# K3s and MetalLB Setup Guide

## Objective

We are setting up a lightweight Kubernetes cluster using K3s, installing MetalLB for LoadBalancer support, deploying an Nginx service, and exposing it using MetalLB.

## 1. Install K3s

K3s is a lightweight Kubernetes distribution that simplifies deployment.

Run the following command to install K3s:

curl -sfL https://get.k3s.io | sh -

Check if K3s is running:

sudo systemctl status k3s

### Check if K3s is running

Verify that the Kubernetes nodes are available:

kubectl get nodes

## 2. Install MetalLB

MetalLB is a load balancer implementation for bare-metal Kubernetes clusters.

Apply the MetalLB manifest:

kubectl apply -f https://raw.githubusercontent.com/metallb/metallb/main/config/manifests/metallb-native.yaml

## 3. Deploy Nginx

Create an Nginx deployment:

kubectl create deployment nginx --image=nginx

Expose it as a LoadBalancer service:

kubectl expose deployment nginx --port=80 --type=LoadBalancer

### Check Nginx Service

Check if the Nginx service is running:

kubectl get svc nginx

## 4. Configure MetalLB IP Pool

Define an external IP range that MetalLB can assign to LoadBalancer services.

Edit the IP address pool configuration:

nano ipaddresspool.yaml

Add the following content to ipaddresspool.yaml:

apiVersion: metallb.io/v1beta1  
kind: IPAddressPool  
metadata:  
 name: external-ip-pool  
 namespace: metallb-system  
spec:  
 addresses:  
 - 10.0.2.100-10.0.2.120 # Update this to match your desired external IP range

Apply the configuration:

kubectl apply -f ipaddresspool.yaml

Verify the IP address pool:

kubectl get ipaddresspool -n metallb-system

## 5. Verify and Manage Resources

### Check Kubernetes Pods

kubectl get pods -A

### Check Nodes

kubectl get nodes

### Check Services

kubectl get svc

### Describe a Pod

kubectl describe pod <POD\_NAME> -n <NAMESPACE>

### Check Logs of a Pod

kubectl logs -f <POD\_NAME>

### Delete Deployment

kubectl delete deployment nginx

### Delete Service

kubectl delete svc nginx