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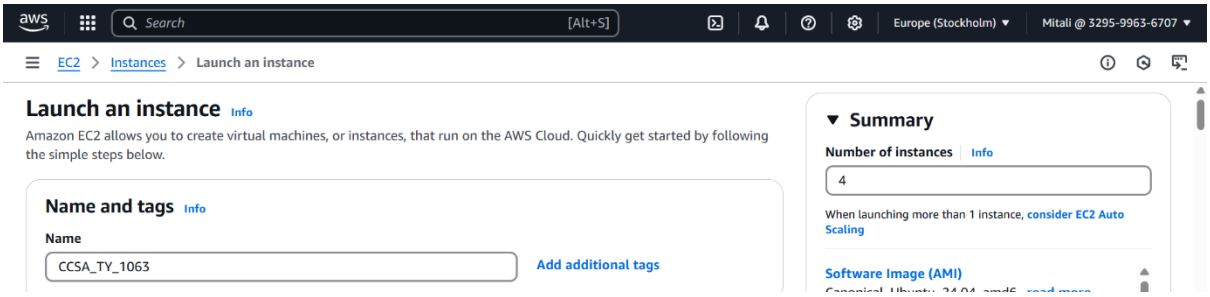
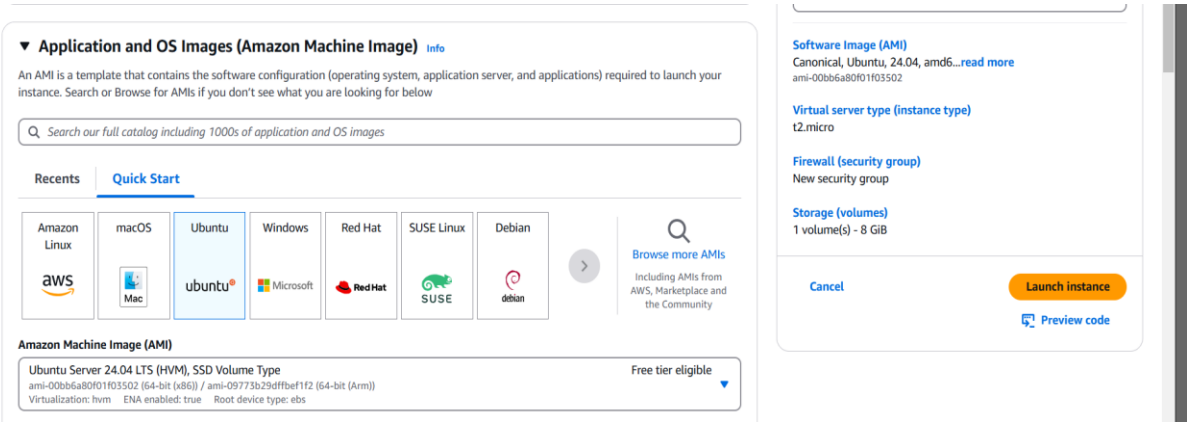
Title of Practical: High Availability Container Orchestration with Docker Swarm Master-Worker Setup on AWS EC2

Step1: Launch 4 EC2 INSTANCES

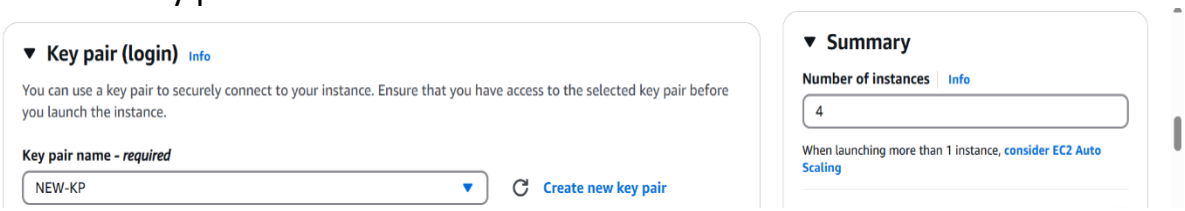
- Name the Instance



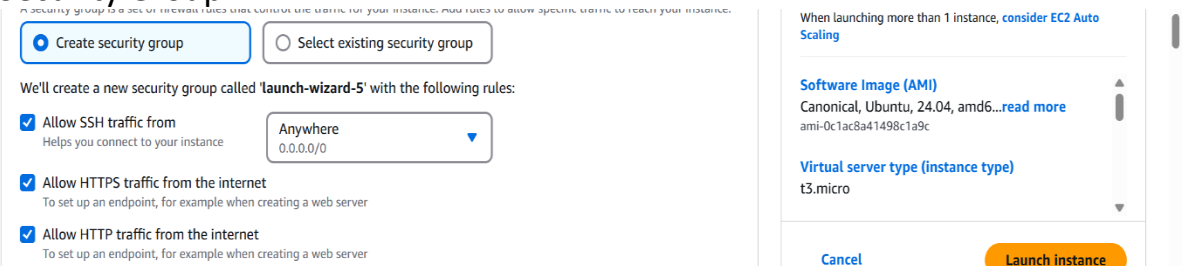
- Choose AMI: Ubuntu



- Select the instance type: t2 micro
- Create a Key pair

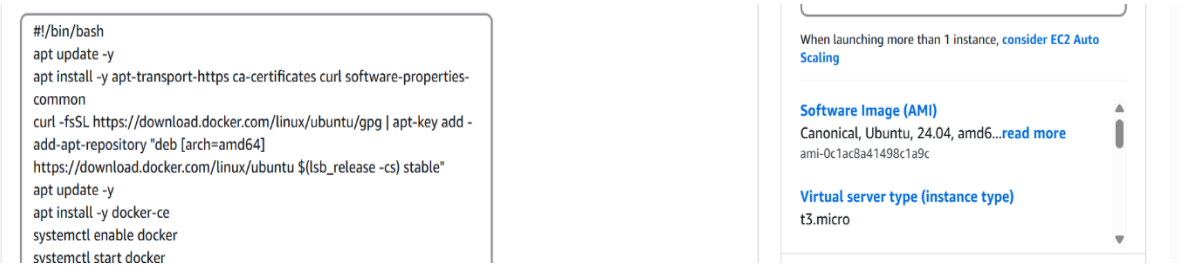


- Security Group

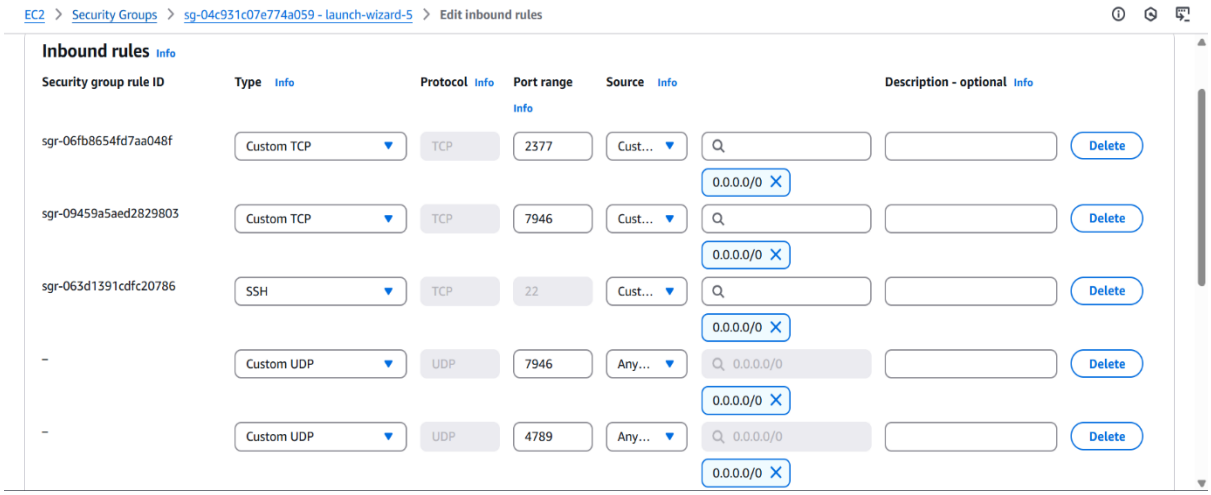


- Launch the instance

- Scroll down to Advanced Details → Paste this in User data:



Step 2: Edit Security Group Inbound Rules



STEP 3: CONNECT TO ALL 4 INSTANCES

1. 1st Instance: Initialize Swarm (MANAGER/LEADER)

On Instance 1 terminal, run:

- docker swarm init

```
ubuntu@ip-172-31-16-191:~$ sudo -i
root@ip-172-31-16-191:~# docker swarm init
Swarm initialized: current node (eb3x90awljdywuipfik8dpvja) is now a manager.

To add a worker to this swarm, run the following command:

    docker swarm join --token SWMTKN-1-1jomzgfnykzm8shqpd57nfoajufnhr6oga2fqm1bkoq7tu73kx-dqq4sihecdxk1af8kif34rpt7 172.31.16.191:237
7

To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.
```

Get The manager toker by firing this command on Instance 1 and copy it:

- sudo docker swarm join-token manager

```
root@ip-172-31-16-191:~# sudo docker swarm join-token manager
To add a manager to this swarm, run the following command:

    docker swarm join --token SWMTKN-1-1jomzgfnykzm8shqpd57nfoajufnhr6oga2fqm1bkoq7tu73kx-d7okvhpepeqbu82h4czjghwt1 172.31.16.191:237
7
```

2. 2nd Instance: Join INSTANCE 2 AS MANAGER

Paste the Manager token from Instance 1

```
root@ip-172-31-26-210:~# docker swarm join --token SWMTKN-1-1jomzgfnykzm8shqpd57nfoajufnhr6oga2fqm1bkoq7tu73kx-d7okvhpepeqbu82h4czjgh
wt1 172.31.16.191:2377
This node joined a swarm as a manager.
root@ip-172-31-26-210:~#
```

3. 3rd Instance: Join INSTANCE 3 AS WORKER

Paste the Worker token from Instance 1

```
root@ip-172-31-20-159:~# docker swarm join --token SWMTKN-1-1jomzgfnykzm8shqpd57nfoajufnhr6oga2fqm1bkoq7tu73kx-dqq4sihecdxk1af8kif34r
pt7 172.31.16.191:2377
This node joined a swarm as a worker.
```

4. 4th Instance: Join INSTANCE 4 AS WORKER

Paste the Worker token from Instance 1

```
root@ip-172-31-27-102:~# docker swarm join --token SWMTKN-1-1jomzgfnykzm8shqpd57nfoajufnhr6oga2fqm1bkoq7tu73kx-dqq4sihecdxk1af8kif34r
pt7 172.31.16.191:2377
This node joined a swarm as a worker.
```

STEP 4: Perform Operations on Instance 1:

- View all nodes: docker node ls
- Promote Worker Node: docker node promote <worker-hostname>
- Demote Manager Node: docker node demote <manager-hostname>

```
root@ip-172-31-16-191:~# docker node ls
ID                            HOSTNAME           STATUS    AVAILABILITY   MANAGER STATUS   ENGINE VERSION
eb3x90awljdywuipfik8dpvja *   ip-172-31-16-191   Ready     Active         Leader           28.1.1
aune3uhd2k4vimufet1fojbue     ip-172-31-20-159   Ready     Active                          28.1.1
g2ml22t7r0h7acq7p6jnvywlb     ip-172-31-26-210   Ready     Active         Reachable        28.1.1
lgm0egem9v3fpcjidvyw6y7hi     ip-172-31-26-210   Down      Active                          28.1.1
5w21mkuy0j549z7nih5f4xfce     ip-172-31-27-102   Ready     Active                          28.1.1
```

```
ubuntu@ip-172-31-16-191:~$ sudo -i
root@ip-172-31-16-191:~# docker node promote ip-172-31-20-159
Node ip-172-31-20-159 promoted to a manager in the swarm.
root@ip-172-31-16-191:~#
root@ip-172-31-16-191:~# docker node demote ip-172-31-26-210
Manager ip-172-31-26-210 demoted in the swarm.
root@ip-172-31-16-191:~#
```

STEP 5: Now, Check the status of Worker node and Manager node

Manager node should be demoted & Worker node should be promoted

WORKER Node's Terminal:

```
root@ip-172-31-20-159:~# docker node ls
ID                            HOSTNAME           STATUS    AVAILABILITY   MANAGER STATUS   ENGINE VERSION
eb3x90awljdywuipfik8dpvja     ip-172-31-16-191   Ready     Active         Leader           28.1.1
aune3uhd2k4vimufet1fojbue *   ip-172-31-20-159   Ready     Active         Reachable        28.1.1
g2ml22t7r0h7acq7p6jnvywlb     ip-172-31-26-210   Ready     Active         Reachable        28.1.1
lgm0egem9v3fpcjidvyw6y7hi     ip-172-31-26-210   Down      Active                          28.1.1
5w21mkuy0j549z7nih5f4xfce     ip-172-31-27-102   Ready     Active                          28.1.1
root@ip-172-31-20-159:~#
```

MANAGER Node's Terminal:

```
root@ip-172-31-26-210:~# docker node ls
Error response from daemon: This node is not a swarm manager. Worker nodes can't be used to view or modify cluster state. Please run
this command on a manager node or promote the current node to a manager.
root@ip-172-31-26-210:~#
```