Are you about to break Prod?

Acceptance Testing with Ephemeral Environments

Erin Krengel & Sean Holung

How **confident** are you that the changes you're about to make...

... won't break prod?

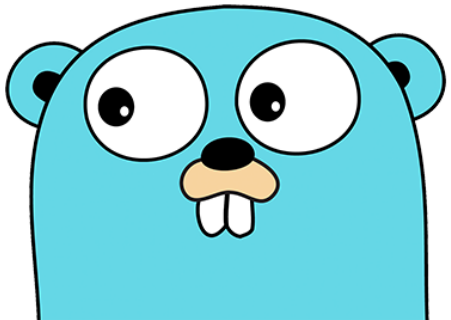
... do exactly what you expect?

Erin Krengel
Software Engineer

NORDSTROM

pulumi

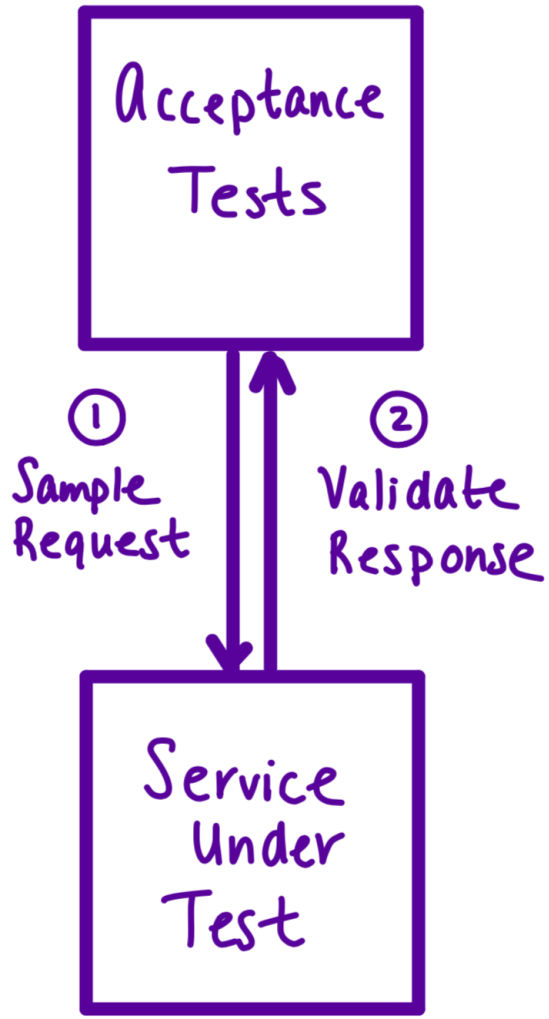
Sean Holung
Software Engineer

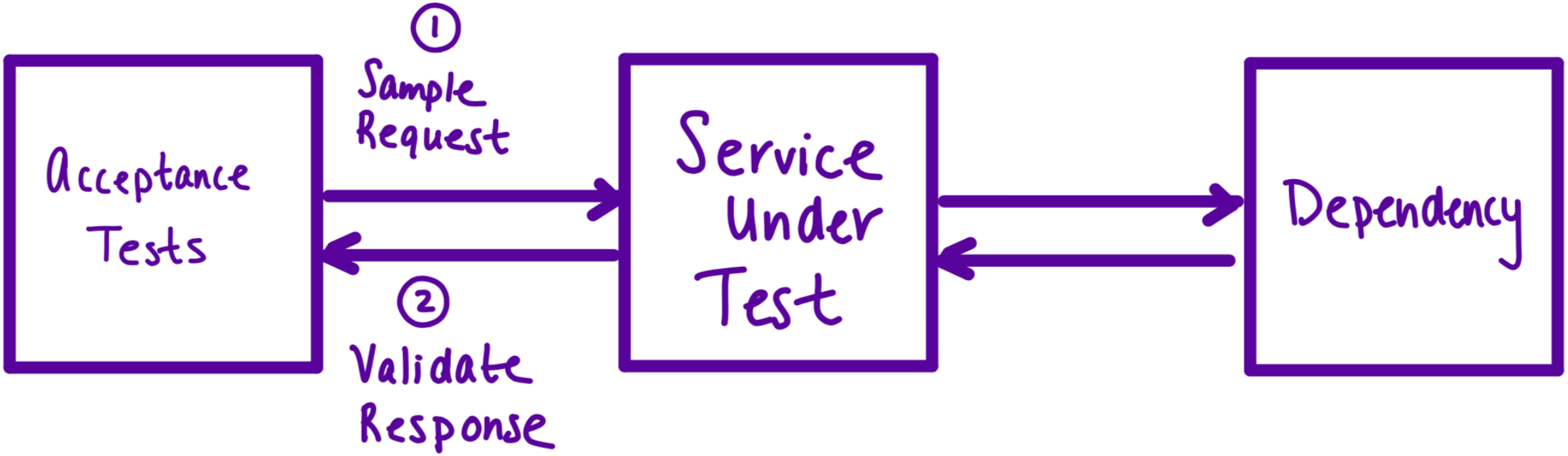


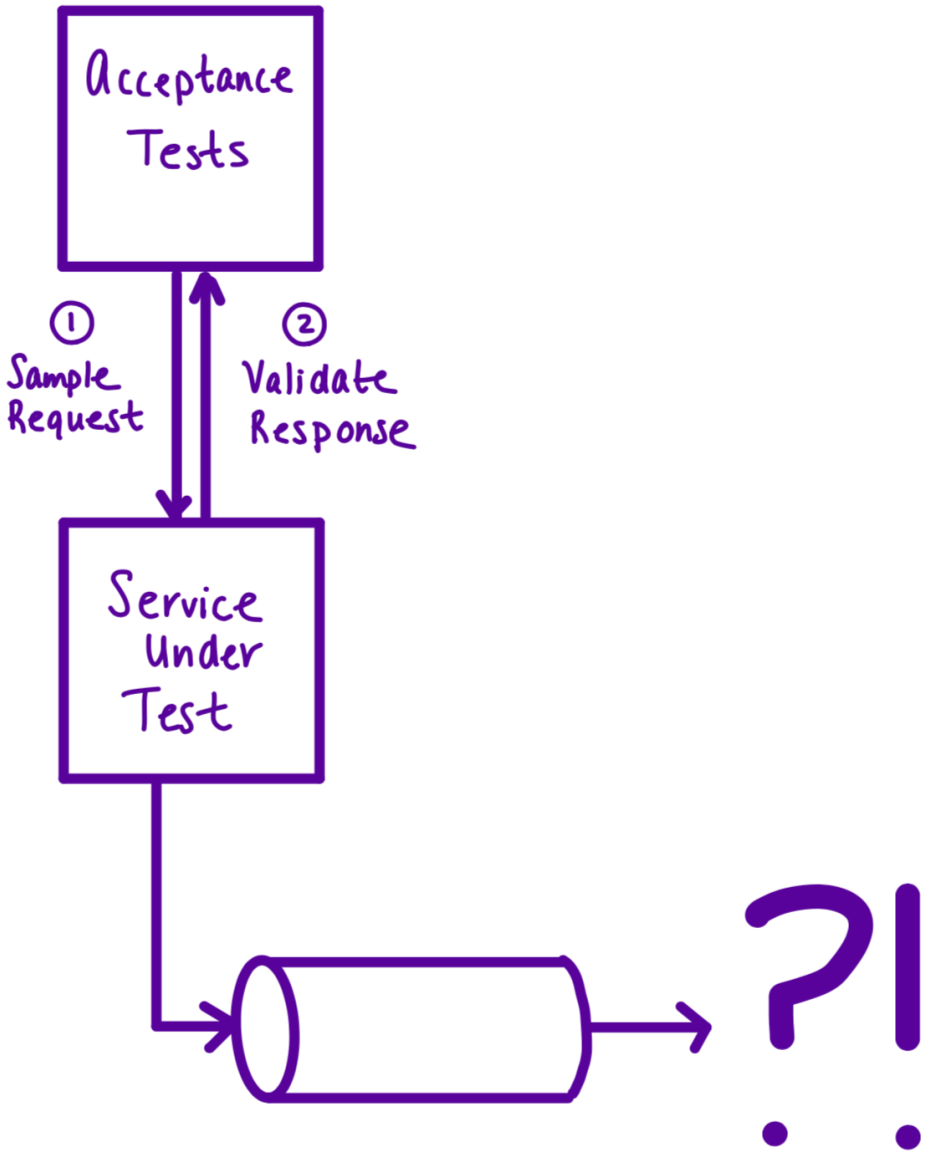
Unit vs Acceptance Tests

```
func Sum(a, b int) int {
    return a+b
}
```

```
func TestSum(t *testing.T) {
    actual := Sum(1, 2)
    assert(t, actual, 1+2)
}
```




Acceptance Tests
1
Sample Request
2
Validate Response
Service Under Test
Dependency



How do we acceptance test **event-driven** architectures?

EPHEMERAL

adjective
: lasting for only a short time

ENVIRONMENT

noun
: the system in which a computer or computer program operates

https://dictionary.cambridge.org

Creating an Ephemeral Environment:
Infrastructure as Code

Creating an Ephemeral Environment: A Unique Name for the Environment

Name our ephemeral environment

```
variables:
  ENV: "test-$CI_PIPELINE_ID"
```

gitlab-ci.yml

Creating an Ephemeral Environment: Templatized Infrastructure

Prepend the environment to the resource

```
const name = `${ENV}-demo-app`;
export const topic = new gcp.pubsub.Topic(name);
```

Pulumi TypeScript program

Creating an Ephemeral Environment: Configurable Application and Tests

Configure app through environment variables

```
project := getConfigurationValue("PROJECT")
topicName := getConfigurationValue("TOPIC")
bucketName := getConfigurationValue("BUCKET")
```

GoLang app

Creating an Ephemeral Environment: Conditionally Provision Test Specific Infra

Provision required resources for tests

```
// If it's a test environment, set up acceptance tests.
let job: k8s.batch.v1.Job | undefined;
if (ENV.startsWith("test")) {
    job = acceptance.SetupAcceptanceTests({…
    });
}
```

Pulumi TypeScript program

Creating an Ephemeral Environment: Clean up your Resources

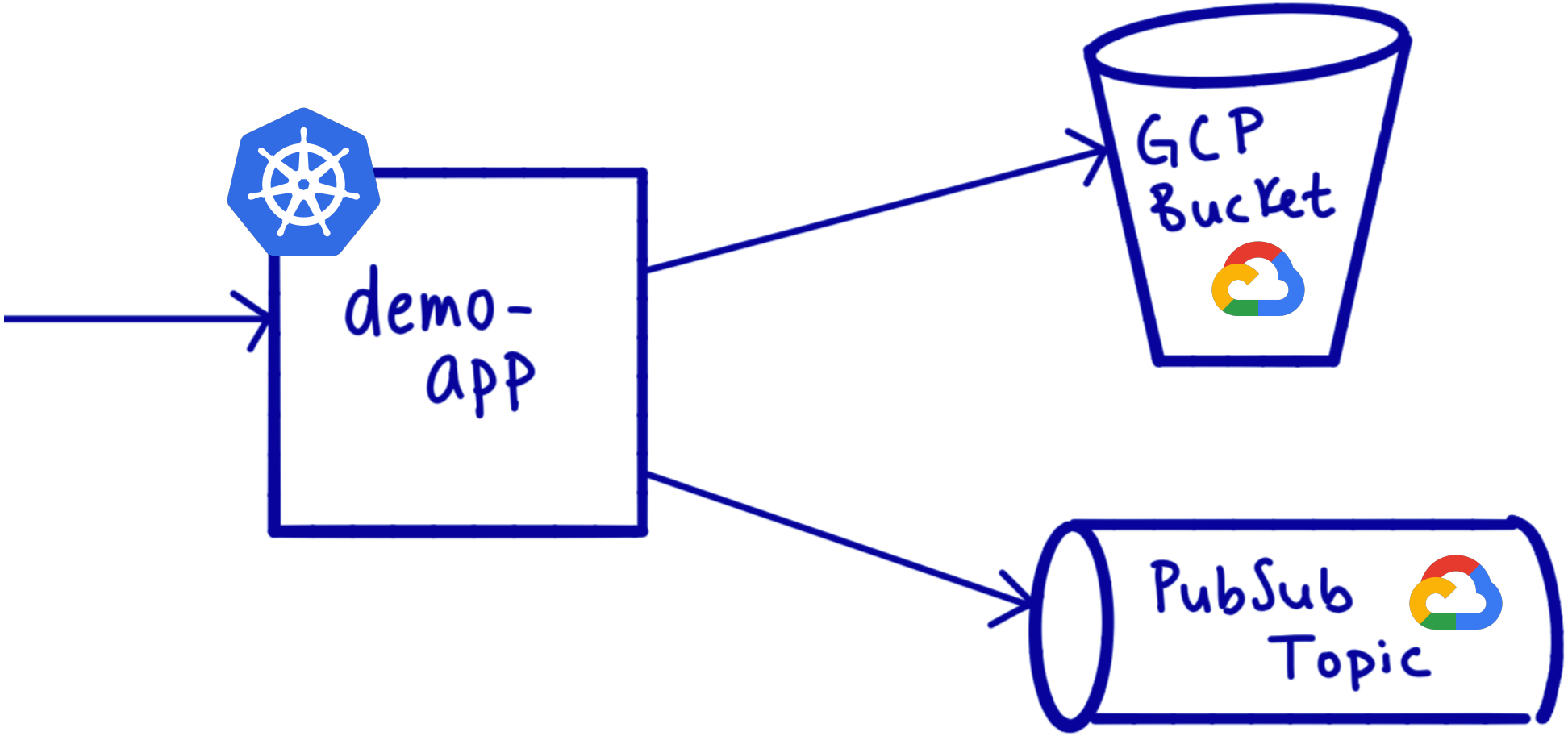
```
$ pulumi destroy --skip-preview -s rocore/$ENV-app
Destroying (rocore/test-93363532-app):

 -  kubernetes:batch:Job test-93363532-demo-app-acc-test-job deleting
 -  kubernetes:batch:Job test-93363532-demo-app-acc-test-job deleted
 -  kubernetes:apps:Deployment test-93363532-demo-app deleting
 -  kubernetes:apps:Deployment test-93363532-demo-app deleted
 -  kubernetes:core:Secret test-93363532-demo-app deleting
 -  gcp:pubsub:SubscriptionIAMMember test-93363532-demo-app-acc-test deleting
 -  gcp:storage:Notification notification deleting
 -  kubernetes:core:Service test-93363532-demo-app deleting
 -  kubernetes:core:Secret test-93363532-demo-app-acc-test deleting
 -  kubernetes:core:Secret test-93363532-demo-app deleting
 -  kubernetes:core:Secret test-93363532-demo-app deleted
 -  gcp:storage:Notification notification deleted
 -  kubernetes:core:Service test-93363532-demo-app deleting
 -  kubernetes:core:Service test-93363532-demo-app deleted
 -  kubernetes:core:Secret test-93363532-demo-app-acc-test deleting
 -  kubernetes:core:Secret test-93363532-demo-app-acc-test deleted
 -  gcp:pubsub:SubscriptionIAMMember test-93363532-demo-app-acc-test deleted
 -  gcp:storage:BucketIAMMember test-93363532-demo-app-acc-test deleting
 -  pulumi:providers:kubernetes test-93363532-demo-app deleting
 -  gcp:pubsub:Subscription test-93363532-rocore-subscription deleting
 -  gcp:pubsub:TopicIAMBinding binding deleting
 -  gcp:storage:BucketIAMMember test-93363532-demo-app deleting
 -  pulumi:providers:kubernetes test-93363532-demo-app deleted
 -  gcp:pubsub:Subscription test-93363532-rocore-subscription deleted
 -  gcp:pubsub:TopicIAMBinding binding deleted
 -  gcp:storage:BucketIAMMember test-93363532-demo-app-acc-test deleted
@ Destroying....
 -  gcp:storage:BucketIAMMember test-93363532-demo-app deleted
```

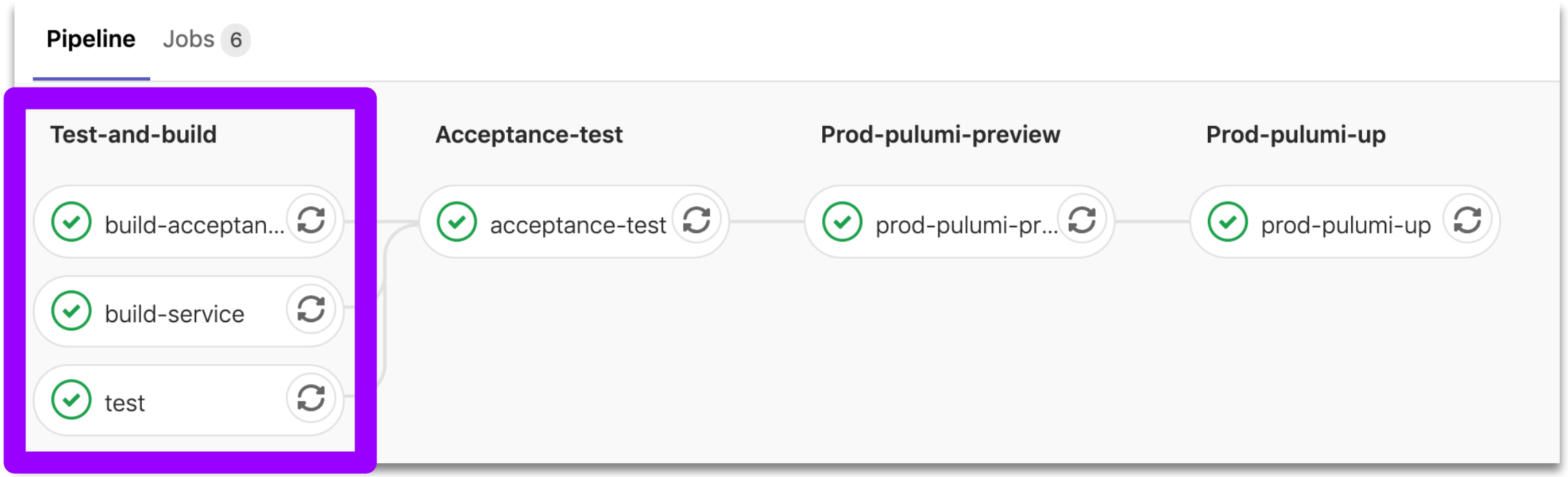
Trade Offs

- ★ Exact replica of Production
- ★ Speed
  - New Kubernetes cluster vs PubSub topic
- ★ Cost
  - A single database instance for all tests
  - One replica for testing vs three in Production

Demo Architecture

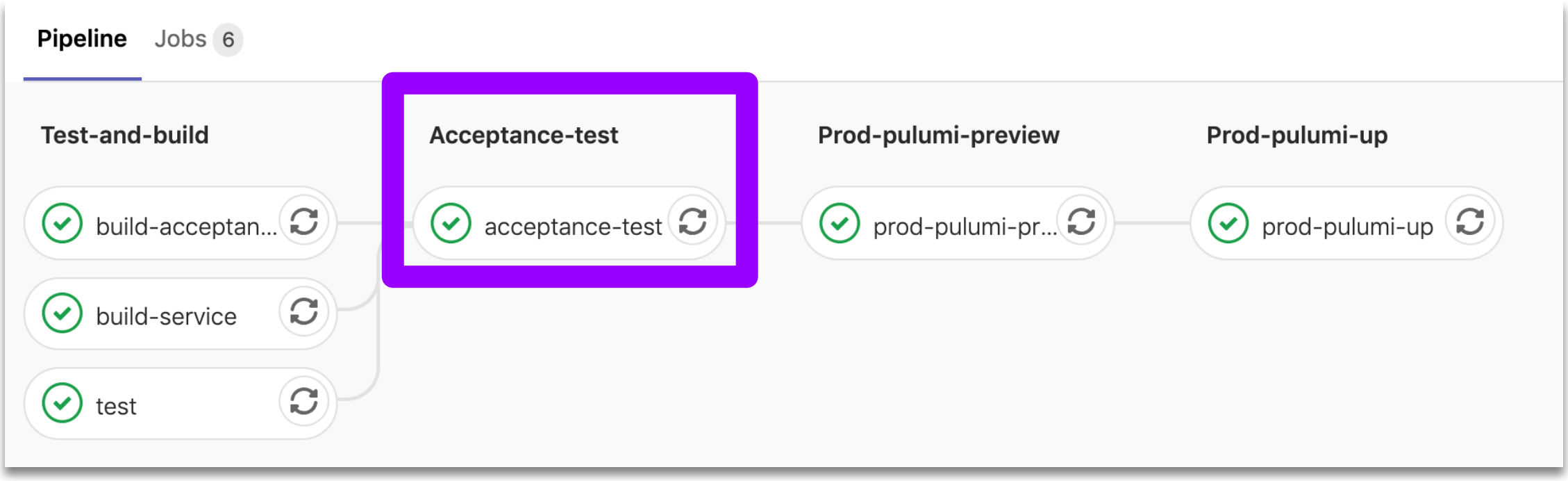


Test and Build



GitLab

Acceptance Test

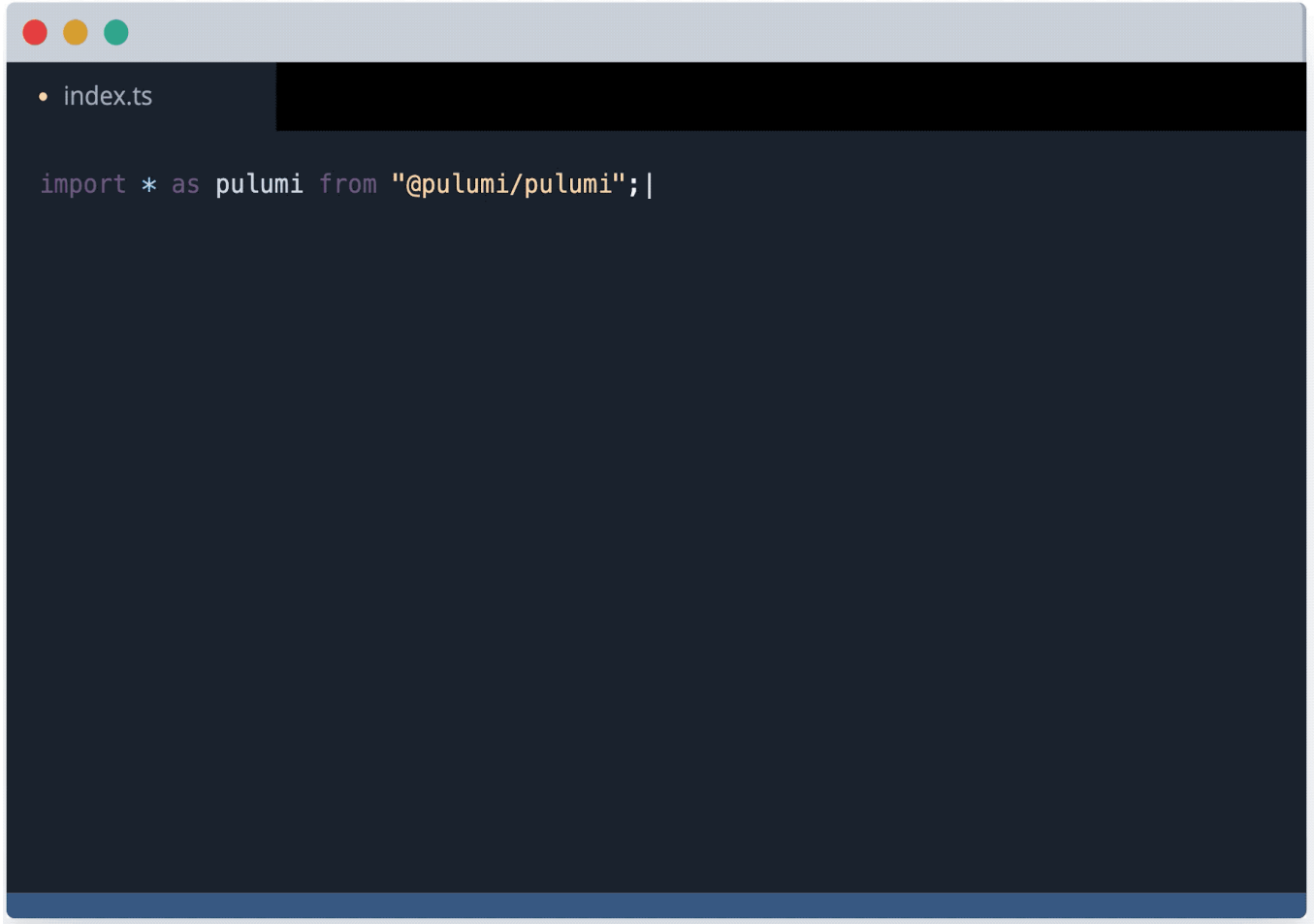


GitLab

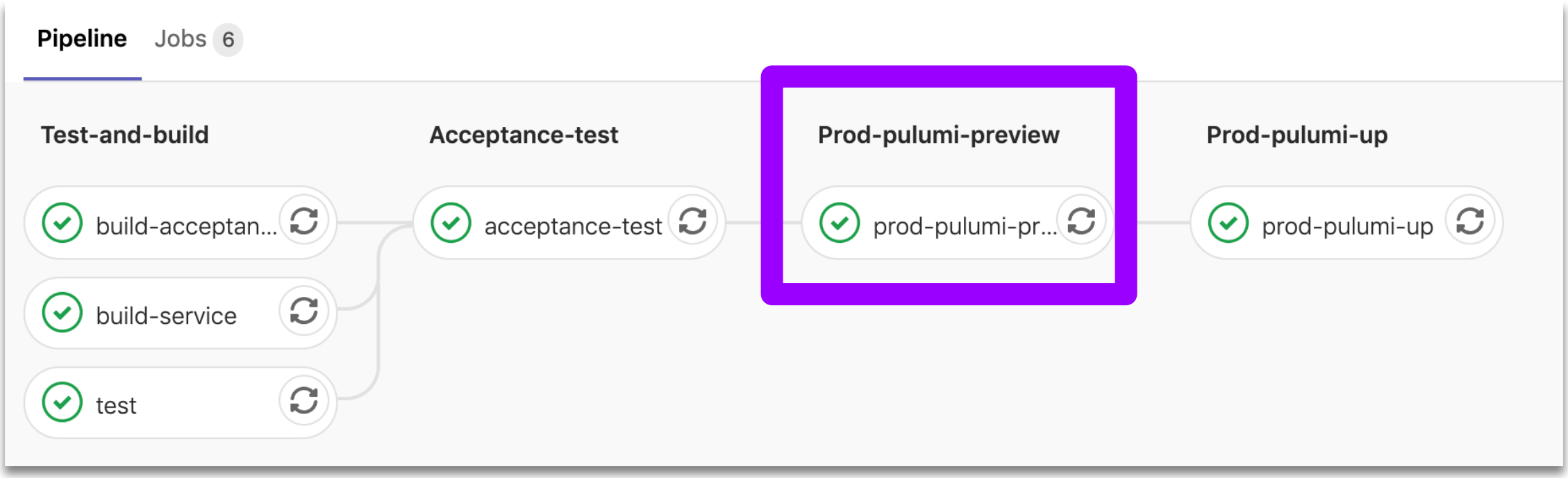
Create modern applications.

Deploy to any cloud.

Manage cloud environments

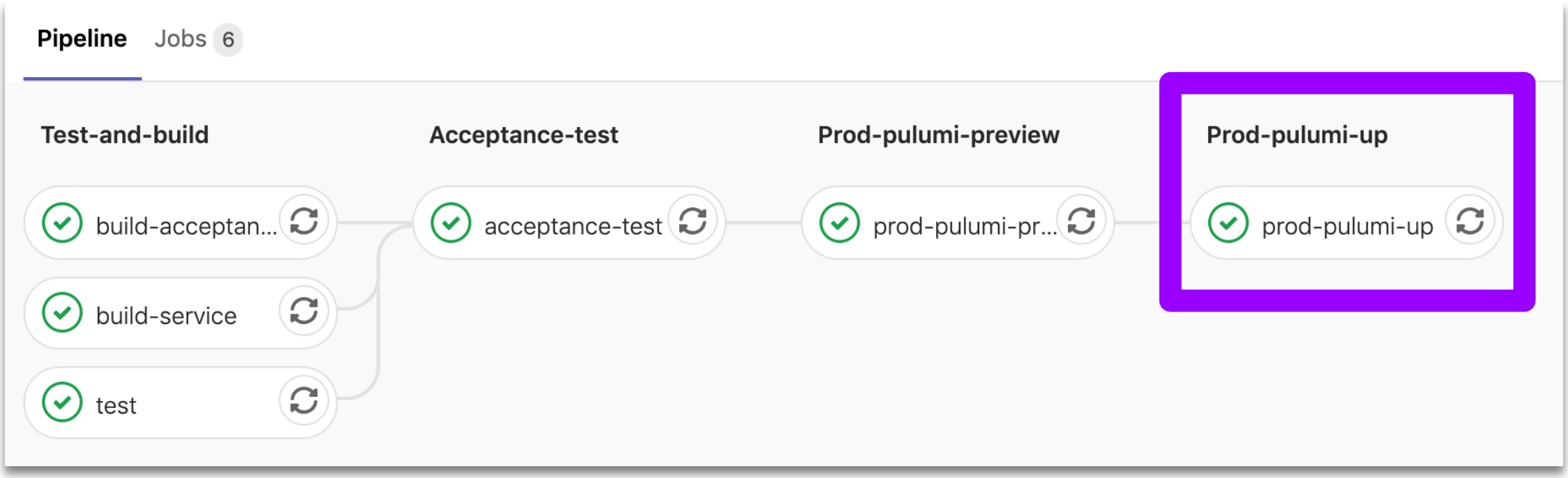


pulumi preview



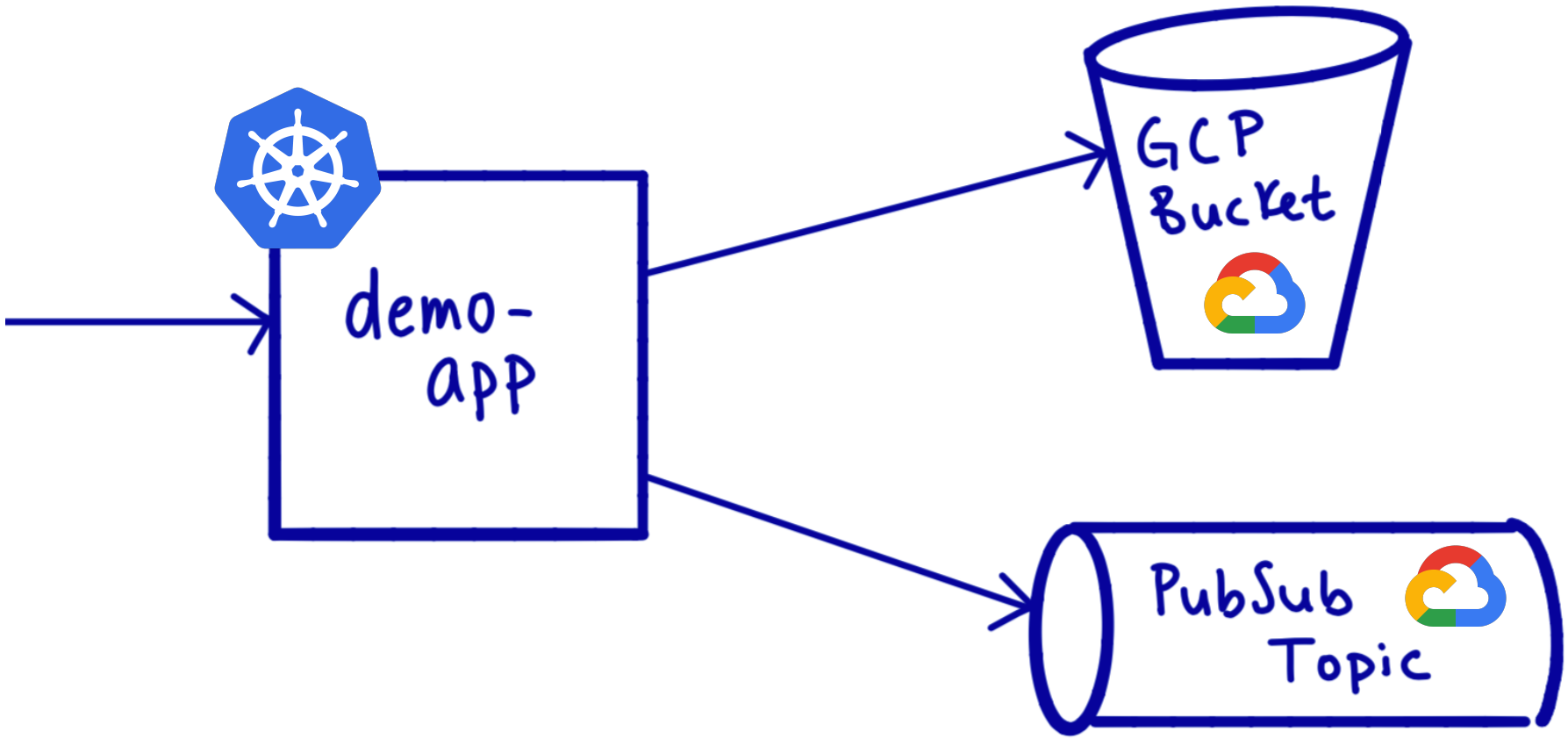
GitLab

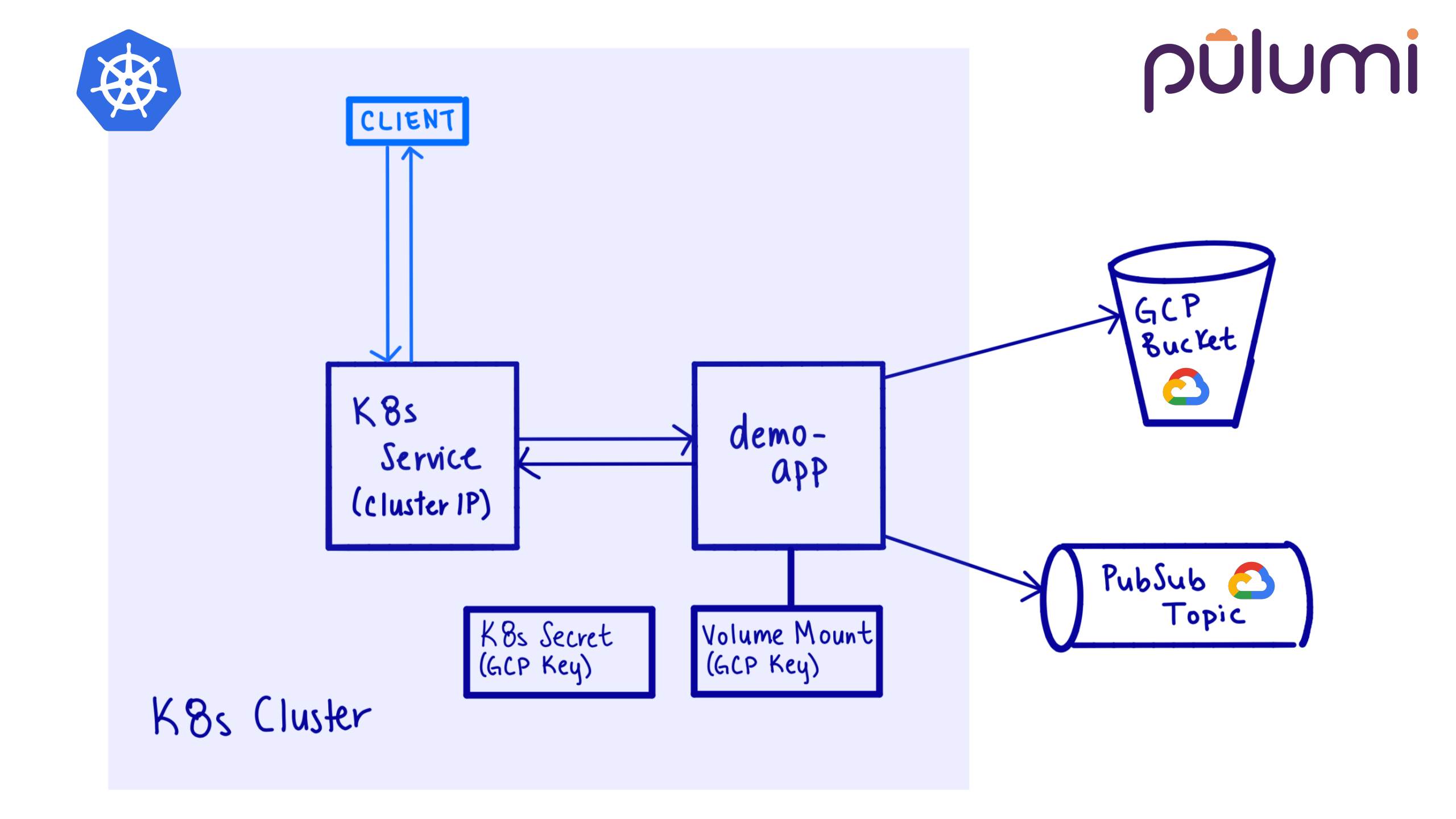
pulumi up

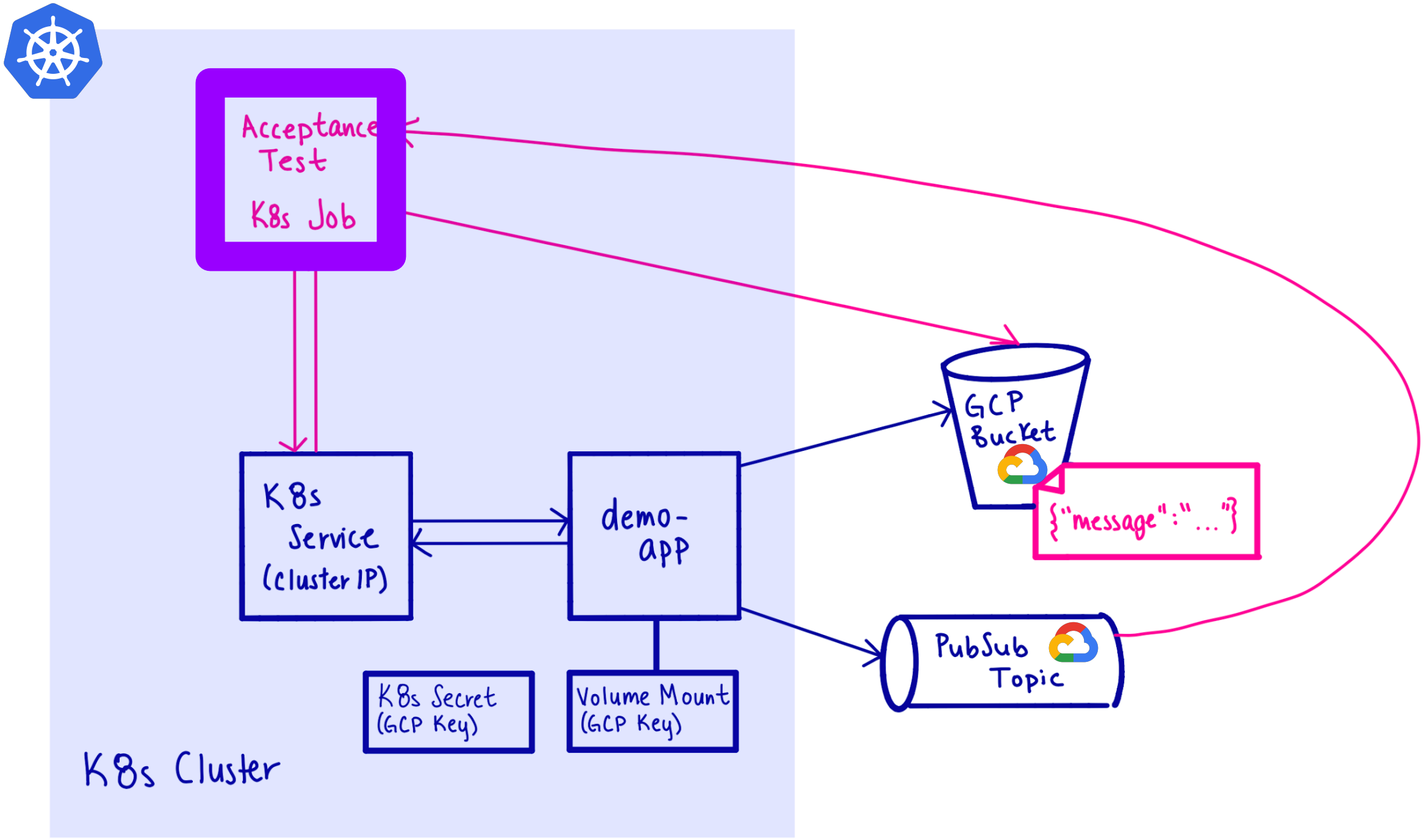


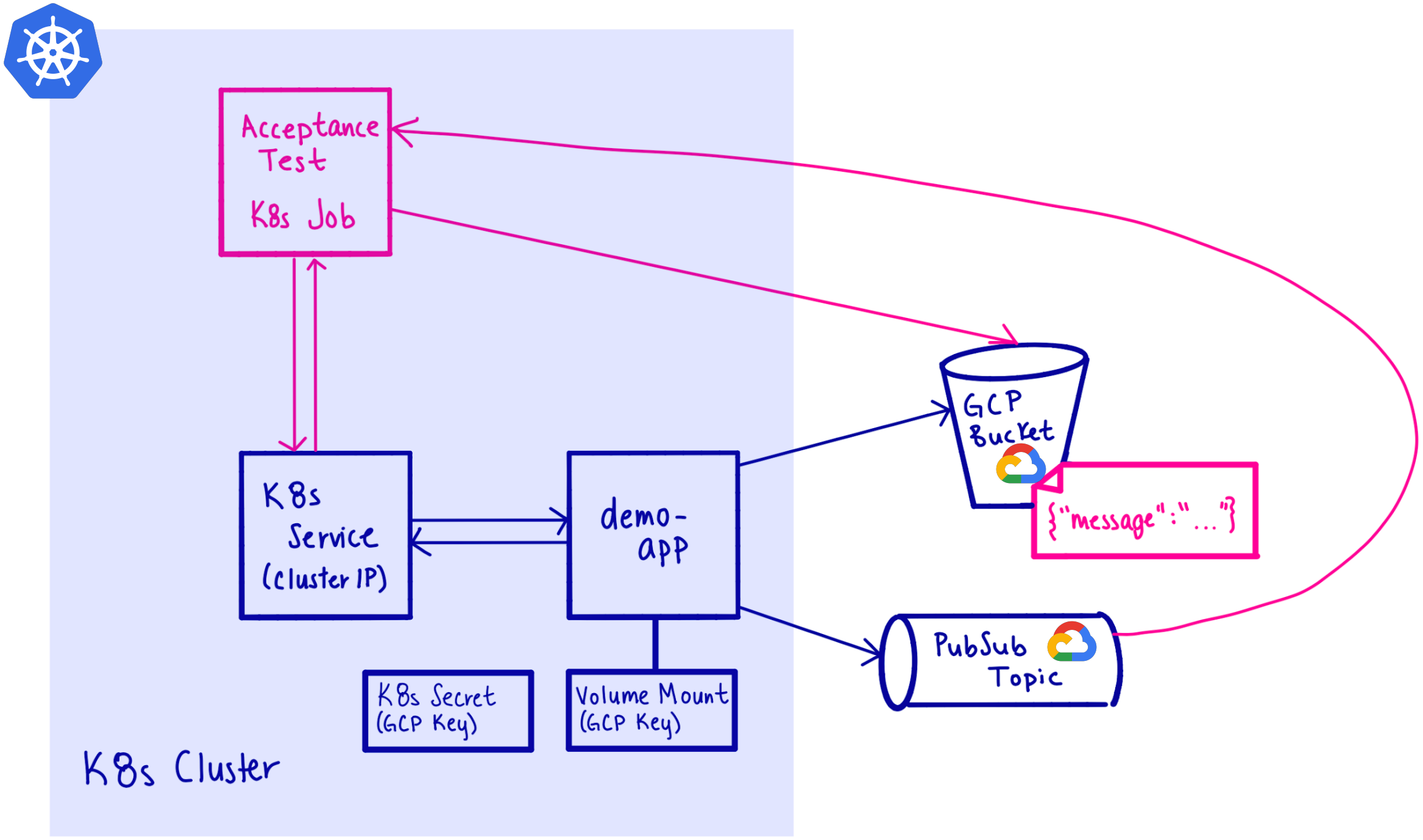
GitLab

Demo Architecture

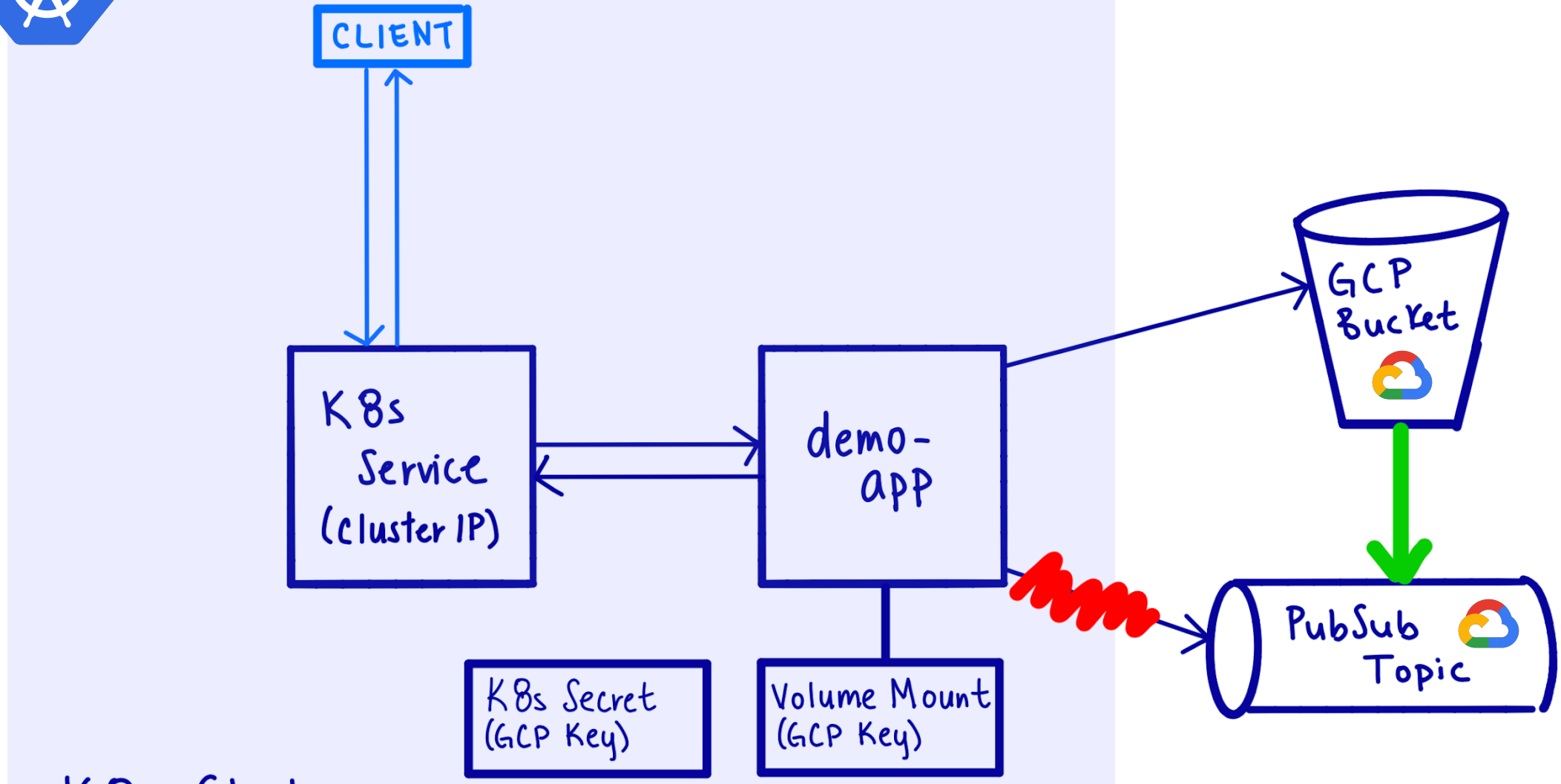


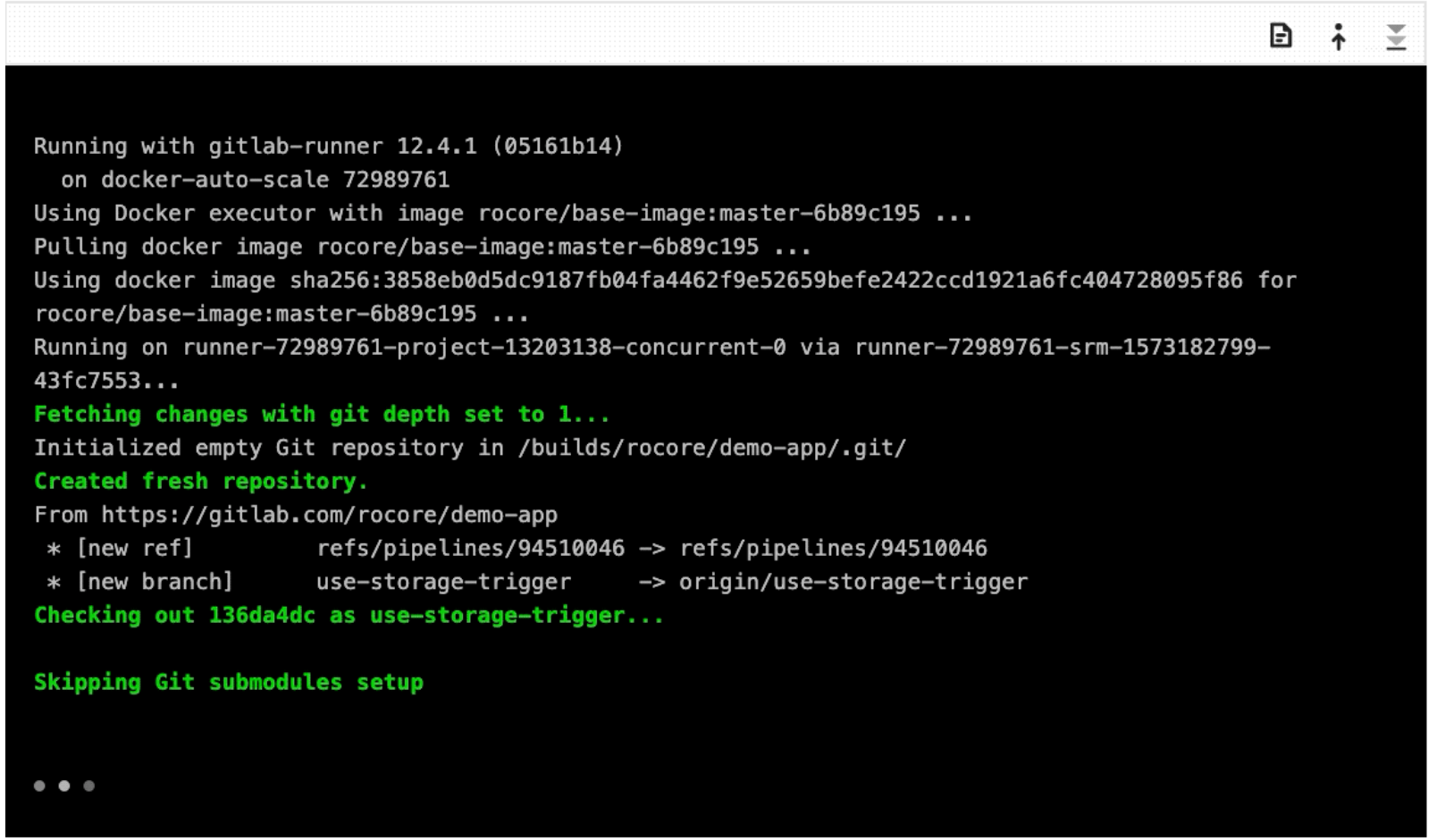

CLIENT
K8s Service (cluster IP)
demo-app
GCP Bucket
PubSub Topic
K8s Secret (GCP Key)
Volume Mount (GCP Key)
K8s Cluster


Acceptance Test
K8s Job
K8s Service (cluster IP)
demo-app
GCP Bucket
{"message":"..."}
PubSub Topic
K8s Secret (GCP Key)
Volume Mount (GCP Key)
K8s Cluster

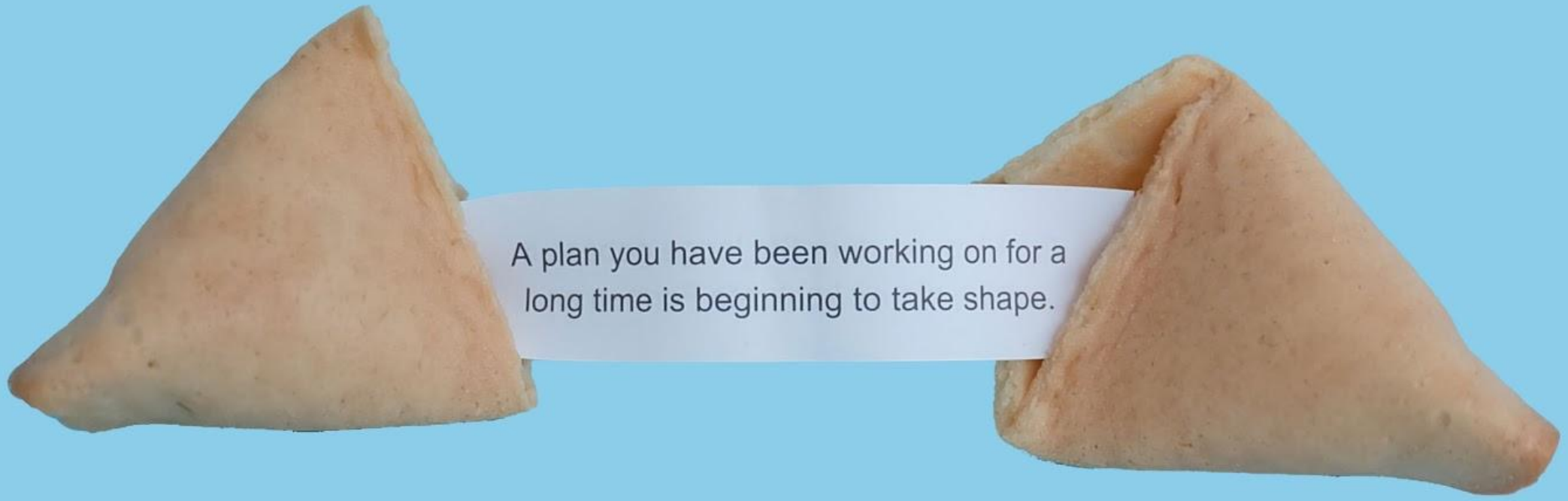

Acceptance Test
K8s Job
K8s Service (cluster IP)
demo-app
GCP Bucket
{"message":"..."}
PubSub Topic
K8s Secret (GCP Key)
Volume Mount (GCP Key)
K8s Cluster

New Architecture




Running with gitlab-runner 12.4.1 (05161b14)
on docker-auto-scale 72989761
Using Docker executor with image rocore/base-image:master-6b89c195 ...
Pulling docker image rocore/base-image:master-6b89c195 ...
Using docker image sha256:3858eb0d5dc9187fb04fa4462f9e52659befe2422ccd1921a6fc404728095f86 for rocore/base-image:master-6b89c195 ...
Running on runner-72989761-project-13203138-concurrent-0 via runner-72989761-srm-1573182799-43fc7553...
Fetching changes with git depth set to 1...
Initialized empty Git repository in /builds/rocore/demo-app/.git/
Created fresh repository.
From https://gitlab.com/rocore/demo-app
* [new ref] refs/pipelines/94510046 -> refs/pipelines/94510046
* [new branch] use-storage-trigger -> origin/use-storage-trigger
Checking out 136da4dc as use-storage-trigger...
Skipping Git submodules setup

SUCCESS!


A plan you have been working on for a
long time is beginning to take shape.

Acceptance Testing == Productive Devs

★Ensure service behaves as expected

★Document behavior

★Confidence to make sweeping changes

Ephemeral Envs == Even More Productive Devs

★Testing application & infrastructure

★Quicker feedback loops

★Reproducible env that mimics Prod

★Encourage automated testing

ekrengel@pulumi.com
@eckrengel
sholung@pulumi.com
gitlab.com/rocore
THANKS!