**Overview, Setting up and testing the overlay network**

**Basic Overview**

1. Overlay network is mostly used for swarm mode.
2. It is vital that containers can communicate with each other reliably and securely, even when they’re on different hosts that are on different networks. This is where overlay networking comes in to play. It allows you to create a flat, secure, layer-2 network, spanning multiple hosts.

**Setup**

1. Create two nodes/instances
2. docker swarm init --advertise-addr={insert IP address of swarm manager}
3. create a swarm worker on the other node using the token received on step 2
4. Run the following command from node1 (manager).
   1. docker network create -d overlay mynet
5. docker network ls
   1. see if the network was created
   2. The newly created network is at the bottom of the list called mynet. The other networks were automatically created when Docker was installed and when the swarm was initialized.
6. If you run the docker network ls command on node2, you’ll notice that it can’t see the mynet network. This is because new overlay networks are only extended to worker nodes when they are tasked with running a container on it. This lazy approach to extended overlay networks improves network scalability by reducing the amount of network gossip.
7. On manager node run --
   1. docker service create --name test --network mynet --replicas 2 ubuntu sleep 1d
8. The command creates a new service called test, attaches it to the mynet overlay network, and creates two replicas (containers) based on the image provided.
9. Because we’re running two replicas (containers), and the Swarm has two nodes, one replica will be scheduled on each node.
10. docker service ps test
11. When Swarm starts a container on an overlay network, it automatically extends that network to the node the container is running on. This means that the mynet network is now visible on node2.
12. For Information only –
    1. Standalone containers that are not part of a swarm service cannot attach to overlay networks unless they have the attachable=true property. The following command can be used to create an attachable overlay network that standalone containers can also attach to.
    2. docker network create -d overlay --attachable mynet

**Test**

1. Run the following command on both nodes to find their internal IP
   1. docker container ls
   2. docker container inspect --format='{{range .NetworkSettings.Networks}}{{.IPAddress}}{{end}}' [container id]
   3. make a note of this ip. We will need it in next step.
2. Run the following command on both nodes to update few packages
   1. docker container exec -it [container id] bash
   2. apt-get update && apt-get install iputils-ping -y
   3. apt-get install tcptraceroute
   4. ping [ip of the other node found by step 1b]
   5. tcptraceroute [ip of the other node found by step 1b]
   6. the tcptracerroute proves that the containers are talking to each other directly without being aware of any underlying networks being traversed.