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# SIG Testing Deep Dive

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# Agenda



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- ❑ Prow Architecture (@krzyzacy)
- ❑ Tide, merge automation (@cjwagner)
- ❑ Test-infra Roadmap (@krzyzacy)
- ❑ Q&A

# Prow? Why Prow?



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Source: <https://www.redbubble.com/people/xfnans/works/24797880-angry-jenkins?p=sticker>  
<http://knowyourmeme.com/memes/this-is-fine>

# Pain with Jenkins



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- ❑ Problem with Jenkins:
  - ❑ Stateful, restart Jenkins? Painful!
  - ❑ Github plugins are hard to use
  - ❑ Security issues
- ❑ Maintaining nightmare (ask @ixdy for one of his oncall days) on Jenkins VMs
  - ❑ Resource leaks
  - ❑ Offline agents
  - ❑ Running out of fds
  - ❑ Only some Jenkins experts (or nobody) knows how to debug



# Prosper of Prow



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- ❑ Started by Joe Finney (@spxtr) ~2016
- ❑ Fully replaced Jenkins by Jan 2018
- ❑ Test k8s on k8s!
  - ❑ Easy to maintain/deploy
  - ❑ Job config is basically a podspec
  - ❑ Respond to github webhooks, rather than a munger
- ❑ We know k8s better than Jenkins :)



# What does Prow do?



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krzyzacy commented a day ago

Member



/lgtm



k8s-ci-robot assigned krzyzacy a day ago



k8s-ci-robot added the **lgtm** label a day ago



pull-kubernetes-bazel-build — Job succeeded.



pull-kubernetes-bazel-test — Job succeeded.



pull-kubernetes-cross — Skipped



pull-kubernetes-e2e-gce — Job succeeded.



pull-kubernetes-e2e-gce-device-plugin-gpu —

k8s-ci-robot commented an hour ago

Owner

[APPROVALNOTIFIER] This PR is **NOT APPROVED**

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

To fully approve this pull request, please assign additional approvers.

We suggest the following additional approver: [eparis](#)

Assign the PR to them by writing `/assign @eparis` in a comment when ready.

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

The pull request process is described [here](#)

▼ Details



k8s-ci-robot merged commit **207462c** into `kubernetes:master`

[View details](#)

[Revert](#)

a day ago

10 checks passed



k8s-ci-robot commented a day ago

Owner



[@rsdcastro](#): Updated the config configmap

► Details

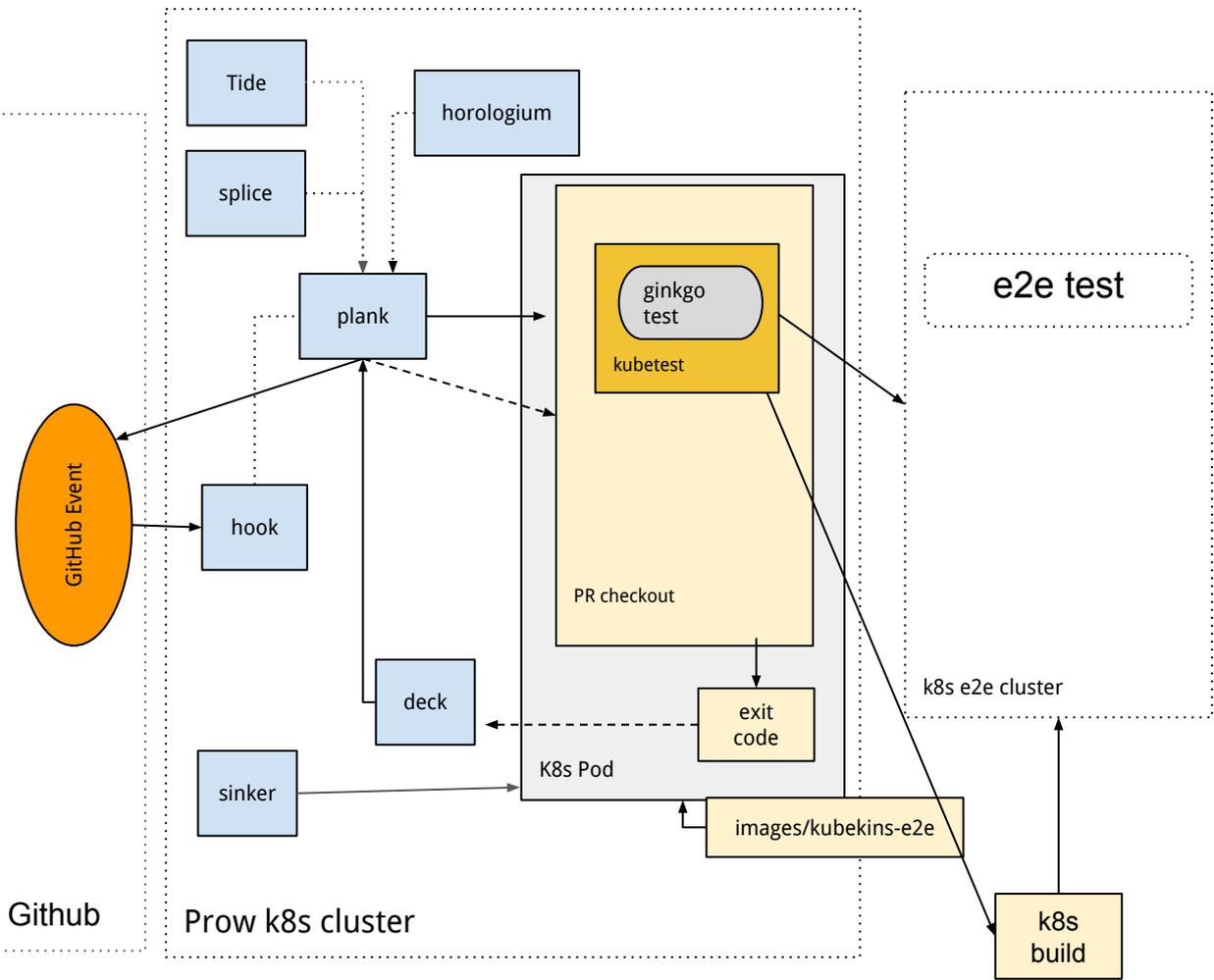
# Prow Architecture

## Update github status

Add more commits by pushing to the `disable-ui` branch on `krzyczac/kubernet.es`.

- Review requested  
Review has been requested on this pull request. It is not required to merge. [Learn more.](#)
- Some checks haven't completed yet  
1 pending and 15 successful checks
- pull-kubernetes-bazel-build — Job succeeded. Required [Details](#)
- pull-kubernetes-bazel-test — Job succeeded. Required [Details](#)
- pull-kubernetes-cross — Skipped
- pull-kubernetes-e2e-gce — Job succeeded. Required [Details](#)
- pull-kubernetes-e2e-gce-device-plugin-gpu — Job succeeded. [Details](#)

This branch has no conflicts with the base branch  
Merging can be performed automatically.



# Prow Plugins

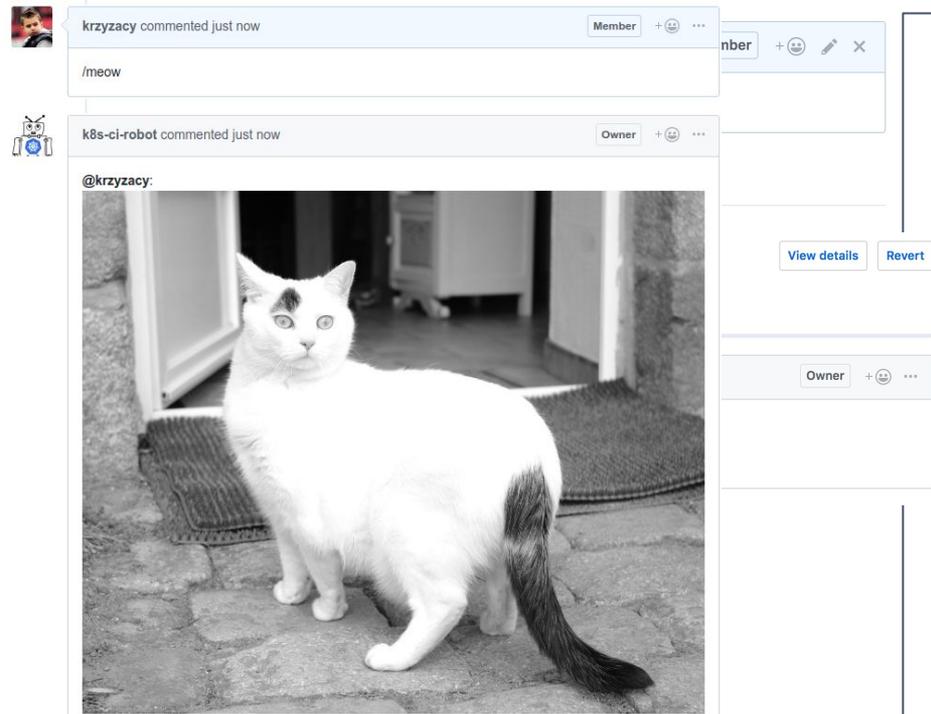


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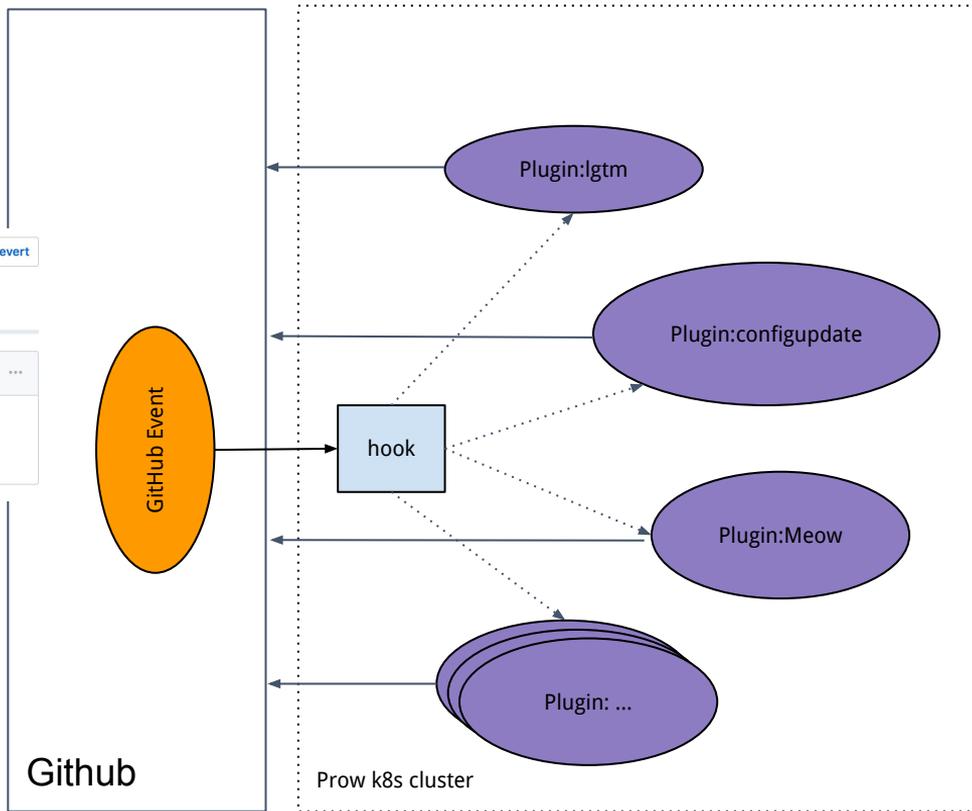
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Details

<https://prow.k8s.io/command-help>



Github

Prow k8s cluster

# Prow Adoption



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# Today: Kubernetes Stats on Prow



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- 181 nodes, 1152 cores
- Scheduled 4.3 mil jobs last year
- 770 different jobs
- Set up presubmits for 31 repos

# Deploy your Own prow



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What you need:

- ❑ k8s cluster
- ❑ github tokens
- ❑ starter.yaml

Then:

- ❑ github webhooks

## Run the prow components in the cluster

Run the following command to start up a basic set of prow components.

```
kubectl apply -f cluster/starter.yaml
```

After a moment, the cluster components will be running.

```
$ kubectl get deployments
NAME          DESIRED  CURRENT  UP-TO-DATE  AVAILABLE  AGE
deck          2         2         2            2           1m
hook          2         2         2            2           1m
horologium    1         1         1            1           1m
plank         1         1         1            1           1m
sinker        1         1         1            1           1m
```

[https://github.com/kubernetes/test-infra/blob/master/prow/getting\\_started.md](https://github.com/kubernetes/test-infra/blob/master/prow/getting_started.md)

# Next: Merge your PR



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# Automated PR Merging



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## Goals:

- Automatically merge PRs that meet specific requirements
  - Has label, does not have label, milestone, status contexts...
  - Allows restricting access to the merge button.
- Ensure that a PR is not merged until tested against most recent base branch commit.
- Scalable:
  - Needs to be able to process thousands of PRs.
  - Should be able to process many repos.

# Testing Against HEAD

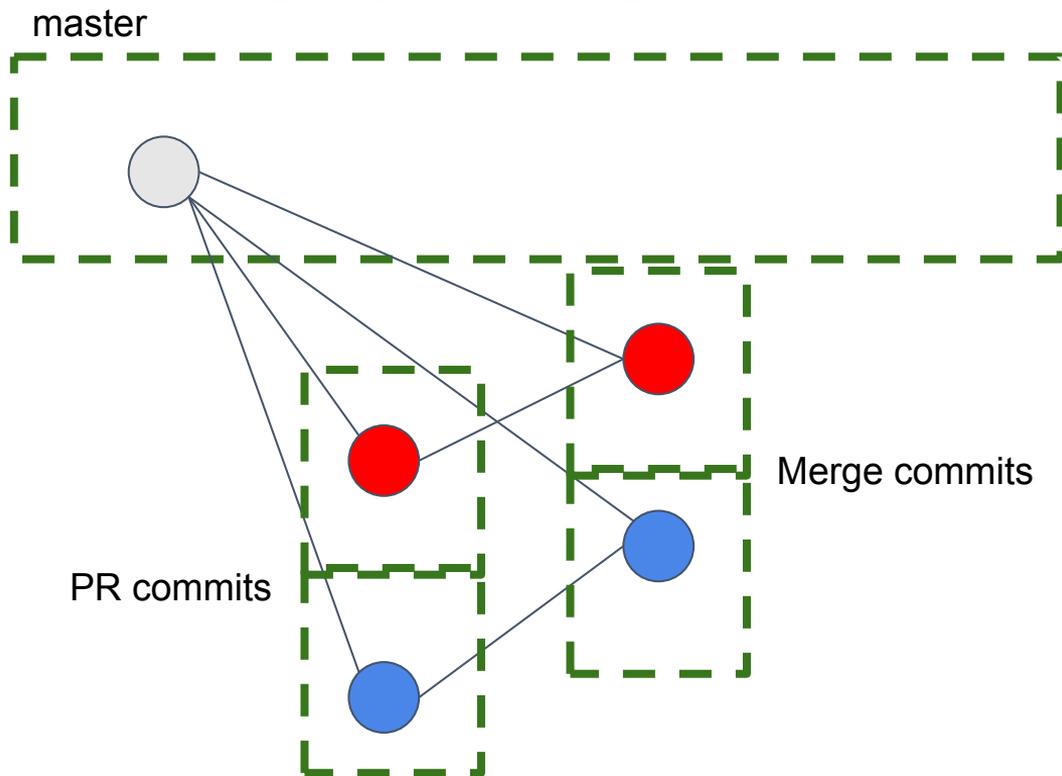


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PR 1



PR 2



# Testing Against HEAD

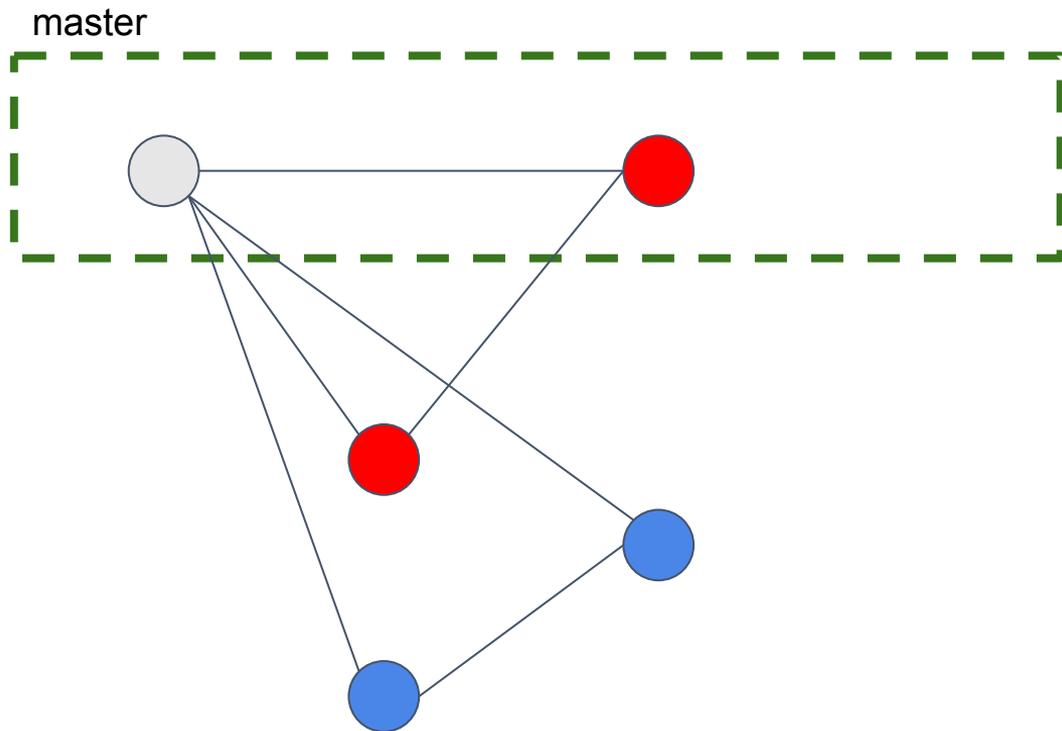


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PR 1



PR 2



# Testing Against HEAD

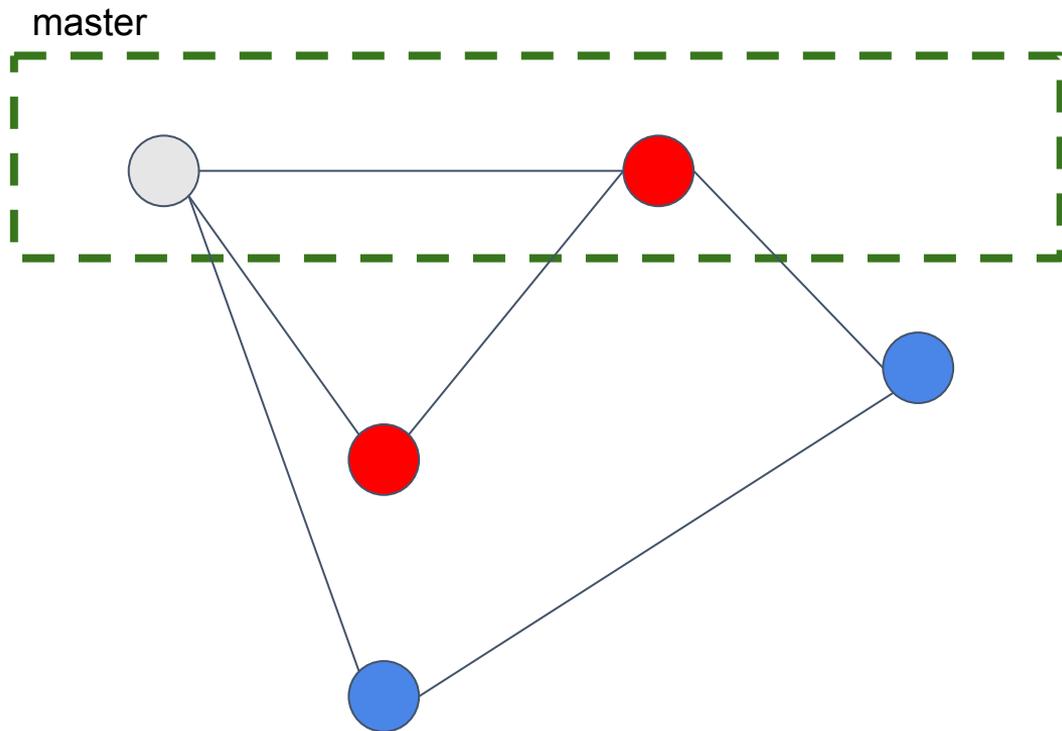


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PR 1



PR 2



# Batch Testing/Merging



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Up to 50 PRs per day, testing takes ~45 mins

=>

Only able to test ~35 PRs per day, wouldn't be able to clear the queue as fast as it grows.

Instead try to test and merge multiple PRs together.

# Previous Solution: Submit Queue



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## Kubernetes Submit Queue Status



PRS

QUEUE

HISTORY

CI

INFO

Pull Requests (1519)

Enter username or PR number



[#33440: Don't commit generated \(some\) code](#)

PR is unable to be automatically merged. Needs rebase.

May 2, 2018 10:02:00 AM (+50/-37473)



[#33573: AWS: network providers required to update NetworkUnavailable](#)

Required Github CI test is not green: pull-kubernetes-bazel-build

May 2, 2018 10:02:01 AM (+14/-7)



[#38861: Add optional loading from a config.d directory to kubectl](#)

PR is unable to be automatically merged. Needs rebase.

May 2, 2018 10:02:06 AM (+140/-10)



[#40059: add kubectl set rbac-rule role/clusterrole](#)

PR is unable to be automatically merged. Needs rebase.

May 2, 2018 10:02:10 AM (+1493/-1)



[#40211: genericapiserver: write negotiated Status on timeout](#)

PR is unable to be automatically merged. Needs rebase.

May 2, 2018 10:02:12 AM (+122/-70)



[#40674: Use multihosts feature from client-go](#)

# Submit Queue



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- One binary+config per repo (single tenancy).
- Polls for all PRs and their related info then filters+sorts them.
- Complicated prioritization logic.
- Batch testing added as an afterthought.
- Always retests PRs before merge.

# New Solution: Tide



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- Uses Github search query to define all merge requirements
- Batch testing/merging as a cornerstone.
- A single instance operates on many Github orgs and repos.
  - Currently merging PRs in 45 repos!
  - All, but one Submit Queue instances have been replaced.
- Doesn't retest unnecessarily because it has access to Prow job data (namely what base branch commit the test ran against).

# Tide Dashboard



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Tide Status

## Tide Status

Repo	State	Batch	Passing	Pending	Missing
<a href="#">kubernetes/charts master</a>	MERGE: #2997		#3008 #2997		
<a href="#">kubernetes/heapster master</a>	WAIT			#1964	
<a href="#">kubeflow/tf-operator master</a>	WAIT			#549	
<a href="#">kubeflow/kubeflow master</a>	WAIT			#660	
<a href="#">kubernetes/charts master</a>	WAIT			#5336 #4804 #4589 #4175 #3958	
<a href="#">kubernetes/kops master</a>	WAIT			#5057 #5012	

# PR Dashboard w/ Tide



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#7848 kubernetes/test-infra

Needs to Resolve Labels

## Github API reverse proxy HTTP cache

🕒 Tests are running



❗ Does not meet merge requirements ?



### PR's Labels

approved area/prow cncf-cla: yes do-not-merge/hold lgtm size/XL

### Required Labels (Missing)

### Forbidden Labels (Shouldn't have)

do-not-merge/hold



# Tide Status Context



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●  **tide** Pending — Not mergeable. Needs lgTM label.

[Details](#)

✓  **tide** — In merge pool.

[Details](#)

# Tide: Future Improvements



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- Dynamic batch sizing and concurrent batches.
- Make the required status context configurable instead of requiring overall status to be ‘green’.
- Improve how jobs with failing tests are displayed.

# Test-infra Roadmap



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# Test-infra Roadmap



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- Switch to Tide for kubernetes/kubernetes
  - Retire last submit-queue :-)
- Split up testing configurations for each org/sig
  - Each sig can own their prow jobs
- Policy for promote/demote merge blocking jobs
  - We have [metrics for presubmit flakiness](#) now!
- Conformance Drive
  - [Run with sonobuey, kubetest & display in testgrid](#)
- Prow Bundle
  - OSS Testgrid
  - Logging/artifacts view from Prow
  - Bundle Prow + Testgrid

# Test-infra Contributors

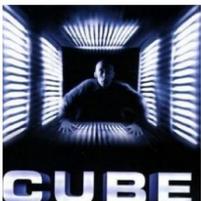
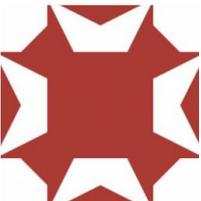
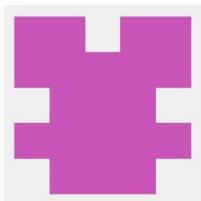
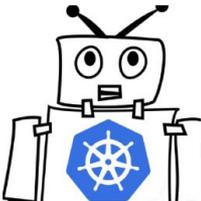
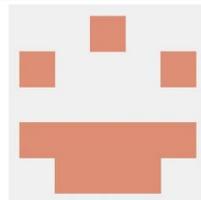


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# Q & A



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# Thanks!



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Where to find us:

#sig-testing on slack

[kubernetes-sig-testing@googlegroups.com](mailto:kubernetes-sig-testing@googlegroups.com)

Contribute to test-infra:

Send a PR to <https://github.com/kubernetes/test-infra>