Day 29: Helm Charts and Application Packaging

90 Days DevOps challenge

Objective for the Class

- Understand what Helm is and why it's used
- Work with Helm repositories and charts
- Install, upgrade, and uninstall Helm applications
- Customize deployments using values.yaml and --set
- Create and package their own charts

What is Helm?

- Helm is the package manager for Kubernetes
- Analogous to apt, yum, pip — but for Kubernetes apps
- Solves: YAML sprawl, upgrades, rollbacks, versioning

What is a Helm Chart?

- A Helm chart is a folder with all Kubernetes manifests & metadata
  - Includes: Chart.yaml, values.yaml, templates/, charts/
  - Think: Reusable, parameterized Kubernetes application package

Helm Releases

- Every install of a chart = a release
- Each release has its own config & revision history
- You can deploy same chart multiple times with different settings

Installing Helm CLI

- Command: curl https://raw.githubusercontent.com/helm/helm/main/scripts/get-helm-3 | bash
- Verify with: helm version
- Requires: kubectl configured to cluster

Adding a Helm Repository

- Example repo: Bitnami (https://charts.bitnami.com/bitnami)
- Commands:
  - helm repo add bitnami https://charts.bitnami.com/bitnami
  - helm repo update

Installing a Chart

- Command: helm install my-mysql bitnami/mysql
  - my-mysql: release name
  - bitnami/mysql: chart name

Inspecting a Chart

- View metadata & default config before install
- Commands:
  - helm show chart bitnami/mysql
  - helm show values bitnami/mysql

Using Custom Values

- Override default values.yaml using CLI or file
  - CLI: --set key=value
  - File: -f my-values.yaml

Upgrading a Release

- Command: helm upgrade <release> <chart> --set ...
- Applies new configuration or new chart version

Rolling Back a Release

- Command: helm rollback <release> <revision>
- Reverts the app to an earlier working state

Uninstalling a Release

- Command: helm uninstall <release>
  - Deletes all Kubernetes resources created by the chart

Creating Your Own Chart

- • Command: helm create mychart
- • Creates: Chart.yaml, values.yaml, templates/
- • Install: helm install myapp ./mychart

Packaging and Sharing Charts

- Package: helm package mychart
- Create index: helm repo index .
- Useful for internal chart repos or GitHub Pages

Summary Table

- Helm = Kubernetes package manager
- Chart = Templated, reusable app definition
- Release = Chart instance in the cluster install, upgrade, rollback,
- uninstall = Release management