Trouble testing **Kubernetes** on your bespoke cloud?

Kubetest2 to the rescue!

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Who am I?

Priyanka Saggu

@psaggu

Kubernetes
E2E (end-to-end) test

Kubernetes: E2E Test

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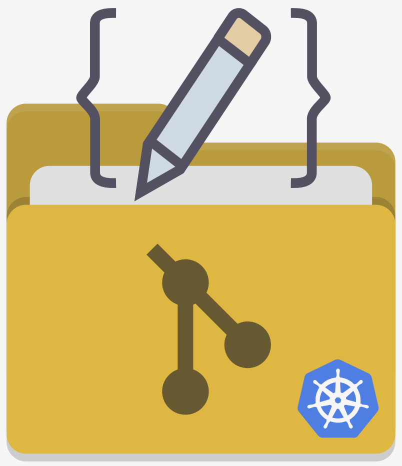
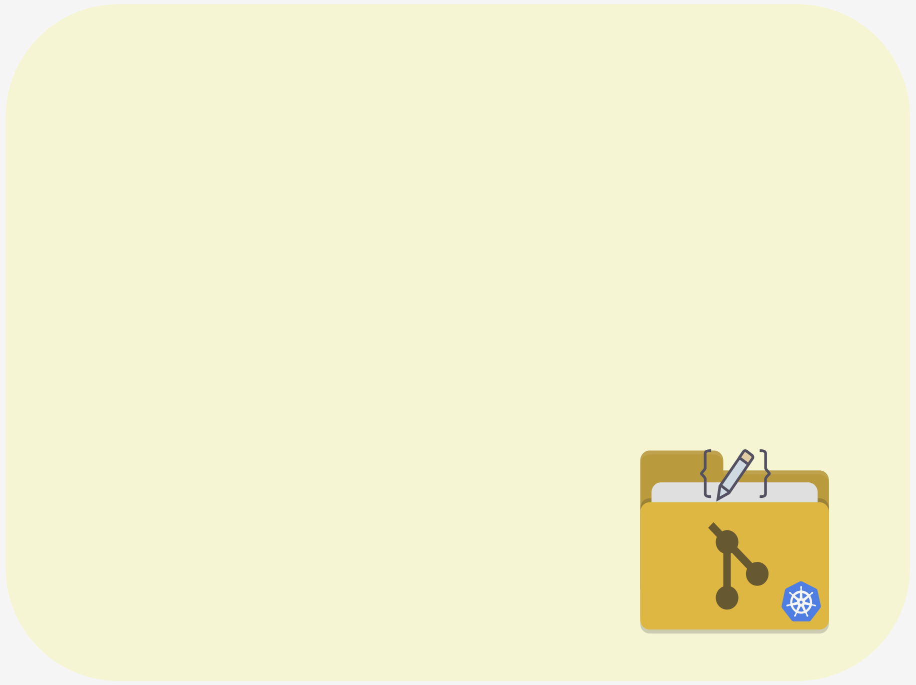
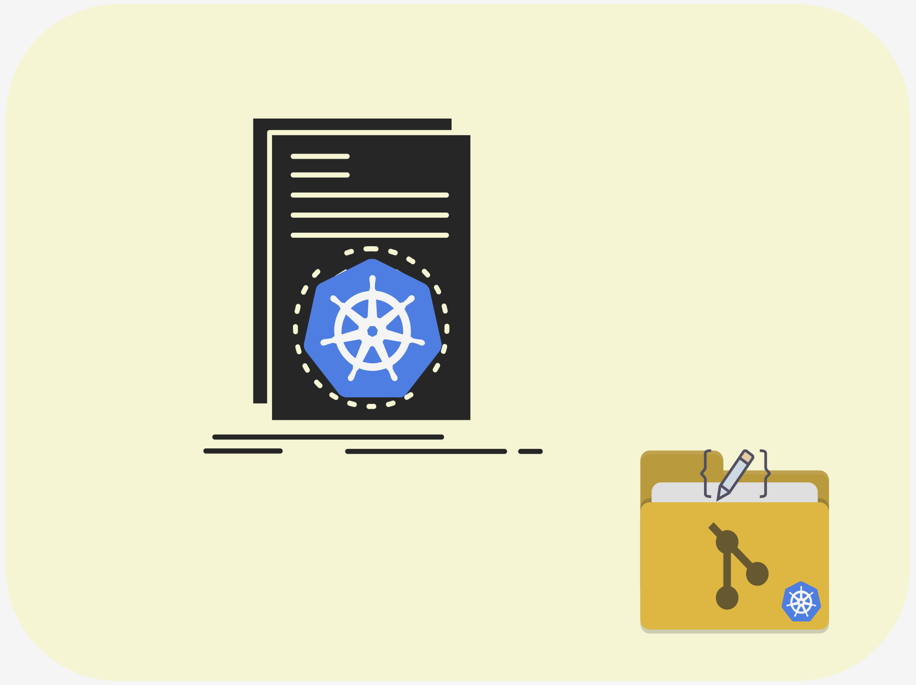


Kubernetes: E2E Test



Kubernetes: E2E Test



Kubernetes: E2E Test

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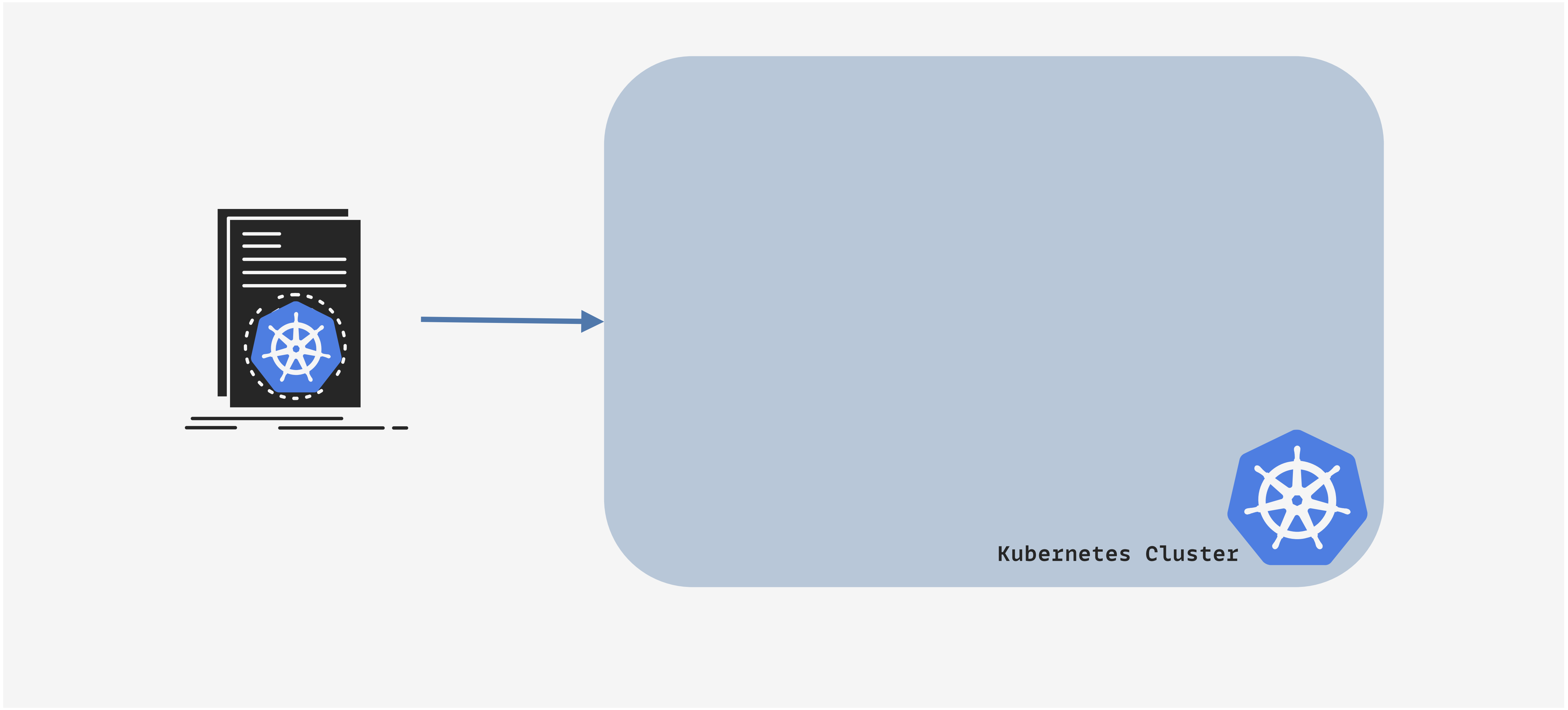
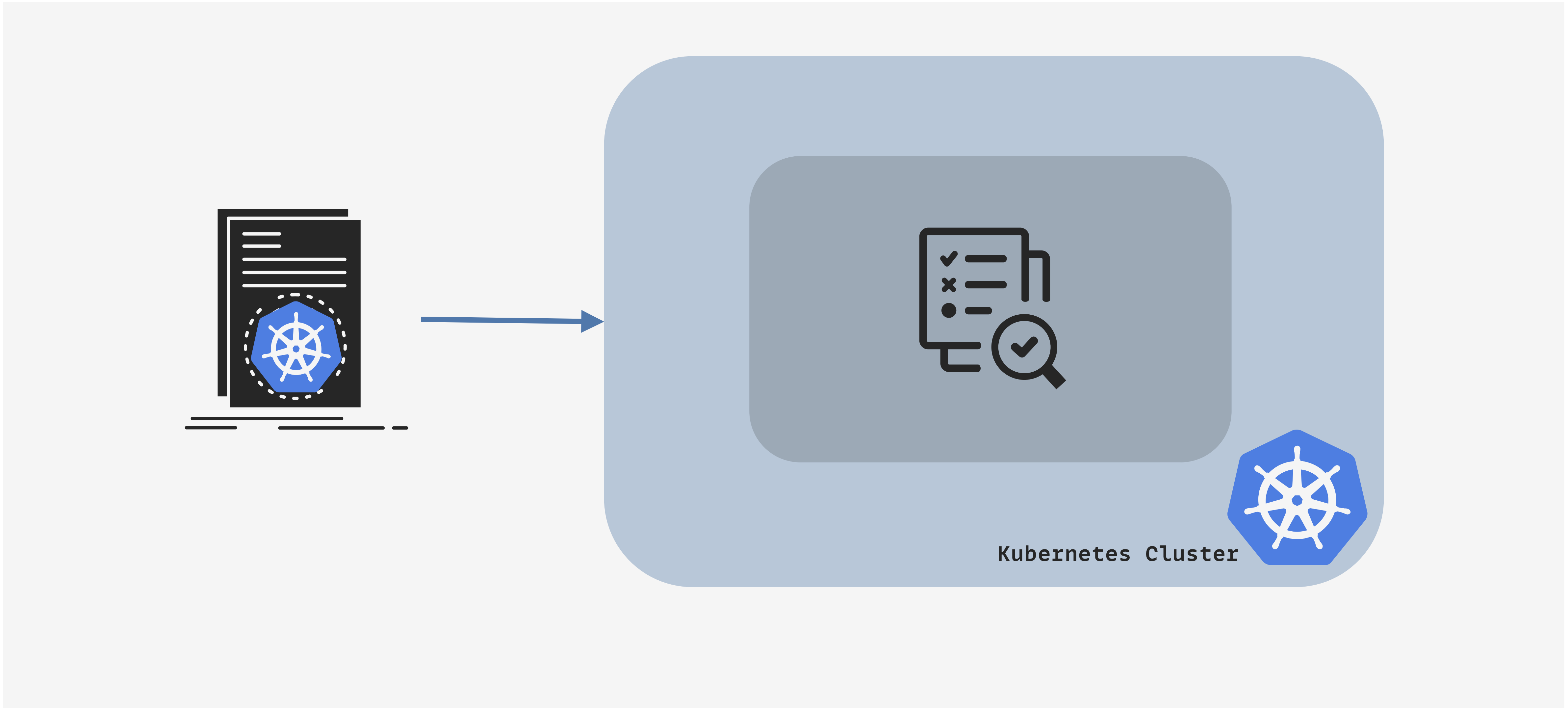
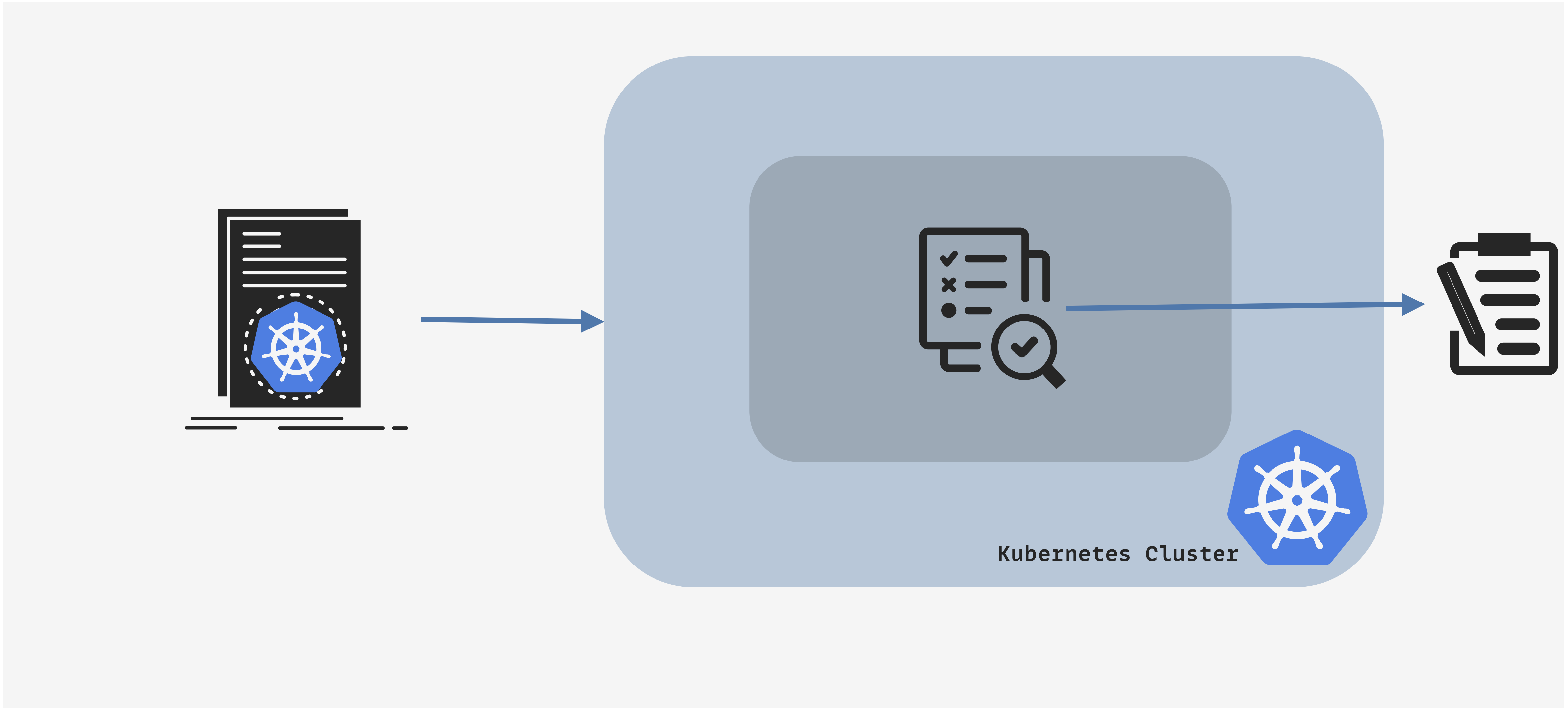


Kubernetes: E2E Test



Kubernetes: E2E Test



Kubernetes: E2E Test

Kubernetes Cluster

Kubernetes: E2E Test

Kubetest2!

What is Kubetest2?

What is Kubetest2?

A framework for deploying Kubernetes clusters, and executing E2E (end-to-end) tests on them

What is Kubetest2?

Cluster Configuration

What is Kubetest2?

Cluster Configuration

E2E Testing, & Log Collection

What is Kubetest2?

Cluster Configuration

E2E Testing, & Log Collection

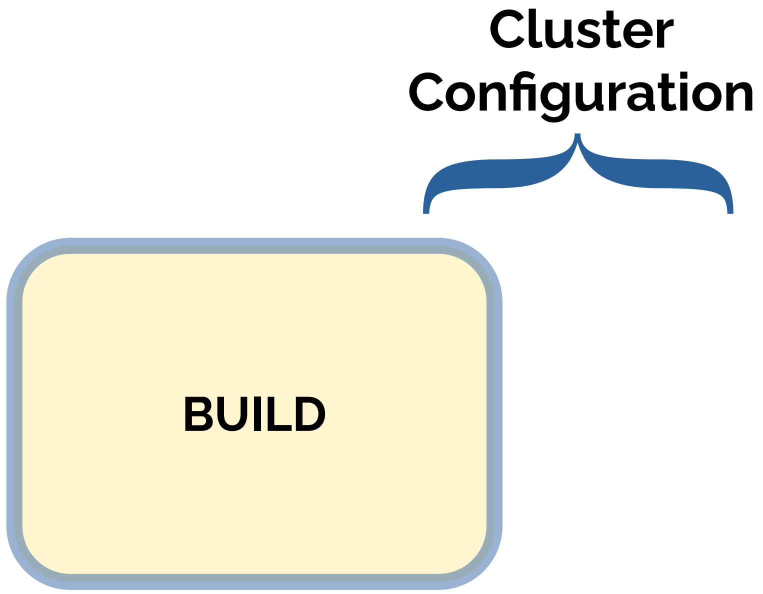
Test Environment Disposal

Kubetest2 (workflow)

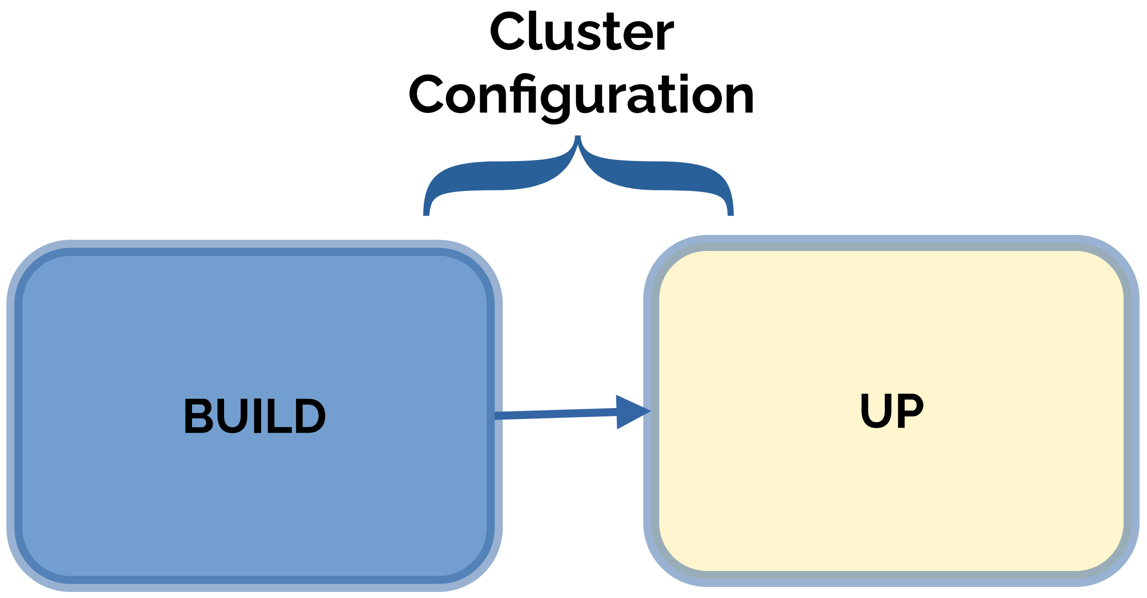
Kubetest2 (workflow)

Cluster
Configuration

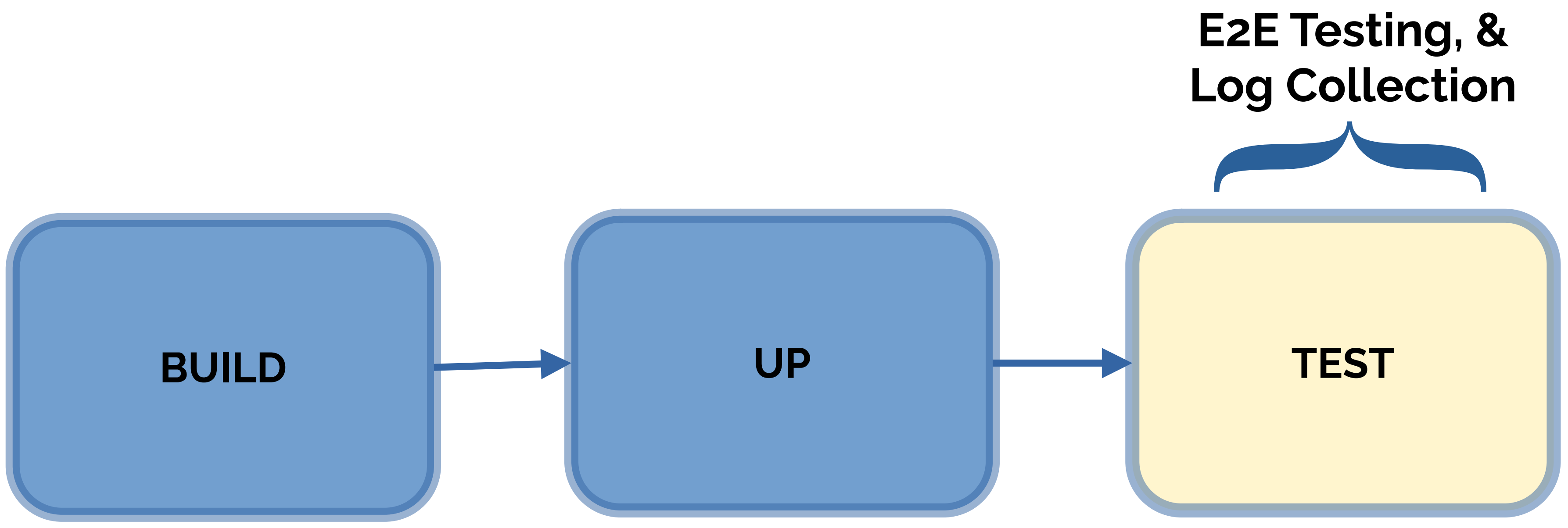
Kubetest2 (workflow)



Kubetest2 (workflow)



Kubetest2 (workflow)



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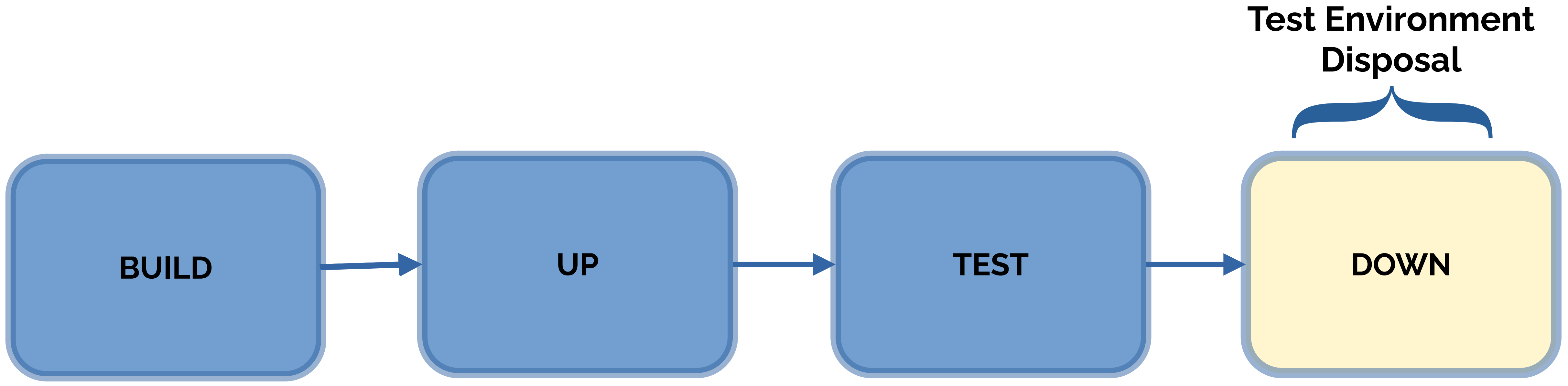

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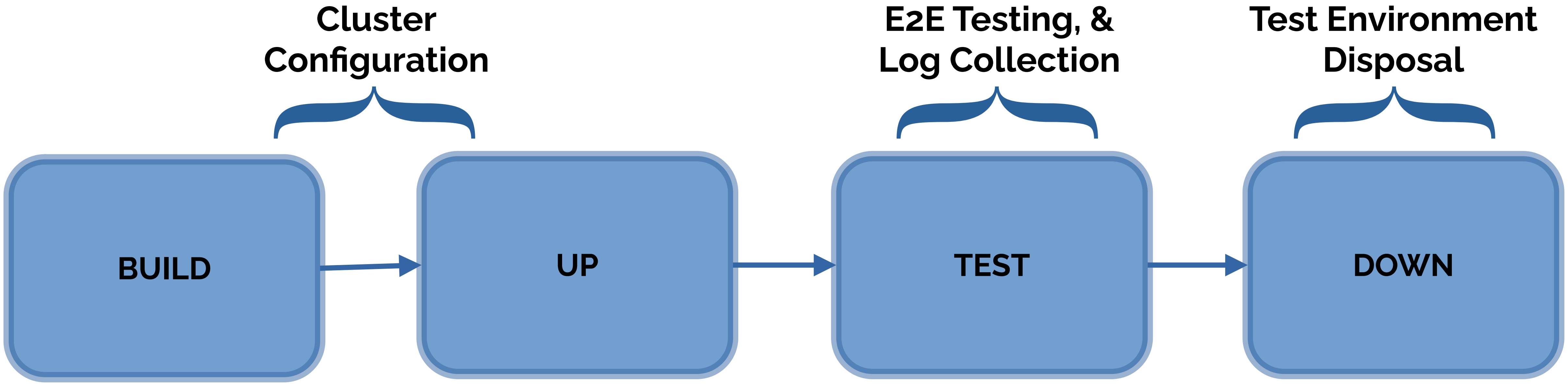
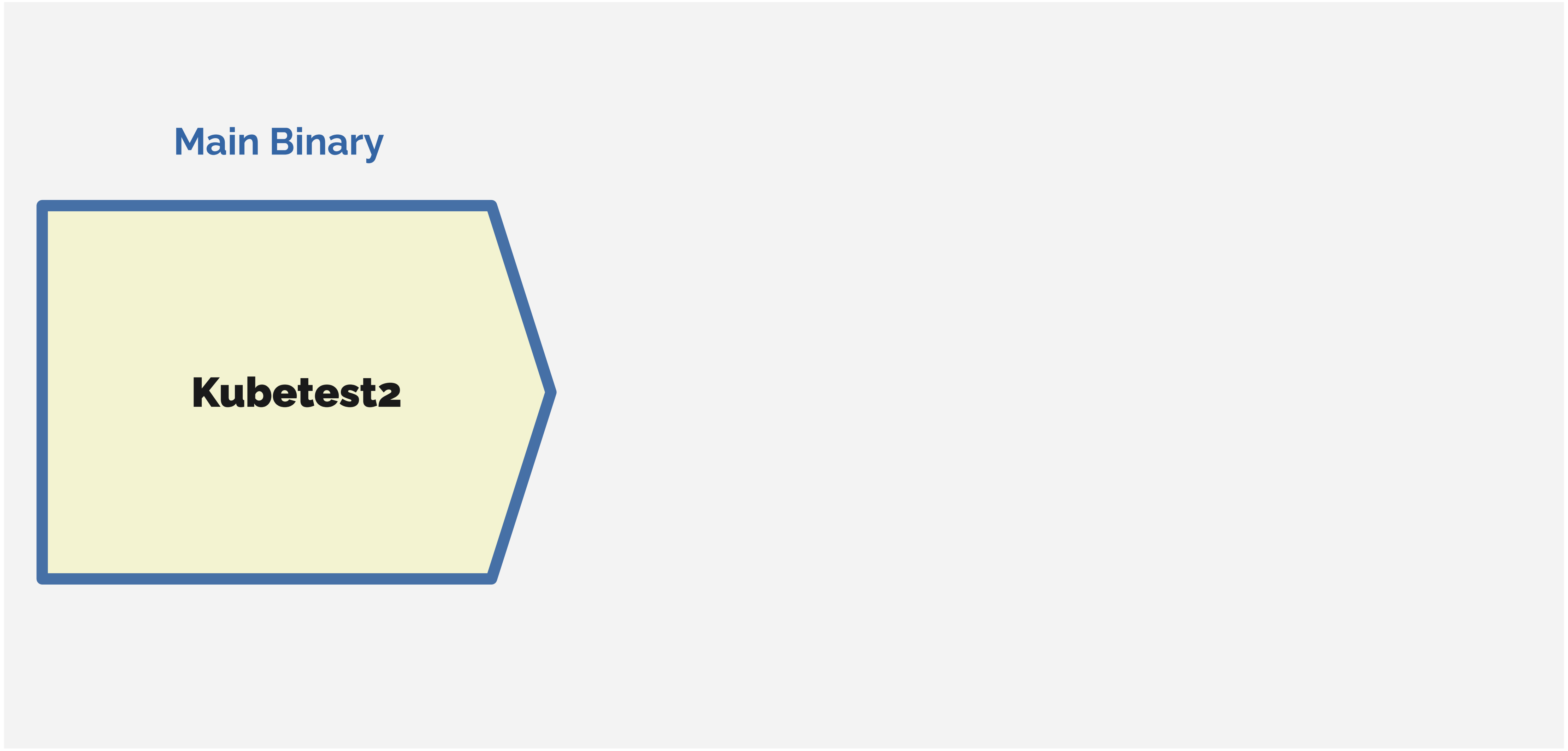


Architecture of Kubtest2

Architecture of Kubtest2

Kubetest2 is split into
three independent executables

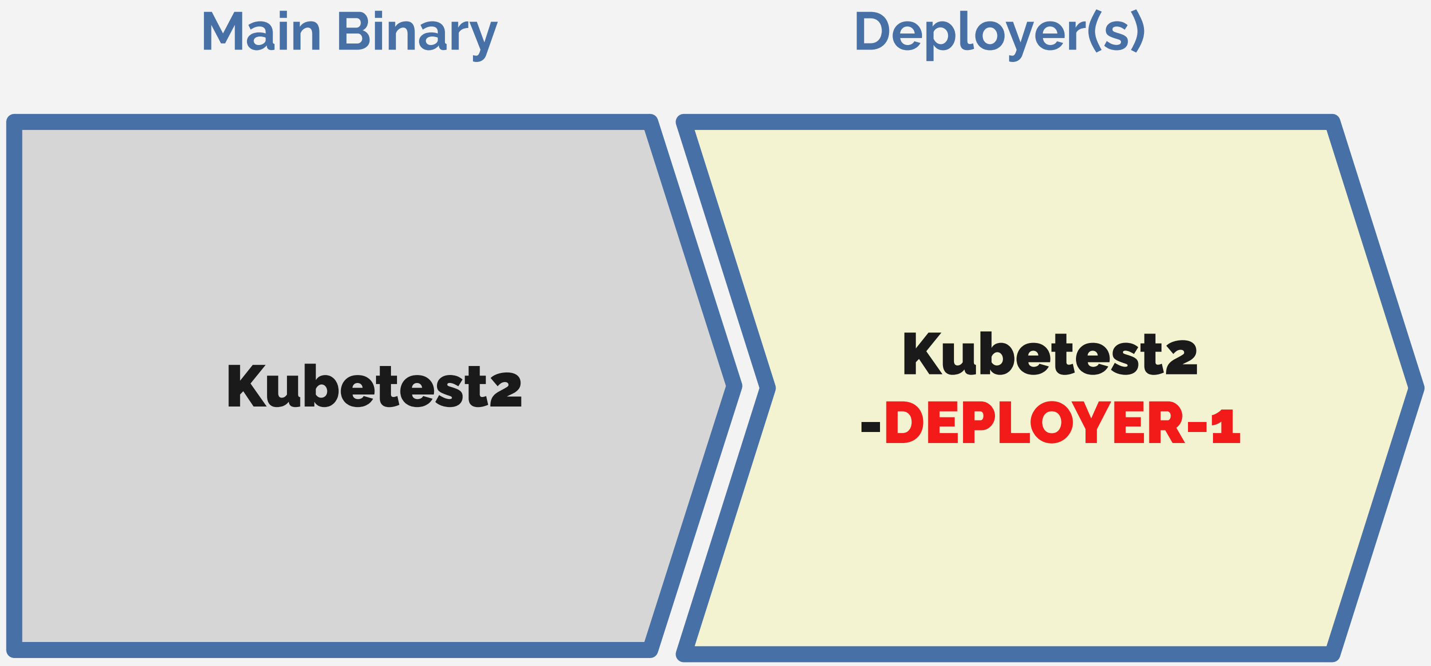
Architecture of Kubtest2



Architecture of Kubtest2

```
$ kubetest2


kubetest2 is a tool for kubernetes end to end testing.

It orchestrates creating clusters, building kubernetes, deleting clusters, running tests, etc.

kubetest2 should be called with a deployer like: 'kubetest2 kind --help'

For more information see: https://github.com/kubernetes-sigs/kubetest2

Usage:

  kubetest2 [deployer] [flags]


Detected Deployers:


Detected Testers:
```

Architecture of Kubtest2



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Usage:

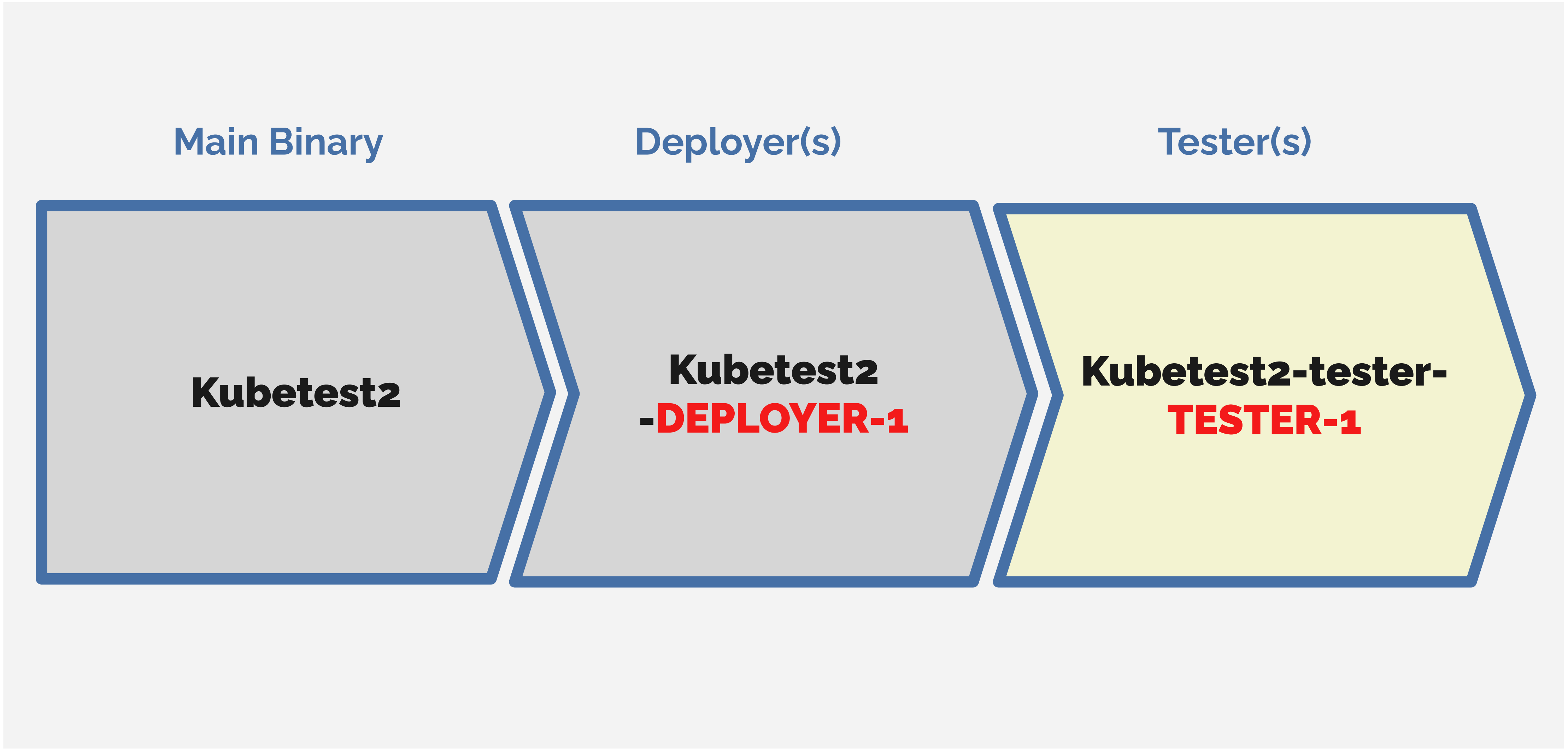
  kubetest2 [deployer] [flags]


Detected Deployers:

  DEPLOYER-1


Detected Testers:
```

Architecture of Kubtest2



Architecture of Kubtest2

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Usage:

  kubetest2 [deployer] [flags]


Detected Deployers:

  DEPLOYER-1


Detected Testers:

  TESTER-1
```
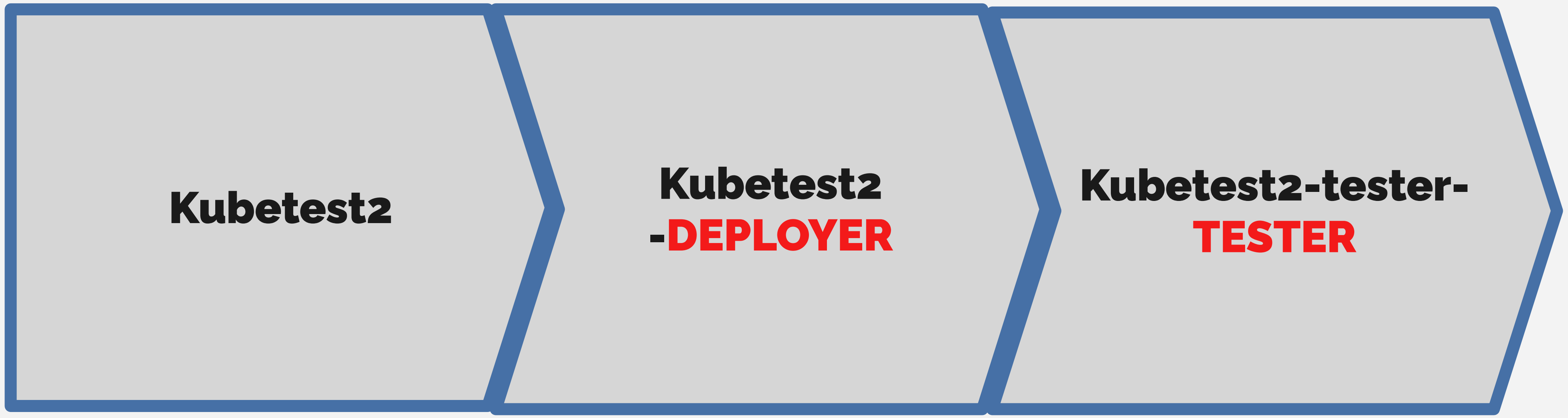

Architecture of Kubtest2



Architecture of Kubtest2

```
$ kubetest2


...
Usage:
  kubetest2 [deployer] [flags]

Detected Deployers:
  DEPLOYER-1
  DEPLOYER-2
  DEPLOYER-3

Detected Testers:
  TESTER-1
  TESTER-2
  TESTER-3
```

Kubetest2 (Example)

```
# Syntax


$ kubetest2 <deployer-name> \
--up \
--down \
--test <tester> <test- arguments>
```

Kubetest2 (Example)

```
# Syntax

$ kubetest2 <deployer-name> \
--up \
--down \
--test <tester> <test- arguments>
```

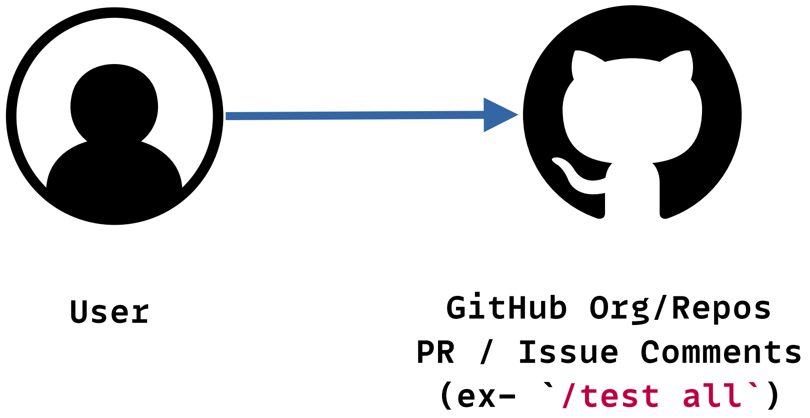
```
# Example: upstream CNCF kubernetes test against a GKE cluster

$ kubetest2 gke\
--up \
--down \
--test ginkgo -- --focus-regex “[Conformance]”
```

How the upstream Kubernetes Project integrates kubetest2 with Prow

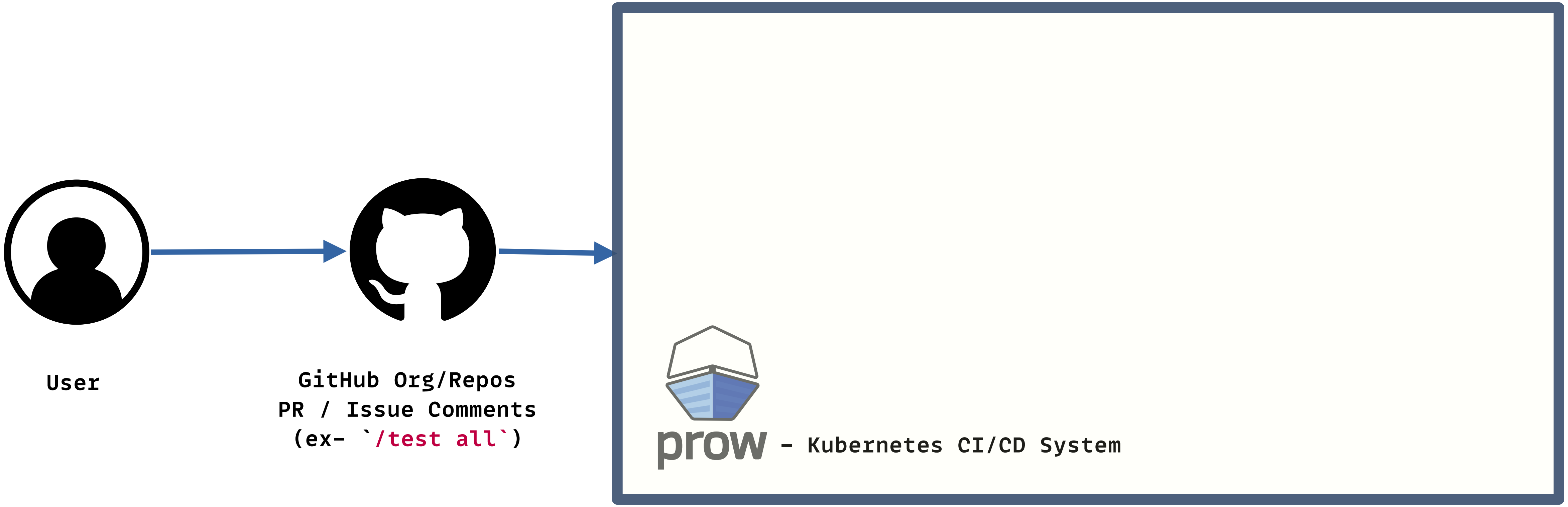
How the upstream Kubernetes Project integrates kubetest2 with Prow

User

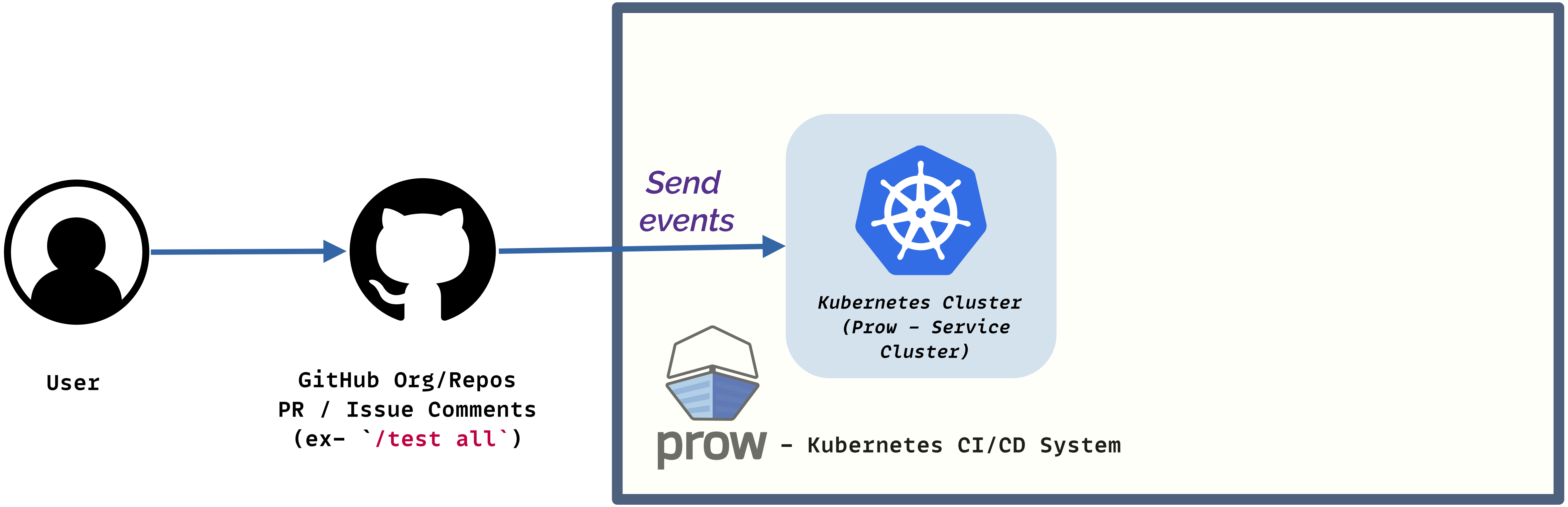
How the upstream Kubernetes Project integrates kubetest2 with Prow



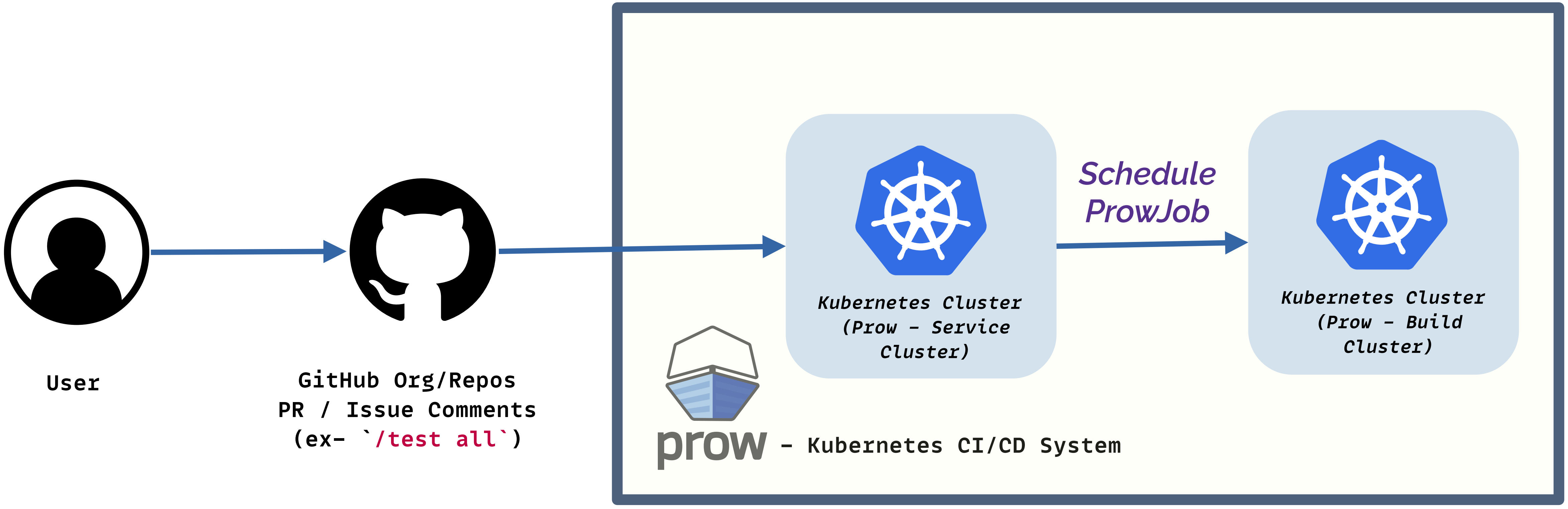
How the upstream Kubernetes Project integrates kubetest2 with Prow



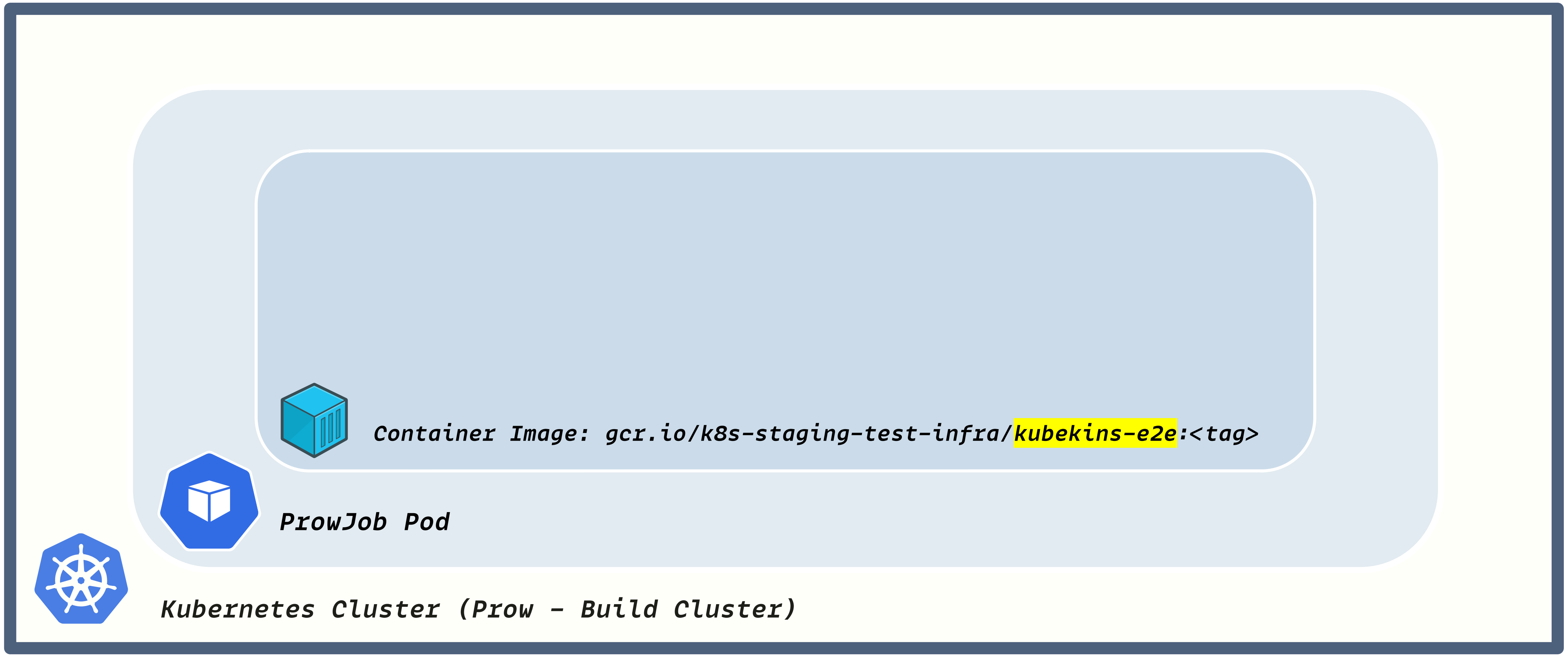
How the upstream Kubernetes Project integrates kubetest2 with Prow


Send events
Kubernetes Cluster (Prow - Service Cluster)
User
GitHub Org/Repos
PR / Issue Comments
(ex- `/test all`)
prow - Kubernetes CI/CD System

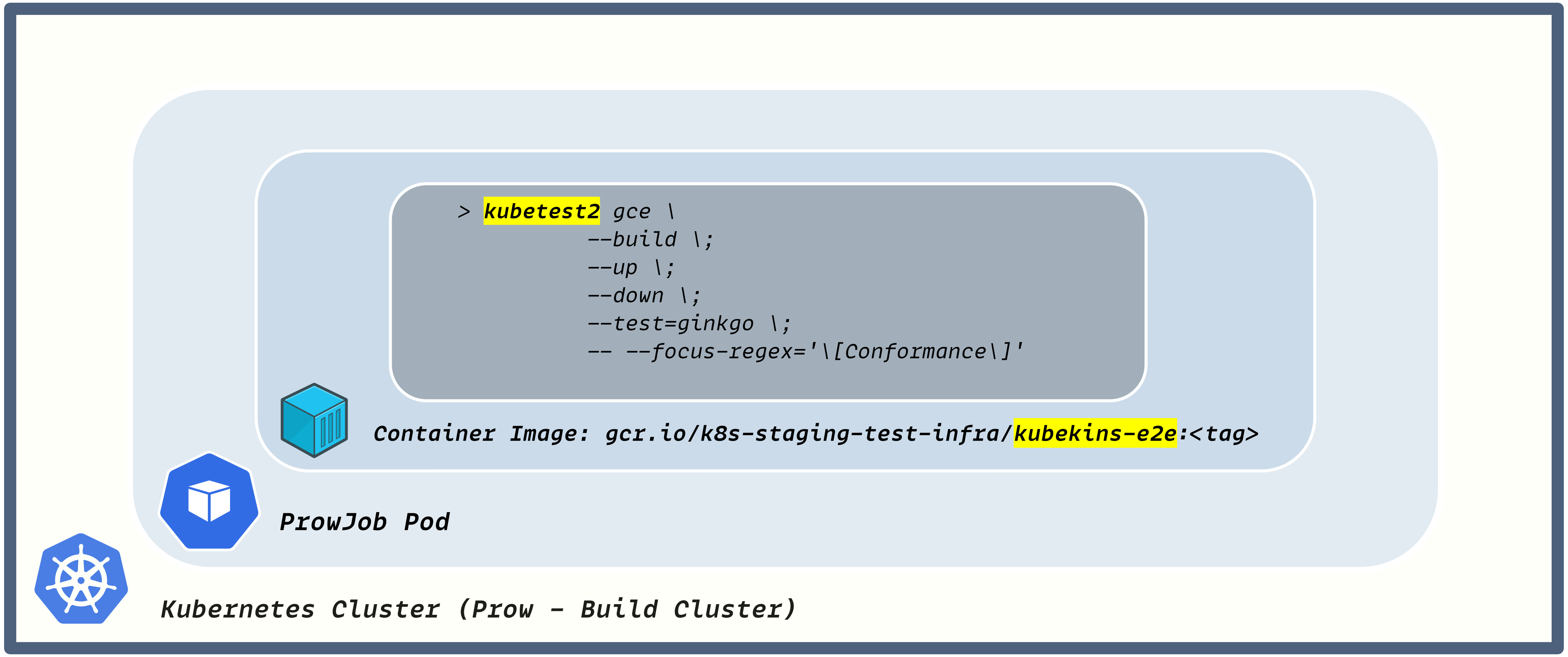
How the upstream Kubernetes Project integrates kubetest2 with Prow



How the upstream Kubernetes Project integrates kubetest2 with Prow


Container Image: gcr.io/k8s-staging-test-infra/kubekins-e2e:<tag>
ProwJob Pod
Kubernetes Cluster (Prow - Build Cluster)

How the upstream Kubernetes Project integrates kubetest2 with Prow



```
> kubetest2 gce \
          --build \;
          --up \;
          --down \;
          --test=ginkgo \;
          -- --focus-regex='\[Conformance\]'
```

Container Image: gcr.io/k8s-staging-test-infra/kubekins-e2e:<tag>
ProwJob Pod
Kubernetes Cluster (Prow - Build Cluster)

Kubetest2: Primary Features

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Consistent cluster life-cycle

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Decoupled implementation of deployers, and plug-&-play testers

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Decoupled implementation of deployers, and plug-&-play testers

Reproducible CI & local testing experience

Kubetest2: Primary Features

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Reproducible CI & local testing experience

Support for Boskos

Bespoke Deployer: Why?

At present, Kubetest2 *only* supports GCP, GKE, and KinD Deployers (in-tree)

Bespoke Deployer: Why?

At present, Kubetest2 *only* supports GCP, GKE, and KinD Deployers (in-tree)

but *enables* writing *Custom Deployers* for different cloud platforms *out-of-tree*

Demo!

Demo!

Writing *Custom Deployer* for Kubetest2: *AKS (Azure Kubernetes Services)*

Demo: Custom AKS Deployer

```go
type Deployer interface {
   Up() error
   Down() error
   IsUp() (up bool, err error)
   DumpClusterLogs() error
   Build() error //optional!
}
```

sigs.k8s.io/kubetest2/pkg/types/types.go#L67-L85

Demo: Custom AKS Deployer

```go
type Deployer interface {

    Up() error

    Down() error

    IsUp() (up bool, err error)

    DumpClusterLogs() error

    Build() error //optional!

}
```

Deployer defines the interface between Kubetest2 & a deployer

sigs.k8s.io/kubetest2/pkg/types/types.go#L67-L85

Demo: Custom AKS Deployer

```
type Deployer interface {
    Up() error
    Down() error
    IsUp() (up bool, err error)
    DumpClusterLogs() error
    Build() error //optional!
}
```

Up should provision a new cluster for testing

sigs.k8s.io/kubetest2/pkg/types/types.go#L67-L85

Demo: Custom AKS Deployer

```
type Deployer interface {

   Up() error

   Down() error

   IsUp() (up bool, err error)

   DumpClusterLogs() error

   Build() error //optional!

}
```

Down should tear down the test cluster if any

sigs.k8s.io/kubetest2/pkg/types/types.go#L67-L85

Demo: Custom AKS Deployer

```go
type Deployer interface {
    Up() error
    Down() error
    IsUp() (up bool, err error)
    DumpClusterLogs() error
    Build() error //optional!
}
```

IsUp should return true if a test cluster is successfully provisioned

sigs.k8s.io/kubetest2/pkg/types/types.go#L67-L85

Demo: Custom AKS Deployer

```go
type Deployer interface {

   Up() error

   Down() error

   IsUp() (up bool, err error)

   DumpClusterLogs() error

   Build() error //optional!

}
```

DumpClusterLogs exports logs from the cluster during Test Run

sigs.k8s.io/kubetest2/pkg/types/types.go#L67-L85

Demo: Custom AKS Deployer

```
type Deployer interface {
    Up() error
    Down() error
    IsUp() (up bool, err error)
    DumpClusterLogs() error
    Build() error //optional!
}
```

Build should build Kubernetes & package it in whatever format the deployer consumes

sigs.k8s.io/kubetest2/pkg/types/types.go#L67-L85

Demo: Custom AKS Deployer

Demo: Custom AKS Deployer

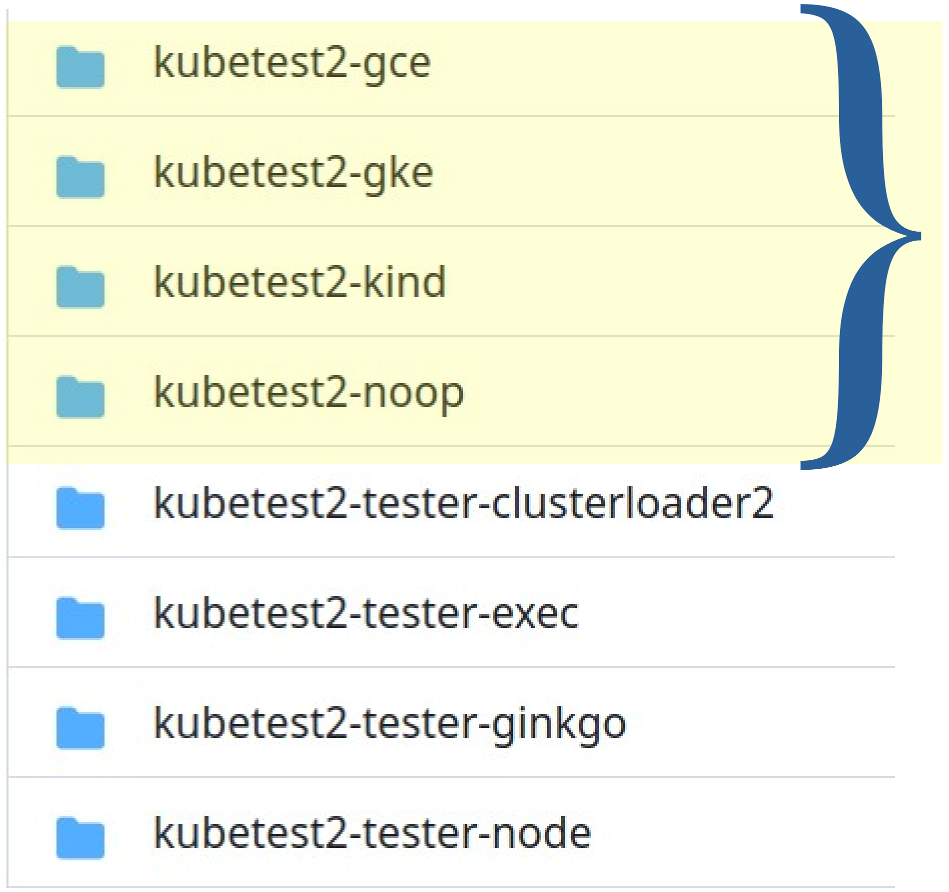
```
$ git clone https://github.com/kubernetes-sigs/kubetest2.git

$ cd kubetest2

$ make install-all
```

Install Kubetest2, and all deployers & testers in the PATH

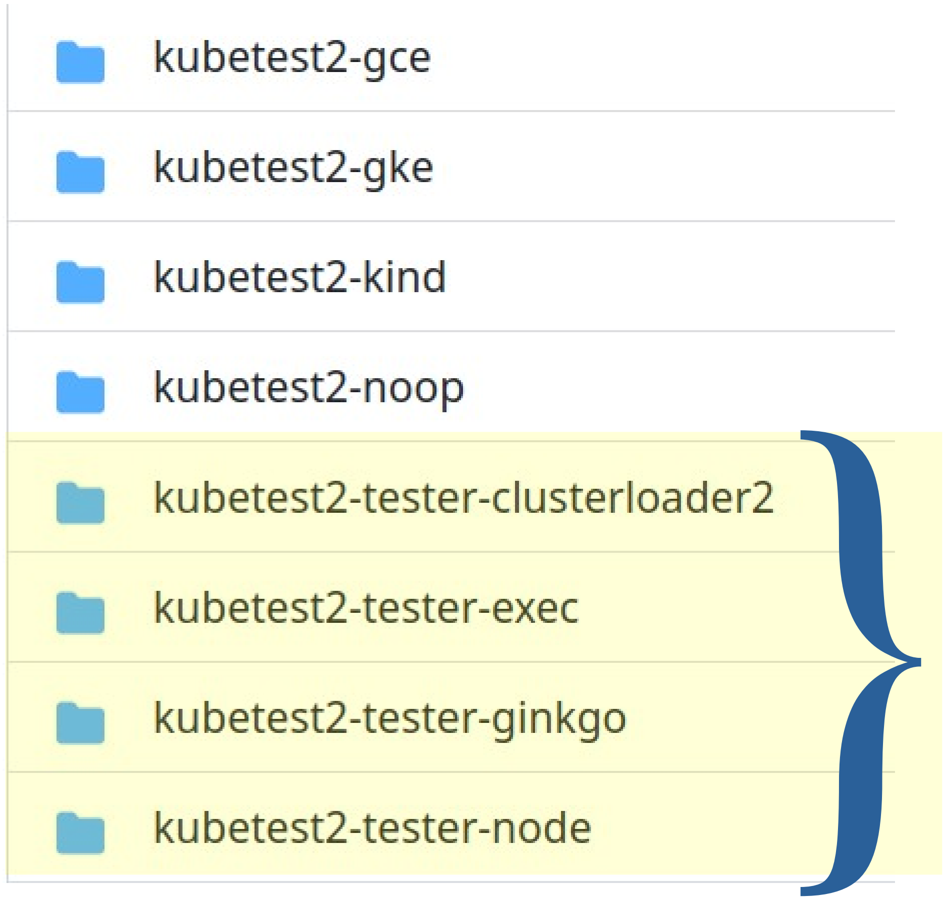
Demo: Custom AKS Deployer



kubetest2-gce
kubetest2-gke
kubetest2-kind
kubetest2-noop
kubetest2-tester-clusterloader2
kubetest2-tester-exec
kubetest2-tester-ginkgo
kubetest2-tester-node

Kubetest2-
DEPLOYER

Demo: Custom AKS Deployer



kubetest2-gce
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kubetest2-tester-clusterloader2
kubetest2-tester-exec
kubetest2-tester-ginkgo
kubetest2-tester-node

Kubetest2-tester-
TESTER

Demo: Custom AKS Deployer

```
$ kubetest2

...

Usage:

  kubetest2 [deployer] [flags]

Detected Deployers:
  gce
  gke
  kind
  noop


Detected Testers:
  clusterloader-2
  exec
  ginkgo
  node
```

Demo: Custom AKS Deployer

```
$ mkdir kubetest2-aks

$ cd kubetest2-aks

    // tree of kubetest2-aks
    .
    |-- deployer
    |    `-- deployer.go
    |-- main.go
    `-- script
         |-- kube-down.sh
         `-- kube-up.sh
```

For new AKS Deployer, in the format of Kubetest2-DEPLOYER

Demo: Custom AKS Deployer

```
$ mkdir kubetest2-aks

$ cd kubetest2-aks

    // tree of kubetest2-aks
    .
    |-- deployer
    |   `-- deployer.go
    |-- main.go
    `-- script
        |-- kube-down.sh
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```

Implements the Deployer interface

To implement Up() & Down() methods in deployer.go

Demo: Custom AKS Deployer

```
$ mkdir kubetest2-aks

$ cd kubetest2-aks

    // tree of kubetest2-aks
    .
    |-- deployer
    |   `-- deployer.go
    |-- main.go
    `-- script
        |-- kube-down.sh
        `-- kube-up.sh
```

Entrypoint!

File: scripts/kube-up.sh

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```bash
#!/usr/bin/env bash
set -x
## Check for required commands
command -v az > /dev/null || { echo "'az' command not not found" 1>&2; exit 1; }
command -v jq > /dev/null || { echo "'jq' command not not found" 1>&2; exit 1; }
## Default variables
AZ_VM_SIZE=${AZ_VM_SIZE:-Standard_DS2_v2}
KUBECONFIG=${KUBECONFIG:-$HOME/.kube/${AZ_CLUSTER_NAME}.yaml}
## Check for required variables
[[ -z "${AZ_RESOURCE_GROUP}" ]] && { echo 'AZ_RESOURCE_GROUP not specified. Aborting'1>&2 ; exit 1; }
[[ -z "${AZ_CLUSTER_NAME}" ]] && { echo 'AZ_CLUSTER_NAME not specified. Aborting' 1>&2 ; exit 1; }
## Create the resource group (idempotently)
if ! az group list | jq '.[].name' -r | grep -q ${AZ_RESOURCE_GROUP}; then
  [[ -z "${AZ_LOCATION}" ]] && { echo 'AZ_LOCATION not specified. Aborting' 1>&2 ; exit 1; }
  az group create --name=${AZ_RESOURCE_GROUP} --location=${AZ_LOCATION}
else
  echo "'${AZ_RESOURCE_GROUP}' resource group is already created, skipping."
fi
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```bash
#!/usr/bin/env bash
set -x
## Check for required commands
command -v az > /dev/null || { echo "'az' command not not found" 1>&2; exit 1; }
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  [[ -z "${AZ_LOCATION}" ]] && { echo 'AZ_LOCATION not specified. Aborting' 1>&2 ; exit 1; }
  az group create --name=${AZ_RESOURCE_GROUP} --location=${AZ_LOCATION}
else
  echo "'${AZ_RESOURCE_GROUP}' resource group is already created, skipping."
fi
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```bash
## create aks cluster if resource group was created
if az group list | jq '.[].name' -r | grep -q ${AZ_RESOURCE_GROUP}; then
  ## check if AKS cluster was already created
  if ! az aks list | jq '.[].name' -r | grep -q ${AZ_CLUSTER_NAME}; then
    echo "Creating '${AZ_CLUSTER_NAME}' Kubernetes cluster"
    az aks create \
        --resource-group ${AZ_RESOURCE_GROUP} \
        --name ${AZ_CLUSTER_NAME} \
        --generate-ssh-keys \
        --vm-set-type VirtualMachineScaleSets \
        --node-vm-size ${AZ_VM_SIZE} \
        --load-balancer-sku standard \
        --enable-managed-identity \
        --node-count 3 \
        --zones 1 2 3
  else
    echo "'${AZ_CLUSTER_NAME}' Kubernetes cluster is already created, skipping."
  fi
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
  ## create KUBECONFIG so that cluster can be accessed using existing login credentials
  if az aks list | jq '.[].name' -r | grep -q ${AZ_CLUSTER_NAME}; then
    ## Azure ignores KUBECONFIG, but we can specify with --file flag
    az aks get-credentials \
      --resource-group ${AZ_RESOURCE_GROUP} \
      --name ${AZ_CLUSTER_NAME} \
      --file ${KUBECONFIG}
  fi
fi
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

File: scripts/kube-down.sh

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```bash
#!/usr/bin/env bash

## Check for required commands
command -v az > /dev/null || { echo "'az' command not not found" 1>&2; exit 1; }
command -v jq > /dev/null || { echo "'jq' command not not found" 1>&2; exit 1; }
## Check for required variables
[[ -z "$AZ_RESOURCE_GROUP" ]] && { echo 'AZ_RESOURCE_GROUP not specified. Aborting' 1>&2 ; exit 1; }
[[ -z "$AZ_CLUSTER_NAME" ]] && { echo 'AZ_CLUSTER_NAME not specified. Aborting' 1>&2 ; exit 1; }
## delete aks cluster if resource group was created
if az group list | jq '.[].name' -r | grep -q "^${AZ_RESOURCE_GROUP}$"; then
  if az aks list | jq '.[].name' -r | grep -q "^${AZ_CLUSTER_NAME}$"; then
    az aks delete \
     --resource-group "${AZ_RESOURCE_GROUP}" \
     --name "${AZ_CLUSTER_NAME}" --yes
  else
    echo "Cannot find '$AZ_CLUSTER_NAME' Kubernetes cluster, skipping."
  fi
fi
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```bash
#!/usr/bin/env bash

## Check for required commands
command -v az > /dev/null || { echo "'az' command not not found" 1>&2; exit 1; }
command -v jq > /dev/null || { echo "'jq' command not not found" 1>&2; exit 1; }
## Check for required variables
[[ -z "$AZ_RESOURCE_GROUP" ]] && { echo 'AZ_RESOURCE_GROUP not specified. Aborting' 1>&2 ; exit 1; }
[[ -z "$AZ_CLUSTER_NAME" ]] && { echo 'AZ_CLUSTER_NAME not specified. Aborting' 1>&2 ; exit 1; }
## delete aks cluster if resource group was created
if az group list | jq '.[].name' -r | grep -q "^${AZ_RESOURCE_GROUP}$"; then
  if az aks list | jq '.[].name' -r | grep -q "^${AZ_CLUSTER_NAME}$"; then
    az aks delete \
     --resource-group "${AZ_RESOURCE_GROUP}" \
     --name "${AZ_CLUSTER_NAME}" --yes
  else
    echo "Cannot find '$AZ_CLUSTER_NAME' Kubernetes cluster, skipping."
  fi
fi
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

File: deployer/deployer.go

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```go
package deployer
import (
        ...
        "sigs.k8s.io/kubetest2/pkg/types"
        ...
)
var (

   GitTag string
   randomPostFix, _ = RandString(6)
   aksResourceGroup = "aks-rg-" + randomPostFix
   aksClusterName = "aks-cluster-" + randomPostFix

)

// Name is the name of the deployer
const Name = "aks"

func (d *deployer) buildEnv() []string {
        env := os.Environ()
        env = append(env, fmt.Sprintf("AZ_LOCATION=%s", "westus2"))
        env = append(env, fmt.Sprintf("AZ_RESOURCE_GROUP=%s", aksResourceGroup))
        env = append(env, fmt.Sprintf("AZ_CLUSTER_NAME=%s", aksClusterName))
        env = append(env, fmt.Sprintf("HOME=%s", os.UserHomeDir()))
        env = append(env, fmt.Sprintf("KUBECONFIG=%s", filepath.Join(home, ".kube", aksClusterName+".yaml")))
        return env

}
...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```go
package deployer
import (
        ...
        "sigs.k8s.io/kubetest2/pkg/types"
        ...
)
var (

   GitTag string
   randomPostFix, _ = RandString(6)
   aksResourceGroup = "aks-rg-" + randomPostFix
   aksClusterName = "aks-cluster-" + randomPostFix

)

// Name is the name of the deployer
const Name = "aks"

func (d *deployer) buildEnv() []string {
        env := os.Environ()
        env = append(env, fmt.Sprintf("AZ_LOCATION=%s", "westus2"))
        env = append(env, fmt.Sprintf("AZ_RESOURCE_GROUP=%s", aksResourceGroup))
        env = append(env, fmt.Sprintf("AZ_CLUSTER_NAME=%s", aksClusterName))
        env = append(env, fmt.Sprintf("HOME=%s", os.UserHomeDir()))
        env = append(env, fmt.Sprintf("KUBECONFIG=%s", filepath.Join(home, ".kube", aksClusterName+".yaml")))
        return env

}
...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
package deployer
import (
        ...
        "sigs.k8s.io/kubetest2/pkg/types"
        ...
)

var (

   GitTag string
   randomPostFix, _ = RandString(6)
   aksResourceGroup = "aks-rg-" + randomPostFix
   aksClusterName = "aks-cluster-" + randomPostFix

)

// Name is the name of the deployer
const Name = "aks"

func (d *deployer) buildEnv() []string {
        env := os.Environ()
        env = append(env, fmt.Sprintf("AZ_LOCATION=%s", "westus2"))
        env = append(env, fmt.Sprintf("AZ_RESOURCE_GROUP=%s", aksResourceGroup))
        env = append(env, fmt.Sprintf("AZ_CLUSTER_NAME=%s", aksClusterName))
        env = append(env, fmt.Sprintf("HOME=%s", os.UserHomeDir()))
        env = append(env, fmt.Sprintf("KUBECONFIG=%s", filepath.Join(home, ".kube", aksClusterName+".yaml")))
        return env

}
...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```go
package deployer
import (
        ...
        "sigs.k8s.io/kubetest2/pkg/types"
        ...
)

var (

   GitTag string
   randomPostFix, _ = RandString(6)
   aksResourceGroup = "aks-rg-" + randomPostFix
   aksClusterName = "aks-cluster-" + randomPostFix

)

// Name is the name of the deployer
const Name = "aks"

func (d *deployer) buildEnv() []string {
        env := os.Environ()
        env = append(env, fmt.Sprintf("AZ_LOCATION=%s", "westus2"))
        env = append(env, fmt.Sprintf("AZ_RESOURCE_GROUP=%s", aksResourceGroup))
        env = append(env, fmt.Sprintf("AZ_CLUSTER_NAME=%s", aksClusterName))
        env = append(env, fmt.Sprintf("HOME=%s", os.UserHomeDir()))
        env = append(env, fmt.Sprintf("KUBECONFIG=%s", filepath.Join(home, ".kube", aksClusterName+".yaml")))
        return env

}
...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```go
...
type deployer struct {
        commonOptions     types.Options
        logsDir           string
        overwriteLogsDir bool
        repoRoot          string
        kubeconfigPath    string
}

// New implements deployer.New
func New(opts types.Options) (types.Deployer, *pflag.FlagSet) {
     d := &deployer{
       commonOptions:    opts,
       logsDir:          filepath.Join(opts.RunDir(), "cluster-logs"),
       verwriteLogsDir:  false,
       repoRoot:         "",
       kubeconfigPath:   "",
     }

     // bindFlags() - helper to create & bind a flagset to the deployer
     return d, bindFlags(d)
}




...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```go
...

type deployer struct {
        commonOptions    types.Options
        logsDir          string
        overwriteLogsDir bool
        repoRoot         string
        kubeconfigPath   string
}

// New implements deployer.New
func New(opts types.Options) (types.Deployer, *pflag.FlagSet) {
     d := &deployer{
       commonOptions:    opts,
       logsDir:          filepath.Join(opts.RunDir(), "cluster-logs"),
       verwriteLogsDir:  false,
       repoRoot:         "",
       kubeconfigPath:   "",
     }

     // bindFlags() - helper to create & bind a flagset to the deployer
     return d, bindFlags(d)
}



...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) IsUp() (bool, error) {
        klog.V(1).Info("AKS deployer starting IsUp()")

        env := d.buildEnv()


        // ` kubectl get nodes -o=name --kubeconfig=<path-to-kubeconfig>`
        cmd := exec.Command("/usr/local/bin/kubectl", "get", "nodes",
                            "-o=name", "--kubeconfig="+filepath.Join(homeDir(), ".kube", aksClusterName+".yaml"))

        cmd.SetEnv(env...)
        cmd.SetStderr(os.Stderr)

        output, err := exec.Output(cmd)
        if err != nil {
                return false, fmt.Errorf("is up failed to get nodes: %w", err)
        }
        return len(output) > 0, nil
}




...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) IsUp() (bool, error) {
        klog.V(1).Info("AKS deployer starting IsUp()")

        env := d.buildEnv()


        // ` kubectl get nodes -o=name --kubeconfig=<path-to-kubeconfig>`
        cmd := exec.Command("/usr/local/bin/kubectl", "get", "nodes",
                            "-o=name", "--kubeconfig="+filepath.Join(homeDir(), ".kube", aksClusterName+".yaml"))

        cmd.SetEnv(env...)
        cmd.SetStderr(os.Stderr)

        output, err := exec.Output(cmd)
        if err ≠ nil {
                return false, fmt.Errorf("is up failed to get nodes: %w", err)
        }
        return len(output) > 0, nil
}





...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) IsUp() (bool, error) {
	klog.V(1).Info("AKS deployer starting IsUp()")

	env := d.buildEnv()

	// ` kubectl get nodes -o=name --kubeconfig=<path-to-kubeconfig>`
	cmd := exec.Command("/usr/local/bin/kubectl", "get", "nodes",
		          "-o=name", "--kubeconfig="+filepath.Join(homeDir(), ".kube", aksClusterName+".yaml"))

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...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) IsUp() (bool, error) {
        klog.V(1).Info("AKS deployer starting IsUp()")

        env := d.buildEnv()

        // ` kubectl get nodes -o=name --kubeconfig=<path-to-kubeconfig>`
        cmd := exec.Command("/usr/local/bin/kubectl", "get", "nodes",
                    "-o=name", "--kubeconfig="+filepath.Join(homeDir(), ".kube", aksClusterName+".yaml"))

        cmd.SetEnv(env...)
        cmd.SetStderr(os.Stderr)

        output, err := exec.Output(cmd)
        if err ≠ nil {
                return false, fmt.Errorf("is up failed to get nodes: %w", err)
        }
        return len(output) > 0, nil
}

...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) DumpClusterLogs() error {
        klog.V(1).Info("AKS deployer starting DumpClusterLogs()")

        if err := d.makeLogsDir(); err != nil {
                return fmt.Errorf("failed to make logs directory: %w", err)
        }


        // ` kubectl cluster-info dump --kubeconfig=<path-to-kubeconfig>`
        if err := d.kubectlDump(); err != nil {
                return fmt.Errorf("failed to dump cluster info with kubectl: %w", err)
        }
        return nil
}









...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) DumpClusterLogs() error {
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...
```

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```go
...

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...
```

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	}
	return nil
}








...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```go
...

func (d *deployer) Up() error {
        klog.V(1).Info("AKS deployer starting Up()")

        env := d.buildEnv()

        defer func() {
                if err := d.DumpClusterLogs(); err != nil {
                        klog.Warningf("Dumping cluster logs at the end of Up() failed: %s", err)
                }
        }()

        if err := d.runScript("kube-up.sh"); err != nil {
                return fmt.Errorf("error encountered during kube-up.sh: %w", err)
        }

        // ` kubectl get nodes -o name --kubeconfig=<path-to-kubeconfig>`
        if isUp, err := d.IsUp(); err != nil {
                klog.Warningf("failed to check if cluster is up: %s", err)
        } else if isUp {
                klog.V(1).Infof("cluster reported as up")
        } else {
                klog.Errorf("cluster reported as down")
        }
        return nil
}

...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

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	} else {
		klog.Errorf("cluster reported as down")
	}
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...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

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                }
        }()

        if err := d.runScript("kube-up.sh"); err != nil {
                return fmt.Errorf("error encountered during kube-up.sh: %w", err)
        }

        // ` kubectl get nodes -o name --kubeconfig=<path-to-kubeconfig>`
        if isUp, err := d.IsUp(); err != nil {
                klog.Warningf("failed to check if cluster is up: %s", err)
        } else if isUp {
                klog.V(1).Infof("cluster reported as up")
        } else {
                klog.Errorf("cluster reported as down")
        }
        return nil
}

...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

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        klog.V(1).Info("AKS deployer starting Up()")

        env := d.buildEnv()

        defer func() {
                if err := d.DumpClusterLogs(); err != nil {
                        klog.Warningf("Dumping cluster logs at the end of Up() failed: %s", err)
                }
        }()

        if err := d.runScript("kube-up.sh"); err != nil {
                return fmt.Errorf("error encountered during kube-up.sh: %w", err)
        }

        // ` kubectl get nodes -o name --kubeconfig=<path-to-kubeconfig>`
        if isUp, err := d.IsUp(); err != nil {
                klog.Warningf("failed to check if cluster is up: %s", err)
        } else if isUp {
                klog.V(1).Infof("cluster reported as up")
        } else {
                klog.Errorf("cluster reported as down")
        }
        return nil
}

...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) Down() error {
	klog.V(1).Info("AKS deployer starting Down()")

	if err := d.runScript("kube-down.sh"); err ≠ nil {
		return fmt.Errorf("error encountered during kube-down.sh: %w", err)
	}
	return nil
}


func (d *deployer) Kubeconfig() (string, error) {

	if d.KubeconfigPath ≠ "" {
		return d.KubeconfigPath, nil
	}
	if kconfig, ok := os.LookupEnv("KUBECONFIG"); ok {
		return kconfig, nil
	}
	home, err := os.UserHomeDir()
	if err ≠ nil {
		return "", err
	}
	return filepath.Join(home, ".kube", "config"), nil
}


...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) Down() error {
        klog.V(1).Info("AKS deployer starting Down()")

        if err := d.runScript("kube-down.sh"); err ≠ nil {
                return fmt.Errorf("error encountered during kube-down.sh: %w", err)
        }
        return nil
}


func (d *deployer) Kubeconfig() (string, error) {

        if d.KubeconfigPath ≠ "" {
                return d.KubeconfigPath, nil
        }
        if kconfig, ok := os.LookupEnv("KUBECONFIG"); ok {
                return kconfig, nil
        }
        home, err := os.UserHomeDir()
        if err ≠ nil {
                return "", err
        }
        return filepath.Join(home, ".kube", "config"), nil
}


...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```
...

func (d *deployer) Down() error {
	klog.V(1).Info("AKS deployer starting Down()")

	if err := d.runScript("kube-down.sh"); err ≠ nil {
		return fmt.Errorf("error encountered during kube-down.sh: %w", err)
	}
	return nil
}


func (d *deployer) Kubeconfig() (string, error) {

	if d.KubeconfigPath ≠ "" {
		return d.KubeconfigPath, nil
	}
	if kconfig, ok := os.LookupEnv("KUBECONFIG"); ok {
		return kconfig, nil
	}
	home, err := os.UserHomeDir()
	if err ≠ nil {
		return "", err
	}
	return filepath.Join(home, ".kube", "config"), nil
}


...
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

File: main.go

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

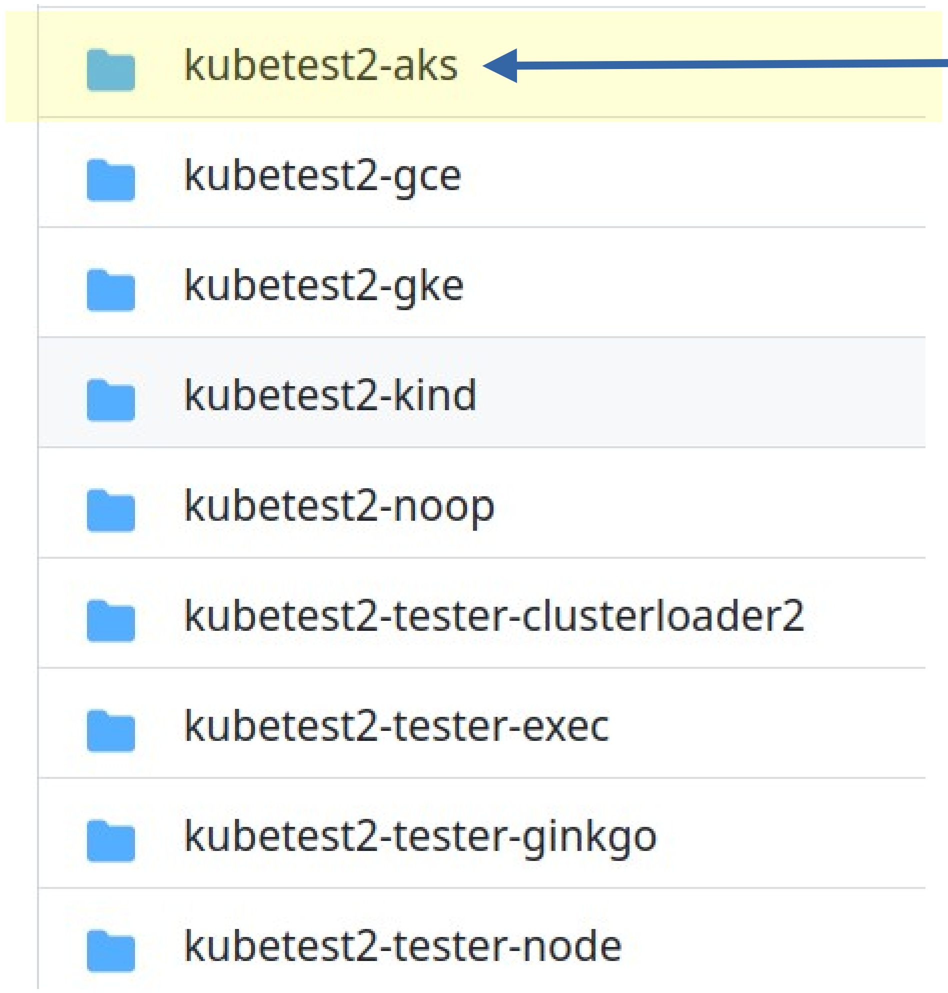
```go
package main

import (
	"sigs.k8s.io/kubetest2/pkg/app"
	"sigs.k8s.io/kubetest2/kubetest2-aks/deployer"
)

func main() {
	app.Main(deployer.Name, deployer.New)
}
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

```go
package main

import (
       "sigs.k8s.io/kubetest2/pkg/app"
       "sigs.k8s.io/kubetest2/kubetest2-aks/deployer"
)

func main() {
    app.Main(deployer.Name, deployer.New)
}
```

github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks

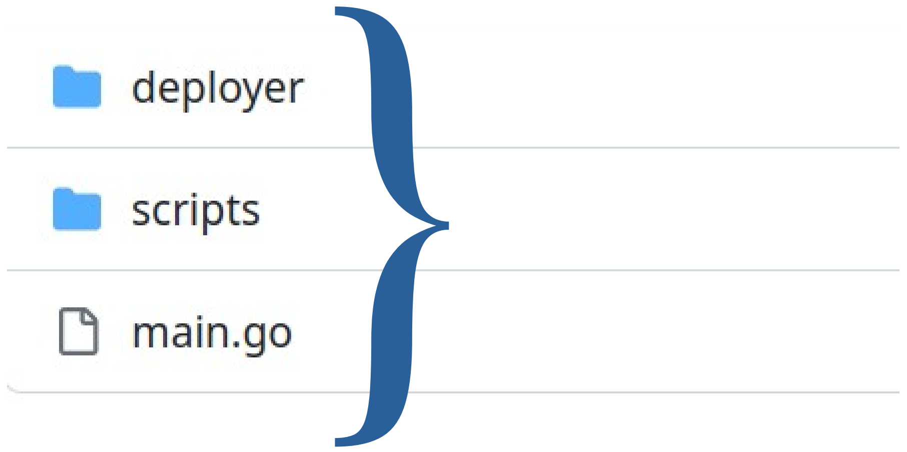
Demo: Custom AKS Deployer



- kubetest2-aks
- kubetest2-gce
- kubetest2-gke
- kubetest2-kind
- kubetest2-noop
- kubetest2-tester-clusterloader2
- kubetest2-tester-exec
- kubetest2-tester-ginkgo
- kubetest2-tester-node

Kubetest2-aks

Demo: Custom AKS Deployer


deployer
scripts
main.go

Demo: Custom AKS Deployer

```
$ make install-all
```

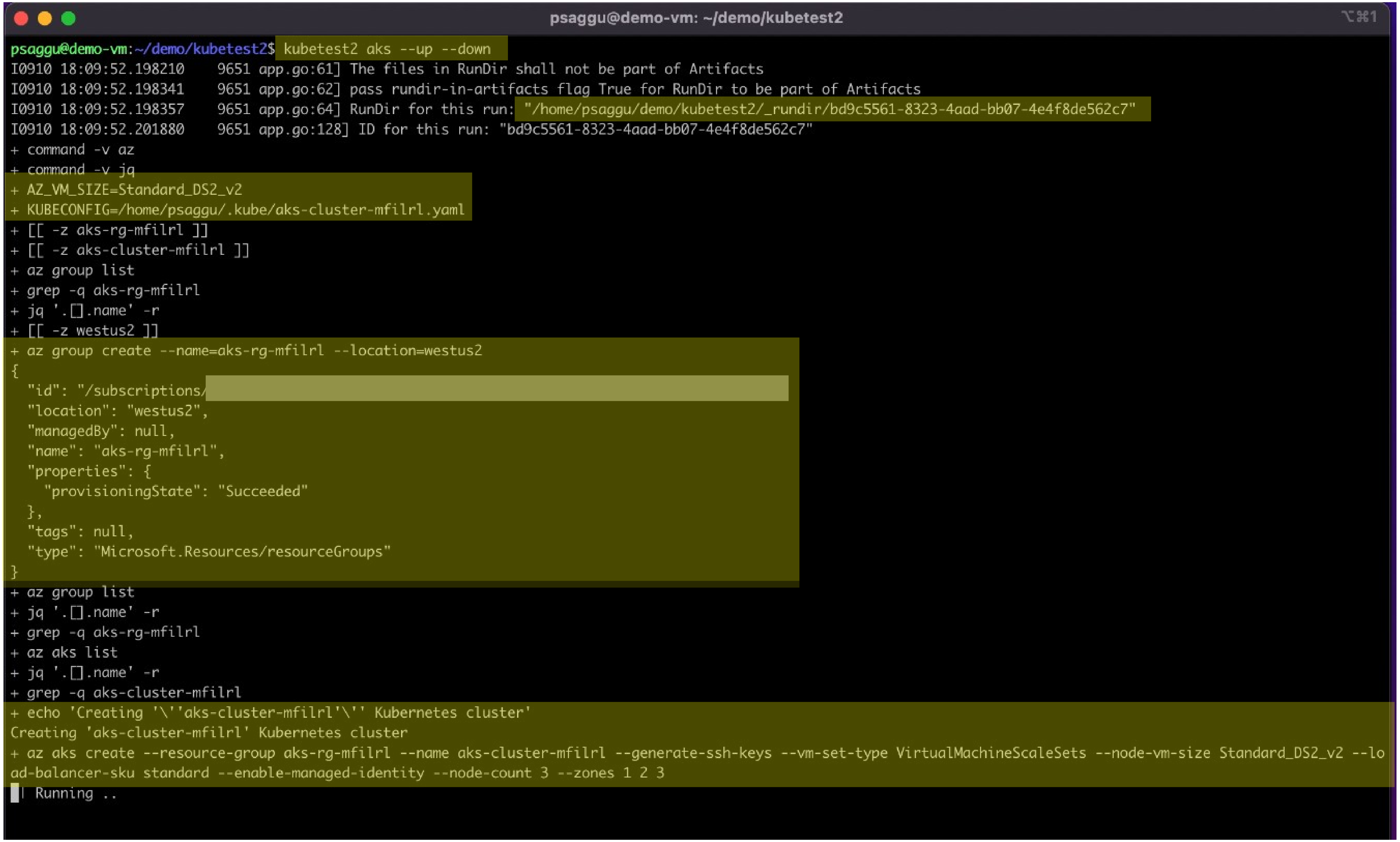
rerun to install new Kubetest2-aks deployer

Demo: Custom AKS Deployer

```
$ kubetest2

...

Usage:

  kubetest2 [deployer] [flags]


Detected Deployers:

  aks
  gce
  gke
  kind
  noop

Detected Testers:
  clusterloader-2
  exec
  ginkgo
  node
```

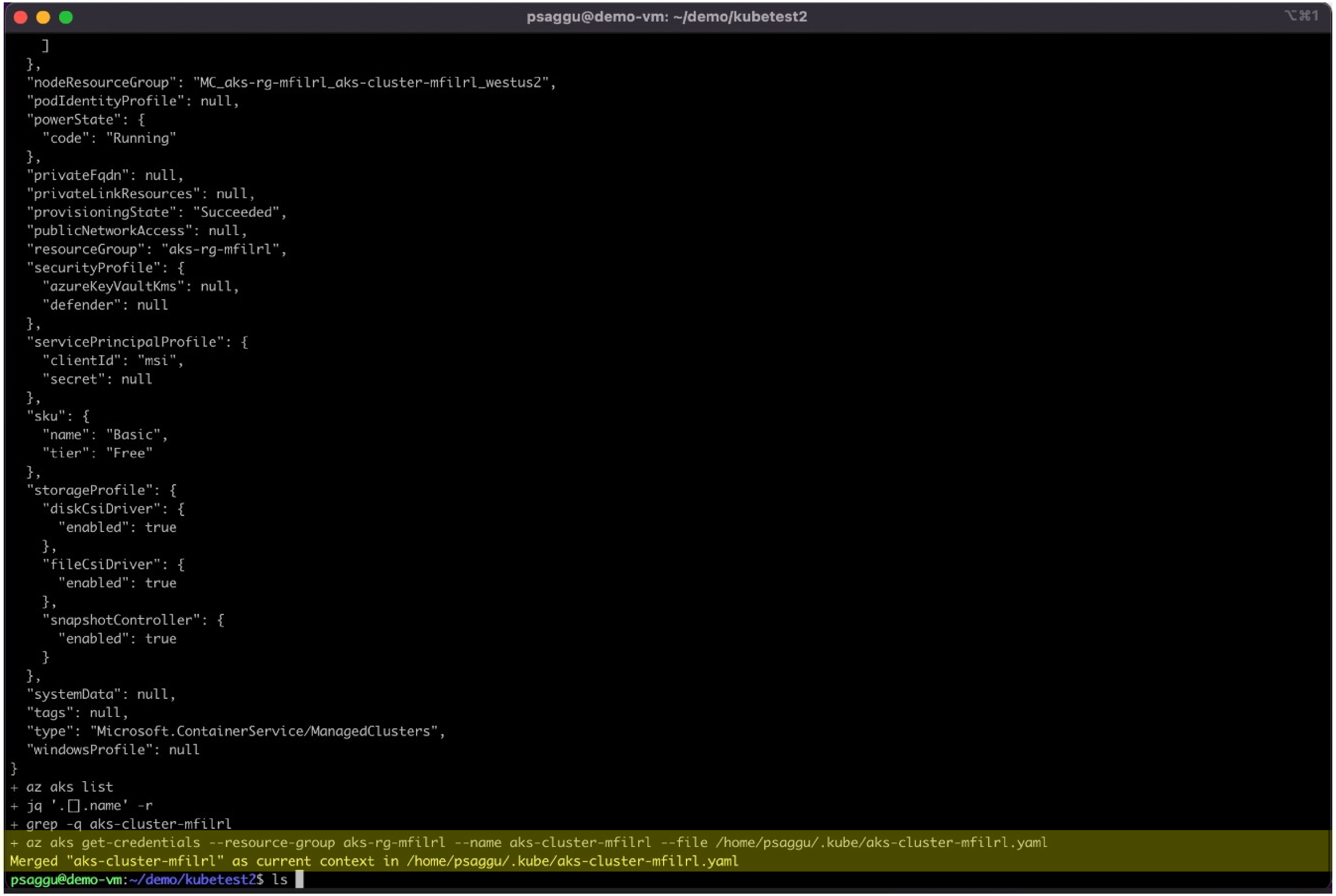
Demo: Custom AKS Deployer

```
$ kubetest2 aks --up --down
```

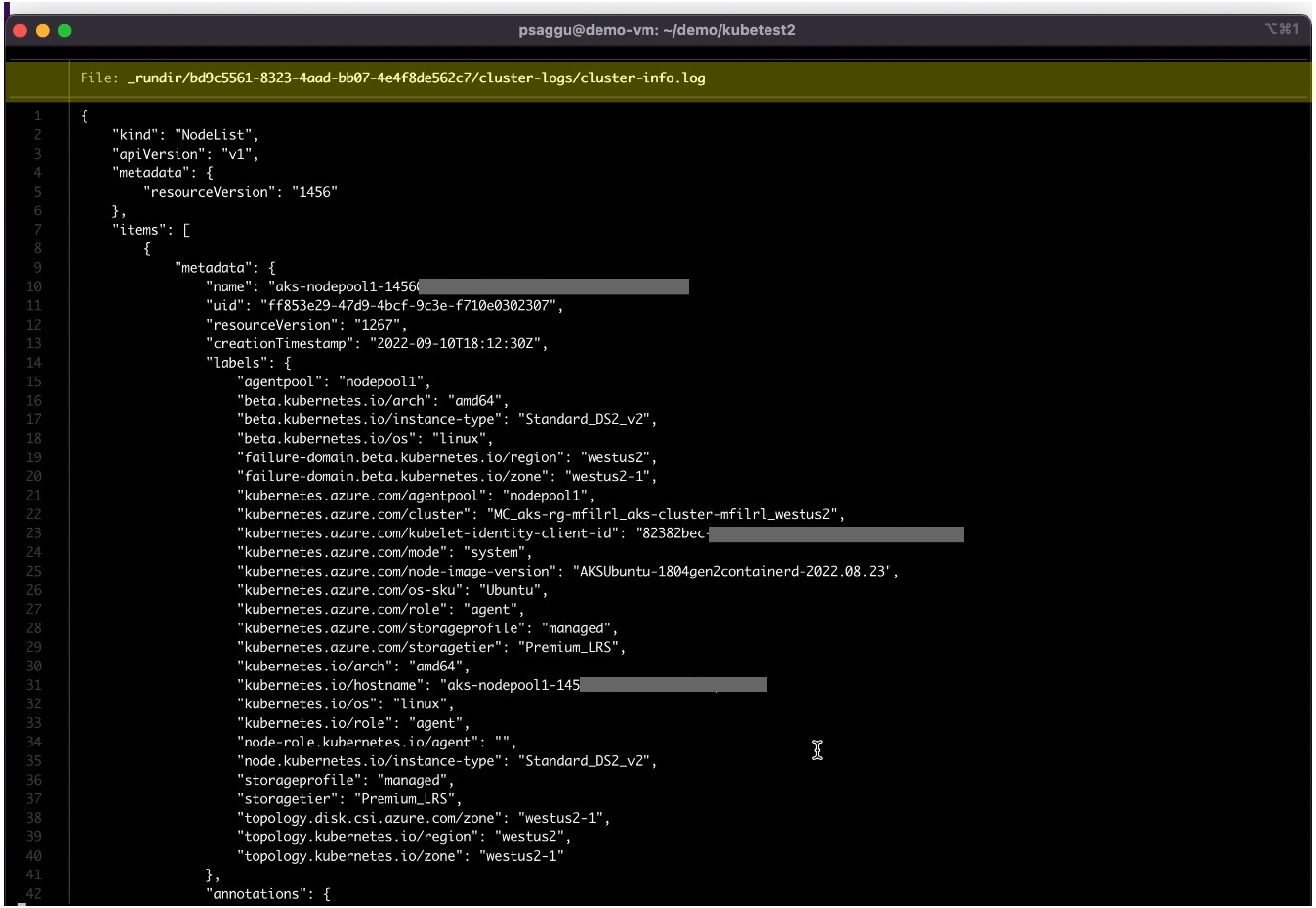


psaggu@demo-vm: ~/demo/kubetest2

```
psaggu@demo-vm:~/demo/kubetest2$ kubetest2 aks --up --down
I0910 18:09:52.198210    9651 app.go:61] The files in RunDir shall not be part of Artifacts
I0910 18:09:52.198341    9651 app.go:62] pass rundir-in-artifacts flag True for RunDir to be part of Artifacts
I0910 18:09:52.198357    9651 app.go:64] RunDir for this run: "/home/psaggu/demo/kubetest2/_rundir/bd9c5561-8323-4aad-bb07-4e4f8de562c7"
I0910 18:09:52.201880    9651 app.go:128] ID for this run: "bd9c5561-8323-4aad-bb07-4e4f8de562c7"
+ command -v az
+ command -v jq
+ AZ_VM_SIZE=Standard_DS2_v2
+ KUBECONFIG=/home/psaggu/.kube/aks-cluster-mfilrl.yaml
+ [[ -z aks-rg-mfilrl ]]
+ [[ -z aks-cluster-mfilrl ]]
+ az group list
+ grep -q aks-rg-mfilrl
+ jq '.[].name' -r
+ [[ -z westus2 ]]
+ az group create --name=aks-rg-mfilrl --location=westus2
{
  "id": "/subscriptions/[redacted]
  "location": "westus2",
  "managedBy": null,
  "name": "aks-rg-mfilrl",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
+ az group list
+ jq '.[].name' -r
+ grep -q aks-rg-mfilrl
+ az aks list
+ jq '.[].name' -r
+ grep -q aks-cluster-mfilrl
+ echo 'Creating '\''aks-cluster-mfilrl'\'' Kubernetes cluster'
Creating 'aks-cluster-mfilrl' Kubernetes cluster
+ az aks create --resource-group aks-rg-mfilrl --name aks-cluster-mfilrl --generate-ssh-keys --vm-set-type VirtualMachineScaleSets --node-vm-size Standard_DS2_v2 --lo
ad-balancer-sku standard --enable-managed-identity --node-count 3 --zones 1 2 3
▌| Running ..
```


psaggu@demo-vm: ~/demo/kubetest2

```
    ]
  },
  "nodeResourceGroup": "MC_aks-rg-mfilrl_aks-cluster-mfilrl_westus2",
  "podIdentityProfile": null,
  "powerState": {
    "code": "Running"
  },
  "privateFqdn": null,
  "privateLinkResources": null,
  "provisioningState": "Succeeded",
  "publicNetworkAccess": null,
  "resourceGroup": "aks-rg-mfilrl",
  "securityProfile": {
    "azureKeyVaultKms": null,
    "defender": null
  },
  "servicePrincipalProfile": {
    "clientId": "msi",
    "secret": null
  },
  "sku": {
    "name": "Basic",
    "tier": "Free"
  },
  "storageProfile": {
    "diskCsiDriver": {
      "enabled": true
    },
    "fileCsiDriver": {
      "enabled": true
    },
    "snapshotController": {
      "enabled": true
    }
  },
  "systemData": null,
  "tags": null,
  "type": "Microsoft.ContainerService/ManagedClusters",
  "windowsProfile": null
}
+ az aks list
+ jq '.[].name' -r
+ grep -q aks-cluster-mfilrl
+ az aks get-credentials --resource-group aks-rg-mfilrl --name aks-cluster-mfilrl --file /home/psaggu/.kube/aks-cluster-mfilrl.yaml
Merged "aks-cluster-mfilrl" as current context in /home/psaggu/.kube/aks-cluster-mfilrl.yaml
psaggu@demo-vm:~/demo/kubetest2$ ls
```



psaggu@demo-vm: ~/demo/kubetest2

File: _rundir/bd9c5561-8323-4aad-bb07-4e4f8de562c7/cluster-logs/cluster-info.log

```
{
    "kind": "NodeList",
    "apiVersion": "v1",
    "metadata": {
        "resourceVersion": "1456"
    },
    "items": [
        {
            "metadata": {
                "name": "aks-nodepool1-1456[redacted]
                "uid": "ff853e29-47d9-4bcf-9c3e-f710e0302307",
                "resourceVersion": "1267",
                "creationTimestamp": "2022-09-10T18:12:30Z",
                "labels": {
                    "agentpool": "nodepool1",
                    "beta.kubernetes.io/arch": "amd64",
                    "beta.kubernetes.io/instance-type": "Standard_DS2_v2",
                    "beta.kubernetes.io/os": "linux",
                    "failure-domain.beta.kubernetes.io/region": "westus2",
                    "failure-domain.beta.kubernetes.io/zone": "westus2-1",
                    "kubernetes.azure.com/agentpool": "nodepool1",
                    "kubernetes.azure.com/cluster": "MC_aks-rg-mfilrl_aks-cluster-mfilrl_westus2",
                    "kubernetes.azure.com/kubelet-identity-client-id": "82382bec-[redacted]
                    "kubernetes.azure.com/mode": "system",
                    "kubernetes.azure.com/node-image-version": "AKSUbuntu-1804gen2containerd-2022.08.23",
                    "kubernetes.azure.com/os-sku": "Ubuntu",
                    "kubernetes.azure.com/role": "agent",
                    "kubernetes.azure.com/storageprofile": "managed",
                    "kubernetes.azure.com/storagetier": "Premium_LRS",
                    "kubernetes.io/arch": "amd64",
                    "kubernetes.io/hostname": "aks-nodepool1-145[redacted]
                    "kubernetes.io/os": "linux",
                    "kubernetes.io/role": "agent",
                    "node-role.kubernetes.io/agent": "",
                    "node.kubernetes.io/instance-type": "Standard_DS2_v2",
                    "storageprofile": "managed",
                    "storagetier": "Premium_LRS",
                    "topology.disk.csi.azure.com/zone": "westus2-1",
                    "topology.kubernetes.io/region": "westus2",
                    "topology.kubernetes.io/zone": "westus2-1"
                },
                "annotations": {
```

Note!

Kubetest2 has a predecessor: Kubetest, and is still in use in certain test cases.

But the Kubernetes Project now recommends using *Kubetest2* as it is more modular, uses plugin paradigm, and has a simplified code structure.

Try it: https://github.com/Priyankasaggu11929/kubetest2/tree/step-3/kubetest2-aks
Source Code: https://sigs.k8s.io/Kubetest2
Slides: https://psaggu.com/assets/osc2023/k2p.pdf

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Questions?