

squash the flakes!

KubeVirt Summit 2023
Talk by Daniel Hiller

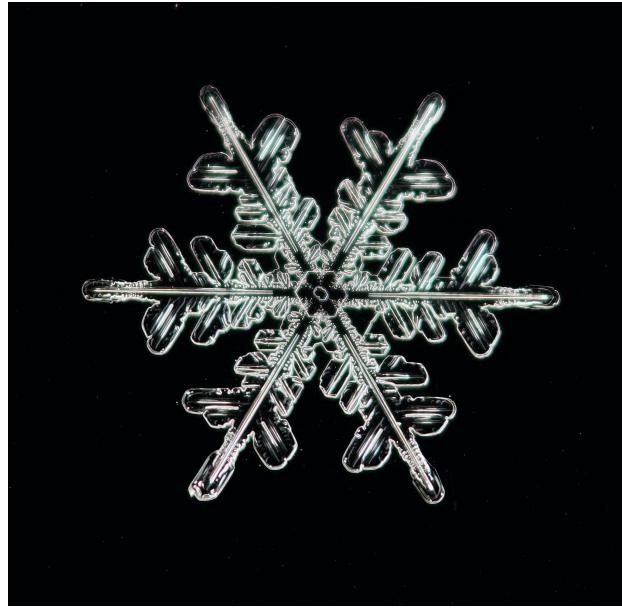
agenda

Talk will be 25 mins incl. QA

- introduction to flakes
- how do we minimize the impact
- what tools do we have
- how does the flake process work
- the future
- want to help?
- Q&A

what is a flake

what is not a flake (in this context)



what is a flake

a **flake**

is an automated **test** that doesn't behave deterministically

i.e.

without any code change it fails and passes in successive runs

what is a flake

PR History: kubevirt/kubevirt #9445

	9d41878		
pull-kubevirt-e2e-k8s-1.25-sig-compute-migrations	1637934812398358528	1636633531918585856	1636403749595385856
pull-kubevirt-e2e-k8s-1.25-sig-compute	1637934815221125120	1636403757321293824	
pull-kubevirt-e2e-k8s-1.25-sig-network	1637934813975416832	1636403756985749504	
pull-kubevirt-e2e-k8s-1.25-sig-operator	1637934815393091584	1636403757992382464	
pull-kubevirt-e2e-k8s-1.25-sig-storage	1637934814088663040	1636633532048609280	1636403756704731136
pull-kubevirt-e2e-k8s-1.26-sig-compute	1637934816471027712	1636404222087925760	
pull-kubevirt-e2e-k8s-1.26-sig-network	1637934816085151744	1636403758915129344	

pull-kubevirt-e2e-k8s-1.25-sig-compute-migrations #1636633531918585856

Job History PR History Artifacts

Test started last Friday at 8:40 AM passed after 1h9m49s. ([more info](#))

JUnit

91/1406 Tests Passed!

1315/1406 Tests Skipped.

Build Log

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

pull-kubevirt-e2e-k8s-1.25-sig-compute-migrations #1636403749595385856

Job History PR History Artifacts

Test started last Thursday at 7:33 PM failed after 1h18m18s. ([more info](#))

JUnit

1/1406 Tests Failed.

Tests Suite: [rfe_id:393][crit:high][vendor:cnv-qe@redhat.com][level:system][sig:compute] VM Live Migration [Serial]with a dedicated migration network Should migrate over that network 4m18s

90/1406 Tests Passed!

1315/1406 Tests Skipped.

source: <https://prow.ci.kubevirt.io/pr-history/?org=kubevirt&repo=kubevirt&pr=9445>

what is the impact of flakes

from a survey:

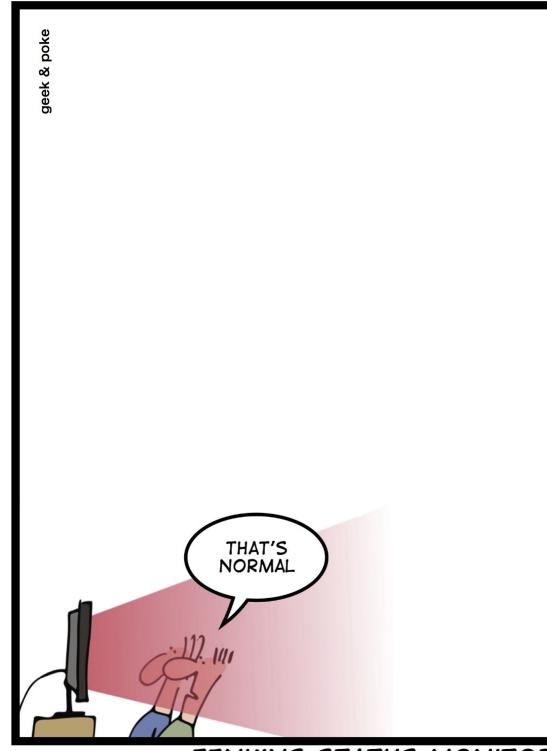
- 97% of flakes were false alarms, and
- more than 50% of flakes could not be reproduced in isolation

source: "[A survey of flaky tests](#)"

what is the impact of flakes

SIMPLY EXPLAINED

This leads people to believe that ignoring flaky tests is safe to do



JENKINS STATUS MONITOR

what is the impact of flakes

*“... [A] Microsoft study demonstrated that the **0.02% of flaky test failures** from over 80 million test executions, over a 30-day period, could have been responsible for what would have been **5.7% of all the failed builds** in that period, had they not been identified”*

source: [A survey of flaky tests](#)

what is the impact of flakes



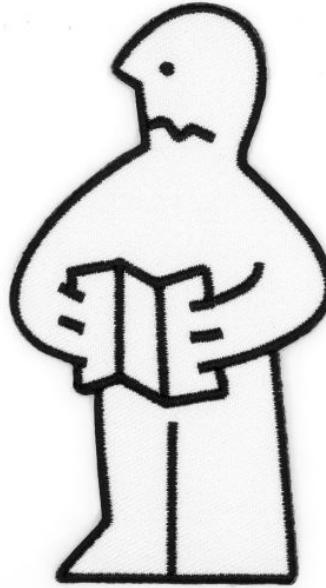
what is the impact of flakes

Flaky tests lead to:

- longer feedback cycles
- increase of CI load
- slowdown of merges
- invalidating the effect of test prioritization and acceleration techniques
- reverting the acceleration impact of batch testing
- devs losing trust in automated testing

what is the impact of flakes

Flaky tests lead to
developer frustration!

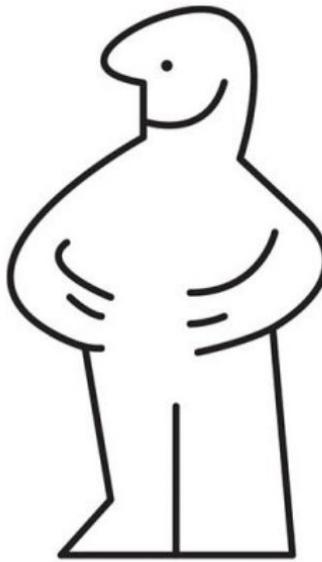


what is the impact of flakes

goal

reduce the impact of
flakes as much and as fast
as possible

to avoid developer
dissatisfaction and keep
frustration to a minimum



how we minimize the impact

tldr; exclude (aka quarantine) a flaky test from test runs as early as possible, but only as long as necessary



how we minimize the impact

requirements:

- a report over possible flaky tests
- a method to remove a test from the set of stable tests

how we minimize the impact

We assume that any PR that was merged into the codebase had all gating tests succeeding in the end.

Therefore any test run on a merged PR with test failures on the gating lanes would contain execution of flaky tests

how we minimize the impact

PR History: [kubevirt/kubevirt #9445](#)

	9d41878		
pull-kubevirt-e2e-k8s-1.25-sig-compute-migrations	1637934812398358528	1636633531918585856	1636403749595385856
pull-kubevirt-e2e-k8s-1.25-sig-compute	1637934815221125120	1636403757321293824	
pull-kubevirt-e2e-k8s-1.25-sig-network	1637934813975416832	1636403756985749504	
pull-kubevirt-e2e-k8s-1.25-sig-operator	1637934815393091584	1636403757992382464	
pull-kubevirt-e2e-k8s-1.25-sig-storage	1637934814088663040	1636633532048609280	1636403756704731136
pull-kubevirt-e2e-k8s-1.26-sig-compute	1637934816471027712	1636404222087925760	
pull-kubevirt-e2e-k8s-1.26-sig-network	1637934816085151744	1636403758915129344	
pull-kubevirt-e2e-k8s-1.26-sig-operator	1637934816919818240	1636403761427517440	
pull-kubevirt-e2e-k8s-1.26-sig-storage	1637934816311644160	1637740300766023680	1636697256788758528 1636633532153466880
pull-kubevirt-e2e-kind-1.23-sriov	1637934797852512256	1636403742393765888	

source: <https://prow.ci.kubevirt.io/pr-history/?org=kubevirt&repo=kubevirt&pr=9445>

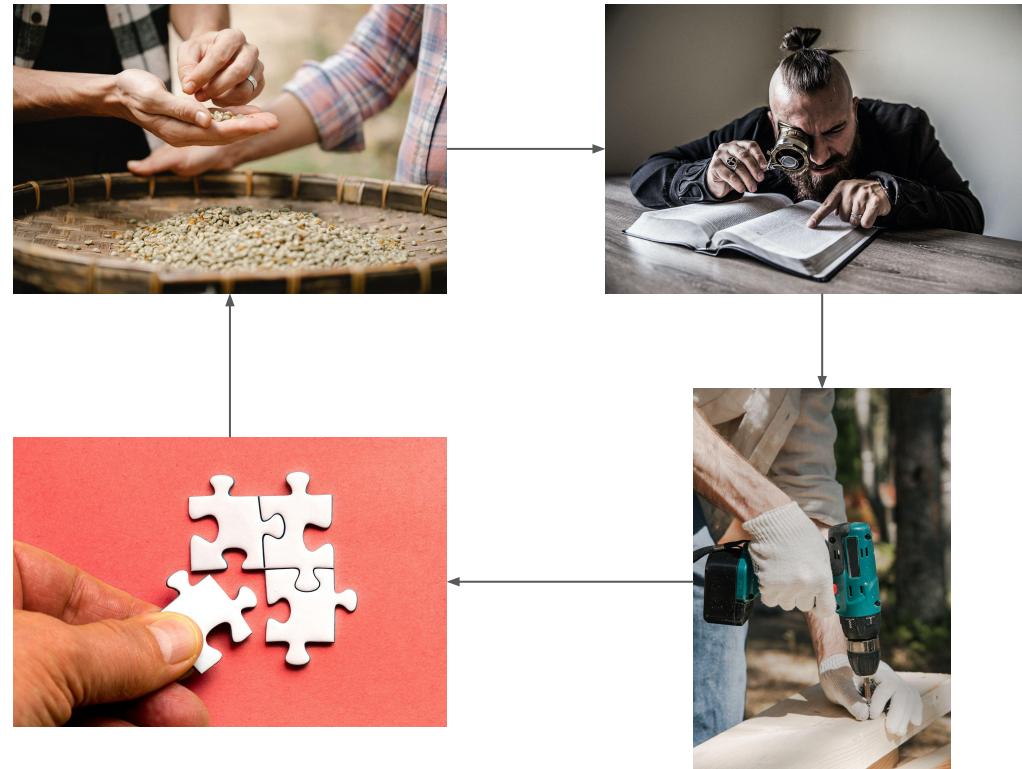
how does the flake process work

regular meeting

- look at flakes
- fix or quarantine
- hand to dev
- bring back in

emergency quarantine

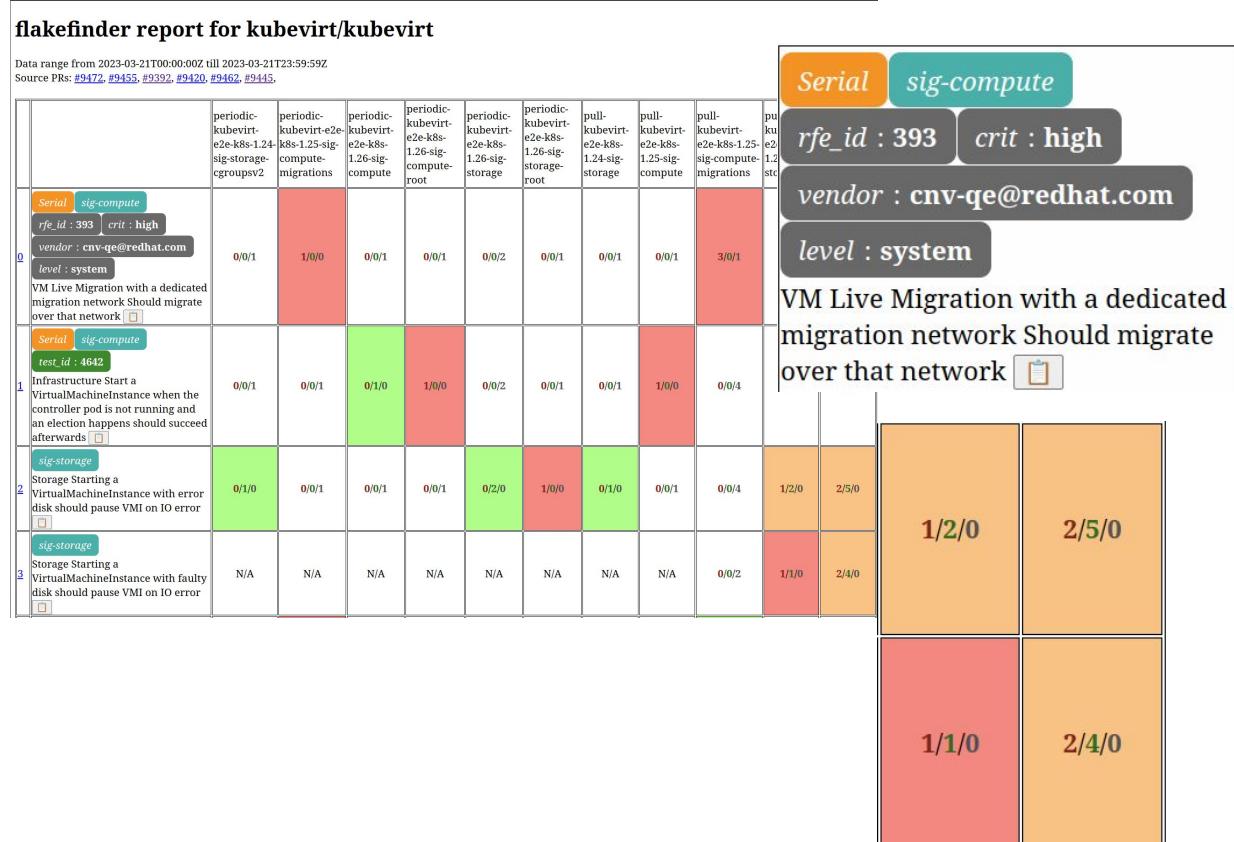
source: [QUARANTINE.md](#)



what tools do we have

[flakefinder](#) report

gives an overview of the current flaky tests



what tools do we have

ci honoring QUARANTINE label

presubmits skipping
quarantined tests
periodics including
execution of the
quarantined tests

```
# If KUBEVIRT_QUARANTINE is not set, do not run quarantined tests. When it is
# set the whole suite (quarantined and stable) will be run.
if [ -z "$KUBEVIRT_QUARANTINE" ]; then
    if [ -n "$KUBEVIRT_E2E_SKIP" ]; then
        export KUBEVIRT_E2E_SKIP="${KUBEVIRT_E2E_SKIP}|$KUBEVIRT_QUARANTINE"
    else
        export KUBEVIRT_E2E_SKIP="$KUBEVIRT_QUARANTINE"
    fi
fi
```

```
176
177     It("[QUARANTINE]should successfully upgrade virt-handler", func() {
178         var expectedEventsLock sync.Mutex
179         expectedEvents := []string{
180             "maxUnavailable=1",
181             "maxUnavailable=10%",
182             "virt-handler=ready",
183             "maxUnavailable=1",
184         }
185         ds, err := virtCli.AppsV1().DaemonSets(flags.KubeVirtInstall
186             .Name).Get(context.TODO(), flags.KubeVirtInstall.Name)
```

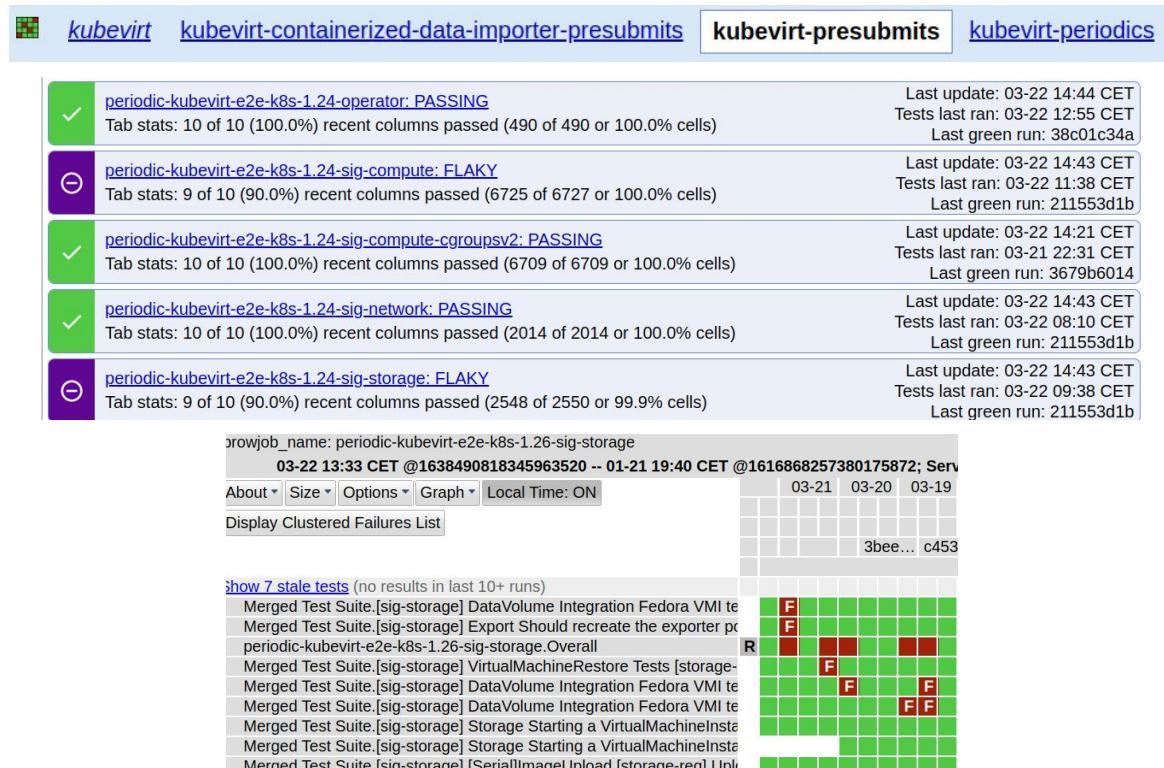
sources:

- <https://github.com/kubevirt/kubevirt/blob/38c01c34acecfafc89078b1bbaba8d9cf3cf0d4d/automation/test.sh#L452>
- <https://github.com/kubevirt/kubevirt/blob/38c01c34acecfafc89078b1bbaba8d9cf3cf0d4d/hack/functests.sh#L69>
- https://github.com/kubevirt/kubevirt/blob/38c01c34acecfafc89078b1bbaba8d9cf3cf0d4d/tests/canary_upgrade_test.go#L177

what tools do we have

[testgrid](#)

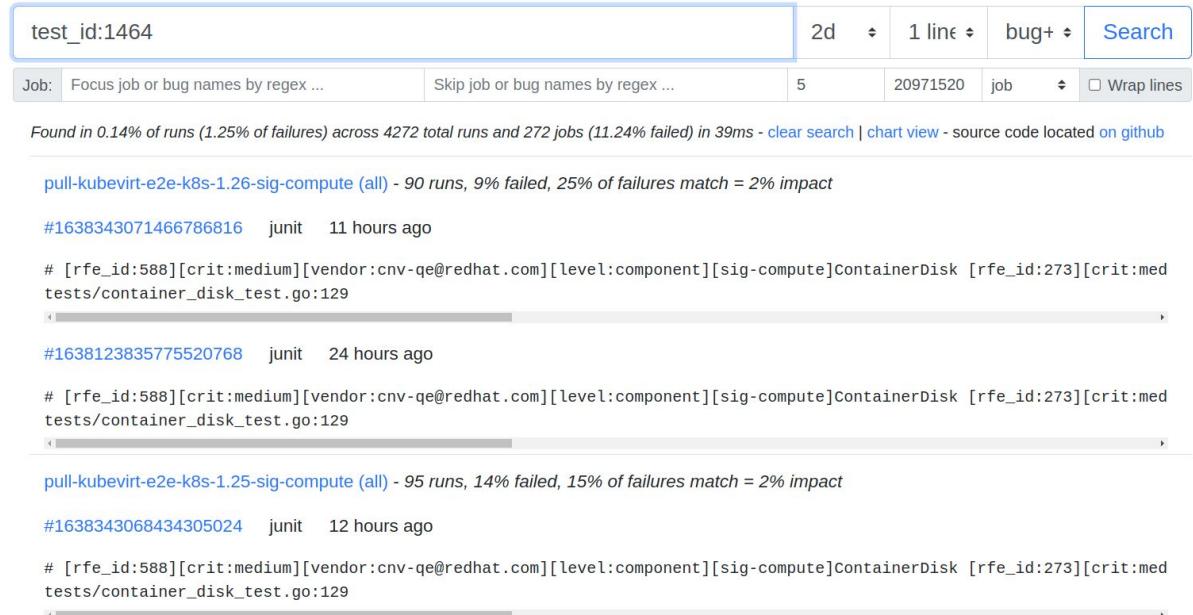
drill down on all jobs for kubevirt/kubevirt that are running inside KubeVirt
Prow



what tools do we have

ci-search

search for terms in prow job logs (see [openshift ci-search](#))



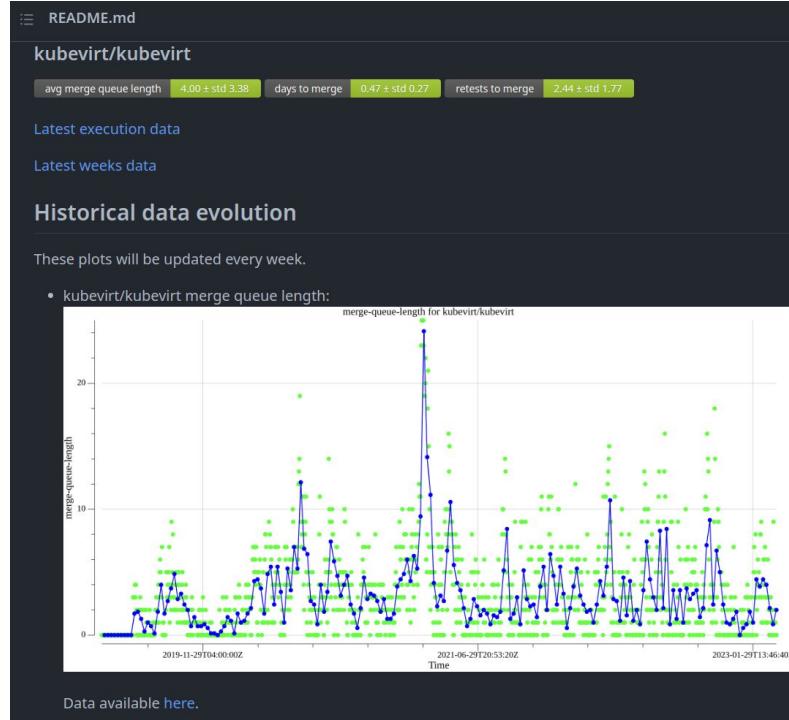
The screenshot shows a search interface with the query "test_id:1464". The results are filtered by "2d", "1 line", and "bug+". The search found 5 results across 4272 runs and 272 jobs. The results are as follows:

- pull-kubevirt-e2e-k8s-1.26-sig-compute (all)** - 90 runs, 9% failed, 25% of failures match = 2% impact
#1638343071466786816 junit 11 hours ago
[rfe_id:588][crit:medium][vendor:cnv-qe@redhat.com][level:component][sig-compute]ContainerDisk [rfe_id:273][crit:med tests/container_disk_test.go:129]
- pull-kubevirt-e2e-k8s-1.25-sig-compute (all)** - 95 runs, 14% failed, 15% of failures match = 2% impact
#1638343068434305024 junit 12 hours ago
[rfe_id:588][crit:medium][vendor:cnv-qe@redhat.com][level:component][sig-compute]ContainerDisk [rfe_id:273][crit:med tests/container_disk_test.go:129]

what tools do we have

[ci-health](#)

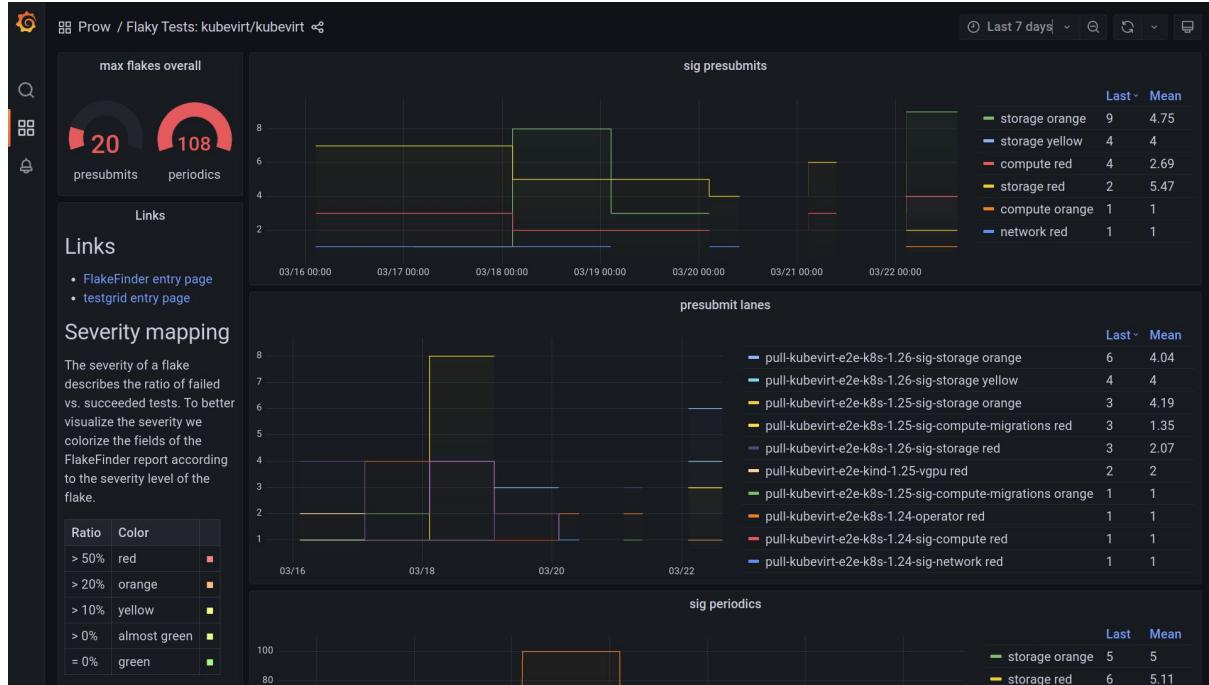
record metrics over
merge-queue-length,
time-to-merge,
retests-to-merge and
merges-per-day



what tools do we have

flake report graph

visualizes the flakefinder data



the future - more data, more tooling

gaps we need to close:

- improved checking of PRs against flakes
- a quick overview of how exactly we are progressing (beyond ci-health)
- exact number of flakes in quarantine, per sig
- averages per day / per week, drilldown to flake level
- automatic alerts when new flakes are entering the codebase



want to help?

- join [#kubevirt-dev](#) Slack channel
- join [kubevirt-dev](#) Google group
- fix flakes on [kubevirt/kubevirt](#)



Q&A

mailto: dhiller@redhat.com

k8s slack: [@dhiller](#)