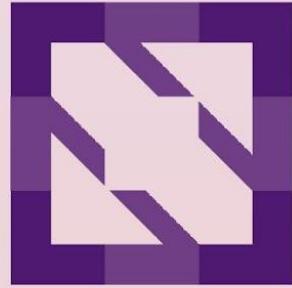


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SIG Testing: Intro & Updates

Mahamed Ali, Cisco

About Me

- Senior DevOps Engineer at ThousandEyes by Cisco
- Kubernetes Maintainer
 - SIG K8s Infra Tech Lead
- Knative Maintainer
 - Productivity WG Lead
- Topics
 - Intro on Tools/Systems for testing Kubernetes
 - Updates on cool projects we are working on

What is SIG Testing?

We're interested in **effective testing** of Kubernetes and **automating away project toil**.

Frameworks, tools, and infra make it easy to:

- write and run tests
- ensure Kubernetes is stable
- develop and test at scale

Leadership

Chairs:

- Michelle Shepardson
- Brian McQueen
- Brady Pratt

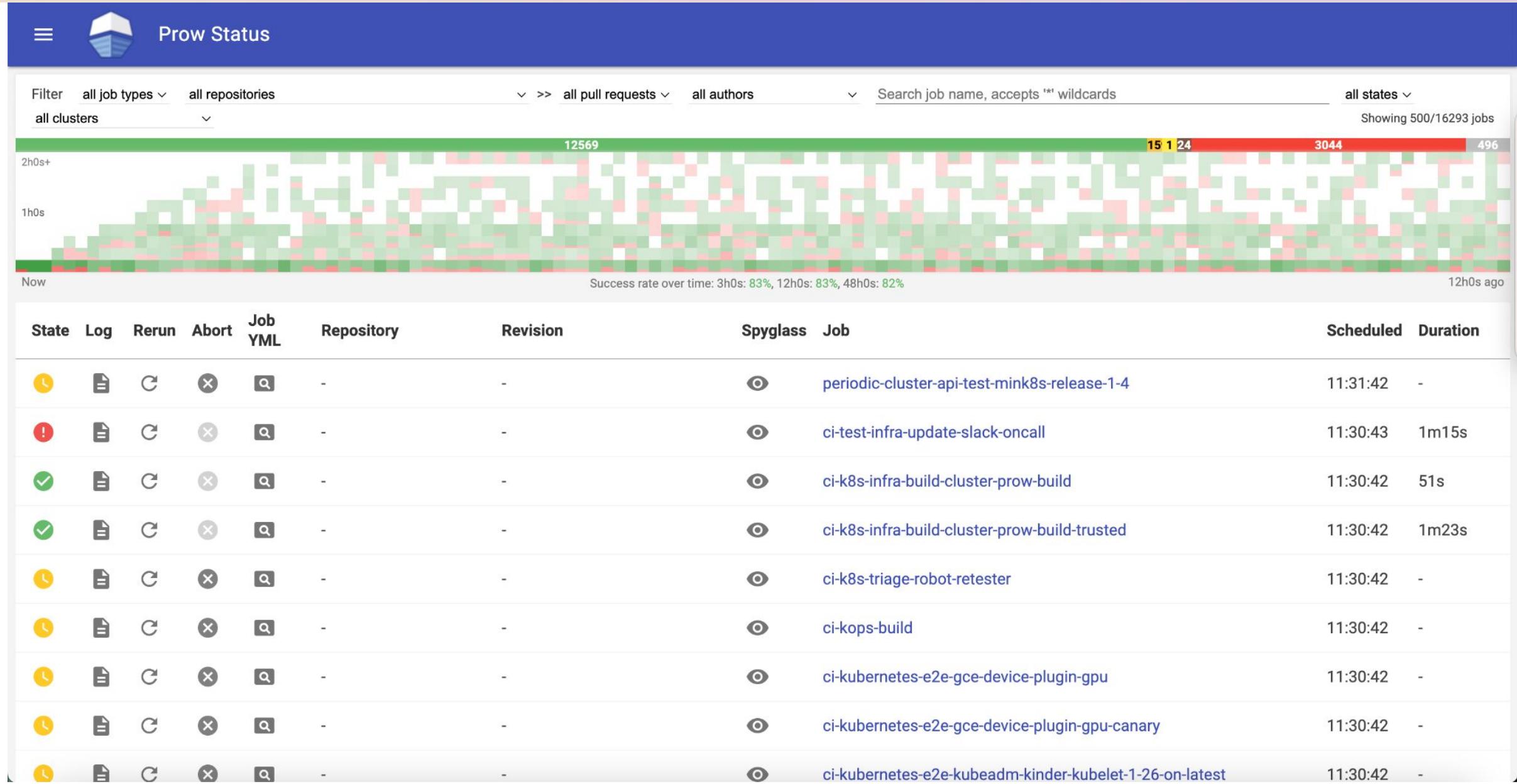
Tech Leads:

- Benjamin Elder
- Antonio Ojea
- Patrick Ohly
- Alvaro Aleman
- Cole Wagner

Tools and Systems

- Tools
 - kind
 - kubetest/kubetest2
 - e2e test framework
- Systems
 - Prow <https://prow.k8s.io>
 - Testgrid <https://testgrid.k8s.io>

Prow - https://prow.k8s.io



Prow - https://prow.k8s.io

≡ ci-kubernetes-e2e-gce-canary #1718581368885088256 ⚡ ✖

Help migrate Prow jobs to community clusters! See [k8s/test-infra#29722](#) for details.

[Job History](#) [Prow Job YAML](#) [Artifacts](#) [Testgrid](#)

Test started today at 10:51 AM **passed** after 29m31s. ([more info](#))

JUnit

34/7428 Tests Passed!

7394/7428 Tests Skipped.

Build Log

Analyze Show all hidden lines [Raw build-log.txt](#) ↗

⋮ 905 skipped lines...

906 Changing logfiles to be world-readable for download
907 Copying 'kube-apiserver.log kube-apiserver-audit.log kube-scheduler.log kube-controller-manager.log cloud-controller-manager.log etcd.log etcd-events.log glbc.log cluster-autoscaler.log kube-addon-manager.log konnectivity-server.log fluentd.log kubelet cov startupscript.log' from canary-e2e-master

Prow - <https://prow.k8s.io>

- Prow supports ChatOps
- Automerging PR when valid labels are set on PRs.

A screenshot of a GitHub pull request interface illustrating Prow's approval process. At the top, a comment from 'k8s-ci-robot' states: '[APPROVALNOTIFIER] This PR is NOT APPROVED'. It explains that the pull-request has been approved by 'upodroid' and provides instructions for review and labeling. Below this, a section titled '▼ Details' lists files requiring approval: 'cluster/gce/OWNERS', 'hack/OWNERS', 'test/e2e/autoscaling/OWNERS', and 'test/e2e_node/OWNERS'. It also notes that approvers can indicate approval with '/approve' and cancel it with '/approve cancel'. The PR has moved through stages: 'PRs Waiting on Author' to 'Needs Reviewer' (SIG Node CI/Test Board) and then to 'Waiting on Author' to 'Needs Reviewer' (SIG Node PR Triage). A comment from 'upodroid' at the bottom includes commands: '/triage accepted', '/priority important-soon', and '/sig k8s-infra'. The final status shows 'k8s-ci-robot' adding labels: 'triaj/accepted', 'priority/important-soon', and 'sig/k8s-infra', while removing 'needs-triage' and 'needs-priority'.

k8s-ci-robot commented 3 days ago

[APPROVALNOTIFIER] This PR is NOT APPROVED

This pull-request has been approved by: [upodroid](#)

Once this PR has been reviewed and has the lgtm label, please assign [wojtek-t](#) for approval. For more information see [the Kubernetes Code Review Process](#).

The full list of commands accepted by this bot can be found [here](#).

▼ Details

Needs approval from an approver in each of these files:

- [cluster/gce/OWNERS](#)
- [hack/OWNERS](#)
- [test/e2e/autoscaling/OWNERS](#)
- [test/e2e_node/OWNERS](#)

Approvers can indicate their approval by writing `/approve` in a comment
Approvers can cancel approval by writing `/approve cancel` in a comment

upodroid moved this from PRs Waiting on Author to PRs - Needs Reviewer in SIG Node CI/Test Board 3 days ago

upodroid moved this from Waiting on Author to Needs Reviewer in SIG Node PR Triage 3 days ago

upodroid commented 3 days ago

/triage accepted
/priority important-soon
/sig k8s-infra

k8s-ci-robot added triaj/accepted, priority/important-soon, sig/k8s-infra and removed needs-triage, needs-priority labels 3 days ago

Testgrid - <https://testgrid.k8s.io>



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	sig-cluster-lifecycle-cluster-api-1.5	sig-cluster-lifecycle-cluster-api-addon-provider-helm	sig-cluster-lifecycle-cluster-api-provider-aws	sig-cluster-lifecycle-cluster-api-provider-aws-1.5		
	sig-cluster-lifecycle-cluster-api-provider-aws-2.0	sig-cluster-lifecycle-cluster-api-provider-azure	sig-cluster-lifecycle-cluster-api-provider-digitalocean	sig-cluster-lifecycle-cluster-api-provider-vsphere		
	sig-cluster-lifecycle-cluster-api-provider-gcp	sig-cluster-lifecycle-cluster-api-provider-ibmcloud	sig-cluster-lifecycle-cluster-api-provider-openstack	sig-cluster-lifecycle-cluster-api-provider-cloudstack		
	sig-cluster-lifecycle-cluster-api-provider-nested	sig-cluster-lifecycle-cluster-api-operator-0.6	sig-cluster-lifecycle-cluster-api-operator	sig-cluster-lifecycle-kops	sig-cluster-lifecycle-etcdadm	
	sig-cluster-lifecycle-system Validators	sig-cluster-lifecycle-kubespray	sig-cluster-lifecycle-image-builder	sig-cluster-lifecycle-kubeup-to-kops	sig-cluster-lifecycle-image-pushes	
Summary	ci-kubernetes-e2e-al2023-aws-alpha-features	ci-kubernetes-e2e-al2023-aws-canary	ci-kubernetes-e2e-al2023-aws-conformance-canary	ci-kubernetes-e2e-al2023-aws-disruptive-canary		
	ci-kubernetes-e2e-al2023-aws-serial-canary	ci-kubernetes-e2e-al2023-aws-slow-canary	ci-kubernetes-e2e-cos-gce-alpha-features	ci-kubernetes-e2e-cos-gce-canary	ci-kubernetes-e2e-cos-gce-conformance-canary	
	ci-kubernetes-e2e-cos-gce-disruptive-canary	ci-kubernetes-e2e-cos-gce-serial-canary	ci-kubernetes-e2e-cos-gce-slow-canary	ci-kubernetes-e2e-ubuntu-aws-canary		
	ci-kubernetes-e2e-al2023-aws-alpha-features: FAILING					
	Tab stats: 0 of 10 (0.0%) recent columns passed (794 of 822 or 96.6% cells)					
	- Hide Alerts -					
Test Name	# Fails	Failure Messages	First Failed	Last Passed	Bugs	Regression
e2e-ci-kubernetes-e2e-al2023-aws-alpha-features.Overall	56		10-07 08:18 BST			
kubetest2.Test	50		10-08 00:18 BST			
Kubernetes e2e suite.[It] [sig-network] Networking Granular Checks: Services should function for service endpoints using hostNetwork [sig-network]	19		10-13 04:18 BST			
	ci-kubernetes-e2e-al2023-aws-canary: FAILING					Last update: 10-16 14:43 BST
	Tab stats: 0 of 10 (0.0%) recent columns passed (22770 of 22970 or 99.1% cells)					Tests last ran: 10-16 12:18 BST
	- Show Alerts -					Last green run: no recent greens
	ci-kubernetes-e2e-al2023-aws-conformance-canary: FLAKY					Last update: 10-16 14:48 BST
	Tab stats: 6 of 9 (66.7%) recent columns passed (2758 of 2766 or 99.7% cells)					Tests last ran: 10-16 14:48 BST
	- Show Alerts -					Last green run: ab5b8a873
	ci-kubernetes-e2e-al2023-aws-disruptive-canary: FAILING					Last update: 10-16 15:00 BST
	Tab stats: 0 of 10 (0.0%) recent columns passed (2903 of 3010 or 96.4% cells)					Tests last ran: 10-16 07:58 BST
	- Show Alerts -					Last green run: no recent greens
	ci-kubernetes-e2e-al2023-aws-serial-canary: FAILING					Last update: 10-16 14:59 BST
	Tab stats: 0 of 10 (0.0%) recent columns passed (5330 of 5395 or 98.8% cells)					Tests last ran: 10-16 13:07 BST
	- Show Alerts -					Last green run: no recent greens
	ci-kubernetes-e2e-al2023-aws-slow-canary: FAILING					Last update: 10-16 15:07 BST
	Tab stats: 0 of 10 (0.0%) recent columns passed (15209 of 15280 or 99.5% cells)					Tests last ran: 10-16 11:23 BST
	- Show Alerts -					Last green run: no recent greens
	ci-kubernetes-e2e-cos-gce-alpha-features: PASSING					Last update: 10-16 14:29 BST
	Tab stats: 10 of 10 (100.0%) recent columns passed (1020 of 1020 or 100.0% cells)					Tests last ran: 10-16 11:23 BST
	- Show Alerts -					Last green run: ab5b8a873

Testgrid - <https://testgrid.k8s.io>



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- kubetest2 is a test framework that launches kubernetes clusters for e2e testing
 - It can build kubernetes from scratch
 - It is written in Go and easy to run on developer workstations (requires go/make/gcloud/gsutil to be installed)
- The example below creates a cluster with Alpha Features and runs a selection of e2e tests.

```
+ bash -c 'make test-e2e-install
kubetest2 kops \
-v 2 \
--up --down \
--cloud-provider=gce \
--admin-access=0.0.0.0/0 \
--create-args="--channel=alpha --networking=kubenet --image=cos-cloud/cos-105-17412-156-49 --set=spec.kubeAPIServer.logLevel=4 --set=spec.kubeAPIServer.auditLogMaxSize=2000000000 --set=spec.kubeAPIServer.enableAggregatorRouting=true --set=spec.kubeAPIServer.auditLogPath=/var/log/kube-apiserver-audit.log --set=spec.kubeAPIServer.runtimeConfig=api/all=true" \
--kubernetes-feature-gates=AllAlpha,-InTreePluginGCEUnregister,DisableCloudProviders,DisableKubeletCloudCredentialProviders \
--kops-version-marker=https://storage.googleapis.com/kops-ci/bin/latest-ci.txt \
--kubernetes-version=https://storage.googleapis.com/k8s-release-dev/ci/latest.txt \
--test=kops \
-- \
--test-args="-test.timeout=240m --master-os-distro=gci --node-os-distro=gci" \
--test-package-bucket=k8s-release-dev \
--test-package-dir=ci \
--test-package-marker=latest.txt \
--focus-regex="\[Feature:(AdmissionWebhookMatchConditions|InPlacePodVerticalScaling|SidecarContainers|StorageVersionAPI|PodPreset|StatefulSetAutoDeletePVC)\]|Networking" \
--skip-regex="\[Feature:(SCTPConnectivity|Volumes|Networking-Performance)\]|IPv6|csi-hostpath-v0" \
--parallel=4
'
cd /home/prow/go/src/k8s.io/kops/tests/e2e && \
  go install ./kubetest2-tester-kops && \
  go install ./kubetest2-kops
```

- Kubernetes in Docker
- Great for e2e testing Kubernetes itself or other projects that require kubernetes test clusters
- Blazing fast start times

```
mahamed MAHAALI-M-2PY9 ~ Desktop > Git $ kind create cluster
Creating cluster "kind" ...
  ✓ Ensuring node image (kindest/node:v1.27.1) 
  ✓ Preparing nodes 
  ✓ Writing configuration 
  ✓ Starting control-plane 
  ✓ Installing CNI 
  ✓ Installing StorageClass 
Set kubectl context to "kind-kind"
You can now use your cluster with:

kubectl cluster-info --context kind-kind

Have a question, bug, or feature request? Let us know! https://kind.sigs.k8s.io/#community 😊
mahamed MAHAALI-M-2PY9 ~ Desktop > Git $ kubectl cluster-info --context kind-kind
Kubernetes control plane is running at https://127.0.0.1:60983
CoreDNS is running at https://127.0.0.1:60983/api/v1/namespaces/kube-system/services/kube-dns:dns/proxy

To further debug and diagnose cluster problems, use 'kubectl cluster-info dump'.
mahamed MAHAALI-M-2PY9 ~ Desktop > Git $ kubectl get pods
No resources found in default namespace.
mahamed MAHAALI-M-2PY9 ~ Desktop > Git $ kubectl get pods -A
NAMESPACE          NAME                READY   STATUS    RESTARTS   AGE
kube-system        coredns-5d78c9869d-hdrdh   1/1     Running   0          15s
kube-system        coredns-5d78c9869d-khmj4   1/1     Running   0          15s
kube-system        etcd-kind-control-plane   1/1     Running   0          31s
kube-system        kindnet-sxcjq            1/1     Running   0          15s
kube-system        kube-apiserver-kind-control-plane   1/1     Running   0          29s
kube-system        kube-controller-manager-kind-control-plane   1/1     Running   0          29s
kube-system        kube-proxy-c9864           1/1     Running   0          15s
kube-system        kube-scheduler-kind-control-plane   1/1     Running   0          29s
local-path-storage local-path-provisioner-6bc4bddd6b-c8dwm 1/1     Running   0          15s
mahamed MAHAALI-M-2PY9 ~ Desktop > Git $
```

Updates

- Prow CI on AWS
- Core Kubernetes testing on AWS
- kubetest2 migration
- e2e framework updates

Quick Wins

- bootstrap.py has been removed

Prow CI on AWS

- We have been running a Prow Build Cluster on AWS for the last few months
- We have a large number of cloud-agnostic jobs that don't require access to Cloud APIs
- There have been a few bumps along the way, (nodes dying infrequently, kind jobs bugging out)
- Many thanks to Ricky, Marko and Patryk for driving this initiative

Core k/k testing on AWS

- k/k is short for kubernetes/kubernetes repository
- Last year AWS donated cloud credits and we are using it to run CI on AWS.
- We have also started the journey for making these jobs part of the release process.
- We have started running 100 node and 5000 node scale tests on AWS using kops.

Core k/k testing on AWS



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Core k/k testing on AWS



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kube-up to kops E2E Migration - 1

- KEP-4224
- We have some shell scripts that create e2e test clusters on GCP. These clusters are called “kubeup”
- These scripts are brittle and have been with us since 1.0 release
- It is also difficult to run those clusters on a dev workstation.
- It is not possible to test against arm64 without making substantial changes to the scripts
- Timelines: 1.29 Alpha, 1.30 Beta, 1.31 GA, 1.32 Removal

kube-up to kops E2E Migration - 2

```
- args:  
- --build=quick  
- --cluster=  
- --env=KUBE_UBUNTU_INSTALL_CONTAINERD_VERSION=v1.7.5  
- --env=KUBE_UBUNTU_INSTALL_RUNC_VERSION=v1.1.9  
- --env=LOG_DUMP_SYSTEMD_SERVICES=containerd  
- --env=CONTAINER_RUNTIME_TEST_HANDLER=true  
- --env=KUBE_MASTER_OS_DISTRIBUTION=ubuntu  
- --env=KUBE_GCE_MASTER_IMAGE=ubuntu-2204-jammy-v20220712a  
- --env=KUBE_GCE_MASTER_PROJECT=ubuntu-os-cloud  
- --env=KUBE_NODE_OS_DISTRIBUTION=ubuntu  
- --env=KUBE_NODE_IMAGE=ubuntu-2204-jammy-v20220712a  
- --env=KUBE_GCE_NODE_PROJECT=ubuntu-os-cloud  
- --extract=local  
- --gcp-master-image=ubuntu  
- --gcp-node-image=ubuntu  
- --gcp-zone=us-west1-b  
- --ginkgo-parallel=30  
- --provider=gce  
- --env=ENABLE_CACHE_MUTATION_DETECTOR=true  
- --stage=gs://kubernetes-release-pull/ci/pull-kubernetes-e2e-gce  
- --test_args==ginkgo.skip=\[Driver:.+gcepd\]|\\[Slow\]|\\[Serial\]|\\[Disruptive\]|\\[Flaky\]|\\[Feature:.+\]  
- --minStartupPods=8  
- --timeout=80m  
command:  
- runner.sh  
- /workspace/scenarios/kubernetes_e2e.py
```

kube-up to kops E2E Migration - 3

- the kops version of the previous job, it is much easier to run this on a dev workstation
- Doesn't require python
- It can be tweaked easily to run on AWS/Azure or other cloud vendors supported by kops

```
- args:  
- bash  
- -c  
- |  
ARGS="--set=spec.containerd.runc.version=1.1.9 --set=spec.packages=nfs-common --set=spec.containerd.version=1.7.5"  
make -C $GOPATH/src/k8s.io/kops test-e2e-install  
kubetest2 kops -v=6 --cloud-provider=gce --up --down --build \  
--build-kubernetes=true --target-build-arch=linux/amd64 \  
--admin-access=0.0.0.0/0 \  
--kops-version-marker=https://storage.googleapis.com/kops-ci/bin/latest-ci.txt \  
--create-args "$ARGS --networking=kubenet --set=spec.nodeProblemDetector.enabled=true" \  
--test=kops \  
-- \  
--ginkgo-args="--debug" \  
--skip-regex="\[Driver:.+gcepd\]|\[Slow\]|\[Serial\]|\[Disruptive\]|\[Flaky\]|\[Feature:.+\]" \  
--timeout=80m \  
--use-built-binaries=true \  
--parallel=30  
command:  
- runner.sh
```

kube-up to kops E2E Migration - 4



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Current status

e2e test framework

- ginkgo v2 supports labels now. This allows us to use better regex to select test suites
 - Old Style:
`--focus="\[Serial\]"
--skip="\[Flaky\]|\[NodeAlphaFeature:+\]|\[NodeAlpha
Feature\]|\[NodeFeature:Eviction\]"`
 - New Style:
`--label-filter="Serial && !(Flaky ||
/NodeAlphaFeature(:.+)?/ || NodeFeature:Eviction)"`
- Please watch Patrick Ohly's great talk at Kubecon EU 2023 about the E2E testing frameworks

Any Questions?



Connect with us

Find us at:

- #sig-testing channel on Kubernetes Slack
- GitHub at <https://git.k8s.io/test-infra>
 - Always looking for more contributors!



Slack



GitHub



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