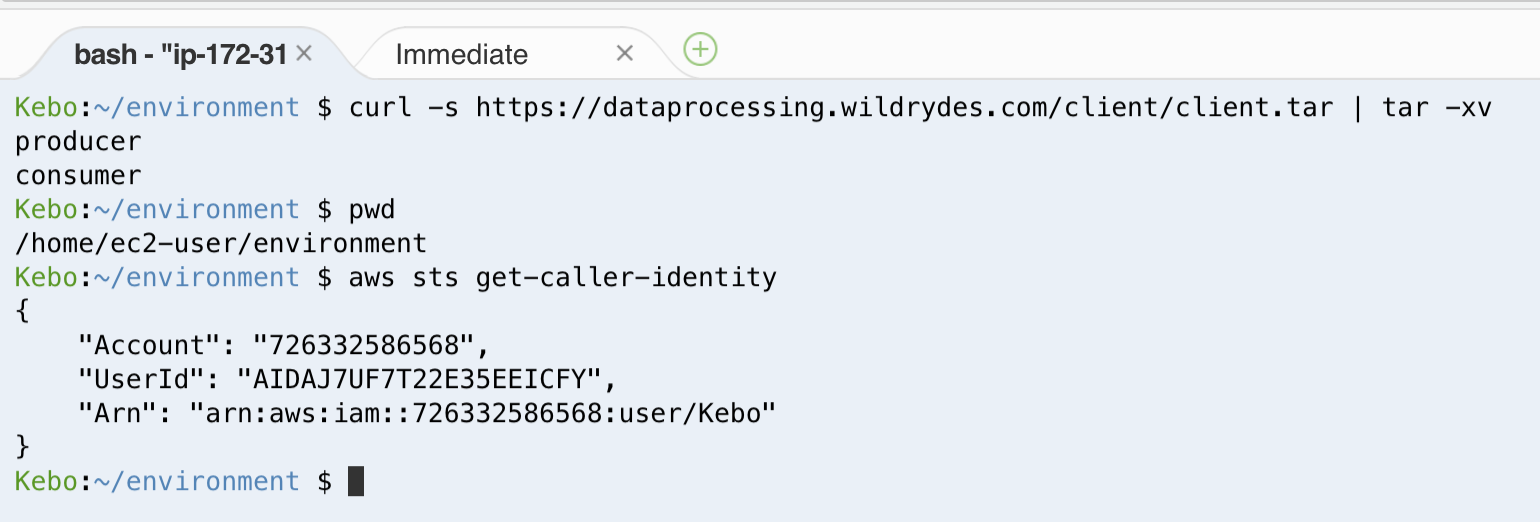
# Build a Serverless Real-Time Data Processing App

I have learned the following services of AWS.

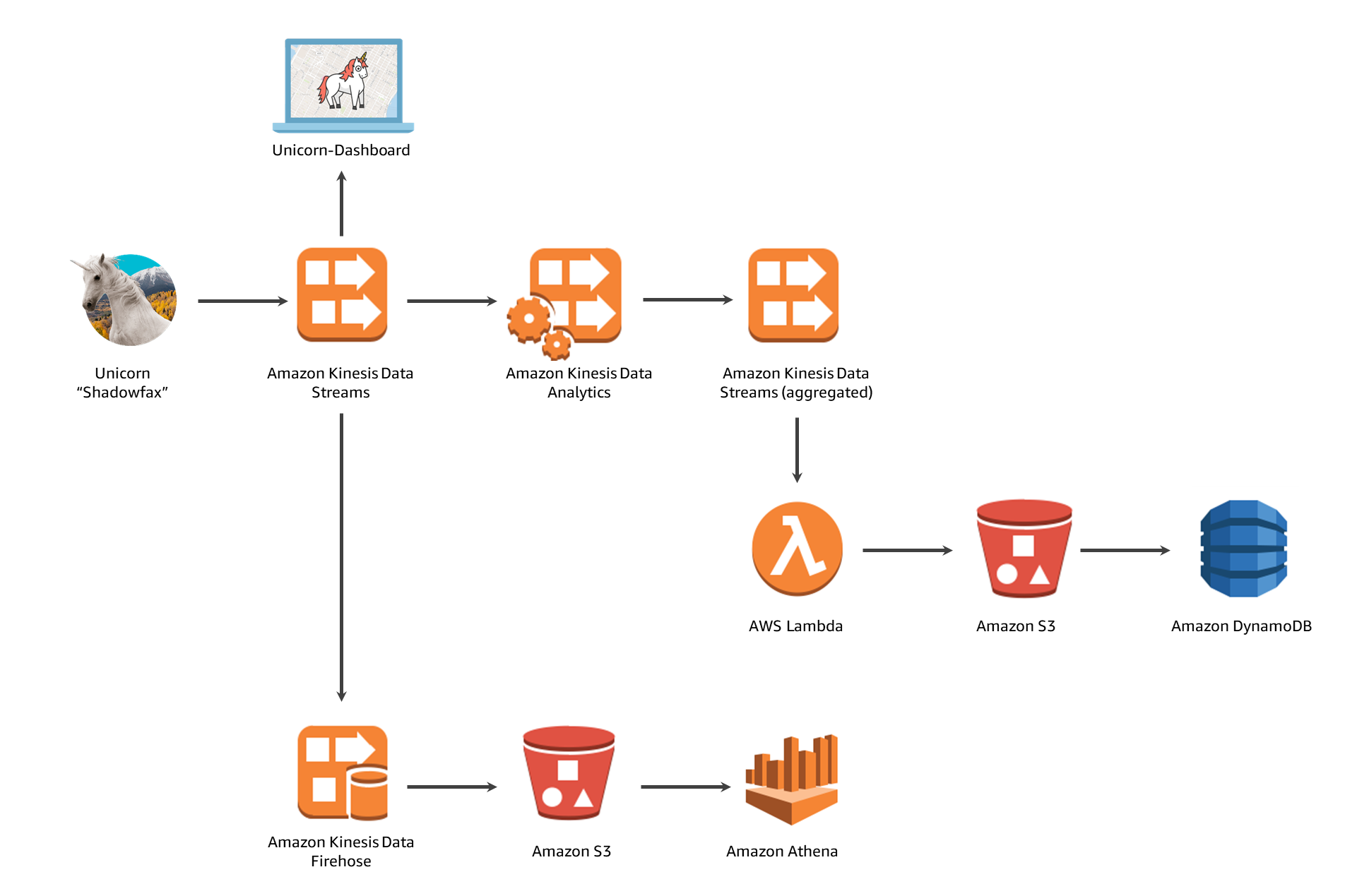
1. Lambda: process real-time streams, without worrying about which server to run.
2. DynamoDB: persist records in a NoSQL database
3. Kinesis Data Analytics: a framework which can read streaming data in real-time, call serverless functions to process the data and store it to a database.
4. Kinesis Data Firehose: archive the streaming raw data to S3
5. Athena: run ad-hoc queries against the raw data using standard SQL.

## Real-time Streaming Data

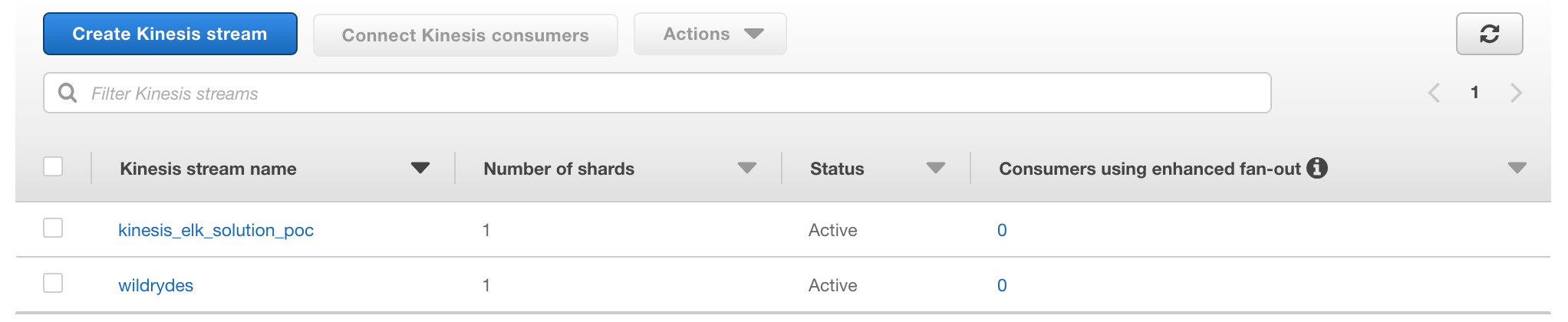
### 1. Set up your AWS Cloud9 IDE



1. Build a data stream



### **Step 1. Create an Amazon Kinesis stream**



Step 2. Produce messages into the stream

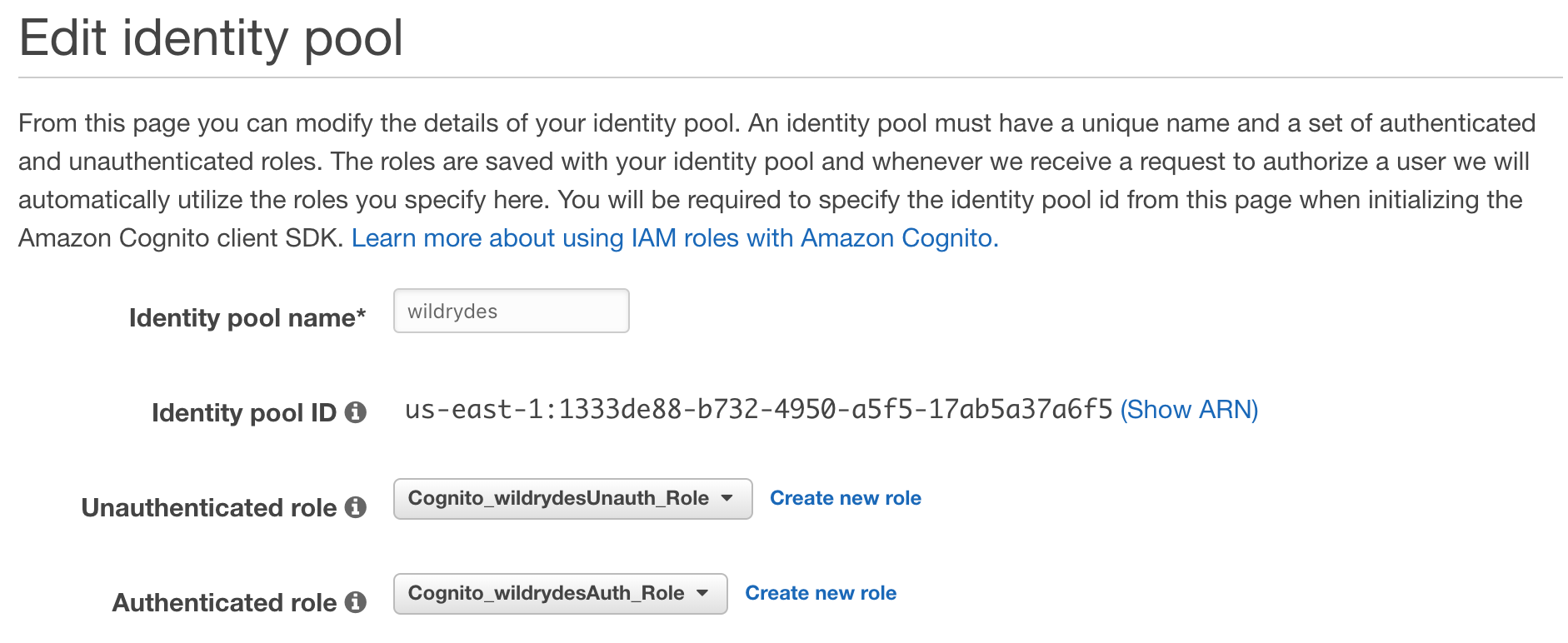
Run command in Cloud9 Console,

./producer

The producer emits a message a second to the stream and prints a period to the screen.

Step 3. Read messages from the stream

Step 4. Create an identity pool for the unicorn dashboard



Step 5. Grant the unauthenticated role access to the stream

Step 6. View unicorn status on the dashboard



## Aggregate data

In this module, I will create an Amazon Kinesis Data Analytics application to aggregate sensor data from the unicorn fleet in real-time. The architecture for this module involves an Amazon Kinesis Data Analytics application, source and destination Amazon Kinesis streams, and the producer and consumer command-line clients.

### Step 1. Create an Amazon Kinesis stream

named *wildrydes-summary* with *1* shard

Build an Amazon Kinesis Data Analytics application which reads from the wildrydes stream built in the previous module and emits a JSON object with the following attributes each minute:

Name Unicorn name

StatusTime ROWTIME provided by Amazon Kinesis Data Analytics

Distance The sum of distance traveled by the unicorn

MinMagicPoints The maximum data point of the MagicPoints attribute

MaxMagicPoints The maximum data point of the MagicPooints attribute

MinHealthPoints The minimum data point of the HealthPoints attribute

MaxHealthPoints The maximum data point of the HealthPoints attribute

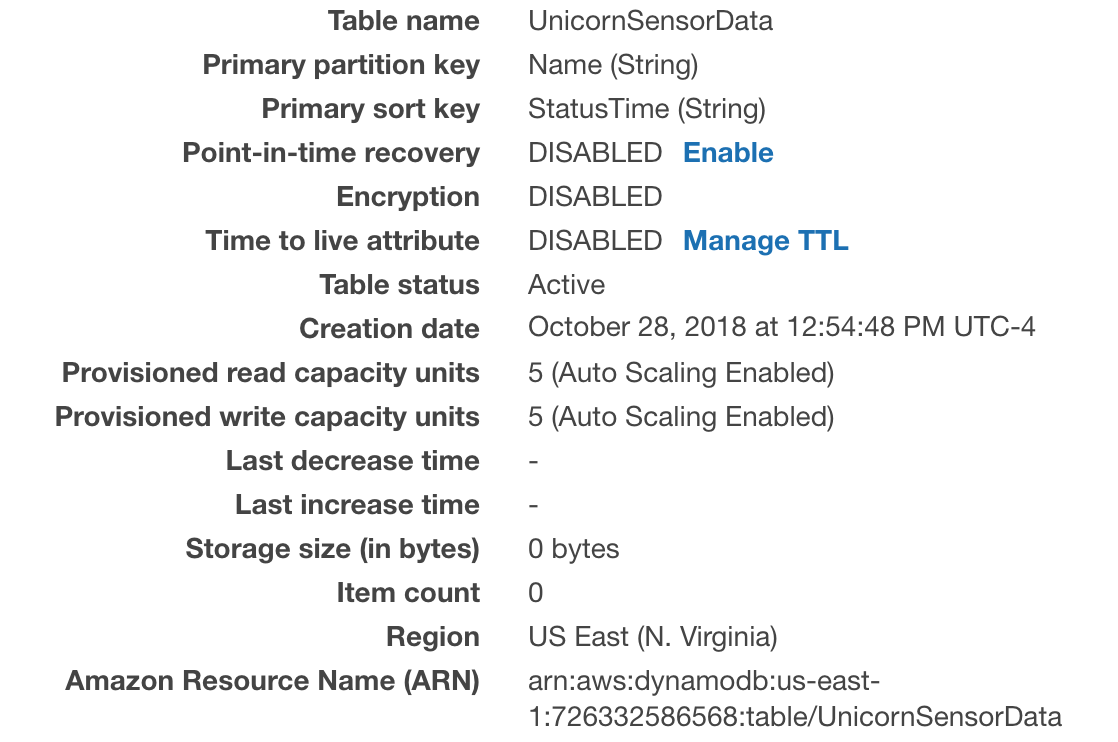
Step 2. Create an Amazon Kinesis Data Analytics application

*(Kinesis stream) Wildrydes -> Kinesis analytics application -> (Kinesis stream) Wildrydes-summary*

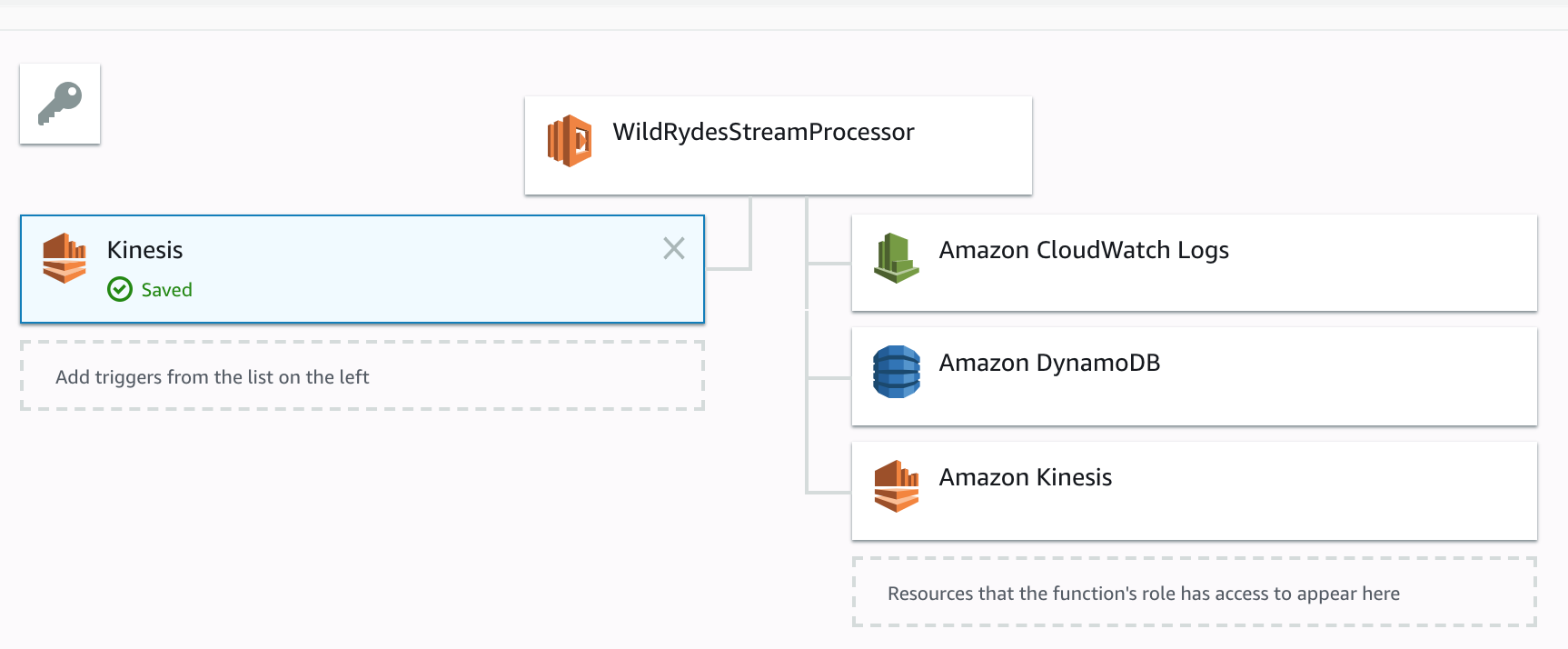
So I created a Kinesis Data Analytics application that reads from the Kinesis stream of unicorn data and emits a summary row each minute.

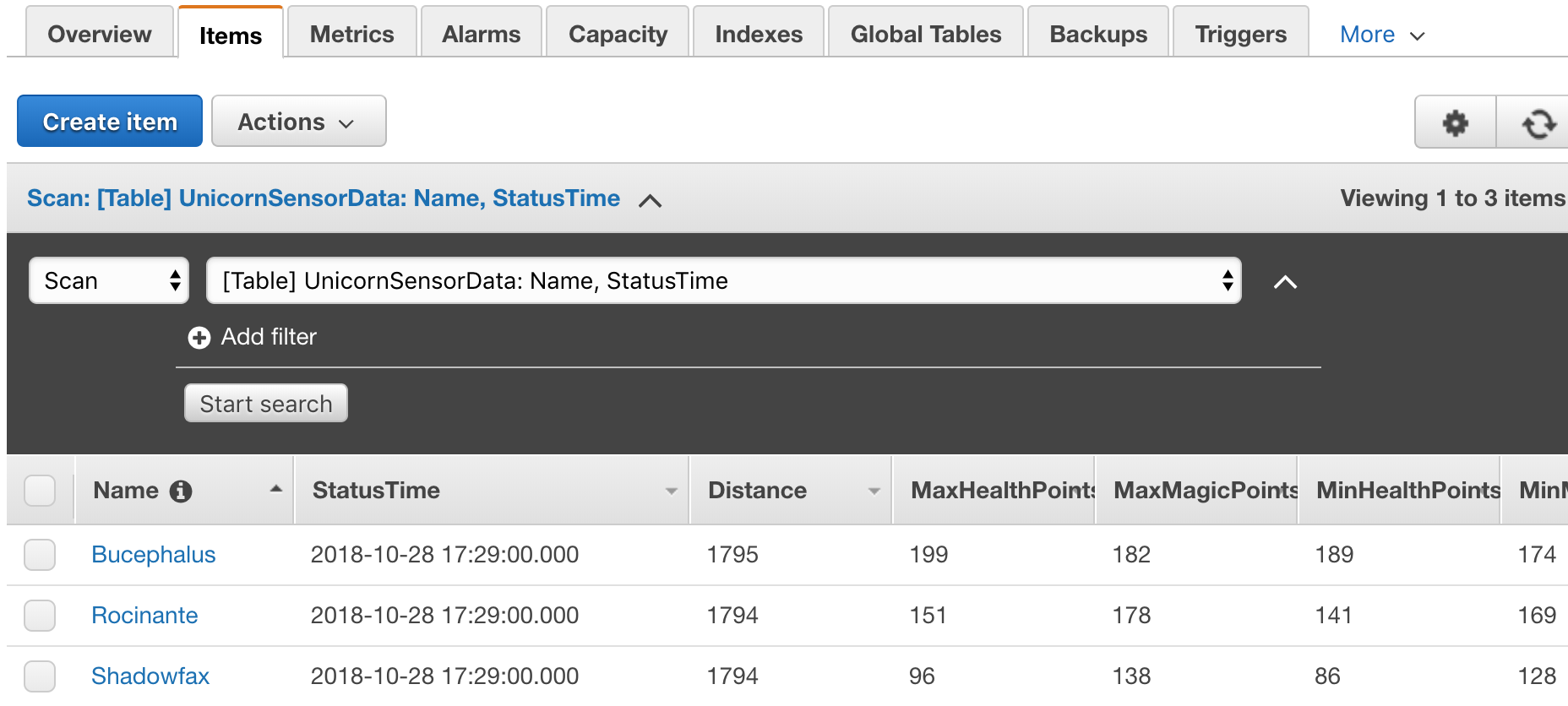
## Process streaming data

### Step 1. Create an Amazon DynamoDB tables



### Step 2. Create a Lambda function to process the stream





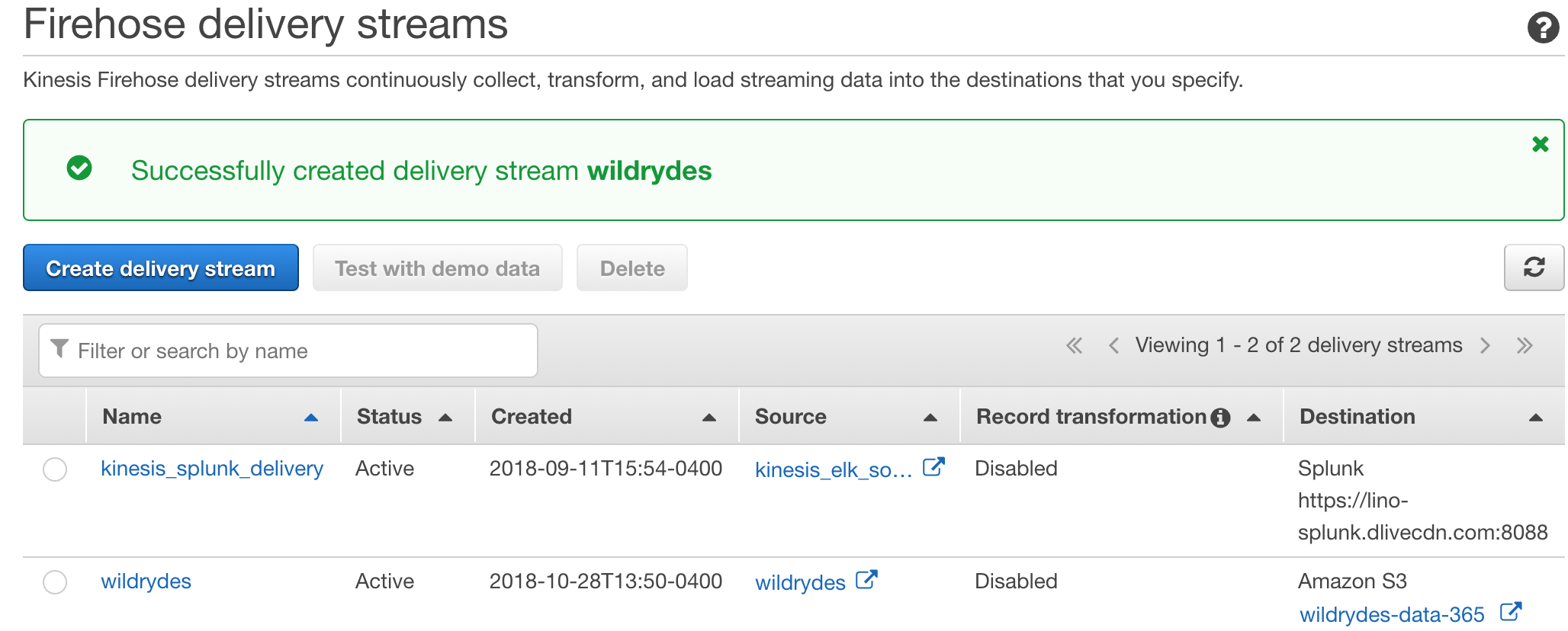
Though this section, I have learned how to create a Lambda function that reads from the Kinesis stream of summary unicorn data and saves each row to DynamoDB.

## Store & query Data

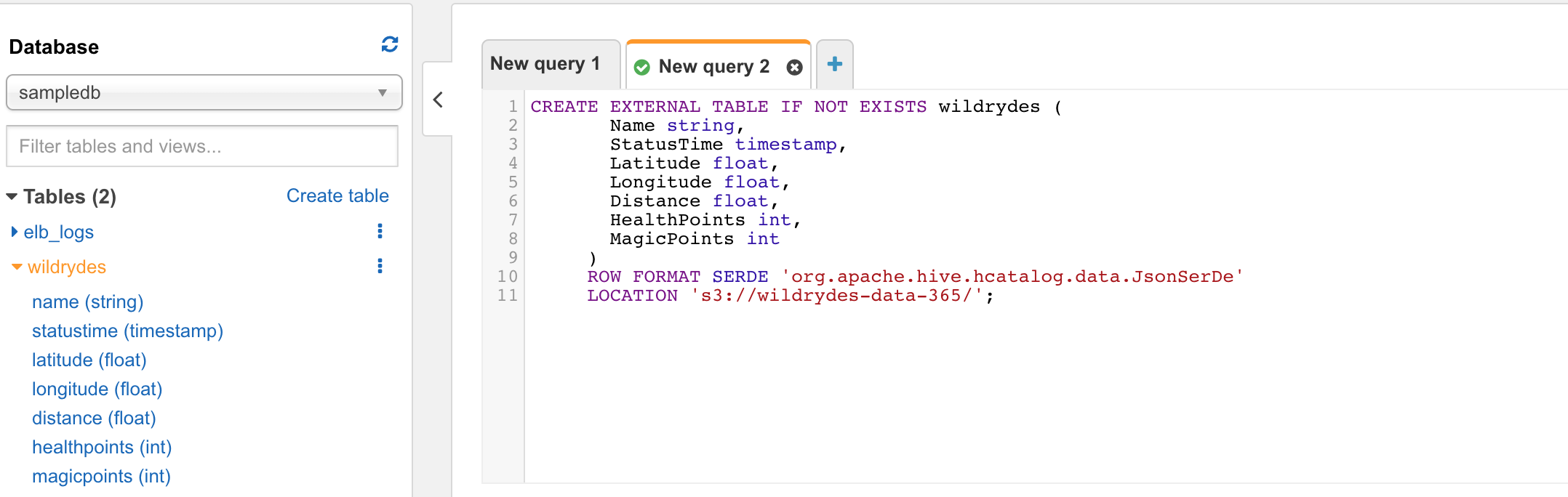
In this module, I will create a Kinesis Data Firehose to deliver data from the Kinesis stream to an Amazon S3 bucket and use Athena to run SQL like queries against this data on S3.

### Step 1. Create an Amazon S3 bucket

### Step 2. Create an Amazon Kinesis Data Firehose delivery stream



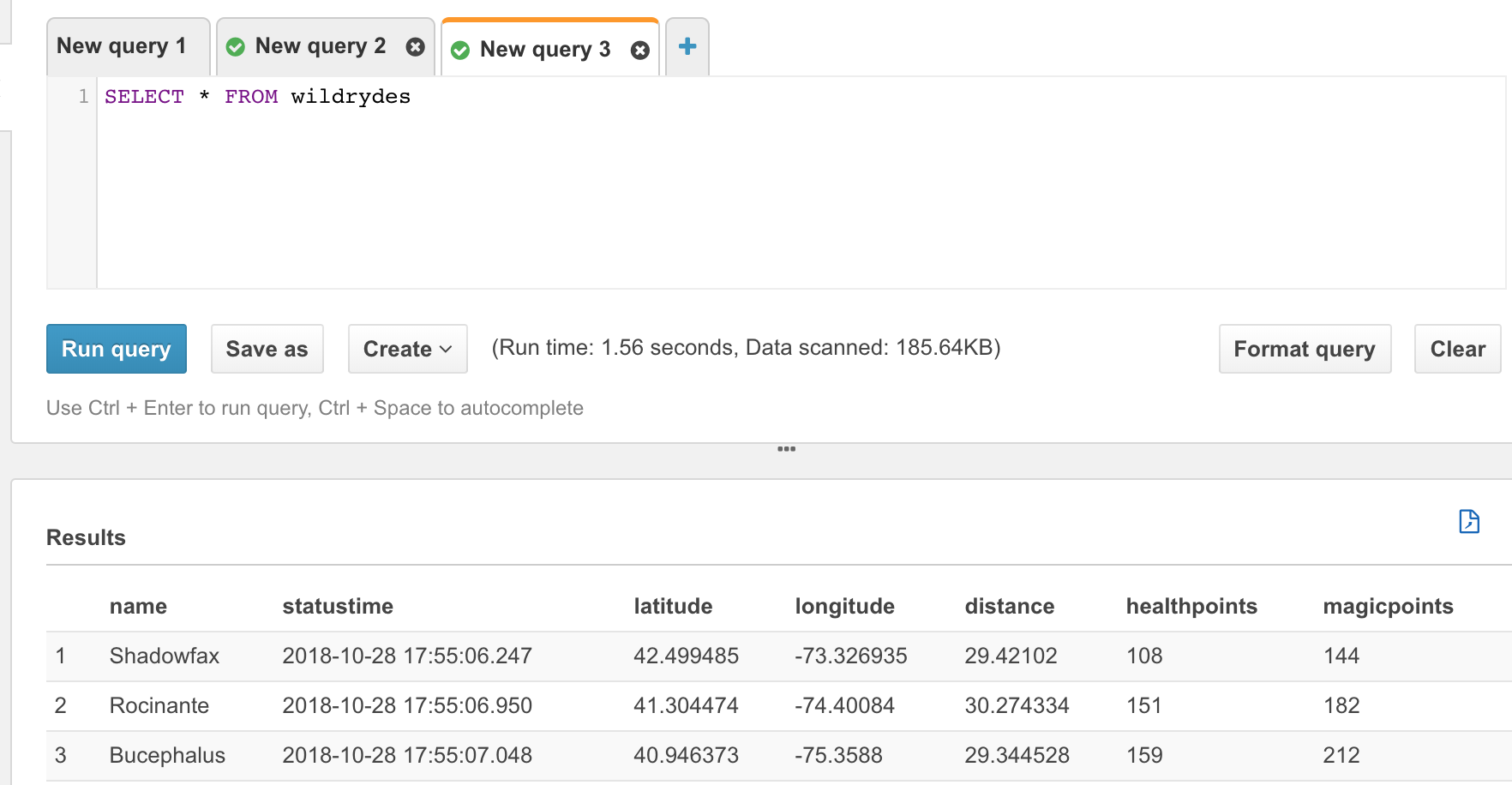
Step 3. Create an Amazon Athena table



Step 4. Explore the batched data files

download the data file from s3

Step 5: Query the data files



Through this section, I know that Amazon Kinesis Data Firehose can deliver real-time streaming data to storage like S3, and Amazon Athena allows us to run ad-hoc queries against the raw data using standard SQL.