# Complete Guide: Spring Boot Microservices with Docker, MySQL, Kubernetes (Minikube)

## 1. Prerequisites

Install the following:  
- Docker Desktop (with Kubernetes support)  
- Minikube  
- kubectl  
- Maven  
- Docker Hub account

## 2. Start Minikube

minikube start --driver=docker

## 3. MySQL Setup Inside Kubernetes

a. Create `mysql-deployment.yaml`:  
(Include PVC, Deployment and Service in YAML)  
  
b. Apply the MySQL deployment:  
kubectl apply -f mysql-deployment.yaml  
  
c. Connect and Create DBs:  
kubectl exec -it $(kubectl get pods -l app=mysql -o jsonpath="{.items[0].metadata.name}") -- mysql -uroot  
  
Inside MySQL:  
CREATE DATABASE guru\_authdb;  
CREATE DATABASE guru\_communitydb;  
CREATE DATABASE guru\_contentdb;  
CREATE DATABASE guru\_notificationdb;

## 4. Build & Package Microservices

For each service (auth, community, content, notification):  
cd <service-folder>  
mvn clean package -DskipTests

## 5. Dockerfile

FROM eclipse-temurin:21-jdk-alpine  
WORKDIR /app  
COPY target/\*.jar app.jar  
ENTRYPOINT ["java", "-jar", "app.jar"]

## 6. Build & Push Docker Images

docker build -t afra1507/<servicename>:latest .  
docker push afra1507/<servicename>:latest

## 7. Kubernetes Deployment YAMLs

Each deployment YAML should include:  
- Deployment (image, ports, env with DB config)  
- Service  
  
Example for authservice:  
- port: 8081  
- env SPRING\_DATASOURCE\_URL=jdbc:mysql://mysql:3306/guru\_authdb

## 8. Apply All Kubernetes Configurations

cd <k8s-folder>  
kubectl apply -f .

## 9. Restart Deployments

kubectl rollout restart deployment <deployment-name>

## 10. Check Status

kubectl get pods  
kubectl get services

## 11. Port Forward for Local Testing

Each in separate terminal:  
kubectl port-forward service/authservice 8081:8081  
kubectl port-forward service/communityservice 8082:8082  
kubectl port-forward service/contentservice 8083:8083  
kubectl port-forward service/notificationservice 8084:8084

## 12. Test in Postman

Example:  
POST http://localhost:8081/auth/register  
  
Services validate JWT using:  
http://authservice:8081/auth/validate-token

## 13. Logs & Debugging

kubectl logs <pod-name>  
kubectl exec -it <pod-name> -- /bin/sh

## 14. Stop Everything

minikube stop

## 15. Next Boot

minikube start  
# Reapply port-forwards if needed