Minikube with Docker on RHEL 9

Given your experience with Kubernetes administration and container orchestration, here's a focused guide for setting up Minikube with Docker driver on RHEL 9.

Prerequisites

System Requirements

RHEL 9 with 2+ CPUs and 4GB RAM

20GB free disk space

Internet connectivity

Sudo privileges

Docker Version Requirements

Docker 18.09 or higher (20.10+ recommended) for optimal compatibility.

Step-by-Step Installation

Step 1: Install Docker CE

bash

# Add Docker repository

sudo dnf config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo

# Install Docker CE with compatibility flags

sudo dnf install docker-ce docker-ce-cli containerd.io --nobest -y

# Start and enable Docker service

sudo systemctl start docker

sudo systemctl enable docker

# Verify Docker installation

sudo systemctl status docker

docker --version

Step 2: Configure Docker for Non-Root Access

bash

# Add current user to docker group

sudo usermod -aG docker $USER

# Apply group changes (logout/login or use newgrp)

newgrp docker

# Test Docker without sudo

docker run hello-world

Step 3: Install kubectl

bash

# Download latest stable kubectl

curl -LO "https://dl.k8s.io/release/$(curl -L -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"

# Make executable and install

chmod +x kubectl

sudo mv kubectl /usr/local/bin/

# Verify installation

kubectl version --client --output=yaml

Step 4: Install Minikube

bash

# Download latest Minikube binary

curl -LO https://storage.googleapis.com/minikube/releases/latest/minikube-linux-amd64

# Install Minikube

sudo install minikube-linux-amd64 /usr/local/bin/minikube

# Verify installation

minikube version

Starting Minikube with Docker Driver

Basic Cluster Startup

bash

# Start Minikube with Docker driver

minikube start --driver=docker

# Set Docker as default driver for future clusters

minikube config set driver docker

# Verify cluster status

minikube status

Advanced Configuration Options

bash

# Start with custom resource allocation

minikube start --driver=docker --memory=4096 --cpus=2 --disk-size=20GB

# Start with specific Kubernetes version

minikube start --driver=docker --kubernetes-version=v1.28.3

# Start with container runtime specification

minikube start --driver=docker --container-runtime=containerd

Cluster Verification and Testing

Verify Cluster Components

bash

# Check cluster information

kubectl cluster-info

# List nodes

kubectl get nodes -o wide

# Check system pods

kubectl get pods -n kube-system

# Minikube specific status

minikube status

Deploy Test Application

bash

# Create nginx deployment

kubectl create deployment nginx-test --image=nginx:latest --replicas=2

# Expose deployment as NodePort service

kubectl expose deployment nginx-test --type=NodePort --port=80 --target-port=80

# Get service details

kubectl get services nginx-test

# Access the service through Minikube

minikube service nginx-test --url

# Test the service

curl $(minikube service nginx-test --url)