Lab Exercise 3- Working with Docker Networking

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Batch:- DevOps B1

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Step 1: Understanding Docker Default Networks

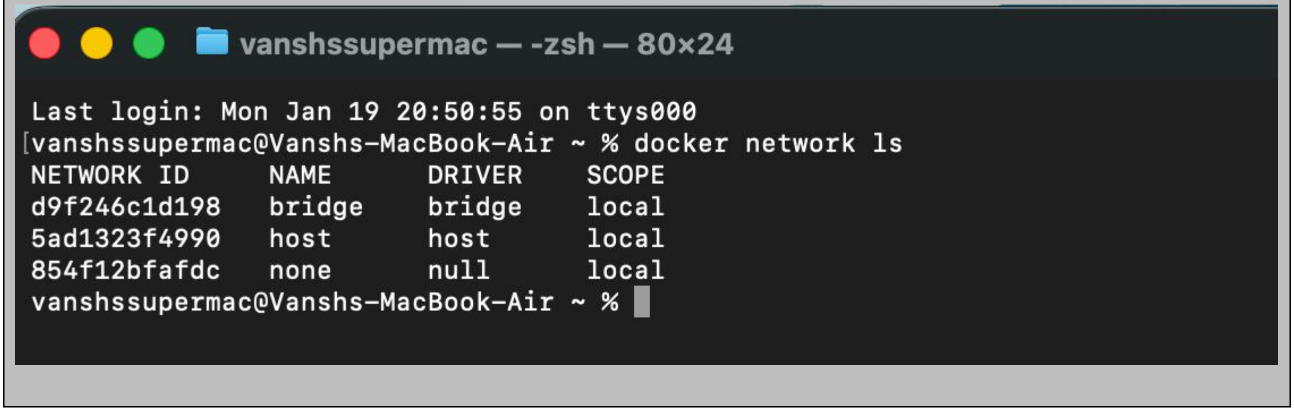
Docker provides three default networks:

- bridge: The default network when a container starts.
- host: Bypasses Docker's network isolation and attaches the container directly to the host network.
- none: No networking is available for the container.

1.1. Inspect Default Networks

Check Docker's default networks using:

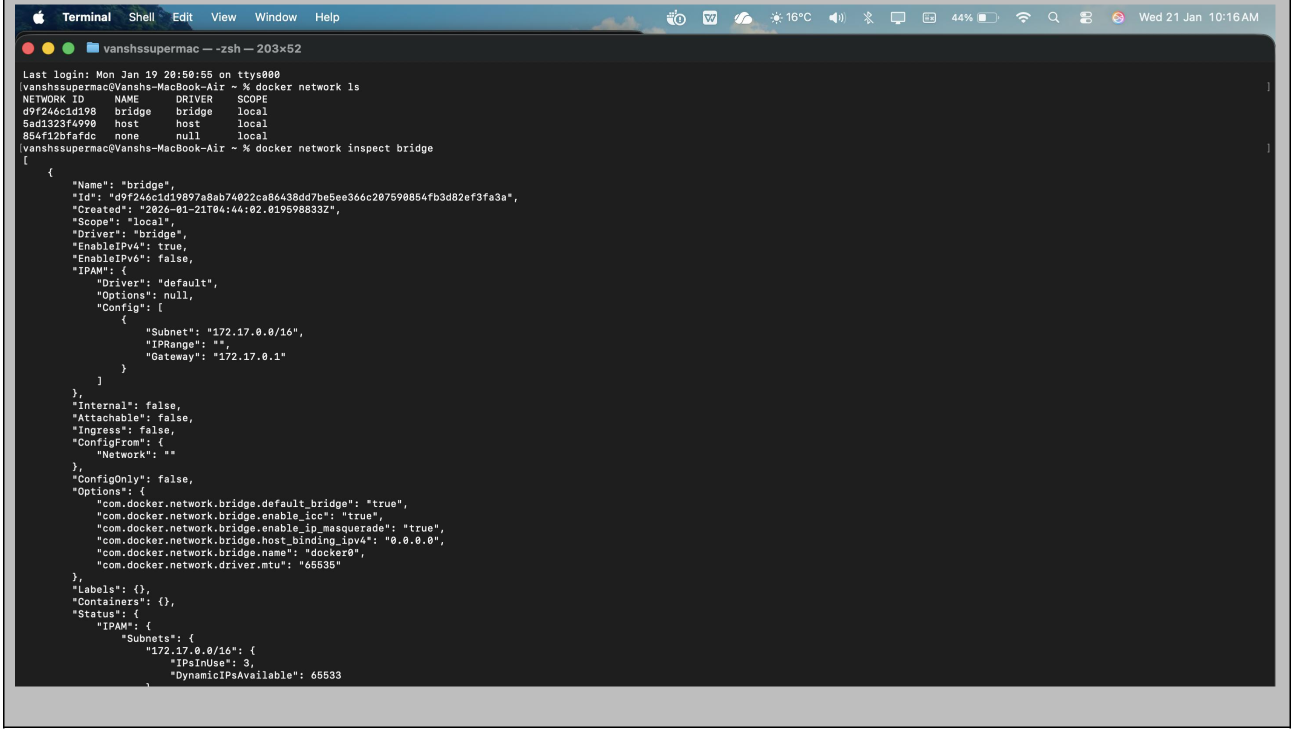
```
docker network

ls
```



```
Last login: Mon Jan 19 20:50:55 on ttys000
vanshssupermac@Vanshs-MacBook-Air ~ % docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
d9f246c1d198   bridge    bridge    local
5ad1323f4990   host      host      local
854f12bfafdc   none      null      local
vanshssupermac@Vanshs-MacBook-Air ~ %
```

1.2. Inspect the Bridge Network

```
docker network inspect bridge
```



```
Last login: Mon Jan 19 20:50:55 on ttys000
vanshssupermac@Vanshs-MacBook-Air ~ % docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
d9f246c1d198   bridge    bridge    local
5ad1323f4990   host      host      local
854f12bfafdc   none      null      local
vanshssupermac@Vanshs-MacBook-Air ~ % docker network inspect bridge
[
    {
        "Name": "bridge",
        "Id": "d9f246c1d19897a8ab74022ca86438dd7be5ee366c207590854fb3d82ef3fa3a",
        "Created": "2026-01-21T04:44:02.019598833Z",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv4": true,
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": null,
            "Config": [
                {
                    "Subnet": "172.17.0.0/16",
                    "IPRange": "",
                    "Gateway": "172.17.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
            "Network": ""
        },
        "ConfigOnly": false,
        "Options": {
            "com.docker.network.bridge.default_bridge": "true",
            "com.docker.network.bridge.enable_icc": "true",
            "com.docker.network.bridge.enable_ip_masquerade": "true",
            "com.docker.network.bridge.host_binding_ipv4": "0.0.0.0",
            "com.docker.network.bridge.name": "docker0",
            "com.docker.network.driver.mtu": "65535"
        },
        "Labels": {},
        "Containers": {},
        "Status": {
            "IPAM": {
                "Subnets": {
                    "172.17.0.0/16": {
                        "IPsInUse": 3,
                        "DynamicIPsAvailable": 65533
```

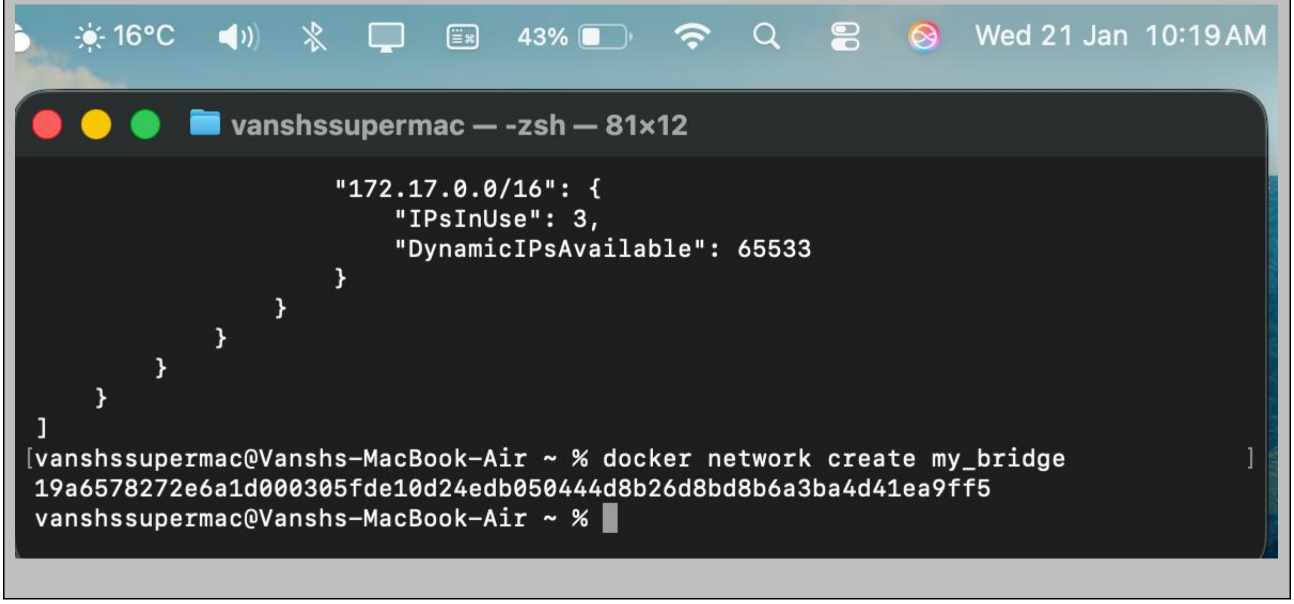
This command will show detailed information about the bridge network, including the connected containers and IP address ranges.

Step 2: Create and Use a Bridge Network

2.1. Create a User-Defined Bridge Network

A user-defined bridge network allows containers to communicate by name instead of IP.

```
docker network create

my_bridge
```

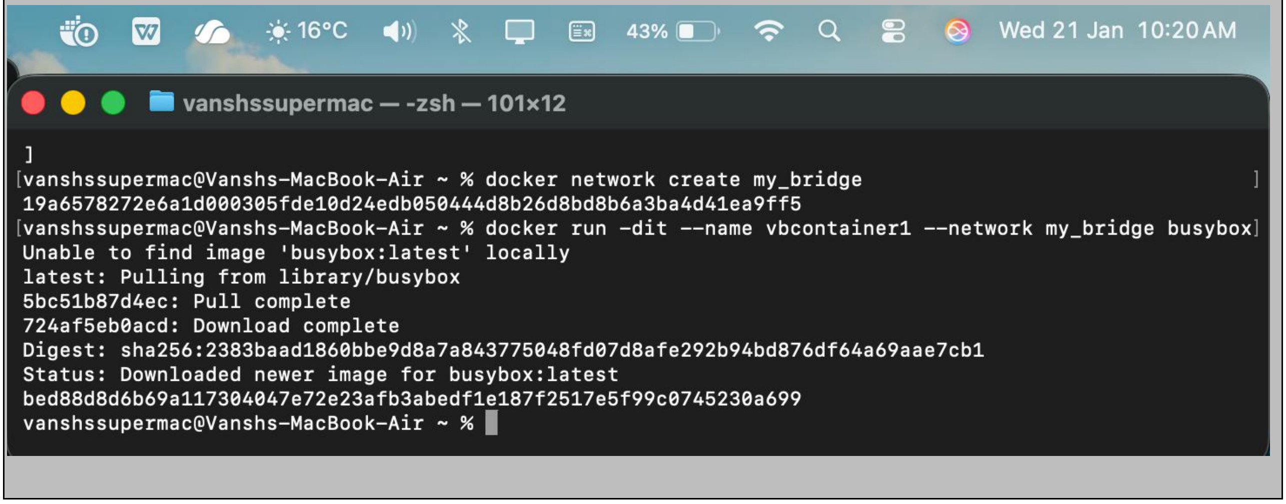


```
                    "172.17.0.0/16": {
                        "IPsInUse": 3,
                        "DynamicIPsAvailable": 65533
                    }
                }
            }
        }
    }
]
vanshssupermac@Vanshs-MacBook-Air ~ % docker network create my_bridge
19a6578272e6a1d000305fde10d24edb050444d8b26d8bd8b6a3ba4d41ea9ff5
vanshssupermac@Vanshs-MacBook-Air ~ %
```

2.2. Run Containers on the User-Defined Network

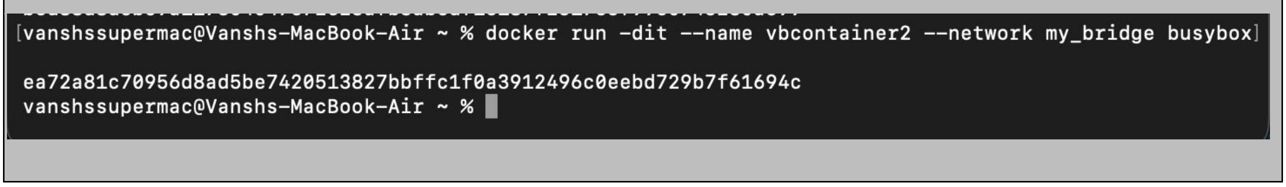
Start two containers on the newly created my_bridge network:

```
docker run -dit --name container1 --network my_bridge

busybox
```



```
]
vanshssupermac@Vanshs-MacBook-Air ~ % docker network create my_bridge
19a6578272e6a1d000305fde10d24edb050444d8b26d8bd8b6a3ba4d41ea9ff5
vanshssupermac@Vanshs-MacBook-Air ~ % docker run -dit --name vbcontainer1 --network my_bridge busybox
Unable to find image 'busybox:latest' locally
latest: Pulling from library/busybox
5bc51b87d4ec: Pull complete
724af5eb0acd: Download complete
Digest: sha256:2383baad1860bbe9d8a7a843775048fd07d8afe292b94bd876df64a69aae7cb1
Status: Downloaded newer image for busybox:latest
bed88d8d6b69a117304047e72e23afb3abedf1e187f2517e5f99c0745230a699
vanshssupermac@Vanshs-MacBook-Air ~ %
```

```
docker run -dit --name container2 --network my_bridge

busybox
```

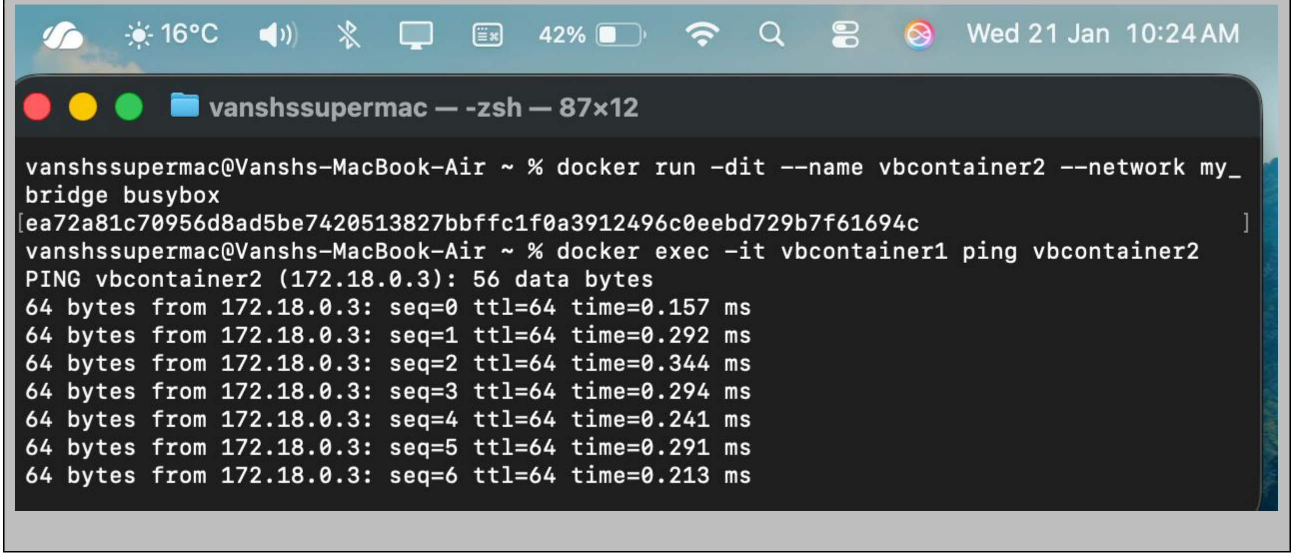


```
[vanshssupermac@Vanshs-MacBook-Air ~ % docker run -dit --name vbcontainer2 --network my_bridge busybox]

 ea72a81c70956d8ad5be7420513827bbffc1f0a3912496c0eebd729b7f61694c
 vanshssupermac@Vanshs-MacBook-Air ~ %
```

2.3. Test Container Communication

Execute a ping command from container1 to container2 using container names:

```
docker exec -it container1 ping

container2
```



```
vanshssupermac@Vanshs-MacBook-Air ~ % docker run -dit --name vbcontainer2 --network my_
bridge busybox
[ea72a81c70956d8ad5be7420513827bbffc1f0a3912496c0eebd729b7f61694c                      ]
vanshssupermac@Vanshs-MacBook-Air ~ % docker exec -it vbcontainer1 ping vbcontainer2
PING vbcontainer2 (172.18.0.3): 56 data bytes
64 bytes from 172.18.0.3: seq=0 ttl=64 time=0.157 ms
64 bytes from 172.18.0.3: seq=1 ttl=64 time=0.292 ms
64 bytes from 172.18.0.3: seq=2 ttl=64 time=0.344 ms
64 bytes from 172.18.0.3: seq=3 ttl=64 time=0.294 ms
64 bytes from 172.18.0.3: seq=4 ttl=64 time=0.241 ms
64 bytes from 172.18.0.3: seq=5 ttl=64 time=0.291 ms
64 bytes from 172.18.0.3: seq=6 ttl=64 time=0.213 ms
```

The containers should be able to communicate since they are on the same network.

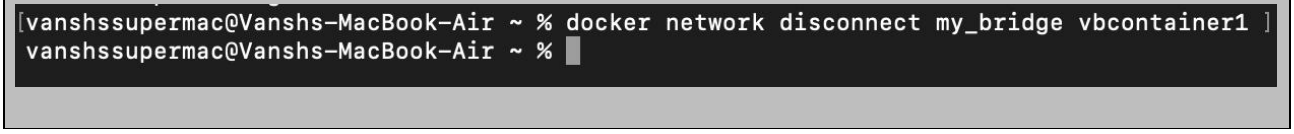
Step 3: Disconnect and Remove Networks

3.1. Disconnect Containers from Networks

To disconnect container1 from my_bridge:

docker network disconnect my_bridge

container1



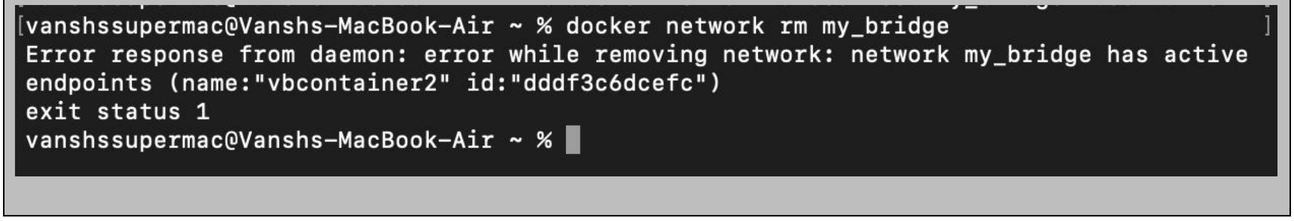
```
[vanshssupermac@Vanshs-MacBook-Air ~ % docker network disconnect my_bridge vbcontainer1 ]
vanshssupermac@Vanshs-MacBook-Air ~ %
```

4.2. Remove Networks

To remove the user-defined network:

docker network rm

my_bridge



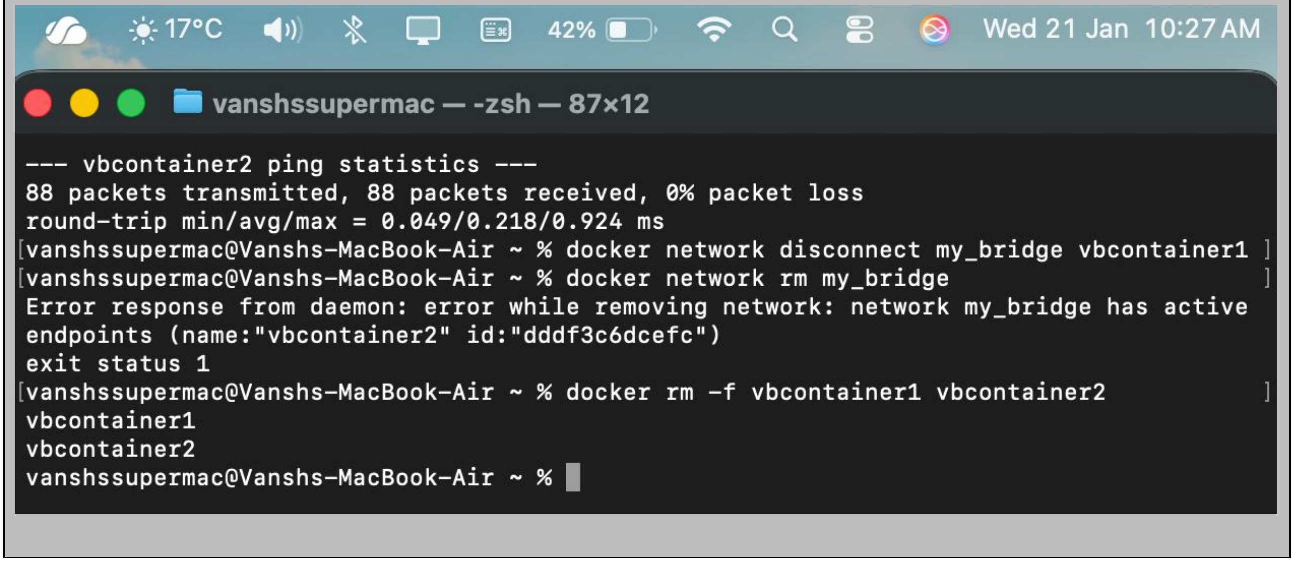
```
[vanshssupermac@Vanshs-MacBook-Air ~ % docker network rm my_bridge                         ]
Error response from daemon: error while removing network: network my_bridge has active
endpoints (name:"vbcontainer2" id:"dddf3c6dcefc")
exit status 1
vanshssupermac@Vanshs-MacBook-Air ~ %
```

Step 4: Clean Up

Stop and remove all containers created during this exercise:

docker rm -f container1

container2



```
--- vbcontainer2 ping statistics ---
88 packets transmitted, 88 packets received, 0% packet loss
round-trip min/avg/max = 0.049/0.218/0.924 ms
[vanshssupermac@Vanshs-MacBook-Air ~ % docker network disconnect my_bridge vbcontainer1 ]
[vanshssupermac@Vanshs-MacBook-Air ~ % docker network rm my_bridge                         ]
Error response from daemon: error while removing network: network my_bridge has active
endpoints (name:"vbcontainer2" id:"dddf3c6dcefc")
exit status 1
[vanshssupermac@Vanshs-MacBook-Air ~ % docker rm -f vbcontainer1 vbcontainer2             ]
vbcontainer1
vbcontainer2
vanshssupermac@Vanshs-MacBook-Air ~ %
```