

Docker Lab 6 — Macvlan & IPVLAN Networking

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Lab Description

Lab 6 focuses on **Macvlan** and **IPVLAN** networking — two advanced Docker networking drivers used in real enterprise networks, DMZ zones, and legacy system integration. These drivers allow containers to appear directly on the physical network with their own MAC and IP addresses.

You will create Macvlan networks, attach containers such as `nginx` and `ubuntu`, and validate direct LAN-level connectivity.

Topics Covered

- What is Macvlan?
 - What is IPVLAN?
 - Differences between Macvlan vs Bridge vs Host vs Overlay
 - Creating Macvlan networks
 - Assigning physical-like IPs to containers
 - Testing connectivity across hosts
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Learning Objectives

- Understand L2-level container networking
 - Create Macvlan and IPVLAN networks
 - Attach containers directly to your LAN
 - Understand when to use Macvlan in enterprise scenarios
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Learning Outcomes

- Ability to design production networks that integrate Docker with physical systems
 - Ability to isolate workloads using VLAN and Macvlan
 - Ability to troubleshoot advanced networking setups
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Section 1 — Create a Macvlan Network

Find your network interface:

```
ip addr
```

Assume interface is `eth0`.

Create Macvlan network:

```
docker network create -d macvlan
--subnet=192.168.1.0/24
--gateway=192.168.1.1
-o parent=eth0 sandeep-macvlan
```

Section 2 — Create Containers Using Macvlan

```
docker run -d --name sandeep-mac-nginx --network sandeep-macvlan nginx
```

Inspect IP:

```
docker inspect sandeep-mac-nginx | grep IPAddress
```

It should receive an IP from your physical LAN.

Section 3 — Test LAN Communication

Ping the container from another machine on your LAN:

```
ping <container_ip>
```

Container behaves like a real physical host.

Section 4 — Create an IPVLAN Network (L3 Mode)

```
docker network create -d ipvlan
  --subnet=192.168.1.0/24
  --gateway=192.168.1.1
  -o parent=eth0
  -o ipvlan_mode=l3 sandeep-ipvlan
```

Create container:

```
docker run -d --name sandeep-ip-ubuntu --network sandeep-ipvlan ubuntu sleep
infinity
```

Section 5 — Cleanup

```
docker rm -f sandeep-mac-nginx sandeep-ip-ubuntu
```

```
docker network rm sandeep-macvlan sandeep-ipvlan
```

Summary

You created Macvlan and IPVLAN networks and deployed containers with physical-like IP addresses. This is required for enterprise network integration and advanced isolation models.