

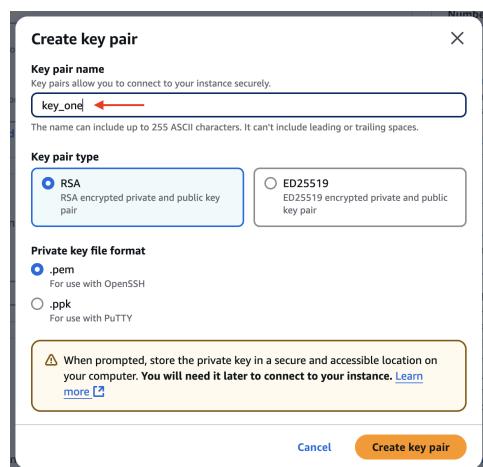
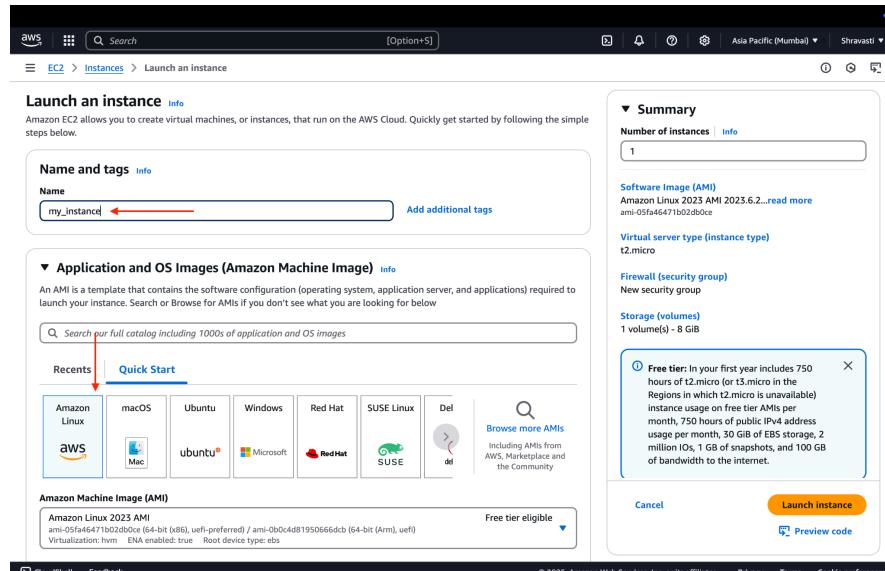
# CBE 321 Cloud Computing & Security

## SHRAVASTI OHOL 2022BCY0012

Encrypting a Volume, Creating Snapshot and Creating an EC2 instance from Snapshot

### 1. Creating an instance

- Name the instance (my\_instance)
- Assign an AMI (Amazon Linux)
- Create>Select a key pair (key\_one)
- Select a security group (default)



**EC2 > Instances > Launch an instance**

**Network settings**

- Network: vpc-007543eb92d582d02
- Subnet: No preference (Default subnet in any availability zone)
- Auto-assign public IP: Enabled
- Firewall (security groups): Create security group (radio button selected)
- Common security groups: Select security group (dropdown menu)
- Selected security group: default sg-000f28cce01d8879 (VPC: vpc-007543eb92d582d02)

**Configure storage**

- Root volume: 1x 8 GiB gp3 (Advanced settings: 3000 IOPS (Not encrypted))
- Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage.

**Summary**

- Number of instances: 1
- Software Image (AMI): Amazon Linux 2023 AMI 2023.6.2... (ami-05fe46471b02db0ce)
- Virtual server type (instance type): t2.micro
- Firewall (security group): default
- Storage (volumes): 1 volume(s) - 8 GiB

**Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.**

**Actions:** Cancel, Launch instance, Preview code

**Instances (1/1) Info**

Last updated: less than a minute ago

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
my_instance	i-0c3cf2a4a8526937b	Running	t2.micro	2/2 checks passed	<a href="#">View alarms</a>	ap-south-1b

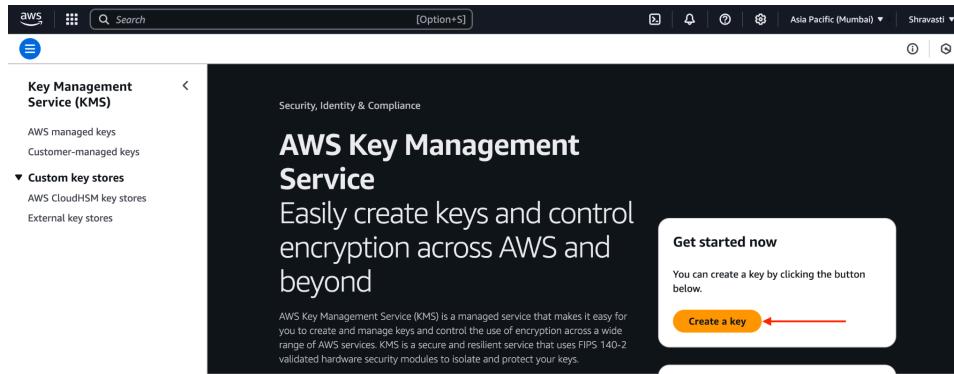
**Details**

**Instance summary**

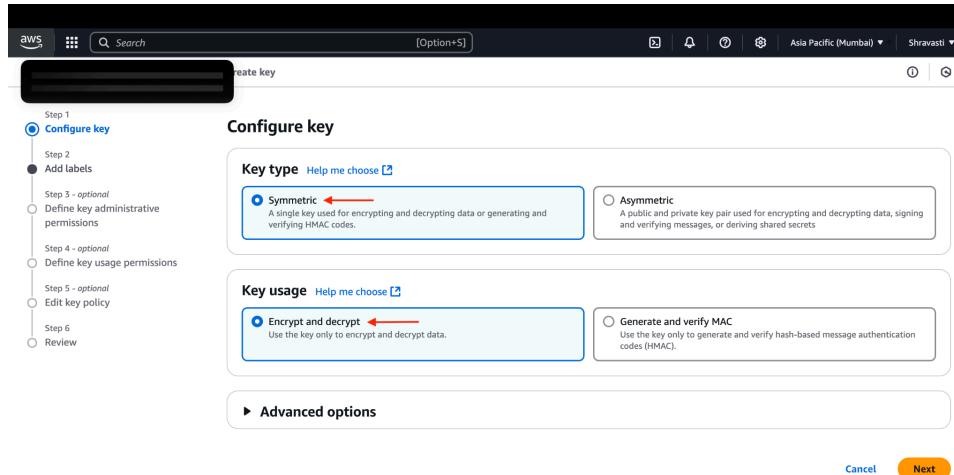
Instance ID: i-0c3cf2a4a8526937b	Public IPv4 address: 3.110.114.103   <a href="#">open address</a>	Private IPv4 addresses: 172.31.1.53
IPv6 address: -	Instance state: Running	Public IPv4 DNS: ec2-3-110-114-103.ap-south-1.compute.amazonaws.com   <a href="#">open address</a>
Hostname type: IP name: ip-172-51-1-53.ap-south-1.compute.internal	Private IP DNS name (IPv4 only): ip-172-51-1-53.ap-south-1.compute.internal	Elastic IP addresses: -
Answer private resource DNS name: IPv4 (A)	Instance type: t2.micro	

## 2. Creating a key using Key Management Service (KMS)

- Click on 'Create Key'



- Select key type as 'Symmetric' and key usage as 'Encrypt and Decrypt'



### c. Add key name (uno\_key)

**Add labels**

**Alias**  
You can change the alias at any time. Learn more [\[Link\]](#)

**Description - optional**  
You can change the description at any time.

**Tags - optional**  
You can use tags to categorise and identify your KMS keys and help you track your AWS costs. When you add tags to AWS resources, AWS generates a cost allocation report for each tag. Learn more [\[Link\]](#)

This key has no tags.

[Add tag](#)

You can add up to 50 more tags.

Cancel Skip to Review Previous Next

### d. Set the optional configurations as default and create the key

**Define key administrative permissions - optional**

**Key administrators (4)**  
Select the IAM users and roles authorised to manage this key via the KMS API. These administrators will be added to the key policy under the statement identifier (Sid) 'Allow administration of the key'. Modifying this Sid might impact the console's ability to update the administrator statement in the key policy. Learn more [\[Link\]](#)

Name	Path	Type
arithmetic_operation_mumbai-role-rksj...	/service-role/	Role
AWSServiceRoleForSupport	/aws-service-role/support.amazonaws.c...	Role
AWSServiceRoleForTrustedAdvisor	/aws-service-role/trustedadvisor.amazo...	Role
palindrome-role-g2u4lps0	/service-role/	Role

**Key deletion**

Allow key administrators to delete this key.

Cancel Skip to Review Previous Next

aws [Option+S] Asia Pacific (Mumbai) Shravasti

KMS > Customer-managed keys > Create key

Define key usage permissions - optional

**Key users (4)**

Select the IAM users and roles authorised to use this key in cryptographic operations. These users will be added to the key policy under the statement identifiers (Sid) 'Allow use of the key' and 'Allow attachment of persistent resources'. Modifying these Sids might impact the console's ability to update the user statements in the key policy. [Learn more](#)

Name	Path	Type
arithmetic_operation_mumbai-role-rksj...	/service-role/	Role
AWSServiceRoleForSupport	/aws-service-role/support.amazonaws.c...	Role
AWSServiceRoleForTrustedAdvisor	/aws-service-role/trustedadvisor.amazo...	Role
palindrome-role-g2u4lps0	/service-role/	Role

**Other AWS accounts**

Specify the AWS accounts that can use this key. Administrators of the accounts you specify are responsible for managing the permissions that allow their IAM users and roles to use this key. [Learn more](#)

Add another AWS account

Cancel Skip to Review Previous Next

CloudShell Feedback © 2025, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

aws [Option+S] Asia Pacific (Mumbai) Shravasti

KMS > Customer-managed keys > Create key

Edit key policy - optional

**Key policy**

Review the key policy statements for this key. To manually update this policy, select Edit. Modifying the statement identifiers (Sid) assigned in the previous steps might affect how the console displays updates to that statement.

```

1 {
2   "Id": "key-consolepolicy-3",
3   "Version": "2012-10-17",
4   "Statement": [
5     {
6       "Sid": "Enable IAM User Permissions",
7       "Effect": "Allow",
8       "Principal": {
9         "AWS": "arn:aws:iam::619071313125:root"
10      },
11      "Action": "kms:*",
12      "Resource": "*"
13    }
14  ]
15 }
```

Preview Edit

Cancel Previous Next

CloudShell Feedback © 2025, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Screenshot of the AWS KMS Customer-managed keys page.

The top navigation bar shows the AWS logo, search bar, and region selection (Asia Pacific (Mumbai)).

The left sidebar includes:

- Key Management Service (KMS)
- AWS managed keys
- Customer-managed keys** (selected)
- Custom key stores
  - AWS CloudHSM key stores
  - External key stores

The main content area displays a success message: "Success Your AWS KMS key was created with alias uno\_key and key ID 690be3a1-0de1-4d67-8904-2fbafea70a74." with a "View key" button.

The "Customer-managed keys (1)" section shows a table with one row:

	Aliases	Key ID	Status	Key type	Key spec	Key usage
<input type="checkbox"/>	<a href="#">uno_key</a>	690be3a1-0de1-4d67-8904-2fbafea70a74	Enabled	Symmetric	SYMMETRIC_... AES_256	Encrypt and decr...

Filtering options include: Filter keys by properties or tags, Key actions (dropdown), Create key (button), and pagination (1).

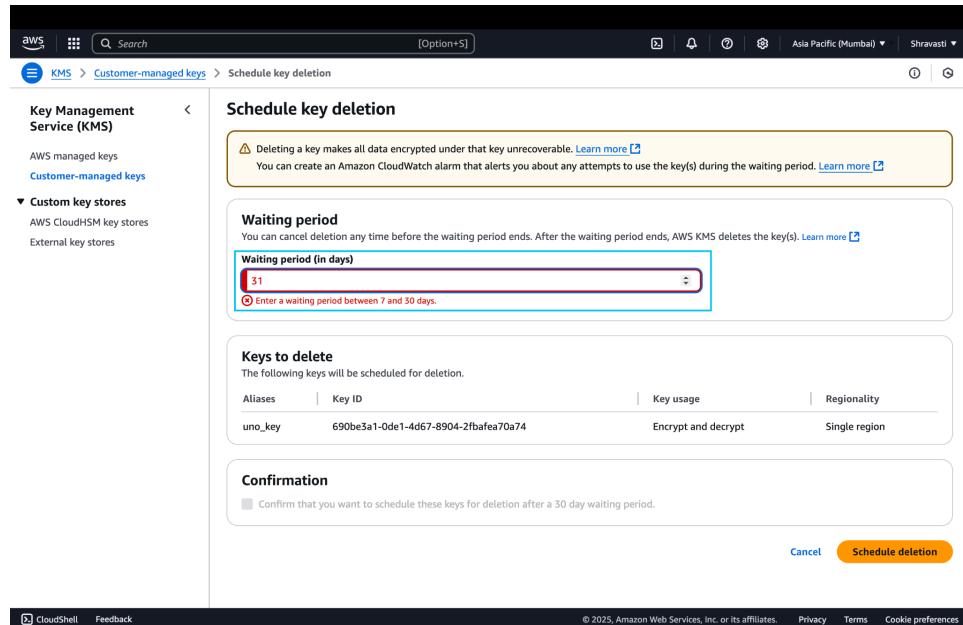
Page footer: CloudShell, Feedback, © 2025, Amazon Web Services, Inc. or its affiliates., Privacy, Terms, Cookie preferences.

### 3. Key Actions

#### a. Disabling a key

The screenshot shows the AWS KMS console interface. On the left, there's a navigation sidebar with 'Key Management Service (KMS)' selected. The main area displays a table titled 'Customer-managed keys (1/1)'. A single row is shown for a key named 'uno\_key' with the ID '690be3a1-0de1-4d67-8904-2fbafea70a74'. The status is 'Enabled'. A context menu is open over this row, with 'Disable' highlighted. Below this, a modal window titled 'Disable key' provides information about disabling the key and a link to create a CloudWatch alarm for monitoring. It also shows the key's alias 'uno\_key' and ID '690be3a1-0de1-4d67-8904-2fbafea70a74'. At the bottom of the modal, there's a checked checkbox for confirming the action and two buttons: 'Cancel' and 'Disable key'.

## b. Scheduling key deletion



The screenshot shows the 'Schedule key deletion' page in the AWS KMS console. On the left, there's a navigation sidebar with 'Key Management Service (KMS)' selected. Under 'Customer-managed keys', there are sections for 'AWS managed keys' and 'Custom key stores' (which includes 'AWS CloudHSM key stores' and 'External key stores'). The main content area is titled 'Schedule key deletion'. It contains a warning about deleting keys and creating CloudWatch alarms. A section for 'Waiting period' is shown, with a input field set to '31' days. Below this, a table lists a key: 'uno\_key' with '690be5a1-0de1-4d67-8904-2fbafea70a74' as its Key ID. The key usage is 'Encrypt and decrypt' and it is in 'Single region'. A 'Confirmation' section at the bottom has a checked checkbox for scheduling deletion after a 30-day period. At the bottom right are 'Cancel' and 'Schedule deletion' buttons.

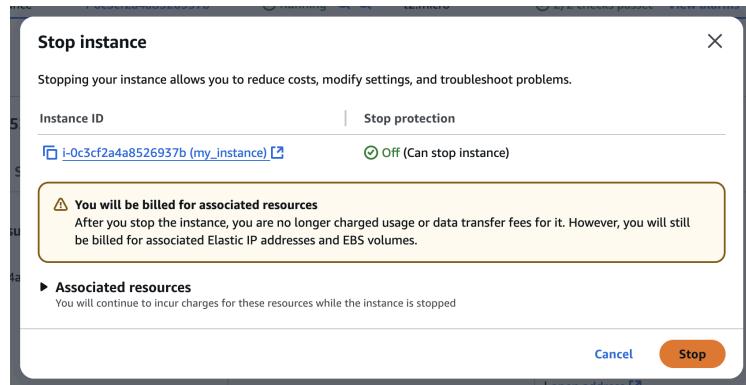
Minimum waiting period for key deletion is 30 days.

## 4. Stopping the instance

- Click on 'Instance Actions' and select 'Stop'

The screenshot shows the AWS EC2 Instances page. In the top navigation bar, there is a 'Actions' dropdown menu with a 'Stop instance' option highlighted by a red arrow. Below the navigation bar, a table lists one instance: 'my\_instance' (ID: i-0c3cf2a4a8526937b, State: Running). At the bottom of the page, there is a detailed view for 'my\_instance' showing its configuration and network details.

- Confirm the action



- Instance state will be changed to 'Stopped'

The screenshot shows the AWS EC2 Instances page again. The 'Instances' table now shows 'my\_instance' with a red box around the 'Instance state' column, which is now listed as 'Stopped'. The rest of the page remains the same, displaying the instance details and network configuration.

## 5. Detaching a volume

### a. Rename the volume as 'unencrypted volume'

The screenshot shows the AWS EC2 Volumes page. A modal window titled 'Edit Name' is open over a table of volumes. In the 'Name' field, the text 'un-encrypted\_volume' is entered. An arrow points from the text input field to the 'Save' button. The table below shows one volume entry:

Type	Size	IOPS	Throughput	Snapshot ID	Created
gp3	8 GiB	3000	125	snap-0beb1e9...	2025/01/

Volume ID: vol-0797a2f39807d8f73

Details Status checks Monitoring Tags

Volume ID: vol-0797a2f39807d8f73 Size: 8 GiB Type: gp3 Status check: Okay

Volume state: In-use IOPS: 3000 Throughput: 125

AWS Compute Optimizer finding: Opt-in to AWS Compute Optimizer for recommendations. [Learn more]

Fast snapshot restored: No Availability Zone: ap-south-1b Created: Wed Jan 29 2025 14:10:12 GMT+0530 (India Standard Time)

Attached resources: i-03cf2a4a8526937b (my\_instance); /dev/xvda (attached) Outposts ARN: - Managed: false Multi-Attach enabled: No

Source: Snapshot ID: snap-0beb1e90614d20fb5 Operator: -

### b. Click on 'Actions' and select 'Detach'

The screenshot shows the same AWS EC2 Volumes page as before, but now the 'Actions' dropdown menu is open. The 'Detach volume' option is highlighted with a red arrow. The table below shows the same volume entry as before.

Actions ▾ Create volume

Modify volume  
Create snapshot  
Create snapshot lifecycle policy  
Delete volume  
Attach volume  
**Detach volume** (highlighted)  
Force detach volume  
Manage auto-enabled I/O  
Manage tags  
Fault injection

Type	Size	IOPS	Throughput	Status check
gp3	8 GiB	3000	125	Okay

Volume ID: vol-0797a2f39807d8f73 (un-encrypted\_volume)

Details Status checks Monitoring Tags

Volume ID: vol-0797a2f39807d8f73 (un-encrypted\_volume) Size: 8 GiB Type: gp3 Status check: Okay

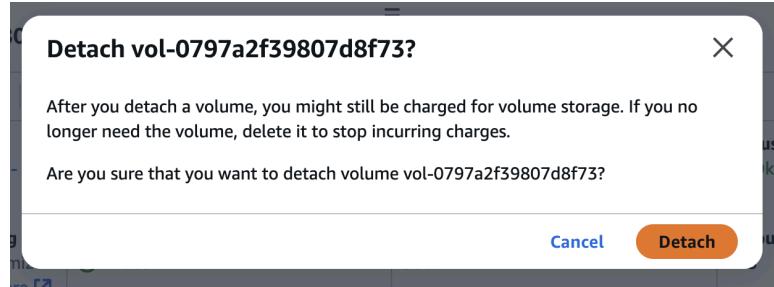
Volume state: In-use IOPS: 3000 Throughput: 125

AWS Compute Optimizer finding: Opt-in to AWS Compute Optimizer for recommendations. [Learn more]

Fast snapshot restored: No Availability Zone: ap-south-1b Created: Wed Jan 29 2025 14:10:12 GMT+0530 (India Standard Time)

Attached resources: i-03cf2a4a8526937b (my\_instance); /dev/xvda (attached) Outposts ARN: - Managed: false Multi-Attach enabled: No

Source: Snapshot ID: snap-0beb1e90614d20fb5 Operator: -



### c. Volume state will be changed to 'Available'

The screenshot shows the AWS CloudWatch Metrics Insights interface. At the top, there's a search bar with the query "aws.ec2.\* instance.\*". Below the search bar is a table with three columns: "Source", "Metric Name", and "Unit". The table data includes:

Source	Metric Name	Unit
aws.ec2.instances	Network In	bytes/second
aws.ec2.instances	Network Out	bytes/second
aws.ec2.instances	CPU Utilization	percentage
aws.ec2.instances	Memory Utilization	percentage

### d. Try to start the instance

The screenshot shows the AWS Lambda console. A modal dialog is open with the title "Start instance". It contains the text "Do you want to start the instance my\_instance?" and two buttons: "Stop instance" and "Start instance".

e. An error will occur since the instance has no volume attached to it

The screenshot shows the AWS EC2 Instances page. A red arrow points from the left margin to a prominent red error banner at the top. The banner contains the text: "Failed to start the instance i-0c3cf2a4a8526937b" and "invalid value 'i-0c3cf2a4a8526937b' for instanceid. Instance does not have a volume attached at root (/dev/xvda)". Below the banner, the main content area displays the following information:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
my_instance	i-0c3cf2a4a8526937b	Stopped	t2.micro	-	View alarms	ap-south-1b

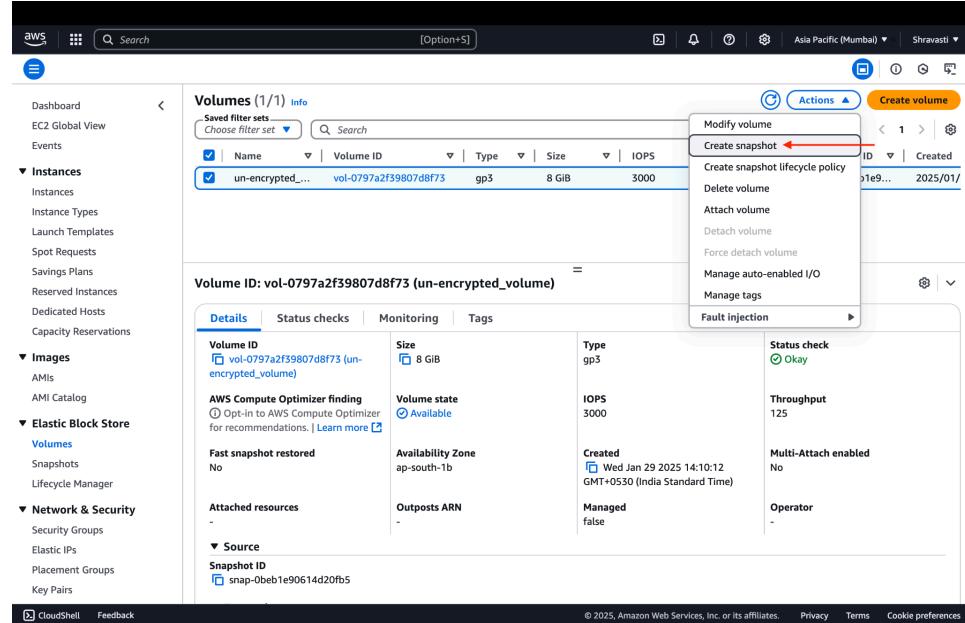
Below the table, there is a "Details" tab selected, showing the "Instance summary" section. The summary includes the following details:

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0c3cf2a4a8526937b	-	172.31.1.53
IPv6 address	Instance state	Public IPv4 DNS
-	Stopped	-
Hostname type	Private IP DNS name (IPv4 only)	Elastic IP addresses
IPV4 (A)	ip-172-31-1-53.ap-south-1.compute.internal	-
Answer private resource DNS name	Instance type	VPC ID
IPv4 (A)	t2.micro	vpc-007543eb92d582d02
Auto-assigned IP address		AWS Compute Optimizer finding
-		Opt-in to AWS Compute Optimizer

At the bottom of the page, there are links for "CloudShell" and "Feedback".

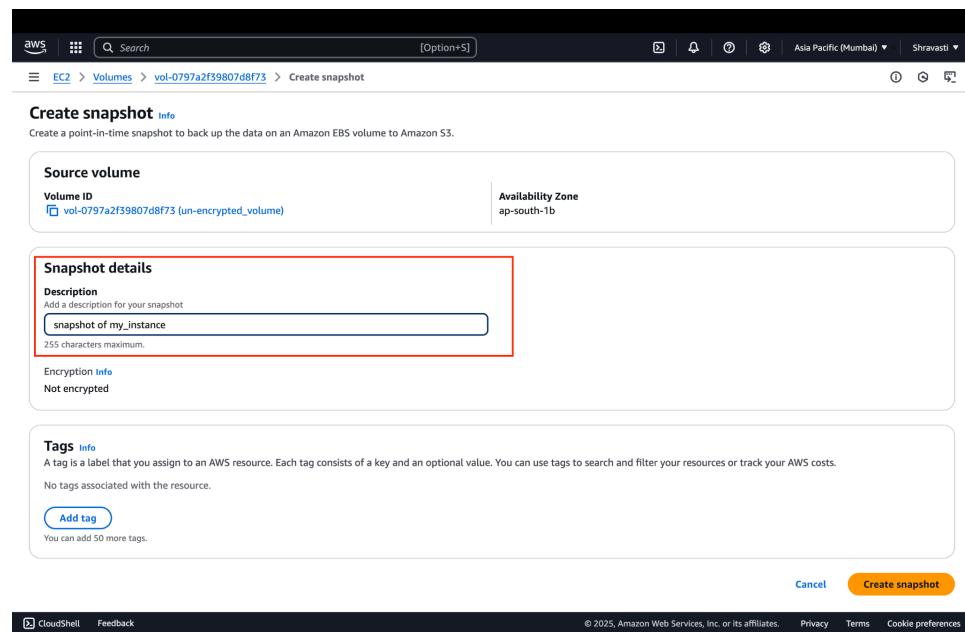
## 6. Creating a snapshot

- Go to 'Volumes' → Click on 'Actions' → Select 'Create Snapshot'



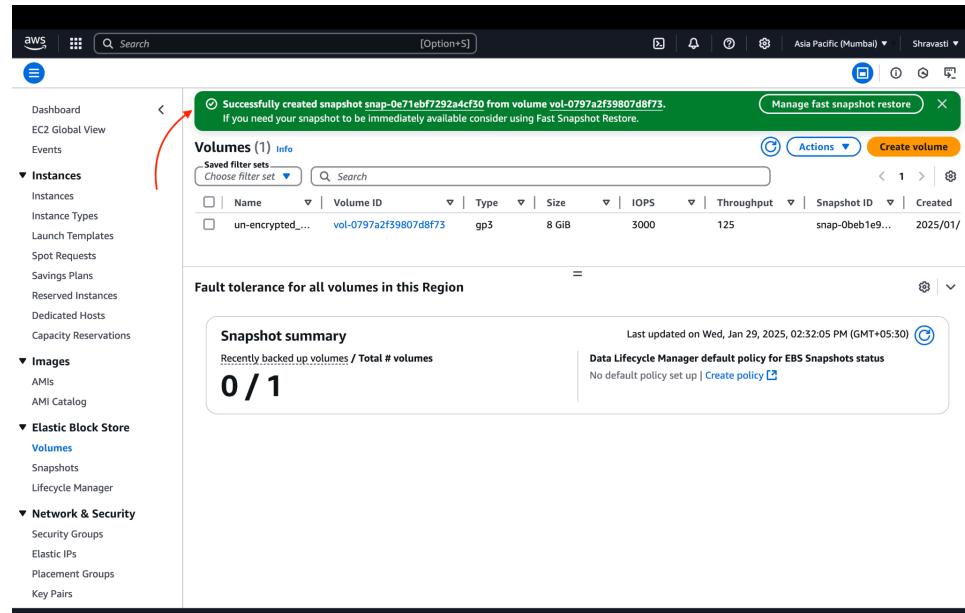
The screenshot shows the AWS EC2 Volumes page. On the left, there's a navigation sidebar with options like Dashboard, EC2 Global View, Events, Instances, Images, and various EC2 services. The main area shows a table of volumes. One volume is selected, and its details are shown in a modal below. The 'Actions' dropdown menu is open, and the 'Create snapshot' option is highlighted with a red arrow.

- Add the 'Snapshot details'



The screenshot shows the 'Create snapshot' wizard. It has three main sections: 'Source volume', 'Snapshot details', and 'Tags'. The 'Snapshot details' section is highlighted with a red box. It contains a 'Description' field with the value 'snapshot of my\_instance'. There are also sections for 'Encryption' (Info) and 'Tags' (Info). At the bottom, there are 'Cancel' and 'Create snapshot' buttons.

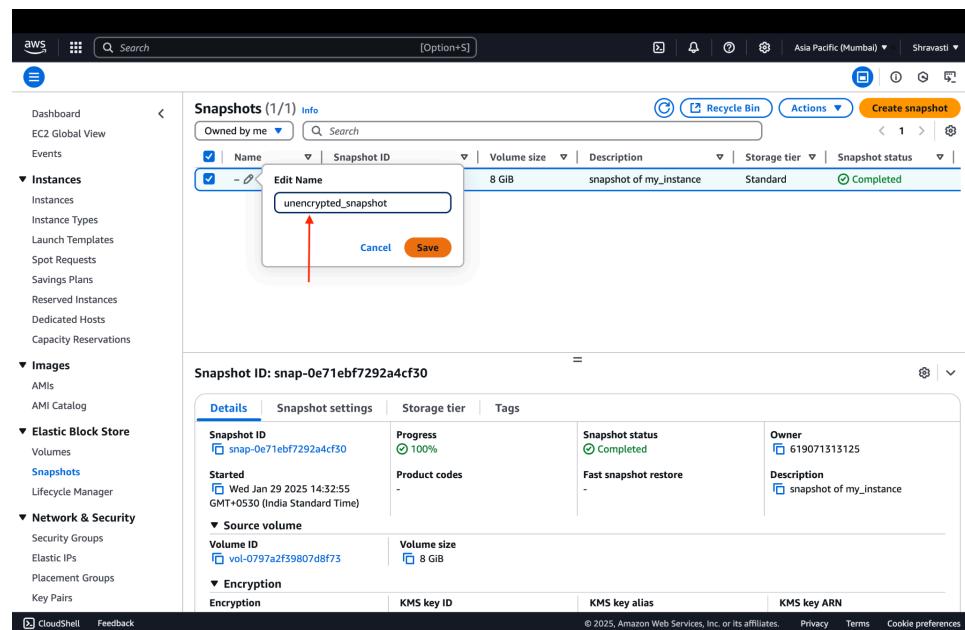
- c. Snapshot will be created; rename it to 'unencrypted snapshot'



The screenshot shows the AWS EBS Volumes page. A green success message at the top states: "Successfully created snapshot snap-0e71ebf7292a4cf30 from volume vol-0797a2f39807d8f73. If you need your snapshot to be immediately available consider using Fast Snapshot Restore." Below the message, there is a table titled "Volumes (1) Info" with one row. The row contains the following information:

Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot ID	Created
un-encrypted_...	vol-0797a2f39807d8f73	gp3	8 GiB	3000	125	snap-0beb1e9...	2025/01/

Below the table, a section titled "Fault tolerance for all volumes in this Region" displays a "Snapshot summary" with the text "0 / 1".

The screenshot shows the AWS EBS Snapshots page. It displays a table titled "Snapshots (1/1) Info" with one row. The row contains the following information:

Name	Snapshot ID	Volume size	Description	Storage tier	Snapshot status
<input checked="" type="checkbox"/> unencrypted_snapshot	snap-0e71ebf7292a4cf30	8 GiB	snapshot of my_instance	Standard	Completed

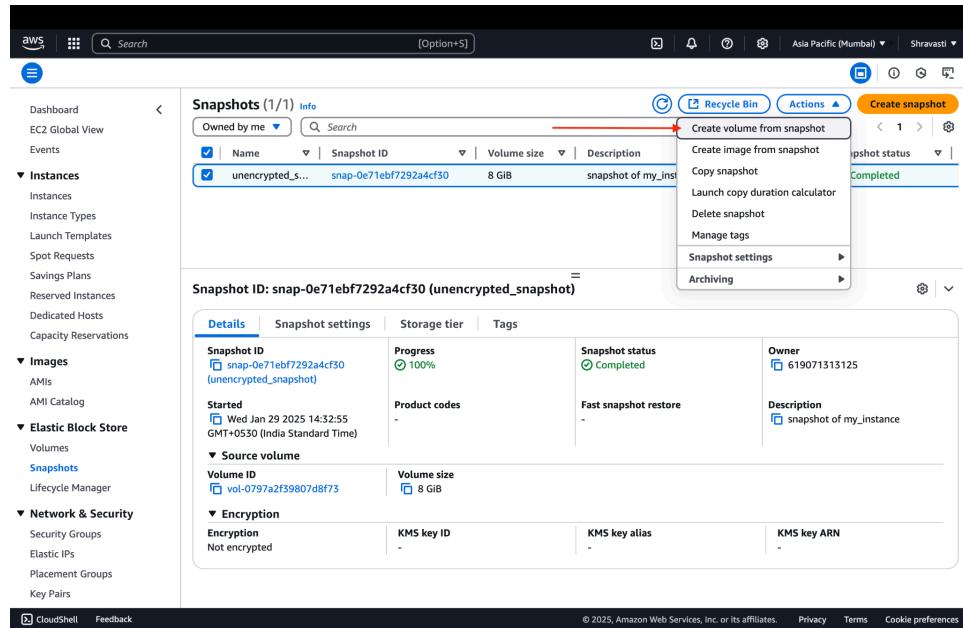
A modal window titled "Edit Name" is open over the table, showing the current name "unencrypted\_snapshot" in an input field. Below the input field are "Cancel" and "Save" buttons. A red arrow points from the "Edit Name" input field to the "Save" button.

Below the table, a detailed view for the snapshot is shown with the ID "Snapshot ID: snap-0e71ebf7292a4cf30". The details include:

- Details:**
  - Snapshot ID: snap-0e71ebf7292a4cf30
  - Progress: 100%
  - Started: Wed Jan 29 2025 14:32:55 GMT+0530 (India Standard Time)
  - Source volume: Volume ID vol-0797a2f39807d8f73
  - Encryption: Encryption
- Snapshot settings:**
  - Product codes: -
  - Fast snapshot restore: -
- Storage tier:**
  - Snapshot status: Completed
  - Owner: 619071313125
  - Description: snapshot of my\_instance
- Tags:** (empty)

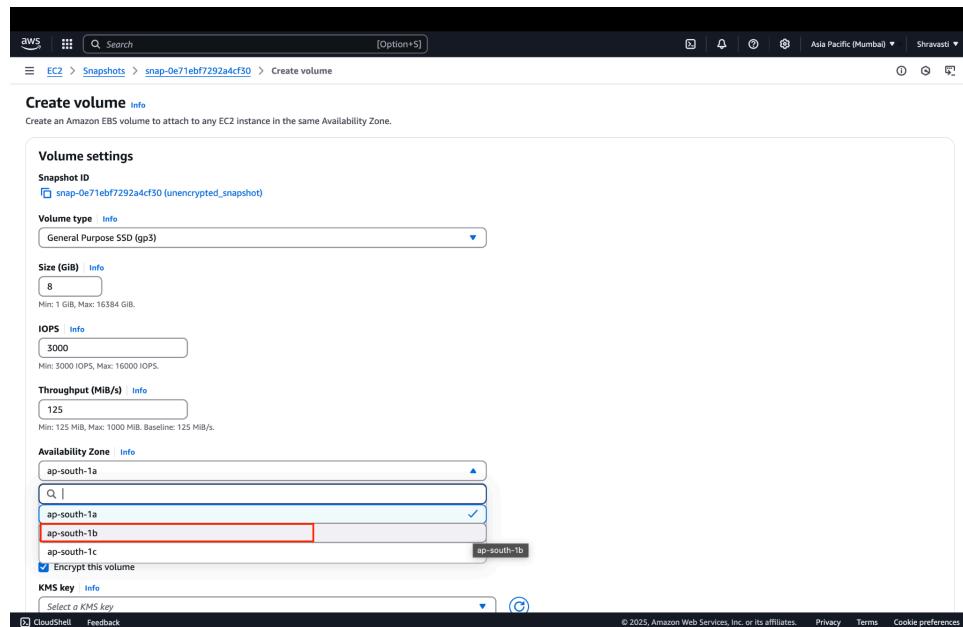
## 7. Creating a volume from a snapshot

- Go to 'Snapshots' → Create volume from snapshot



The screenshot shows the AWS Snapshots page with one snapshot listed. The snapshot is titled "unencrypted\_snapshot" and has a size of 8 GiB. A context menu is open over this snapshot, with the "Create volume from snapshot" option highlighted in red. Other options in the menu include "Create image from snapshot", "Copy snapshot", "Launch copy duration calculator", "Delete snapshot", "Manage tags", "Snapshot settings", and "Archiving".

- Make sure the availability zone of the volume being created is same as the availability zone of the EC2 instance



The screenshot shows the "Create volume" wizard. In the "Availability Zone" step, the "ap-south-1a" zone is selected. The "ap-south-1b" zone is also listed in the dropdown and is highlighted with a red box. Other options like "ap-south-1c" and "ap-south-1d" are also visible. A checkbox for "Encrypt this volume" is checked. At the bottom, there are buttons for "Select a KMS key", "CloudShell", and "Feedback".

### c. Select a KMS key

The screenshot shows the 'Create volume' wizard in the AWS EC2 console. The 'Encryption' section is active, with the 'Encrypt this volume' checkbox checked. Below it, a dropdown menu titled 'Select a KMS key' shows '(default) aws/ebs' and 'uno\_key'. A red arrow points to the 'uno\_key' option. The 'Snapshot summary' section below includes a note about backup information and a 'Create volume' button at the bottom right.

### d. Volume will be created successfully

The screenshot shows the AWS EC2 dashboard. On the left is a navigation sidebar with links like Dashboard, EC2 Global View, Events, Instances, Images, Elastic Block Store, Network & Security, and more. The main area shows a table titled 'Snapshots (1)'. A green success message at the top left reads 'Successfully created volume vol-0486801e6c6909373.' A red arrow points from this message to the 'Snapshots' table. The table has columns for Name, Snapshot ID, Volume size, Description, Storage tier, and Snapshot status. One entry is listed: 'unencrypted\_s...' with Snapshot ID 'snap-0e71ebf7292a4cf30', Volume size '8 GiB', Description 'snapshot of my\_instance', Storage tier 'Standard', and Snapshot status 'Completed'. At the bottom of the table, a message says 'Select a snapshot above.'

e. Rename the volume as 'encrypted volume'

The screenshot shows the AWS EBS Volumes page with one volume listed:

Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot ID	Created
un-encrypted...	vol-0797a2f39807d8f73	gp3	8 GiB	3000	125	snap-0be81e9...	2025/01/

A modal dialog is open over the volume details, titled "Edit Name". The input field contains "encrypted\_volume". A red arrow points from the text "Renaming volume" in the question above to this input field.

Below the modal, the volume details are shown again:

Volume ID	Volume state	IOPS	Throughput
-	Available	3000	125

Other volume metadata includes:

- AWS Compute Optimizer finding: Opt-in to AWS Compute Optimizer for recommendations.
- Fast snapshot restored: No.
- Attached resources: -
- Availability Zone: ap-south-1b
- Outposts ARN: -
- Created: Wed Jan 29 2025 14:38:53 GMT+0530 (India Standard Time)
- Managed: false
- Multi-Attach enabled: No
- Operator: -

Source information:

Snapshot ID
snap-0e71ebf7292a4cf30

Encryption details:

Encryption	KMS key ID	KMS key alias	KMS key ARN
Encrypted	690be3a1-0de1-4d67-8904-2fbafea70a74	uno_key	arn:aws:kms:ap-south-1:619071313125:key/690be3a1-0de1-4d67-8904-2fbafea70a74

## 8. Attaching a volume to an EC2 instance

### a. Go to 'Volumes' → Attach volume

The screenshot shows the AWS Volumes page with two volumes listed: 'un-encrypted...' and 'encrypted\_vol...'. The 'Actions' menu for the selected 'encrypted\_vol...' volume includes the 'Attach volume' option, which is highlighted with a red arrow.

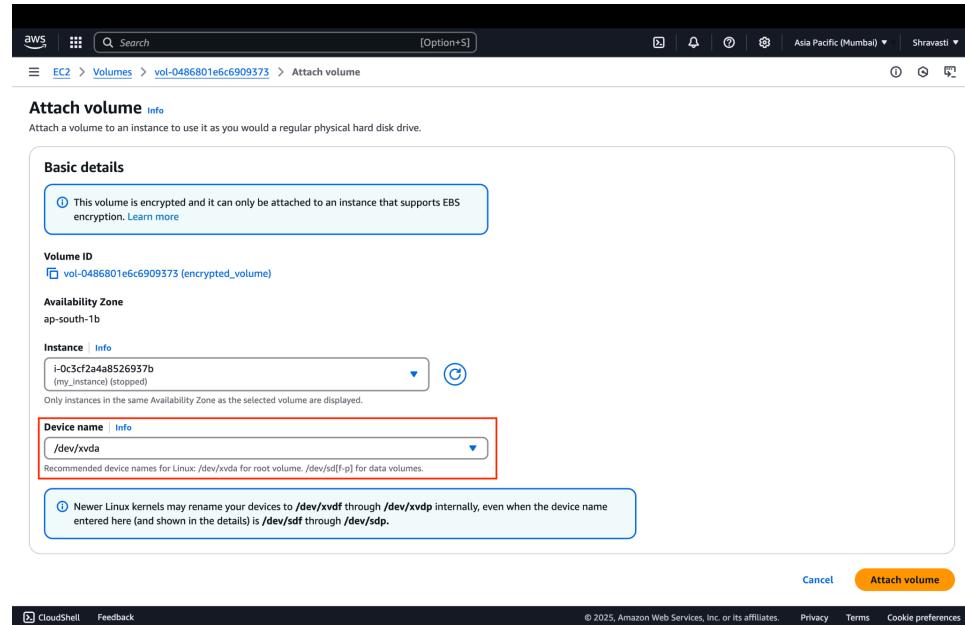
Name	Volume ID	Type	Size	IOPS
un-encrypted...	vol-0797a2f39807d8f73	gp3	8 GiB	3000
encrypted_vol...	vol-0486801e6c6909373	gp3	8 GiB	3000

Volume ID: vol-0486801e6c6909373 (encrypted\_volume)

AWS Compute Optimizer finding	Volume state	IOPS	
Opt-in to AWS Compute Optimizer for recommendations. <a href="#">Learn more</a>	Available	3000	
Fast snapshot restored	Availability Zone	Created	
No	ap-south-1b	Wed Jan 29 2025 14:38:53 GMT+0530 (India Standard Time)	
Attached resources	Outposts ARN	Managed	
-	-	false	
Source	Multi-Attach enabled		
Snapshot ID	No		
<a href="#">snap-0e71ebf7292a4cf50</a>			
Encryption	KMS key ID	KMS key alias	KMS key ARN
Encrypted	690be3a1-0de1-4d67-8904-2fbafea70a74	uno_key	arn:aws:kms:ap-south-1:619071313125:key/690be3a1-0de1-4d67-8904-2fbafea70a74

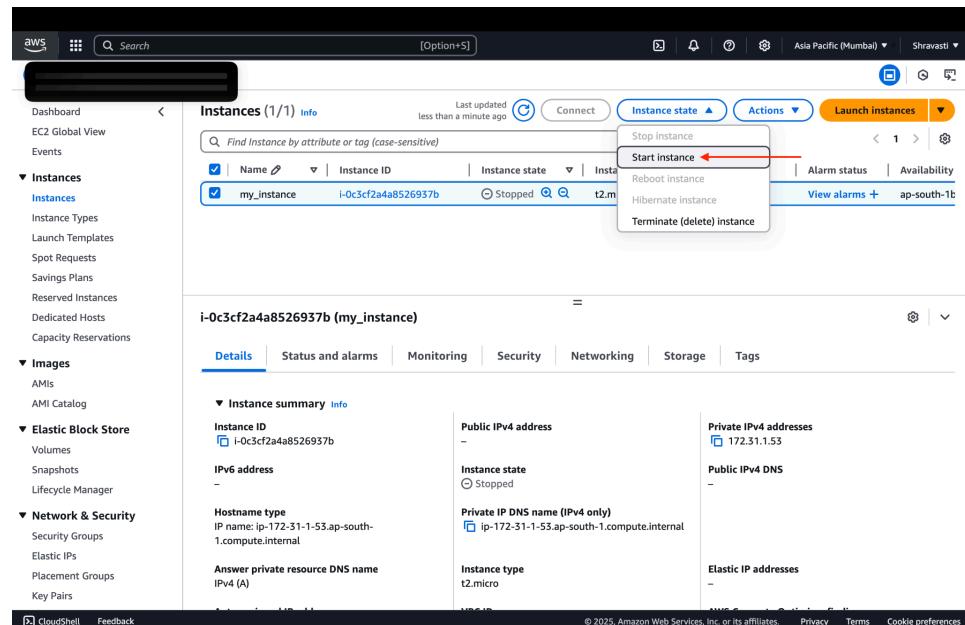
### b. Add instance name and device name

The screenshot shows the 'Attach volume' wizard. In the 'Basic details' step, a note states: 'This volume is encrypted and it can only be attached to an instance that supports EBS encryption.' The 'Volume ID' is set to 'vol-0486801e6c6909373 (encrypted\_volume)'. The 'Availability Zone' is 'ap-south-1b'. In the 'Instance' dropdown, the selected instance is 'i-03cf2a4a8526937b (my\_instance) (stopped)'. The 'Attach volume' button is at the bottom right.



c. Click on 'Attach volume' to finish

d. Go to 'Instances' → 'Instance state' → Start instance



## e. Instance will be started successfully

The screenshot shows the AWS EC2 Instances page. A green success message at the top left reads "Successfully initiated starting of i-0c3cf2a4a8526937b". The main table lists one instance: "my\_instance" (i-0c3cf2a4a8526937b), which is currently "Pending". The instance type is "t2.micro". The status check and alarm status are both "-". The availability zone is "ap-south-1c". The navigation sidebar on the left includes sections for Dashboard, EC2 Global View, Events, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images (AMIs, AMI Catalog), Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), Network & Security (Security Groups, Elastic IPs, Placement Groups, Key Pairs), and Compute (Lambda, Step Functions). The bottom of the page includes links for CloudShell, Feedback, and various AWS terms like © 2025, Amazon Web Services, Inc. or its affiliates, Privacy, and Terms.