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**Subject:** Cloud Computing

**Semester:** 6  
**Section:** G

## Assignment 5 - Introduction to AWS Key Management Service(KMS)

### Deliverables:

The following screenshots are to be submitted:

- a. 1a.png: Showing KMS key created. The name of the alias should be: <Your SRN> Eg: pes1201900001.

The screenshot shows the AWS Management Console for the Key Management Service (KMS). A green success banner at the top states: "Success Your AWS KMS key was created with alias pes2ug19cs451 and key ID a6367724-fc19-4443-aa70-7249111ef2c8." Below this, the "Customer managed keys" section is visible, showing a table with one key entry.

| Aliases       | Key ID                               | Status  | Key spec          | Key usage           |
|---------------|--------------------------------------|---------|-------------------|---------------------|
| pes2ug19cs451 | a6367724-fc19-4443-aa70-7249111ef2c8 | Enabled | SYMMETRIC_DEFAULT | Encrypt and decrypt |

**b. 2a.png: Showing the configured CloudTrail named <Your SRN>-trail.**

The screenshot shows the AWS CloudTrail console. At the top, there's a blue banner for "Introducing CloudTrail Lake". Below it, the "Trails" section is active. A table lists two trails:

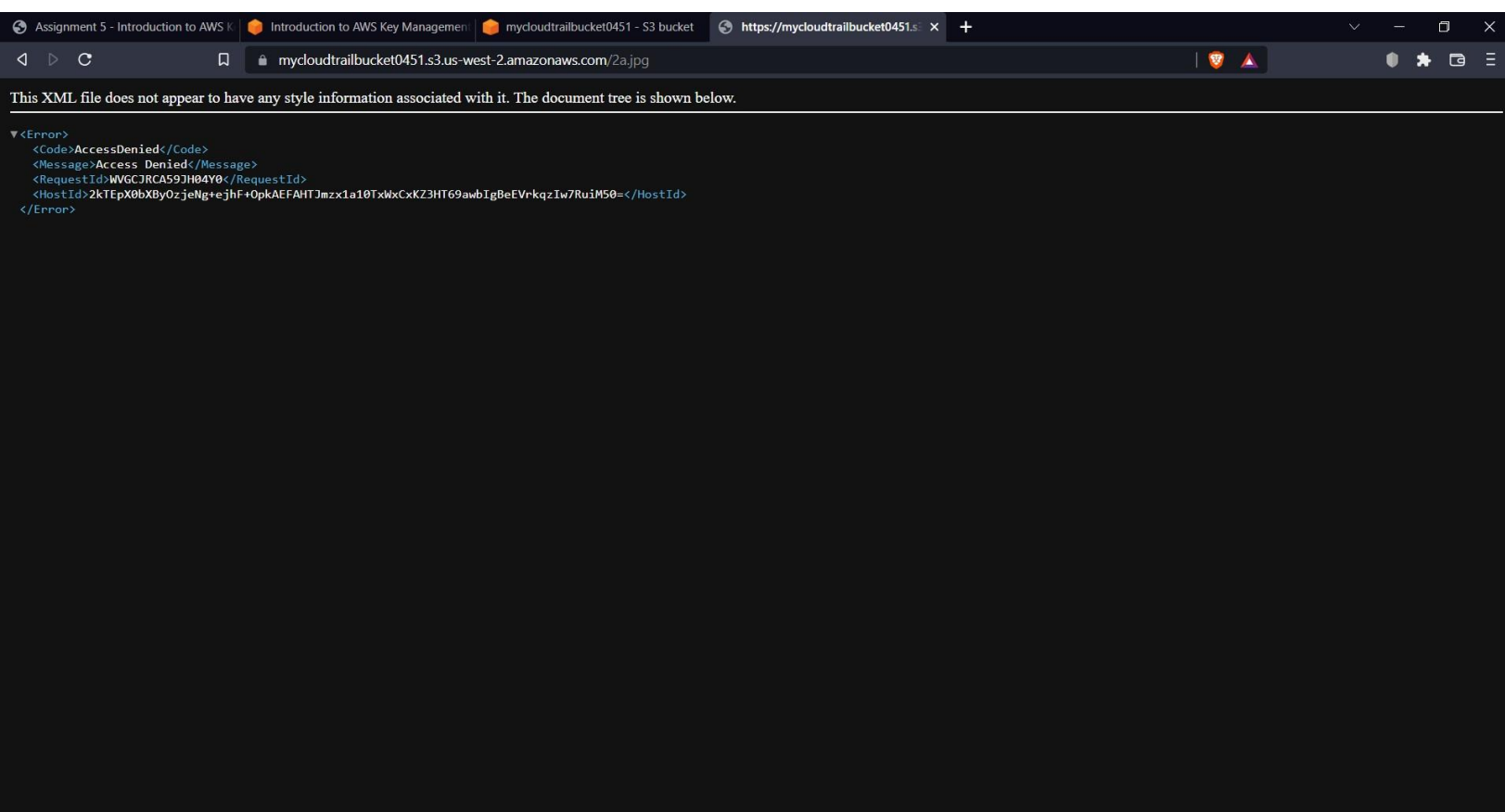
|                       | Name                                  | Home region      | Multi-region trail | Insights | Organization trail | S3 bucket                   | Log file prefix | CloudWatch Logs log group | Status  |
|-----------------------|---------------------------------------|------------------|--------------------|----------|--------------------|-----------------------------|-----------------|---------------------------|---------|
| <input type="radio"/> | pes2ug19cs451-trail                   | US West (Oregon) | Yes                | Enabled  | No                 | mycloudtrailbucket0451      |                 |                           | Logging |
| <input type="radio"/> | us-west-2-qltrail-lab-2481-1649837344 | US West (Oregon) | No                 | Disabled | No                 | qltrail-lab-2481-1649837344 |                 |                           | Logging |

**c. 3a.png: Showing the configured bucket named mycloudtrailbucketXXXX. where XXXX are the last 4 digits of your SRN. You can pad it with 0s if you have less than 4 digits.**

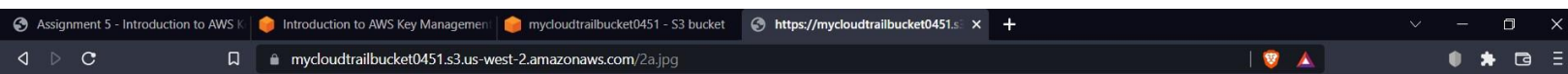
The screenshot shows the AWS S3 console for the bucket "mycloudtrailbucket0451". The "Objects" tab is selected, showing a list of objects:

|                          | Name     | Type   | Last modified                        | Size     | Storage class |
|--------------------------|----------|--------|--------------------------------------|----------|---------------|
| <input type="checkbox"/> | 1a.jpg   | jpg    | April 13, 2022, 13:51:47 (UTC+05:30) | 158.4 KB | Standard      |
| <input type="checkbox"/> | 2a.jpg   | jpg    | April 13, 2022, 13:53:54 (UTC+05:30) | 140.8 KB | Standard      |
| <input type="checkbox"/> | AWSLogs/ | Folder | -                                    | -        | -             |

d. 4a.png: Showing the “Access Denied” page when you open the link to the image stored in the bucket.



- e. 4b.png: Showing the “Requests specifying Server Side Encryption with AWS KMS managed keys require AWS Signature Version 4” page when you open the link to the image stored in the bucket.



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?xml version="1.0"?>
<Error>
  <Code>InvalidArgument</Code>
  <Message>Requests specifying Server Side Encryption with AWS KMS managed keys require AWS Signature Version 4.</Message>
  <ArgumentName>Authorization</ArgumentName>
  <ArgumentValue>null</ArgumentValue>
  <RequestId>CFQMKSSQSKVZ7JPR</RequestId>
  <HostId>Ovv8QVby1Hp1nkmHRSb+h2QPm0Y8jtpA91qMrS5cEK/ibY9YT8aXu89q86Me0oqYm6Dq7V4nNv8=</HostId>
</Error>
```

## f. 5a.png: Showing the key-id being present in the json we get from .gzip'ed cloud trail logs.

```
Assignment 5 - Introduction to AWS KMS Introduction to AWS Key Management mycloudtrailbucket0451 - S3 bucket https://mycloudtrailbucket0451.s3.us-west-2.amazonaws.com/AWSLogs/183471407884/CloudTrail/us-west-2/2022/04/13/183471407884.CloudTrail_u...
7418b3ae9c73", "readOnly": true, "resources":
[{"accountId": "183471407884", "type": "AWS::S3::Bucket", "ARN": "arn:aws:s3:::mycloudtrailbucket0451", "eventType": "AwsApiCall", "managementEvent": true, "recipientAccountId": "183471407884", "vpceEndpointId": "vpce-a0d039c9", "eventCategory": "Management", "tlsDetails": {"tlsVersion": "TLSv1.2", "cipherSuite": "ECDHE-RSA-AES128-GCM-SHA256", "clientProvidedHostHeader": "s3.us-west-2.amazonaws.com"}, {"eventVersion": "1.08", "userIdentity": {"type": "FederatedUser", "principalId": "183471407884:awsstudent", "arn": "arn:aws:sts:183471407884:Federated-user/awsstudent", "accountId": "183471407884", "accessKeyId": "ASIASVN57QMG2USV4XI", "sessionContext": {"sessionIssuer": {"type": "IAMUser", "principalId": "AIDAJDWLNSUKEUQXZT56A", "arn": "arn:aws:iam:183471407884:user/awsstudent", "accountId": "183471407884", "userName": "awsstudent", "webIdFederationData": {}, "attributes": {"creationDate": "2022-04-13T08:09:12Z", "mfaAuthenticated": "false"}}, "eventTime": "2022-04-13T08:22:43Z", "eventSource": "s3.amazonaws.com", "eventName": "ListAccessPoints", "awsRegion": "us-west-2", "sourceIPAddress": "106.197.214.216", "userAgent": "[S3Console/0.4, aws-internal/3 aws-sdk-java/1.11.1030 Linux/5.4.181-109.354.amzn2int.x86_64 OpenJDK_64-Bit_Server_VM/25.302-b08 java/1.8.0_302 vendor/Oracle_Corporation cfg/retry-mode/standard]", "requestParameters": {"bucket": "mycloudtrailbucket0451", "Host": "183471407884.s3-control.us-west-2.amazonaws.com", "maxResults": "1"}, "responseElements": null, "additionalEventData": {"SignatureVersion": "SigV4", "CipherSuite": "ECDHE-RSA-AES128-GCM-SHA256", "bytesTransferredIn": 0, "AuthenticationMethod": "AuthHeader", "x-amz-id-2": "uwuMjguF98WTHKFVD/Cy00huWN23WSPv0mtG/8zdc9HfMxrcrBGVsxd593dkZmnDryQ78ChqM=", "bytesTransferredOut": 72}, "requestID": "FXZEDTHTAEATS87", "eventID": "2350f8b3-967d-466c-8572-4964d4196e37", "readOnly": true, "resources": [{"accountId": "183471407884", "type": "AWS::KMS::Key", "ARN": "arn:aws:kms:us-west-2:183471407884:key/a6367724-fc19-4443-aa70-7249111ef2c8", "encryptionContext": {"aws:s3:arn": "arn:aws:s3:::mycloudtrailbucket0451/2a.jpg"}, "responseElements": null, "requestID": "91593b6c-c300-4e07-ad21-a12020db1290", "eventID": "03d61497-eb88-42a2-b785-0fe7dccc9861", "readOnly": true, "resources": [{"accountId": "183471407884", "type": "AWS::KMS::Key", "ARN": "arn:aws:kms:us-west-2:183471407884:key/a6367724-fc19-4443-aa70-7249111ef2c8", "eventType": "AwsApiCall", "managementEvent": true, "recipientAccountId": "183471407884", "eventCategory": "Management", "sessionCredentialFromConsole": "true"}, {"eventVersion": "1.08", "userIdentity": {"type": "FederatedUser", "principalId": "183471407884:awsstudent", "arn": "arn:aws:sts:183471407884:Federated-user/awsstudent", "accountId": "183471407884", "accessKeyId": "ASIASVN57QMG2USV4XI", "sessionContext": {"sessionIssuer": {"type": "IAMUser", "principalId": "AIDAJDWLNSUKEUQXZT56A", "arn": "arn:aws:iam:183471407884:user/awsstudent", "accountId": "183471407884", "userName": "awsstudent", "webIdFederationData": {"creationDate": "2022-04-13T08:09:12Z", "mfaAuthenticated": "false"}}, "eventTime": "2022-04-13T08:23:56Z", "eventSource": "s3.amazonaws.com", "eventName": "GetBucketVersioning", "awsRegion": "us-west-2", "sourceIPAddress": "106.197.214.216", "userAgent": "[S3Console/0.4, aws-internal/3 aws-sdk-java/1.11.1030 Linux/5.4.181-109.354.amzn2int.x86_64 OpenJDK_64-Bit_Server_VM/25.302-b08 java/1.8.0_302 vendor/Oracle_Corporation cfg/retry-mode/standard]", "requestParameters": {"bucketName": "mycloudtrailbucket0451", "Host": "s3.us-west-2.amazonaws.com", "versioning": ""}, "responseElements": null, "additionalEventData": {"SignatureVersion": "SigV4", "CipherSuite": "ECDHE-RSA-AES128-GCM-SHA256", "bytesTransferredIn": 0, "AuthenticationMethod": "AuthHeader", "x-amz-id-2": "pbNwF1U5Fx+9jEaTHf/ofag91cBlv1N44LHECmtvZ8aB8I8xtDxcG3wZBtVNI4lDdeqt/owE=", "bytesTransferredOut": 113}, "requestID": "S4SXGDSHDF5HQQFA", "eventID": "a49282fc-e58c-4436-948e-a8b6df121439", "readOnly": true, "resources": [{"accountId": "183471407884", "type": "AWS::S3::Bucket", "ARN": "arn:aws:s3:::mycloudtrailbucket0451", "eventType": "AwsApiCall", "managementEvent": true, "recipientAccountId": "183471407884", "vpceEndpointId": "vpce-a0d039c9", "eventCategory": "Management", "tlsDetails": {"tlsVersion": "TLSv1.2", "cipherSuite": "ECDHE-RSA-AES128-GCM-SHA256", "clientProvidedHostHeader": "s3.us-west-2.amazonaws.com"}, {"eventVersion": "1.08", "userIdentity": {"type": "FederatedUser", "principalId": "183471407884:awsstudent", "arn": "arn:aws:sts:183471407884:Federated-user/awsstudent", "accountId": "183471407884", "accessKeyId": "ASIASVN57QMG2USV4XI", "sessionContext": {"sessionIssuer": {"type": "IAMUser", "principalId": "AIDAJDWLNSUKEUQXZT56A", "arn": "arn:aws:iam:183471407884:user/awsstudent", "accountId": "183471407884", "userName": "awsstudent", "webIdFederationData": {"creationDate": "2022-04-13T08:09:12Z", "mfaAuthenticated": "false"}}, "eventTime": "2022-04-13T08:23:57Z", "eventSource": "s3.amazonaws.com", "eventName": "GetBucketOwnershipControls", "awsRegion": "us-west-2", "sourceIPAddress": "106.197.214.216", "userAgent": "[S3Console/0.4, aws-internal/3 aws-sdk-java/1.11.1030 Linux/5.4.181-109.354.amzn2int.x86_64 OpenJDK_64-Bit_Server_VM/25.302-b08 java/1.8.0_302 vendor/Oracle_Corporation cfg/retry-mode/standard]", "errorCode": "OwnershipControlsNotFound", "errorMessage": "The bucket ownership controls were not found", "requestParameters": {"ownershipControls": "", "bucketName": "mycloudtrailbucket0451", "Host": "s3.us-west-2.amazonaws.com", "responseElements": null, "additionalEventData": {"SignatureVersion": "SigV4", "CipherSuite": "ECDHE-RSA-AES128-GCM-SHA256", "bytesTransferredIn": 0, "AuthenticationMethod": "AuthHeader", "x-amz-id-2": "uId+dkE0LYB+29ct+GqQJdVqDIALuNI1M5j/E+wPa3/BuMfH61UB5t8LgxjwEtQ/ZiXlKy7WQ=", "bytesTransferredOut": 300}, "requestID": "8WQ048E275XFZGDA", "eventID": "2c6c318d-c13d-44a8-9240-283aa79c248d", "readOnly": true, "resources": [{"accountId": "183471407884", "type": "AWS::S3::Bucket", "ARN": "arn:aws:s3:::mycloudtrailbucket0451", "eventType": "AwsApiCall", "managementEvent": true, "recipientAccountId": "183471407884", "vpceEndpointId": "vpce-
```

**g. 6a.png: Showing the state of key users after the user has been removed.**

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Key Management Service (KMS)

AWS managed keys

Customer managed keys

Custom key stores

☐

Name

☐

awsstudent

Path

/

Type

User

Key deletion

☒ Allow key administrators to delete this key

Key users

The following IAM users and roles can use this key for cryptographic operations. They can also allow AWS services that are integrated with KMS to use the key on their behalf. [Learn more](#)

Add

Remove

🔍

< 1 >

☐

Name

Path

Type

Empty Resources

No resources to display

Other AWS accounts

Add other AWS accounts

Feedback

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**h. 6b.png: Showing the state of key users after the user has been added.**

The screenshot shows the AWS Key Management Service (KMS) console in the us-west-2 region. The left sidebar displays the 'Key Management Service (KMS)' menu with options for 'AWS managed keys', 'Customer managed keys' (highlighted in orange), and 'Custom key stores'. The main content area is titled 'Key deletion' and includes a checkbox 'Allow key administrators to delete this key' which is checked. Below this is the 'Key users' section, which states: 'The following IAM users and roles can use this key for cryptographic operations. They can also allow AWS services that are integrated with KMS to use the key on their behalf. [Learn more](#)'. The 'Add' button is highlighted with a red box. Below the 'Add' button is a search bar and a table with one user listed. The table has columns for 'Name', 'Path', and 'Type'. The user listed is 'awsstudent' with a path of '/' and type of 'User'. Below the table is the 'Other AWS accounts' section with an 'Add other AWS accounts' button. The footer of the console shows 'Feedback', '© 2022, Amazon Web Services, Inc. or its affiliates.', 'Privacy', 'Terms', and 'Cookie preferences'.

us-west-2.console.aws.amazon.com/kms/home?region=us-west-2#/kms/keys/a6367724-fc19-4443-aa70-7249111ef2c8

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Oregon awsstudent @ 1834-7140-7884

**Key Management Service (KMS)**

AWS managed keys  
**Customer managed keys**  
Custom key stores

**Key deletion**

☒ Allow key administrators to delete this key

**Key users**  
The following IAM users and roles can use this key for cryptographic operations. They can also allow AWS services that are integrated with KMS to use the key on their behalf. [Learn more](#)

**Add** Remove

Q

| <input type="checkbox"/> | Name       | Path | Type |
|--------------------------|------------|------|------|
| <input type="checkbox"/> | awsstudent | /    | User |

**Other AWS accounts**

Add other AWS accounts

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