

OpenShift Architecture

Enterprise Kubernetes for Modern Applications



why OpenShift?

Raw Power

Kubernetes is powerful but lacks enterprise essentials like logging, monitoring, and CI/CD.

Enterprise Ready

OpenShift adds the missing pieces with security-first design and production-grade features.

Complete Solution

Think of Kubernetes as an engine - OpenShift gives you the full car with steering and safety.

OpenShift Flavors



OKD

Community edition for developers and testing environments.



Online

SaaS offering by Red Hat for quick deployment.



Container Platform

Enterprise edition with full support and advanced features.



Dedicated

Managed clusters for organizations requiring dedicated infrastructure.

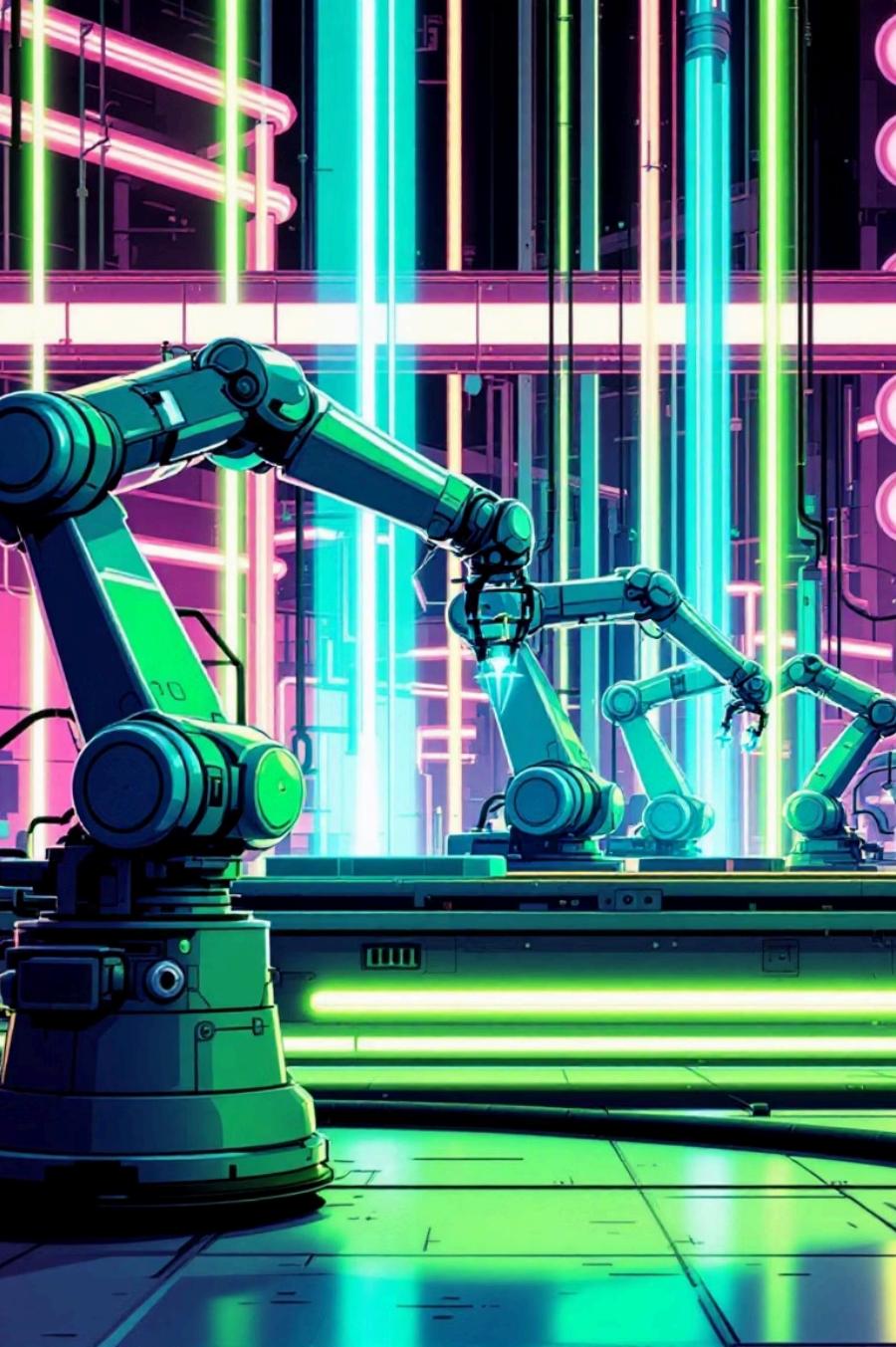
Control Plane Architecture

The Brain of OpenShift

When you say "I want 5 replicas," the Control Plane remembers that request and ensures it happens.

- API Server acts as the front door for all commands
- etcd serves as the cluster database
- Controller Manager enforces desired state
- Scheduler decides optimal pod placement





Worker Nodes & OpenShift Additions



Worker Nodes

Kubelet (node agent), CRI-O (container runtime), and Kube-proxy handle the actual workload execution.

OpenShift Operators

Automate application management and node configuration with Machine Config Operator.

Networking & Routes



Kubernetes makes internal communication easy, but OpenShift makes external access effortless with Routes. Pods get unique IPs, Services provide stable DNS, and Routes expose services to the world.

Security-First Design



Security Context Constraints

Stricter than Kubernetes PodSecurityPolicies - won't let you run as root unless explicitly allowed.



RBAC & OAuth

Fine-grained user roles with integration for LDAP, Active Directory, and GitHub authentication.



Image Security

ImageStreams, vulnerability scanning, and signed images ensure secure container deployment.



Developer Experience

01

Source-to-Image (S2I)

Build images directly from source code without writing Dockerfiles.

02

BuildConfigs & DeploymentConfigs

Automate CI/CD pipelines with triggers for image changes.

03

Web Console & Operators

Drag-and-drop app deployment with automated database and message queue management.

A junior developer can deploy applications without touching YAML, thanks to OpenShift's intuitive developer console.

Enterprise Success Stories



Banking

PCI-DSS compliance and secure workloads for financial institutions requiring strict regulatory adherence.



Retail

Walmart's Black Friday scaling demonstrates OpenShift's ability to handle massive traffic spikes.



Telecom

5G workloads running on bare metal infrastructure for ultra-low latency applications.



Healthcare

HIPAA compliance with comprehensive audit logging for patient data protection.

These aren't toy use cases - Fortune 500 companies rely on OpenShift for mission-critical applications.



Key Takeaways



Complete Platform

OpenShift = Kubernetes + Enterprise Tools for security, networking, storage, and monitoring.



Developer Friendly

S2I, Operators, and intuitive consoles make deployment accessible to all skill levels.



Enterprise Ready

Remember: Kubernetes solves orchestration. OpenShift solves enterprise adoption.

"Kubernetes is like IKEA furniture – you assemble it. OpenShift is like a ready apartment."