Infrastructure ⇒ Hostmap

- 각 호스트는 육각형으로 표현되고 메트릭 수치에 따라 다른 색으로 표시
- 어떤 호스트에서 리소스 사용량이 높은지 확인 후 디테일한 연동 메트릭 확인 가능





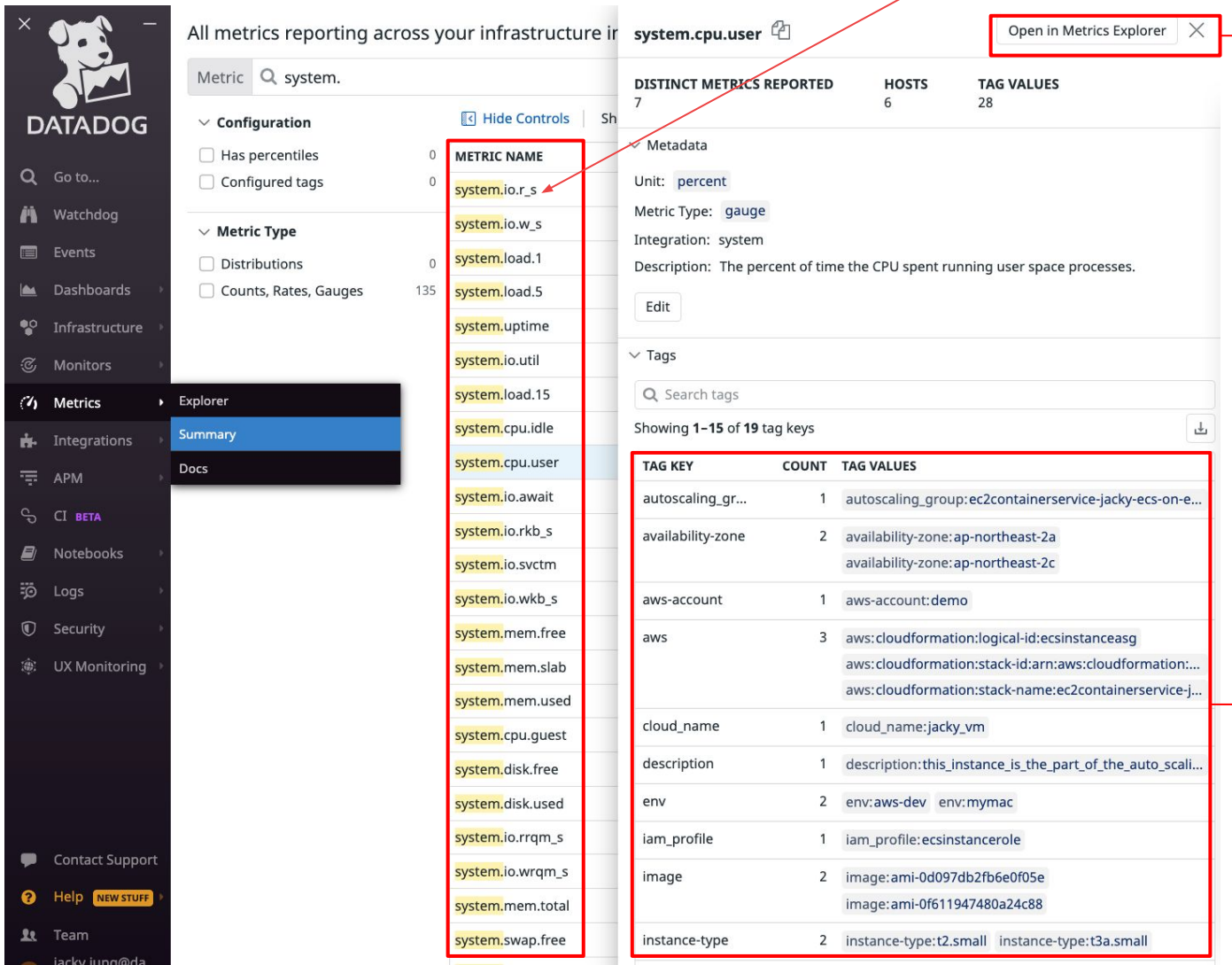
1.3 Host의 시스템 메트릭 리스트 및 Data point 확인

Metrics ⇒ Summary 를 통해 메트릭 리스트 및 tag 확인

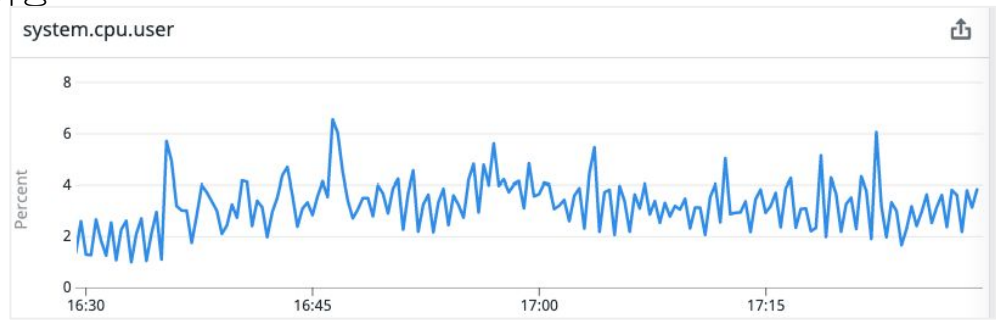
- system.* 네임스페이스에 다양한 시스템 메트릭 수집 확인
- 함께 수집된 Tag 와 타임시리즈 그래프 확인

Q2. 여기보이는 system.* 메트릭은 몇 달 보관이 될까요? (선착순 티셔츠1)

정답: Datadog에 Metric 형태로 보관되는 정보는 15개월 유지가 됩니다



• Data point가 정상적으로 쌓이고 있는지 Metric Explore에서 확인 가능



• 원하는 Tag가 잘 수집되었는지 확인 가능 (자동수집 + Custom tag)

• Custom Tag는 /etc/datadog-agent/datadog.yaml 에 아래와 같이 정의 가능

```
## Learn more about tagging: https://docs.datadoghq.com/tagging/
tags:
   - env:aws-dev
   - team:devops
   - service:jacky-springboot-api
#   - <TAG_KEY>:<TAG_VALUE>
```

1.4 Host의 시스템 메트릭을 이용한 알람 설정

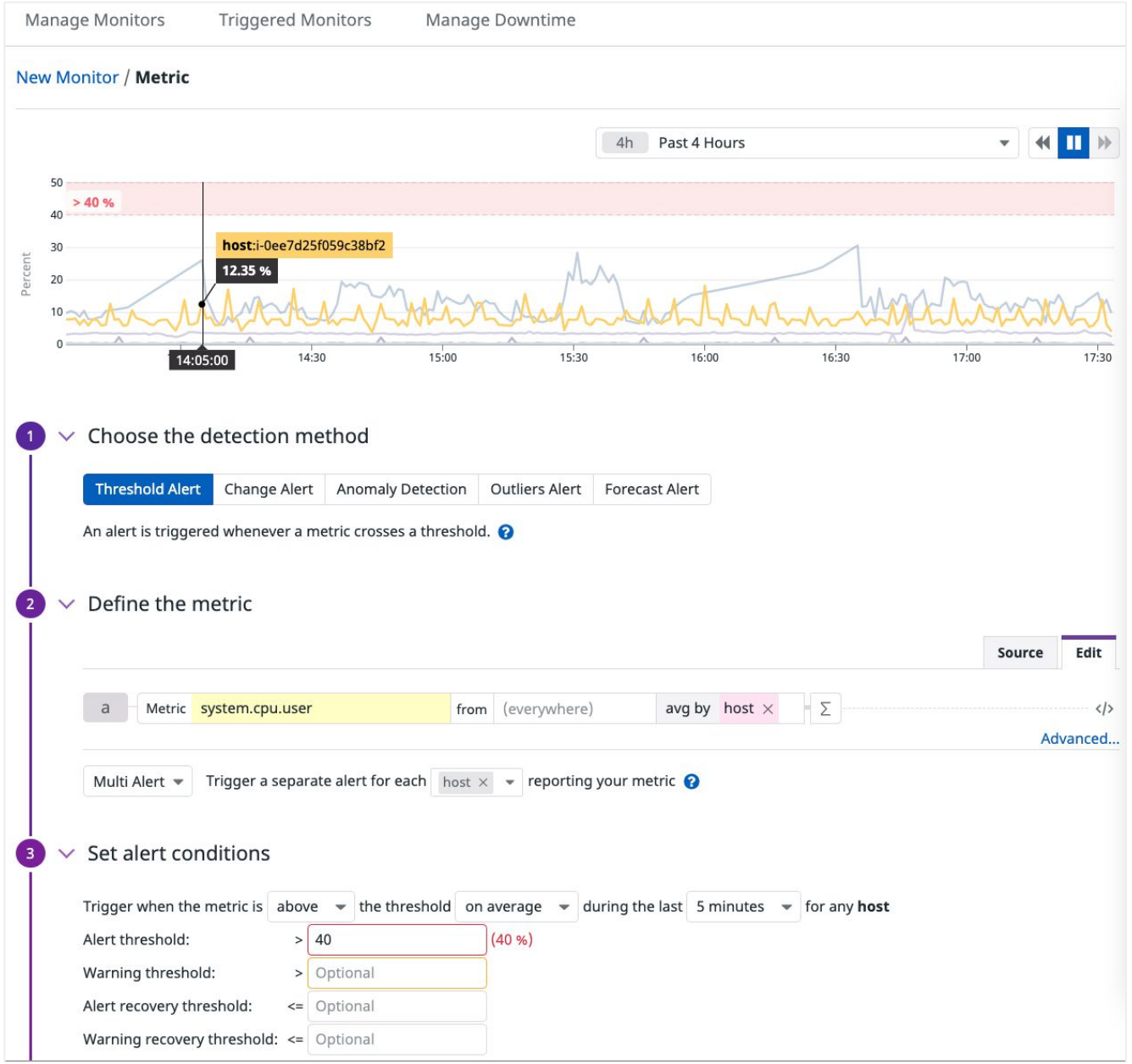
Monitor ⇒ New Monitor ⇒ Metric 선택

1) 지원되는 알람 방식

- Threshold Alert: 임계치 기반 알람
- Change Alert: 변화량 기반 알람
- Anomaly Detection: 특이사항 발생시 알람
- Outliers Alert: 서버 그룹중 혼자 사용량이 다른 경우 알람
- Forecast Alert: 예측치에 도달하기 X일 전에 알람이 필요할 경우 사용

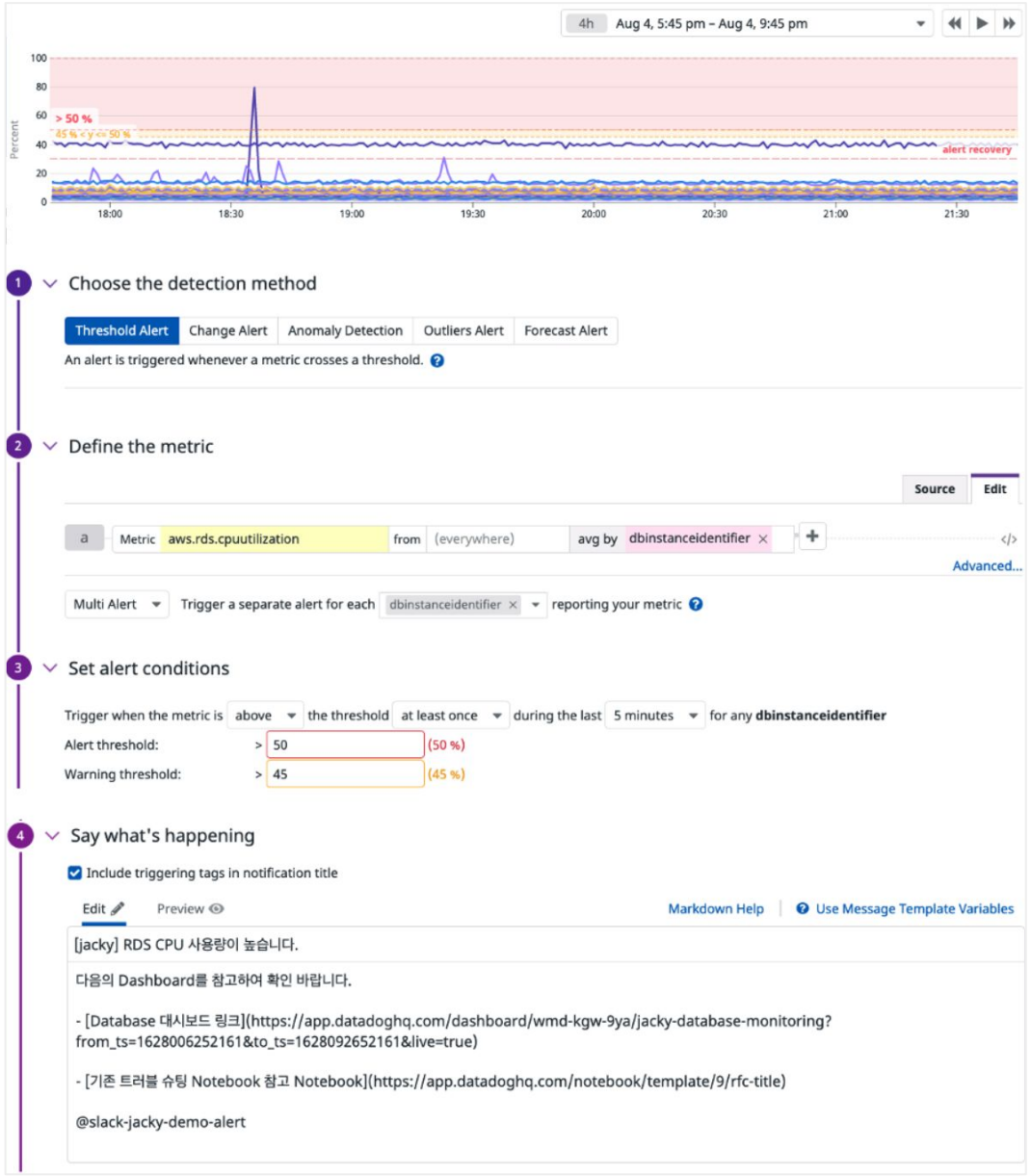
2) 알람 생성 절차 (Threshold Alert 기준)

1. 메트릭 선정
2. 어떤 서버군에 적용할지 조건 지정
3. 임계치 설정
4. 알람 메시지 작성 (관련 대시보드와 같이 분석에 도움되는 정보 추가)
5. 수신자 선정 (Email, Slack, Webhook 등)

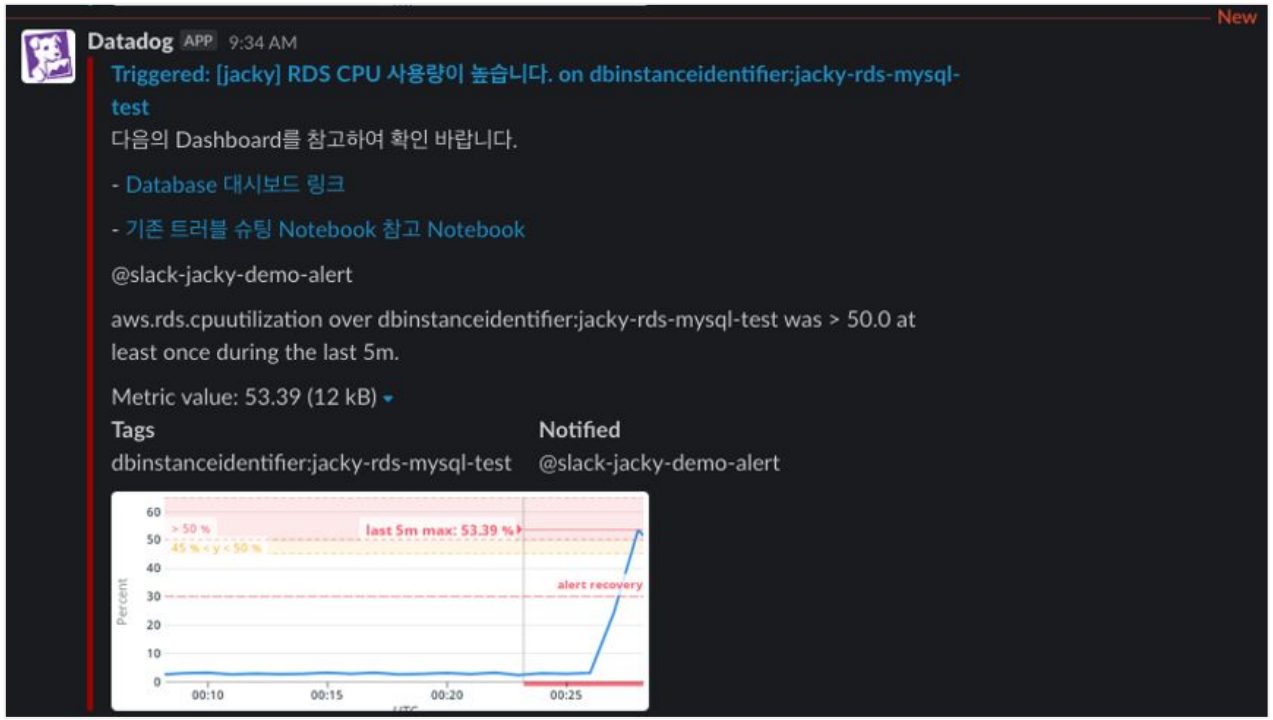


1.5 메트릭 기반 알람 및 분석 예 (1/2)

1) 알람 조건 설정

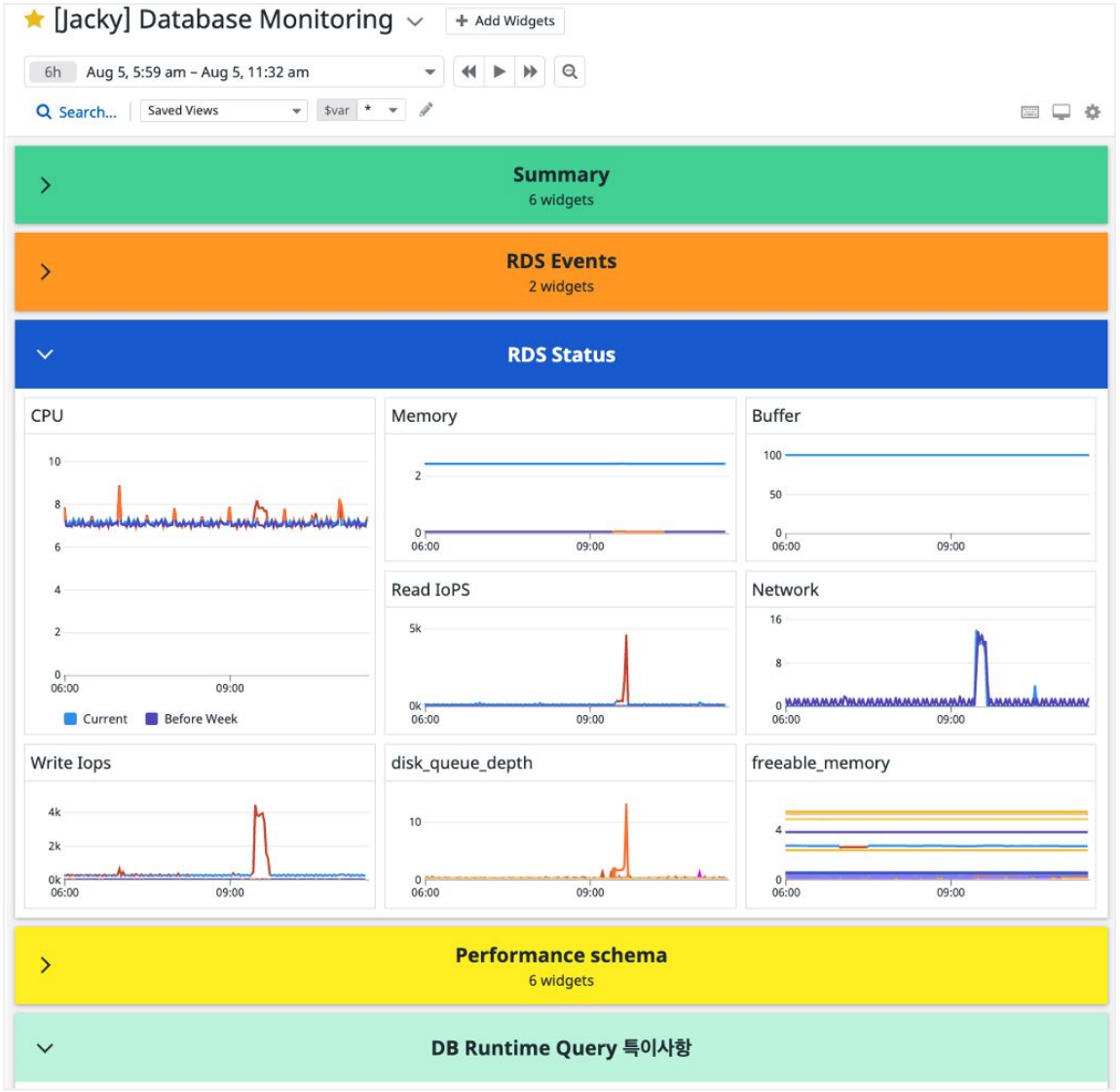


2) 알람 메시지(Slack)를 통한 이슈 확인



1.5 메트릭 기반 알람 및 분석 예 (2/2)

3) 알람 메시지를 참고하여 연계 대시보드로 넘어와 분석



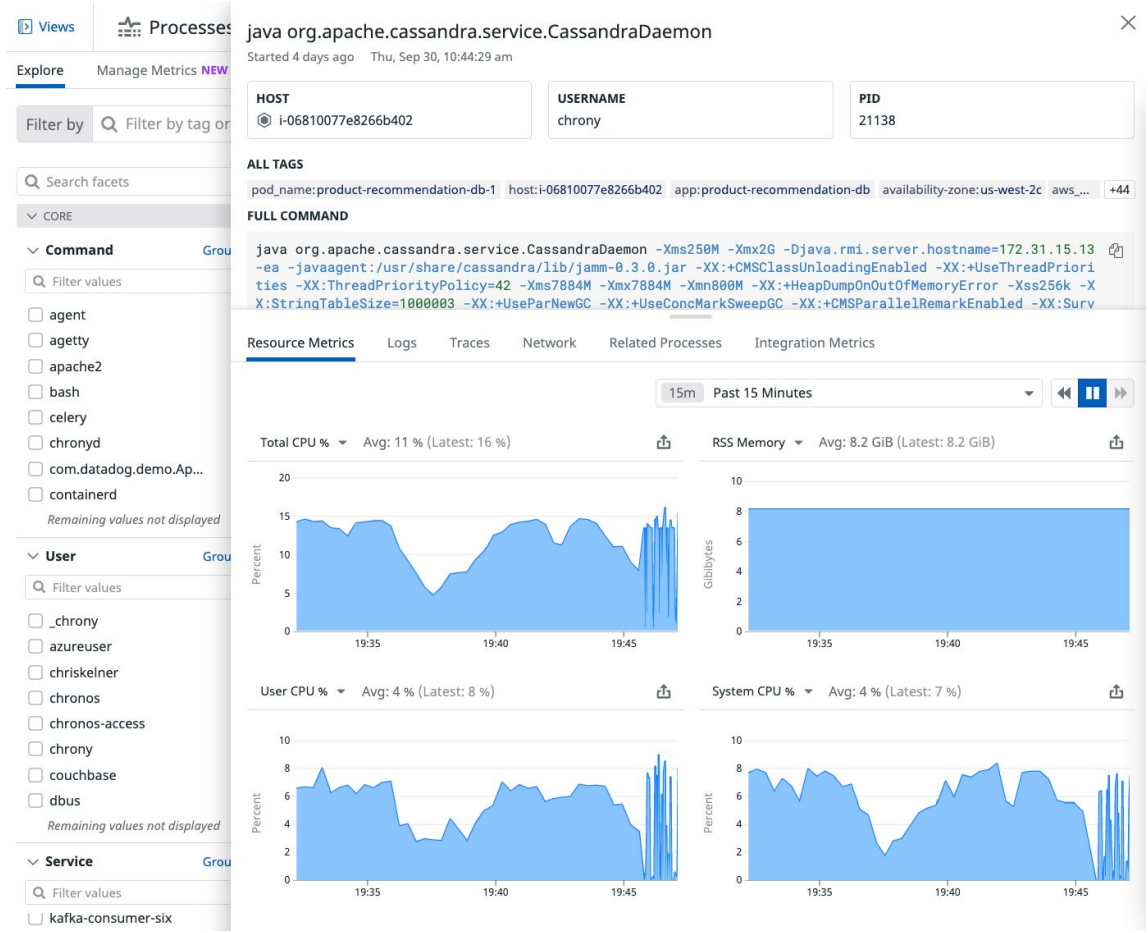
4) 장애 분석 내용을 Notebook에 정리하여 팀원과 협업

2.1 Process Monitoring 타입

개별 Process에 모니터링을 위해 다음의 2가지 Process Monitoring을 지원합니다

1) Live Process

- 호스트의 모든 Process의 리소스 사용량 및 Tag 수집
- 화면 진입 하면 2초단위 실시간 모니터링 진행
- 수집된 Live Process Data는 36시간 데이터 보관



2) Process Integration

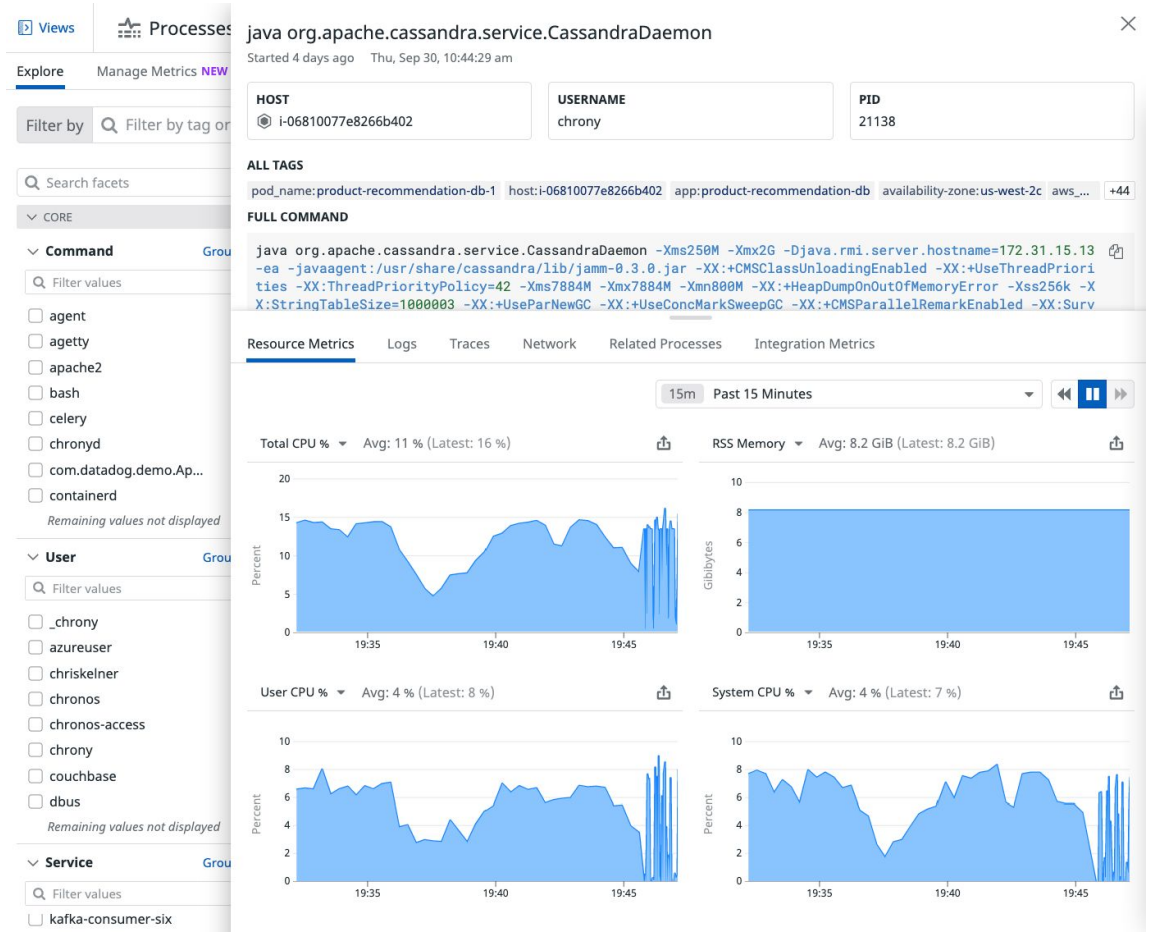
- 원하는 Process에 대해 Datadog 설정 파일에 명시하여 Process 메트릭 수
- 수집 된 메트릭은 15개월 보관

METRIC NAME
system.processes.number
system.processes.cpu.pct
system.processes.mem.pct
system.processes.mem.rss
system.processes.mem.vms
system.processes.threads
system.processes.mem.real
system.processes.ioread_bytes
system.processes.ioread_count
system.processes.run_time.avg
system.processes.run_time.max
system.processes.run_time.min
system.processes.iowrite_bytes
system.processes.iowrite_count
system.processes.cpu.normalized_pct
system.processes.ioread_bytes_count
system.processes.iowrite_bytes_count
system.processes.open_file_descriptors
system.processes.voluntary_ctx_switches
system.processes.involuntary_ctx_switches
system.processes.mem.page_faults.major_faults
system.processes.mem.page_faults.minor_faults
system.processes.mem.page_faults.children_major_faults
system.processes.mem.page_faults.children_minor_faults

2.2 Process Monitoring 설정

1) Live Process

- 호스트의 모든 Process의 리소스 사용량 및 Tag 수집
- 화면 진입 하면 2초단위 실시간 모니터링 진행
- 수집된 Live Process Data는 36시간 데이터 보관



 # 설정 방법 (centos 예)

1) Datadog 설정 파일(/etc/datadog-agent/datadog.yaml)에 다음과 같이 설정

```
process_config:
    enabled: 'true'
```

2) Agent 재시작

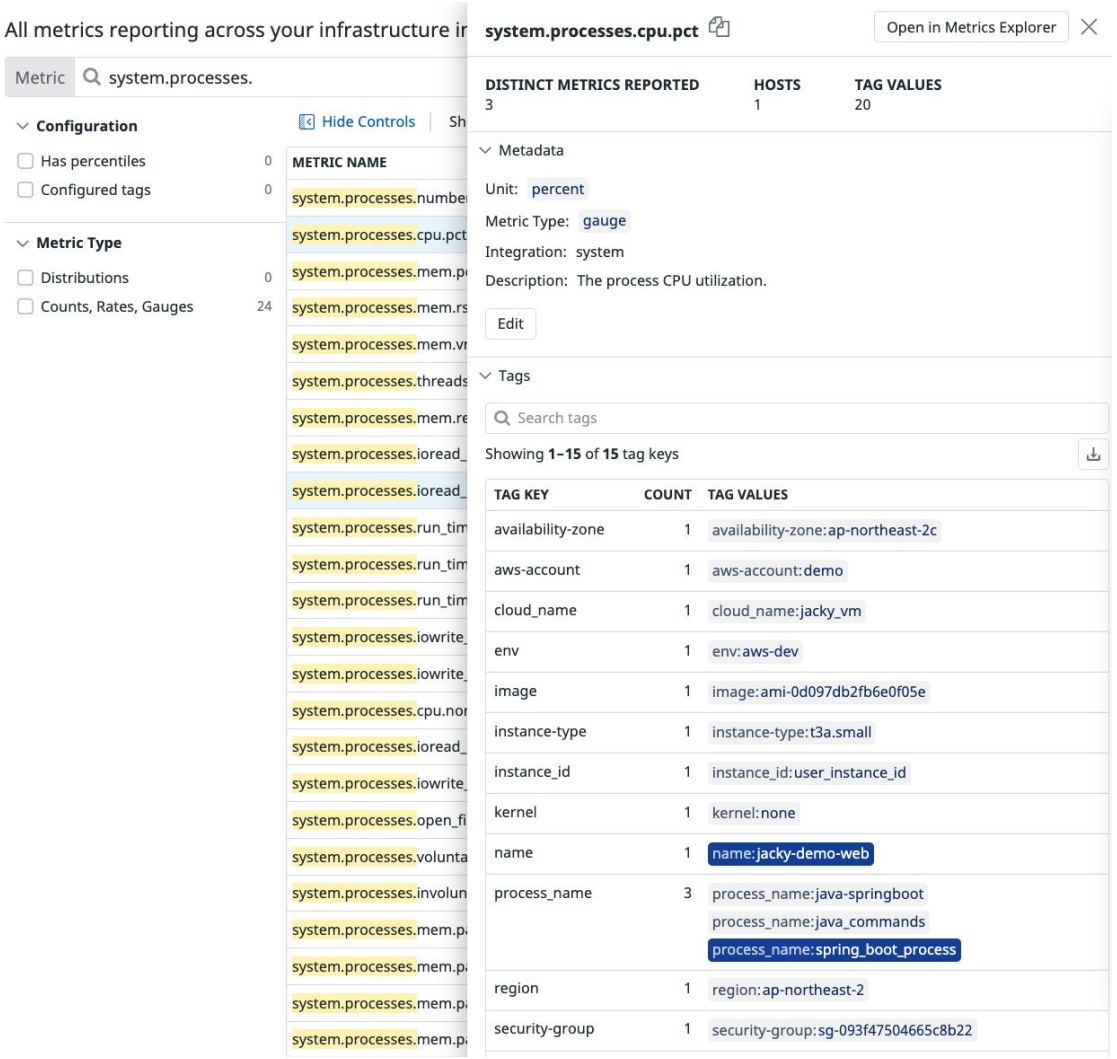
systemctl restart datadog-agent

3) 참고 링크

2.2 Process Monitoring 설정

2) Process Integration

- 원하는 Process에 대해 Datadog 설정 파일에 명시하여 Process 메트릭 수집
- 수집 된 메트릭은 15개월 보관



 # 설정 방법 (centos 예)

1) Process 설정 파일(/etc/datadog-agent/conf.d/process.d/conf.yaml)에 다음과 같이 설정

```
init_config:

instances:
  - name: spring_boot_process
    search_string: ["java"]
```

2) Agent 재시작

systemctl restart datadog-agent

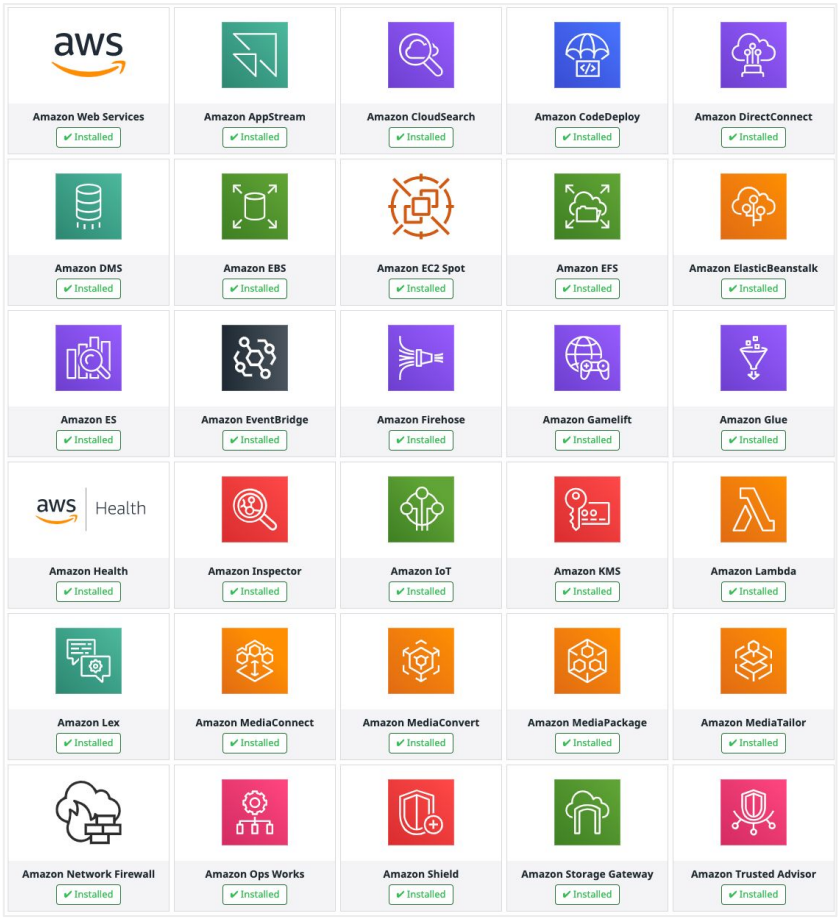
3) 참고 링크

3. Public Cloud Integration

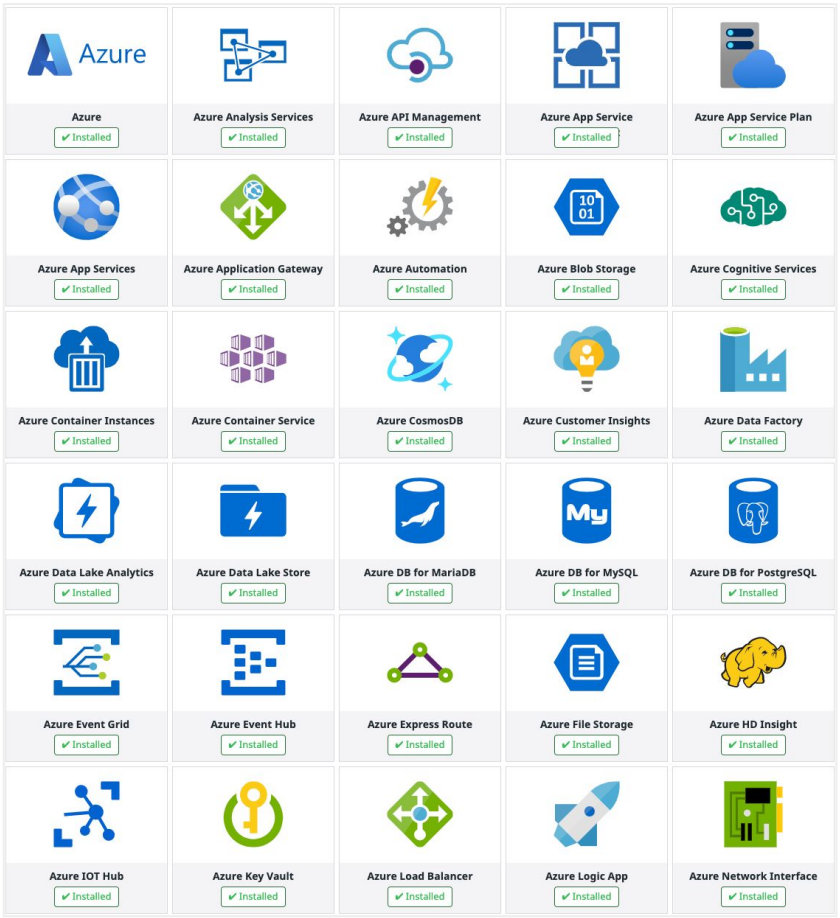
Cloud Provider 별 주요 서비스에 대한 Integration을 제공하여 계정 연동만으로 주요 메트릭 수집이 가능합니다

- 메트릭은 Datadog Crawler 기반으로 수집됩니다
- Crawler는 기본 AWS 10분, Azure 5분, GCP 5분 주기로 수집 됩니다
- 필요시 Support(support@datadoghq.com) 팀을 통해 2분, 5분, 10분 등의 주기로 변경이 가능합니다.

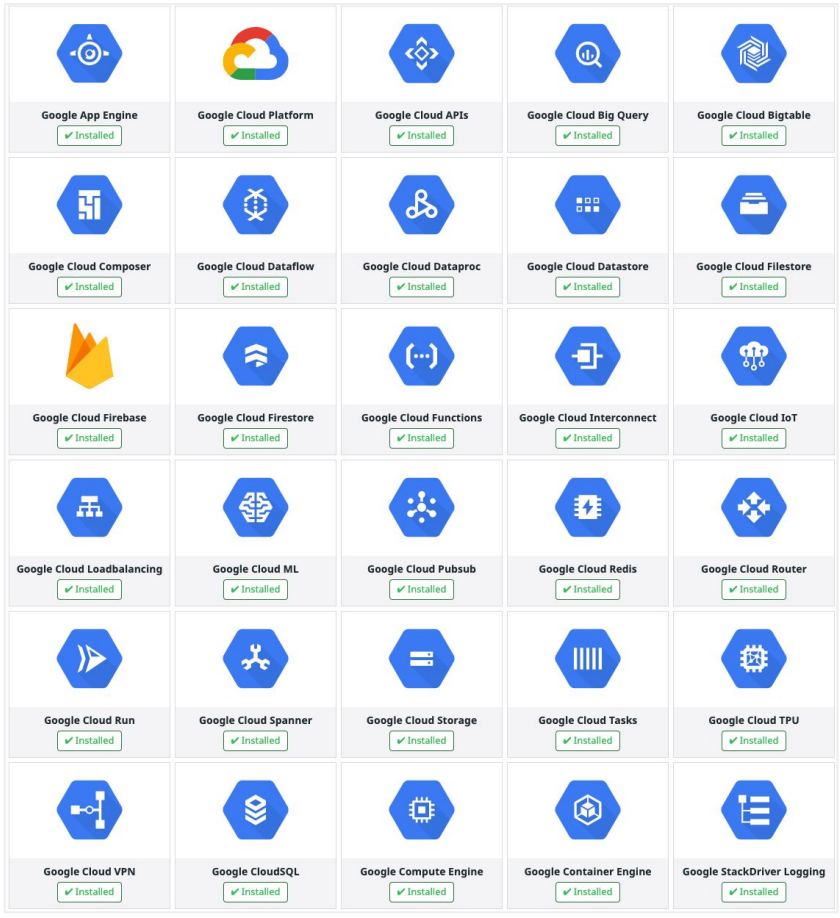
AWS Integrations



Azure Integrations

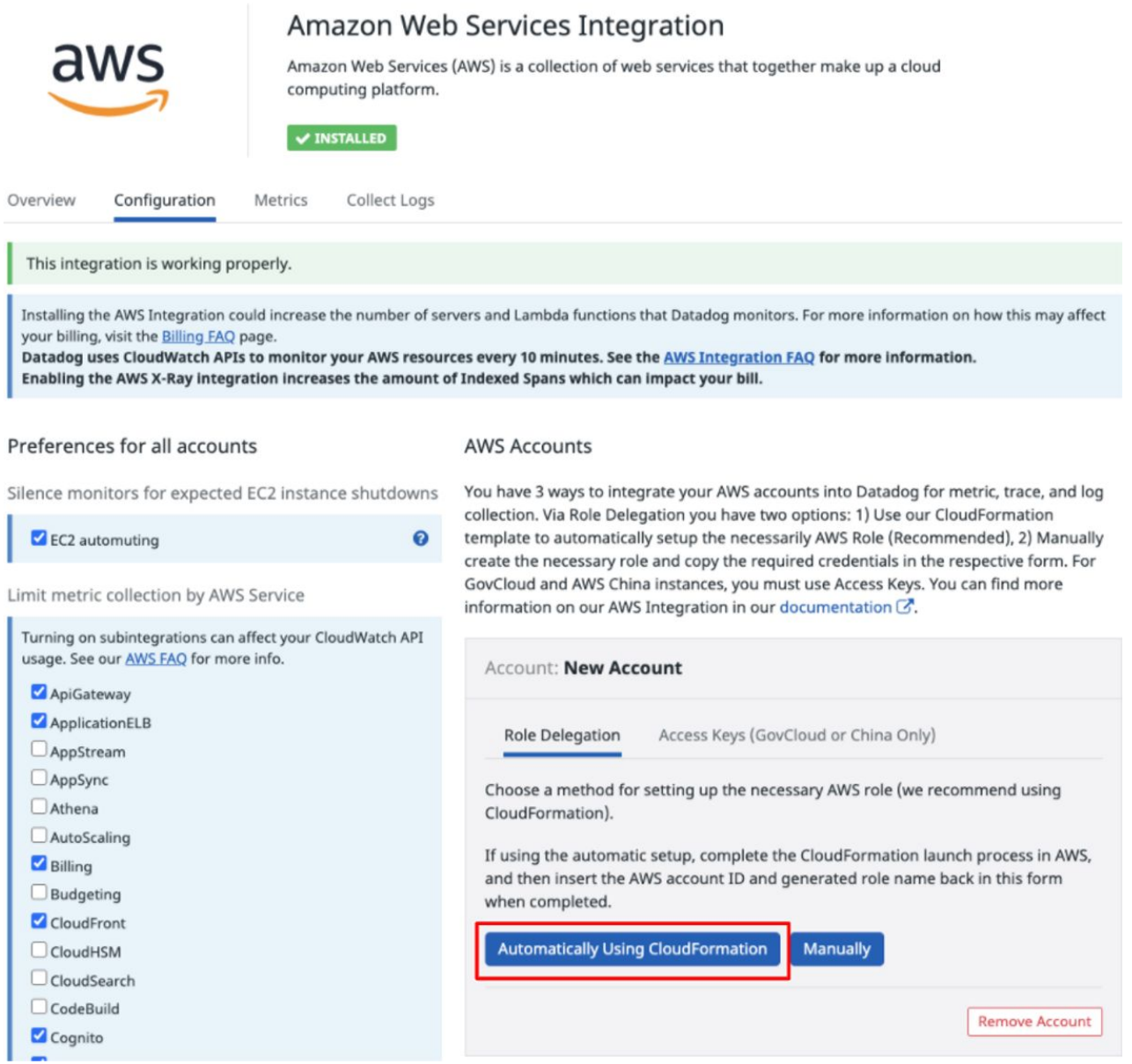


GCP Integrations



3.1 AWS Integration 설정 방법 (Step1)

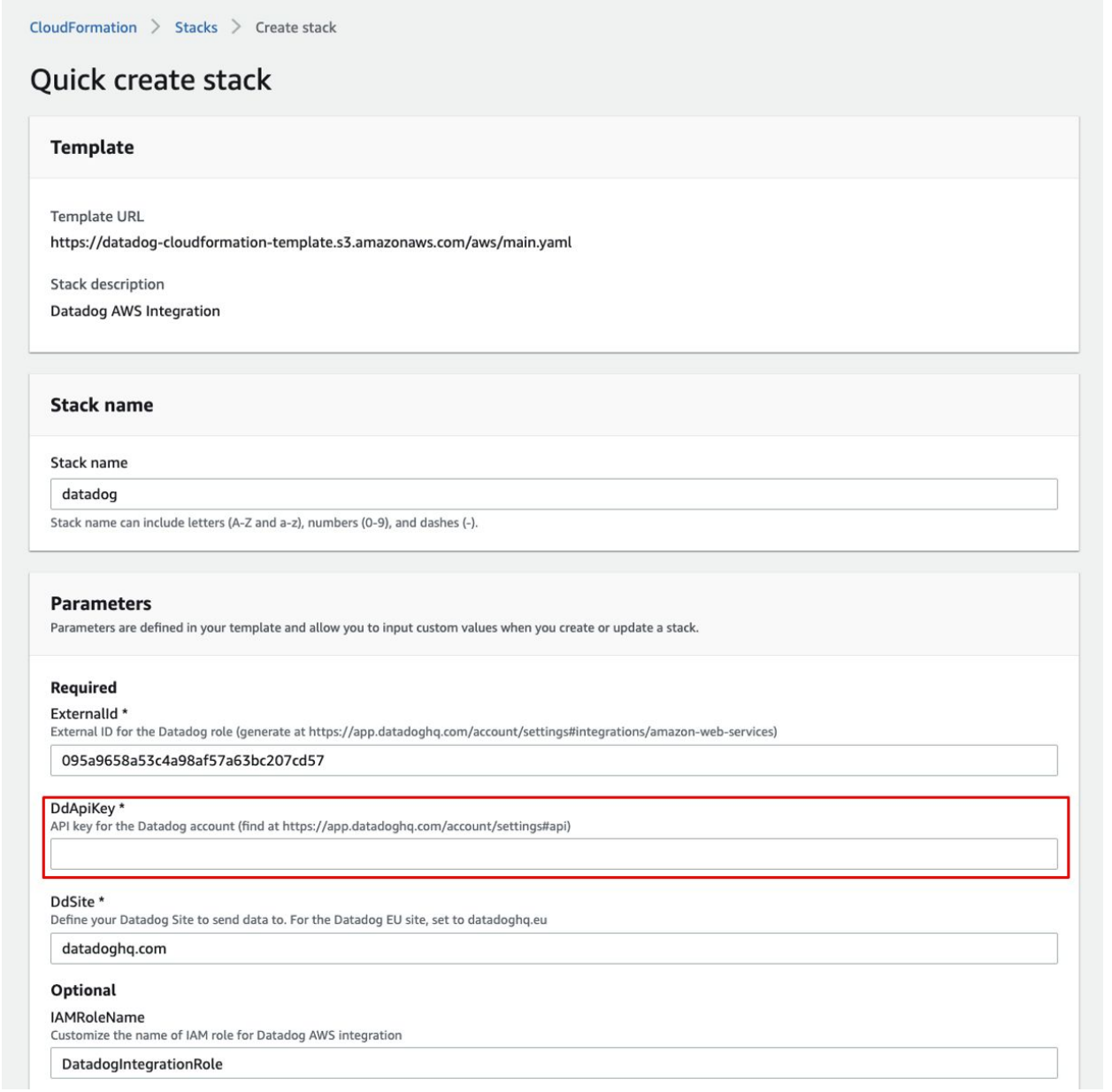
- Datadog Portal의 AWS Integration 페이지에서
- Automatically Using CloudFormation 선택 후
- 기대 결과
  - 자동으로 Role 생성하는 페이지로 이동



3.1 AWS Integration 설정 방법 (Step2)

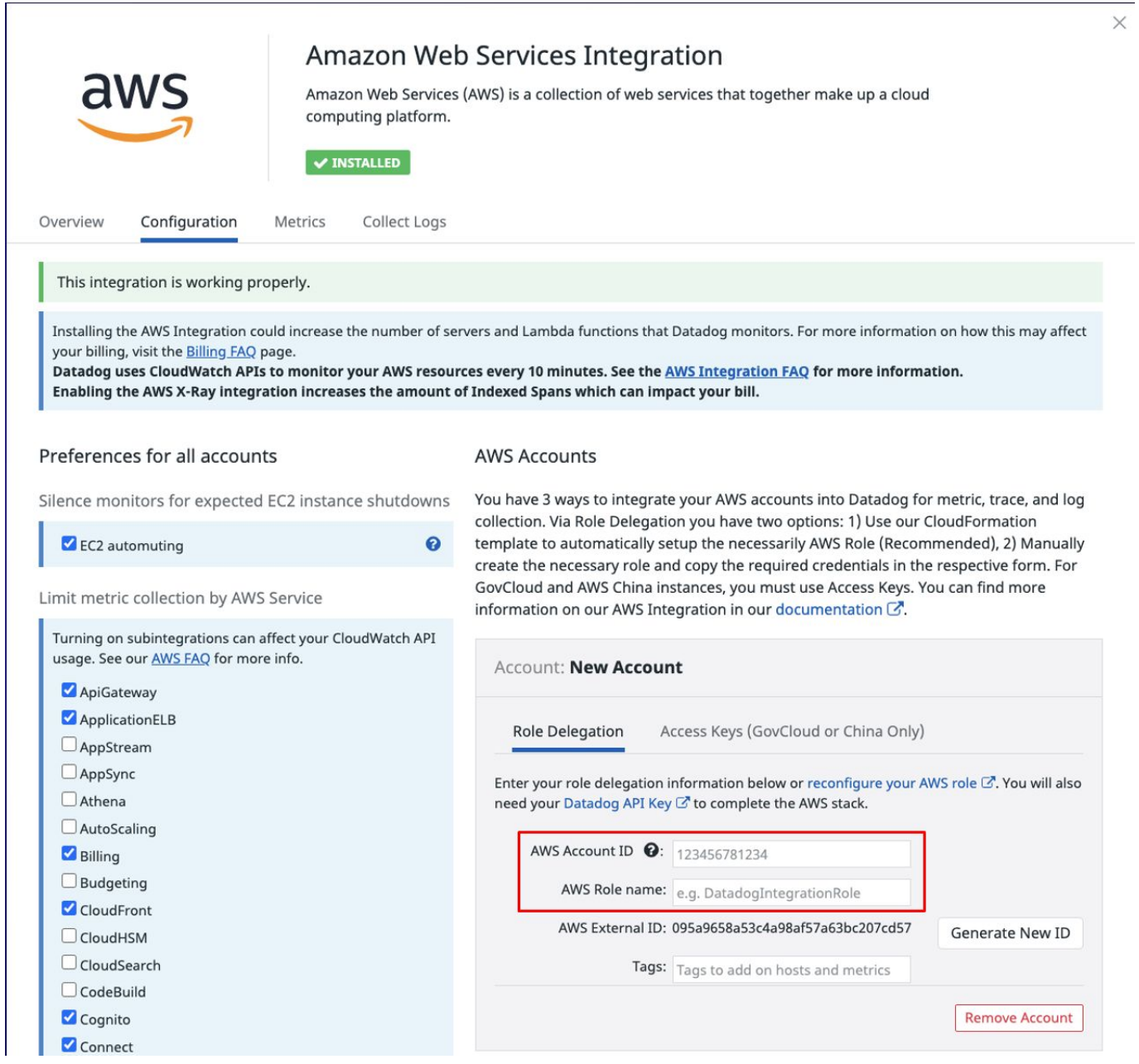
- Datadog API Key 입력 후 Create stack 클릭

- 기대 결과
  - AWS 계정 연동 위한 Role 생성
  - AWS에 적재된 로그 전송위한 Lambda 생성



3.1 AWS Integration 설정 방법 (Step3)

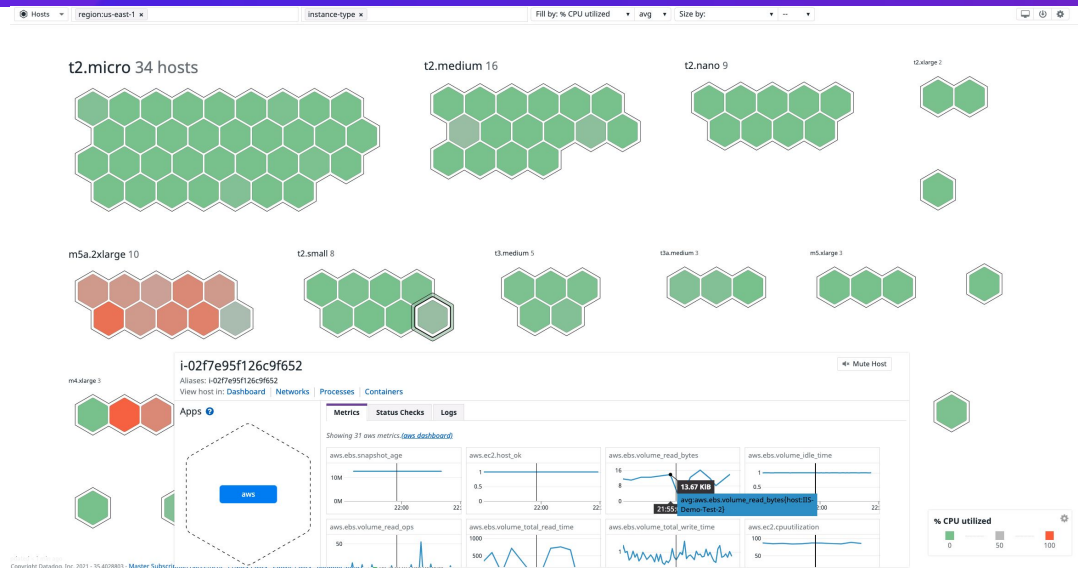
- AWS Account ID 입력
- Step 2에서 생성된 Role 입력 후 Update
- 기대 결과
  - AWS 연동 완료
  - 5~10분 후 AWS 대시보드 통해 메트릭 확인

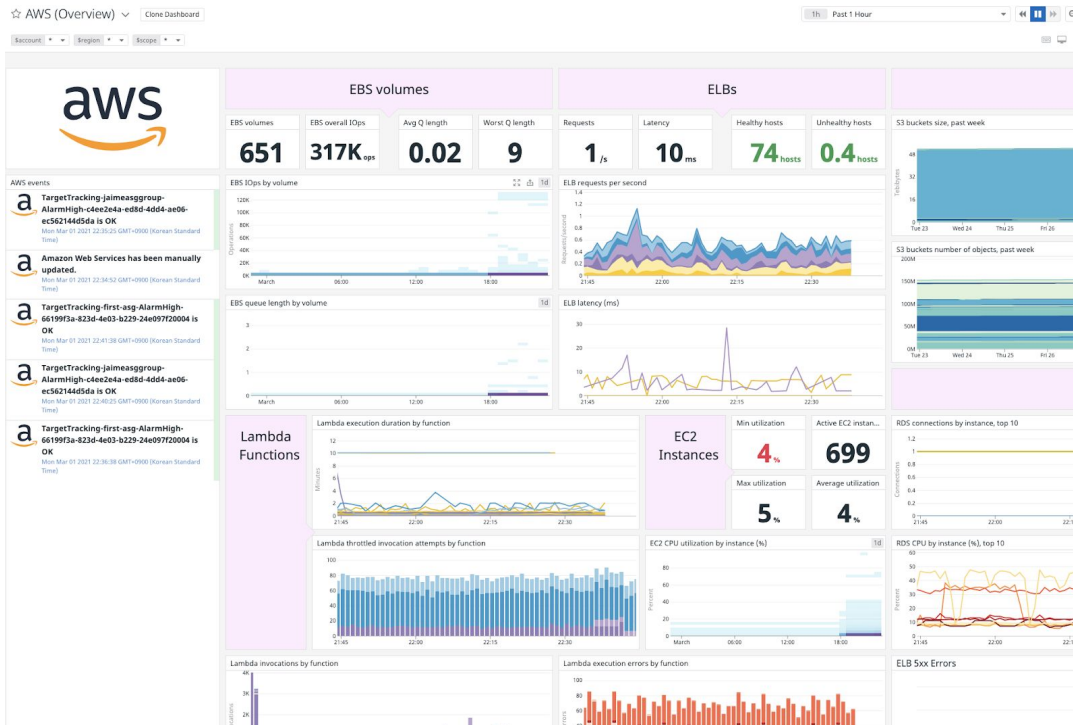


3.2 AWS Integration 연동 완료 후

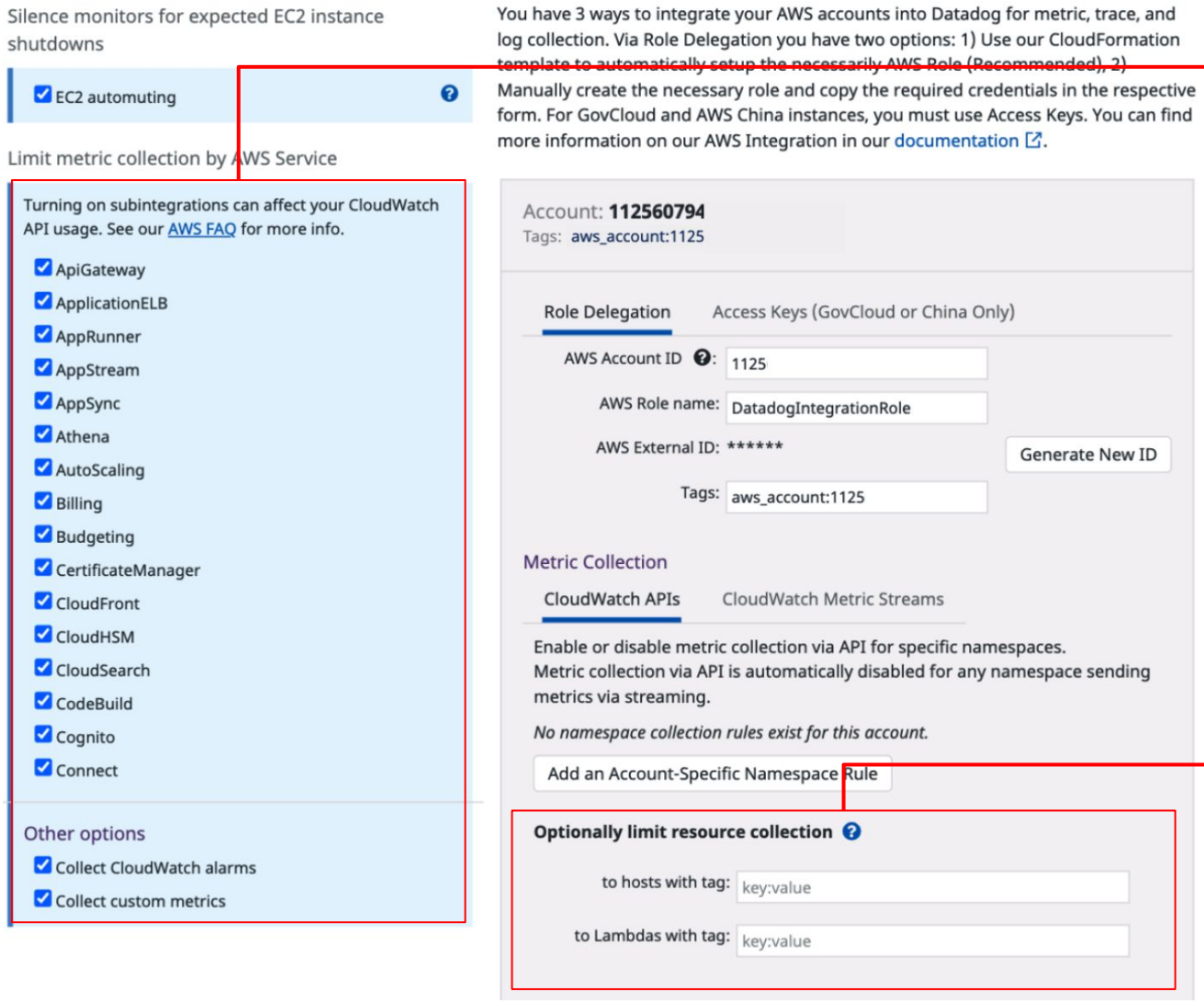
- 다양한 Preset Dashboard가 생성됨
  - EC2
  - EBS
  - ALB
  - RDS
  - 그외 다양한 AWS 서비스

- Clone 후 자유롭게 대시보드 조합 가능





3.3 AWS Integration 연동 Best practice



1. 사용하는 서비스만 메트릭을 수집 하도록 체크하세요

- ❑ 체크가 되어 있으면 기본적으로 CloudWatch API를 호출합니다

2. AWS Integration과 더불어 Agent도 함께 설치가 권장됩니다

- ❑ 둘다 연동해도 1대에 대해서만 과금합니다
- ❑ AWS 연동시 AWS에 설정한 Tag 정보도 호스트 모니터링시 활용이 가능합니다
- ❑ Agent는 15초 단위의 정밀한 메트릭이 수집되므로 상세 분석을 위해서는 Agent를 함께 설치가 권장 됩니다.

3. 서비스 성격에 맞춰 AWS Integration 수집 주기를 조절하세요

- ❑ Integration 수집 주기는 기본 10분 입니다 (RDS 3분)
- ❑ PaaS 서비스에 대해 알람 지연을 줄이기 위해서는 AWS Integration 수집 주기를 5분으로 줄일 수 있습니다. (Cloudwatch 비용 증가)
  - ❑ 2분도 가능하지만 Cloudwatch 비용 증가 관점에서 권고하지 않습니다)

4. 모니터링이 필요없는 호스트는 limit옵션을 활용해 제외하세요

- ❑ tag를 이용하여 EC2 메트릭 수집에서 제외가 가능합니다.
- ❑ 기본은 모든 EC2에 대해 수집하는것이므로 불필요하게 모니터링되고 있는 호스트가 있지 않은지 점검이 필요합니다
- ❑ 예)datadog_monitor:true tag를 EC2에 넣어 whitelist 기반 관리 가능

4. Container Orchestration 환경에서의 상태 메트릭 수집

1) Kubernetes 환경에서 모니터링이 필요한 부분

1. Cluster Node 리소스 사용량
2. Pod/Container 리소스 사용량
3. Kubernetes Event
4. Application의 Trace 수집
5. Log

2) ECS on EC2 에서 모니터링이 필요한 부분

1. ECS Cluster 리소스 사용량
2. ECS Service 리소스 사용량
3. ECS Container 리소스 사용량
4. Application의 Trace 수집
5. Log

3) ECS on Fargate 모니터링이 필요한 부분

1. Container 리소스 사용량
2. Application의 Trace 수집
3. Log (firelens나 Cloutwatch log를 통해 Datadog으로 수집)

수집 방법

- ❑ Datadog Agent
- ❑ Datadog Trace 라이브러리
- ❑ AWS Integration

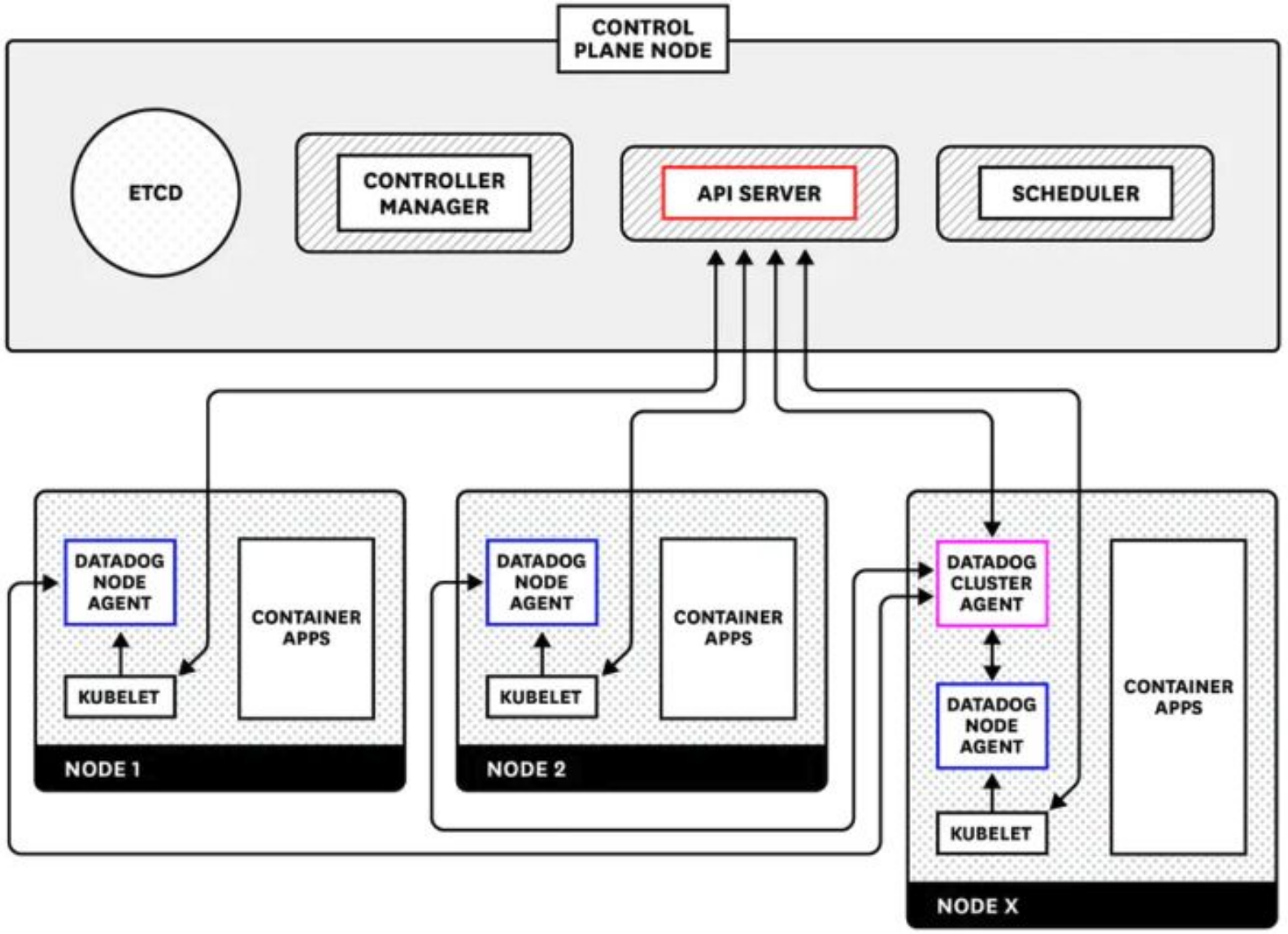
4.1.1 Kubernetes Monitoring 아키텍쳐

Datadog Node Agent

- ❑ Daemonset으로 배포
- ❑ Node/Pod/Container 메트릭 수집
- ❑ Log 및 APM Trace 수집
- ❑ Kubernetes Event 수집

Datadog Cluster Agent

- ❑ Deployment로 배포
- ❑ API 서버로의 통신을 담당(Node Agent의 요청 [
- ❑ HPA에 Custom한 메트릭 사용 지원



4.1.2 Datadog Kubernetes Integration

[공식 설치 가이드 페이지]

Helm | DaemonSet | Operator

To install the chart with a custom release name, `<RELEASE_NAME>` (e.g. `datadog-agent`):

1. Install Helm.
2. Using the Datadog `values.yaml` configuration file as a reference, create your `values.yaml`. Datadog recommends that your `values.yaml` only contain values that need to be overridden, as it allows a smooth experience when upgrading chart versions.
3. If this is a fresh install, add the Helm Datadog repo:

```
helm repo add datadog https://helm.datadoghq.com
helm repo update
```

4. Retrieve your Datadog API key from your Agent installation instructions and run:

- **Helm v3+**

```
helm install <RELEASE_NAME> -f values.yaml  --set datadog.apiKey=
<DATADOG_API_KEY> datadog/datadog --set targetSystem=<TARGET_SYSTEM>
```

Replace `<TARGET_SYSTEM>` with the name of your OS: `linux` or `windows`.

- **Helm v1/v2**

```
helm install -f values.yaml --name <RELEASE_NAME> --set
datadog.apiKey=<DATADOG_API_KEY> datadog/datadog
```

Note

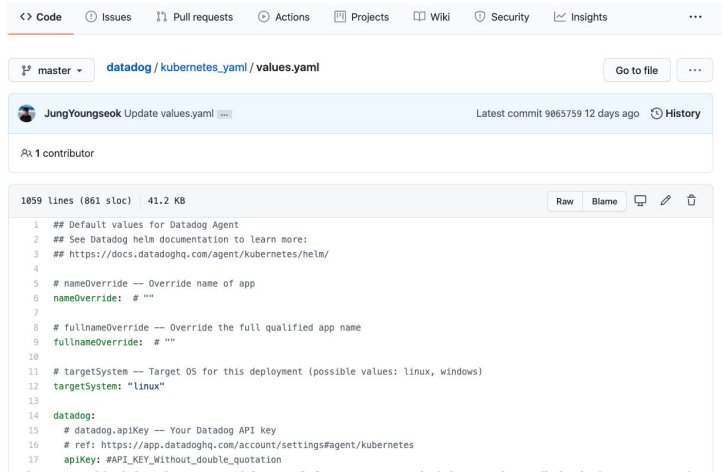
1. helm이 현재는 Recommended 설치 방법 입니다
2. 다음의 링크를 통해 제가 사용한 샘플 helm chart도 참고하시면 도움이 됩니다
   - https://github.com/JungYoungseok/datadog/blob/master/kubernetes_yaml/values.yaml
   - Metric, Process Monitoring, NPM, Log, APM 활성화

4.1.3 Datadog Kubernetes Integration 실행 예

샘플 helm chart 배포 후 결과 화면(1/3)

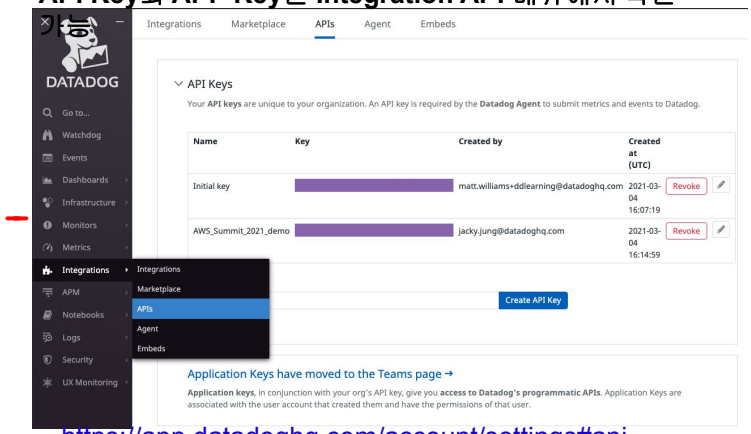
```
jacky.jung@COMP11458:~/AWS_Summit_2021|⇒  helm install -f values.yaml --name datadog-monitoring --s
et datadog.apiKey=e30d7c5c44[redacted]c043e4470f --set datadog.appKey=ddacbeaea9[redacted]22a1
d8c930ddb08b0 datadog/datadog
NAME:   datadog-monitoring
LAST DEPLOYED: Fri Mar  5 01:59:19 2021
NAMESPACE: default
STATUS: DEPLOYED

RESOURCES:
==> v1/APIService
NAME                              AGE
v1beta1.external.metrics.k8s.io   0s

==> v1/ClusterRole
NAME                                                  AGE
datadog-monitoring                                    1s
datadog-monitoring-cluster-agent                      1s
datadog-monitoring-cluster-agent-external-metrics-reader  1s

==> v1/ClusterRoleBinding
NAME                                                  AGE
datadog-monitoring                                    0s
datadog-monitoring-cluster-agent                      0s
datadog-monitoring-cluster-agent-external-metrics-reader  0s
datadog-monitoring-cluster-agent:system:auth-delegator    0s

==> v1/ConfigMap
NAME                                DATA  AGE
datadog-monitoring-installinfo      1     1s
datadog-monitoring-security         1     1s
datadog-monitoring-system-probe-config  1     1s

==> v1/DaemonSet
NAME                DESIRED  CURRENT  READY  UP-TO-DATE  AVAILABLE  NODE SELECTOR            AGE
datadog-monitoring  2        2        0      2           0          kubernetes.io/os=linux   0s
```

Helm chart는 아래 sample Chart 사용



https://github.com/JungYoungseok/datadog/blob/master/kubernetes_yaml/values.yaml

API Key와 APP Key는 Integration API 메뉴에서 확인



https://app.datadoghq.com/account/settings#api

4.1.3 Datadog Kubernetes Integration 실행 예

샘플 helm chart 배포 후 결과 화면(2/3)

```
==> v1/Deployment
NAME                                  READY  UP-TO-DATE  AVAILABLE  AGE
datadog-monitoring-cluster-agent      0/1    1           0          0s
datadog-monitoring-kube-state-metrics 0/1    1           0          0s

==> v1/Pod(related)
NAME                                                  READY  STATUS    RESTARTS  AGE
datadog-monitoring-79mbn                              0/4    Init:0/3  0         0s
datadog-monitoring-cluster-agent-64cbff9499-qfd6x     0/1    Pending   0         0s
datadog-monitoring-kube-state-metrics-6d5c7b57b9-j5wdm 0/1    Pending   0         0s
datadog-monitoring-qrsvg                              0/4    Init:0/3  0         0s

==> v1/RoleBinding
NAME                              AGE
datadog-monitoring-cluster-agent  0s

==> v1/Secret
NAME                              TYPE    DATA  AGE
datadog-monitoring                Opaque  1     1s
datadog-monitoring-appkey         Opaque  1     1s
datadog-monitoring-cluster-agent  Opaque  1     1s

==> v1/Service
NAME                                  TYPE       CLUSTER-IP      EXTERNAL-IP  PORT(S)   AGE
datadog-monitoring-cluster-agent      ClusterIP  10.100.108.7    <none>       5005/TCP  0s
datadog-monitoring-cluster-agent-metrics-api  ClusterIP  10.100.171.206  <none>       8443/TCP  0s
datadog-monitoring-kube-state-metrics ClusterIP  10.100.105.31   <none>       8080/TCP  0s

==> v1/ServiceAccount
NAME                                  SECRETS  AGE
datadog-monitoring                    1        1s
datadog-monitoring-cluster-agent      1        1s
datadog-monitoring-kube-state-metrics 1        1s
```

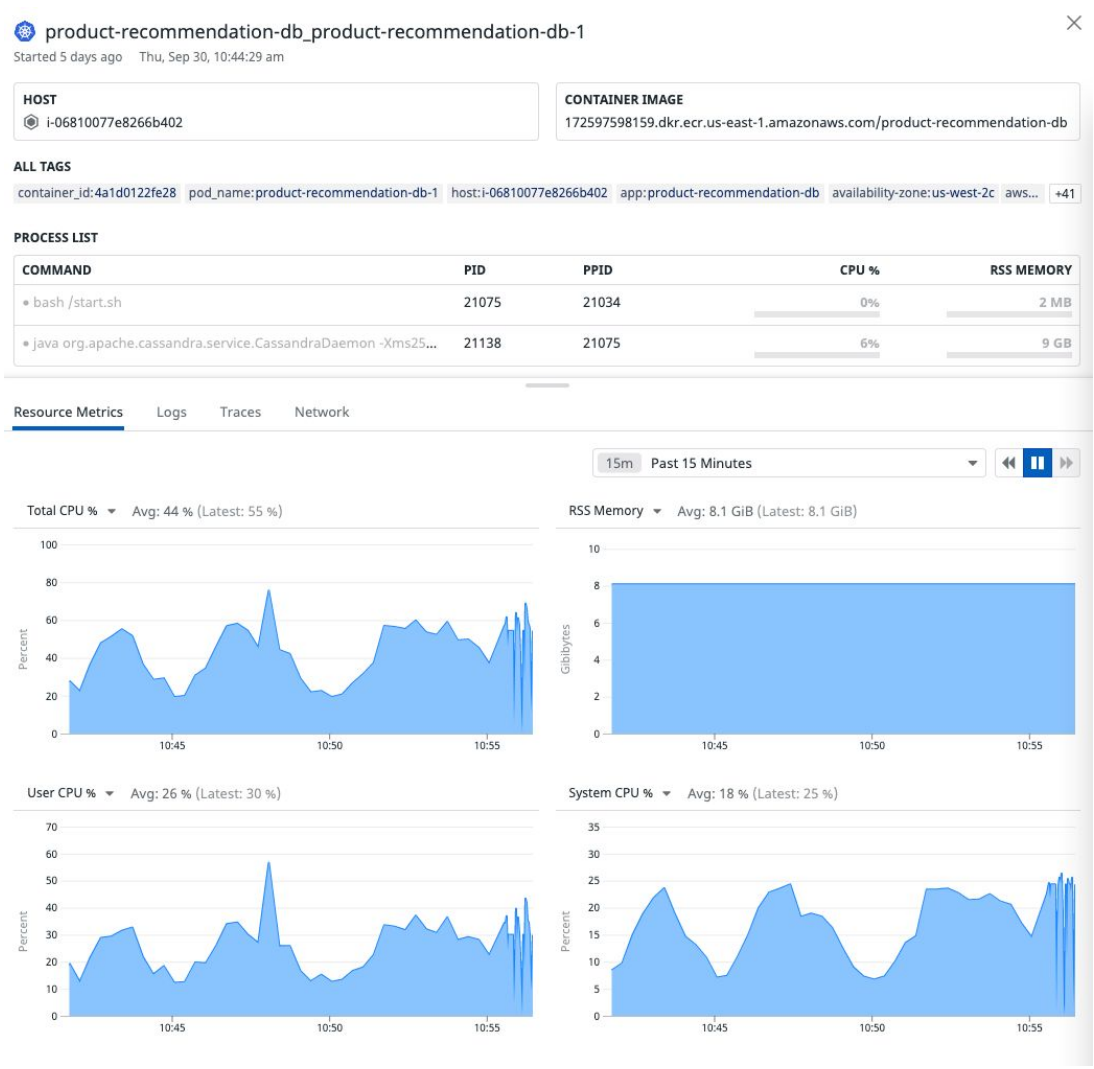
4.1.3 Datadog Kubernetes Integration 실행 예

샘플 helm chart 배포 후 결과 화면(3/3)

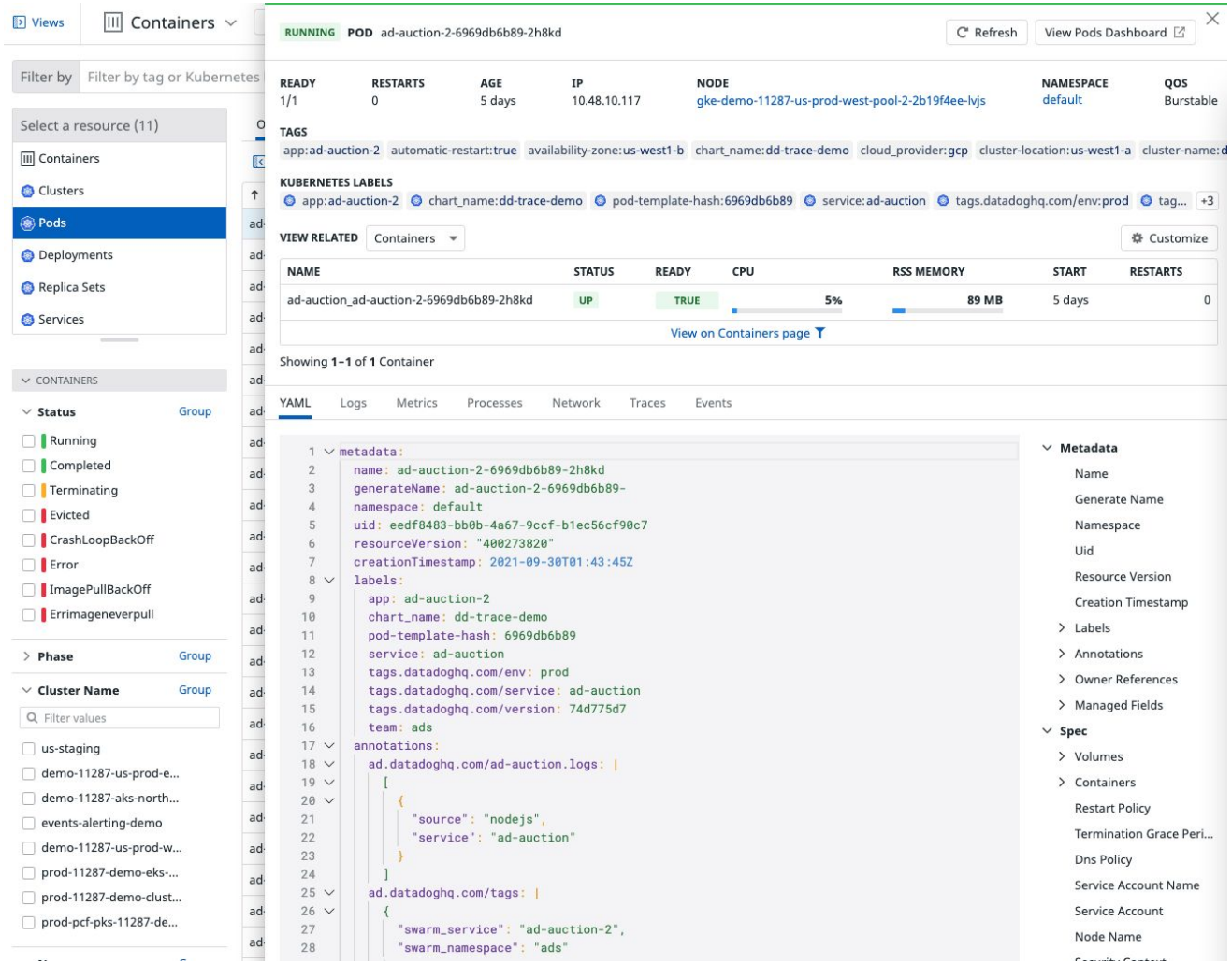
```
==> v1beta1/ClusterRole
NAME                                  AGE
datadog-monitoring-kube-state-metrics  1s

==> v1beta1/ClusterRoleBinding
NAME                                  AGE
datadog-monitoring-kube-state-metrics  0s


NOTES:

Datadog agents are spinning up on each node in your cluster. After a few
minutes, you should see your agents starting in your event stream:
    https://app.datadoghq.com/event/stream

The Datadog Agent is listening on port 8126 for APM service.

jacky.jung@COMP11458:~/AWS_Summit_2021|⇒  kubectl get pods
NAME                                                READY   STATUS    RESTARTS   AGE
advertisements-dcff6b4bd-z7k5r                      1/1     Running   0          2d16h
datadog-monitoring-79mbn                            4/4     Running   0          4m46s
datadog-monitoring-cluster-agent-64cbff9499-qfd6x   1/1     Running   0          4m46s
datadog-monitoring-kube-state-metrics-6d5c7b57b9-j5wdm   1/1     Running   0          4m46s
datadog-monitoring-qrsvg                            4/4     Running   0          4m46s
db-56cf8c59b5-mkjrc                                 1/1     Running   0          5d1h
deployment-2048-6754c747b4-92llk                    2/2     Running   0          2d5h
discounts-5c996dfc49-5k99j                          1/1     Running   0          2d16h
frontend-6888f67fcc-xkxsf                           1/1     Running   0          3d
store-frontend-6fffd84-vt8wb                        1/1     Running   0          2d16h
jacky.jung@COMP11458:~/AWS_Summit_2021|⇒
```

4.1.4 Kubernetes Integration을 통해 확인할 수 있는 부분 (1/3)

1. Container 레벨 가시성 + Process 정보

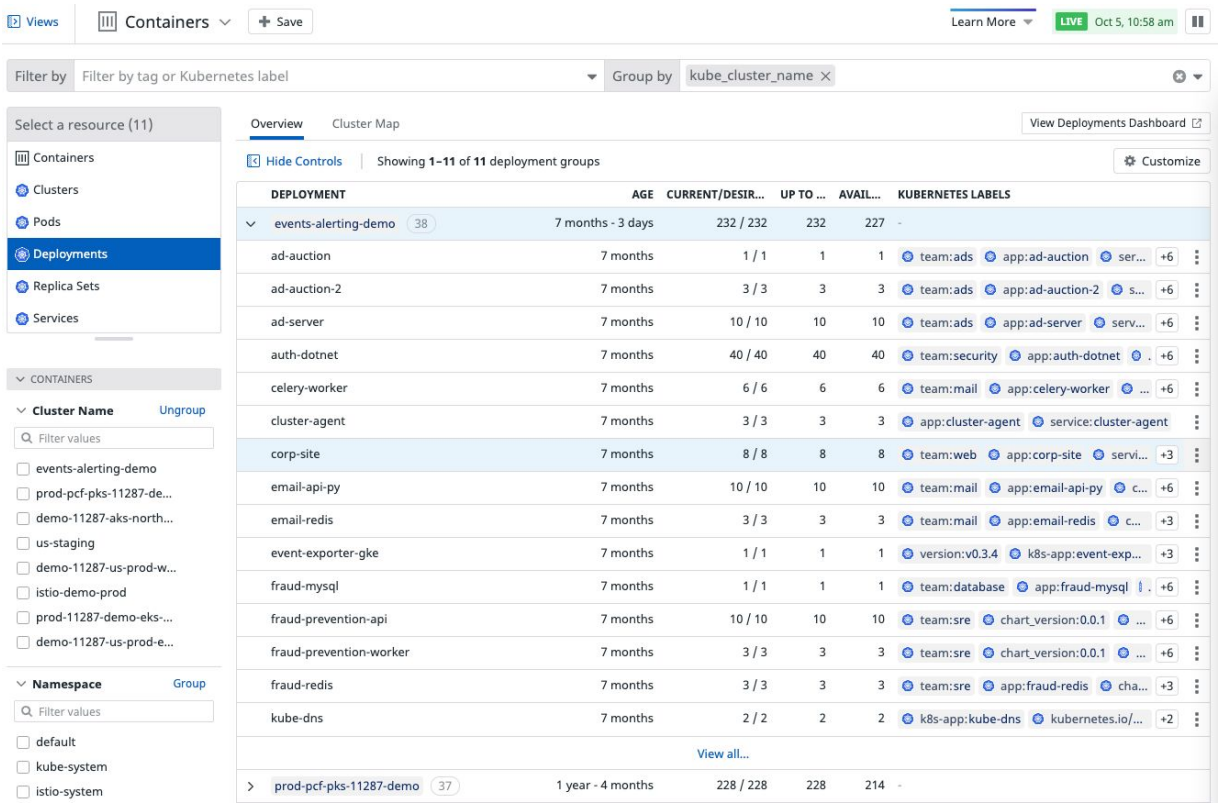


2. Pod Level 가시성

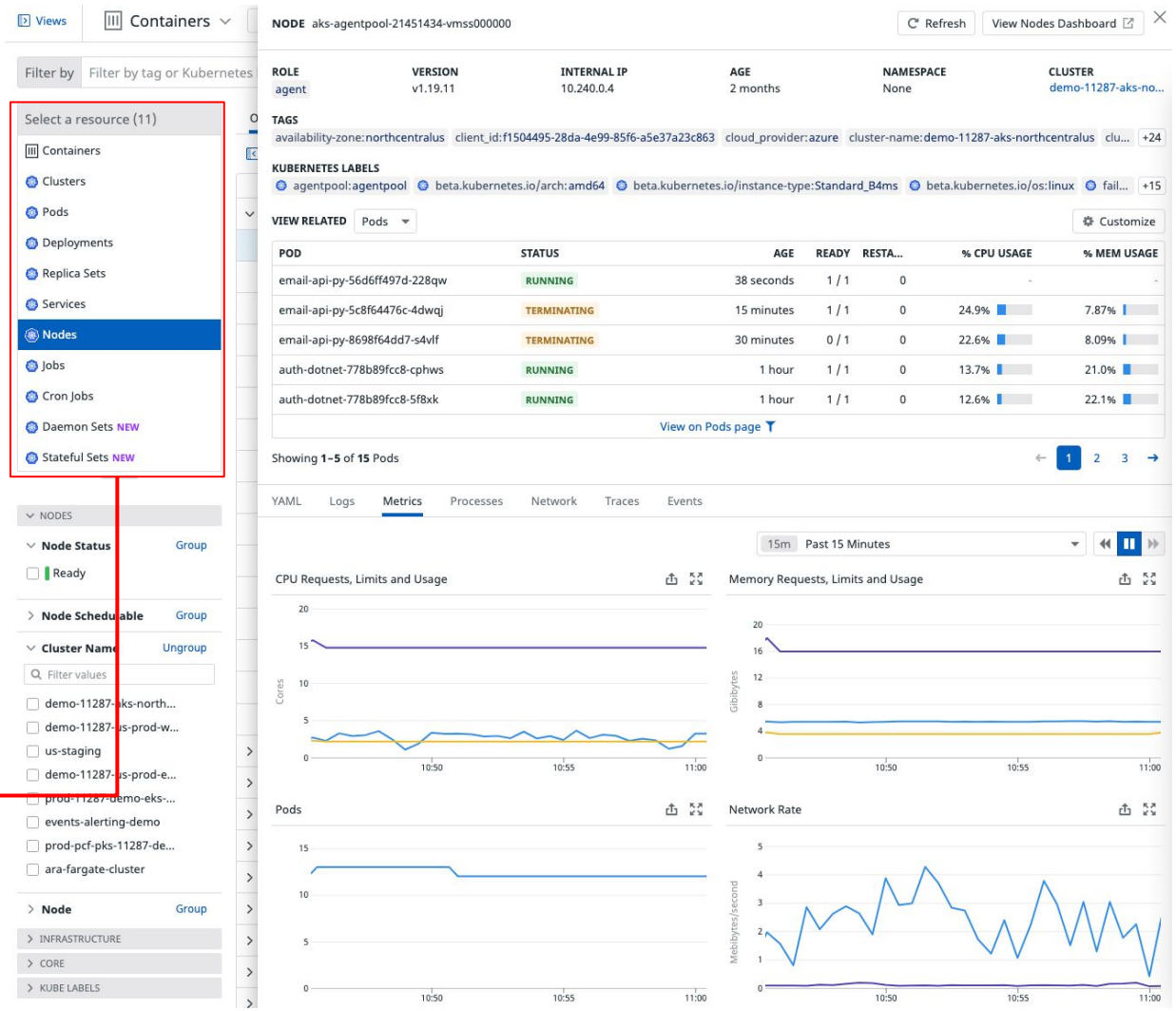


4.1.4 Kubernetes Integration을 통해 확인할 수 있는 부분 (2/3)

3. Deployment 레벨 가시성



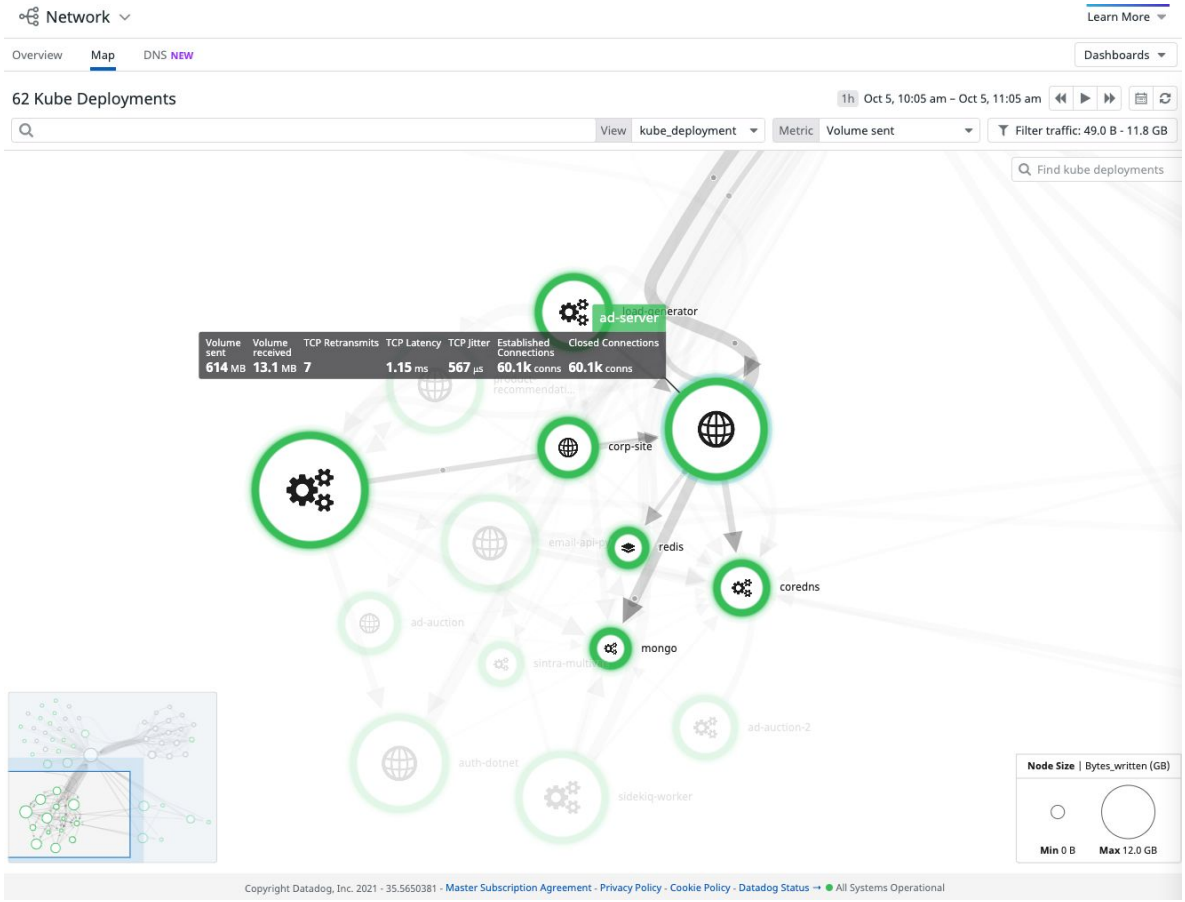
4. Node 레벨 가시성



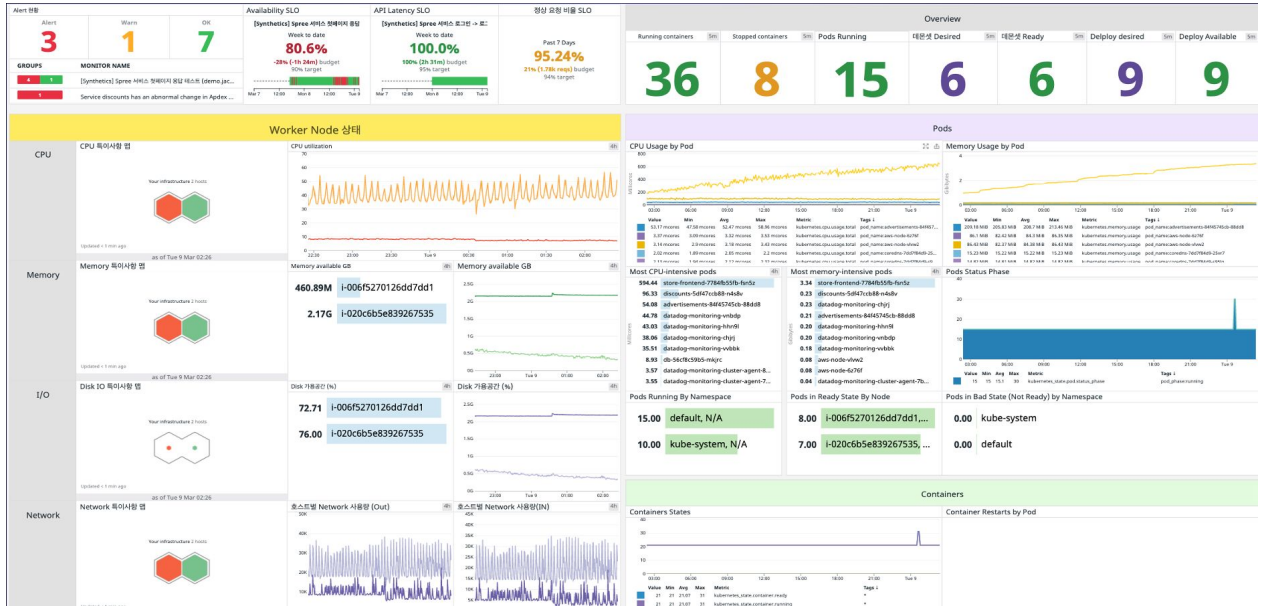
Container, Pod, Node외에 각 리소스별 View를 제공하여 손 쉽게 K8S의 가시성 확보 가능

4.1.4 Kubernetes Integration을 통해 확인할 수 있는 부분 (3/3)

5. Network Flow 가시성



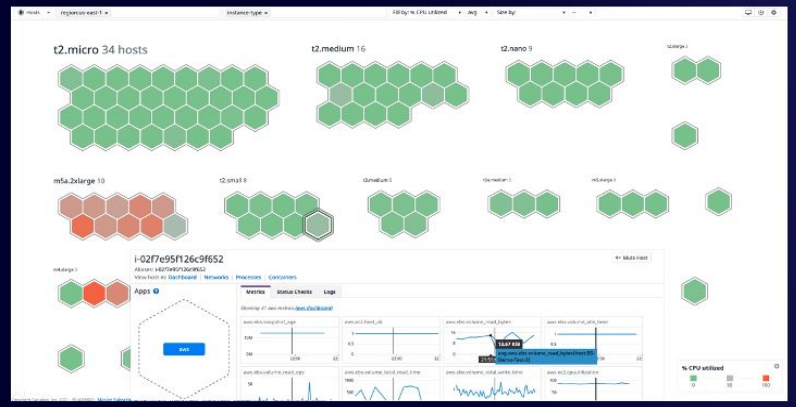
6. Kubernetes 대시보드 샘플



4.1.5 Kubernetes Monitoring Best practice

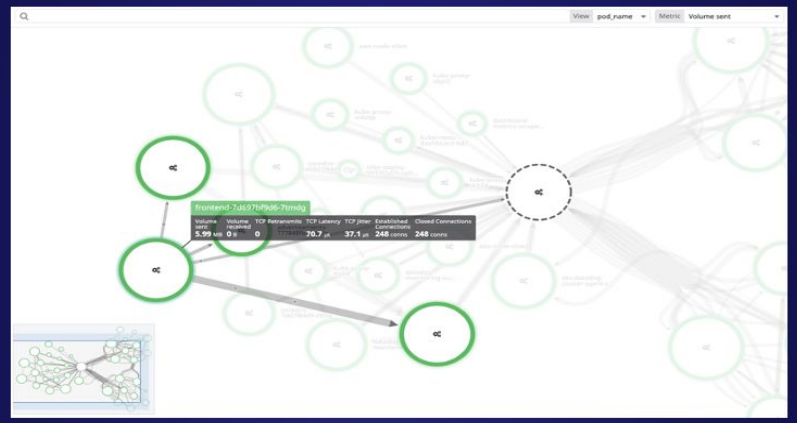
쉽게 **FullStack Data**를 연동하고 **Powerful**한 분석 환경을 통해 장애 분석 시간 최소화

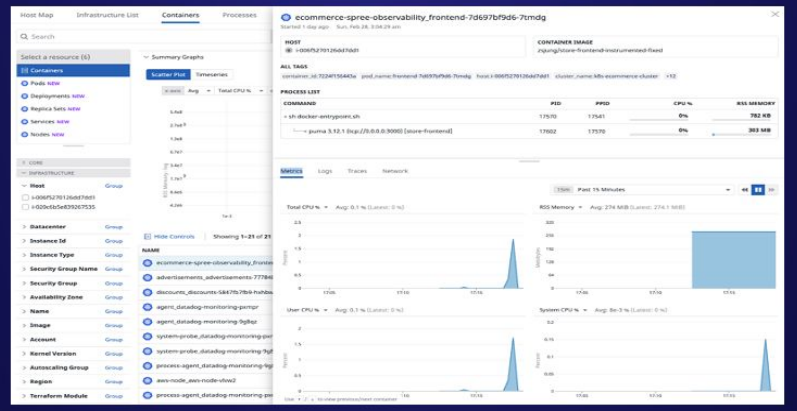
1. AWS 계정 연동



AWS 환경의 리소스를 효과적으로 시각화

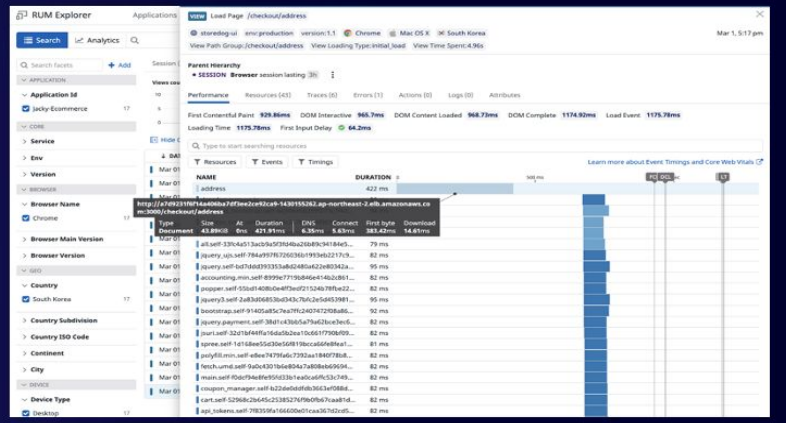
2. Helm chart 배포

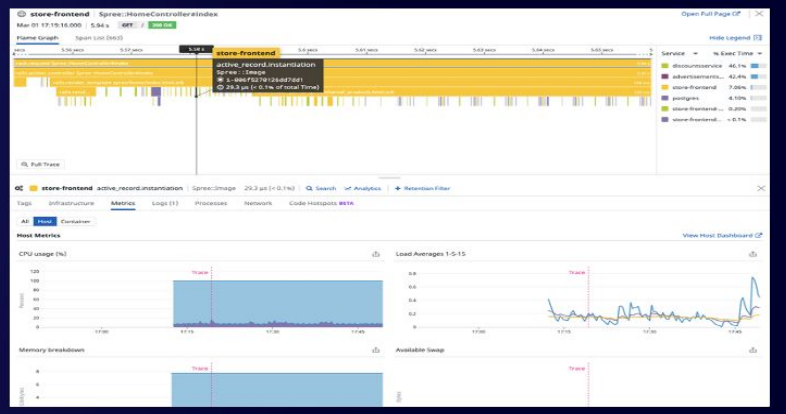




EKS의 Node/Pod/Container에 대한 가시성 확보

3. Application에 Datadog SDK 연동



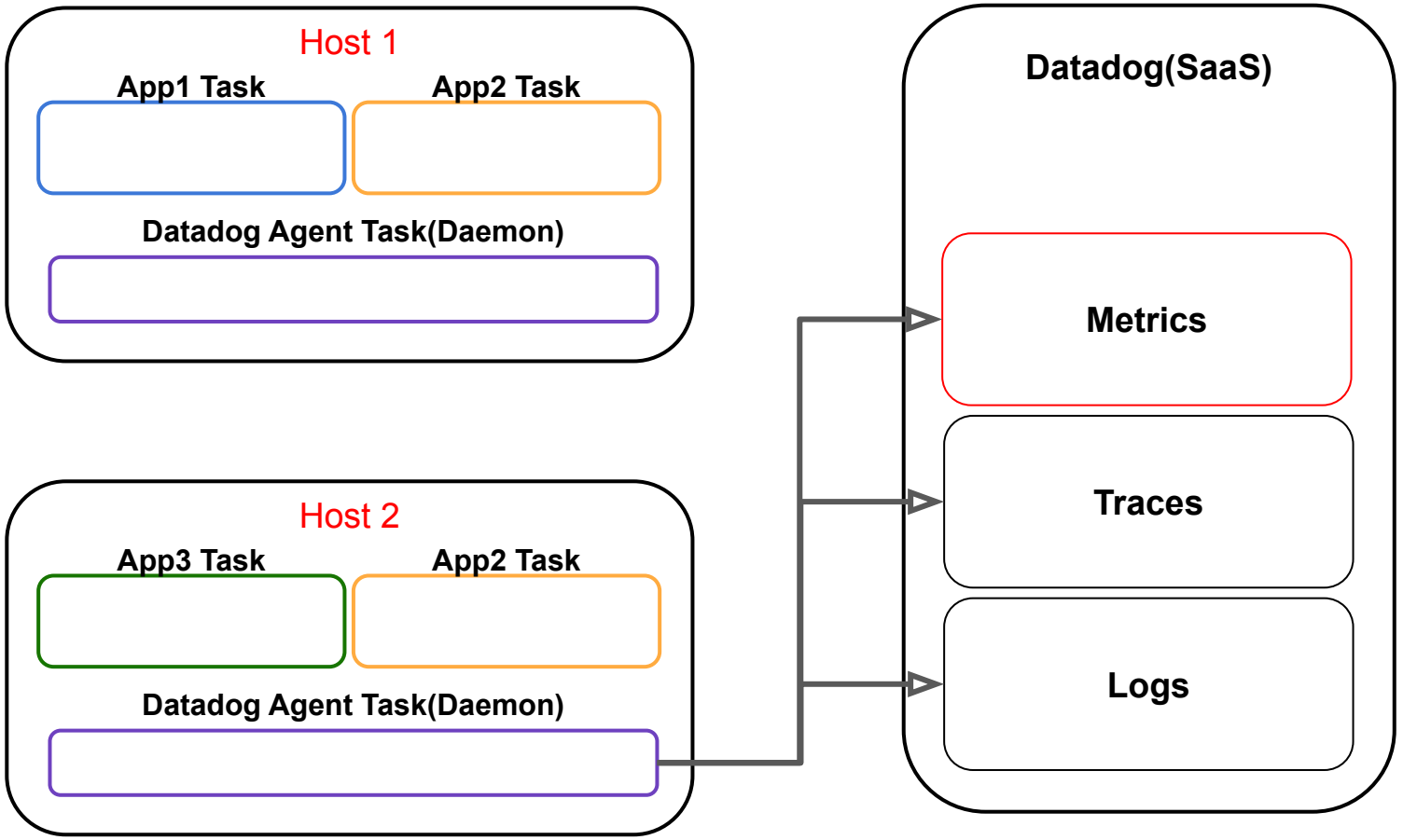


End User부터 Backend까지의 FullStack 가시성 확보

4.2.1 ECS on EC2 메트릭 수집 아키텍쳐

Datadog Agent Task

- ❑ Daemon 서비스로 각 호스트에 배포됨
- ❑ Host내의 Task별 컨테이너 리소스 수집
- ❑ 컨테이너 메트릭 + Trace + Log 수집



4.2.2 ECS on EC2 연동 방법

ECS on EC2 연동 방법 (링크)

1. For Linux containers, download datadog-agent-ecs.json (datadog-agent-ecs1.json if you are using an original Amazon Linux 1 AMI). For Windows, download datadog-agent-ecs-win.json.
2. Edit `datadog-agent-ecs.json` and set `<YOUR_DATADOG_API_KEY>` with the Datadog API key for your account.
3. Optionally - Add the following to your ECS task definition to deploy on an ECS Anywhere cluster.

```
"requiresCompatibilities": ["EXTERNAL"]
```

4. Optionally - Add an Agent health check.

   Add the following to your ECS task definition to create an Agent health check:

```
"healthCheck": {
  "retries": 3,
  "command": ["CMD-SHELL","agent health"],
  "timeout": 5,
  "interval": 30,
  "startPeriod": 15
}
```

5. Optionally - If you are in Datadog EU site, edit `datadog-agent-ecs.json` and set `DD_SITE` to `DD_SITE:datadoghq.eu`.
6. Optionally - See log collection to activate log collection.
7. Optionally - See process collection to activate process collection.
8. Optionally - See trace collection (APM) to activate trace collection.
9. Optionally - See network performance monitoring (NPM) to activate network collection
10. Execute the following command:

```
aws ecs register-task-definition --cli-input-json <path to datadog-agent-ecs.json>
```

요약하면

1. DatadogAgent Task 생성

2. Daemon SERVICE로 등록

Datadog 기본 task definition json

```
{
  "containerDefinitions": [
    {
      "name": "datadog-agent",
      "image": "public.ecr.aws/datadog/agent:latest",
      "cpu": 100,
      "memory": 512,
      "essential": true,
      "mountPoints": [
        {
          "containerPath": "/var/run/docker.sock",
          "sourceVolume": "docker_sock",
          "readOnly": null
        },
        {
          "containerPath": "/host/sys/fs/cgroup",
          "sourceVolume": "cgroup",
          "readOnly": null
        },
        {
          "containerPath": "/host/proc",
          "sourceVolume": "proc",
          "readOnly": null
        }
      ],
      "environment": [
        {
          "name": "DD_API_KEY",
          "value": "<YOUR_DATADOG_API_KEY>"
        },
        {
          "name": "DD_SITE",
          "value": "datadoghq.com"
        }
      ]
    }
  ],
  "volumes": [
    {
      "host": {
        "sourcePath": "/var/run/docker.sock"
      },
      "name": "docker_sock"
    },
    {
      "host": {
        "sourcePath": "/proc/"
      },
      "name": "proc"
    },
    {
      "host": {
        "sourcePath": "/sys/fs/cgroup/"
      },
      "name": "cgroup"
    }
  ],
  "family": "datadog-agent-task"
}
```

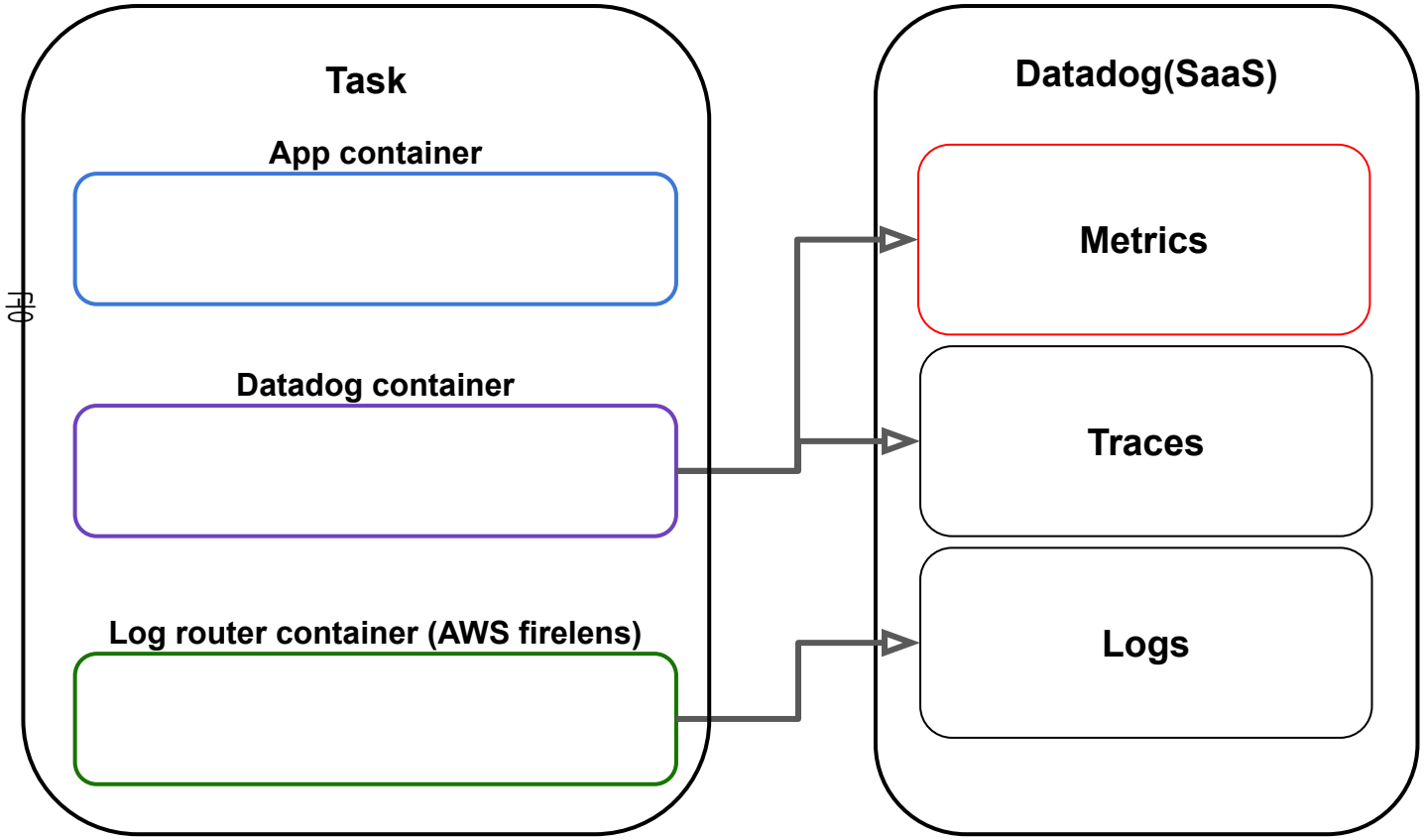
4.3.1 ECS on Fargate 메트릭 수집 아키텍쳐

Datadog container

- ❏ Task내에 sidecar 형태로 배포됨
- ❏ Task내의 container 메트릭 수집
- ❏ Application의 Trace 수집

Log router container

- ❏ Fargate 환경에서 생성되는 로그에 대해 수집
- ❏ AWS firelens에서 Datadog으로 전송할 수 있는 옵션 제공



4.3.2 ECS on Fargate 메트릭 수집 방법

ECS on Fargate 연동 방법 (링크)

AWS CLI

1. Download datadog-agent-ecs-fargate. **Note**: If you are using IE, this may download as gzip file, which contains the JSON file mentioned below.**
2. Update the JSON with a `TASK_NAME`, your Datadog API Key, and the appropriate `DD_SITE` (`datadoghq.com`). Note that the environment variable `ECS_FARGATE` is already set to `"true"`.
3. Add your other containers such as your app. For details on collecting integration metrics, see Integration Setup for ECS Fargate.
4. Execute the following command to register the ECS task definition:

```
aws ecs register-task-definition --cli-input-json
file://<PATH_TO_FILE>/datadog-agent-ecs-fargate.json
```

Datadog 기본 task definition json

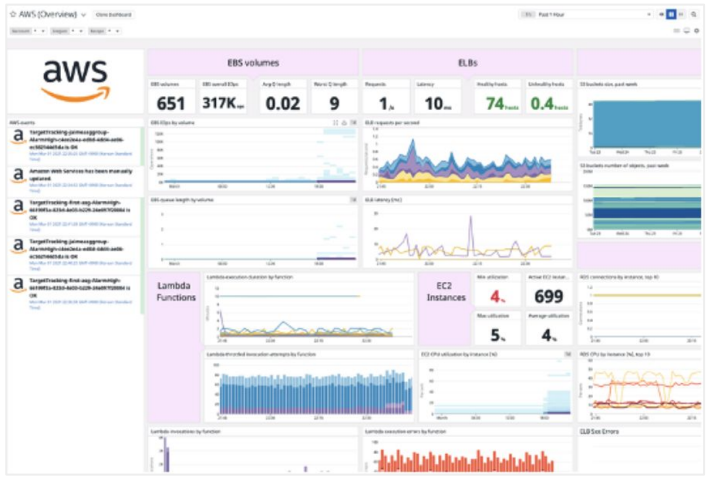
```
{
  "family": "<TASK_NAME>",
  "networkMode": "awsvpc",
  "containerDefinitions": [
      {
          "name": "datadog-agent",
          "image": "public.ecr.aws/datadog/agent:latest",
          "essential": true,
          "environment": [
              {
                  "name": "DD_API_KEY",
                  "value": "<YOUR_API_KEY>"
              },
              {
                  "name": "ECS_FARGATE",
                  "value": "true"
              }
          ]
      }
  ],
  "requiresCompatibilities": [
      "FARGATE"
  ],
  "cpu": "256",
  "memory": "512"
}
```

요약하면

1. Application task에 datadog-agent 컨테이너가 추가되는 형태입니다 (sidecar)

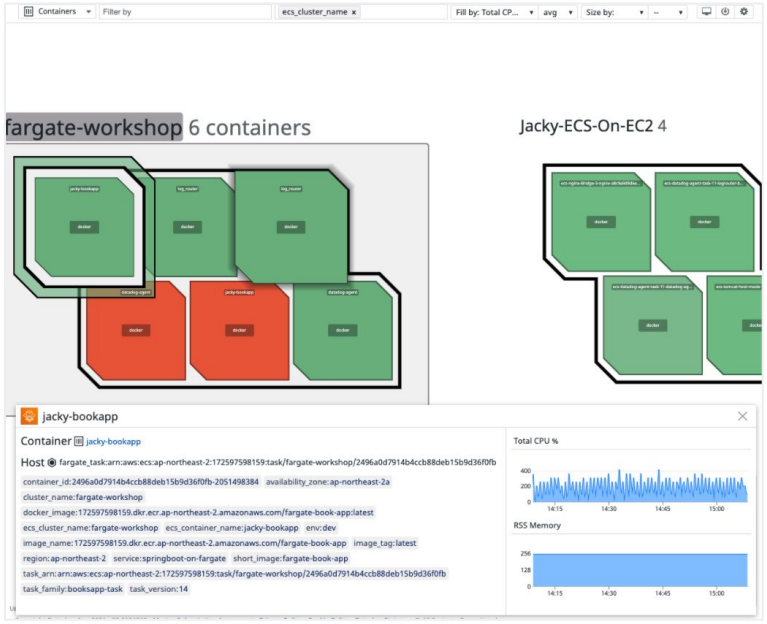
4.3.3 ECS on Fargate Monitoring Best practice (1/2)

1. AWS 계정 연동 (PaaS 서비스 가시성 확보)



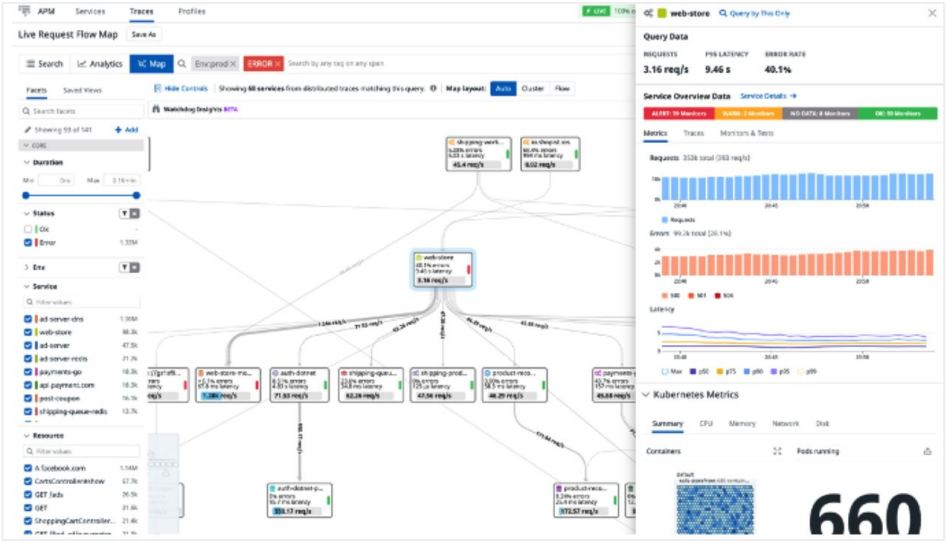
- ❑ 다양한 Preset Dashboard가 생성됨
  - ❑ EC2
  - ❑ EBS
  - ❑ ALB
  - ❑ RDS
  - ❑ 그외 다양한 AWS 서비스
- ❑ Clone 후 자유롭게 대시보드 조합 가능

2. Task내의 Container 메트릭 수집



- ❑ Sidecar 컨테이너로 배포 되어 컨테이너 메트릭 수집
- ❑ Tag가 함께 수집되어 Filtering 및 Grouping 가능

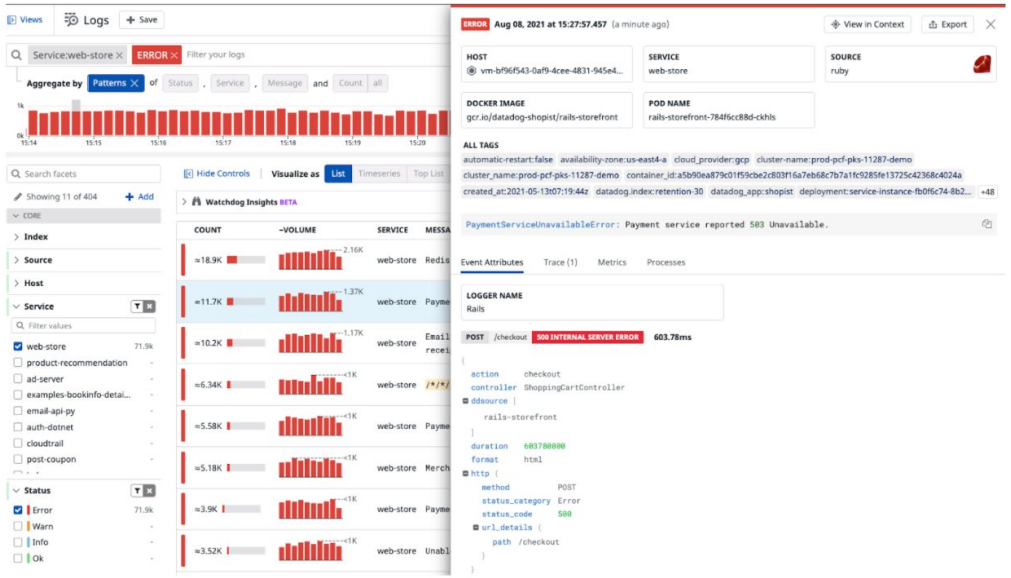
3. Task내의 Application Trace 수집



- ❑ APM을 통해 Application 가시성(trace 확보)
- ❑ 분산 트레이싱 환경 구성
- ❑ 에러만 별도로 모아 관리 가능 (Error Tracking)
- ❑ trace_id를 통해 로그 연계 분석 지원

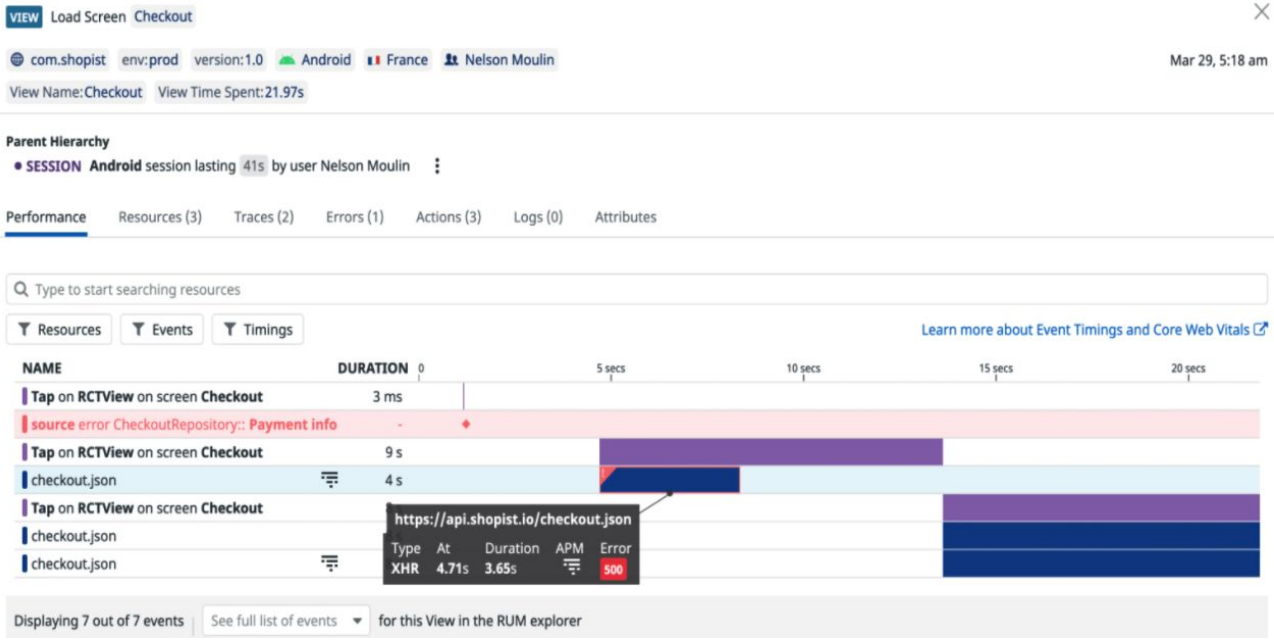
4.3.3 ECS on Fargate Monitoring Best practice (2/2)

4. Application container의 로그 수집



- ❑ firelens를 통해 Datadog으로 로그 전송 기능 지원
- ❑ APM-Log 연계 분석
- ❑ Log 기반 알람 및 대시보드 구성

5. 사용자 관점의 성능 메트릭 수집



- ❑ RUM을 통해 서비스 사용자 성능 메트릭
- ❑ 사용자 부터 Backend까지 FullStack 모니터링 환경 제공
- ❑ Front의 Error Tracking 기능 지원
- ❑ 사용자 관점의 Business 지표 분석 기능 지원

5. 운영중인 솔루션의 Key Metric 수집

요구사항

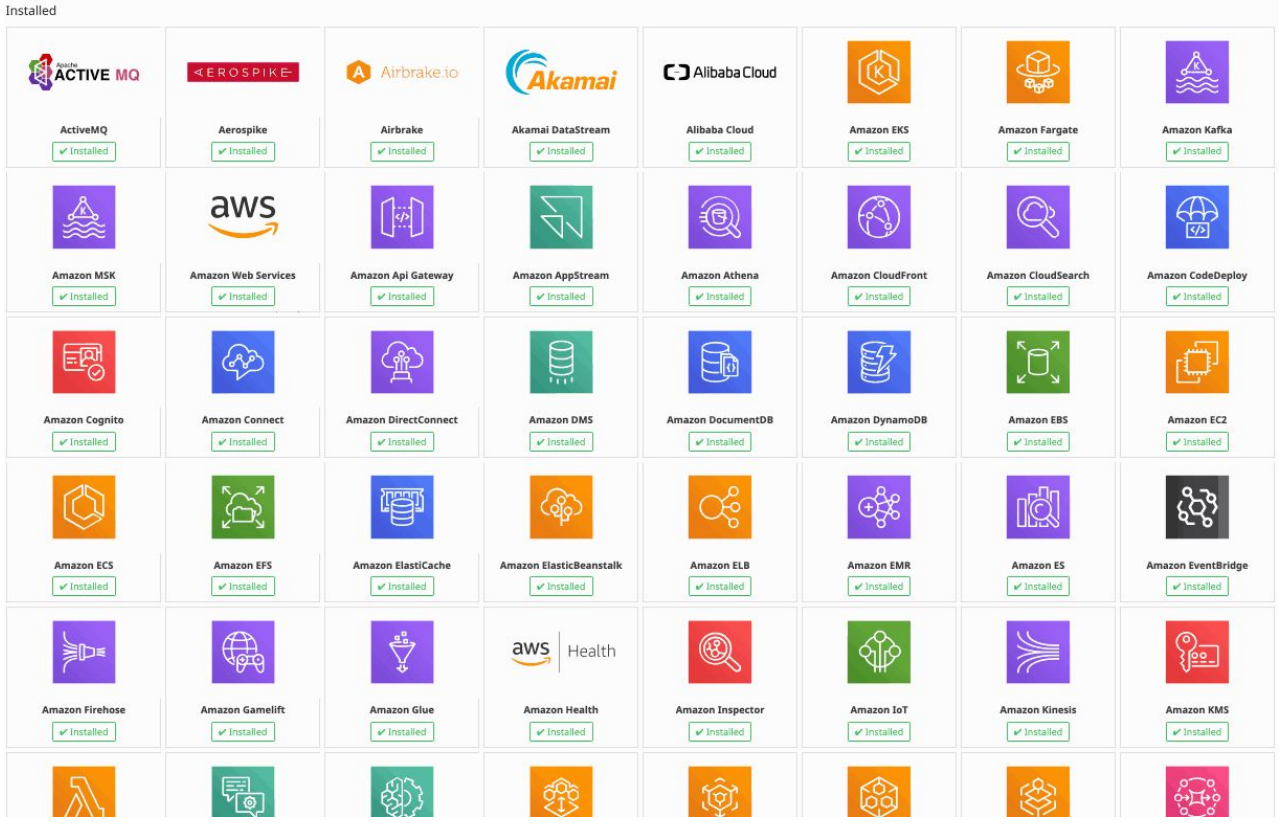
- ❏ Kafka broker의 상태 메트릭 수집 모니터링이 필요합니다 ⇒ kafka integration
- ❏ Mysql 서버의 performance 정보를 수집하고 싶어요 ⇒ mysql integration
- ❏ Redis 서버의 상태 모니터링이 필요합니다 ⇒ redis integration
- ❏ 서비스의 health check API에 대한 availability 와 응답 시간에 대한 레이턴시 측정을 하고 싶어요 ⇒ http check integration

Datadog으로 지원 가능한가요?

- 450+ 제공되는 Datadog Integration으로 지원 가능합니다
- 별도의 개발 없이 Integration 연동을 통해 Key 메트릭 수집

Q2. Kafka 10개의 노드에 Datadog agent가 설치되어 있는 상황에서 Kafka integration을 하면 추가 비용이 발생하나요? (티셔츠 1)

Q3. http check을 이용해 1달 동안 1만번 테스트가 발생했을때 추가 비용이 발생하나요? (티셔츠 1)



5.1 Redis Integration 설정 예

1. /etc/datadog-agent/conf.d/redisdb.d/conf.yaml 파일에서 host, port 정보 확인 후 저장

```
init_config:
instances:
  ## @param host - string - required
  ## Enter the host to connect to.
  - host: localhost
    ## @param port - integer - required
    ## Enter the port of the host to connect to.
    port: 6379

    ## @param username - string - optional
    ## The username to use for the connection. Redis 6+ only.
    #
    # username: <USERNAME>

    ## @param password - string - optional
    ## The password to use for the connection.
    #
    # password: <PASSWORD>
```

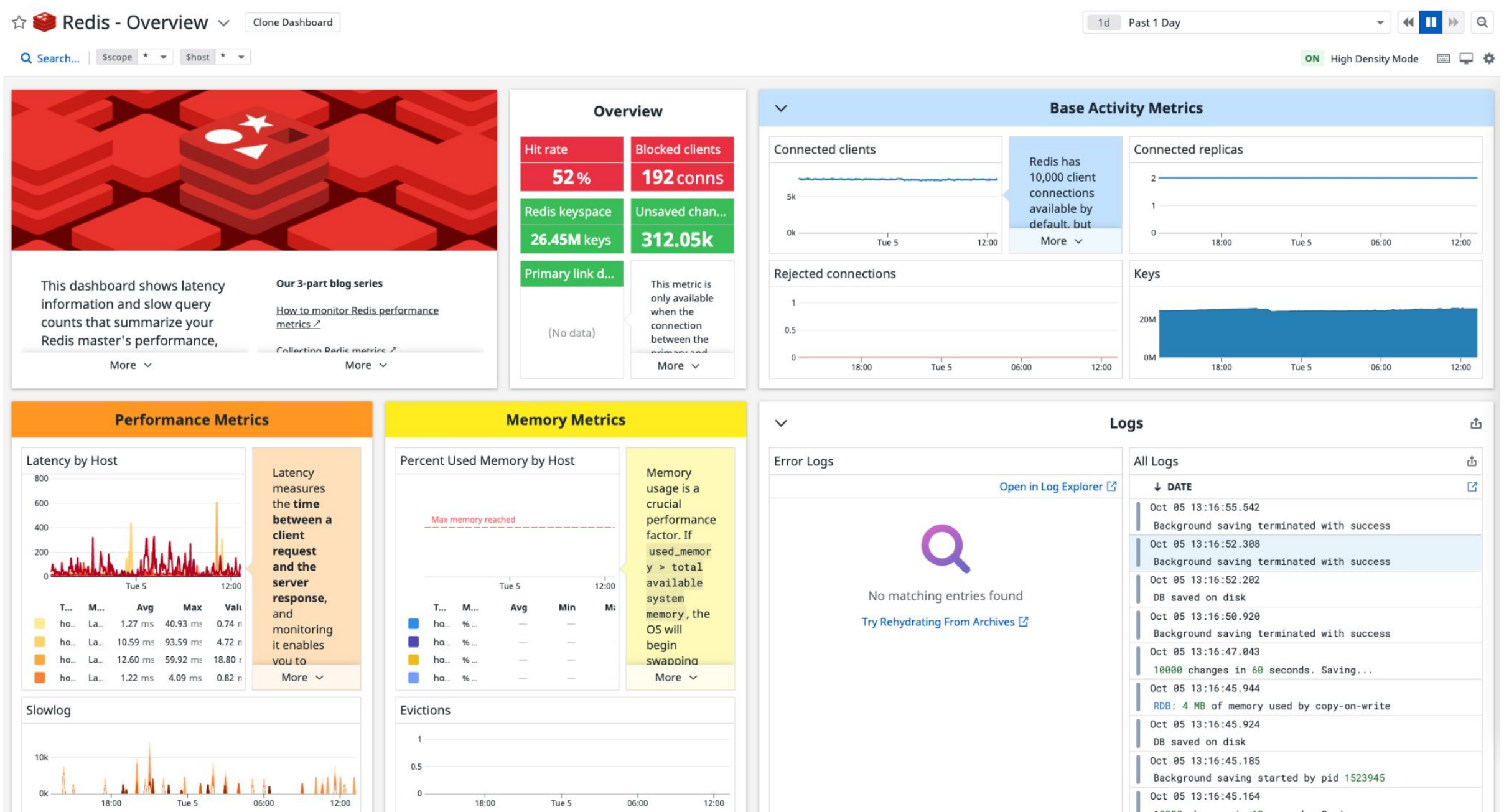
2. Datadog agent 재시작

systemctl restart datadog-agent

3. Redis integration 후 수집되는 메트릭 (참고)

Name	Units	Description
redis.active_defrag.hits	operations	Number of value reallocations performed by the active defragmentation process.
redis.active_defrag.key_hits	keys	Number of keys that were actively defragmented.
redis.active_defrag.key_misses	keys	Number of keys that were skipped by.
redis.active_defrag.misses	operations	Number of aborted value reallocations started by the active defragmentation process.
redis.active_defrag.running		Whether active defragmentation is running or not.
redis.aof.buffer_length	bytes	Size of the AOF buffer.
redis.aof.last_rewrite_time	seconds	Duration of the last AOF rewrite.
redis.aof.loading_eta_seconds	seconds	The estimated amount of time left to load.
redis.aof.loading_loaded_bytes	bytes	The amount of bytes to load.
redis.aof.loading_loaded_perc	percent	The percent loaded.
redis.aof.loading_total_bytes	bytes	The total amount of bytes already loaded.
redis.aof.rewrite		Flag indicating a AOF rewrite operation is on-going.
redis.aof.size	bytes	AOF current file size (aof_current_size).
redis.clients.biggest_input_buf		The biggest input buffer among current client connections.
redis.clients.blocked	connections	The number of connections waiting on a blocking call.
redis.clients.longest_output_list		The longest output list among current client connections.
redis.clients.recent_max_input_buffer		The biggest input buffer among recent client connections.
redis.clients.recent_max_output_buffer		The longest output buffer among recent client connections.
redis.command.calls		The number of times a redis command has been called, tagged by 'command', e.g. 'command:append'. Enable in Agent's redisdb.yaml with the command_stats option.

5.2 Redis Integration Dashboard

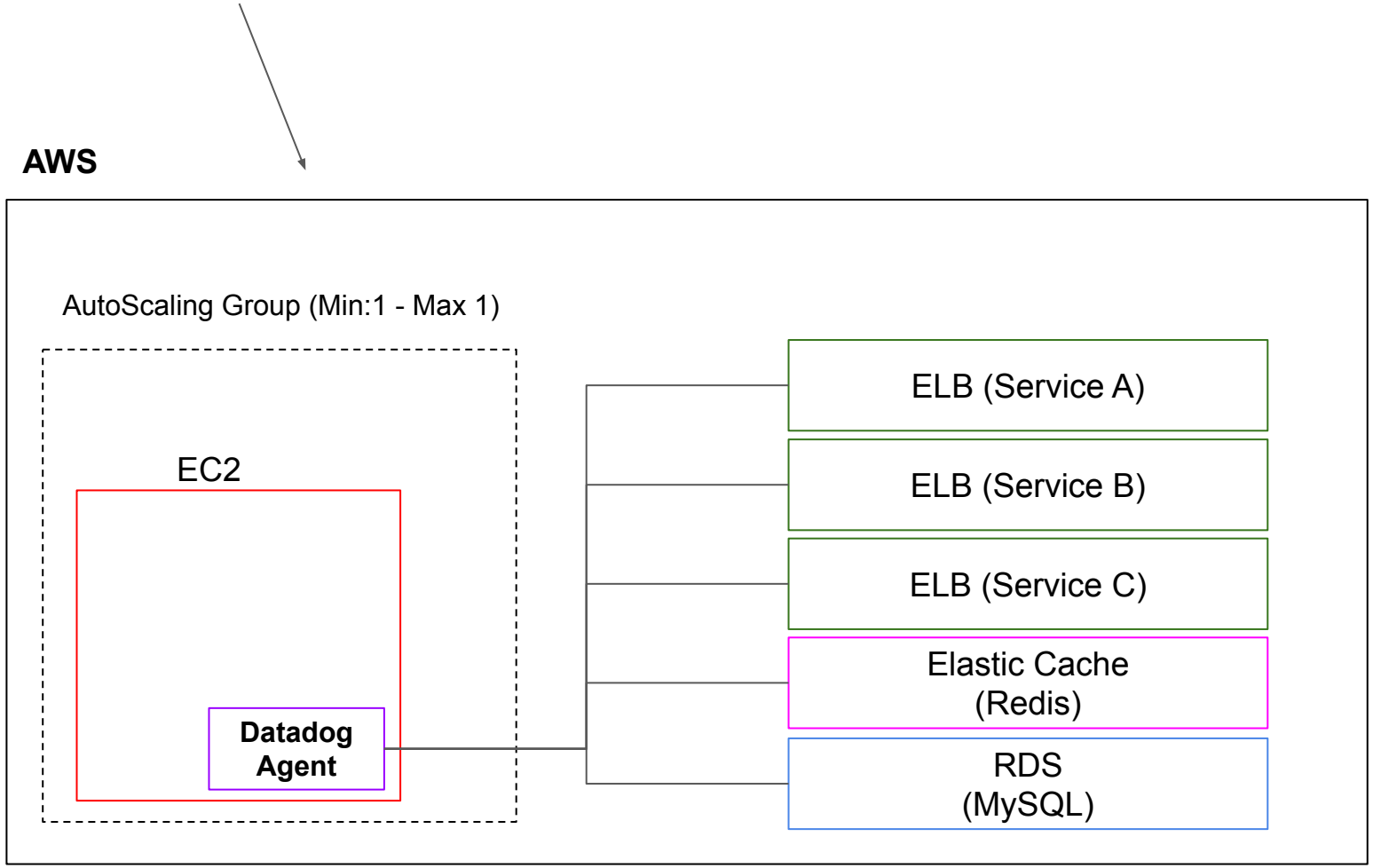


5.3 Integration Best practice

1. 가급적 다양한 인테그레이션을 활용하여 연계 분석에 활용하세요

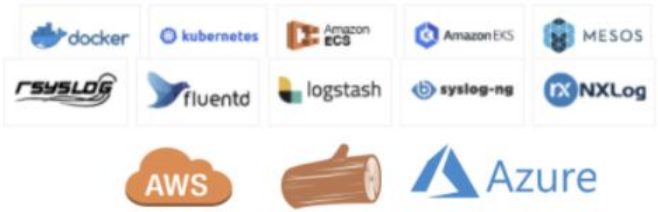
- 다양하게 수집된 메트릭은 머신러닝을 이용한 특이사항 탐지에 사용될 수 있습니다

2. Cloud 환경에서 인스턴스 하나는 모니터링 용도로 PaaS 솔루션 모니터링이나 HTTP Check에 활용하시면 좋습니다



Log Flow

#Datadog Log Flow



Datadog으로 로그 전송

Ingest API

Pipelines

로그 파싱 Pipeline 수행

Live Tail

실시간 유입되는 로그를 웹콘솔로 확인
(tail -f * 와 유사하게 동작)

Index

Archive

Custom Metric

Archive된 로그를 로드하여 검색 가능

Exclusion Filters

7 15 … … … 360

로그의 attribute 및 tag 별 저장 기간 설정 가능

Amazon S3 Google Cloud Storage Azure Storage

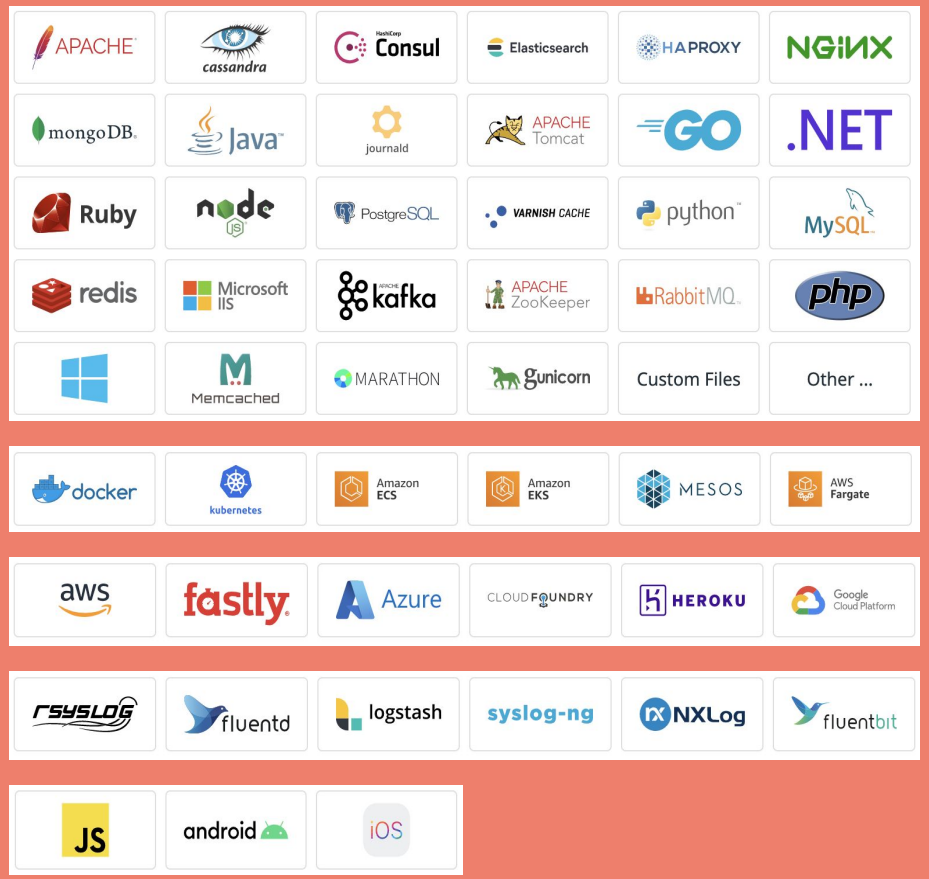
S3, CloudStorage, Azure Storage로
로그 백업 후 필요시 Load 가능

로그로부터 의미있는 값을 메트릭으로 저장

Log Features

#Sending Logs to Datadog

다양한 방법을 통한 로그전송



Things To Check

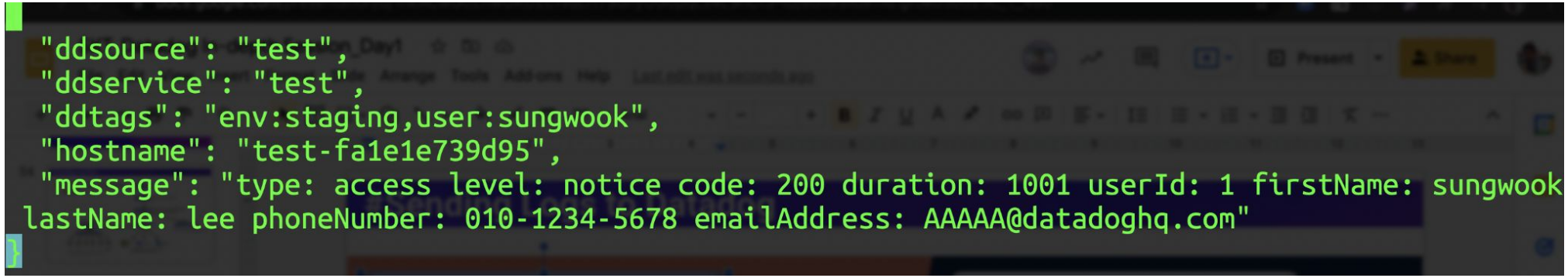
- **Filter logs**
- **Scrub**
- **multi-line**

Sample

```
logs:
 - type: file
   path: 로그_경로/server.log
   service: myapplication
   source: java
   log_processing_rules:
     - type: multi_line
       name: new_log_start_with_date
       pattern: - \d{4}-\d{2}-\d{2}
```

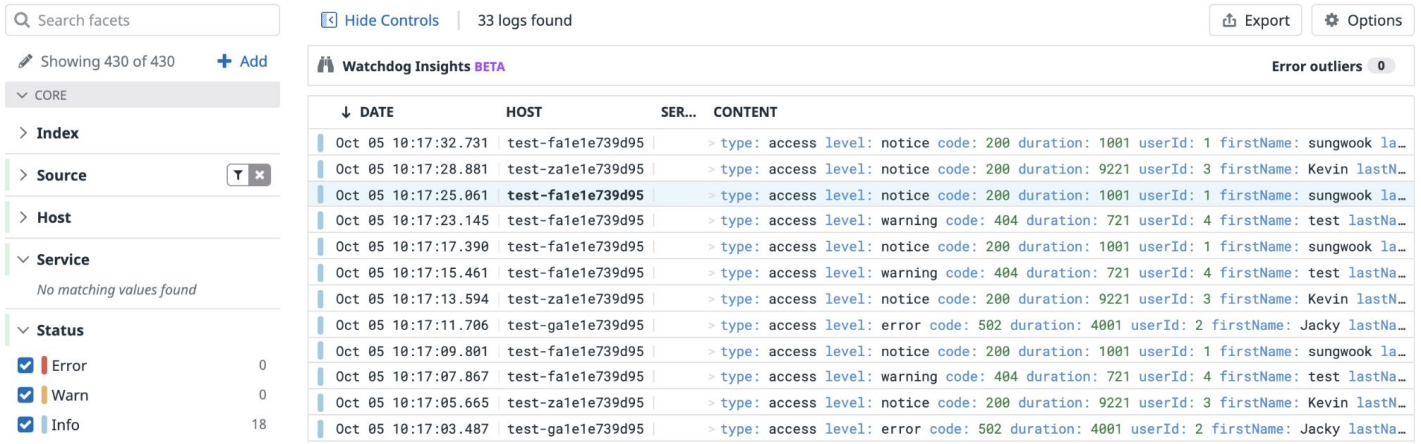
#Sending Logs to Datadog

Sending Logs via API



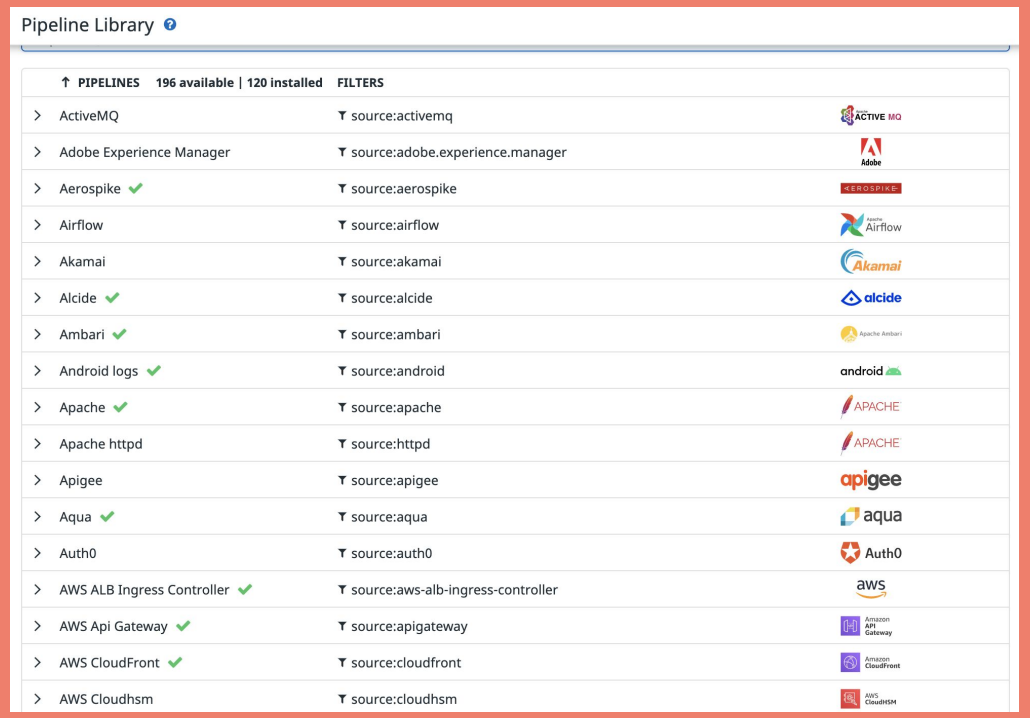
***curl -d @$list https://http-intake.logs.datadoghq.com/v1/input -H "Content-Type: application/json" -H "DD-API-KEY: ${API}"

Result



#Pipelines

다양한 Pipeline Library 제공



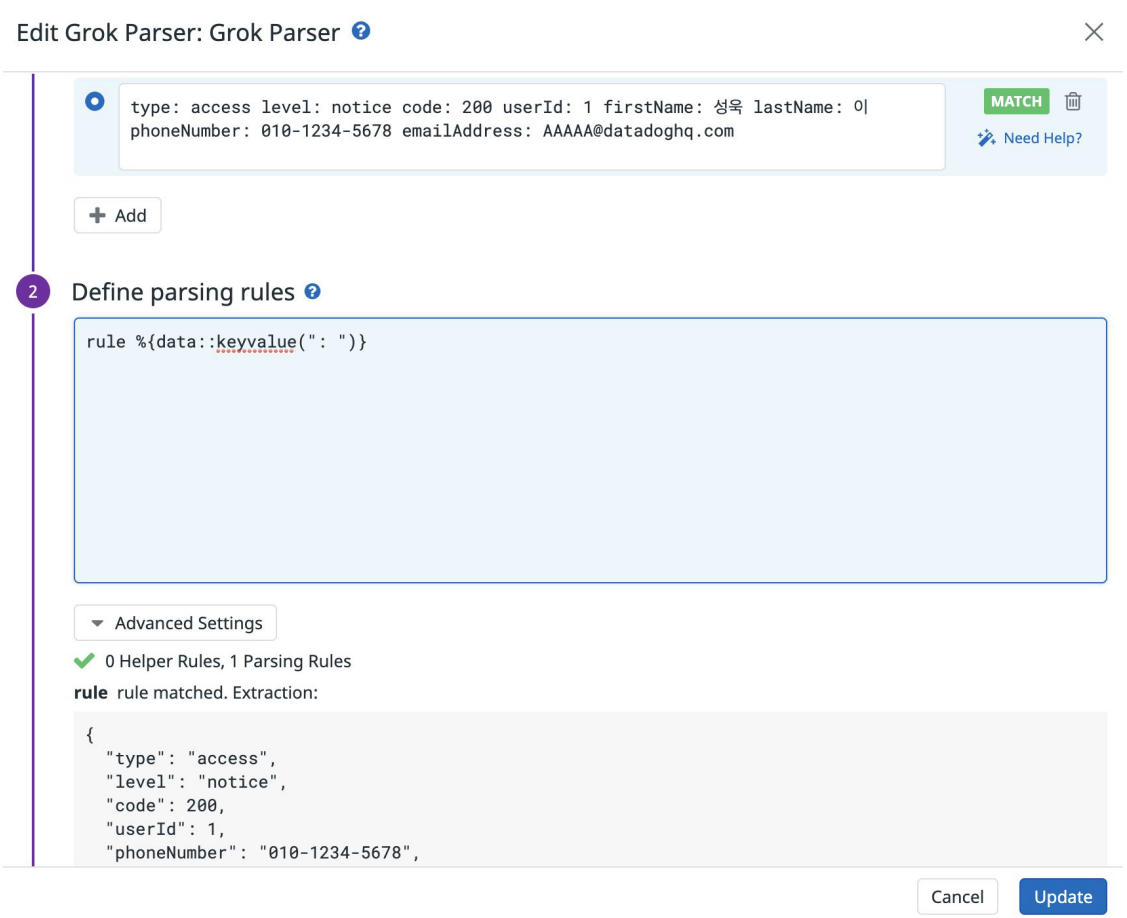
Things To Check

- Processor

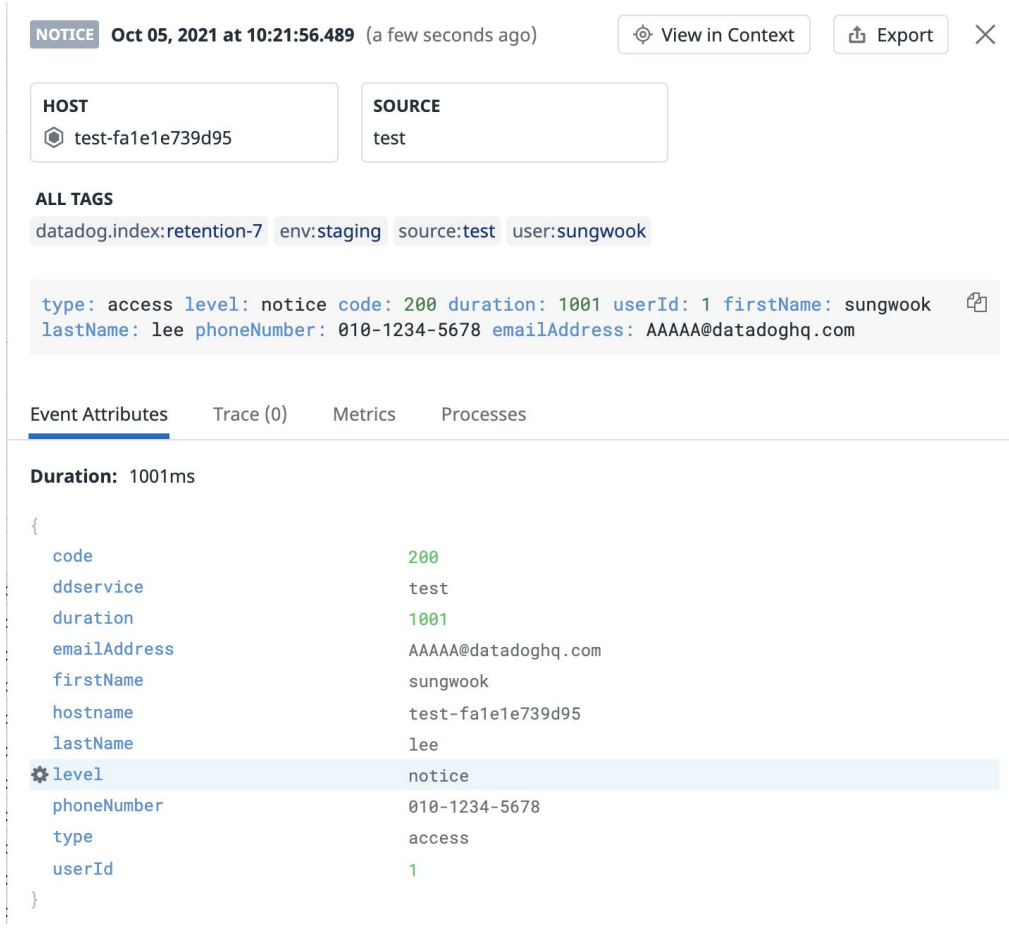
Grok parser
URL parser
User-Agent parser
Category processor
Arithmetic processor
GeoIP parser
Lookup processor
Remapper
Log date remapper
Log status remapper
Service remapper

#Sending Logs to Datadog

Parser 적용 rule ex. %{data::keyvalue(": ")}

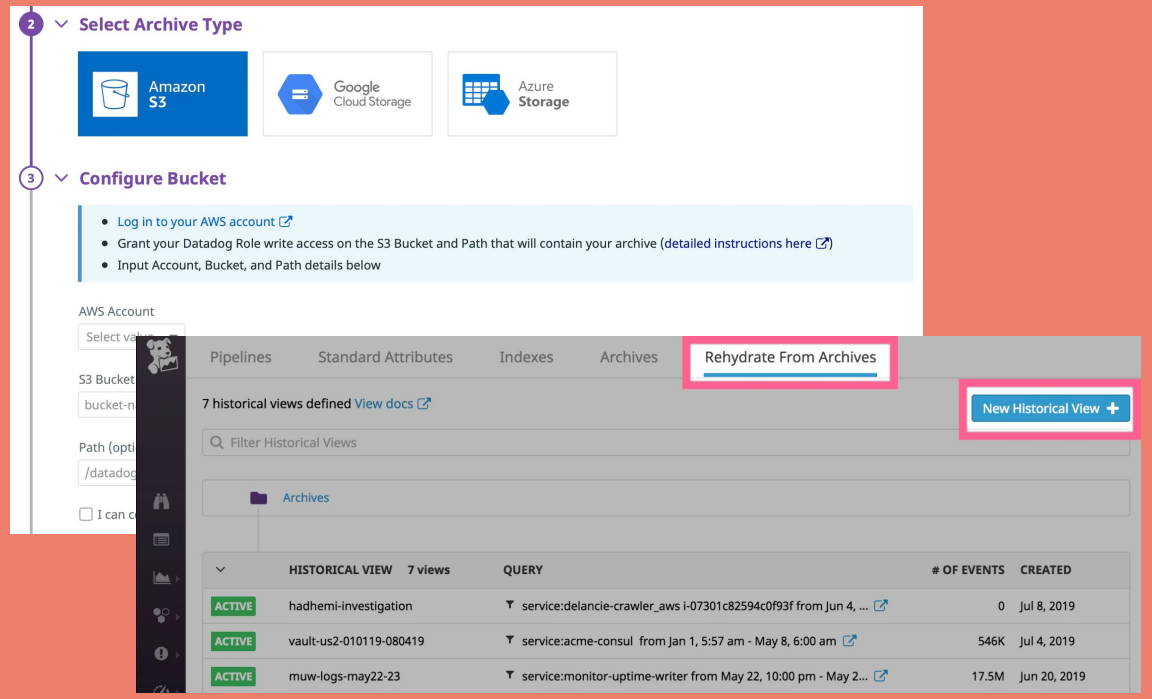


Result



#Archives & Rehydrate

저장 & 복원

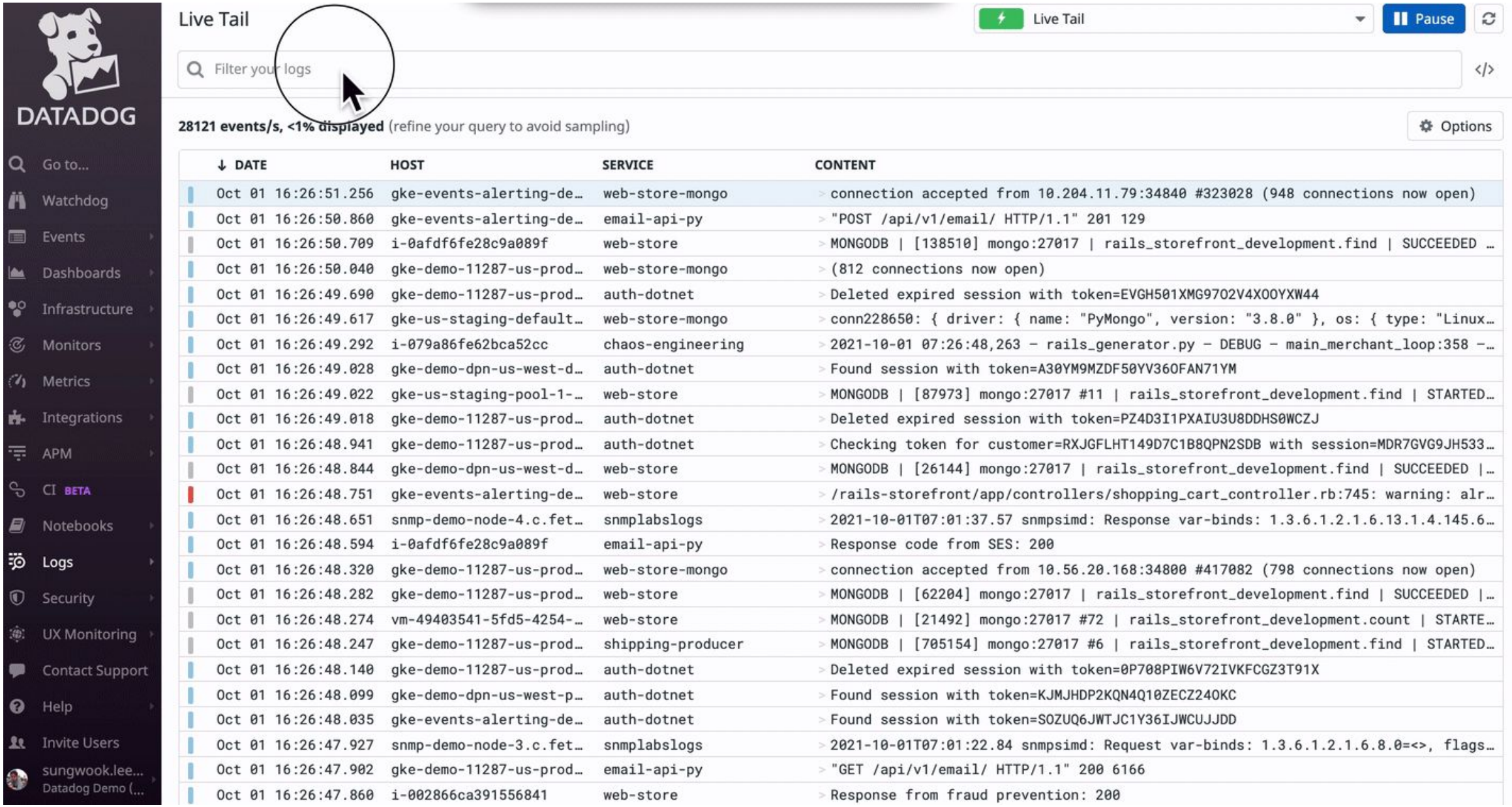


Things To Check

- Index 없이 사용가능
- 복원시 Ingest / Index 비용발생
- Estimate scan size
- Custom Storage 사용불가

*약 12GB 테스트시 약 5-10분 소요
(Storage 위치등에 따라 차이발생)

#Log Features Demo



Log Optimization

#Log Optimization

Logging Without Limits™

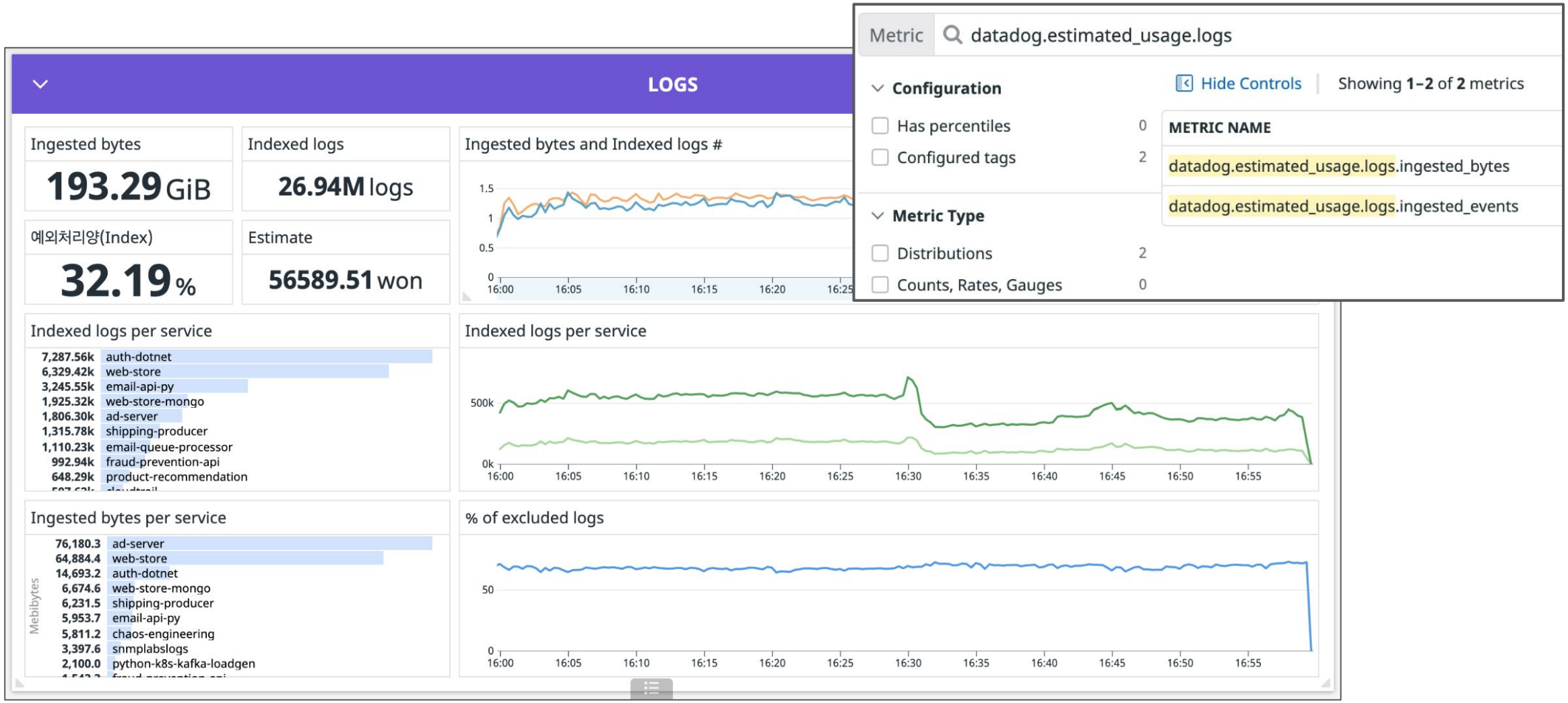
- INGEST
  - Filter Logs
  - Generate Metrics
- INDEX
  - 로그 중요도별 저장 주기 조정
  - Set daily quota
  - 사용량에 따른 알람 생성

After

- INGEST
  - Ingest 비용 절감
  - 로그 저장 없이 특정 패턴 발생시 알람
- INDEX
  - Access 로그 3일 / Error 로그 15일
  - Access 로그에 추가 일 100M 제한
  - Dashboard 및 알람으로 특이사항 감지
  - Archive & Rehydrate 기능 활용

#Log Optimization

Metric을 활용한 사용량 모니터링



Q&A

#Quick Review

Q1. Datadog 로그 제품에서 비용 최적화가 가능한 두가지 영역은?

A. INGEST & INDEX 조정을 통해 가능합니다

Q2. Grok Parser processor 사용이 처음입니다. Parse My Logs를 적용해도 파싱이 정상적으로 되지 않습니다

A. Need Help 클릭 혹은 support@datadoghq.com으로 요청