# Docker Swarm

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# Topics

- What is Docker Swarm?
- What is a Node?
- Docker Swarm visualizer
- Docker Swarm service

# What is a Docker Swarm?

# What is Swarm?

- A swarm is a cluster of Docker engines, or nodes, where you deploy services
  - The Docker Engine CLI and API include commands to manage swarm nodes (e.g., add or remove nodes), and deploy and orchestrate services across the swarm
- You enable swarm mode for an engine by either initializing a swarm or joining an existing swarm
  - When you run Docker without using swarm mode, you execute container commands
  - When you run the Docker in swarm mode, you orchestrate services
- You can run swarm services and standalone containers on the same Docker instances.

# Docker Swarm Features

- Cluster management integrated with Docker Engine
- Decentralized design
- Declarative service model
- Scaling
- Desired state reconciliation
- Multi-host networking
- Service discovery
- Load balancing
- Secure by default
- Rolling updates

# What is a Node?

# What is a Node?

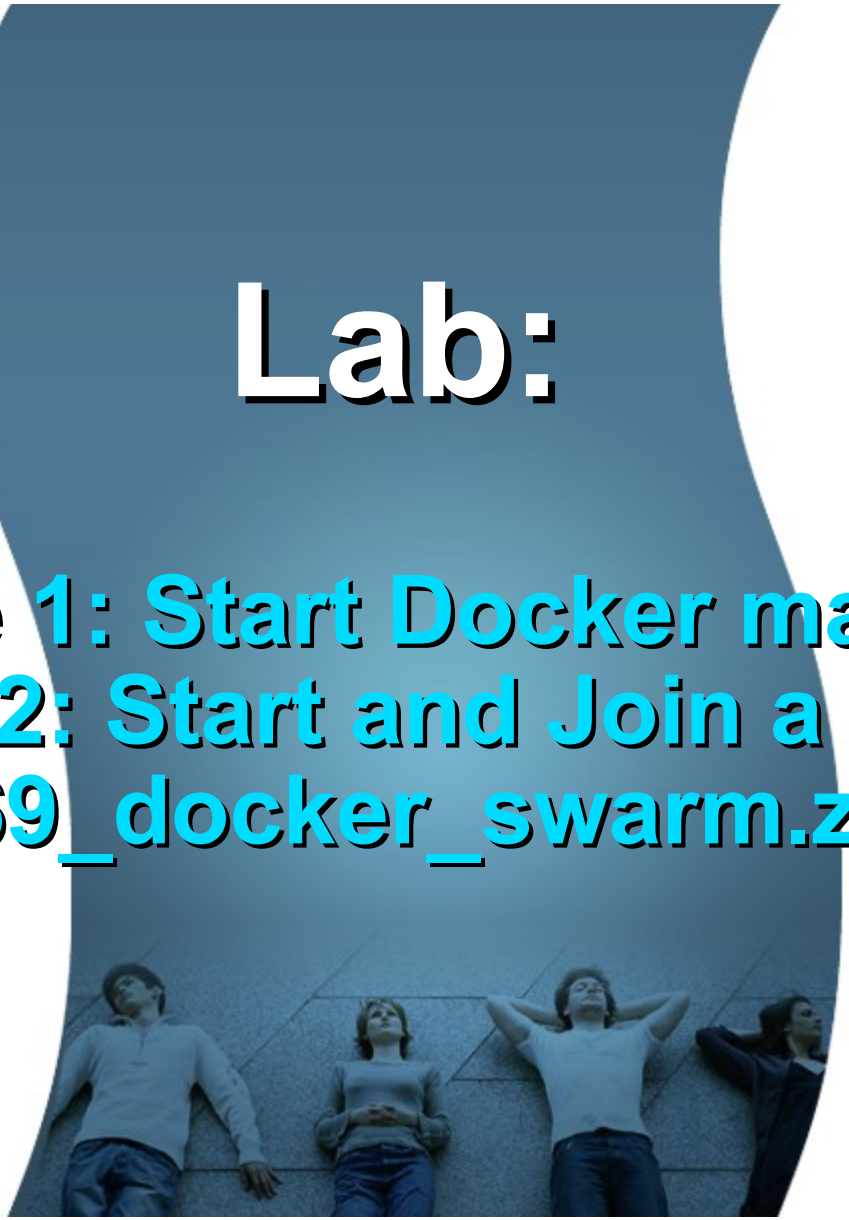
- A node is an instance of the Docker engine participating in the swarm
- You can run one or more nodes on a single physical computer or cloud server, but production swarm deployments typically include Docker nodes distributed across multiple physical and cloud machines
- There are two kinds of nodes
  - Manager mode
  - Worker node

# Manager node & Worker Node

- To deploy your application to a swarm, you submit a service definition to a manager node
  - The manager node dispatches units of work called tasks to worker nodes
- Manager nodes also perform the orchestration and cluster management functions required to maintain the desired state of the swarm
  - Manager nodes elect a single leader to conduct orchestration tasks
- Worker nodes receive and execute tasks dispatched from manager nodes
  - An agent runs on each worker node and reports on the tasks assigned to it - The worker node notifies the manager node of the current state of its assigned tasks so that the manager can maintain the desired state of each worker.

# Lab:

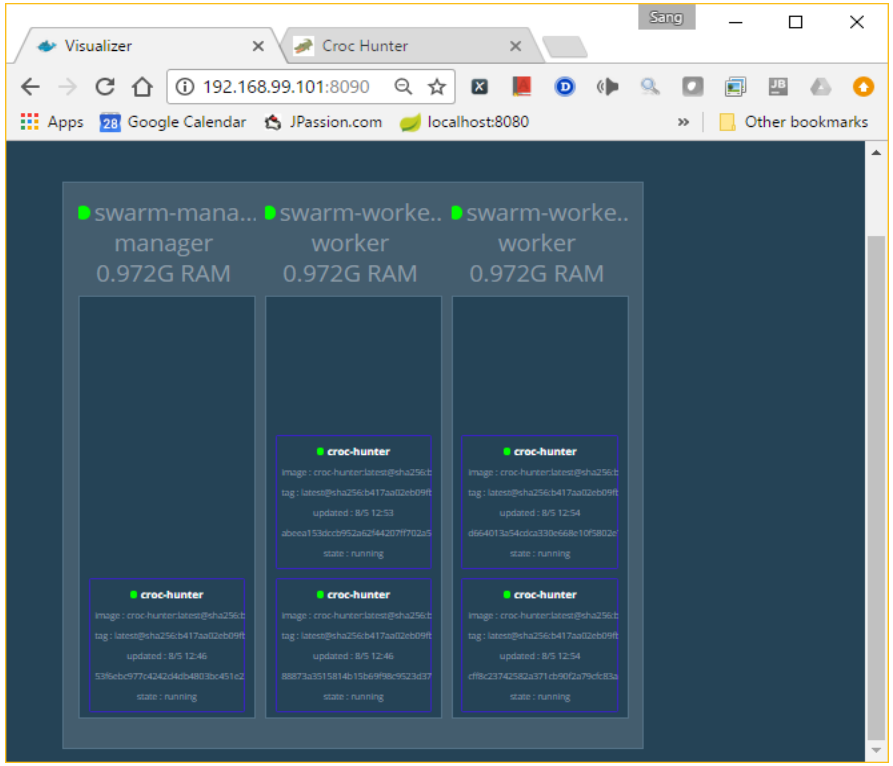
## Exercise 1: Start Docker machines
## Exercise 2: Start and Join a Swarm
## 1669_docker_swarm.zip

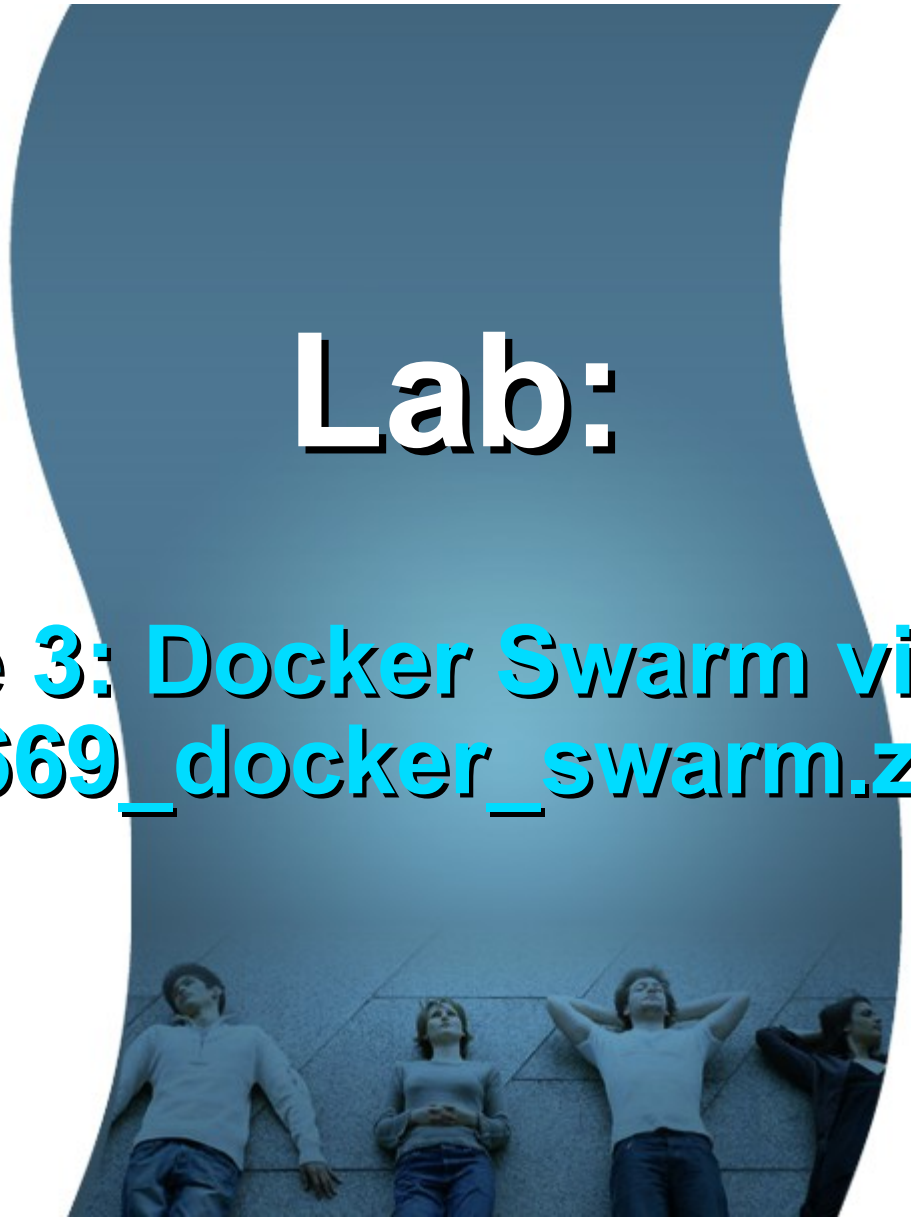


# Docker Swarm Visualizer Container

# Docker Swarm Visualizer

- Docker swarm visualizer is a GUI front-end that shows the docker machines and service instances that are running in the worker nodes





# Lab:

## Exercise 3: Docker Swarm visualizer 1669_docker_swarm.zip

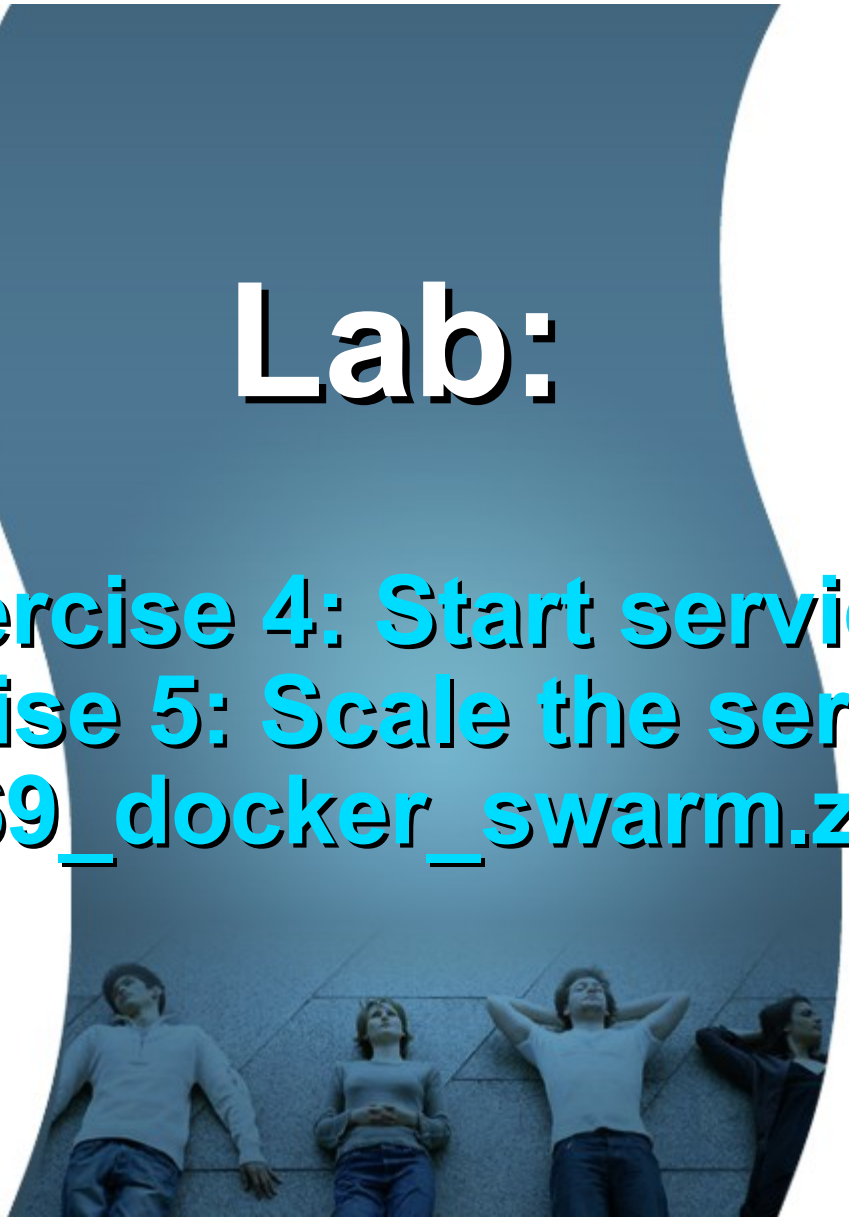
# Docker Swarm Service

# Services and Tasks

- A service is the definition of the tasks to execute on the worker nodes
  - It is the central structure of the swarm system and the primary root of user interaction with the swarm
- When you create a service, you specify which container image to use and which commands to execute inside running containers
- Service can be scaled and scaled down

# Lab:

## Exercise 4: Start service
## Exercise 5: Scale the service
## 1669_docker_swarm.zip



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