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Introduction to Cloudwatch :

- Cloudwatch is the go to monitoring service for AWS .
- It integrates with almost every service and pushes put metrics which gives us insight on how the resource is performing
- Cloudwatch has pre-built metrics from we can monitor key performance attribute like cpu utilization etc .

Cloudwatch metrics

- All the graphs and charts we see for the resources in aws are cloudwatch metrics
- In order to see the metric , we can navigate to the cloudwatch service. On the left index select metrics.
- In search we can enter reources for ex instance id , and we can can get the graphs related to it
- Cloudwatch basic metrics include these graphs getting refreshed every 5 minutes . This refresh point is what we refer as datapoints
- With cloudwatch enhanced monitoring , these graphs get refreshed after every 1 minute.

SNS

- SNS is simple notification service which helps send notifications to bunch of subscribers
- In SNS we need to create a topic to which notifications are sent
- Whoever subscribes to that topic will receive notifications
- SNS works on Pub-sub model

Creating a topic in SNS

- Go to SNS , Click on create Topic
- Enter a name and dscription , keep all the settings as default . And click on create topic
- Once a topic is created , we need to add subscribers
- Click on subscriptions , and click on create subscriptions

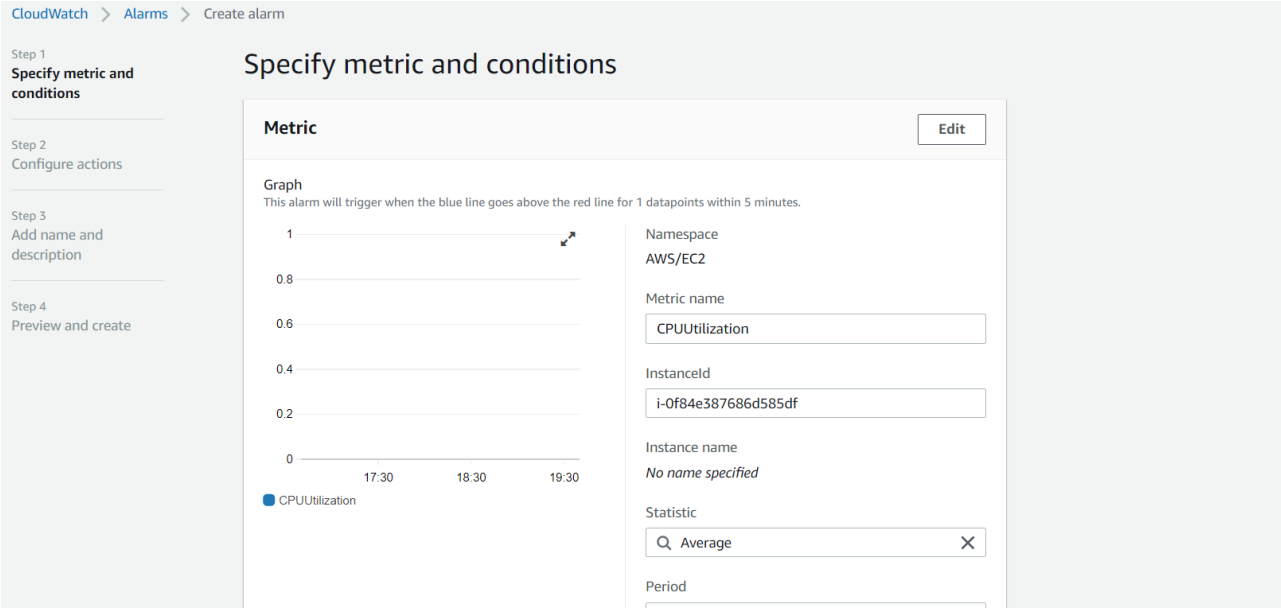
- Select the topic we just created
- Select the protocol as email, and enter the email id we wish to send notification to
- Click on create subscription
- The email owner needs to confirm the subscription from the inbox . Once confirmed , all the notifications sent to the topic will be received by the subscriber

Cloudwatch alarms

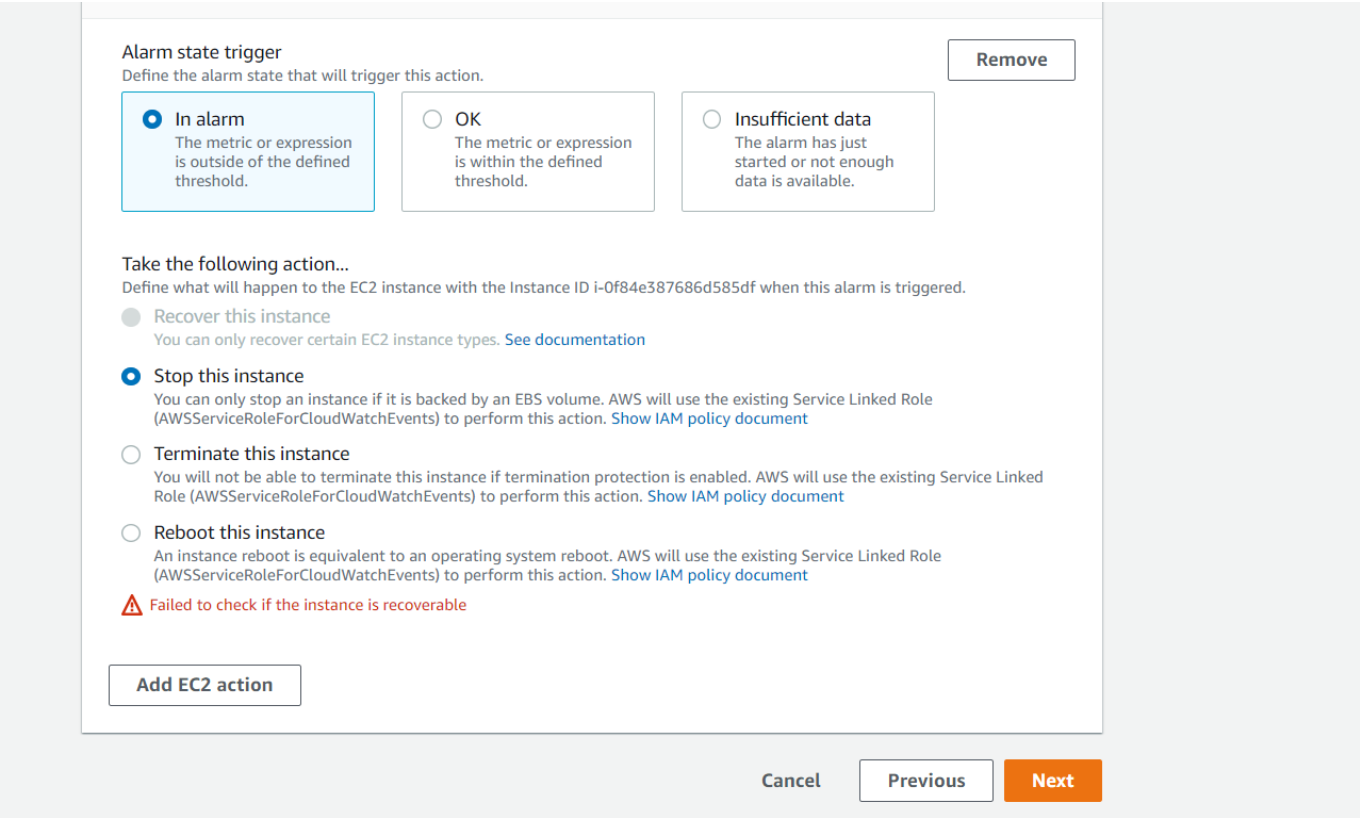
- Cloudwatch alarms are a way of triggering an alert or small actions based on a cloudwatch metric .
- These alarms are useful for monitoring where we cant conitnuously observe a metric

Creating cloudwatch alarms

- Navigate to cloudwathc service and click on alarms and create new alarm
- Select a metric based on which we want to create an alarm . In this instance we will select CPU utlization



- Under the conditions , let us keep the threshold type as static . Below that "Whenever CPUUtilization is " , to be kept at the default value i.e. greater than
- Let us keep the threshold value as 5 since we want to test it .
- The additional configuration states how many datapoints need to be breached in order for alarm to trigger
- Click Next
- For notification settings , we'll choose SNS , which is a notification service by AWS . Let us select the topic we had created earlier
- Alarm state trigger we'll keep it as In alarm
- Auto scaling action we'll be seeing in upcming sessions . Let us skip it for now
- EC2 Action is again optional , where we have option of stopping terminating or rebooting the instance once the alarm is triggered . Let us select the stop the instance action



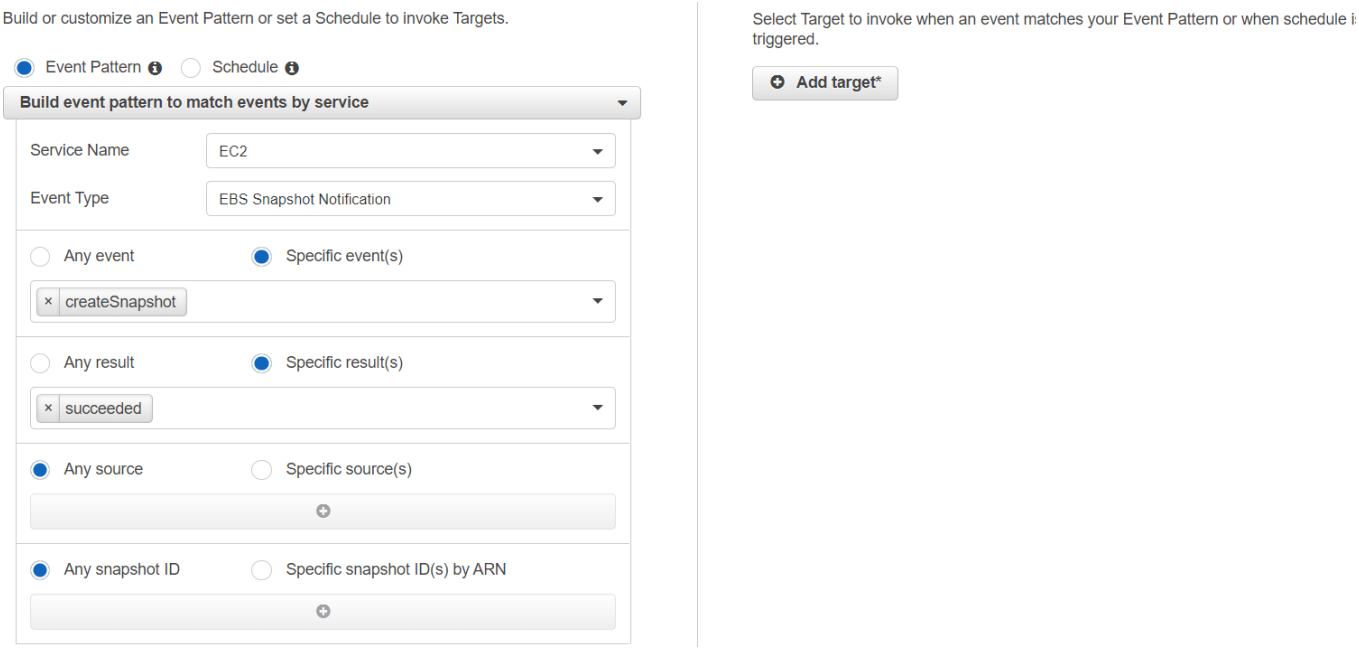
- Let us add name and description for the alarm and create it.
- Once created keep oberving the metric , whenever it goes beyond 5 , you should be receiving the alert and the instance should automatically stop

Cloudwatch Events and rules

- Cloudwatch event is basically any change is AWS resource . for ex- starting an EC2 instance
- Cloudwatch Rule lets us define an automated action on the said event . Cloudwatch rule is similar to alarms but is not dependent on any graph to trigger also it integrates with other services for its actions like lambda ,ssm etc .
- Common use case for cloudwatch rule is to create notifications or actions for any api call made to the aws .

Creating cloudwatch rule

- Click on create rule
- For a rule , there are two types of Event sources . Event pattern and Schedule
- Event pattern is based on any api call that is made in the aws wherein schedule lets us define cron expression (we'll see it in upcoming linuxsession) which schedules it for a specific time period for ex . occurs every monday , or every day etc
- For testing we'll go with event pattern
- In service name let us select EC2
- in Event type "EBS snapshot notification "
- Keep other settings as shown in snippet below



- Observe that based on the settings you chose there is automatically a json created

```
{
  "source": [
    "aws.ec2"
  ],
  "detail-type": [
    "EBS Snapshot Notification"
  ],
  "detail": {
    "event": [
      "createSnapshot"
    ],
    "result": [
      "succeeded"
    ]
  }
}
```

- Now that we have the event patter ready let us configure the right hand side i.e. target
- This target can be services like lambda or ssm which helps us automate things . As of now let us select SNS
- Select the topic and click on configure details
- Grant it an appropirate name and click on create
- Now test the rule by creating an EBS snapshot . We should ideally be receiving an notification once the snapshot succeeds

Cloudwatch Logs

- Till now we have seen many services needs to store logs and S3 is the most common option
- However cloudwatch logs is also an option , even though it is less widely used as compared to S3
- Services like Lambda, VPC flowlogs , cloudtrail can send logs to cloudwatch logs .

- These logs can later be queried from cloudwatch insights
- Logs are sent to logical folder called log group
- The flow of logs sent inside the log group is termed as log stream
- The option to send the logs to cloudwatch logs can be seen while enabling VPC fowlogs or creating a trail in cloudtrail

Creating cloudwatch log group

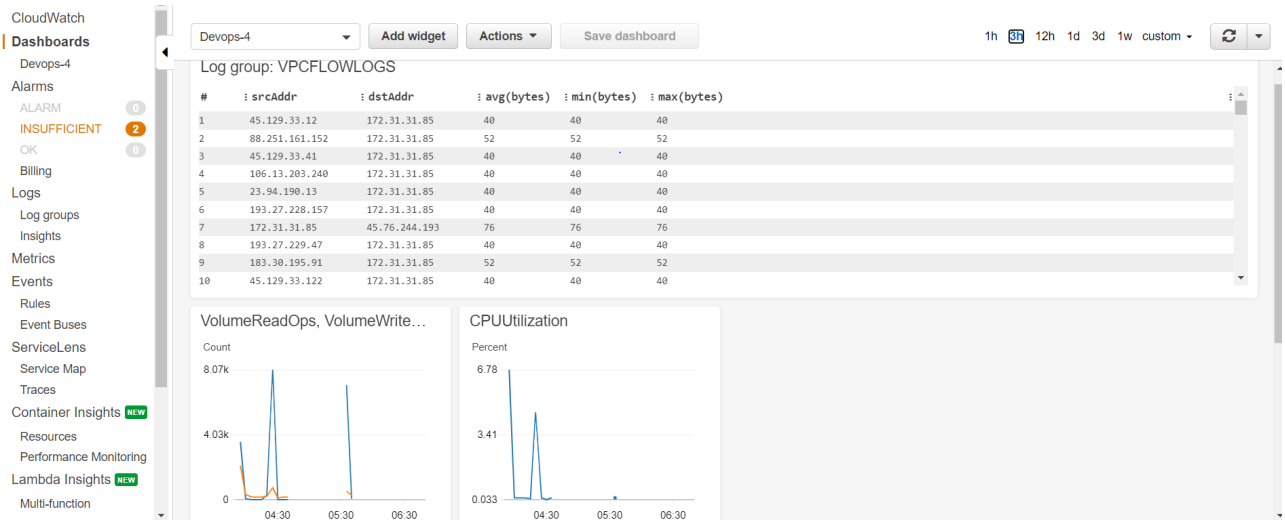
- We can create our own cloudwatch log group and chose to push log streams such as vpc flowlogs in that .
- Go to log groups and click on create log-group .
- Give it an appropriate name and create the log group
- Navigate to VPC flowlogs , follow the usual steps to enable it . Instead of S3 however , enter the cloudwatch log option and select the group we created
- This will need IAM roles , which could be done from "setup permissions tab"

Insights

- Just like athena helps us query data in S3 , insights works the same for cloudwatch logs
- Once you go to insights , select the log group you wish to query . for ex vpc flowlogs log group that we had created earlier
- on the right panel , we can see a query tab where we will be able to see sample query tab
- Copy any of the sample queries and run it on the console . for ex : "stats avg(bytes), min(bytes), max(bytes) by srcAddr, dstAddr "

Cloudwatch dashboard

- Cloudwatch dashboard is way of centralized monitoring of all the important resource metrics . This can also include results of the insights queries as well
- The dashboard can be created from the console itself where you need to navigate to dashboard and click on create dashboard
- Give it a name and click on create dashboard
- once created , click on dashboard and lcick on add widget . From widget add the required graph and click on save dashboard



- Similarly when you get the results of an insights queries , these can be directly added to the dashboard from the console

FAQ

- It is very easy to get confused with cloudtrail and cloudwatch . Remember cloudtrail is for auditing and cloudwatch is meant for monitoring purpose
- Cloudwatch rules is one of the primary ways of automating actions on aws