

CC - mini project

A Distributed Systems Cluster Simulation Framework

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Section C

Starting server :

```
shashanks-MacBook-Air-2:~ shashank$ docker ps -a
CONTAINER ID   IMAGE                                     COMMAND                  CREATED        STATUS        PORTS                    NAMES
23f8fa150164   a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--app  "python app.py"        12 seconds ago Up 10 seconds  0.0.0.0:5000->5000/tcp  a-distrib
uted-systems-cluster-simulation-framework-srn-180-183-163-167--app-1
shashanks-MacBook-Air-2:~ shashank$
```

Interface :

Add Node

CPU Cores:

Launch Pod

CPU Required:

Node Status

Auto-refreshes every 5 seconds

[]

Adding a Node :

Distributed Cluster Simulator

Add Node

CPU Cores: Add Node

Node a53114bb-2cb4-4d8f-992d-55a5af46d266 added with 4 CPU cores

Node Status

Auto-refreshes every 5 seconds

Refresh Now

```
[
  {
    "available_cores": 4,
    "container_id": "031ffdd8829e9267ab2477c568d6068a6a88f7dbceb271e23b467d418bc8baab",
    "cpu_cores": 4,
    "node_id": "a53114bb-2cb4-4d8f-992d-55a5af46d266",
    "pods": [],
    "status": "Healthy"
  }
]
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
031ffdd8829e	cluster-node	'python node.py'	19 seconds ago	Up 18 seconds	
tender_ghern					
23f8fa150164	a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--app	'python app.py'	About a minute ago	Up About a minute	0.0.0.0:5000->5000/tcp
a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--app-1					

shashanks-MacBook-Air-2:~ shashank\$

Adding second node :

Distributed Cluster Simulator

Add Node

CPU Cores: Add Node

Node 5f4a591b-7a75-467b-9ce7-3491bef8226e added with 6 CPU cores

Node Status

Auto-refreshes every 5 seconds

Refresh Now

```
[
  {
    "available_cores": 4,
    "container_id": "031ffdd8829e9267ab2477c568d6068a6a88f7dbcce271e23b467d418bc8baab",
    "cpu_cores": 4,
    "node_id": "a53114bb-2cb4-4d8f-992d-55a5af46d266",
    "pods": [],
    "status": "Healthy"
  },
  {
    "available_cores": 6,
    "container_id": "053fc925827c0760a746add72ffc6761754161d7b4084fc3913ce79d03891a7b",
    "cpu_cores": 6,
    "node_id": "5f4a591b-7a75-467b-9ce7-3491bef8226e",
    "pods": [],
    "status": "Healthy"
  }
]
```

Launching Pod :

Launch Pod

CPU Required: Launch Pod

Pod 4381ea4c-52a1-4dcd-b536-5f06c02fd658 launched

Node Status

Auto-refreshes every 5 seconds

Refresh Now

```
[
  {
    "available_cores": 0,
    "container_id": "031ffdd8829e9267ab2477c568d6068a6a88f7dbceb271e23b467d418bc8baab",
    "cpu_cores": 4,
    "node_id": "a53114bb-2cb4-4d8f-992d-55a5af46d266",
    "pods": [
      "4381ea4c-52a1-4dcd-b536-5f06c02fd658"
    ],
    "status": "Healthy"
  },
  {
    "available_cores": 6,
    "container_id": "053fc925827c0760a746add72ffc6761754161d7b4084fc3913ce79d03891a7b",
    "cpu_cores": 6,
    "node_id": "5f4a591b-7a75-467b-9ce7-3491bef8226e",
    "pods": [],
    "status": "Healthy"
  }
]
```

As we can see it is First fit scheduling so the pod created has chosen the first node that meets the CPU requirements.

All the nodes :

```
shashanks-MacBook-Air-2:~ shashank$ docker ps -a
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
pensive_cartwright 053fc925827c cluster-node             "python node.py"       47 seconds ago Up 46 seconds
tender_shtern      031ffdd8829e cluster-node             "python node.py"       About a minute ago Up About a minute
23f8fa150164      a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--app "python app.py"        2 minutes ago  Up 2 minutes  0.0.0.0:5000->5000/tcp
a-distributed-systems-cluster-simulation-framework-srn-180-183-163-167--app-1
shashanks-MacBook-Air-2:~ shashank$
```

Fault tolerance :

We will be manually stopping a node now

```
[shashanks-MacBook-Air-2:~ shashank$ docker stop tender_shtern
tender_shtern
shashanks-MacBook-Air-2:~ shashank$
```

Node Status

Auto-refreshes every 5 seconds

Refresh Now

```
[
  {
    "available_cores": 2,
    "container_id": "053fc925827c0760a746add72ffc6761754161d7b4084fc3913ce79d03891a7b",
    "cpu_cores": 6,
    "node_id": "5f4a591b-7a75-467b-9ce7-3491bef8226e",
    "pods": [
      "4381ea4c-52a1-4dcd-b536-5f06c02fd658"
    ],
    "status": "Healthy"
  }
]
```

As we can see after the node has been stopped, the node has a pod running in it so when the node stopped we have recognised it stopping with heartbeats.

We have reallocated the pods to the next node using the First-fit that meets the CPU requirements.