

# PES2UG22CS183

## CC-Project demonstration in my system

Running the project:

```
docker build -f Dockerfile.node -t cluster-node .
```

```
PES2UG22CS183:~/A-Distributed-Systems-Cluster-Simulation-Framework-SRN-180-183-163-167--main$ docker build -f Dockerfile.node -t cluster-node .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
             Install the buildx component to build images with BuildKit:
             https://docs.docker.com/go/buildx/

Sending build context to Docker daemon 322.6kB
Step 1/6 : FROM python:3.9-slim
--> bea3dea87178
Step 2/6 : WORKDIR /app
--> Using cache
--> e417a77db752
Step 3/6 : COPY requirements.txt .
--> Using cache
--> 1180d68012e8
Step 4/6 : RUN pip install --no-cache-dir -r requirements.txt
--> Using cache
--> 1b26495c4e51
Step 5/6 : COPY node.py .
--> Using cache
--> 585699429afe
Step 6/6 : CMD ["python", "node.py"]
--> Using cache
--> 39248a45948d
Successfully built 39248a45948d
Successfully tagged cluster-node:latest
```

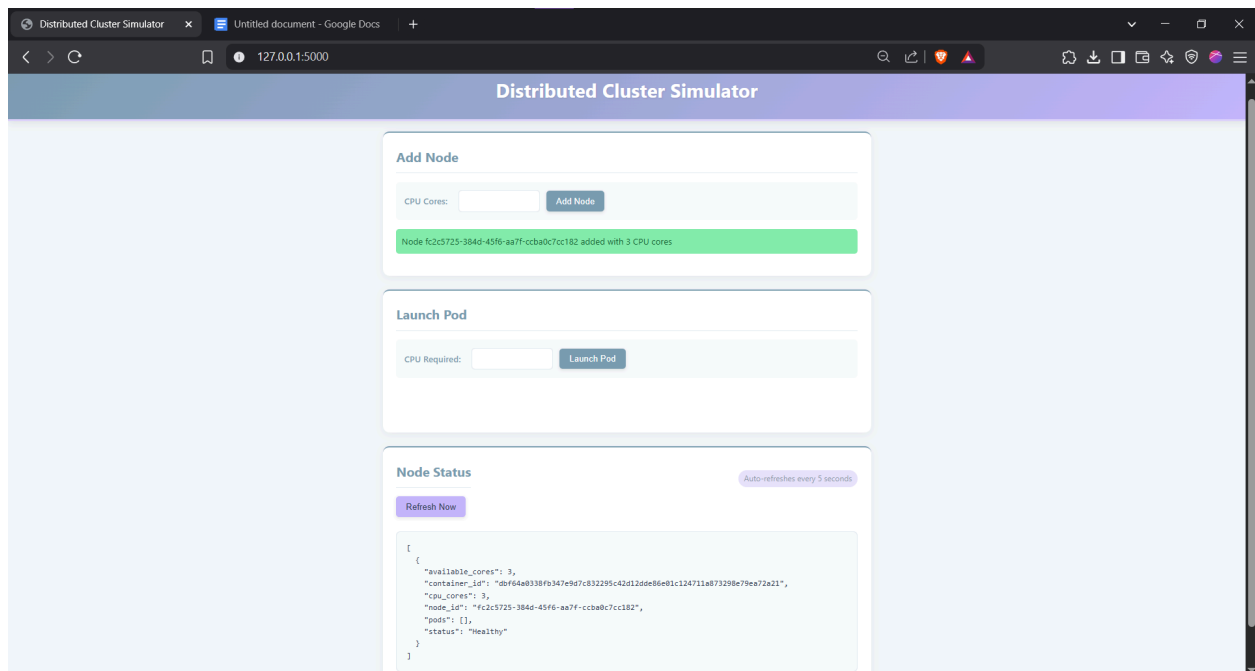
```
docker-compose up --build
```

```
PES2UG22CS183:~/A-Distributed-Systems-Cluster-Simulation-Framework-SRN-180-183-163-167--main$ docker-compose up --build
WARN[0002] /home/disha/A-Distributed-Systems-Cluster-Simulation-Framework-SRN-180-183-163-167--main/docker-compose.yml: the attribute `version` is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Building 1.1s (13/13) FINISHED
=> [app internal] load build definition from Dockerfile.app
=> => transferring Dockerfile: 236B
=> [app internal] load metadata for docker.io/library/python:3.9-slim
=> [app internal] load .dockerignore
=> => transferring context: 2B
=> [app 1/7] FROM docker.io/library/python:3.9-slim
=> [app internal] load build context
=> => transferring context: 5.9kB
=> CACHED [app 2/7] WORKDIR /app
=> CACHED [app 3/7] COPY requirements.txt .
=> CACHED [app 4/7] RUN pip install -r requirements.txt
=> [app 5/7] COPY app.py .
=> [app 6/7] COPY static/ ./static/
=> [app 7/7] COPY templates/ ./templates/
=> [app] exporting to image
=> => exporting layers
=> => writing image sha256:658ff7c7d3418e3c9f6ff077eb2c969cfd155ce10633bedfca54795e4502bfe7
=> => naming to docker.io/library/a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app
=> [app] resolving provenance for metadata file
WARN[0003] a network with name cluster_network exists but was not created for project "a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main".
Set 'external: true' to use an existing network
[+] Running 2/2
   app                               Built                                0.0s
   Container a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app-1 Recreated 0.1s
Attaching to app-1
app-1 | * Serving Flask app 'app'
app-1 | * Debug mode: off
app-1 | INFO:werkzeug:WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:55:20] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:56:19] "GET /list_nodes HTTP/1.1" 200 -
...
Enable Watch
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:52:40] "GET /static/style.css HTTP/1.1" 404 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:52:40] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:52:45] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:52:50] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:52:55] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:00] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:05] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:11] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:15] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:20] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:26] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:30] "GET /list_nodes HTTP/1.1" 200 -
app-1 | INFO:werkzeug:172.22.0.1 - - [11/Apr/2025 06:53:35] "GET /list_nodes HTTP/1.1" 200 -
```

Running

```
PES2UG22CS183:~$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS                               NAMES
a9aa1ee0f5f8   a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app   "python app.py"         6 minutes ago   Up 6 minutes   0.0.0.0:5000->5000/tcp, :::5000->5000/tcp   a-distributed-system
s-cluster-simulation-framework-srn-180-183-163-167--main-app-1
```

## ADDING NODE (WEEK1)



**Add Node**

CPU Cores:  **Add Node**

Node fc2c5725-384d-45f6-aa7f-ccb8c7cc182 added with 3 CPU cores

**Launch Pod**

CPU Required:  **Launch Pod**

**Node Status** Auto-refreshes every 5 seconds

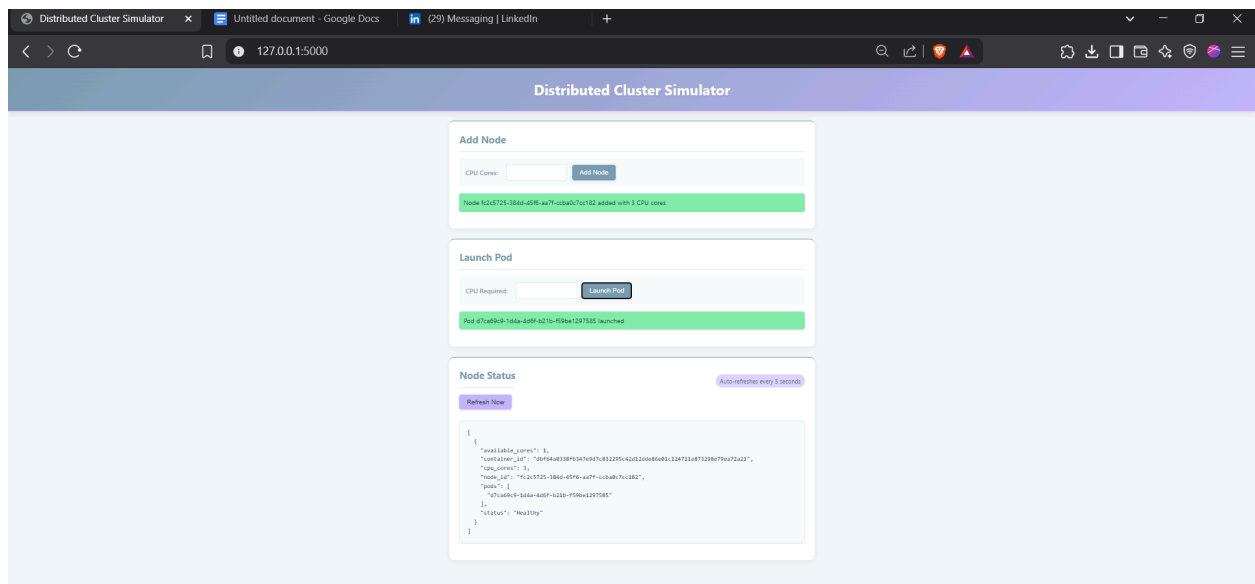
**Refresh Now**

```
{
  {
    "available_cores": 3,
    "container_id": "dbf64a0338fb347e9d7c832295c42d12dde06e01c124711a873298e79ea72a21",
    "cpu_cores": 3,
    "node_id": "fc2c5725-384d-45f6-aa7f-ccb8c7cc182",
    "ports": [],
    "status": "Healthy"
  }
}
```

```
PES2UG22CS183:~$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
dbf64a0338fb   cluster-node                        "python node.py"        43 seconds ago Up 41 seconds
a9aa1ee0f5f8   a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app "python app.py"        8 minutes ago Up 8 minutes   0.0.0.0:5000->5000/tcp, :::5000->5000/tcp
a9aa1ee0f5f8   a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app-1
```

Node called “determined\_rosalind” is added

## ADDING POD AND SCHEDULING (WEEK 2)



**Add Node**

CPU Cores:  **Add Node**

Node fc2c5725-384d-45f6-aa7f-ccb8c7cc182 added with 3 CPU cores

**Launch Pod**

CPU Required:  **Launch Pod**

Pod a7c409d3-10da-4a9f-b27b-950a4207505 launched

**Node Status** Auto-refreshes every 5 seconds

**Refresh Now**

```
{
  {
    "available_cores": 1,
    "container_id": "a7c409d3-10da-4a9f-b27b-950a4207505",
    "cpu_cores": 3,
    "node_id": "fc2c5725-384d-45f6-aa7f-ccb8c7cc182",
    "ports": [],
    "status": "Healthy"
  }
}
```

Pod assigned to node based on FIRST FIT SCHEDULING

# FAILURE RECOVERY

Add another node

```
{
  "available_cores": 5,
  "container_id": "d8f84a8338f93a79d71812295c21d3a8a8e0b13a731a87328ba79ea72a28",
  "cpu_cores": 5,
  "node_id": "793d5725-38aa-45f6-a67f-ccb4b7cc18d7",
  "pods": [
    {
      "id": "d75a6b0b-1d4a-4d89-b27b-f50ba12d7585"
    }
  ],
  "status": "Healthy"
},
{
  "available_cores": 5,
  "container_id": "767c3d827a05a5128993b054277f95b338a8a2c13a793b18f7cc3a850f8",
  "cpu_cores": 5,
  "node_id": "7a5db08f-2f7c-423b-851a-55b0bae931a7",
  "pods": [],
  "status": "Healthy"
}
}
```

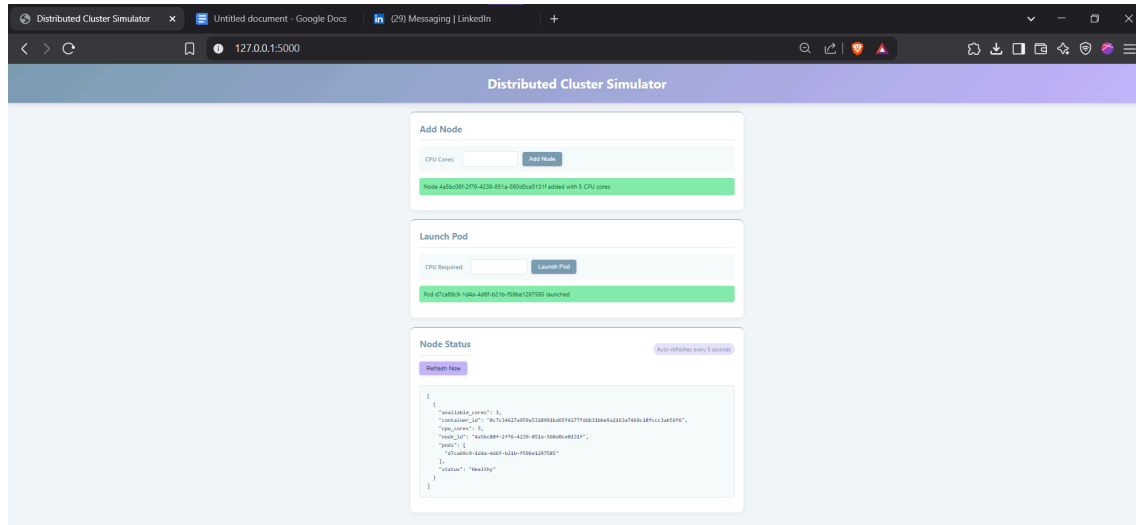
```
PES2UG22CS183:~$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
0c7c34627a95   cluster-node                        "python node.py"        34 seconds ago Up 33 seconds
dbf64a0338fb   cluster-node                        "python node.py"        6 minutes ago  Up 6 minutes
a9aa1ee0f5f8   a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app "python app.py"        14 minutes ago Up 14 minutes  0.0.0.0:5000->5000/tcp, :::5000->5000/tcp
a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app-1
```

Node called “affectionate davinci” added

Stopping the node which the pod has been assigned to

```
PES2UG22CS183:~$ docker rm -f determined_rosalind
determined_rosalind
PES2UG22CS183:~$
```

## Checking if pod has been assigned to the new node



```
PES2UG22CS183:~$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
0c7c34627a95   cluster-node                        "python node.py"        5 minutes ago   Up 5 minutes
a9aa1ee0f5f8   a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--main-app   "python app.py"        18 minutes ago   Up 18 minutes   0.0.0.0:5000->5000/tcp, 5000->5000/tcp
```

Pod has been assigned to new node “affectionate davinci” hence demonstrating failure recovery