- Overview

What you'll accomplish:

Set up a Kinesis Agent on data sources to collect data and send it continuously to Amazon Kinesis Firehose.

Create an end-to-end data delivery stream using Kinesis Firehose. The delivery stream will transmit your data from the agent to destinations including Amazon Kinesis Analytics, Amazon Redshift, Amazon Elasticsearch Service, and Amazon S3.

Process incoming log data using SQL queries in Amazon Kinesis Analytics.

Load processed data from Kinesis Analytics to Amazon Elasticsearch Service to index the data.

Analyze and visualize the processed data using Kibana.

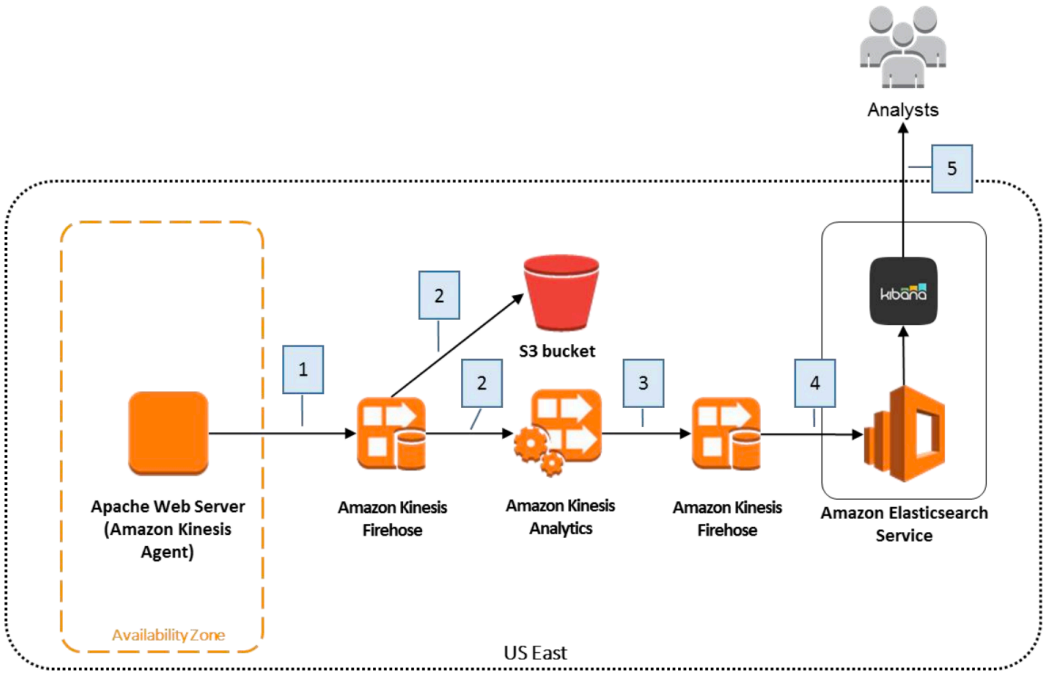
What you'll need before starting:

An AWS Account: You will need an AWS account to begin provisioning resources to host your website. Sign up for AWS.

IT Experience: You will need a basic understanding of web technologies and familiarity with SQL to successfully complete this project.

AWS Experience: No prior experience with AWS is required to successfully complete this project.

An existing server to generate application logs.



The web server in this example will be an Amazon Elastic Compute Cloud (EC2) instance. You will install the Amazon Kinesis Agent on this Linux instance, and the agent will continuously forward log records to an Amazon Kinesis Firehose delivery stream (step 1). Amazon Kinesis Firehose will write each log record to Amazon Simple Storage Service (Amazon S3) for durable storage of the raw log data (step 2), and the Amazon Kinesis Analytics application will continuously run an SQL statement against the streaming input data (step 2). The Amazon Kinesis Analytics application will create an aggregated data set every minute and output that data to a second Firehose delivery stream (step 3). This Firehose delivery stream will write the aggregated data to an Amazon ES domain (step 4). Finally, you will create a view of the streaming data using Kibana to visualize the output of your system (step 5).

• 서비스별 Description

Amazon EC2

Description: Amazon EC2 provides the virtual application servers, known as instances, to run your web application on the platform you choose. EC2 allows you to configure and scale your compute capacity easily to meet changing requirements and demand. It is integrated into Amazon's computing environment, allowing you to leverage the AWS suite of services.

Amazon Kinesis Firehose

Description: Amazon Kinesis Firehose is a fully managed service for delivering real-time streaming data to destinations such as Amazon S3, Amazon Redshift, or Amazon ES. With Firehose, you do not need to write any applications or manage

any resources. You configure your data producers to send data to Firehose and it automatically delivers the data to the destination that you specified.

Amazon S3

Description: Amazon S3 provides secure, durable, and highly-scalable cloud storage for the objects that make up your application. Examples of objects you can store include source code, logs, images, videos, and other artifacts that are created when you deploy your application. Amazon S3 makes it is easy to use object storage with a simple web interface to store and retrieve your files from anywhere on the web, meaning that your website will be reliably available to your visitors.

Amazon Kinesis Analytics

Description: Amazon Kinesis Analytics is the easiest way to process and analyze streaming data in real-time with ANSI standard SQL. It enables you to read data from Amazon Kinesis Streams and Amazon Kinesis Firehose, and build stream processing queries that filter, transform, and aggregate the data as it arrives. Amazon Kinesis Analytics automatically recognizes standard data formats, parses the data, and suggests a schema, which you can edit using the interactive schema editor. It provides an interactive SQL editor and stream processing templates so you can write sophisticated stream processing queries in just minutes. Amazon Kinesis Analytics runs your queries continuously, and writes the processed results to output destinations such as Amazon Kinesis Streams and Amazon Kinesis Firehose, which can deliver the data to Amazon S3, Amazon Redshift, and Amazon ES. Amazon Kinesis Analytics automatically provisions, deploys, and scales the resources required to run your queries.

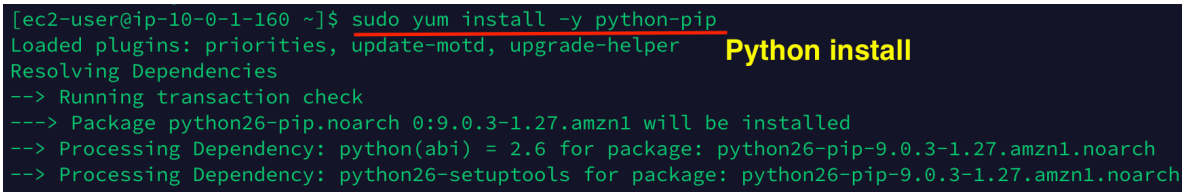
Amazon Elasticsearch Service

Description: Amazon ES is a popular open-source search and analytics engine for big data use cases such as log and click stream analysis. Amazon ES manages the capacity, scaling, patching, and administration of Elasticsearch clusters for you while giving you direct access to the Elasticsearch API.

- Realtime Log 생성을 위해 Fake Apache Log Generator 를 설치

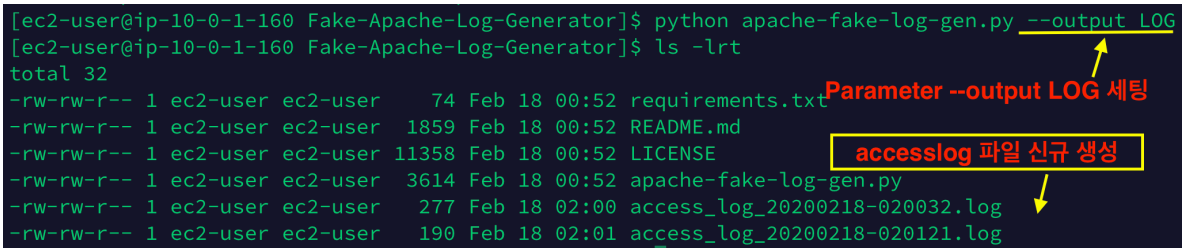
https://github.com/kiritbasu/Fake-Apache-Log-Generator.git

python 설치 필요



sudo pip install --upgrade pip
root 권한으로 아래 4개 module install

/usr/local/bin/pip install pytz
/usr/local/bin/pip install numpy
/usr/local/bin/pip install faker
/usr/local/bin/pip install tzlocal



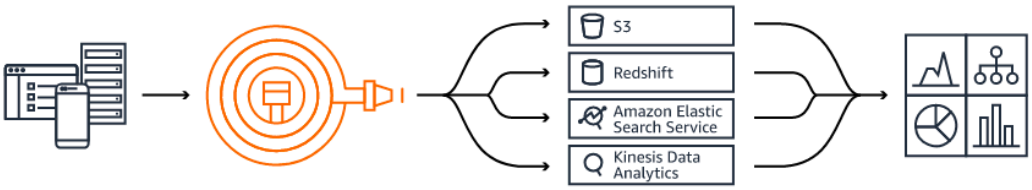
- Amazon Kinesis Firehose

Amazon Kinesis Firehose is a fully managed service for delivering real-time streaming data to destinations such as Amazon Simple Storage Service (Amazon S3), Amazon Redshift, or Amazon Elasticsearch Service (Amazon ES)

- Kinesis Firehose 생성

Deliver streaming data with Kinesis Firehose delivery streams

Continously collect, transform, and load streaming data into destinations such as Amazon S3 and Amazon Redshift.



Create delivery stream

Source

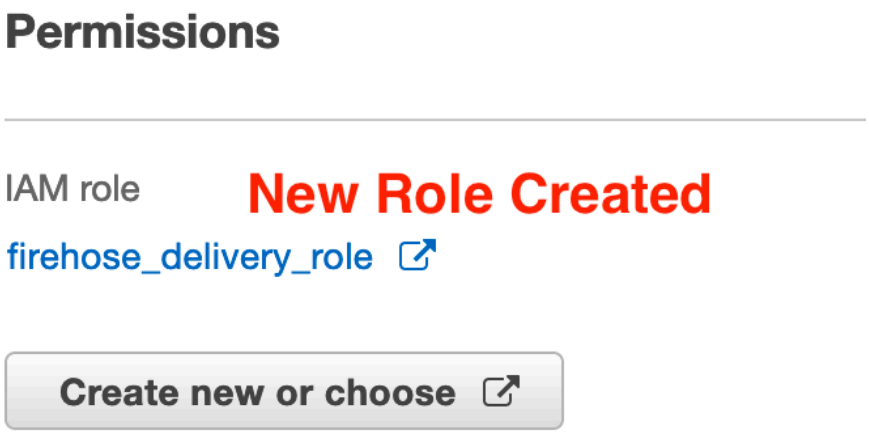
To learn about enabling server-side encryption (SSE), see **Data Protection in Amazon Kinesis Data Firehose**.

- (●) Direct PUT or other sources
  Choose this option to send records directly to the delivery stream, or to send records from AWS IoT, CloudWatch Logs, or CloudWatch Events.
- ( ) Kinesis Data Stream

S3 bucket

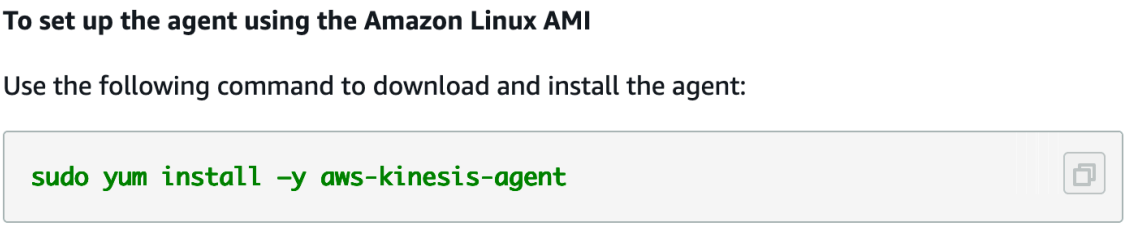
kh-kinesis **New Bucket Created** ▼ | **Create new**

View **kh-kinesis** in S3 console



- Amazon Kinesis Agent 설치

https://docs.aws.amazon.com/firehose/latest/dev/writing-with-agents.html#download-install
you can configure the EC2 instance to send the data using the Amazon Kinesis Agent software



1. Open and edit the configuration file (as superuser if using default file access permissions): `/etc/aws-kinesis/agent.json`

   In this configuration file, specify the files (`"filePattern"`) from which the agent collects data, and the name of the delivery stream (`"deliveryStream"`) to which the agent sends data. The file name is a pattern, and the agent recognizes file rotations. You can rotate files or create new files no more than once per second. The agent uses the file creation time stamp to determine which files to track and tail into your delivery stream. Creating new files or rotating files more frequently than once per second does not allow the agent to differentiate properly between them.

   ```
   {
      "flows": [
           {
               "filePattern": "/tmp/app.log*",
               "deliveryStream": "yourdeliverystream"
           }
      ]
   }
   ```

   The default AWS Region is `us-east-1`. If you are using a different Region, add the `firehose.endpoint` setting to the configuration file, specifying the endpoint for your Region. For more information, see Agent Configuration Settings.

2. Start the agent manually:

   ```
   sudo service aws-kinesis-agent start
   ```

3. (Optional) Configure the agent to start on system startup:

   ```
   sudo chkconfig aws-kinesis-agent on
   ```

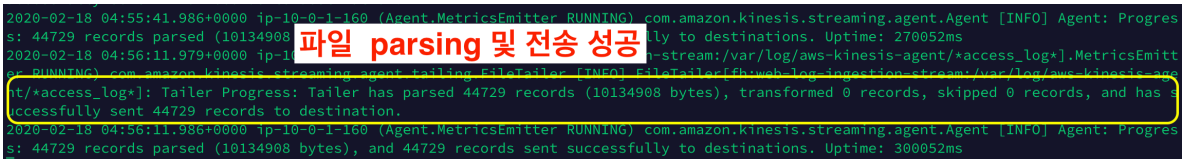
The agent is now running as a system service in the background. It continuously monitors the specified files and sends data to the specified delivery stream. Agent activity is logged in `/var/log/aws-kinesis-agent/aws-kinesis-agent.log`.

- 로그 생성

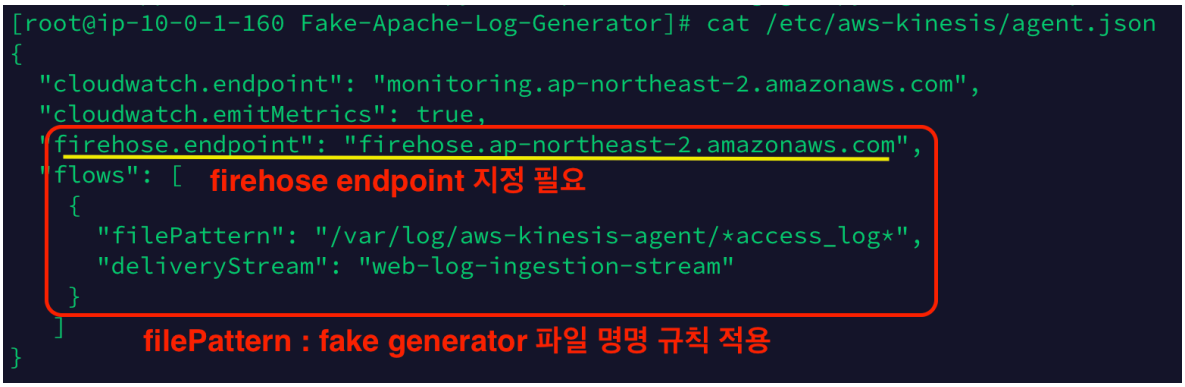
[root@ip-10-0-1-160 Fake-Apache-Log-Generator]# python apache-fake-log-gen.py -o LOG -n 0 -p /var/log/aws-kinesis-agent/

-o LOG : access log를 파일형식으로 저장
-p /var/log/aws-kinesis-agent : 파일 저장 위치

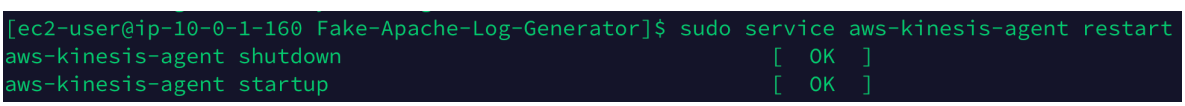
- 수행로그 /var/log/aws-kinesis-agent/aws-kinesis-agent.log



- 설정파일 /etc/aws-kinesis/agent.json



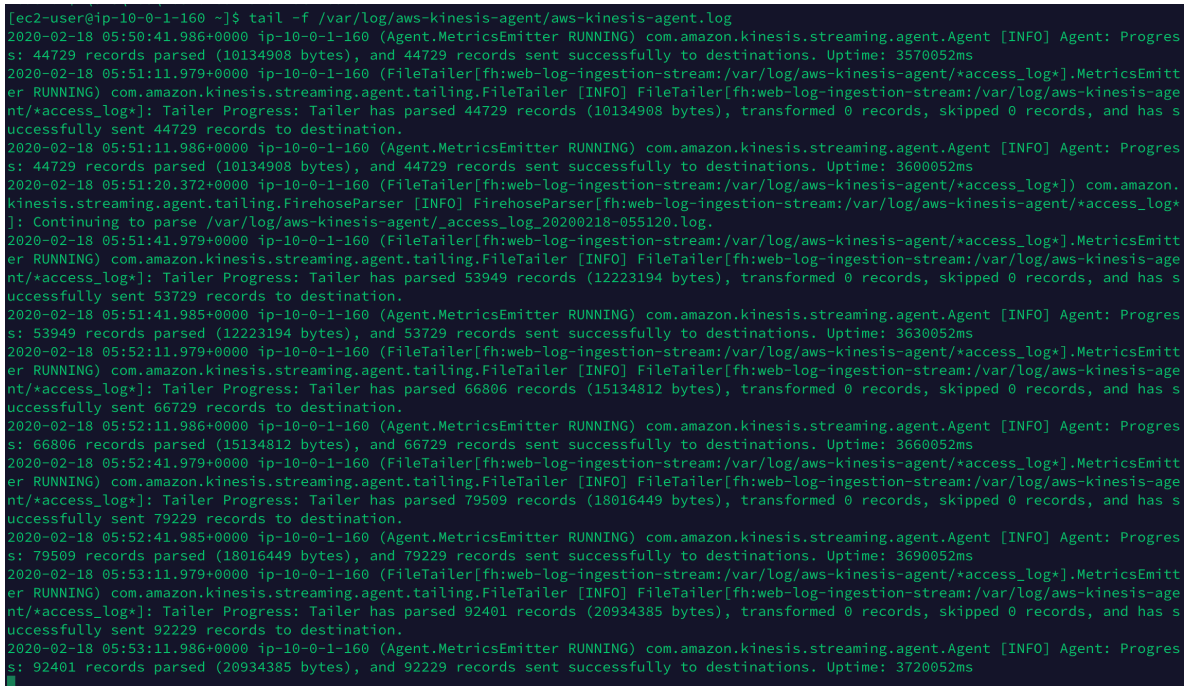
- aws-kinesis-agent 재 기동



- Resources Not Found 에러 발생 시

- /etc/aws-kinesis/agent.json 파일 수정 필요
"firehose.endpoint": "firehose.ap-northeast-2.amazonaws.com",
추가

- aws-kinesis-agent 수행로그



- kinesis analytics 세팅

connect to streaming data

Kinesis Analytics - Create application

Kinesis Analytics applications continuously read and analyze data from a connected streaming source in real-time. To enable interactivity with your data during configuration you will be prompted to run your application. Kinesis Analytics resources are not covered under the AWS Free Tier, and **usage-based charges apply.** For more information, see Kinesis Analytics pricing.

Application name

web-log-aggregation-tutorial

Acceptable characters are uppercase and lowercase letters, numbers, underscores, hyphens, and periods.

Description - *optional*

fake apache log generator ---> aws-kinesis-agent로 accesslog를 firehose로 전송
이 데이터를 kinesis analytics에서 SQL을 이용하여 가공 후 다른 firehose로 전송

Runtime

- (●) SQL
  Process data in real-time using SQL, which provides an easy way to quickly query large volumes of streaming data without learning new frameworks or languages. Learn more
- ( ) Apache Flink
  Apache Flink is an open-source framework and distributed processing engine for stateful computations over unbounded and bounded data streams. Learn more

ⓘ After you create the application, you can't change the type or version of the runtime environment.

Cancel | **Create application**

Connect streaming data source

Choose from your Kinesis data streams and Firehose delivery streams, or quickly configure a demo Kinesis stream that can be used to explore Kinesis Anaytics.

(●) Choose source | ( ) Configure a new stream

Source

- ( ) Kinesis data stream
  Kinesis data stream is an ordered sequence of data records used for rapid and continuous data intake and aggregation.
- (●) Kinesis Firehose delivery stream
  Kinesis Firehose delivery streams send source records to the destinations that you specify, automatically and continuously.

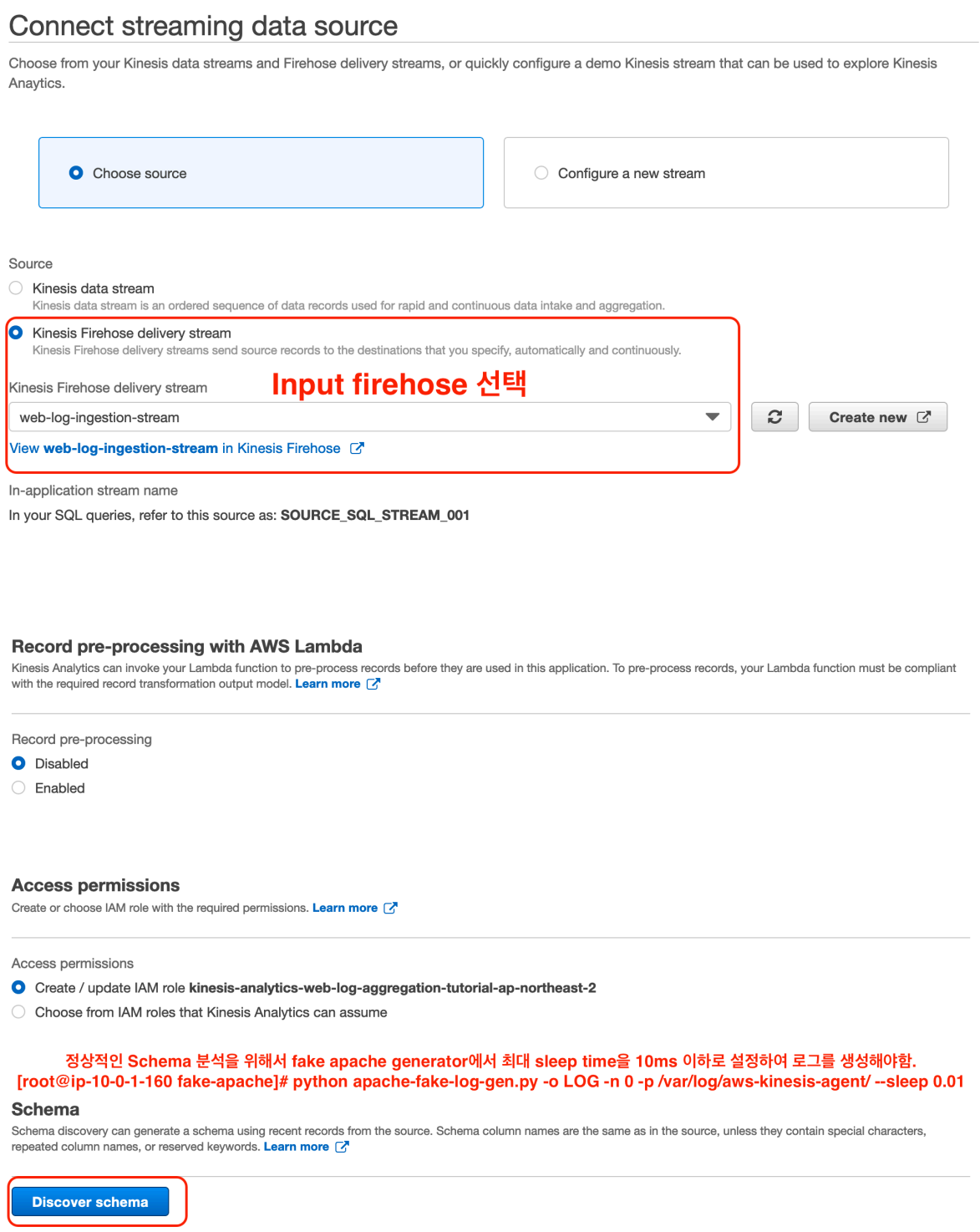
Kinesis Firehose delivery stream

web-log-ingestion-stream | Create new

View **web-log-ingestion-stream** in Kinesis Firehose

In-application stream name

In your SQL queries, refer to this source as: **SOURCE_SQL_STREAM_001**



- not enough data in stream web-log-ingestion-stream

Schema

Schema discovery can generate a schema using recent records from the source. Schema column names are the same as in the source, unless they contain special characters, repeated column names, or reserved keywords. **Learn more**

Schema discovery has failed because there is not enough data in stream web-log-ingestion-stream

Increase the throughput into the source and then choose **Retry schema discovery**.

Troubleshooting

- To see when data was last written to the stream, go to CloudWatch metrics

Other ways to populate the stream

- Generate and send sample data with the Amazon Kinesis Data Generator
- Use the AWS SDKs / agents

Retry schema discovery

==> python apache-fake-log-gen.py -o LOG -n 0 -p /var/log/aws-kinesis-agent/ --sleep 0.01

==> 아래와 같이 scheme 분석이 완료되었음

Schema

Schema discovery can generate a schema using recent records from the source. Schema column names are the same as in the source, unless they contain special characters, repeated column names, or reserved keywords. **Learn more**

Schema discovery successful

Detected CSV format and applied schema

- To define a custom schema, choose "Edit schema" in the stream sample below.
- To capture a new stream sample from the selected source for discovery, choose **Retry schema discovery** below.

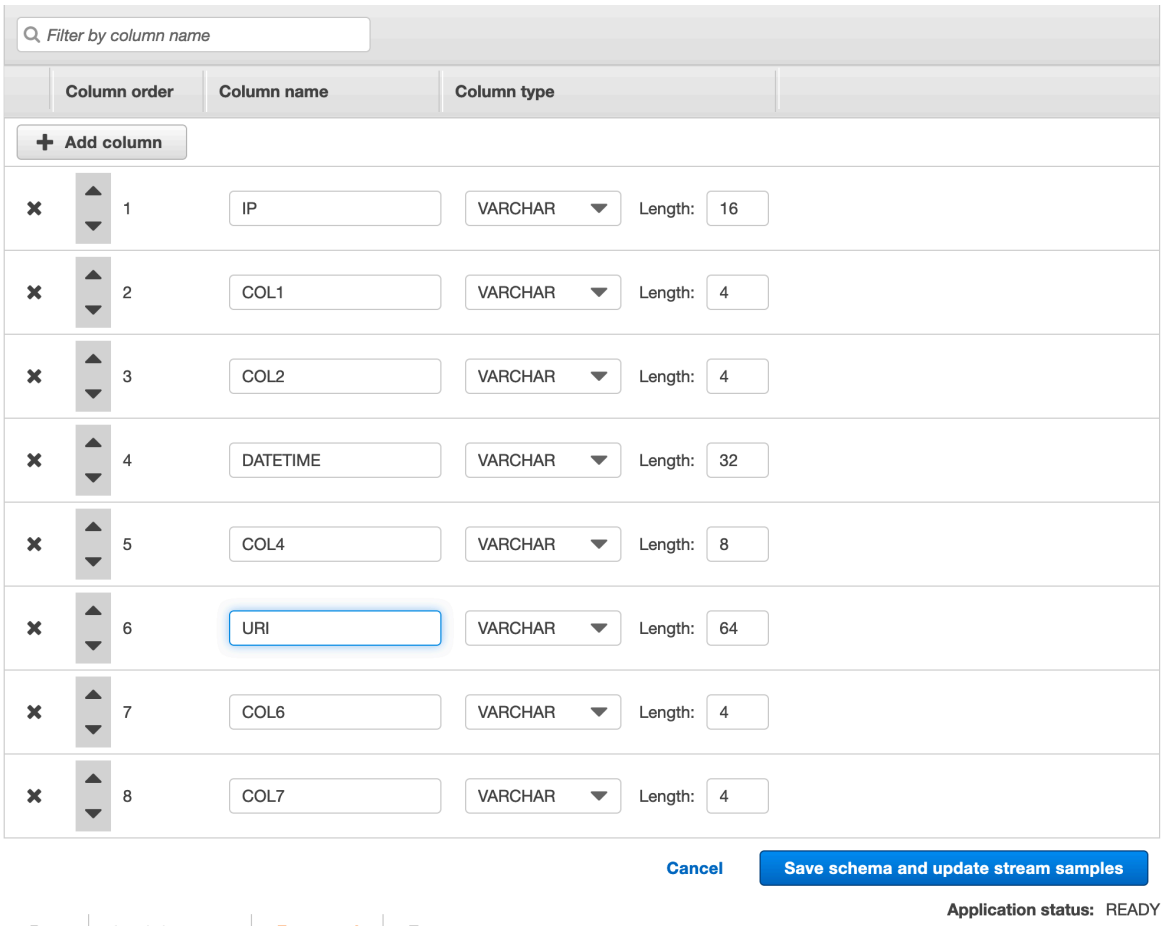
Edit schema | Retry schema discovery

가독성이 높은 SQL 작성을 위해서는
COL0, COL1, COL2 컬럼명을 수정해야함
inpu stream data를 SQL로 가공 후 다른 firehose로 전송
ex) COL0 -> IP , COL3-> TIME, COL5 -> URI

Raw | Lambda output | Formatted

Filter by column name

COL0 VARCHAR(16)	COL1 VARCHAR(4)	COL2 VARCHAR(4)	COL3 VARCHAR(32)	COL4 VARCHAR(8)	COL5 VARCHAR(64)	COL6 VARCHAR(4)	COL7 VARCHAR
77.187.15.133	-	-	[19/Feb/2020:01:45:06	+0000]	GET /app/main/posts HTTP/1.0		
111.30.95.48	-	-	[19/Feb/2020:01:45:09	+0000]	GET /explore HTTP/1.0		
71.57.134.41	-	-	[19/Feb/2020:01:45:08	+0000]	GET /explore HTTP/1.0		
149.46.48.171	-	-	[19/Feb/2020:01:45:05	+0000]	GET /explore HTTP/1.0		
89.6.124.205	-	-	[19/Feb/2020:01:45:07	+0000]	GET /explore HTTP/1.0		
74.186.91.24	-	-	[19/Feb/2020:01:45:09	+0000]	GET /wp-content HTTP/1.0		
177.30.25.11	-	-	[19/Feb/2020:01:45:09	+0000]	GET /app/main/posts HTTP/1.0		
201.47.243.161	-	-	[19/Feb/2020:01:45:06	+0000]	GET /wp-admin HTTP/1.0		
192.247.171.15	-	-	[19/Feb/2020:01:45:06	+0000]	GET /wp-admin HTTP/1.0		
101.141.209.20	-	-	[19/Feb/2020:01:45:07	+0000]	GET /explore HTTP/1.0		



위 컬럼 이름을 아래의 데이터를 보고 적당한 이름으로 변경 (가능하면 대문자로 변경)

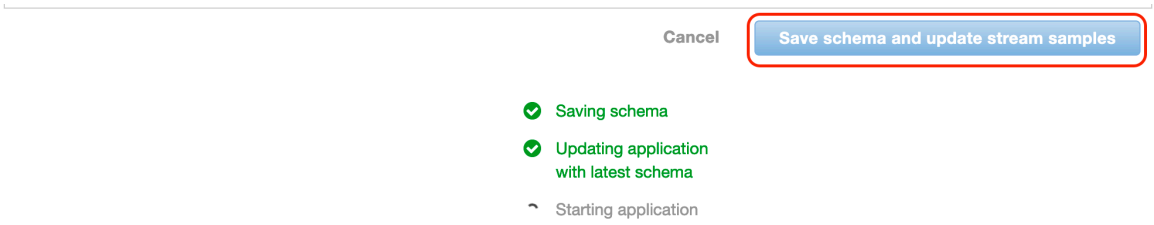
Application status: READY

Raw | Lambda output | Formatted | Error stream

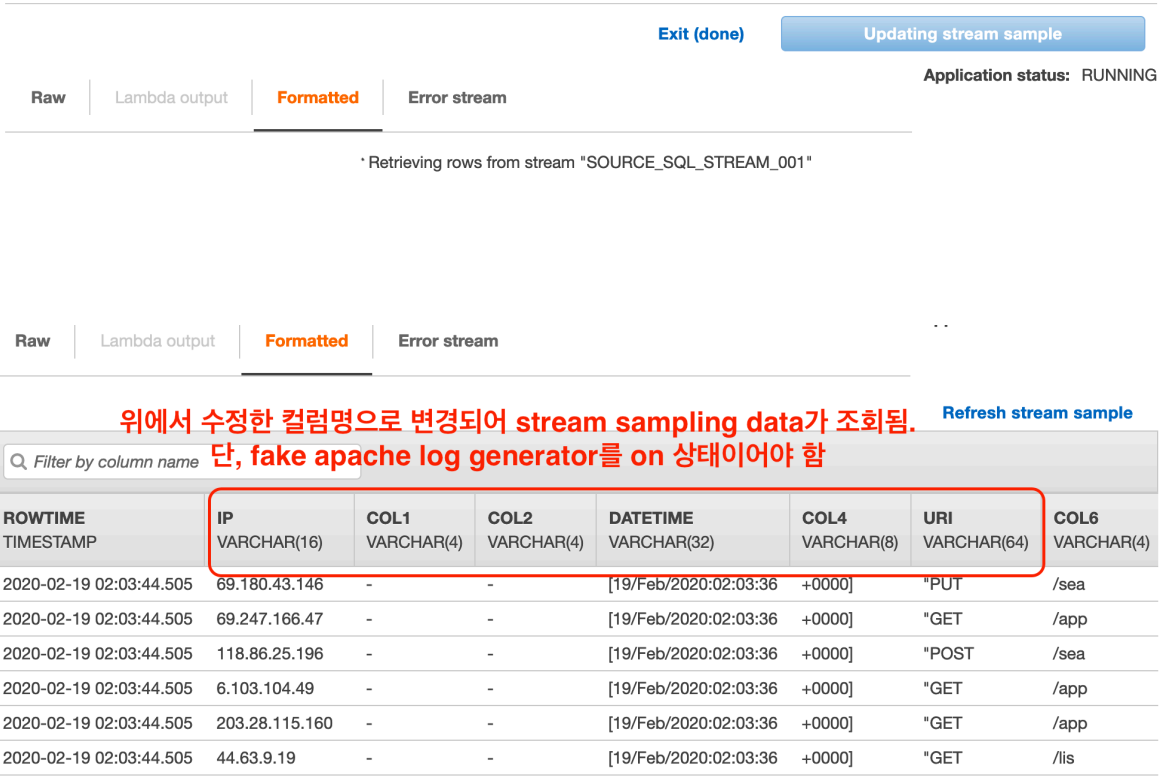
Filter by column name

COL0 VARCHAR(16)	COL1 VARCHAR(4)	COL2 VARCHAR(4)	COL3 VARCHAR(32)	COL4 VARCHAR(8)	COL5 VARCHAR(64)	COL6 VARCHAR(4)	COL7 VARCHAR
77.187.15.133	-	-	[19/Feb/2020:01:45:06	+0000]	GET /app/main/posts HTTP/1.0		
111.30.95.48	-	-	[19/Feb/2020:01:45:09	+0000]	GET /explore HTTP/1.0		
71.57.134.41	-	-	[19/Feb/2020:01:45:08	+0000]	GET /explore HTTP/1.0		
149.46.48.171	-	-	[19/Feb/2020:01:45:05	+0000]	GET /explore HTTP/1.0		
89.6.124.205	-	-	[19/Feb/2020:01:45:07	+0000]	GET /explore HTTP/1.0		
74.186.91.24	-	-	[19/Feb/2020:01:45:09	+0000]	GET /wp-content HTTP/1.0		
177.30.25.11	-	-	[19/Feb/2020:01:45:09	+0000]	GET /app/main/posts HTTP/1.0		
201.47.243.161	-	-	[19/Feb/2020:01:45:06	+0000]	GET /wp-admin HTTP/1.0		
192.247.171.15	-	-	[19/Feb/2020:01:45:06	+0000]	GET /wp-admin HTTP/1.0		
101.141.209.20	-	-	[19/Feb/2020:01:45:07	+0000]	GET /explore HTTP/1.0		

Save Schema and update stream sample 클릭

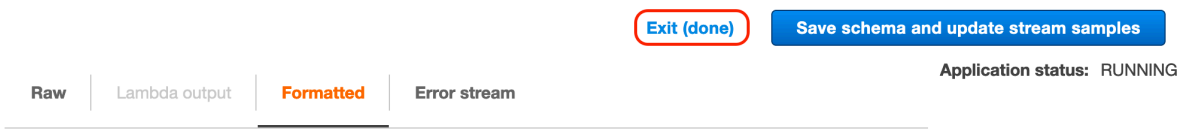


Application status가 RUNNING로 변경



ROWTIME TIMESTAMP	IP VARCHAR(16)	COL1 VARCHAR(4)	COL2 VARCHAR(4)	DATETIME VARCHAR(32)	COL4 VARCHAR(8)	URI VARCHAR(64)	COL6 VARCHAR(4)
2020-02-19 02:03:44.505	69.180.43.146	-	-	[19/Feb/2020:02:03:36	+0000]	"PUT	/sea
2020-02-19 02:03:44.505	69.247.166.47	-	-	[19/Feb/2020:02:03:36	+0000]	"GET	/app
2020-02-19 02:03:44.505	118.86.25.196	-	-	[19/Feb/2020:02:03:36	+0000]	"POST	/sea
2020-02-19 02:03:44.505	6.103.104.49	-	-	[19/Feb/2020:02:03:36	+0000]	"GET	/app
2020-02-19 02:03:44.505	203.28.115.160	-	-	[19/Feb/2020:02:03:36	+0000]	"GET	/app
2020-02-19 02:03:44.505	44.63.9.19	-	-	[19/Feb/2020:02:03:36	+0000]	"GET	/lis

- Exit로 다음 진행



- Go to SQL Editor

Real time analytics

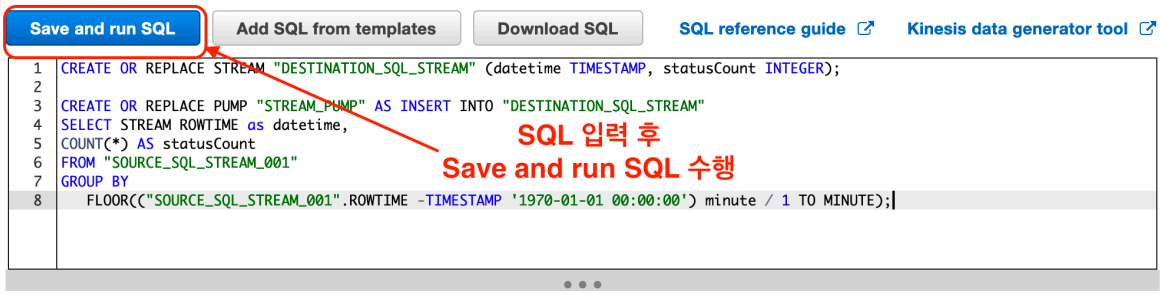
Author your own SQL queries or add SQL from templates to easily analyze your source data. Learn more

Go to SQL editor

SQL 수행

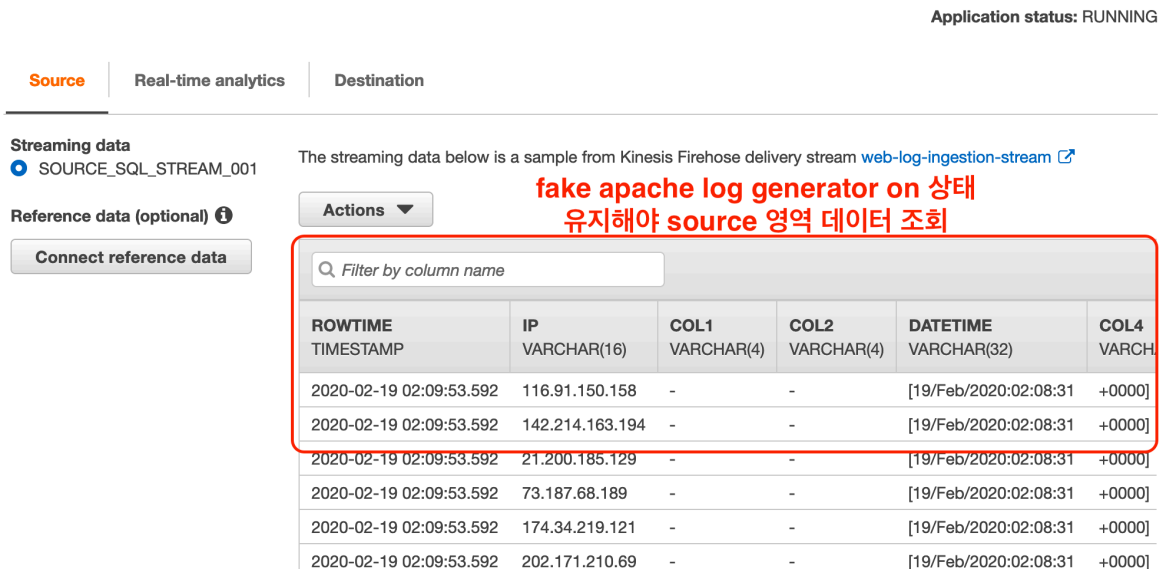
```
CREATE OR REPLACE STREAM
"DESTINATION_SQL_STREAM" (datetime TIMESTAMP,
statusCount INTEGER);

CREATE OR REPLACE PUMP "STREAM_PUMP" AS
INSERT INTO "DESTINATION_SQL_STREAM"
SELECT STREAM ROWTIME as datetime,
COUNT(*) AS statusCount
FROM "SOURCE_SQL_STREAM_001"
GROUP BY
   FLOOR(("SOURCE_SQL_STREAM_001".ROWTIME -
TIMESTAMP '1970-01-01 00:00:00') minute / 1 TO
MINUTE);
```



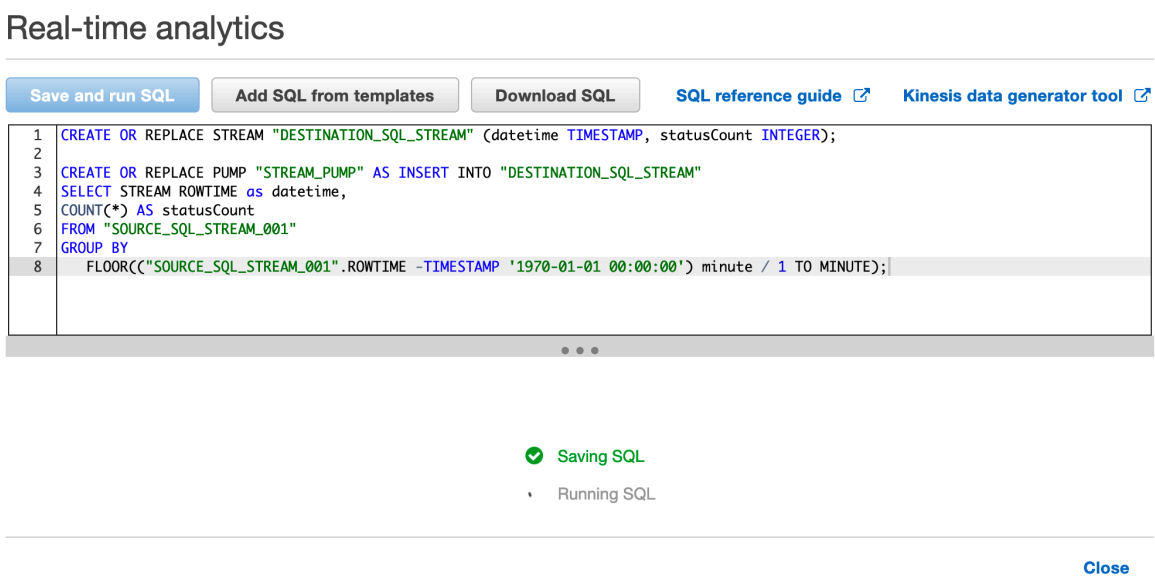

```
CREATE OR REPLACE STREAM "DESTINATION_SQL_STREAM" (datetime TIMESTAMP, statusCount INTEGER);

CREATE OR REPLACE PUMP "STREAM_PUMP" AS INSERT INTO "DESTINATION_SQL_STREAM"
SELECT STREAM ROWTIME as datetime,
COUNT(*) AS statusCount
FROM "SOURCE_SQL_STREAM_001"
GROUP BY
   FLOOR(("SOURCE_SQL_STREAM_001".ROWTIME -TIMESTAMP '1970-01-01 00:00:00') minute / 1 TO MINUTE);
```



ROWTIME TIMESTAMP	IP VARCHAR(16)	COL1 VARCHAR(4)	COL2 VARCHAR(4)	DATETIME VARCHAR(32)	COL4 VARCH
2020-02-19 02:09:53.592	116.91.150.158	-	-	[19/Feb/2020:02:08:31	+0000]
2020-02-19 02:09:53.592	142.214.163.194	-	-	[19/Feb/2020:02:08:31	+0000]
2020-02-19 02:09:53.592	21.200.185.129	-	-	[19/Feb/2020:02:08:31	+0000]
2020-02-19 02:09:53.592	73.187.68.189	-	-	[19/Feb/2020:02:08:31	+0000]
2020-02-19 02:09:53.592	174.34.219.121	-	-	[19/Feb/2020:02:08:31	+0000]
2020-02-19 02:09:53.592	202.171.210.69	-	-	[19/Feb/2020:02:08:31	+0000]

- 시간이 조금 걸린다.




```
CREATE OR REPLACE STREAM "DESTINATION_SQL_STREAM" (datetime TIMESTAMP, statusCount INTEGER);

CREATE OR REPLACE PUMP "STREAM_PUMP" AS INSERT INTO "DESTINATION_SQL_STREAM"
SELECT STREAM ROWTIME as datetime,
COUNT(*) AS statusCount
FROM "SOURCE_SQL_STREAM_001"
GROUP BY
   FLOOR(("SOURCE_SQL_STREAM_001".ROWTIME -TIMESTAMP '1970-01-01 00:00:00') minute / 1 TO MINUTE);
```

Real-time analytics

Save and run SQL | Add SQL from templates | Download SQL | SQL reference guide | Kinesis data generator tool

```
1  CREATE OR REPLACE STREAM "DESTINATION_SQL_STREAM" (datetime TIMESTAMP, statusCount INTEGER);
2
3  CREATE OR REPLACE PUMP "STREAM_PUMP" AS INSERT INTO "DESTINATION_SQL_STREAM"
4  SELECT STREAM ROWTIME as datetime,
5  COUNT(*) AS statusCount
6  FROM "SOURCE_SQL_STREAM_001"
7  GROUP BY
8     FLOOR(("SOURCE_SQL_STREAM_001".ROWTIME -TIMESTAMP '1970-01-01 00:00:00') minute / 1 TO MINUTE);
```

Application status: RUNNING

Source | Real-time analytics | Destination

In-application streams:

- DESTINATION_SQL_STREAM
- error_stream

Pause results New results are added every 2-10 seconds. **The results below are sampled.**

Scroll to bottom when new results arrive.

Realtime 집계 데이터가 완성 됨

Filter by column name

ROWTIME	DATETIME	STATUSCOUNT
2020-02-19 02:13:00.0	2020-02-19 02:13:00.0	3000

• Destination 설정

Application status: RUNNING

destination 진행

Source | Real-time analytics | Destination

In-application streams:

- DESTINATION_SQL_STREAM
- error_stream

Pause results New results are added every 2-10 seconds. **The results below are sampled.**

Scroll to bottom when new results arrive.

Filter by column name

ROWTIME	DATETIME	STATUSCOUNT
2020-02-19 02:13:00.0	2020-02-19 02:13:00.0	3000
2020-02-19 02:14:00.0	2020-02-19 02:14:00.0	5000

Connect to destination

Destination

- Kinesis data stream
  Kinesis data stream is an ordered sequence of data records used for rapid and continuous data intake and aggregation.
- Kinesis Firehose delivery stream
  Kinesis Firehose delivery streams send source records to the destinations that you specify, automatically and continuously.
- AWS Lambda function
  AWS Lambda is a compute service that lets you run code without provisioning or managing servers.

Kinesis Firehose delivery stream

web-log-aggregated-data

Create new

View **web-log-aggregated-data** in Kinesis Firehose

In-application stream

In-application streams are continuous flows of data records. You create in-application streams in SQL to contain the data you want to persist to the specified destination.
Learn more

Connect in-application stream

- Choose an existing in-application stream
- Specify a new in-application stream name
  Use this option for in-application streams that you haven't created yet, but plan to create at a later time. Specifying a stream name ensures that you don't lose output data.

In-application stream name

DESTINATION_SQL_STREAM

Output format

- JSON
- CSV

Access permissions

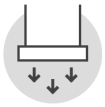
Create or choose IAM role with the required permissions. **Learn more**

Access permissions

- Create / update IAM role **kinesis-analytics-web-log-aggregation-tutorial-ap-northeast-2**
- Choose from IAM roles that Kinesis Analytics can assume

Cancel

Save and continue



Destination

(Optional) Connect an in-application stream to a Kinesis stream, or to a Firehose delivery stream, to continuously deliver SQL results to AWS destinations. The limit is three destinations for each application.

Connect new destination | Disconnect destination

		Destination	In-application stream name	ID
○	✎	Firehose delivery stream web-log-aggregated-data	DESTINATION_SQL_STREAM	4.1

Destination 등록 완료

- Destination 모니터링

s3에 에러로그 발생


```
{"attemptsMade":8,"arrivalTimestamp":
1582082760539,"errorCode":"ES.ServiceException","errorMessage":"Error received
from Elasticsearch cluster. {\"error\":{\"root_cause\":[{\"type\":
\"security_exception\",\"reason\":\"no permissions for [indices:data/write/
bulk] and User [name=arn:aws:iam::936777008077:role/firehose_delivery_role2,
roles=[arn:aws:iam::936777008077:role/firehose_delivery_role2],
requestedTenant=null]\"}],\"type\":\"security_exception\",\"reason\":\"no
permissions for [indices:data/write/bulk] and User [name=arn:aws:iam::
936777008077:role/firehose_delivery_role2, roles=[arn:aws:iam::
936777008077:role/firehose_delivery_role2], requestedTenant=null]\"},
\"status\":403}","attemptEndingTimestamp":
1582083361354,"rawData":"eyJEQVRFVElNRSI6IjIwMjAtMDItMTkgMDM6MjY6MDAuMDAwIiwiU1
RBVFVTQ09VTlQiOjQ1MDB9","subsequenceNumber":
0,"esDocumentId":"49604340806861587563985145816073632601584842809442041858.0","
esIndexName":"request_data","esTypeName":""}
```


Time	Destination	Message	Error code	Version
2020-02-19T11:29:01.1T+0900D	arn:aws:es:ap-northeast-2:936777008077:domain/web-log-summary	Error received from Elasticsearch cluster. {"error":{"root_cause":[{"type":"security_exception","reason":"no permissions for [indices:data/write/bulk] and User [name=arn:aws:iam::936777008077:role/firehose_delivery_role2, roles=[arn:aws:iam::936777008077:role/firehose_delivery_role2], requestedTenant=null]"}],"type":"security_exception","reason":"no permissions for [indices:data/write/bulk] and User [name=arn:aws:iam::936777008077:role/firehose_delivery_role2, roles=[arn:aws:iam::936777008077:role/firehose_delivery_role2], requestedTenant=null]"},"status":403}	ES.ServiceException	1
2020-02-19T10:23:01.1T+0900D	arn:aws:es:ap-northeast-2:936777008077:domain/web-log-summary	Error received from Elasticsearch cluster. {"error":{"root_cause":[{"type":"security_exception","reason":"no permissions for [indices:data/write/bulk] and User [name=arn:aws:iam::936777008077:role/firehose_delivery_role2, roles=[arn:aws:iam::936777008077:role/firehose_delivery_role2], requestedTenant=null]"}],"type":"security_exception","reason":"no permissions for [indices:data/write/bulk] and User [name=arn:aws:iam::936777008077:role/firehose_delivery_role2, roles=[arn:aws:iam::936777008077:role/firehose_delivery_role2], requestedTenant=null]"},"status":403}	ES.ServiceException	1

• Elistic Search

Configure access and security

Amazon Elasticsearch Service offers numerous security features, including fine-grained access control, IAM, Cognito authentication for Kibana, encryption, and VPC access. Learn more

Network configuration

Choose internet or VPC access. To enable VPC access, we use private IP addresses from your VPC, which provides an inherent layer of security. You control network access within your VPC using security groups. Optionally, you can add an additional layer of security by applying a restrictive access policy. Internet endpoints are publicly accessible. If you select public access, you should secure your domain with an access policy that only allows specific users or IP addresses to access the domain.

- ○ VPC access (Recommended)
- ◉ Public access

Fine–grained access control – powered by Open Distro for Elasticsearch

Fine-grained access control provides numerous features to help you keep your data secure. Features include document-level security, field-level security, read-only Kibana users, and Kibana tenants. Fine-grained access control requires a master user.

Set a master user to an IAM account using an ARN, or store a master user in the Elasticsearch internal database by creating a master username and password. After your domain is set up, you can use Kibana or the REST APIs to configure additional users and permissions. Learn more

- ☑ Enable fine-grained access control

- ○ Set IAM ARN as master user
  By selecting an IAM ARN as the master user, your domain will only authenticate with IAM roles and users.

- ◉ Create master user
  By creating a master user, your domain will have the internal user database enabled with HTTP basic authentication.

Master username kilhan

Master usernames must be between 1 and 16 characters.

Master password ••••••••••••••

Master password must be at least 8 characters long and contain at least one uppercase letter, one lowercase letter, one number, and one special character.

Confirm master password ••••••••••••••

Amazon Cognito authentication

Enable to use Amazon Cognito authentication for Kibana. Amazon Cognito supports a variety of identity providers for username-password authentication. Learn more

- ☐ Enable Amazon Cognito authentication

Access policy

Access policies control whether a request is accepted or rejected when it reaches the Amazon Elasticsearch Service domain. If you specify an account, user, or role in this policy, you must sign your requests. Learn more

Custom policy builder allows at most 10 elements. Use a JSON-defined access policy to define a policy with more than 10 elements.

Domain access policy Allow open access to the domain

Encryption

These features help protect your data. After creating the domain, you can't change most encryption settings.

Encryption Require HTTPS for all traffic to the domain

Node-to-node encryption

Enable encryption of data at rest

KMS master key (Default) aws/es

Description Default master key that protects my Elasticsearch data when no other key is defined

Account 936777008077

Key ARN arn:aws:kms:ap-northeast-2:936777008077:key/0baa82d8-cdf9-4c25-b7dc-37231b96d835

You enabled fine-grained access control, which requires HTTPS, node-to-node encryption, and encryption at rest.

Cancel Previous Next

Review

Review the information below, and then choose **Confirm and create**.

Data nodes

Edit

Availability zones 1-AZ
Instance type r5.large.elasticsearch
Number of nodes 1

Data nodes storage

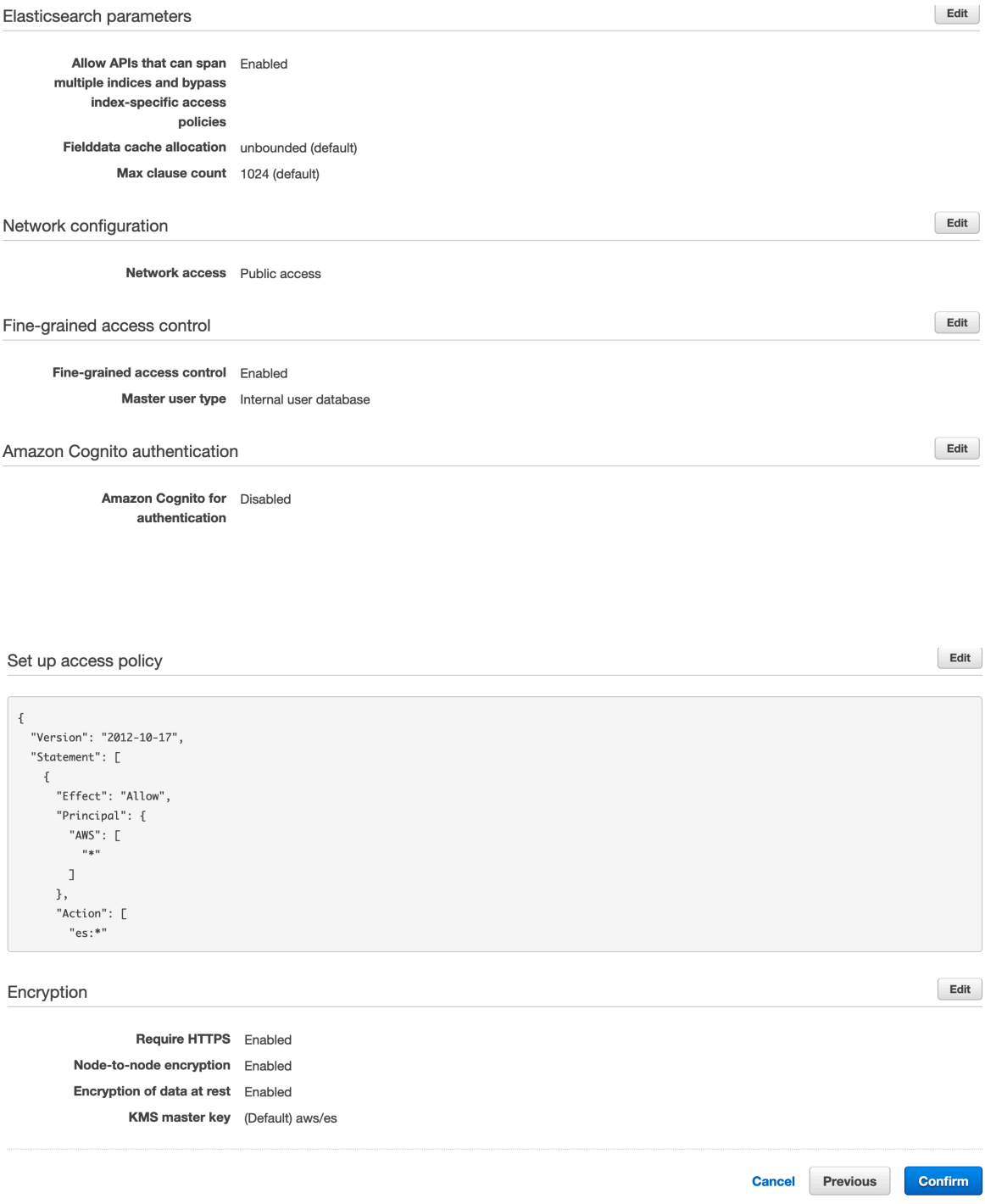
Edit

Data nodes storage type EBS
EBS volume type General Purpose (SSD)
EBS volume size 10 GiB

Snapshot configuration

Edit

Start hour for the daily automated snapshot 00:00 UTC (default)



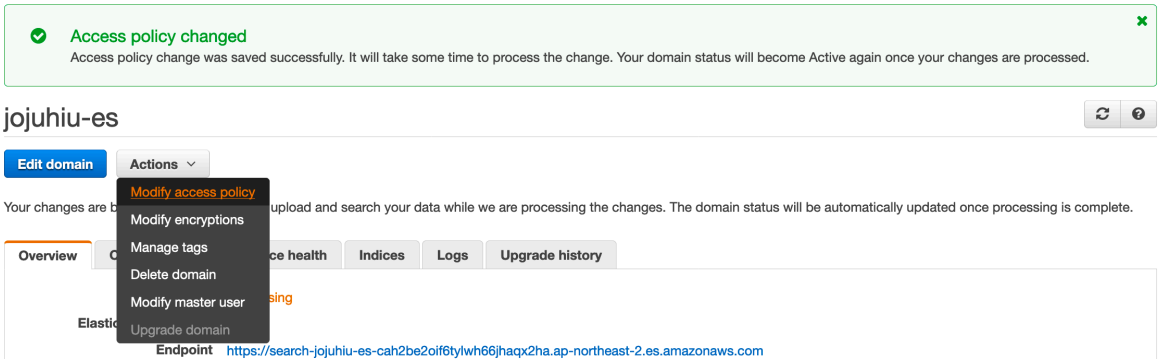
/_cluster/health: {"error":{"root_cause":[{"type":"security_exception","reason":"no permissions for [cluster:monitor/health] and User [name=arn:aws:iam::936777008077:user/kilhan.kim, roles=[], requestedTenant=null]"}],"type":"security_exception","re

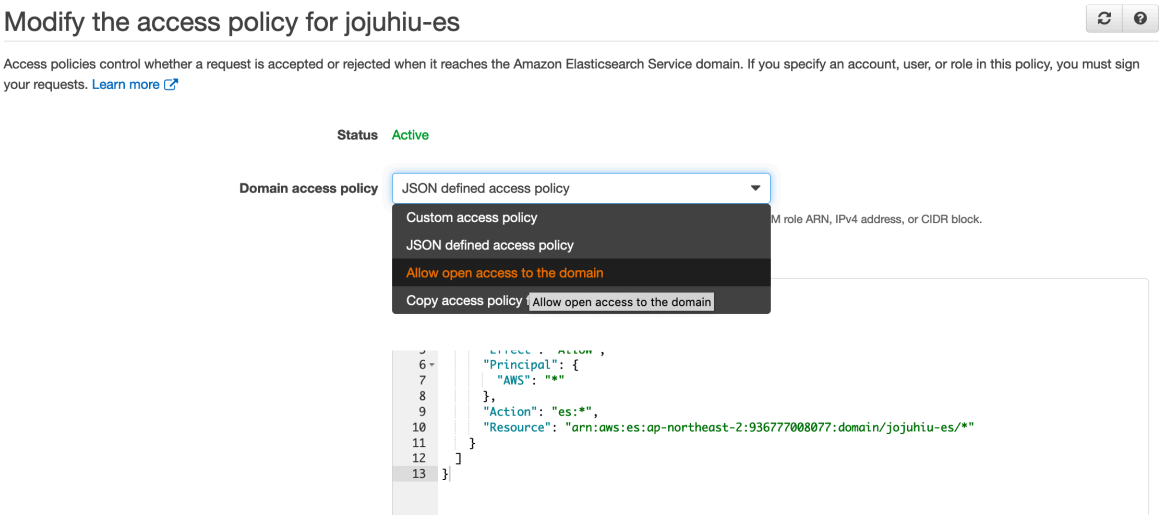
ason":"no permissions for [cluster:monitor/health] and User [name=arn:aws:iam::936777008077:user/kilhan.kim, roles=[], requestedTenant=null]"},"status":403}

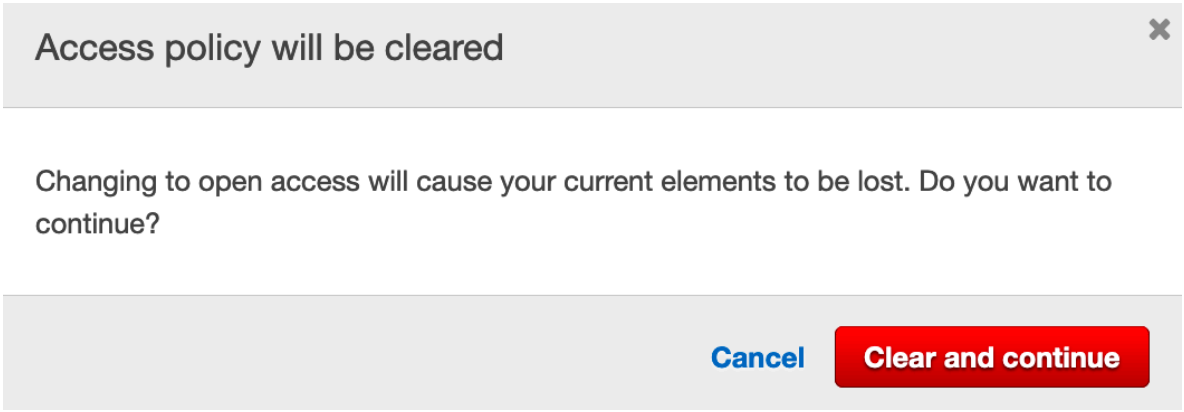
/_cluster/health: {"error":{"root_cause":[{"type":"security_exception","reason":"no permissions for [cluster:monitor/health] and User [name=arn:aws:iam::936777008077:user/kilhan.kim, roles=[], requestedTenant=null]"}],"type":"security_exception","reason":"no permissions for [cluster:monitor/health] and User [name=arn:aws:iam::936777008077:user/kilhan.kim, roles=[], requestedTenant=null]"},"status":403}

{"attemptsMade":8,"arrivalTimestamp":1582171582284,"errorCode":"ES.ServiceException","errorMessage":"Error received from Elasticsearch cluster. {\"error\":{\"root_cause\":[{\"type\":\"security_exception\",\"reason\":\"no permissions for [indices:data/write/bulk] and User [name=arn:aws:iam::936777008077:role/firehose_delivery_role3, roles=[arn:aws:iam::936777008077:role/firehose_delivery_role3], requestedTenant=null]\"}],\"type\":\"security_exception\",\"reason\":\"no permissions for [indices:data/write/bulk] and User [name=arn:aws:iam::936777008077:role/firehose_delivery_role3, roles=[arn:aws:iam::936777008077:role/firehose_delivery_role3], requestedTenant=null]\"},\"status\":403}","attemptEndingTimestamp":1582172183356,"rawData":"eyJEQVRFVElNRSI6IjIwMjAt

MDItMjAgMDQ6MDY6MDAuMDAwIiwiVVJJIjoiXCJQT1NUIiwiTlVNQkVSQ09VTlQiOjk1Nn0=","subsequenceNumber":0,"esDocumentId":"4960438340984840291371345762691215374130843056642981888 2.0","esIndexName":"test-database","esTypeName":""}






Access policy will be cleared
Changing to open access will cause your current elements to be lost. Do you want to continue?
Cancel
Clear and continue