# Docker Certified Associate

## Importance of Quorum in a Swarm Cluster

# The Importance of Manager Nodes in a Swarm

Every Swarm will have 1 to N ‘Manager’ nodes in it. These special nodes are responsible for managing, directing, logging and reporting on the lifecycle of the Swarm in general.

The ‘Raft Consensus Algorithm’ is used to manage the swarm state. Using this ‘consensus’ method amongst the management nodes is designed to be sure that in the event of a failure of any manager, any other manager will have enough information stored on it to continue to operation the swarm as expected.

Raft tolerates up to (N-1)/2 failures and requires a majority (quorum) of (N/2)+1 to agree on any new instructions that are proposed to the cluster for execution.

# Requirements

## Breakdown of Manager Nodes for Fault Tolerance

| Swarm Size | Majority | Fault Tolerance |
|---|---|---|
| 1 | 1 | 0 |
| 2 | 2 | 0 |
| 3 | 2 | 1 |
| 4 | 3 | 1 |
| 5 | 3 | 2 |
| 6 | 4 | 2 |
| 7 | 4 | 3 |
| 8 | 5 | 3 |
| 9 | 5 | 4 |

## Requirements/Considerations

- Use Static IPs
- Immediately Replace Failed Managers
- Distribute Management Nodes for High Availability
- Monitor Swarm Health
- Have a Backup and Recovery Plan for the Swarm

# Requirements

## Management Node Datacenter Distribution for HA

| Swarm Manager Nodes | Repartition (on 3 Availability Zones) |
|---|---|
| 3 | 1-1-1 |
| 5 | 2-2-1 |
| 7 | 3-2-2 |
| 9 | 3-3-3 |

## Requirements/Considerations

- Use a Minimum of 3 Availability Zones to Distribute Managers
- Run ‘Manager Only’ Nodes
- docker node update –availability drain [node]
- Force Rebalance
- docker service update --force