Assignment: Deploy a Web Application using CI/CD and Kubernetes

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**Pipeline Overview**

The Jenkins pipeline is structured with multiple stages, each performing specific tasks related to building, Docker image management, and Kubernetes deployment. It includes environment variables for Docker Hub credentials, Kubernetes server details, and SSH credentials for server access.

#### Pipeline Stages

1. **Checkout**:
   * Clones the Git repository (**https://github.com/vtywari/sr-devops.git**) with specified credentials (**github**) and branch (**main**).
2. **Build and Push Backend Image**:
   * Builds a Docker image for the backend application (**backend**) tagged with **${DOCKER\_HUB\_USERNAME}/backend:latest**.
   * Pushes the backend Docker image to Docker Hub using Docker Hub credentials (**dockerhub**).
3. **Build and Push Frontend Image**:
   * Builds a Docker image for the frontend application (**frontend**) tagged with **${DOCKER\_HUB\_USERNAME}/frontend:latest**.
   * Pushes the frontend Docker image to Docker Hub using Docker Hub credentials (**dockerhub**).
4. **Deploy to Kubernetes**:
   * Copies the kubeconfig file from Jenkins credentials to a temporary location.
   * SSHes into the Kubernetes server (**192.168.1.11**) using SSH credentials (**admin**).
   * Copies Kubernetes deployment manifests (**backend-deployment.yaml**, **frontend-deployment.yaml**) to the Kubernetes server.
   * Applies the Kubernetes deployment manifests using **kubectl**.

#### Environment Variables

* **DOCKER\_REGISTRY**: Docker registry URL (**docker.io**).
* **DOCKER\_HUB\_USERNAME**: Docker Hub username (**vikastiwari**).
* **SSH\_CREDENTIALS\_ID**: Jenkins credentials ID for SSH access (**admin**).
* **K8S\_SERVER\_HOST**: Kubernetes server hostname or IP address (**192.168.1.11**).
* **K8S\_SERVER\_USER**: Username for SSH access to the Kubernetes server (**root**).
* **K8S\_SERVER\_PASSWORD**: Password for SSH access to the Kubernetes server (**redhat**).

### Execution

* The pipeline runs on any available Jenkins agent (**agent any**).
* Each stage performs specific tasks related to source code management, Docker image building/pushing, and Kubernetes deployment.
* Ensure that appropriate Jenkins credentials and configurations are set up for accessing Git, Docker Hub, and Kubernetes.