

CS7346 Lab 5: CloudTrail, CloudWatch, and AWS Config

Name: Bingying Liang

ID: 48999397

July 10 2023

To support the following lab exercises, please read the following chapters in the AWS Certified Solutions Architect Study Guide.

Chapter 7

Lab: Please complete the following lab exercises in the AWS Certified Solutions Architect Study Guide. When you are done, delete all the resources that you provisioned to avoid charges.

7.1 through 7.3 (inclusive)

Environment

Laptop: MacBook Air M2 2022, macOS 13.3

Chapter 7

7.1

EXERCISE 7.1

Create a Trail

In this exercise, you'll configure CloudTrail to log write-only management events in all regions.

1. Browse to the CloudTrail service console and click the Create Trail button.
2. Under Trail Name, enter a trail name of your choice. Names must be at least three characters and can't contain spaces.
3. Under the Storage Location heading, select Create New S3 Bucket. Enter the name of the S3 bucket you want to use. Remember that bucket names must be globally unique.

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EXERCISE 7.1 (*continued*)

4. Under Log File SSE-KMS Encryption, clear the box next to Enabled.
 5. Enter a custom name for the AWS KMS Alias.
 6. Leave all other settings at their defaults and click the Next button.
 7. Under EventTypes, select the box next to Management Events. Don't select any other boxes.
 8. Under Management Events, make sure only Write is selected.
 9. Click Next.
 10. Review the settings and click the Create Trail button.
-

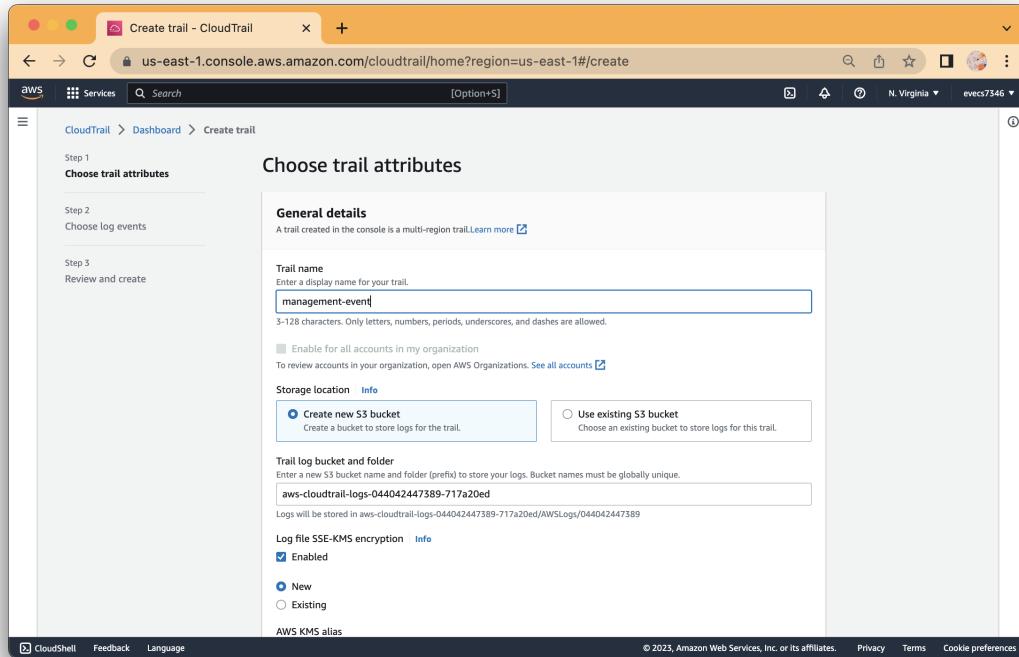
Solution:

1.

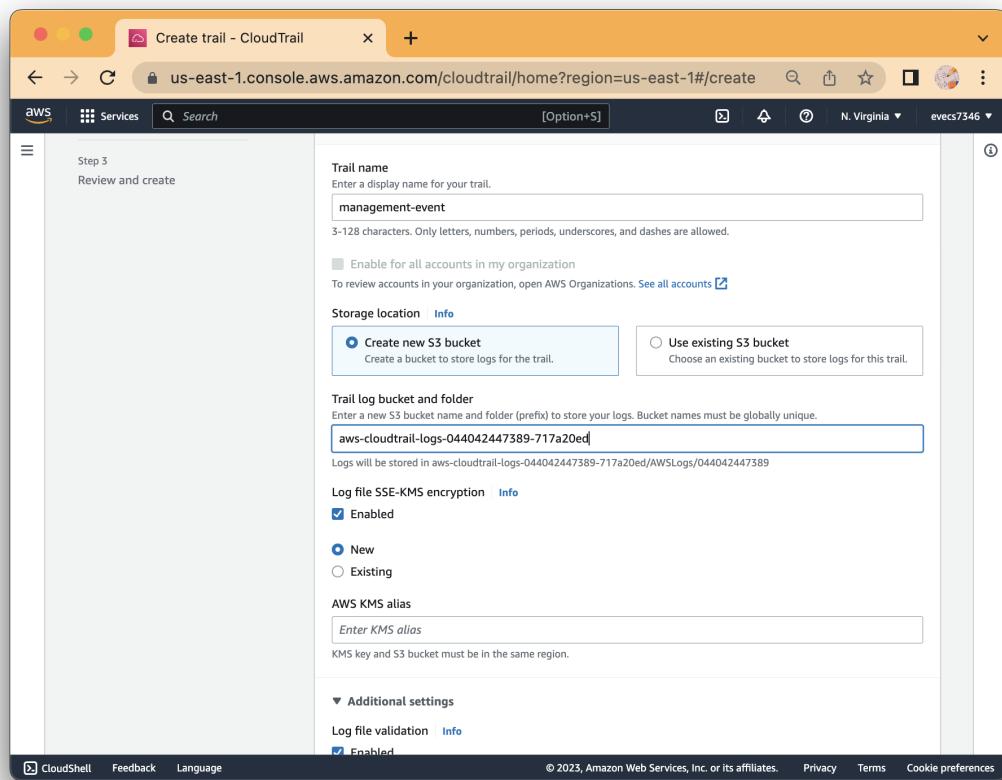
The screenshot shows the AWS CloudTrail management console home page. At the top, there is a banner for 'Introducing CloudTrail Lake' which allows querying multiple event fields in logs across all regions for auditing and analysis. Below the banner, the main heading is 'AWS CloudTrail' with the subtext 'Continuously log your AWS account activity'. A call-to-action button 'Create a trail' is visible. To the left, there is a section titled 'How it works' with a diagram showing a cloud icon connected to a camera icon. To the right, there are sections for 'Pricing' and 'Getting started'. The bottom of the page includes standard AWS navigation links like CloudShell, Feedback, Language, and a footer with copyright information.

The screenshot shows the AWS CloudTrail dashboard. On the left, a sidebar menu includes options like Dashboard, Event history, Insights, and Lake (with sub-options: Dashboard, Query, Event data stores, Integrations, Trails). The main content area has two main sections: 'Dashboard' and 'Event history'. The 'Dashboard' section contains a 'Trails' table with one entry: 'No trails' and a 'Create trail' button. The 'CloudTrail Insights' section indicates that insights are not enabled. The 'Event history' section lists several recent events with columns for Event name, Event time, and Event source. Events listed include StopInstances, ConsoleLogin, PutBucketAcl, PutBucketOwnership..., and PutBucketEncryption, all occurring on July 10, 2023.

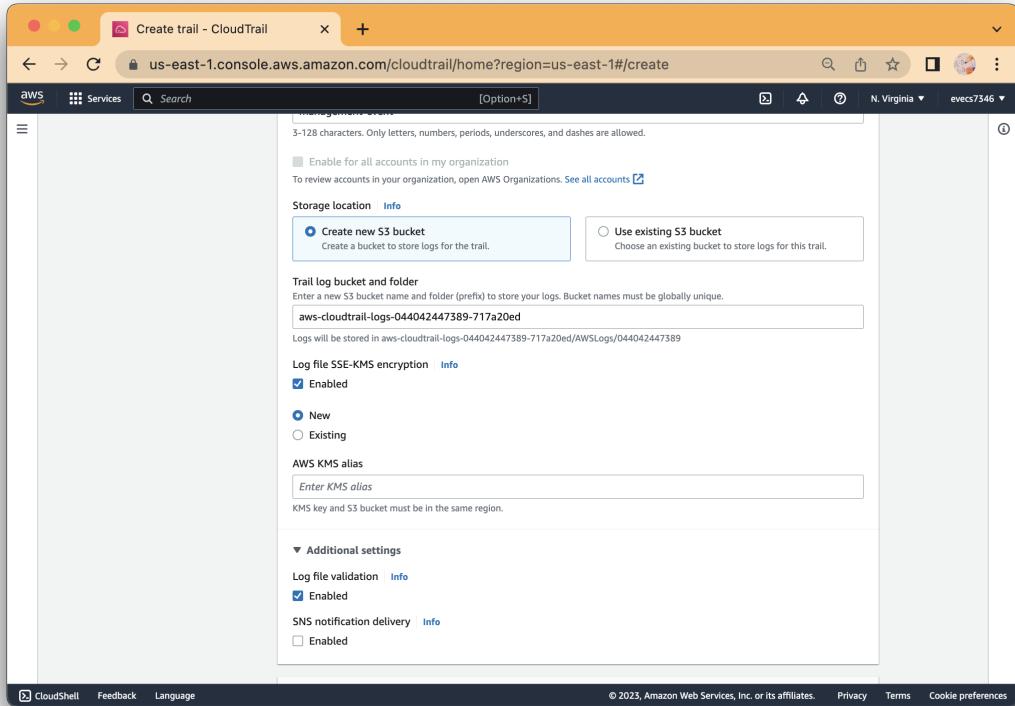
2.



3.

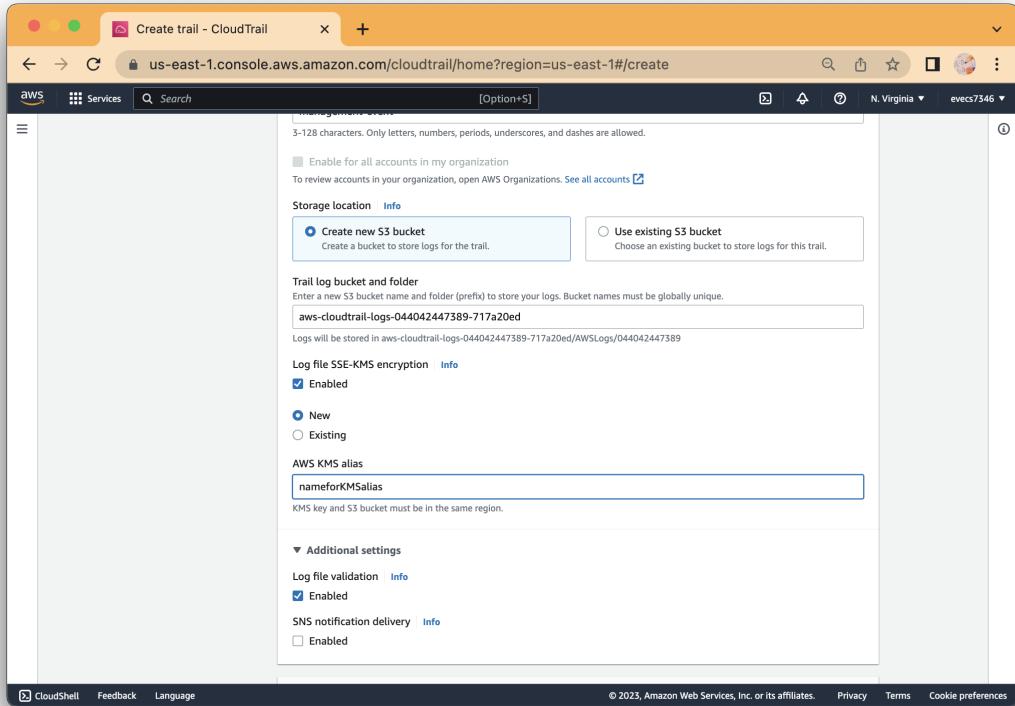


4.

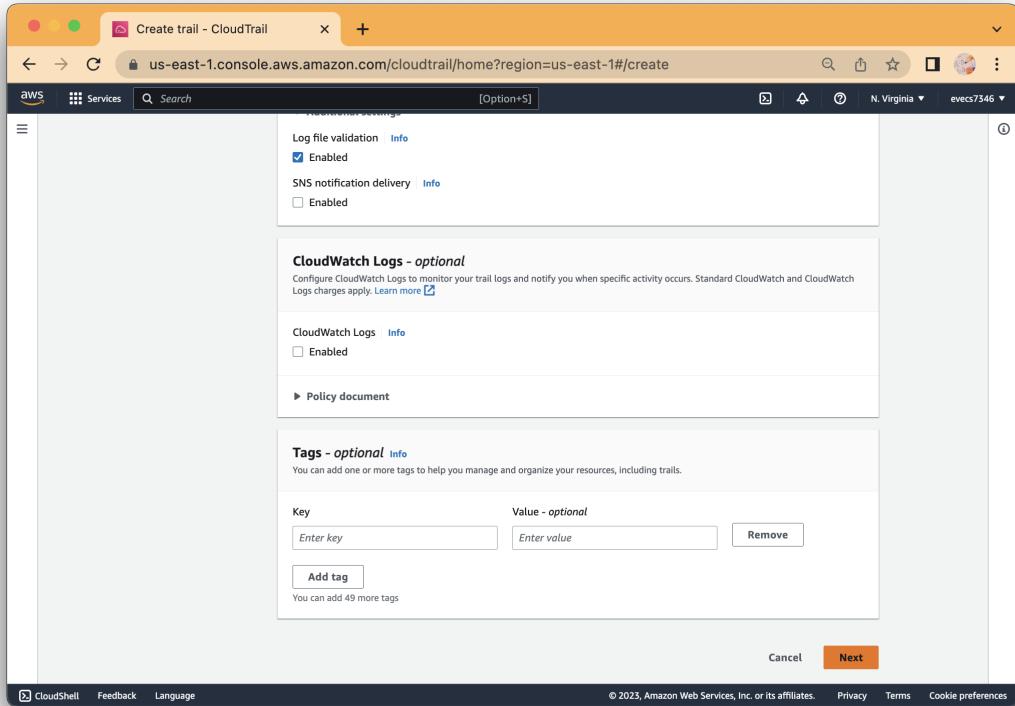


5.

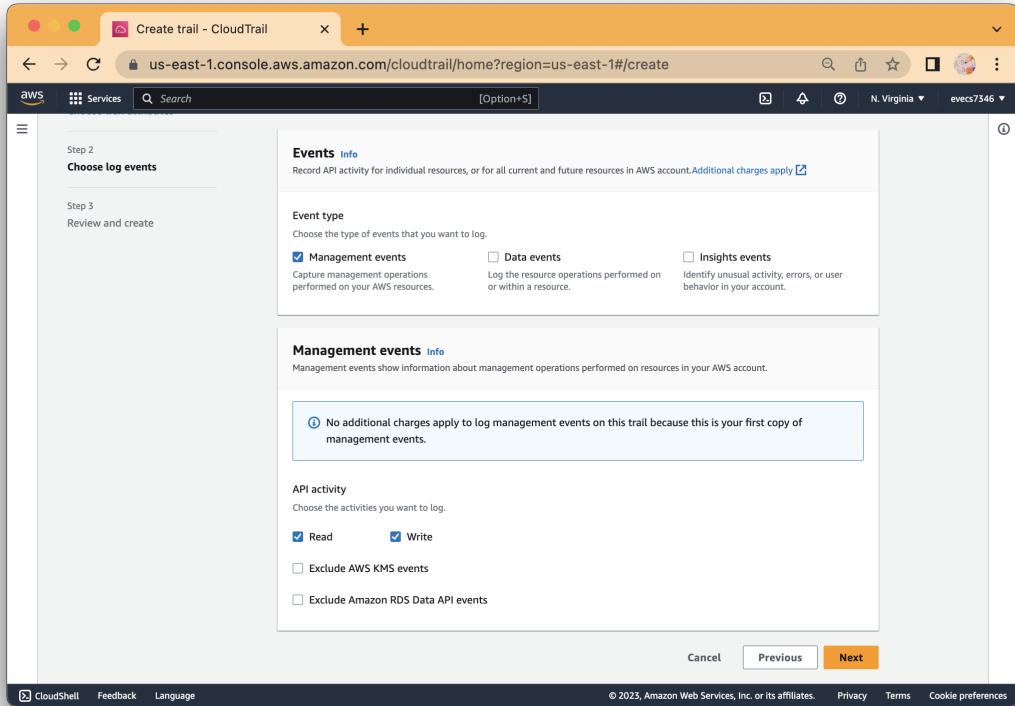
6



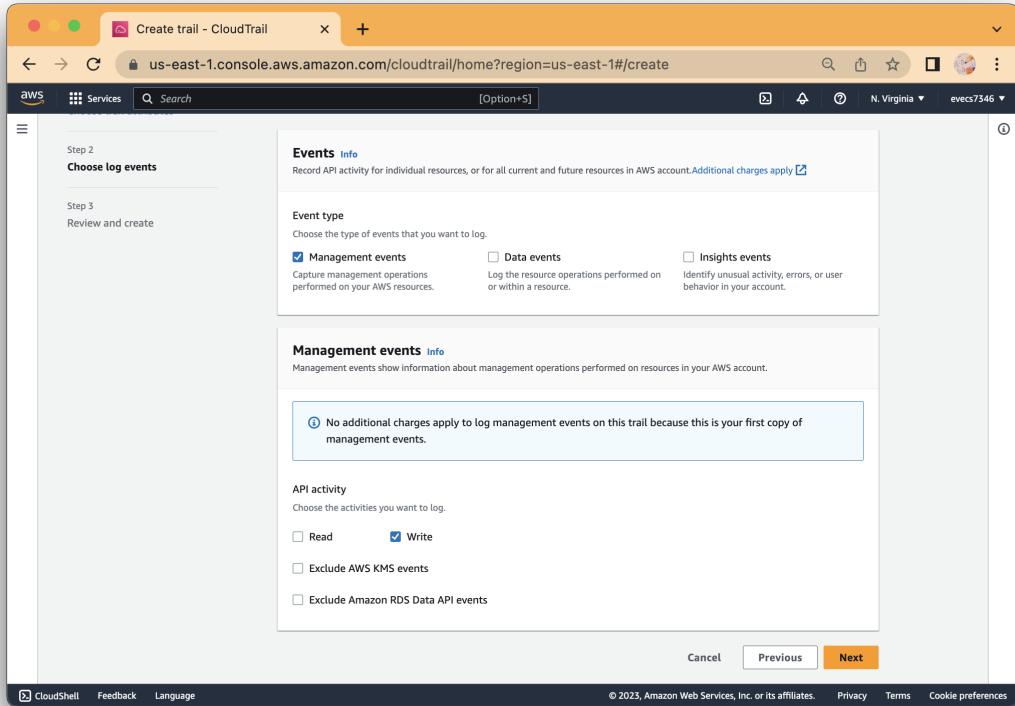
6.



7.



8.



9.

The screenshot shows the 'Create trail' wizard in the AWS CloudTrail console. The current step is 'Step 1: Choose trail attributes'. The left sidebar shows navigation steps: Step 1 (Choose trail attributes), Step 2 (Choose log events), and Step 3 (Review and create). The main content area is titled 'Review and create'.

Step 1: Choose trail attributes

General details

Trail name management-event	Trail log location aws-cloudtrail-logs-044042447389-9	Log file validation Enabled
Multi-region trail Yes	717a20ed/AWSLogs/044042447389-9	SNS notification delivery Disabled
Apply trail to my organization Not enabled	Log file SSE-KMS encryption Enabled	AWS KMS key alias nameforKMSalias

CloudWatch Logs

No CloudWatch Logs log groups
CloudWatch Logs is not configured for this trail

Tags

Key	Value
No tags No tags associated with this trail	

Step 2: Choose log events

Management events

API activity Write-only	Exclude AWS KMS events No Exclude Amazon RDS Data API events No
----------------------------	--

Data events

10.

Trails - CloudTrail

us-east-1.console.aws.amazon.com/cloudtrail/home?region=us-east-1#/trails

CloudTrail > Trails

Trails

Name	Home region	Multi-region trail	Insights	Organization trail	S3 bucket	Log file prefix	CloudWatch Logs log group	Status
management-event	US East (N. Virginia)	Yes	Disabled	No	aws-cloudtrail-logs-044042447389-717a20ed	-	-	Logging

Copy events to Lake Delete Create trail

CloudShell Feedback Language © 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

The screenshot shows the AWS CloudTrail Trails page. At the top, there's a navigation bar with tabs for 'CloudTrail' and 'Trails'. Below the navigation is a search bar and a toolbar with buttons for 'Copy events to Lake', 'Delete', and 'Create trail'. The main area is a table titled 'Trails' with columns for Name, Home region, Multi-region trail, Insights, Organization trail, S3 bucket, Log file prefix, CloudWatch Logs log group, and Status. A single row is listed: 'management-event' (Home region: US East (N. Virginia), Multi-region trail: Yes, Insights: Disabled, Organization trail: No, S3 bucket: aws-cloudtrail-logs-044042447389-717a20ed, Log file prefix: -, CloudWatch Logs log group: Logging). The status is shown as 'Logging' with a green checkmark icon.

7.2

EXERCISE 7.2

Create a Graph Using Metric Math

In this exercise, you'll create a graph that plots the NetworkIn and NetworkOut metrics for an EC2 instance. You'll then use metric math to graph a new time series combining both metrics.

1. Browse to the CloudWatch service console and expand Metrics on the navigation menu.
2. Click All Metrics.
3. On the Browse tab, descend into the EC2 namespace. Select Per-Instance Metrics; then locate and select the NetworkIn and NetworkOut metrics.
4. Click the Graphed Metrics tab.
5. For each metric, select Sum for Statistic and 5 Minutes for Period. Refer to Figure 7.2 as needed.
6. Click the Add Math button and select Start With Empty Expression.
7. In the Edit Math Expression field, enter the expression **m1+m2**.
8. Click the Apply button. CloudWatch will add another time series to the graph representing the sum of the NetworkIn and NetworkOut metrics. Your graph should look similar to this one:



Solution:

1.

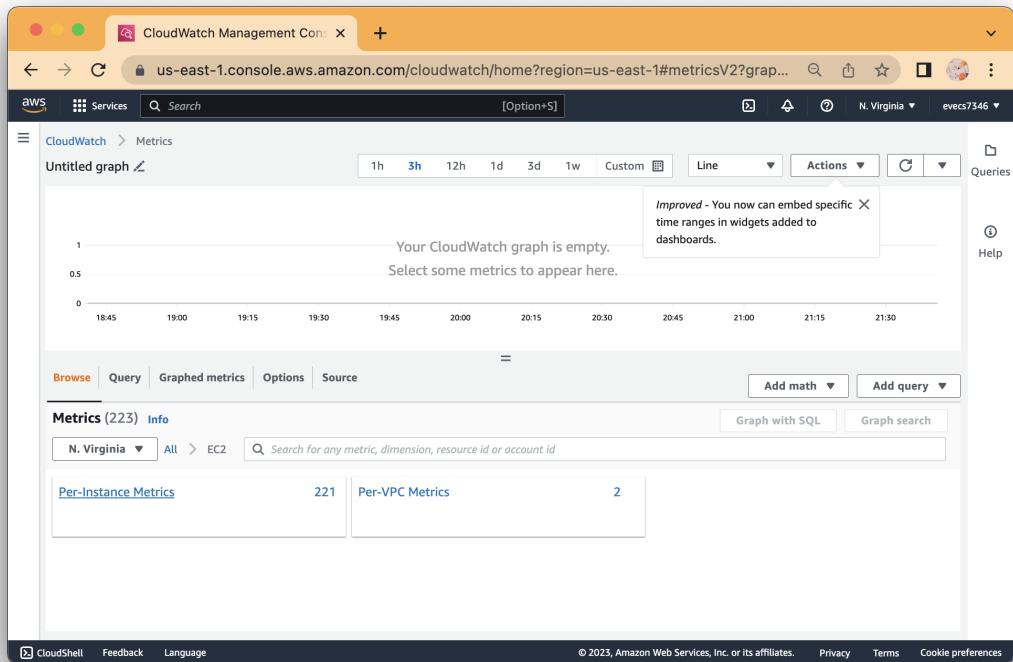
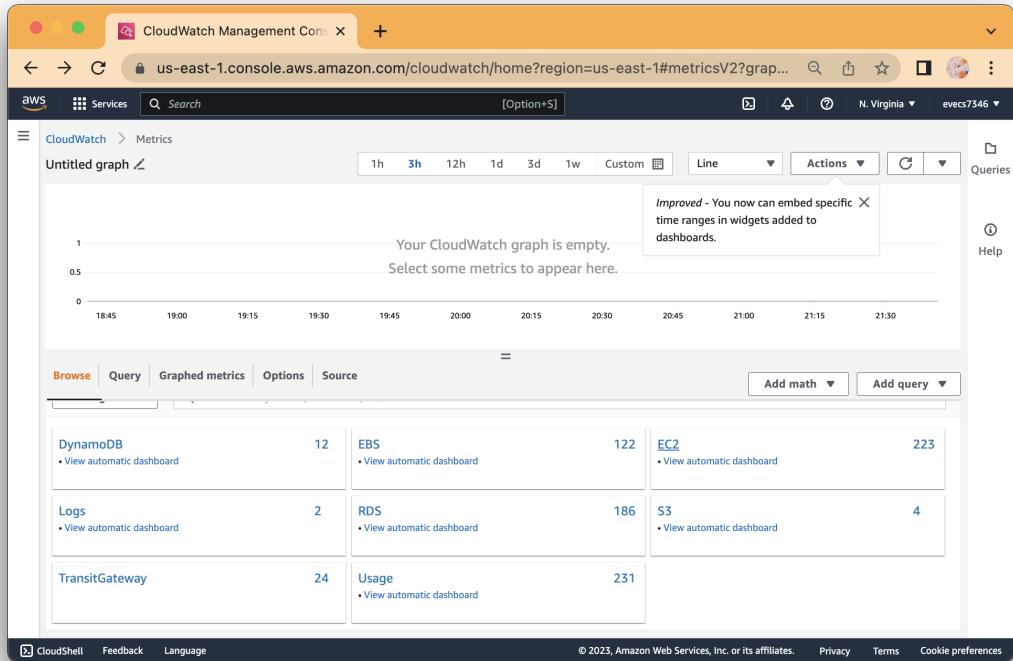
The screenshot shows the AWS CloudWatch Management Console home page. The left sidebar contains navigation links for CloudWatch services like Dashboards, Alarms, Logs, Metrics, X-Ray traces, Events, Application monitoring, and Insights. The main content area features a "Get started with CloudWatch" section with four cards: "Create alarms" (alarm icon), "Create a default dashboard" (cloud icon), "View logs" (log icon), and "View events" (event icon). Below this is a "Get started with Application Insights" section with a "Configure Application Insights" button.

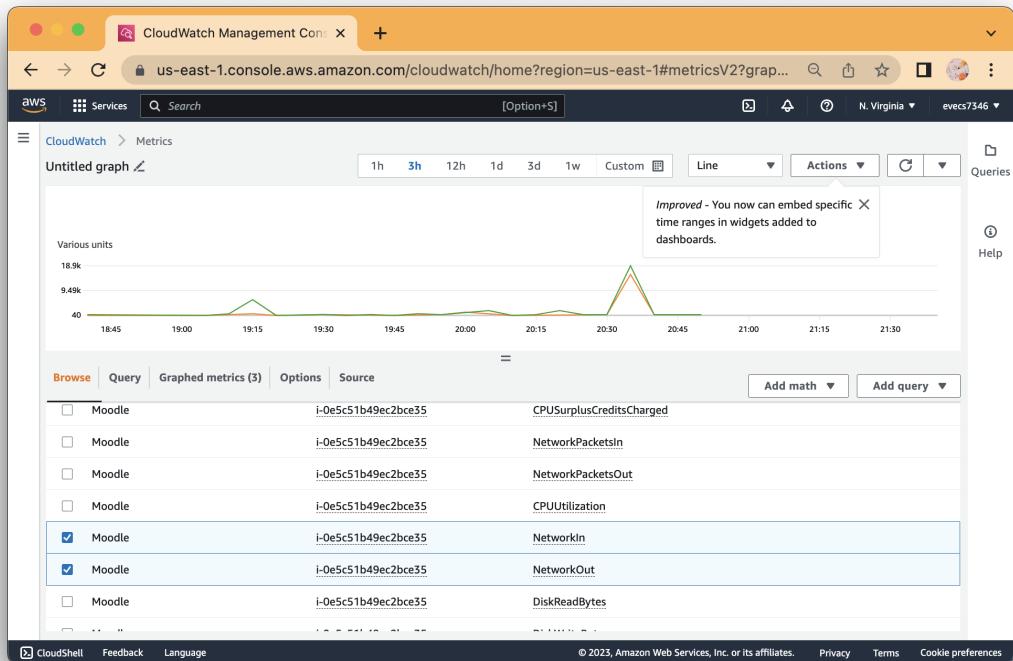
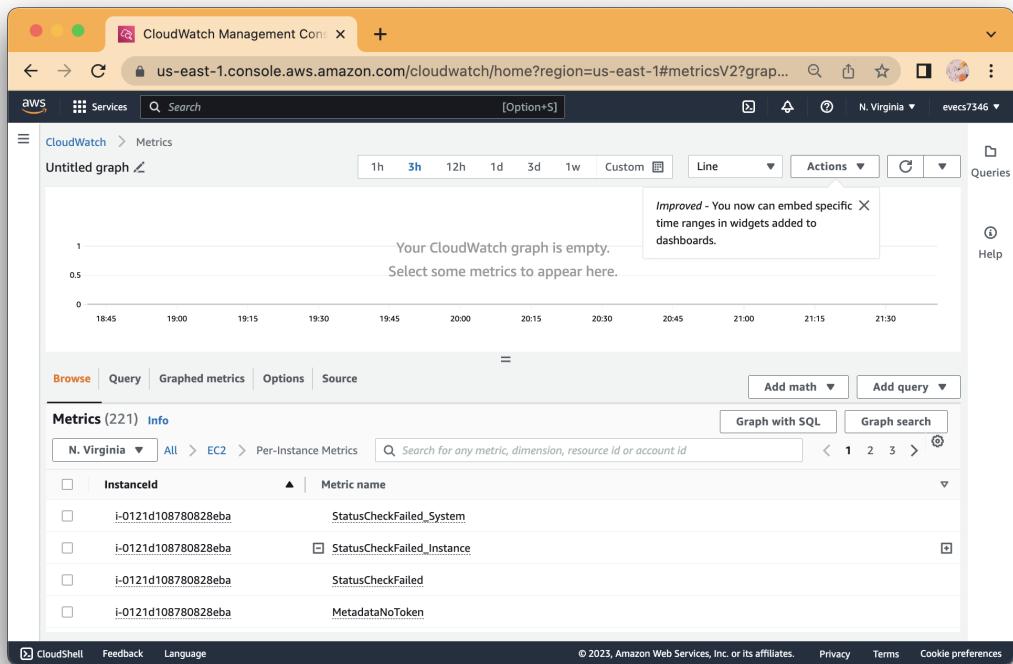
2.

The screenshot shows the AWS CloudWatch Metrics service. It displays an "Untitled graph" with a Y-axis from 0 to 1 and an X-axis from 18:45 to 21:30. A message box says "Improved - You now can embed specific time ranges in widgets added to dashboards." Below the graph, there are tabs for "Browse", "Query", "Graphed metrics", "Options", and "Source". A search bar allows searching for metrics. The "Metrics (804) Info" section shows a table of metrics categorized by service:

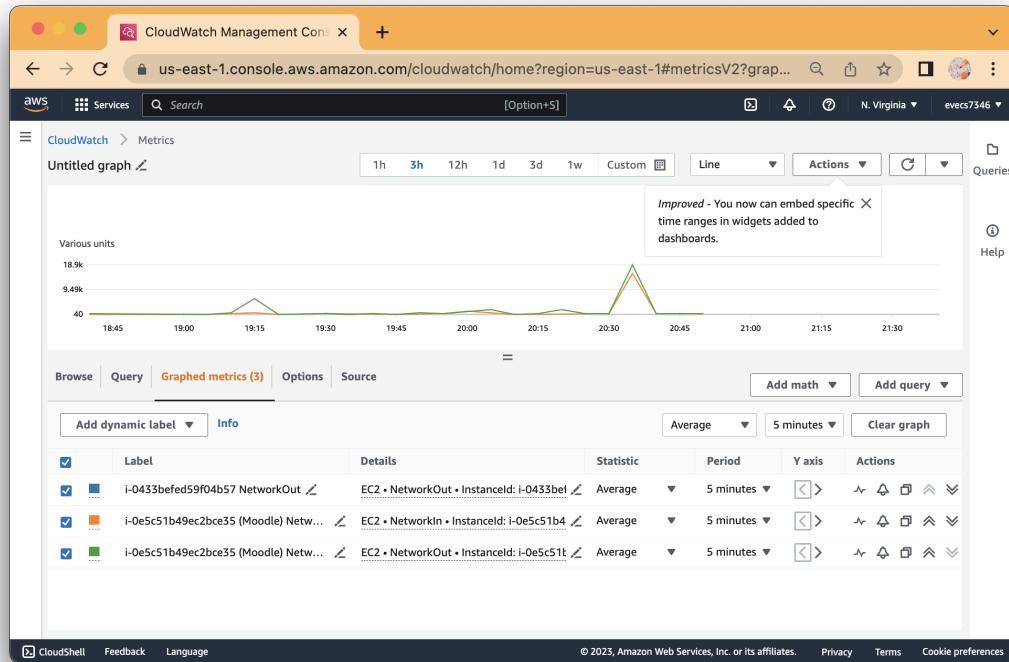
Service	Count
DynamoDB	12
EBS	122
EC2	223
Logs	2
RDS	186
S3	4

3.

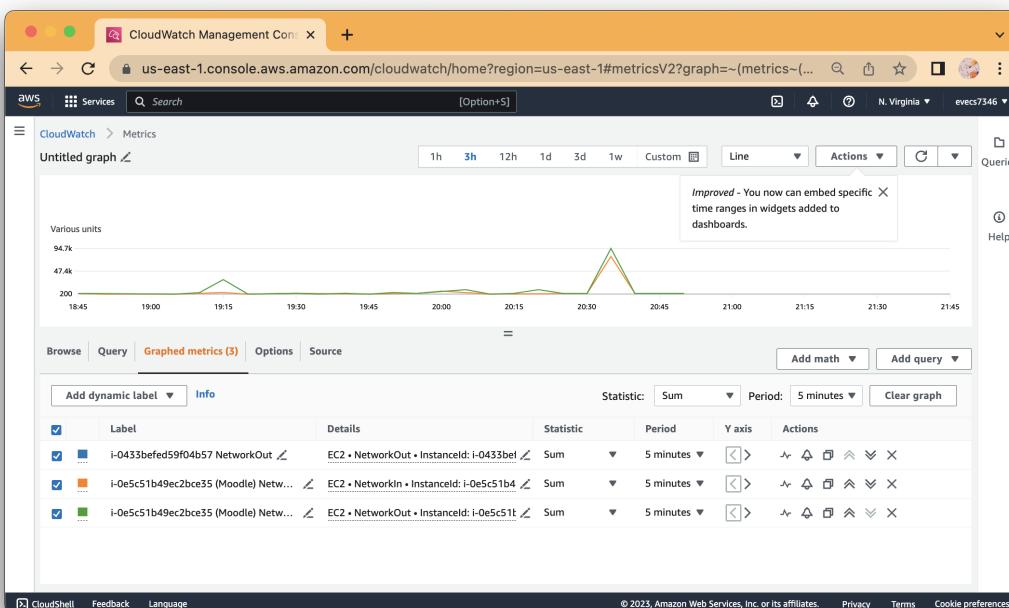




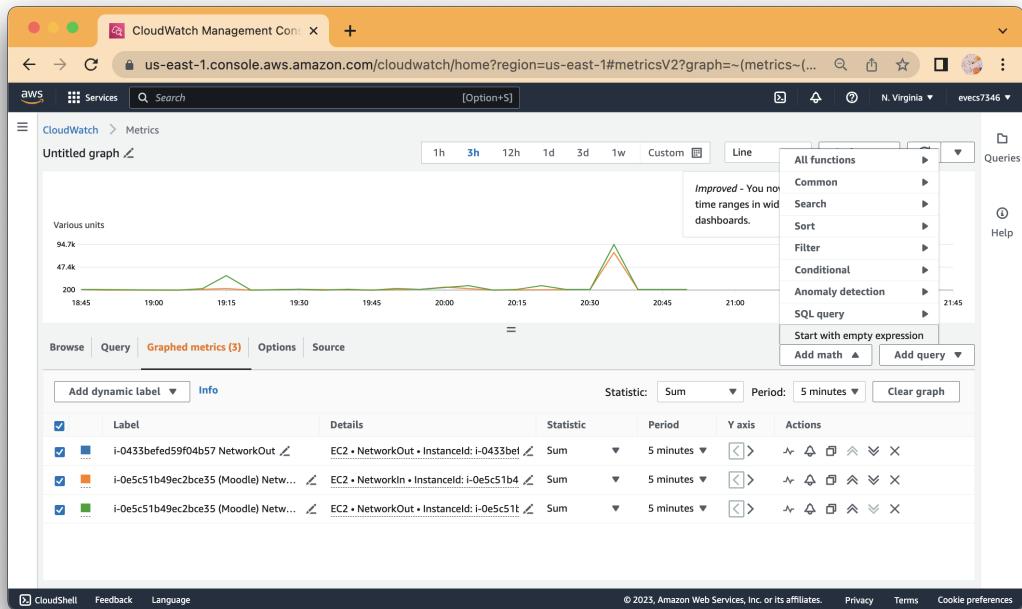
4.



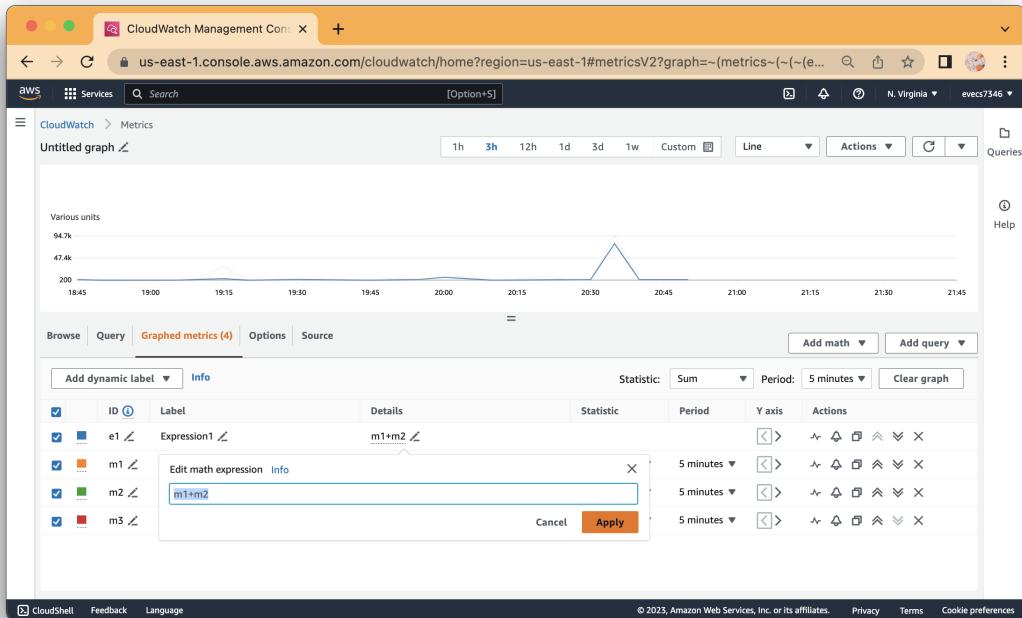
5.



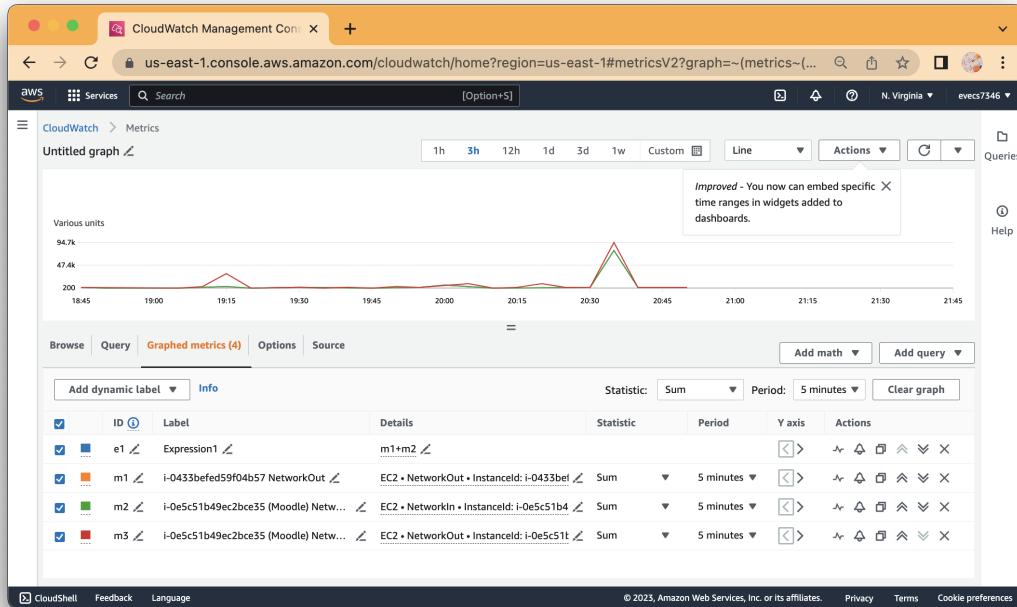
6.



7.



8.



7.3

EXERCISE 7.3

Deliver CloudTrail Logs to CloudWatch Logs

In this exercise, you'll reconfigure the trail you created in Exercise 7.1 to stream events captured by CloudTrail to CloudWatch Logs.

1. Browse to the CloudTrail service console and click Trails.
2. Click the name of the trail you created in Exercise 7.1.
3. Under the heading CloudWatch Logs, click the Edit button.
4. Under CloudWatch Logs, select the Enabled check box.
5. CloudTrail prompts you to use a New or Existing Log Group. Select New and enter a log group name of your choice.
6. CloudTrail must assume an IAM role that will give it permissions to stream logs to CloudWatch Logs. CloudTrail can create the role for you. Just click the New radio button under IAM Role. Enter a custom role name of your choice.
7. Click the Save Changes button.

Delivery isn't instant, and it can take a few minutes before trail logs show up in CloudWatch Logs.

Solution:

1.

The screenshot shows the AWS CloudTrail Dashboard. On the left, there's a sidebar with options like Dashboard, Event history, Insights, Lake, Trails, Settings, Pricing, Documentation, Forums, and FAQs. The main area has tabs for 'Trails' and 'CloudTrail Insights'. Under 'Event history', it lists several events with columns for Event name, Event time, and Event source. One event is highlighted: 'CreateAlias' on July 10, 2023, at 17:22:36 UTC from kms.amazonaws.com. Other events listed include 'CreateTrail', 'StartLogging', 'PutInsightSelectors', and 'PutEventSelectors'.

2.

This screenshot shows the 'management-event' trail details page. The sidebar is identical to the first screenshot. The main content shows 'General details' for the trail. Key information includes:

Setting	Value
Trail logging	Logging (Enabled)
Trail name	management-event
Multi-region trail	Yes
Apply trail to my organization	Not enabled
AWS KMS key	arn:aws:kms:us-east-1:044042447389:key/38814dd7-84bf-4aa1-9e67-afoab7dc394
AWS KMS key alias	nameforKMSalias

Below this, there's a section for 'CloudWatch Logs'.

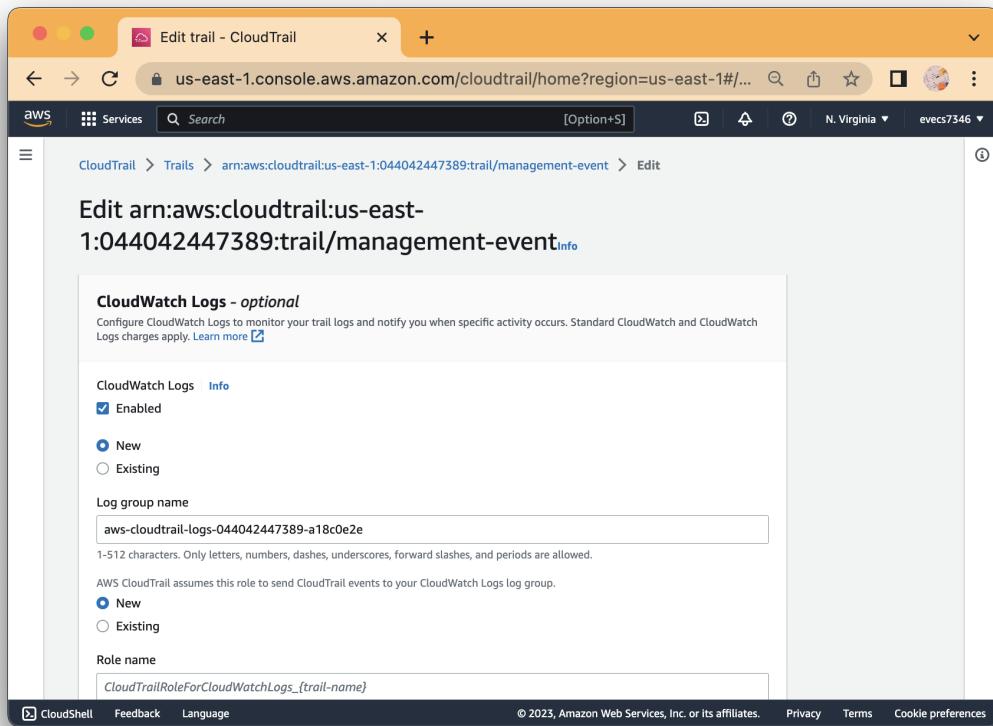
3.

The screenshot shows the AWS CloudTrail Trail details page for a trail named 'aws' in the 'us-east-1' region. The page is divided into several sections:

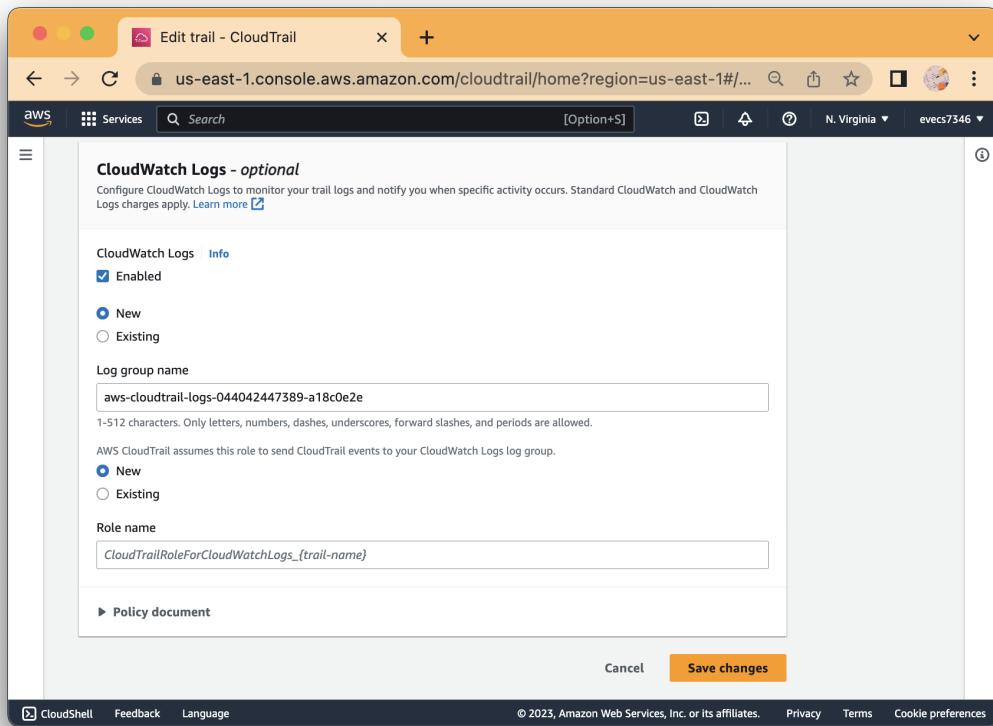
- Trail Settings:** Shows that the trail is a "Multi-region trail" (Yes) and has "Apply trail to my organization" (Not enabled). It includes fields for "Last log file delivered" (July 10, 2023, 17:27:49 (UTC-04:00)), "Log file SSE-KMS encryption" (Enabled), "AWS KMS key" (arn:aws:kms:us-east-1:044042447389:key/38814dd7-84bf-4aa1-9ce7-af0ab7dcb394), and "AWS KMS key alias" (nameforKMSalias).
- CloudWatch Logs:** A section titled "CloudWatch Logs" with an "Edit" button. It displays the message "No CloudWatch Logs log groups" and "CloudWatch Logs is not configured for this trail".
- Tags:** A section titled "Tags" with a "Manage tags" button. It displays the message "No tags" and "No tags associated with this trail".

At the bottom of the page, there are links for CloudShell, Feedback, Language, and cookie preferences, along with a copyright notice for 2023 and links for Privacy, Terms, and Cookie preferences.

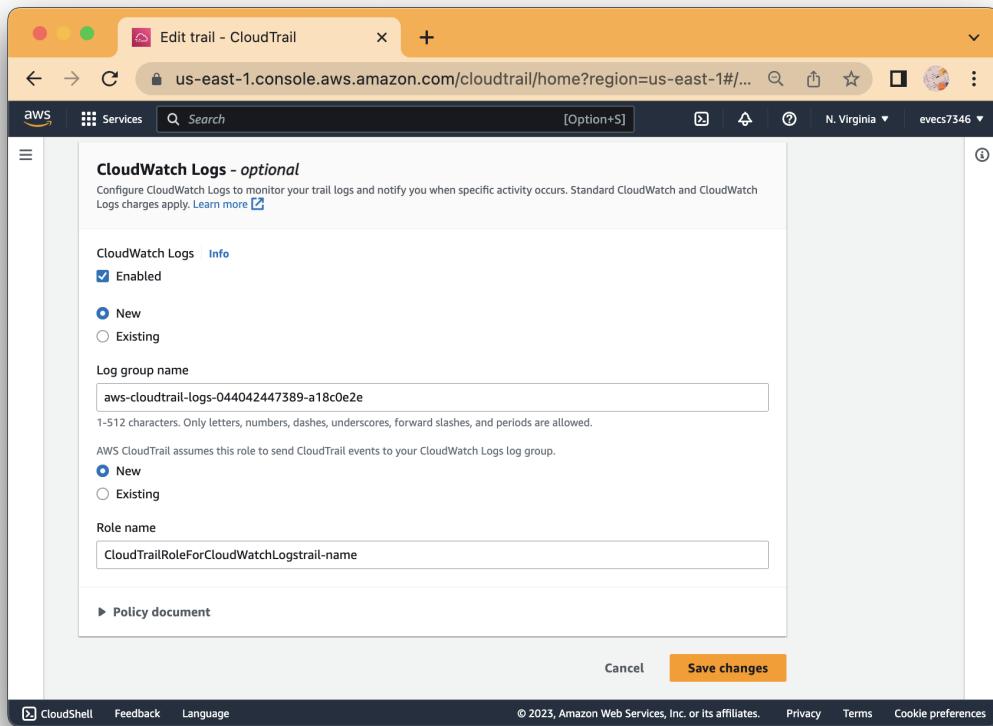
4.



5.



6.



7.

Trail details - CloudTrail

us-east-1.console.aws.amazon.com/cloudtrail/home?region=us-east-1#/trails/arn:aws:cloudtrail:us-east-1:044042447389:trail/management-event

CloudTrail > Trails > arn:aws:cloudtrail:us-east-1:044042447389:trail/management-event

management-event

Delete Stop logging

General details

Trail logging Logging	Trail log location aws-cloudtrail-logs-044042447389-717a20ed/AWSLogs/044042447389/389	Log file validation Enabled	SNS notification delivery Disabled
Trail name management-event	Last log file delivered July 10, 2023, 17:27:49 (UTC-04:00)	Last file validation delivered July 10, 2023, 18:44:22 (UTC-04:00)	Last SNS notification -
Multi-region trail Yes	Log file SSE-KMS encryption Enabled	AWS KMS key arn:aws:kms:us-east-1:044042447389:key/38814dd7-84bf-4aa1-9ce7-af0ab7dcb394	AWS KMS key alias nameforKMSalias
Apply trail to my organization Not enabled			

CloudWatch Logs

Log group aws-cloudtrail-logs-044042447389-a18c0e2e	IAM Role arn:aws:iam::044042447389:role/service-role/CloudTrailRoleForCloudWatchLogtrail-name
--	--

Tags

Manage tags

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The screenshot shows the AWS CloudTrail Trail details page for a specific trail named 'management-event'. The page is divided into sections: General details, CloudWatch Logs, and Tags. Under General details, it shows trail logging status (Enabled), log location (aws-cloudtrail-logs-044042447389-717a20ed/AWSLogs/044042447389/389), validation status (Enabled), and SNS notification delivery status (Disabled). It also displays the last log file delivered (July 10, 2023, 17:27:49 UTC-04:00) and the last file validation delivered (July 10, 2023, 18:44:22 UTC-04:00). The CloudWatch Logs section shows the log group (aws-cloudtrail-logs-044042447389-a18c0e2e) and the IAM role assigned (arn:aws:iam::044042447389:role/service-role/CloudTrailRoleForCloudWatchLogtrail-name). The Tags section has a 'Manage tags' button.