Activity 0: Environment Setup

🎯 Objective

Launch an AWS EC2 instance (Ubuntu 24.04 LTS) and install Docker so that all subsequent lab activities can be executed on this environment.

By the end of this activity you will have:

- A running Ubuntu VM on AWS EC2.
- Docker installed and verified.
- SSH access working from your lab environment.

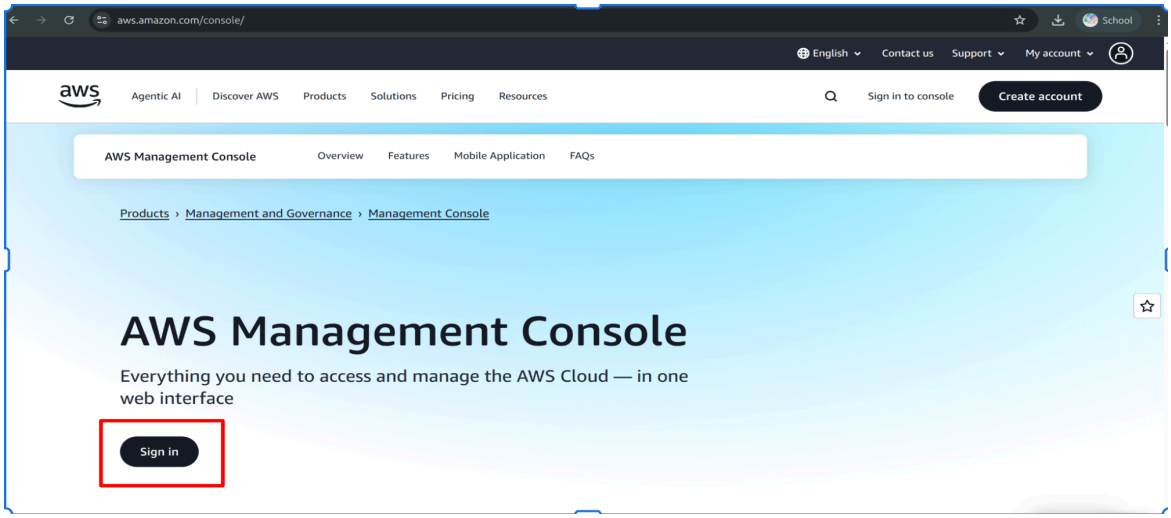
✅ Prerequisites

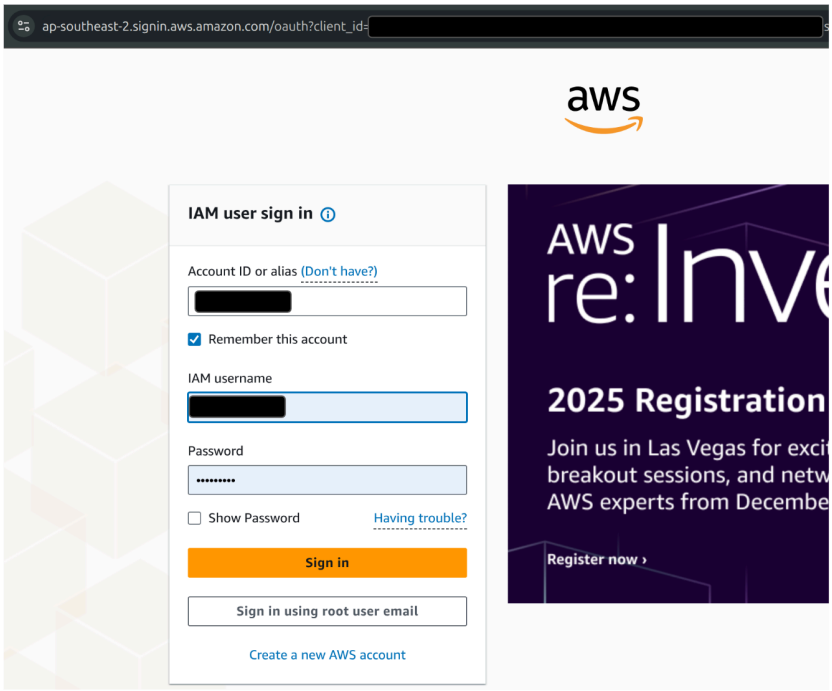
- An AWS account with EC2 permissions.
- Local SSH client (Linux/macOS: builtin; Windows: WSL, PowerShell + OpenSSH, or Git Bash).
- Minimum VM requirements: **2 vCPU**, **4 GiB RAM**, **20 GiB disk**.
- Recommended instance type: `t3.medium` (stop/terminate when not in use to avoid charges).

📜 Step-by-step Guidance

Step 1 — Sign in to AWS Management Console

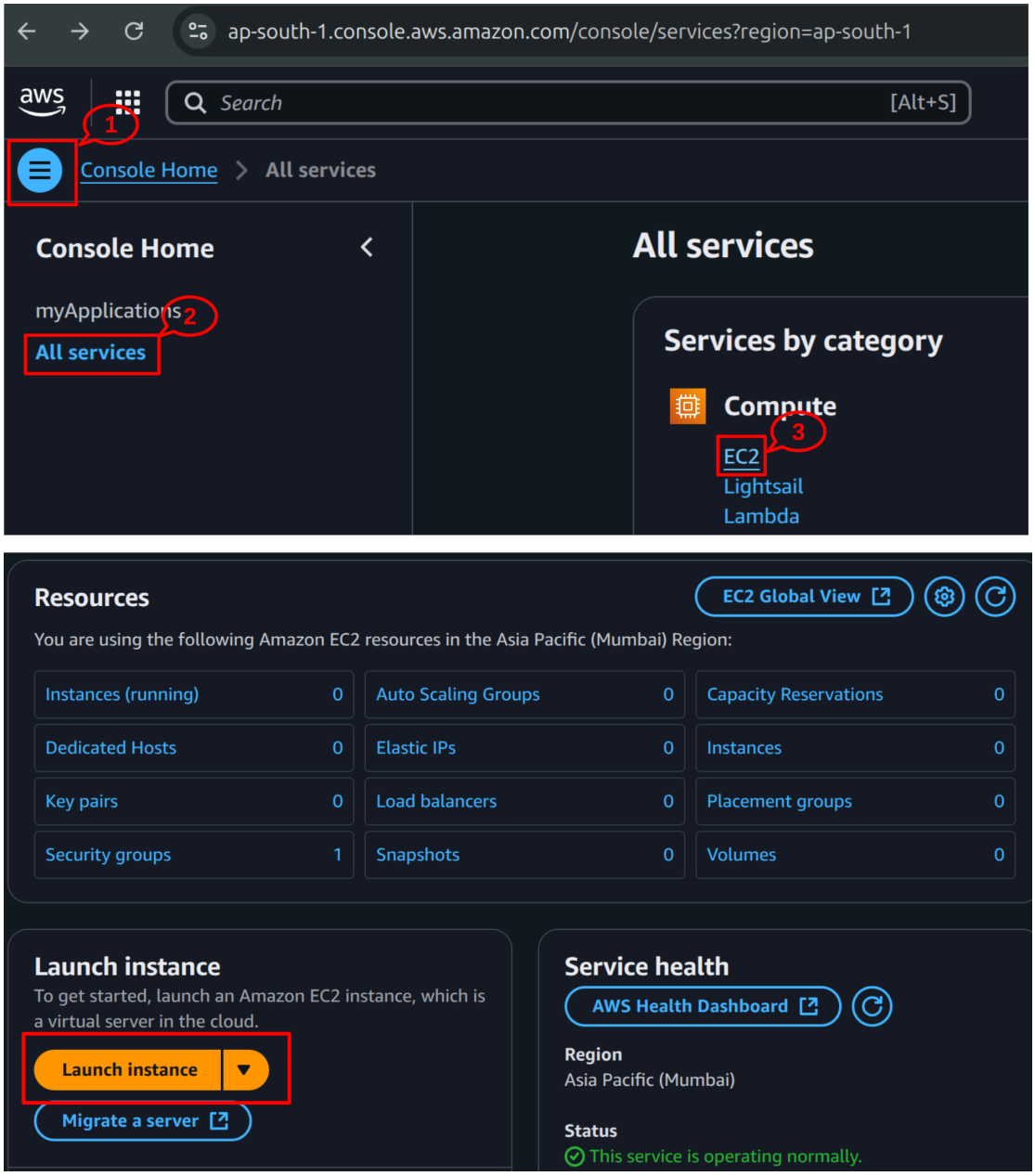
1. Open: https://aws.amazon.com/console/
2. Click **Sign in to the console** and log in with your AWS account.





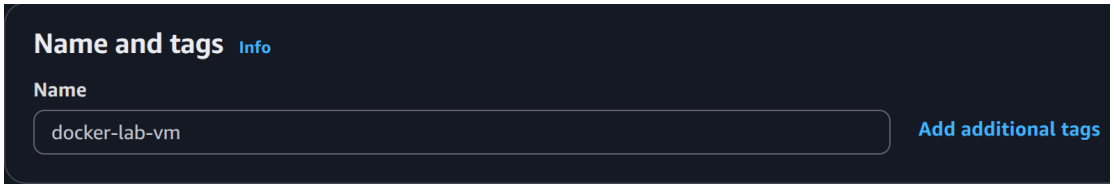
Step 2 — Navigate to EC2 and Launch Instance

1. In the Console, go to **All Services** → **Compute** → **EC2**.
2. Click **Launch instance**.



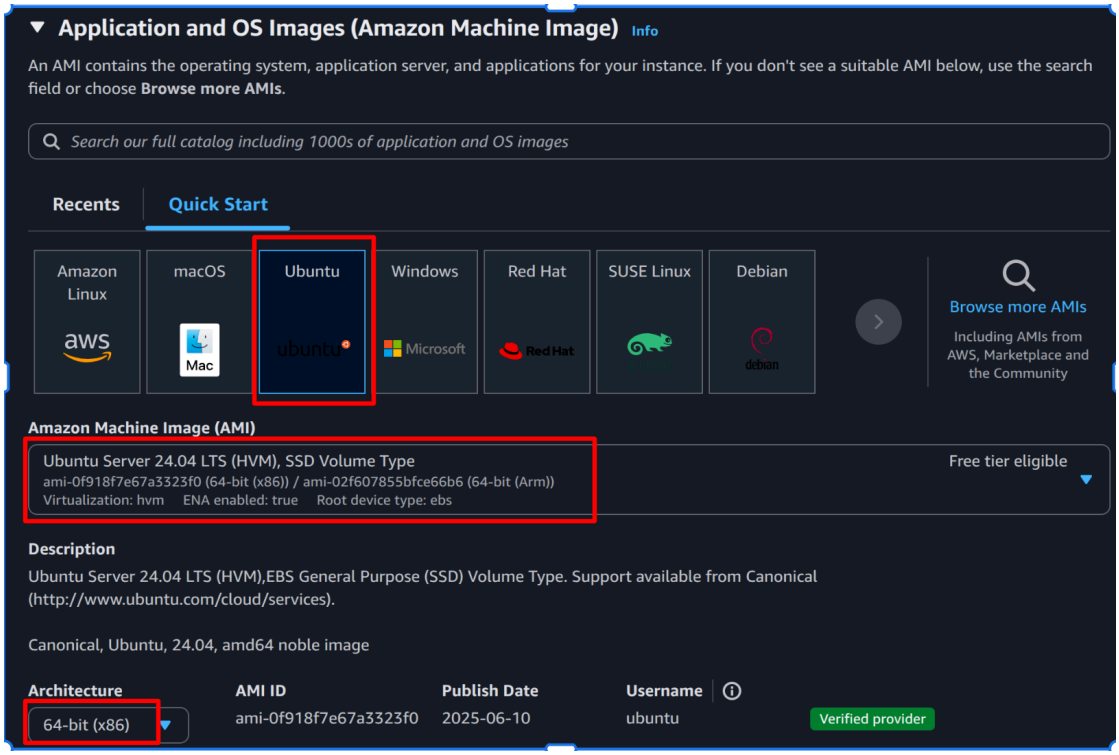
Step 3 — Name and Tags

1. In the **Name and Tags** section, set `Name` to something like: `docker-lab-vm`.
2. (Optional) Add additional tags for owner, course, etc.



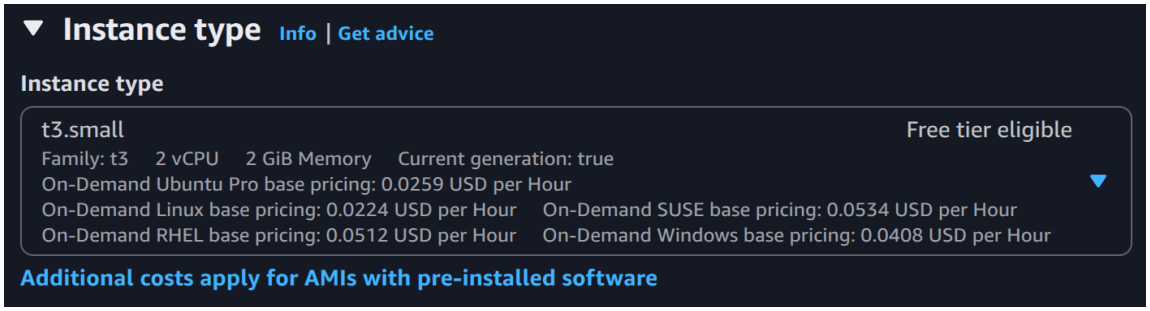
Step 4 — Choose Amazon Machine Image (AMI)

1. Select **Ubuntu Server 24.04 LTS (HVM), SSD Volume Type**.
2. Make sure Architecture is selected as **64-bit(x86)**.



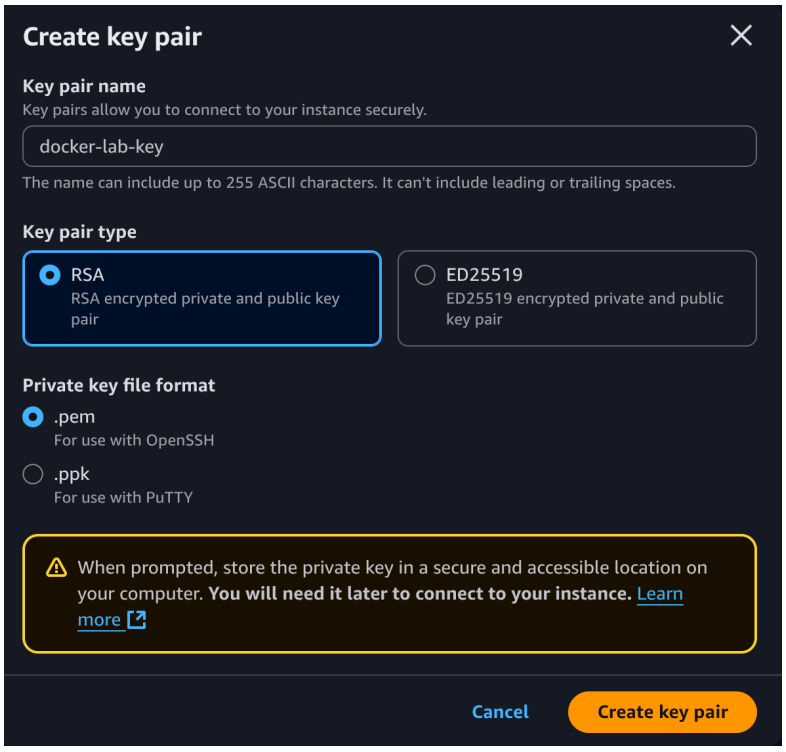
Step 5 — Choose Instance Type

1. Choose **t3.medium** (2 vCPU, 4 GiB RAM).
   [*This choice ensures one has enough resources for the lab as mentioned in prerequisite.*]
   ⚠️ This instance type may incur charges. Stop/terminate when not required.
2. Prefer an equivalent `Free-tier eligible` AMI if available.



Step 6 — Create (or Use) Key Pair

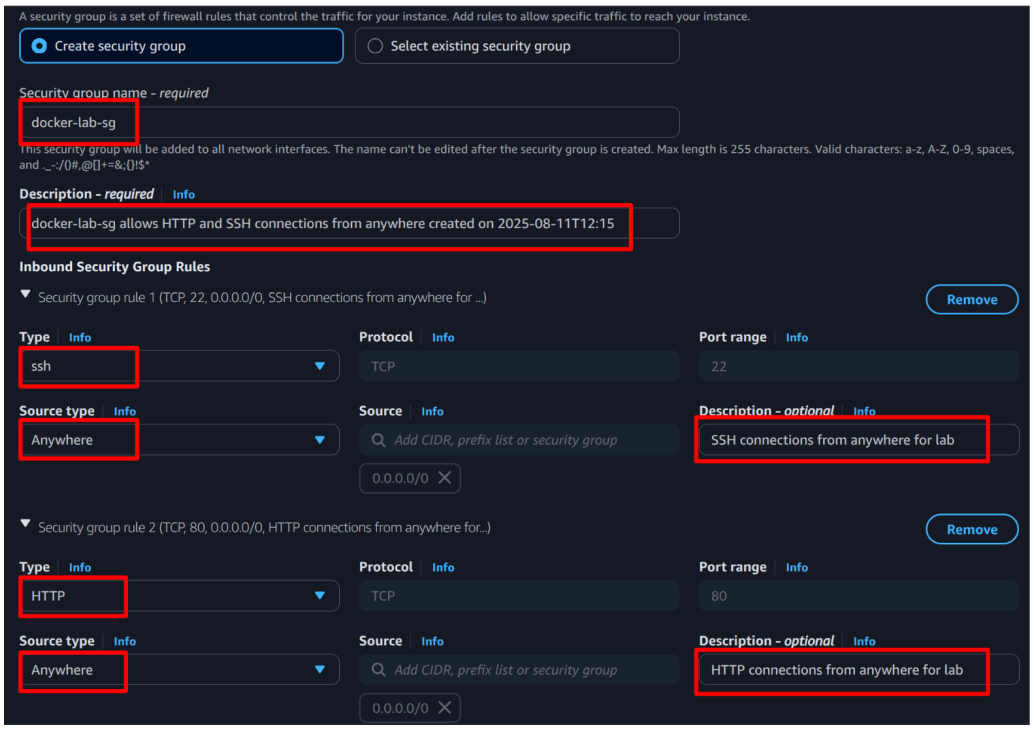
1. Under **Key pair (login)** select **Create new key pair**.
2. Choose RSA and **.pem** format. Name it (e.g., `docker-lab-key`).
3. Click **Create key pair** and download the `.pem` file.
   ⚠️ Save this `.pem` file securely — this is your only download opportunity.



Step 7 — Configure Network / Security Group

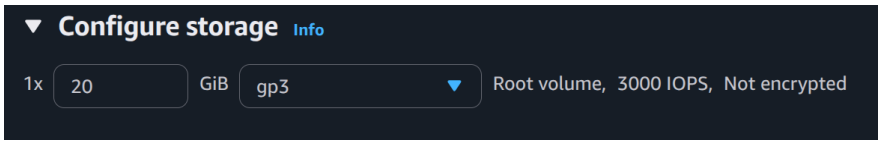
1. Create a new security group (e.g., `docker-lab-sg`).
2. Add rules:
   - **SSH** — TCP 22 — Source `0.0.0.0/0` (or restrict to your IP)
   - **HTTP** — TCP 80 — Source `0.0.0.0/0`
     [*Here, we want to allow SSH and HTTP to the VM from **Anywhere***]
3. (Optional) Add additional rules as required by your lab.

⚠️ For real production or tighter security, restrict SSH to your IP only.



Step 8 — Configure Storage

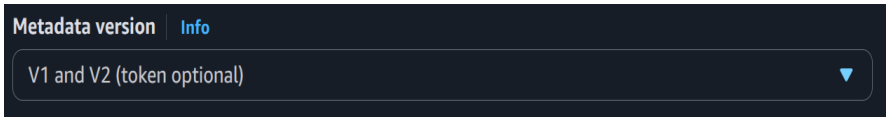
1. Set root volume to **20 GiB** (**gp3**).
   [*AWS EBS(Elastic Block Storage) gp3 volumes are generally cheaper and offer better performance than gp2 volumes*]
2. Confirm and proceed.



Step 9 — Make Metadata accessible

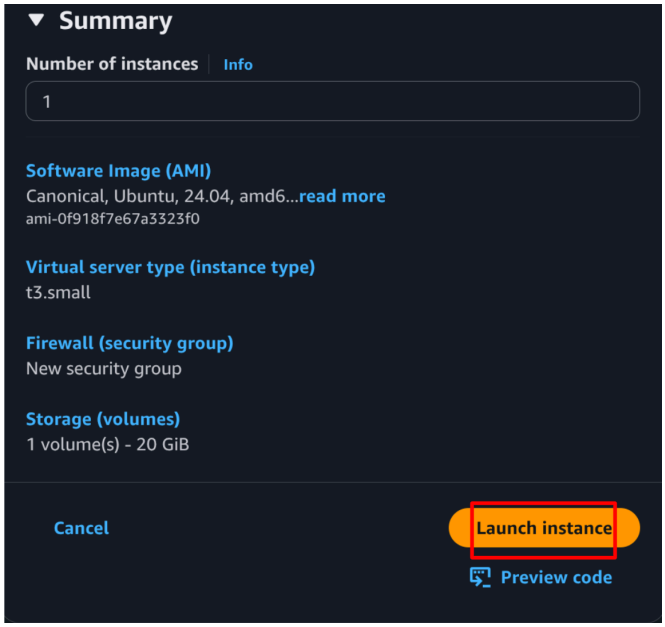
1. In the **Advanced details** Info select **Metadata Version**
2. Choose **V1 and V2 (token optional)**

[*V2 enforces token-based access for security where in lab setting we intentionally make token optional using V1 so that no need to attach a token with any ssh request into our ec2 instance*]



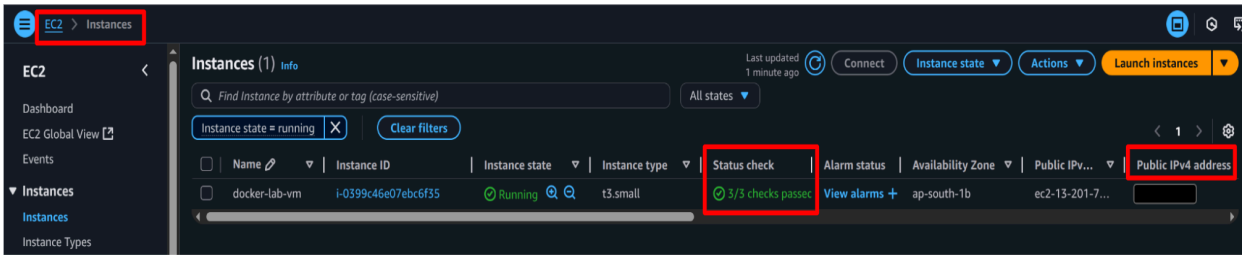
Step 10 — Launch Instance

1. Review configuration and click **Launch instance**.



Step 11 — Note Public IP

1. In **Instances** view wait until the instance state is **running** and status checks show **3/3 checks passed**.
2. In **EC2** → **Instances**, copy the **Public IPv4 address** of your instance.



Step 12 — Prepare SSH Key Locally and Connect

Since cLab is a containerised application, direct file transfer from your local machine is limited. Follow these steps:

1. Open the **cLab** app and enter the current lab → current activity.
2. Click the **POP TERMINAL** button (opens a terminal at `labDirectory`).
3. Run:

```
Shell
chmod 770 secret-key.pem
```

4. Click **OPEN DIRECTORY** in cLab (opens `labDirectory`).
5. Open the downloaded `.pem` file (`docker-lab-key.pem`) from your local machine, copy its full content, and paste it into `secret-key.pem` inside `labDirectory`. Save the file.
6. Again, in the popped terminal, run:

```
Shell
chmod 400 secret-key.pem
```

    - This ensures the private key has the correct permissions.
7. From the **popped terminal** in cLab (`labDirectory`), run:

```shell
ssh -i secret-key.pem ubuntu@<public-ip-address>
```

Replace `<public-ip-address>` with the value noted in **Step 11**.

Step 13 — Install Docker on the EC2 Instance

Step 13.0 — Login to the EC2 instance (ubuntu)

```shell
ssh -i secret-key.pem ubuntu@<public-ip-address>
```

Step 13.1 — Update Ubuntu packages and install prerequisites

- `apt-transport-https` : for https package retrieval
- `curl` : for data transfer
- `conntrack` : for network connection tracking

```shell
sudo apt-get update -y
sudo apt-get upgrade -y
sudo apt-get install -y apt-transport-https curl conntrack
```

Step 13.2 — Download Docker installation script

```shell
curl -fsSL https://get.docker.com -o get-docker.sh
```

Step 13.3 — Run the Docker installation script

```shell
sudo sh get-docker.sh
```

Step 13.4 — Allow current user to run Docker without sudo

```shell
sudo usermod -aG docker $USER && newgrp docker
```

⚠️ If `docker` commands require `sudo` after `usermod`, **log out** and log back in or use `newgrp docker` to refresh group membership.

Step 14 — Verify Docker Installation

Check Docker version

```
Shell
docker --version
```

Expected output (sample):

```
None
Docker version 28.3.3, build 980b856
```

⚠️ If you see `docker: command not found`, the installation was unsuccessful.

Step 15 — Verify Docker with Hello World

```
Shell
docker run hello-world
```

Expected output (excerpt):

```
None
Hello from Docker!
This message shows that your installation appears to be working correctly.
```

Step 16 — Configure for Evaluation

- Open the `data.json` file in `labDirectory`.
- Paste your AWS EC2 **Public IPv4 address** into the appropriate field.
- Save the file.

🔍 Evaluation (what the grader checks)

The evaluation script will:

1. SSH into your EC2 instance using the provided `public-ip` and `secret-key.pem`.
2. Verify:
    - The AWS **EC2 instance** is set up correctly.
    - **Docker** is installed and configured correctly.

🧩 Notes & Tips

- Keep `secret-key.pem` private and do not share it publicly.
- If you use a restricted SSH source IP for better security, ensure the grader's IP (or the mechanism used by the autograder) can connect.

🛑 Stop / Terminate Instance (to avoid charges)

- After completing evaluation, it is important to stop the instance so that no extra costs are incurred.
- To **stop** the instance (preserve disk/data): In EC2 Console → select instance → **Instance state** → **Stop instance**.
- To **terminate** (delete resources): **Instance state** → **Terminate instance**.

🏆 Congratulations — You've completed Activity 0!

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