Deploying a Reddit Clone on Kubernetes: Utilizing Ingress for Scalable Access

Prerequisites

Before you begin, ensure you have the following:

1. **Kubernetes Cluster**: A running Kubernetes cluster. You can use a managed service (e.g., GKE, AKS, EKS) or a local setup (e.g., Minikube or Kind).
2. **kubectl Installed**: The Kubernetes command-line tool should be installed and configured to access your cluster.
3. **Docker Installed**: To build and push container images.
4. **Ingress Controller**: A working Ingress controller installed in your cluster (e.g., NGINX Ingress Controller).
5. **Basic Understanding of Kubernetes**: Familiarity with Pods, Deployments, Services, and ConfigMaps.
6. **A Dockerized Reddit Clone Application**: The application code packaged into a Docker image and available in a container registry (e.g., Docker Hub or AWS ECR).

Steps to Deploy the Reddit Clone

1. Create a Namespace

Namespaces help organize and isolate resources in a Kubernetes cluster.

```
kubectl create namespace reddit-clone
```

2. Deploy the Backend Service

The Reddit clone backend handles API requests and database interactions.

a. Create a Deployment for the Backend

Save the following YAML as `backend-deployment.yaml`:

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: reddit-backend
  namespace: reddit-clone
spec:
  replicas: 3
  selector:
    matchLabels:
      app: reddit-backend
  template:
    metadata:
      labels:
        app: reddit-backend
    spec:
      containers:
      - name: backend
```

```
        image: <your-backend-image>
        ports:
        - containerPort: 8080
```

Apply the Deployment:

kubectl apply -f backend-deployment.yaml

b. Create a Service for the Backend

Save the following YAML as `backend-service.yaml`:

```
apiVersion: v1
kind: Service
metadata:
  name: reddit-backend-service
  namespace: reddit-clone
spec:
  selector:
    app: reddit-backend
  ports:
  - protocol: TCP
    port: 80
    targetPort: 8080
  type: ClusterIP
```

Apply the Service:

kubectl apply -f frontend-service.yaml

4. Configure the Ingress Resource

Ingress provides a single access point for HTTP and HTTPS traffic to your services.

Save the following YAML as `ingress.yaml`:

```yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: reddit-ingress
  namespace: reddit-clone
  annotations:
    nginx.ingress.kubernetes.io/rewrite-target: /
spec:
  rules:
  - host: <your-domain-or-ip>
    http:
      paths:
      - path: /api
        pathType: Prefix
        backend:
          service:
            name: reddit-backend-service
            port:
              number: 80
      - path: /
        pathType: Prefix
        backend:
          service:
            name: reddit-frontend-service
```

```
        port:
          number: 80
```

Replace `<your-domain-or-ip>` with your domain name or the external IP of your cluster. Then apply the Ingress:

kubectl apply -f ingress.yaml

5. Test the Deployment

1. **Verify Pod Status**:

kubectl get pods -n reddit-clone

Ensure all Pods are running.

1. **Access the Application**:
   ○ If you're using a domain, ensure DNS points to the external IP of your cluster.
   ○ Clusters without a domain can access the application via the external IP of the Ingress controller.

Open a browser and navigate to `http://<your-domain-or-ip>` to access the Reddit clone.

6. Scale the Application

You can scale the frontend or backend services using the following command:

kubectl scale deployment <deployment-name> --replicas=<number-of-replicas> -n reddit-clone

For example:

kubectl scale deployment reddit-backend --replicas=5 -n reddit-clone

7. Monitor and Debug

- **Check Logs**:

kubectl logs <pod-name> -n reddit-clone

Monitor Resources:

kubectl top pods -n reddit-clone
kubectl top nodes

Inspect Ingress:

kubectl describe ingress reddit-ingress -n reddit-clone