squash the flakes!

SFSCon 2023
Daniel Hiller

agenda

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

about me

- Software Engineer @ Red Hat OpenShift Virtualization team
- KubeVirt CI, automation in general

what is a flake

a flake is a test

that without any code change

will either fail or pass in successive runs

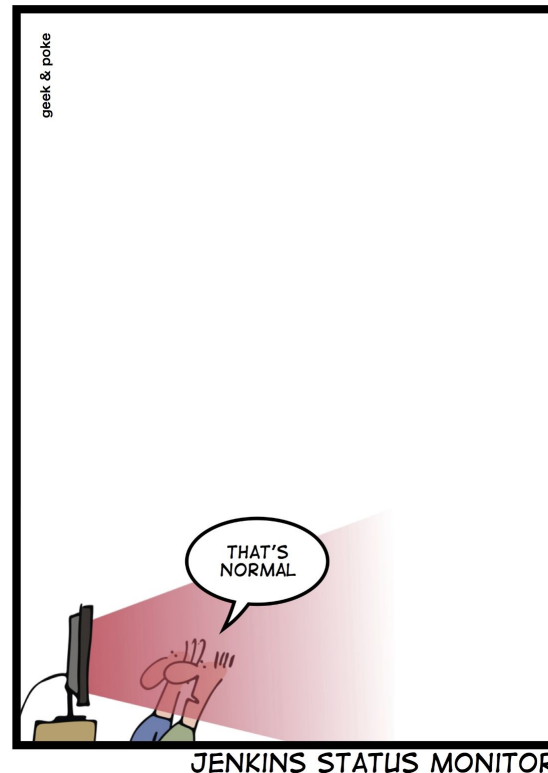KubeVirt

what is the impact of flakes

from "a survey of flaky tests":
- 97% of flakes were false alarms, and
- more than 50% of flakes could not be reproduced in isolation

this leads to the conclusion: "ignoring flaky tests is ok"

source: "A survey of flaky tests"

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what is the impact of flakes

failed test runs signal that the code is not stable

a flake can invalidate the entire test run

thus failed test runs with flaky tests have no value in CI

what is the impact of flakes

Flaky tests lead to:

- longer feedback cycles for developers
- slowdown of merging pull requests - "retest trap"
- reversal of acceleration which batch testing provides
- **lost trust in automated testing**
- **ignoring test results**

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

what do we need?

- ability to move a test from **set of stable** tests into **set of quarantined** tests and back
- a report over possible flaky tests
- enough runtime data to triage flakes
  - devs decide whether we quarantine right away or they can fix them in time
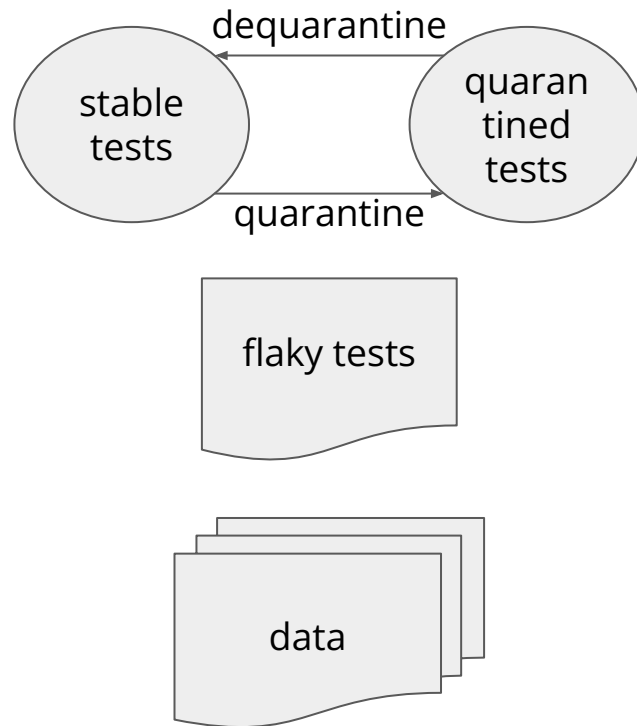
how we minimize the impact

how can we find flaky tests?

any merged PR had all tests succeeding in the end,

thus any test run with test failures from that PR *might* contain execution of flaky tests

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how does the flake process work

regular meeting
- look at flakes
- decide: fix or quarantine?
- hand to dev
- bring back in

emergency quarantine

source: QUARANTINE.md

what tools do we have

ci honoring QUARANTINE label

- **presubmits skip** quarantined tests
- **periodics execute** quarantined tests to check their stability

```
# 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}|QUARANTINE"
    else
        export KUBEVIRT_E2E_SKIP="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
186             ds, err := virtCli.AppsV1().DaemonSets(flags.KubeVirtInstall
```
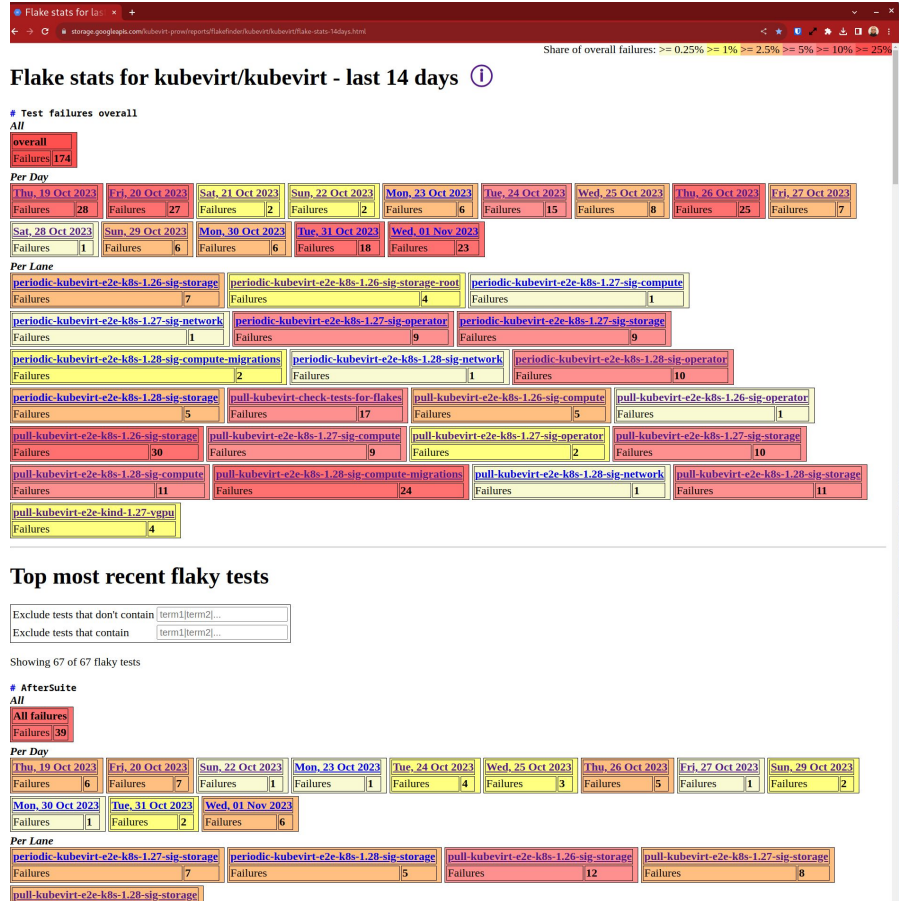
sources:
- https://github.com/kubevirt/kubevirt/blob/38c01c34acecfafc89078b1bbaba8d9cf3cf0d4d/automation/test.sh#L452
- https://github.com/kubevirt/kubevirt/blob/38c01c34acecfafc89078b1bbaba8d9cf3cf0d4d/hack/functests.sh#L69
- https://github.com/kubevirt/kubevirt/blob/38c01c34acecfafc89078b1bbaba8d9cf3cf0d4d/tests/canary_upgrade_test.go#L177

what tools do we have

[flake stats](#) report

the high level overview

([source](#))

what tools do we have

[flakefinder](#) report

the detail overview

gives an overview of the current flaky tests

what tools do we have

ci-health

record metrics over
merge-queue-length,
time-to-merge,
retests-to-merge and
merges-per-day
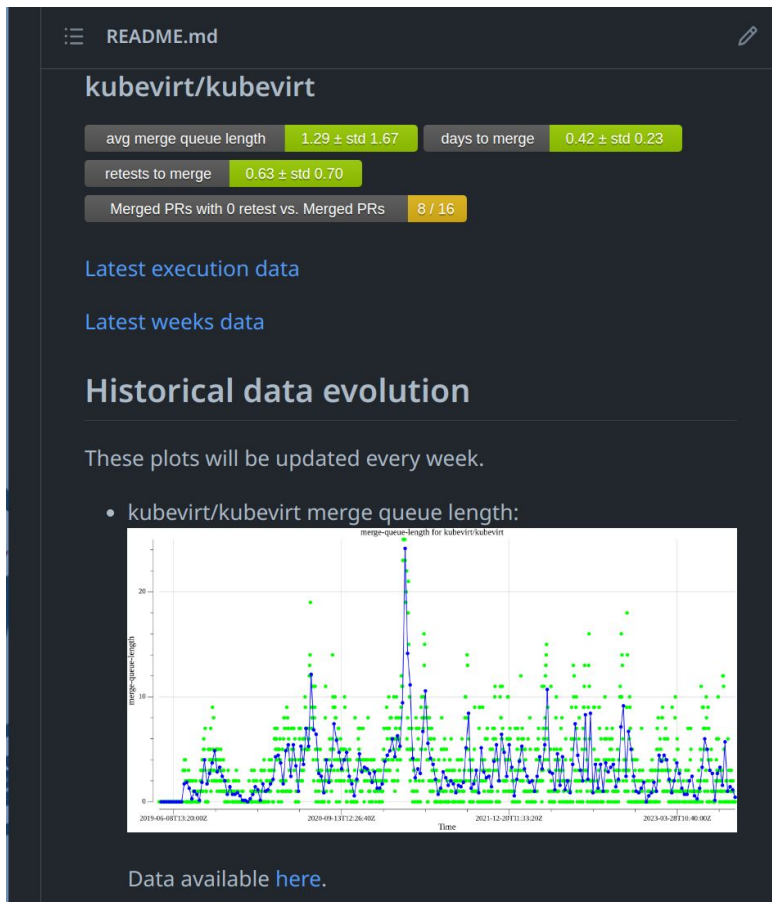
what tools do we have

quarantine overview

(source)

Overview of Quarantine tests

Total: 1 tests

https://github.com/kubevirt/kubevirt/tree/c35be138d85864b17946ae1fe07f99a75445d501/tests/operator/operator.go

```
var _ = Describe("[Serial][sig-operator]Operator", Serial, decorators.SigOperator, func() {
        Describe("[rfe_id:2897][crit:medium][vendor:cnv-qe@redhat.com][level:component]Dynamic feature
    detection", func() {
                It("[test_id:3153][QUARANTINE] Ensure infra can handle dynamically detecting
    DataVolume Support", func() {
```

2 months

Last updated: 2023-09-08 10:18:02.458076498 +0000 UTC m=+3.056989100

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

check-tests-for-flakes test lane

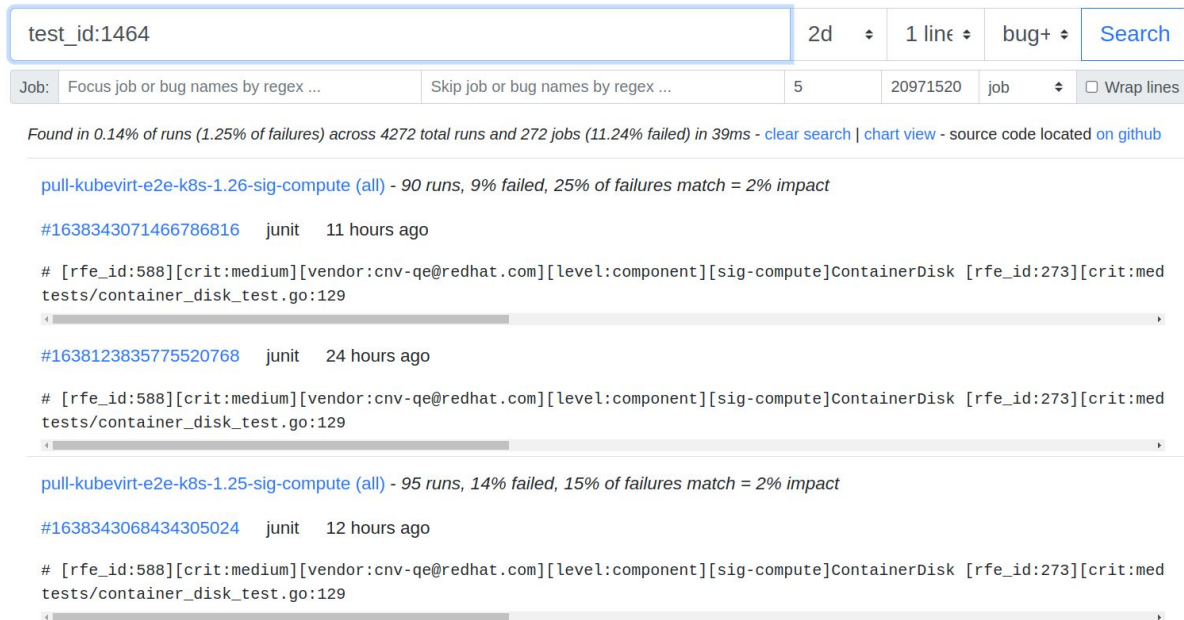tries to catch flakes before they enter the codebase

(source)

a test lane that

- selects the changed e2e test files from the commit set
- runs changed e2e tests five times
- runs in random execution order to catch order-dependent test

what tools do we have

ci-search

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

in a nutshell

In regular intervals:

- follow up on previous action items
- derive action items from data available
- hand action items over to dev teams
- revisit and dequarantine quarantined tests

the future - more data, more tooling

gaps we want to close:

- a quick dashboard overview of how exactly we are progressing (beyond ci-health)
- overview of current number of flakes in quarantine per sig
- automatic quarantine PRs when new flakes have entered the codebase

Q&A

Feel free to send questions and comments:

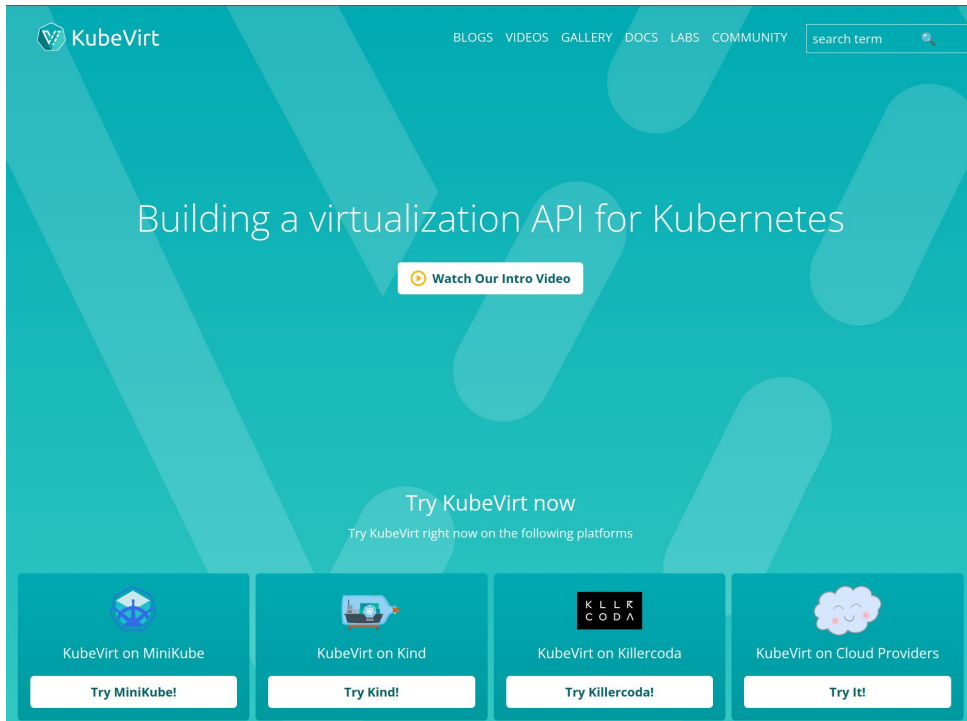|	
mailto:	dhiller@redhat.com
k8s slack:	@dhiller
mastodon:	@dhiller@fosstodon.org
web:	www.dhiller.de

interested in kubevirt.io?
want to help?

- join #kubevirt-dev Slack channel
- join kubevirt-dev Google group
- fix flakes on kubevirt/kubevirt

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