

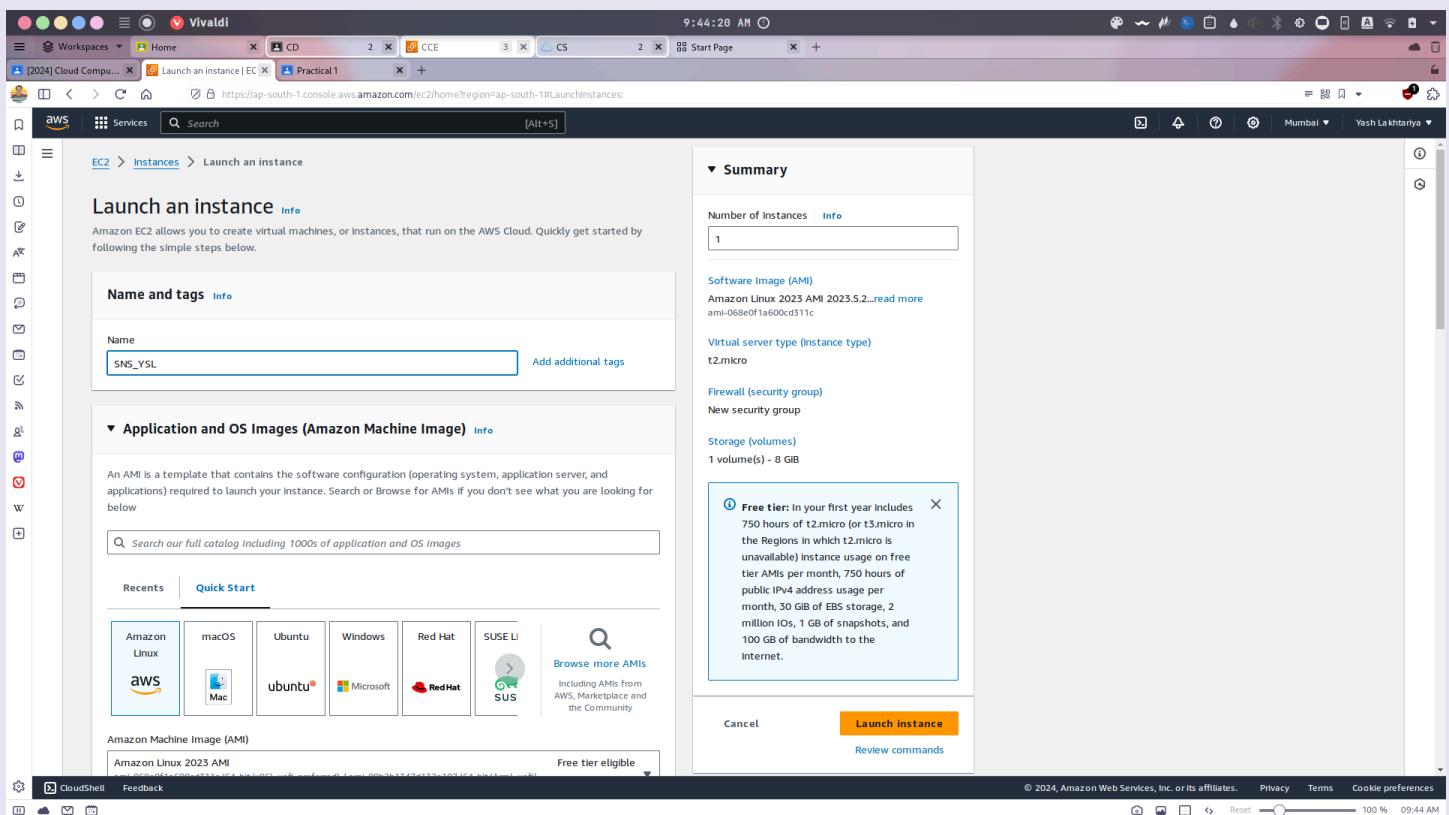
Name - Yash Lakhtariya
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Branch - CBA Batch - 71
CCE Practical 1

Scenario : Bob is an IT Administrator of SNS group Pvt limited is organized and wants to be adopted as Infrastructure as a Service (IAAS) using AWS cloud solution. Their majority of clients are e-commerce and OTP service providers. Initially, they want to set up three virtual Linux servers using Amazon EC2 which can be resizable and provide compute capacity along with a web-scale cloud computing solution. Bob is planning to create IAAS as below for E-Commerce clients.

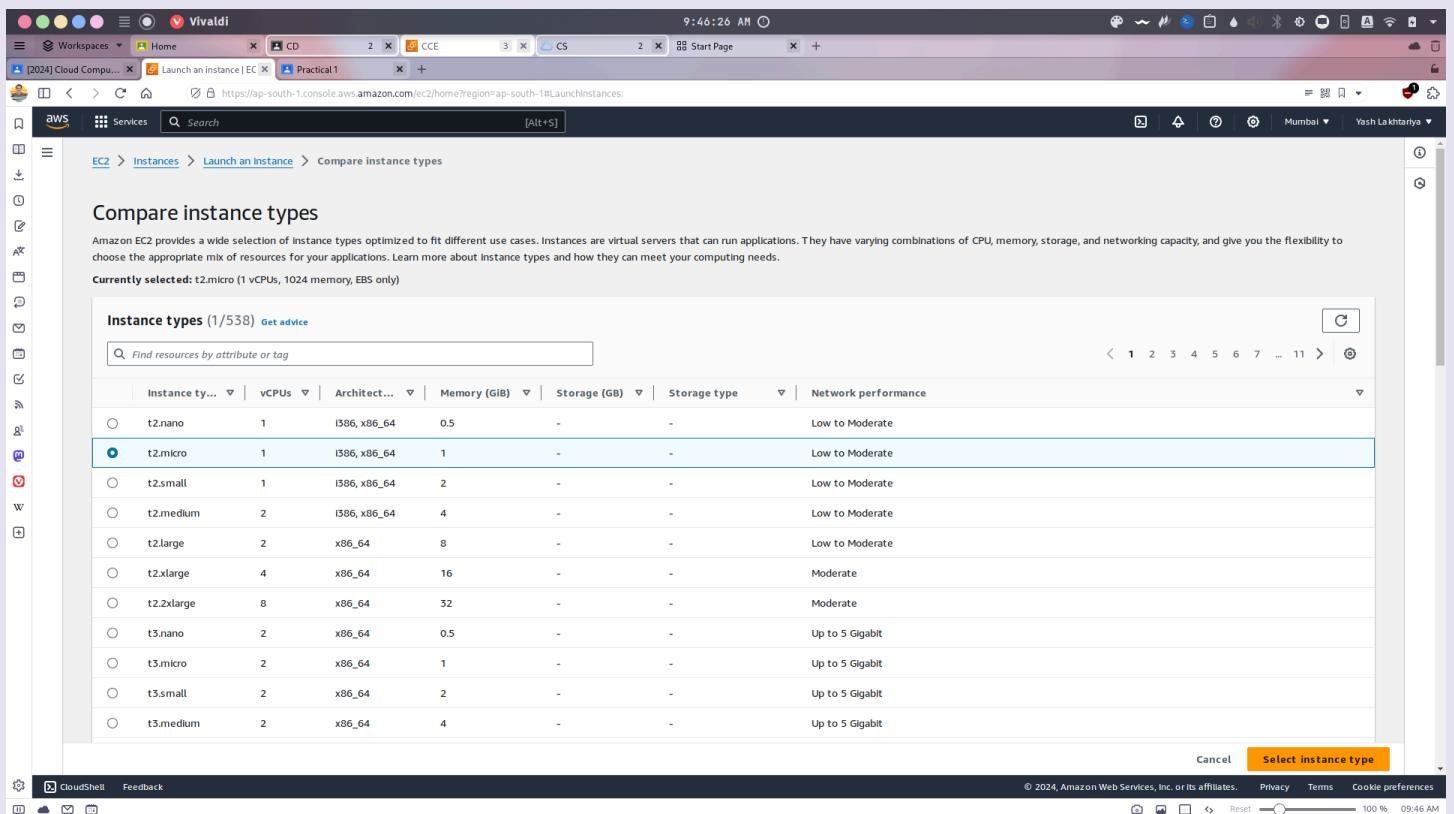
You are required to provide the solution Bob with proper step by step demonstration.

Consider the following attached scenario and perform the following tasks using AWS EC2 Service :

- Launch a web server with termination protection enabled

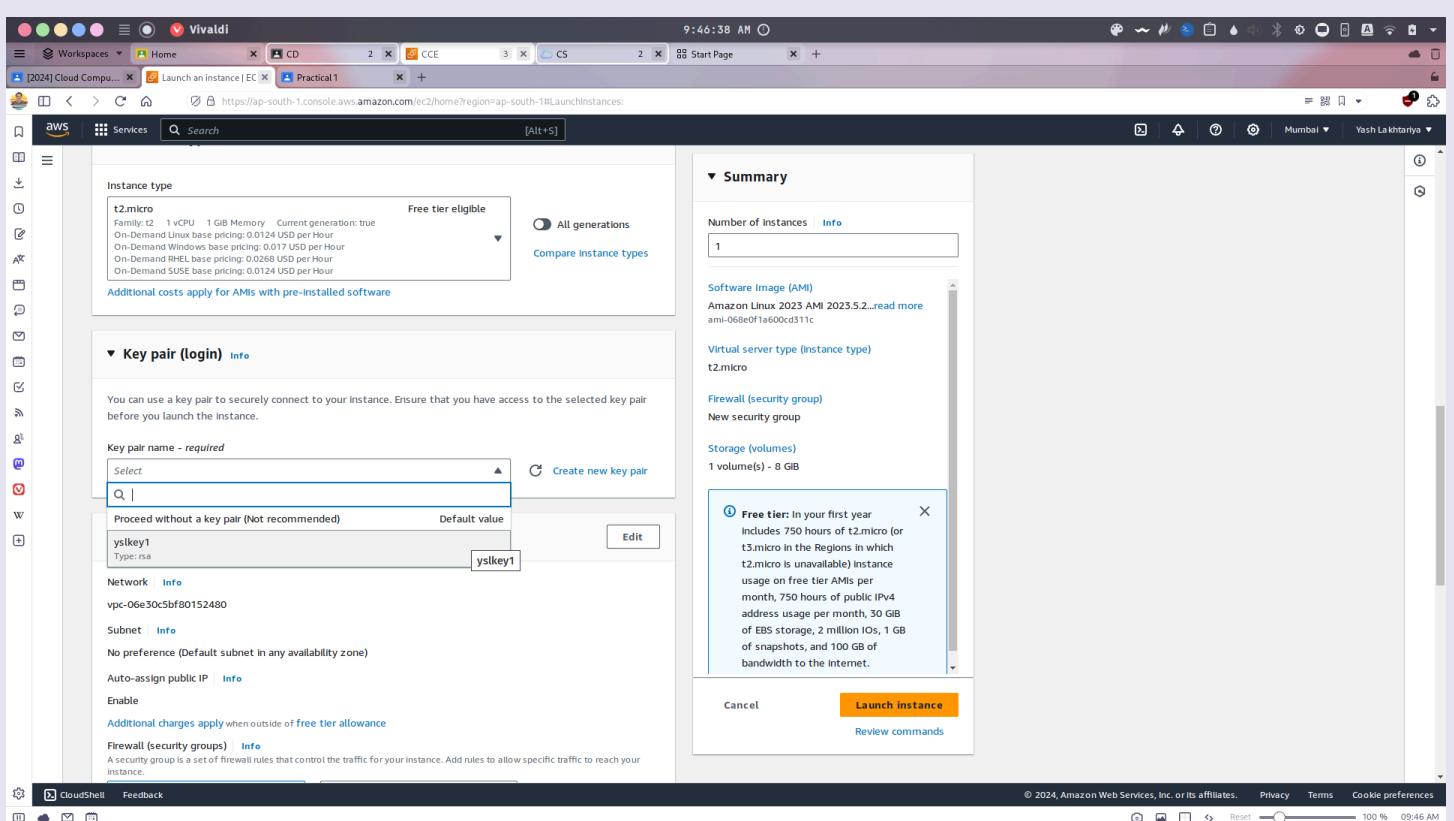


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The screenshot shows the AWS EC2 Instances > Launch an Instance > Compare instance types page. It displays a table of 1538 instance types, with the t2.micro type selected. The table includes columns for Instance type, vCPUs, Architecture, Memory (GiB), Storage (GB), Storage type, and Network performance.

Instance type	vCPUs	Architecture	Memory (GiB)	Storage (GB)	Storage type	Network performance
t2.nano	1	i386, x86_64	0.5	-	-	Low to Moderate
t2.micro	1	i386, x86_64	1	-	-	Low to Moderate
t2.small	1	i386, x86_64	2	-	-	Low to Moderate
t2.medium	2	i386, x86_64	4	-	-	Low to Moderate
t2.large	2	x86_64	8	-	-	Low to Moderate
t2.xlarge	4	x86_64	16	-	-	Moderate
t2.2xlarge	8	x86_64	32	-	-	Moderate
t3.nano	2	x86_64	0.5	-	-	Up to 5 Gigabit
t3.micro	2	x86_64	1	-	-	Up to 5 Gigabit
t3.small	2	x86_64	2	-	-	Up to 5 Gigabit
t3.medium	2	x86_64	4	-	-	Up to 5 Gigabit



The screenshot shows the AWS EC2 Launch instance page. The instance type is set to t2.micro. The configuration includes:

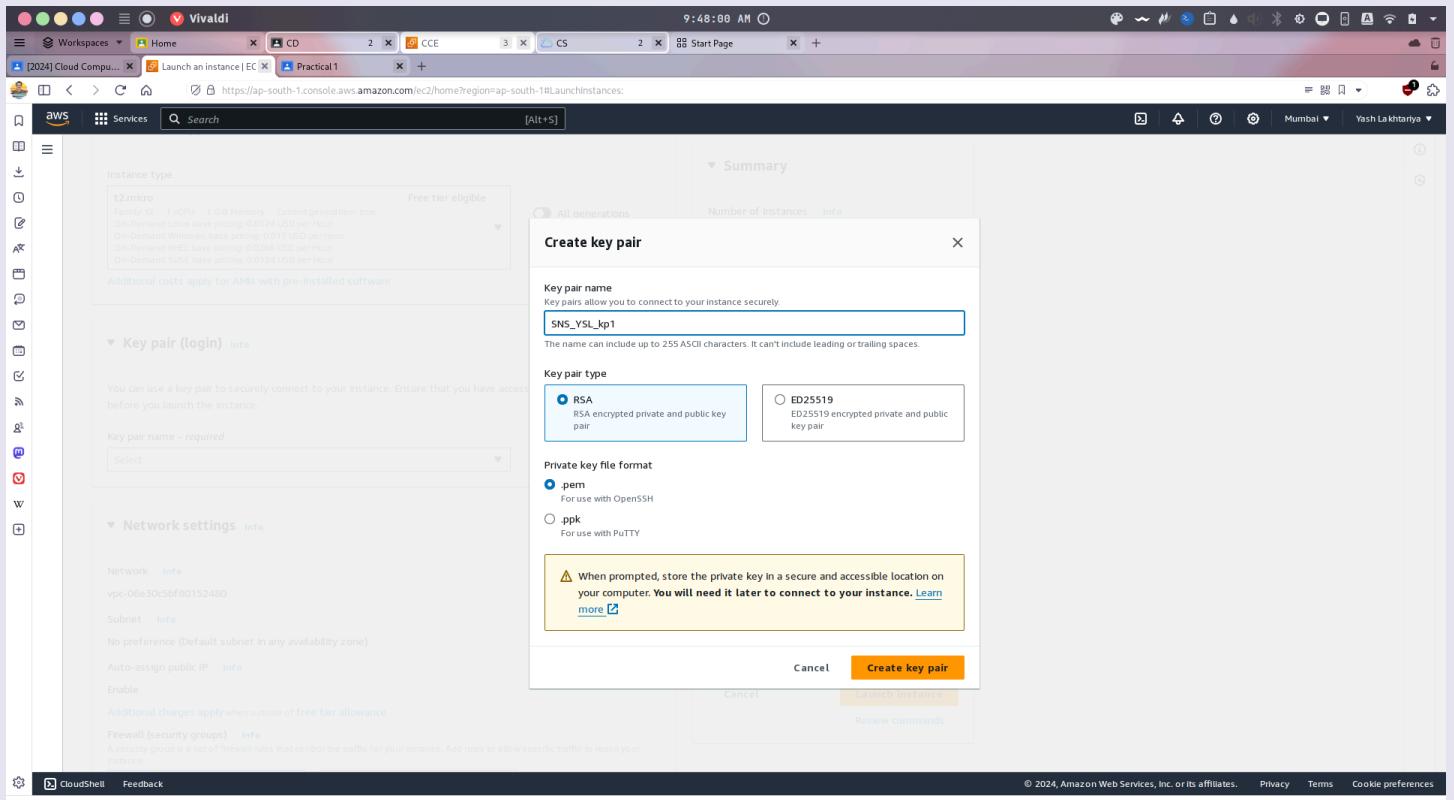
- Key pair (login):** yskey1 (rsa)
- Network:** vpc-06e30c5bf80152480
- Subnet:** No preference (Default subnet in any availability zone)
- Auto-assign public IP:** Enabled
- Firewall (security groups):** New security group

The **Summary** panel shows:

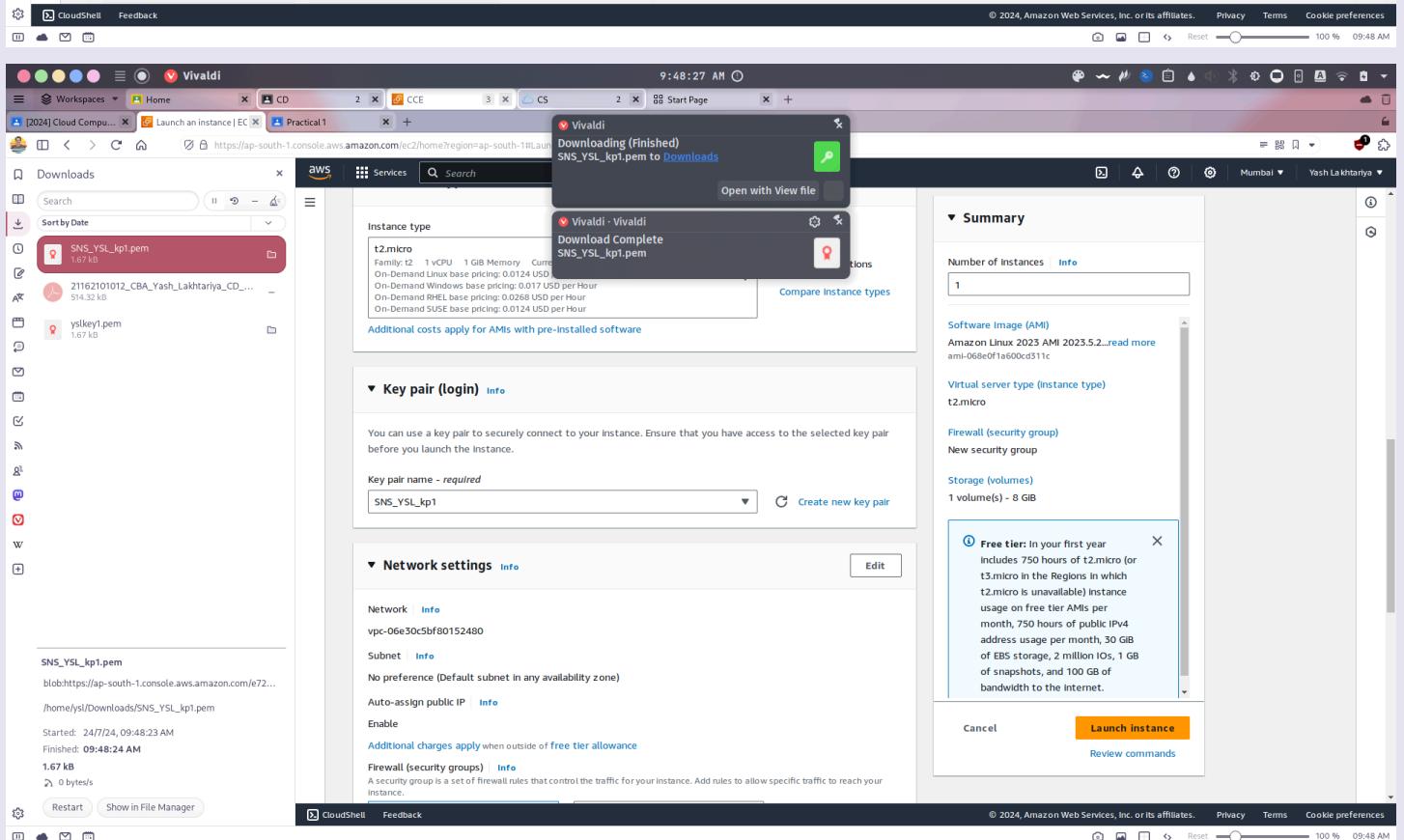
- Number of instances: 1
- Software Image (AMI): Amazon Linux 2023 AMI 2023.5.2... (read more)
- Virtual server type (Instance type): t2.micro
- Firewall (security group): New security group
- Storage (volumes): 1 volume(s) - 8 GB

A **Free tier** information box is displayed, stating: "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, 50 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the Internet."

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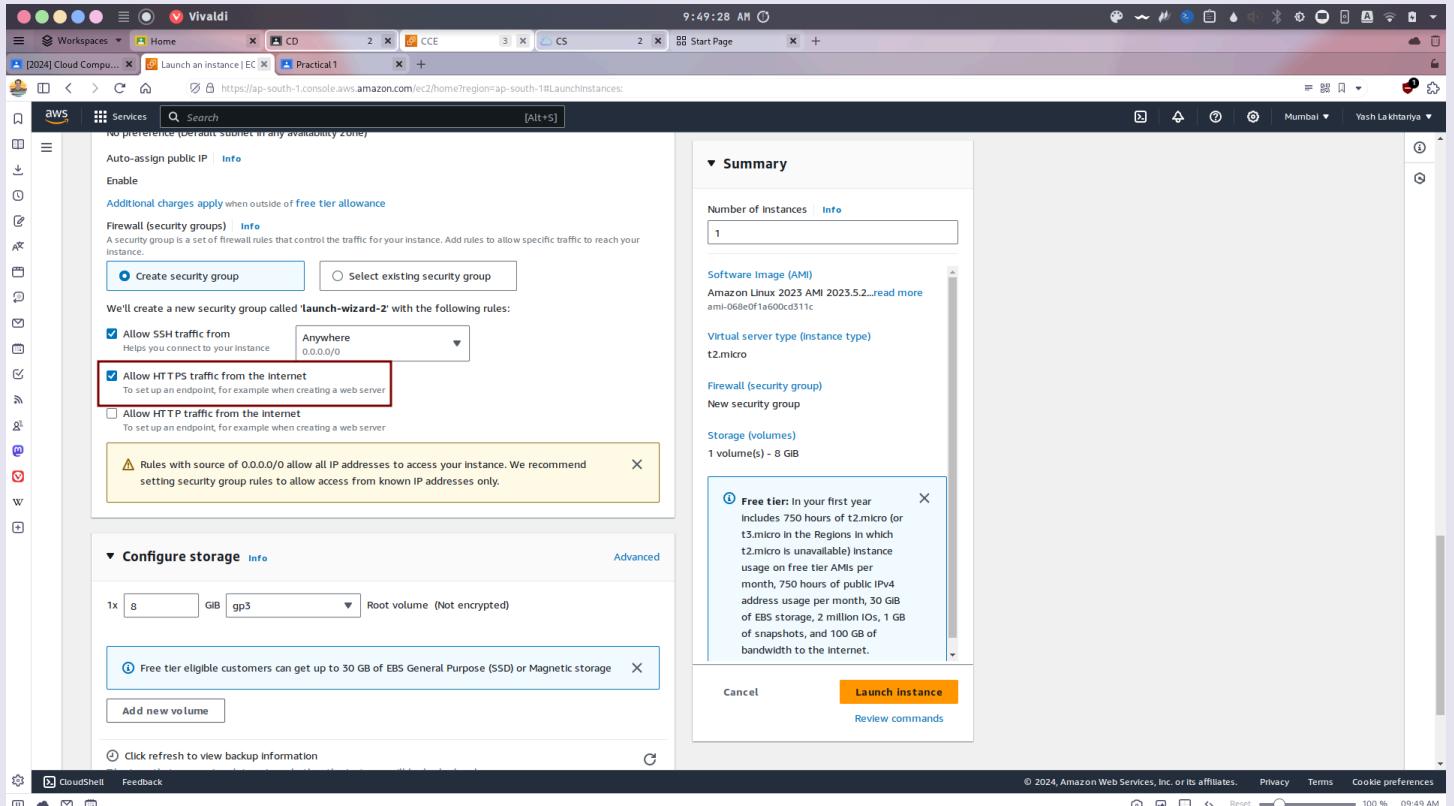


The screenshot shows the AWS Cloud9 interface with multiple tabs open. The active tab is 'Launch an instance | EC' under the 'Practical 1' workspace. A modal window titled 'Create key pair' is open, prompting for a key pair name ('SNS_YSL_kp1') and type ('RSA'). It also specifies a private key file format ('.pem'). A note at the bottom of the modal states: 'When prompted, store the private key in a secure and accessible location on your computer. You will need it later to connect to your instance.' A yellow callout box points to this note. At the bottom right of the modal are 'Cancel' and 'Create key pair' buttons.

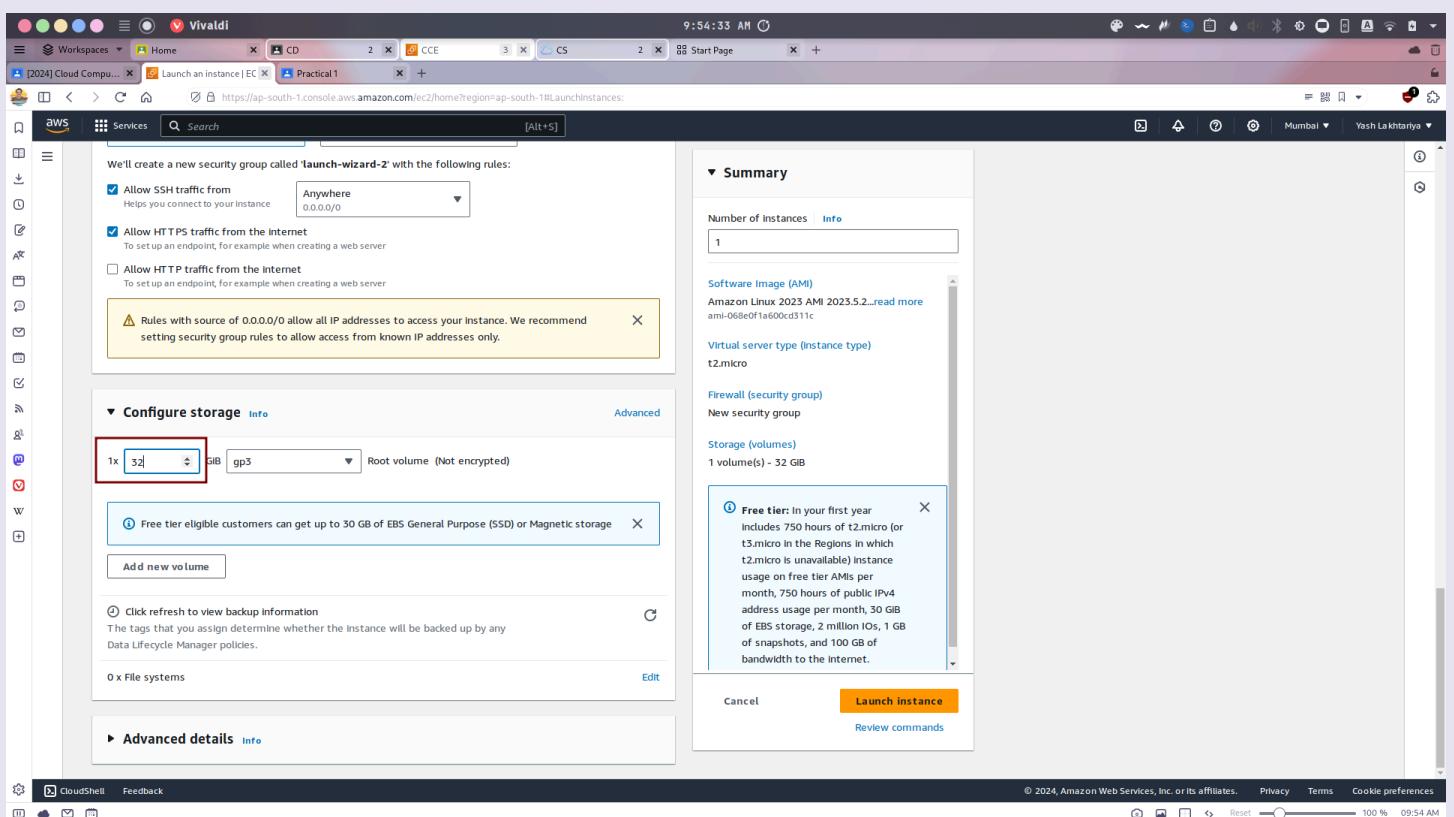


The screenshot shows the AWS Cloud9 interface after the key pair has been created. A download notification 'Download (Finished) SNS_YSL_kp1.pem to Downloads' is visible. The 'Launch instance' button is highlighted in orange at the bottom right of the main window. The 'Summary' section shows one instance is launching. A tooltip for the 'Free tier' is displayed, stating: '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 GB of EBS storage, 2 million IOPS, 1 GB of snapshots, and 100 GB of bandwidth to the internet.' Other details shown include the software image (Amazon Linux 2025 AMI 2023.5.2), virtual server type (t2.micro), and storage (1 volume(s) - 8 GB).

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The screenshot shows the AWS Cloud9 interface with a browser window titled "Launch an instance | EC". The URL is <https://ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#LaunchInstances>. The page displays the configuration for launching an EC2 instance. In the "Firewall (security groups)" section, the "Allow HTTP traffic from the internet" checkbox is selected and highlighted with a red box. In the "Configure storage" section, the root volume size is set to 8 GB. On the right side, a "Summary" panel shows the instance configuration: 1 instance, Amazon Linux 2023 AMI 2023.5.2, t2.micro instance type, and a new security group. A tooltip for the "Free tier" is open, stating: "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 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet." At the bottom right of the summary panel are "Cancel", "Launch instance", and "Review commands" buttons.



This screenshot is identical to the one above, but the root volume size is explicitly highlighted with a red box in the "Configure storage" section, set to 32 GB. All other configurations and the summary panel are the same.

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The screenshot shows the AWS Cloud9 interface with the "Launch an instance | EC" tab selected. On the left, there's a sidebar with various AWS services like CloudWatch Metrics, Lambda, and CloudWatch Logs. The main area is titled "Launch instances" and contains several configuration fields:

- Enable resource-based IPv4 (A record) DNS requests**: Enabled.
- Enable resource-based IPv6 (AAAA record) DNS requests**: Disabled.
- Instance auto-recovery**: Set to "Select".
- Shutdown behavior**: Set to "Stop".
- Stop - Hibernate behavior**: Set to "Select".
- Termination protection**: Set to "Enable". This field is highlighted with a red box.
- Stop protection**: Set to "Select".
- Detailed CloudWatch monitoring**: Set to "Select".
- Credit specification**: Set to "Select".
- Placement group**: Set to "Select".
- EBS-optimized instance**: Set to "Disable".
- Purchasing option**: Set to "None".

To the right, the "Summary" section shows:

- Number of instances**: 1
- Amazon Linux 2023 AMI 2023.5.2...**: ami-068e0f1a600cd311c
- Virtual server type (Instance type)**: t2.micro
- Firewall (security group)**: New security group
- Storage (volumes)**: 1 volume(s) - 8 GB

A tooltip for the "Free tier" is displayed, stating: "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 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet."

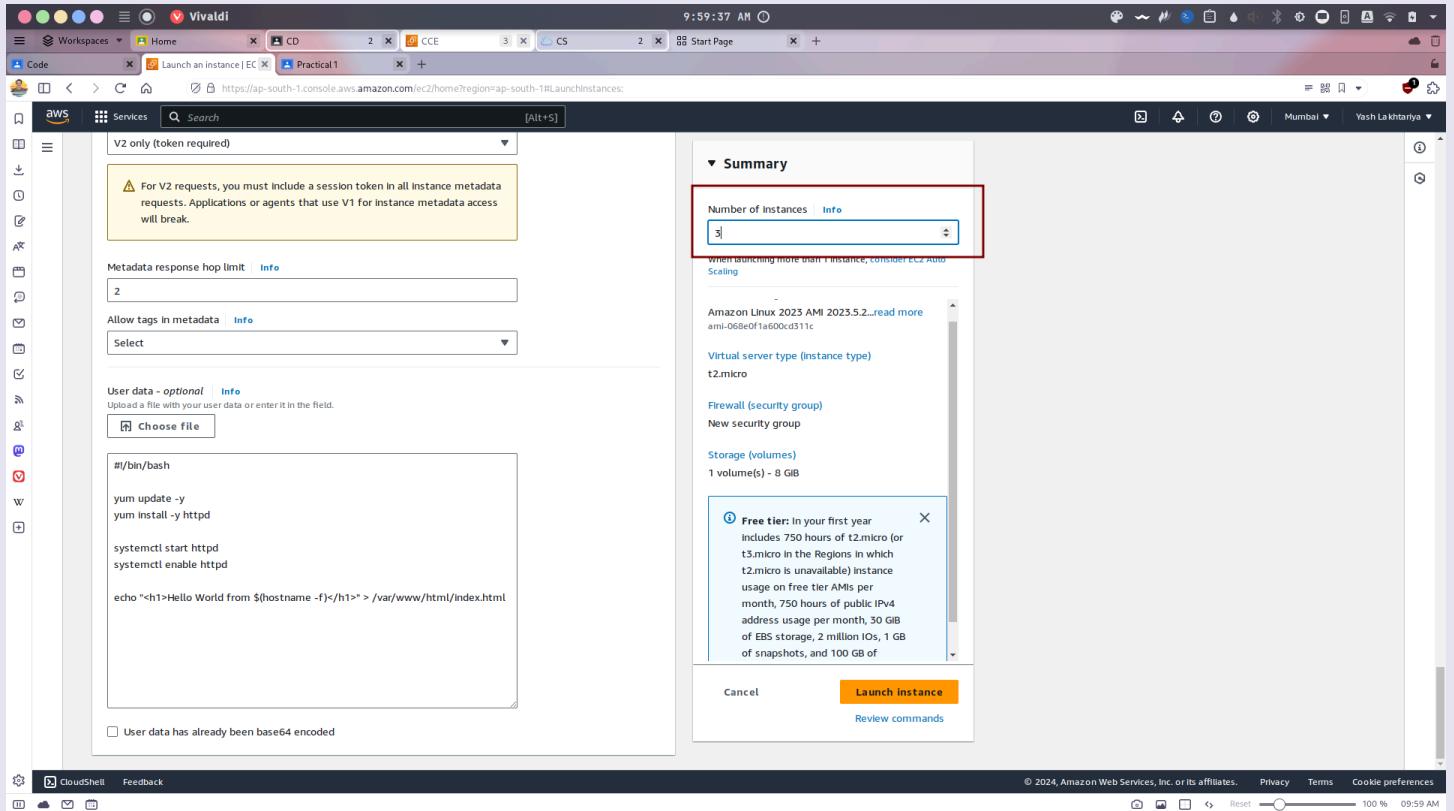
At the bottom right are "Cancel", "Launch instance" (highlighted with an orange box), and "Review commands".

This screenshot shows the same AWS Cloud9 interface as the previous one, but with user data entered in the "User data - optional" field. The user data is a shell script that installs Apache and sets up a basic "Hello World" website:

```
#!/bin/bash
yum update -y
yum install -y httpd
systemctl start httpd
systemctl enable httpd
echo "<h1>Hello World from $(hostname -f)</h1>" > /var/www/html/index.html
```

The "User data has already been base64 encoded" checkbox is unchecked. The rest of the configuration is identical to the first screenshot, including the "Free tier" tooltip and the "Launch instance" button highlighted in orange.

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- Monitor Your EC2 instance

The screenshot shows the AWS Management Console interface. The left sidebar contains the following navigation links:

- Workspaces
- Home
- Code
- Instances
- Images
- Elastic Block Store
- Network & Security
- Load Balancing
- Auto Scaling

The main content area displays the "Instances (1/2) info" table:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
SNS_YSL	i-0917f3270bffef2d2	Running	t2.micro	Initializing	View alarms	ap-south-1b	ec2-65-0-107-51.ap-so...	65.0.107.51	-
ylsprac1	i-0ef9eb532bf650ee5	Terminated	t2.micro	-	View alarms	ap-south-1b	-	-	-

Below the table, the details for the running instance SNS_YSL are shown:

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

Instance summary

Instance ID i-0917f3270bffef2d2 (SNS_YSL)	Public IPv4 address 65.0.107.51 open address
IPv6 address -	Private IPv4 addresses 172.31.15.64
Hostname type IP name: ip-172-31-15-64.ap-south-1.compute.internal	Public IPv4 DNS ec2-65-0-107-51.ap-south-1.compute.amazonaws.com open address
Answer private resource DNS name IPv4 (A)	Private IP DNS name (IPv4 only) ip-172-31-15-64.ap-south-1.compute.internal
Auto-assigned IP address 65.0.107.51 [Public IP]	Instance type t2.micro
IAM Role -	VPC ID vpc-06e30c5bf80152480
IMDSv2 Required	Subnet ID subnet-0adfd36bde1531893
Settings	Instance ARN arn:aws:ec2:ap-south-1:7503535462491:instance/i-0917f3270bffef2d2

Instance details

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- Modify the security group that your web server is using to allow HTTP access

The screenshot shows the AWS EC2 Instances page. On the left, the navigation pane includes EC2 Dashboard, EC2 Global View, Events, Instances (selected), Images, AMIs, AMI Catalog, Elastic Block Store, Volumes, Snapshots, Lifecycle Manager, Network & Security (Security Groups selected), Network Interfaces, Load Balancing, Auto Scaling, and Settings. The main content area displays two instances: SNS_YSL (Running, t2.micro, Initializing) and yslprac1 (Terminated, t2.micro). The SNS_YSL instance is selected. The Security tab is active, showing its current security groups: sg-09080b6007b2a7531 (highlighted with a red box). The Inbound rules table shows two rules:

Name	Security group rule ID	Port range	Protocol	Source	Security groups	Description
-	sgr-032994f4497fcdf44	22	TCP	0.0.0.0/0	launch-wizard-2	-
-	sgr-078a5536878a2ec54	443	TCP	0.0.0.0/0	launch-wizard-2	-

The Outbound rules table is empty.

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(Alternate way to access security group :)

The screenshot shows the AWS CloudWatch Metrics Insights interface. A query is being run against the CloudWatch Metrics Insights metric stream. The results are displayed in a table with columns: Metric Name, Value, and Time. The table shows two rows of data, each corresponding to a CloudWatch Metrics Insights metric.

Metric Name	Value	Time
CloudWatch Metrics Insights Metrics	1	2024-07-24T10:05:00Z
CloudWatch Metrics Insights Metrics	1	2024-07-24T10:05:01Z

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The screenshot shows the AWS EC2 Security Groups page. The left sidebar includes options like EC2 Dashboard, EC2 Global View, Events, Instances, Images, AMIs, AMI Catalog, Elastic Block Store, Volumes, Snapshots, Lifecycle Manager, Network & Security (Security Groups selected), Elastic IPs, Placement Groups, Key Pairs, Network Interfaces, Load Balancing, Auto Scaling, and Settings. The main content area displays a table titled "Security Groups (3) Info" with columns: Name, Security group ID, Security group name, VPC ID, Description, and Owner. The "Security group name" column shows entries: "launch-wizard-2", "default", and "launch-wizard-1". The "Owner" column shows the same ID for all three: "730335462491". The "Security group ID" column shows unique IDs: "sg-09080b6007b2a7531", "sg-0e31fbf9e2e65d984", and "sg-0fa7775ec4c530a6b". The "Description" column indicates they were created on 2024-07-24T04:12:45.551Z. A red box highlights the "Actions" button at the top right of the table.

The screenshot shows the details page for the security group "sg-09080b6007b2a7531 - launch-wizard-2". The left sidebar is identical to the previous screenshot. The main content area has a "Details" section with fields: Security group name (launch-wizard-2), Security group ID (sg-09080b6007b2a7531), Description (launched-wizard-2 created 2024-07-24T04:12:45.551Z), and VPC ID (vpc-06e30c5bf80152480). Below this are sections for Owner (730335462491), Inbound rules count (2 Permission entries), and Outbound rules count (1 Permission entry). The "Inbound rules" tab is selected, showing two entries: one for port 22 (SSH, TCP) and another for port 443 (HTTPS, TCP). A red box highlights the "Edit inbound rules" button in the top right corner of the rule table.

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The screenshot shows the 'Edit inbound rules' page for a security group. It lists three existing rules and one new rule being added:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-032994f4497ccdf44	SSH	TCP	22	Custom	0.0.0.0/0
sgr-078a5536878a2ec54	HTTPS	TCP	443	Custom	0.0.0.0/0
-	HTTP	TCP	80	Anywhere...	0.0.0.0/0

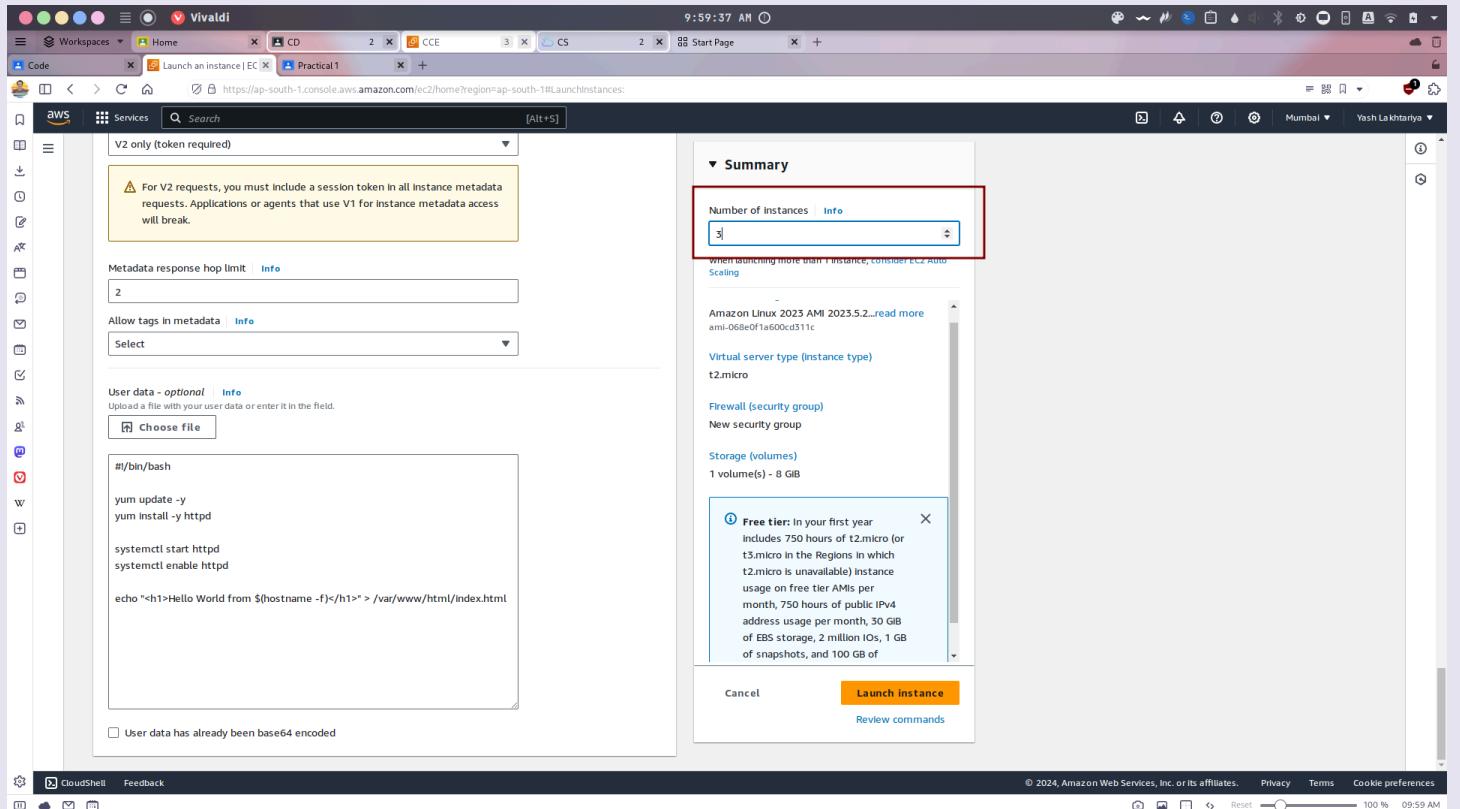
A new rule for port 80 is being added, highlighted with a red box. The 'Type' dropdown is set to 'HTTP', 'Protocol' to 'TCP', 'Port range' to '80', and 'Source' to 'Anywhere...'. The 'Description' field is empty. Below the table, a warning message says: '⚠ Rules with source of 0.0.0.0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' At the bottom right are 'Cancel', 'Preview changes', and 'Save rules' buttons.

The screenshot shows a browser window displaying the output of a 'Hello World' program. The URL is 'http://65.0.107.51'. The page content is: 'Hello World from ip-172-31-15-64.ap-south-1.compute.internal'.

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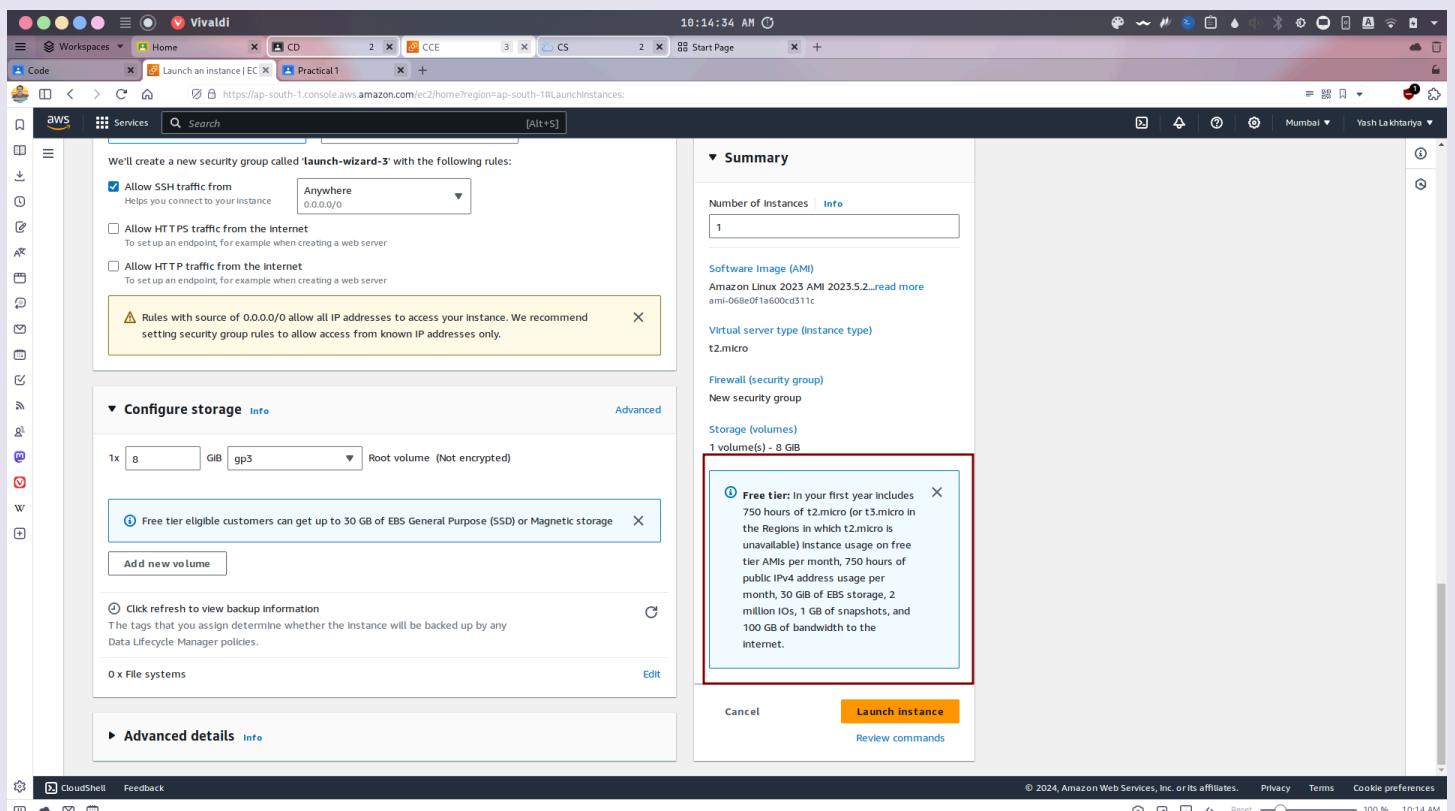
(In above URL, use http only if not accessible)

- Resize your Amazon EC2 instance to scale



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- Explore EC2 limits



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- Test termination protection

The screenshot shows the AWS EC2 Instances page. On the left sidebar, under the 'Instances' section, 'Termination protection' is listed under 'Actions'. A modal dialog titled 'Terminate instance?' is displayed over the instance list. The dialog contains a warning message: 'On an EBS-backed instance, the default action is for the root EBS volume to be deleted when the instance is terminated. Storage on any local drives will be lost.' Below this, it asks 'Are you sure you want to terminate these instances?' with a table showing the instance ID 'i-0917f3270bffef2d2 (SNS_YSL)' and 'Termination protection' status 'Enabled'. At the bottom of the dialog, it says 'To confirm that you want to terminate the instances, choose the terminate button below. Instances with termination protection enabled will not be terminated. Terminating the instance cannot be undone.' There are 'Cancel' and 'Terminate' buttons at the bottom right.

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The screenshot shows the AWS EC2 Instances page. The left sidebar navigation includes: EC2 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, Network Interfaces), and Load Balancing (CloudShell, Feedback).

The main content area displays the 'Instances (1/2) Info' table:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
SNS_YSL	i-0917f3270bfffef2d2	Running	t2.micro	2/2 checks passed	View alarms	ap-south-1b	ec2-65-0-107-51.ap-so...	65.0.107.51	-
yslprac1	i-0ef9eb532bfe50ee5	Terminated	t2.micro	-	View alarms	ap-south-1b	-	-	-

Below the table, the details for the SNS_YSL instance are expanded:

i-0917f3270bfffef2d2 (SNS_YSL)

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

Instance summary

Instance ID: i-0917f3270bfffef2d2 (SNS_YSL)	Public IPv4 address: 65.0.107.51 [open address]
IPv6 address: -	Instance state: Running
Hostname type: IP name: ip-172-51-15-64.ap-south-1.compute.internal	Private IP DNS name (IPv4 only): ip-172-51-15-64.ap-south-1.compute.internal
Answer private resource DNS name: IPv4 (A)	Instance type: t2.micro
Auto-assigned IP address: 65.0.107.51 [Public IP]	VPC ID: vpc-06e30c5bf80152480
IAM Role: -	Subnet ID: subnet-0adfd36bde1531895
IMDSv2: Required	Instance ARN: arn:aws:ec2:ap-south-1:730355462491:instance/i-0917f3270bfffef2d2

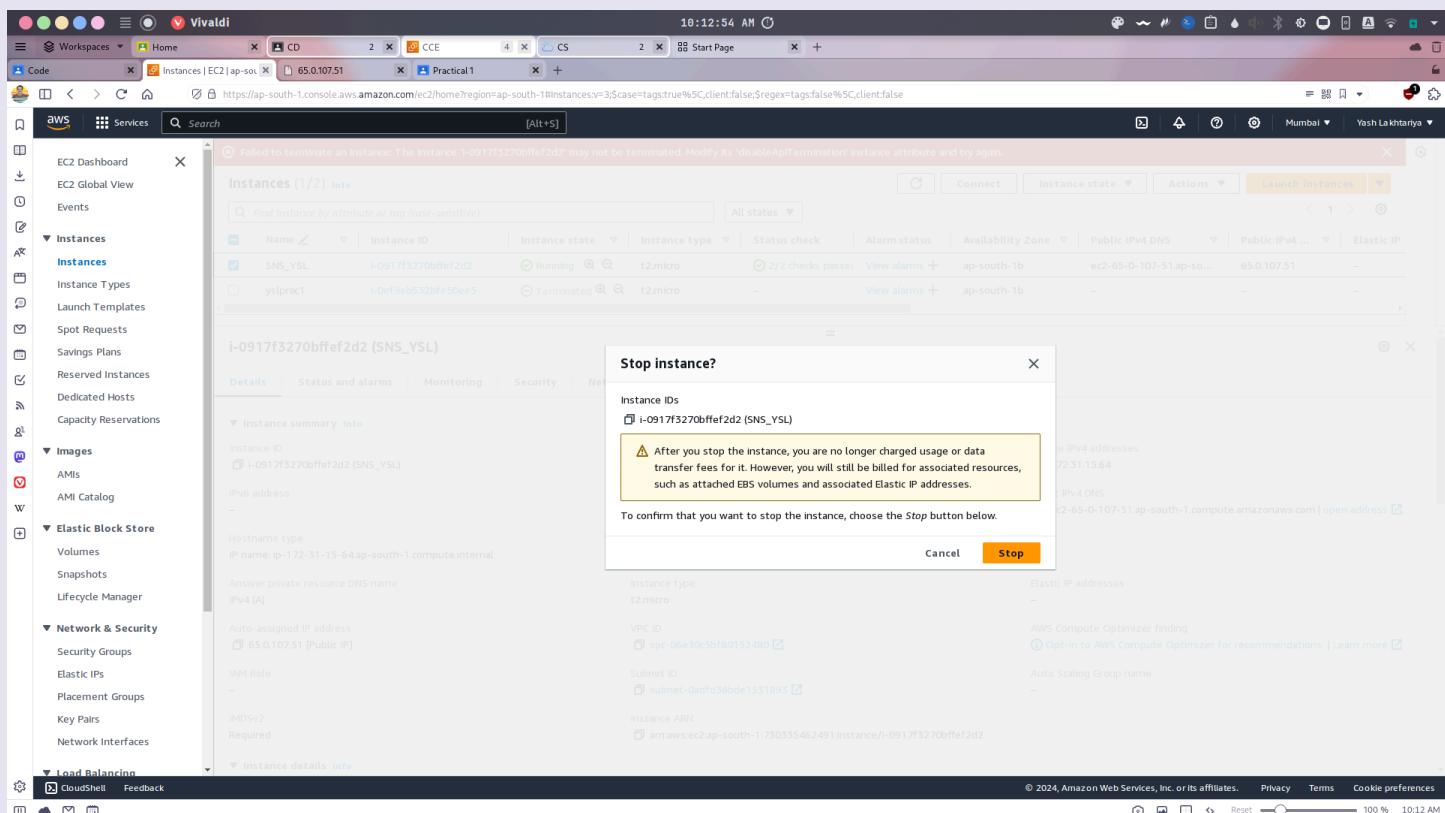
Load Balancing

CloudShell Feedback

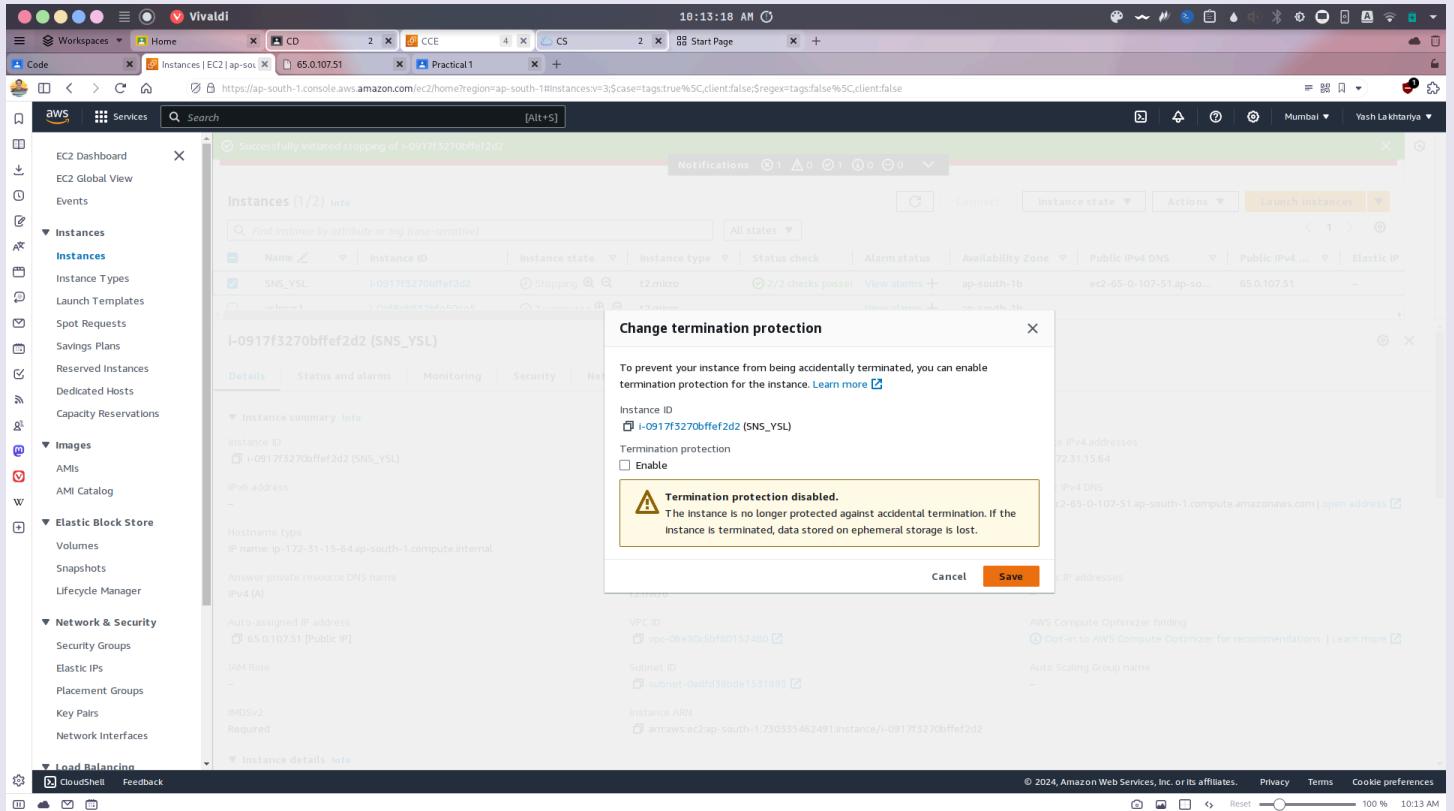
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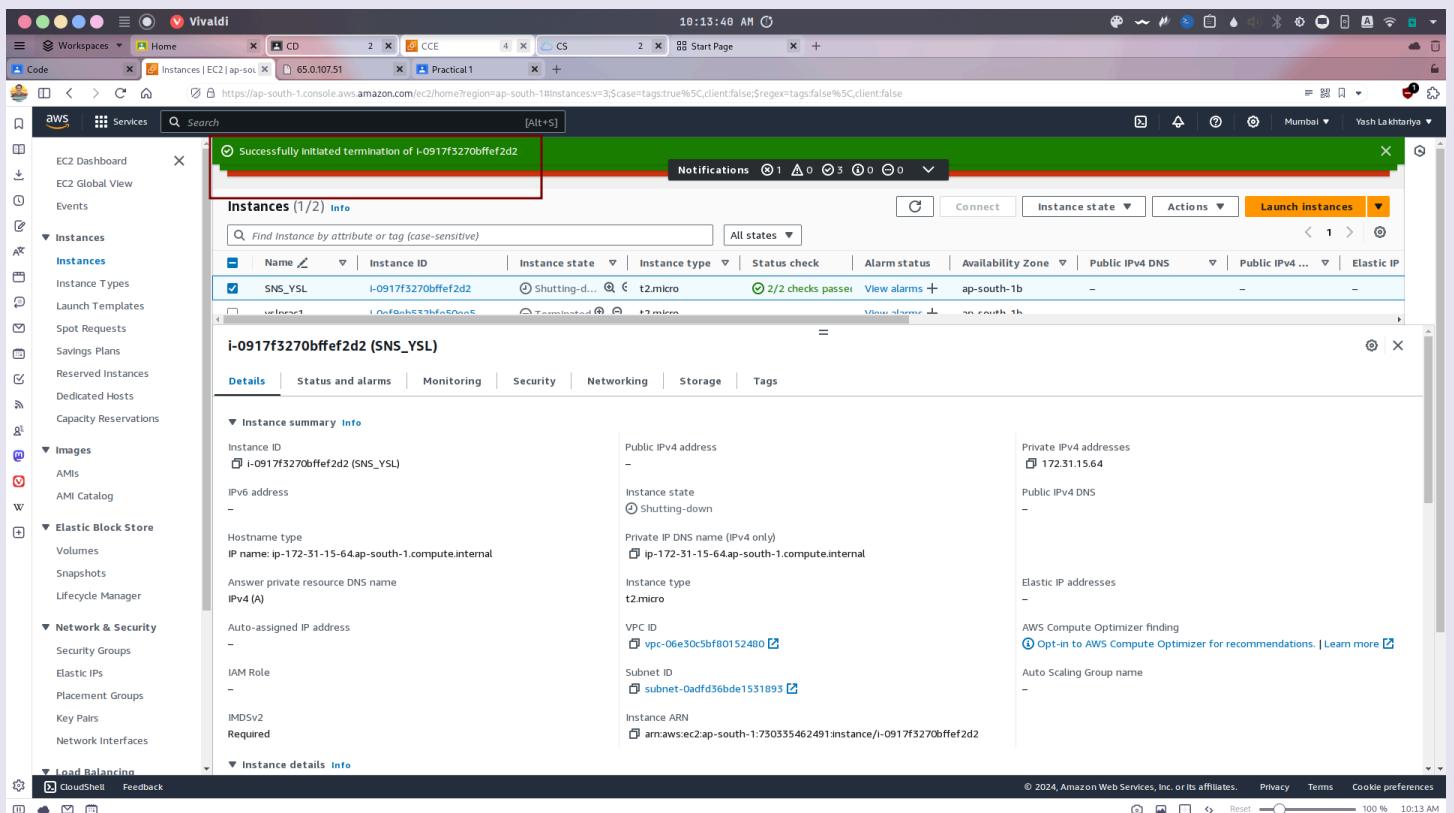
- Terminate your EC2 instance



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The screenshot shows a browser window with multiple tabs open. The main content is the AWS CloudWatch interface, specifically the 'Instances' section. A green notification bar at the top reads "Successfully initiated stopping of i-0917f3270bfffef2d2". Below this, the 'Instances (1/2) Info' table lists one instance: SNS_YSL (i-0917f3270bfffef2d2). An 'Actions' dropdown menu is open over this instance, showing options like 'Stop', 'Start', 'Reboot', 'Terminate', and 'Change termination protection'. A modal window titled 'Change termination protection' is displayed, containing a warning message: "Termination protection disabled. The instance is no longer protected against accidental termination. If the instance is terminated, data stored on ephemeral storage is lost." There are 'Cancel' and 'Save' buttons at the bottom of the modal. The left sidebar contains navigation links for EC2 Dashboard, EC2 Global View, Events, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images (selected), AMIs, AMI Catalog, Elastic Block Store, Volumes, Snapshots, Lifecycle Manager, Network & Security, Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces, and Load Balancing.



This screenshot is nearly identical to the previous one, showing the same AWS CloudWatch interface. The main difference is the status of the instance listed in the 'Instances (1/2) Info' table. The instance SNS_YSL (i-0917f3270bfffef2d2) is now shown as 'Shutting-down' instead of 'Stopping'. The rest of the interface, including the left sidebar with navigation links and the top header with browser tabs and AWS branding, remains the same.