In chaos engineering, "pod delete" refers to deliberately deleting one or more pods (containers) within a Kubernetes cluster to simulate a failure scenario. This action mimics a situation where a pod crashes unexpectedly or is terminated due to resource constraints, network issues, or other factors.

By intentionally deleting pods, engineers can observe how the system reacts to such failures and whether it can gracefully recover without causing service disruptions or data loss. They can assess whether the system's failover mechanisms, such as replica sets or auto-scaling, are functioning correctly and whether the workload is redistributed effectively to maintain service availability.

The goal of performing pod deletion in chaos engineering is to uncover weaknesses in the system's resilience and identify areas for improvement. By conducting controlled experiments with pod deletion, engineers can validate the effectiveness of their disaster recovery strategies and ensure the system can withstand unexpected failures in production environments.

Enable image registry changes

The registry is a stateless, scalable server side application that stores and lets you distribute container images.

Kubectl get deployments

kubectl get deployments --show-labels

Helm is a tool that automates the creation, packaging, configuration, and deployment of Kubernetes applications by combining your configuration files into a single reusable package.

The appkind in the spec specifies the Kubernetes resource type of the app deployment. The Litmus ChaosOperator supports chaos on deployments, statefulsets ,daemonsets , deploymentconfig and rollouts.

App labels are key/value pairs that we can give to k8s objects. By using labels we can identify attributes of objects and also can select those objects by the selector

Deployment :-

A Kubernetes Deployment tells Kubernetes how to create or modify instances of the pods that hold a containerized application.

Statefulsets:-

A StatefulSet runs a group of Pods, and maintains a sticky identity for each of those Pods.

Stateless application:-

Stateless applications are applications which do not store data or application state to the cluster or to persistent storage. Instead, data and application state stay with the client, which makes stateless applications more scalable.

Daemonsets

DaemonSet is a Kubernetes feature that lets you run a Kubernetes pod on all cluster nodes

Deploymentconfig :-

A DeploymentConfig object, which is a template for running applications

Rollout:-

It is used to manage the rollout of updates to applications running on the platform, as part of the Kubernetes deployment process.

TOTAL\_CHAOS\_DURATION: - The time duration for chaos insertion (in sec)

Overall run duration of the experiment may exceed the TOTAL\_CHAOS\_DURATION by a few min

Chaos interval:- Time interval between two successive pod failures.

Force : - Application Pod deletion mode. false indicates graceful deletion with default termination period of 30s. true indicates an immediate forceful deletion with 0s grace period.

Pods affected percentage: The Percentage of total pods to target

If we need to tune any other variables we can specify them in key tunables.

Key tunables:-

We have additionally

RANDOMNESS - Introduces randomness to pod deletions with a minimum period defined by CHAOS\_INTERVAL

Key- Randomness value- True/false

It supports true or false. Default value: false

TARGET\_PODS - Comma separated list of application pod name subjected to pod delete chaos.

If not provided, it will select target pods randomly based on provided appLabels.

RAMP\_TIME: - Period to wait before and after injection of chaos in sec.

SEQUENCE :- It defines sequence of chaos execution for multiple target pods.

Default value: parallel. Supported: serial, parallel

Node selector:-

A node selector specifies a map of key/value pairs that are defined using custom labels on nodes and selectors specified in pods.

Tolerations :- effect, key, operator, value

Tolerations allow the scheduler to schedule pods with matching taints.

These weights signify the priority/importance of the fault. The higher the weight, the more significant the fault is.

In ChaosCenter, the weight priority is generally divided into three sections:

* 0-3: Low Priority
* 4-6: Medium Priority
* 7-10: High Priority