## **🔹 1. Basics of Docker Networking**

When you run containers, they need a way to talk to:

* **Each other** (e.g., app ↔ database)
* **The outside world** (e.g., fetch packages, expose APIs)
* **Your host machine** (developer tools, browser, etc.)

Docker provides **network drivers** to handle this.

## **🔹 2. Docker Network Drivers**

### **1. bridge (default)**

* Default network driver for standalone containers.
* Each container gets its own private IP inside a bridge network.
* Containers can talk to each other if they are on the same bridge network.
* Good for **most local development** setups.

👉 Example: Run a web and db container on the same custom bridge network, and they can talk by container name.

### **2. host**

* Removes the isolation between container and host.
* The container shares the host’s networking namespace.
* Faster (no NAT), but **only available on Linux**.
* Useful if:  
  + You want the container to listen on the host’s network stack directly.
  + Example: Running monitoring agents like prometheus-node-exporter.

### **3. none**

* No networking at all.
* Container has a loopback device only.
* Useful for security or batch jobs where networking is not needed.

### **4. overlay**

* Used in **Docker Swarm / Kubernetes**.
* Allows multi-host networking (containers on different machines can communicate).
* Not needed for single-host setups.

### **5. macvlan**

* Assigns a MAC address to a container, making it look like a physical device on the LAN.
* Useful when containers need to appear as if they are **real machines on the network**.
* Example: Running a containerized DHCP server.

## **🔹 3. Which One to Use When?**

| **Network** | **Use Case** |
| --- | --- |
| **bridge** | Default for local development, app ↔ db, microservices on one host |
| **host** | Performance-critical apps that need direct host networking (Linux only) |
| **none** | Jobs with no networking needed |
| **overlay** | Multi-host (Swarm / Kubernetes) communication |
| **macvlan** | When containers must appear as physical devices on LAN |