AWS DMS Monitoring Runbook

Runbook –
https://github.com/aws-samples/aws-dms-monitoring-runbook

This runbook deploys following monitoring -

1. Centralized Amazon CloudWatch dashboard to review resource consumption (e.g., CPU, Memory, Storage utilizations or Capacity utilization for DMS Serverless etc.) by all AWS DMS Classic Instances.
2. Centralized Amazon CloudWatch dashboard to review CDC (Change Data Capture) Metrics like Source Latency, Target Latency etc. from all DMS tasks.
3. Setup AWS DMS event notifications (Including change of state like stop, start, fail etc. for all DMS Instances & tasks) for all AWS DMS classic Instances and tasks.
4. Setup hourly Amazon CloudWatch alerts for Errors & Warnings in all AWS DMS migrations including AWS DMS Classic, homogenous migration or DMS Serverless. Users can customize the notification frequency.
5. Setup alerts for AWS DMS Instances to notify when breach thresholds.
6. Setup other alerts for DMS Instances and DMS task. For example, script will alert if there are DMS instances with public access enabled or unused DMS Classic Instances or DMS task with debug logging enabled.

All monitoring placed by the solution are fully customizable where users can choose which monitoring to implement from above list. Also, individual monitoring can be customized to specify filtering for special logs, events.

Prerequisites

1. DMS Instances, tasks are already deployed.
2. Amazon Simple Notification Service (SNS) topic already setup for sending notification to users.
3. Amazon Simple Storage Service (S3) bucket to store deployment scripts.
4. AWS Identity and Access Management (IAM) permissions to create new role & deploy solution. As part of this solution, two new Amazon IAM roles (prefixed with Amazon CloudFormation stack name) will be created:

    - %-**LambdaExecutionRole**

      Permissions:

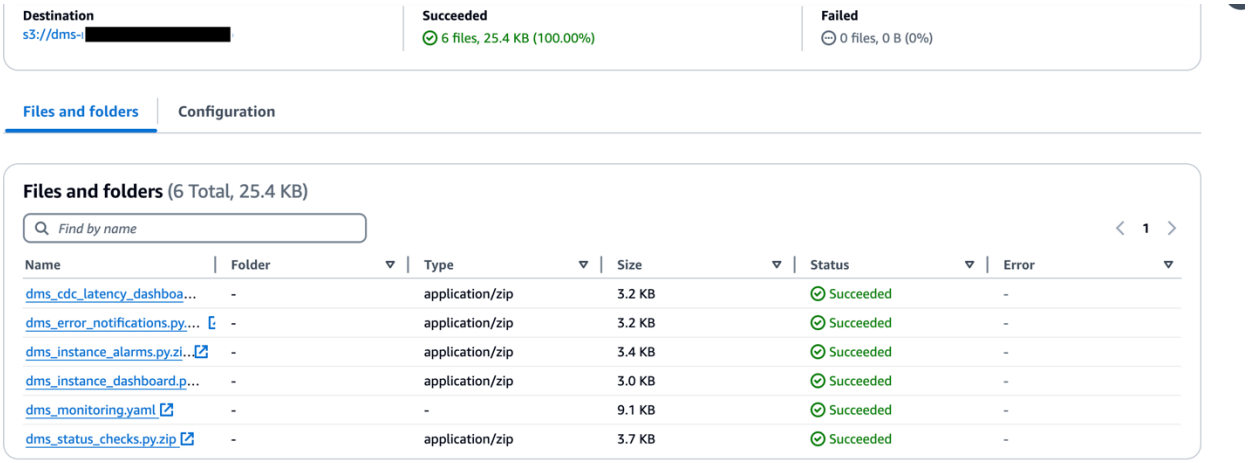
        - "dms:Describe*",
        - "logs:DescribeLogGroups",
        - "logs:DescribeLogStreams",
        - "logs:FilterLogEvents",
        - "cloudwatch:PutMetricAlarm",
        - "cloudwatch:PutDashboard",
        - "sns:Publish"
    - %-**SchedulerExecutionRole**

      Permissions:

        - "lambda:InvokeFunction"

Implementation

1. Download scripts folder including python zip files and Amazon CloudFormation template Upload downloaded files to your Amazon S3 bucket:



2. Create Amazon CloudFormation stack to deploy the monitoring. This template accept parameter input to select which script to deploy. You also require to provide Amazon S3 bucket name where the scripts are uploaded. Also provide Amazon Simple Notification Service (SNS) topic ARN. This ARN is set on all Amazon Lambda functions deployed by this template as ‘SNS_TOPIC’ environment variable.

Step 1
Create stack
Step 2
Specify stack details
Step 3
Configure stack options
Step 4
Review and create

Create stack

Prerequisite - Prepare template

You can also create a template by scanning your existing resources in the IaC generator.

Prepare template

Every stack is based on a template. A template is a JSON or YAML file that contains configuration information about the AWS resources you want to include in the stack.

- (•) Choose an existing template — Upload or choose an existing template.
- ( ) Use a sample template — Choose from our sample template library.
- ( ) Build from Application Composer — Create a template using a visual builder.

Specify template Info

A template is a JSON or YAML file that describes your stack's resources and properties.

Template source

Selecting a template generates an Amazon S3 URL where it will be stored.

- (•) Amazon S3 URL — Provide an Amazon S3 URL to your template.
- ( ) Upload a template file — Upload your template directly to the console.
- ( ) Sync from Git - *new* — Sync a template from your Git repository.

Amazon S3 URL

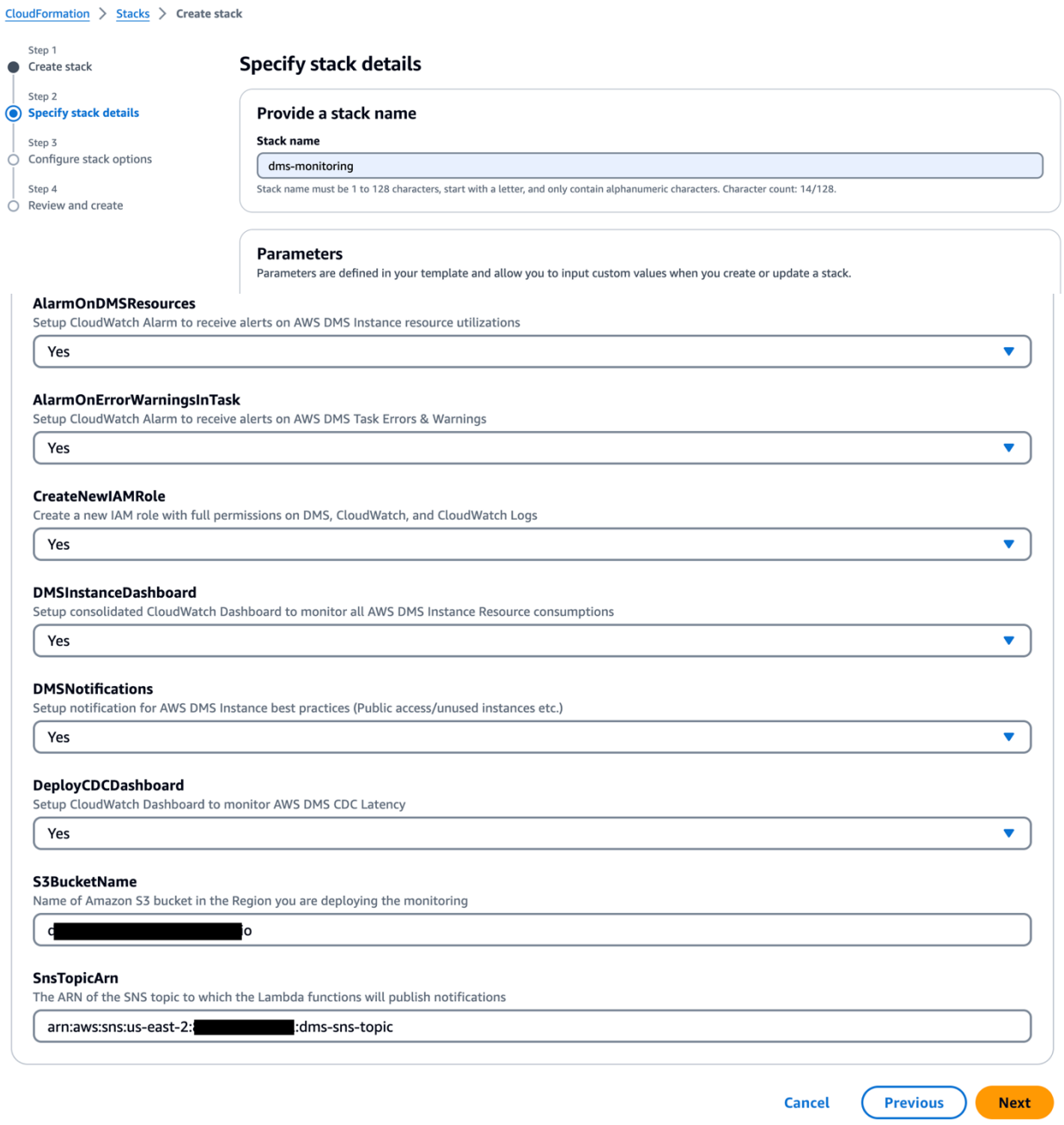
https://[redacted].s3.us-east-2.amazonaws.com/dms_monitoring.yaml

Amazon S3 template URL

S3 URL: https://[redacted].s3.us-east-2.amazonaws.com/dms_monitoring.yaml

View in Application Composer

Cancel Next



3. List of AWS resources deployed after successful completion of Amazon CloudFormation template.

Resources (14)

Search resources

Logical ID	Physical ID	Type	Status
DMSInstanceEventSubscription	dms-monitoring-DMSInstancesSubscription	AWS::DMS::EventSubscription	CREATE_COMPLETE
DMSTaskEventSubscription	dms-monitoring-DMSTasksSubscription	AWS::DMS::EventSubscription	CREATE_COMPLETE
LambdaExecutionRole	dms-monitoring-LambdaExecutionRole	AWS::IAM::Role	CREATE_COMPLETE
SchedulerExecutionRole	dms-monitoring-SchedulerExecutionRole	AWS::IAM::Role	CREATE_COMPLETE
LambdaFunction1	dms-monitoring-CDC-Dashboard	AWS::Lambda::Function	CREATE_COMPLETE
LambdaFunction2	dms-monitoring-ErrorNotifications	AWS::Lambda::Function	CREATE_COMPLETE
LambdaFunction3	dms-monitoring-DMS-Instance-Alarms	AWS::Lambda::Function	CREATE_COMPLETE
LambdaFunction4	dms-monitoring-DMS-Instances-Dashboard	AWS::Lambda::Function	CREATE_COMPLETE
LambdaFunction5	dms-monitoring-Misc-Alerts	AWS::Lambda::Function	CREATE_COMPLETE
LambdaFunction1Scheduler	dms-monitoring-Create-CDC-Dashboard	AWS::Scheduler::Schedule	CREATE_COMPLETE
LambdaFunction2Scheduler	dms-monitoring-Schedule-ErrorNotifications	AWS::Scheduler::Schedule	CREATE_COMPLETE
LambdaFunction3Scheduler	dms-monitoring-Schedule-DMS-Instance-Alarms	AWS::Scheduler::Schedule	CREATE_COMPLETE
LambdaFunction4Scheduler	dms-monitoring-Create-DMS-Instances-Dashboard	AWS::Scheduler::Schedule	CREATE_COMPLETE
LambdaFunction5Scheduler	dms-monitoring-Schedule-Misc-Alerts	AWS::Scheduler::Schedule	CREATE_COMPLETE

4. List of Amazon Lambda functions deployed:

Function name	Description	Package type	Runtime
dms-monitoring-Misc-Alerts	-	Zip	Python 3.12
dms-monitoring-DMS-Instance-Alarms	-	Zip	Python 3.12
dms-monitoring-CDC-Dashboard	-	Zip	Python 3.12
dms-monitoring-DMS-Instances-Dashboard	-	Zip	Python 3.12
dms-monitoring-ErrorNotifications	-	Zip	Python 3.12

5. Each Lambda function has various environment variables to configure. Example:

   - dms-monitoring-ErrorNotifications

     Configurable parameters:

SNS_TOPIC_ARN

Set by default with Amazon SNS ARN specified as Amazon CloudFormation stack parameter.

LOG_GROUP_PATTERN

#Specify pattern for AWS DMS Log pattern('dms-*'). Do NOT change this pattern.

EXCLUDED_LOG_STREAMS

#Specify pattern for AWS DMS task log stream to exclude from the list.

filter_pattern

Filter pattern for errors and warnings in selected LogGroups. Default set to '?ERROR ?WARNING ?error ?warning' .

- dms-monitoring-misc-alerts

  Configurable parameters:

  SNS_TOPIC_ARN

  # Set by default with Amazon SNS ARN specified as Amazon CloudFormation stack parameter.

  EXCLUDE_INSTANCES

  # Specify comma separated list of DMS Instances you want to exclude from the monitoring alert.

  EXCLUDE_TASKS

  # Specify comma separated list of DMS tasks you want to exclude from the monitoring alert.

- dms-monitoring-dms-instance-alarms

  Configurable parameters:

  CPU_THRESHOLD

  # Set by default to alert when CPU Utilization cross 80% threshold.

  MEMORY_THRESHOLD

  # Set by default to alert when Freeable Memory cross below 25% threshold.

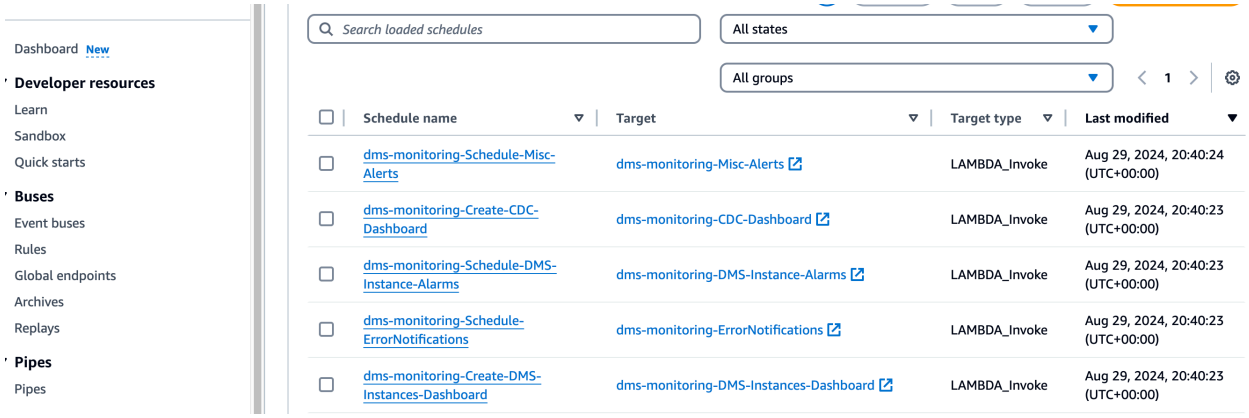
  SWAP_THRESHOLD

  # Set by default to alert when SWAP Utilization cross 25% threshold.

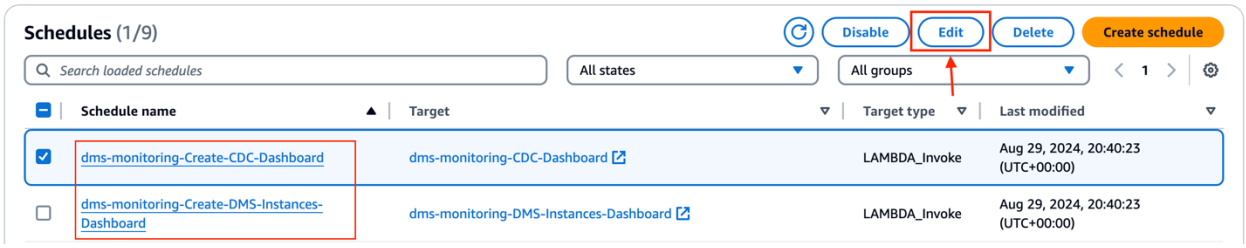
  CAPACITY_THRESHOLD

```
# Set by default to alert when Capacity Utilization for AWS DMS Serverless replication cross 75% threshold.
```

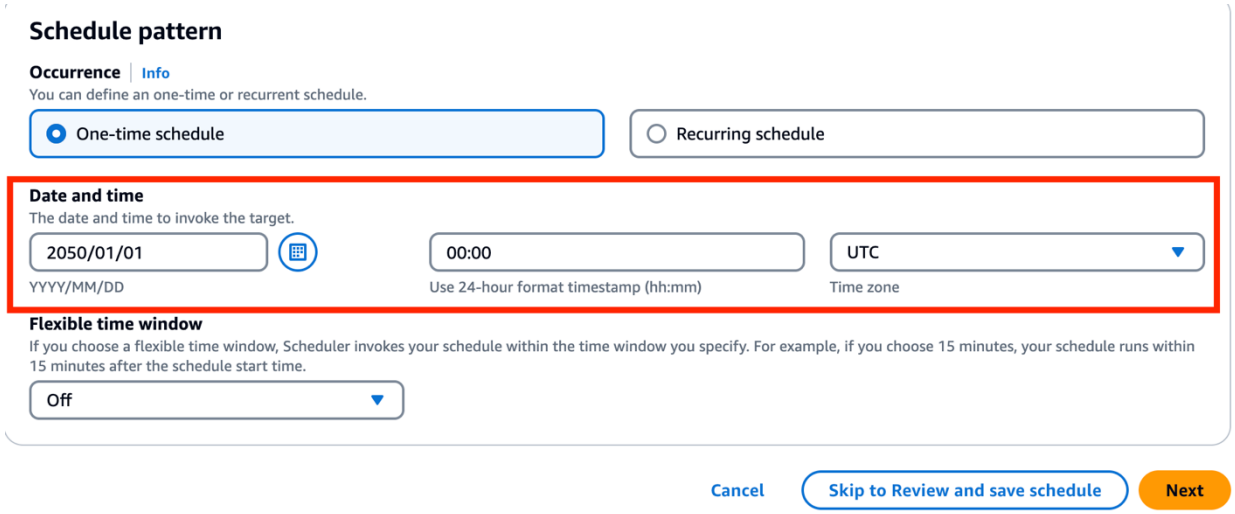
6. List of AWS Event Bridge Schedules deployed.



7. Scheduler also have two schedules for creating Amazon CloudWatch dashboard. These schedules has Amazon Lambda functions as target and one time execution date is set to 2050/01/01.



8. Edit schedules for creating these dashboards and specify date and time as per your schedule to execute the target Lambda functions and deploy respective Amazon CloudWatch Dashboards.



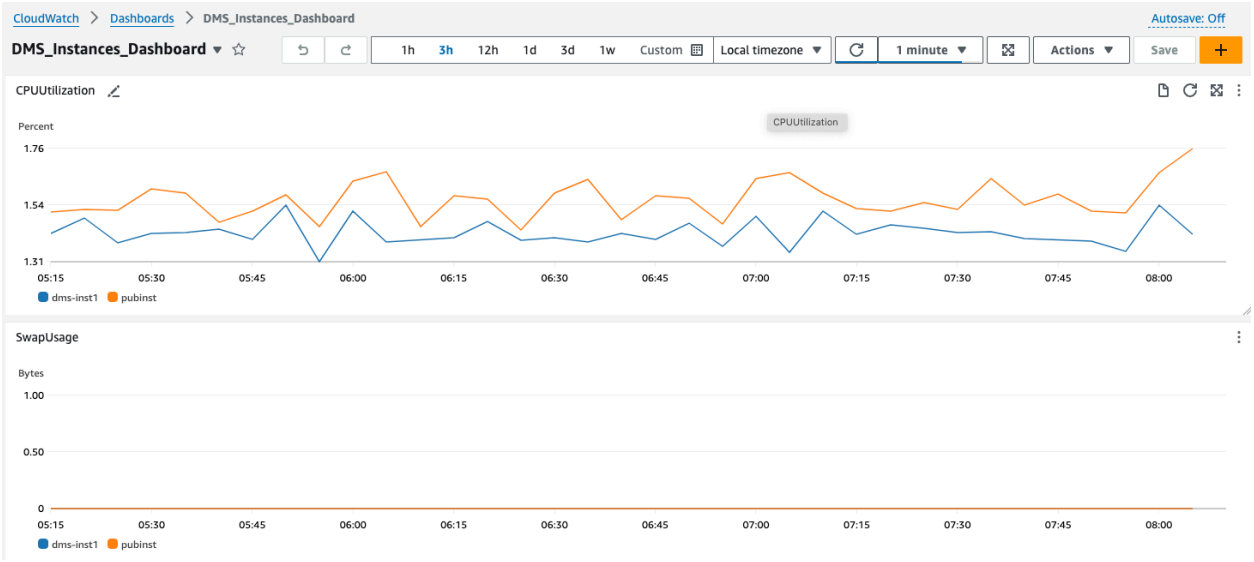
9. Optionally, you can also verify and update schedule for remaining monitoring alerts set on Amazon Event Bridge scheduler.

Clean up

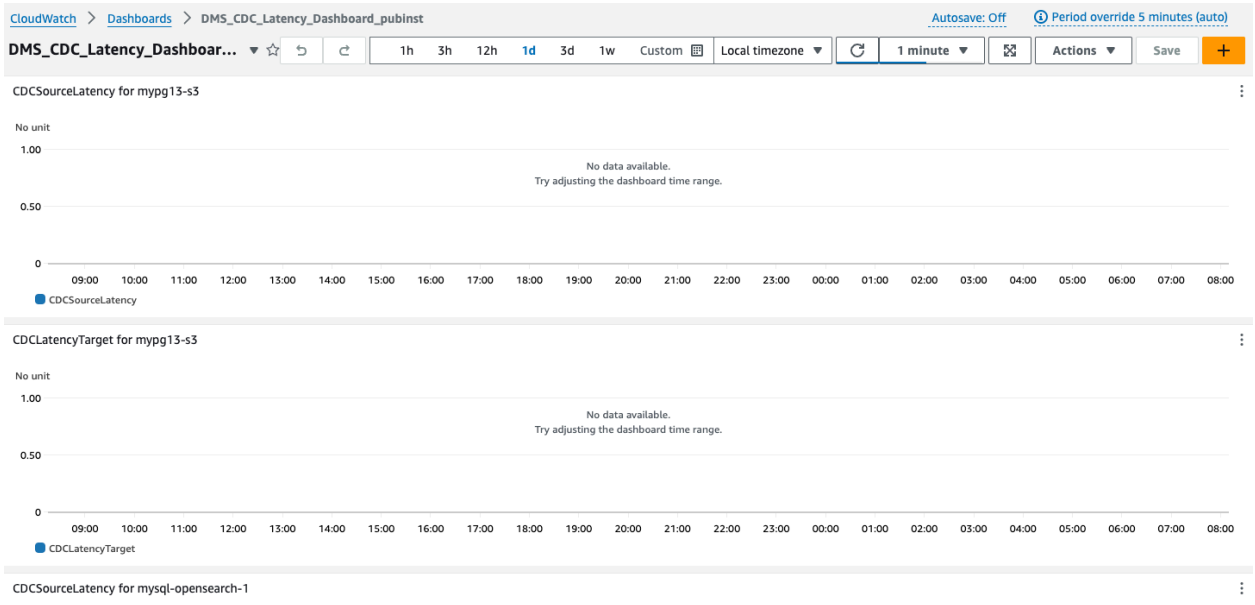
Delete Amazon CloudFormation stack to remove all resources deployed as part of this solution.

Appendix

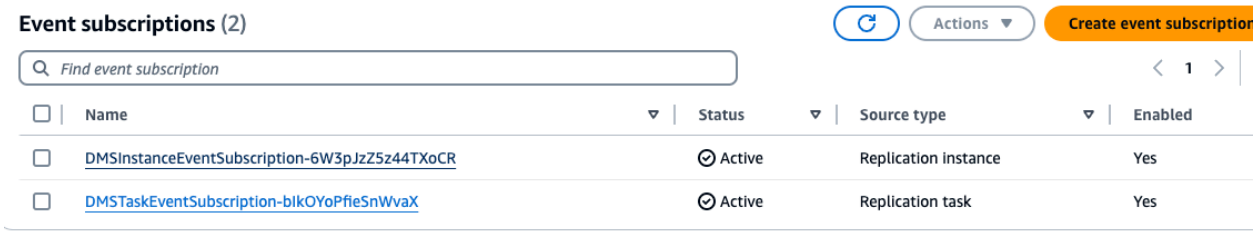
1. Centralized Amazon CloudWatch dashboard for AWS DMS Replication Instances



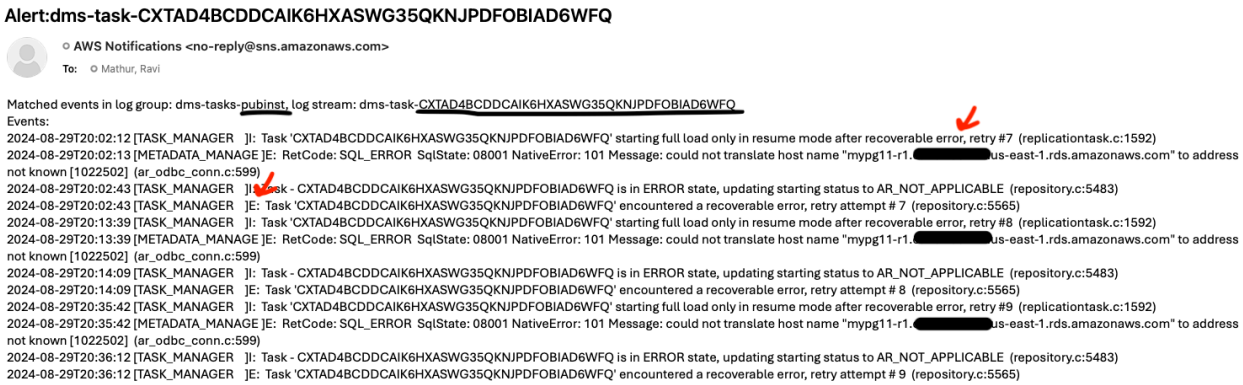
2. Centralized Amazon CloudWatch dashboard for DMS task CDC Metrics



3. CloudFormation Template for DMS Instance and Task Event Subscription



4. CloudWatch Alerts for Errors and Warnings in DMS Tasks



5. DMS Instances and DMS tasks best practice alerts