

Use Case: On-Prem Infrastructure Setup for a Regulated Financial Services Client

Business Context:

A mid-sized bank wants to modernize its data platform by moving from legacy infrastructure to a **containerized microservices environment**, hosted **on-premises** due to regulatory and data residency requirements. The infrastructure must support:

- Secure multi-tenancy
- Scalable CI/CD workflows
- High availability and fault tolerance
- Real-time monitoring
- Strong access control

You are tasked with **designing, deploying, and managing** this infrastructure stack.

Core Tasks for the Candidate:

1. Containerization & Orchestration

- **Design decision:** Choose between Docker and Podman. Justify why Podman may be preferred in a rootless, daemonless setup.
- **Deployment Task:** Set up a Kubernetes (K8s) cluster on on-prem servers.
 - Bonus: Compare Kubernetes vs. OpenShift. When would you recommend OpenShift despite its license?

2. CI/CD Pipeline

- **Architecture Task:** Design a CI/CD pipeline using Jenkins or GitLab CI/CD that:
 - Automates build, test, and deploy of microservices
 - Integrates with Kubernetes

- Provides audit trails and rollback mechanisms

3. Storage System Design

- **Design Task:** Choose between NFS, HDFS, and Ceph for:
 - Transaction logs
 - Model binaries (e.g., ML models)
 - User uploaded files
- **Hands-On:** Configure Ceph storage using Rook for Kubernetes integration.

4. Monitoring & Logging

- **Setup Task:**
 - Configure **Prometheus + Grafana** for metrics (e.g., CPU, memory, pod usage).
 - Configure **ELK Stack** (ElasticSearch, Logstash, Kibana) for logs. Ensure:
 - Role-Based Access Control (RBAC) is in place using Kibana plugins.
 - Logs are stored securely and searchable by tenant.

5. Security & Access Control

- **Integration Task:**
 - Configure SSO using LDAP or Active Directory.
 - Implement RBAC in Kubernetes/OpenShift for tenant-level isolation.

6. Routing & Proxy Layer

- **Task:** Deploy and configure **NGINX or Traefik** as a reverse proxy to:
 - Route traffic to different microservices
 - Enforce HTTPS
 - Support path-based routing and request rate limiting