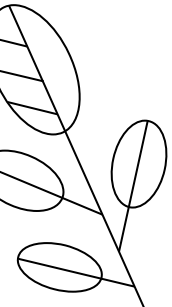


HOW TO RELEASE A NEW KUBERNETES VERSION

Max Körbächer





Max Körbächer

Co-Founder & Manager Platform
Engineering @ Liquid Reply

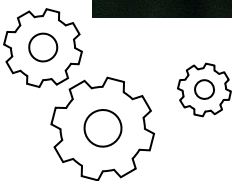
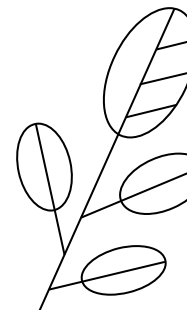
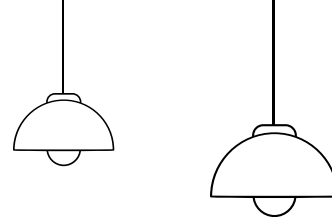
Part of the Kubernetes Release Team &
Release Engineering since v1.17



mkoerbaecher



mkoerbi



NEXT STOPS

01

KUBERNETES

A project, a community, a whole universe

02

FROM A COMMIT TO A RELEASE

Overview of the release process

03

THE FIRST PR

System side tests

04

FROM THE MERGE INTO MAIN

7060 tests later

05

THE RELEASE

beta.1, RC.1, a new major version

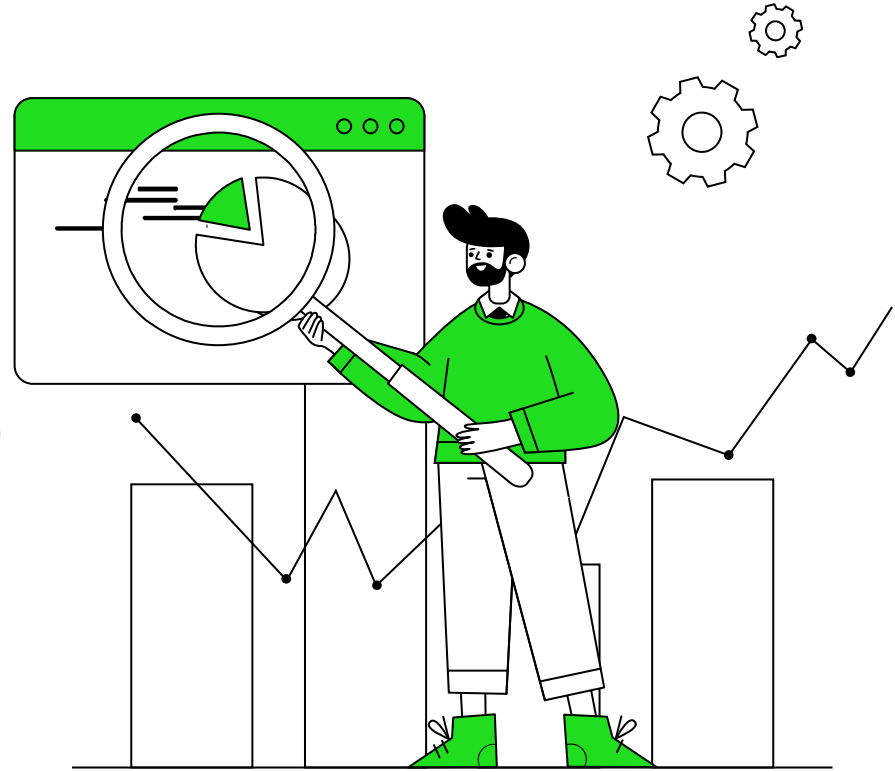
06

LESSONS LEARNED

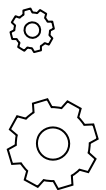
What you can take away from the K8s release!

01

WHAT IS KUBERNETES



Solved all your problems. You're welcome.

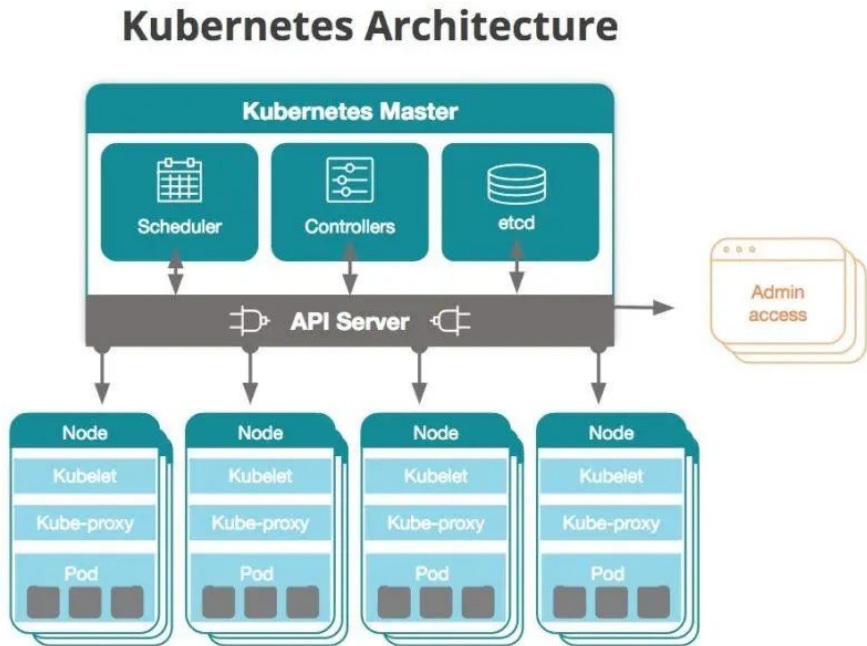


KUBERNETES

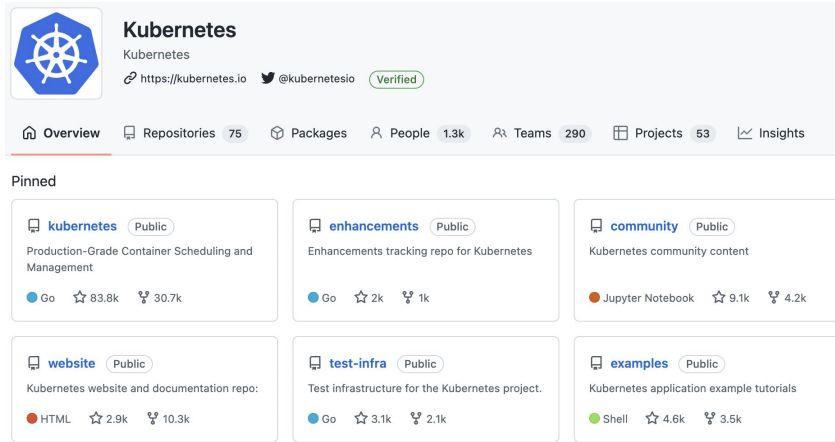
Kubernetes supports the deployment and operation of applications with a micro service architecture.

This is done through an abstraction layer across a group of nodes which handles containers.

Developers can deploy their containerized applications towards K8s while K8s takes care about basic operations and keep alive & scaling mechanisms.



KUBERNETES PROJEKT



Kubernetes
Kubernetes
<https://kubernetes.io> @kubernetesio Verified

Overview Repositories 75 Packages People 1.3k Teams 290 Projects 53 Insights

Pinned

- kubernetes** (Public)
Production-Grade Container Scheduling and Management
Go 83.8k 30.7k
- enhancements** (Public)
Enhancements tracking repo for Kubernetes
Go 2k 1k
- community** (Public)
Kubernetes community content
Jupyter Notebook 9.1k 4.2k
- website** (Public)
Kubernetes website and documentation repo:
HTML 2.9k 10.3k
- test-infra** (Public)
Test infrastructure for the Kubernetes project.
Go 3.1k 2.1k
- examples** (Public)
Kubernetes application example tutorials
Shell 4.6k 3.5k



Kubernetes SIGs
Org for Kubernetes SIG-related work

Overview Repositories 138 Packages

Metric name ^	Metric value
Code committers	1134
Commenters	4862
Comments	67890
Commit commenters	22
Commits	8981
Contributions	81826
Contributors	5659
Events	229185
Forkers	4448
Issue commenters	4755
Issue creators	2106
Issues	4304
PR creators	1540
PR reviewers	1003
PRs	8993

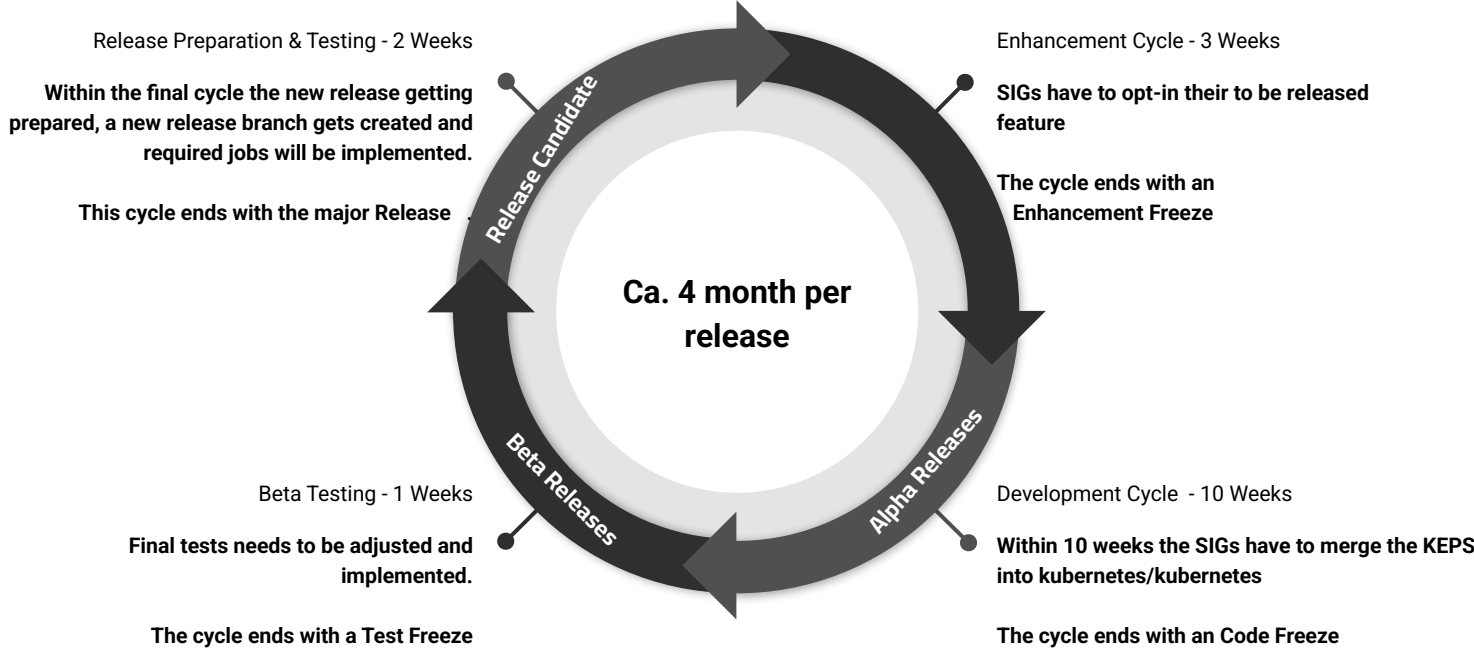




02

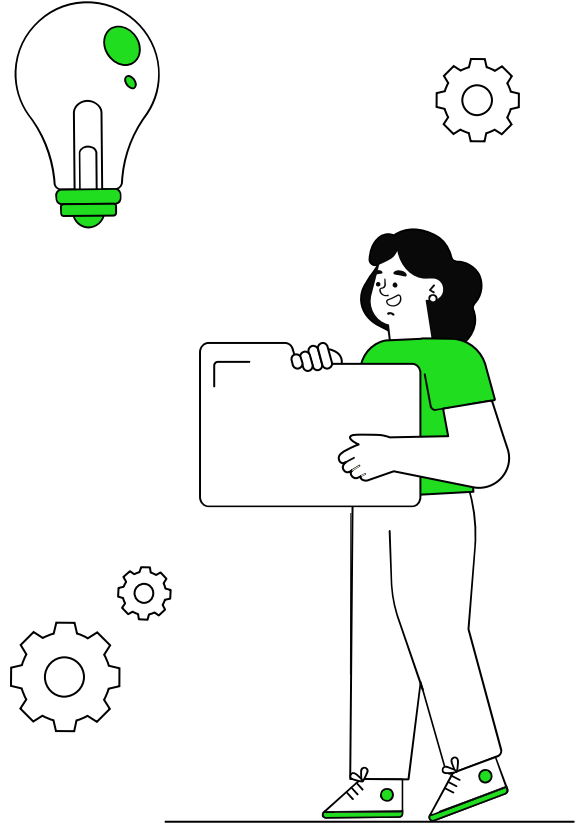
FROM COMMIT TO THE RELEASE

RELEASE CYCLE

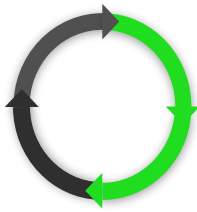


03

THE FIRST PULL REQUEST



FROM DEVELOPMENT TO PR



The development happens locally, all test can and must be executed once before committed.

As soon as the developer decides to move on with an PR, PR pre-submit tests and checks are automatically executed.

K8s test infrastructure:

<https://github.com/kubernetes/test-infra>

k8s-ci-robot merged commit 8323ef7 into `kubernetes:master` 6 days ago

[Hide details](#) [Revert](#)

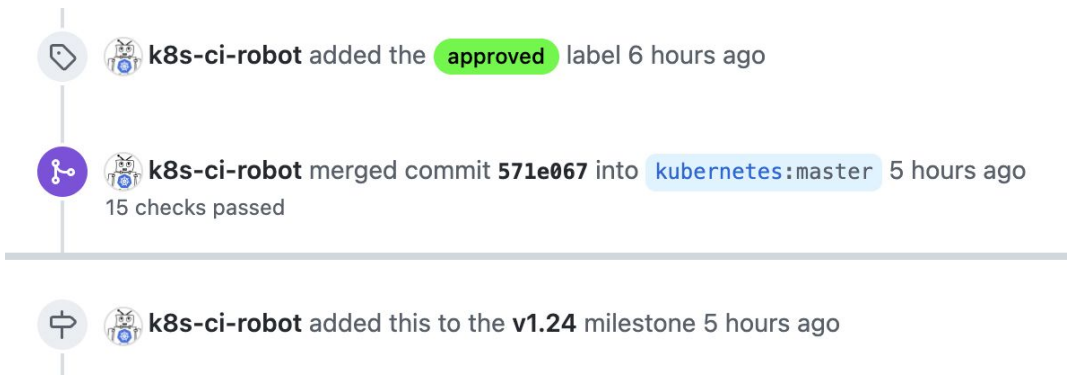
15 checks passed

✓		pull-kubernetes-conformance-kind-ga-only-parallel Job succeeded.	...	Details
✓		pull-kubernetes-dependencies Job succeeded.	Base...	Details
✓		pull-kubernetes-e2e-gce-100-performance Job succeeded.	...	Details
✓		pull-kubernetes-e2e-gce-ubuntu-containerd Job succeeded.	...	Details
✓		pull-kubernetes-e2e-kind Job succeeded.	BaseSHA:...	Details
✓		pull-kubernetes-e2e-kind-ipv6 Job succeeded.	Base...	Details
✓		pull-kubernetes-integration Job succeeded.	BaseSH...	Details
✓		pull-kubernetes-node-e2e-containerd Job succeeded.	...	Details

TAKING OVER A COMMIT INTO THE PLANNED RELEASE

If a commit is merged into the main branch, it gets labeled with a milestone.

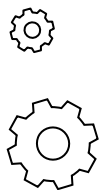
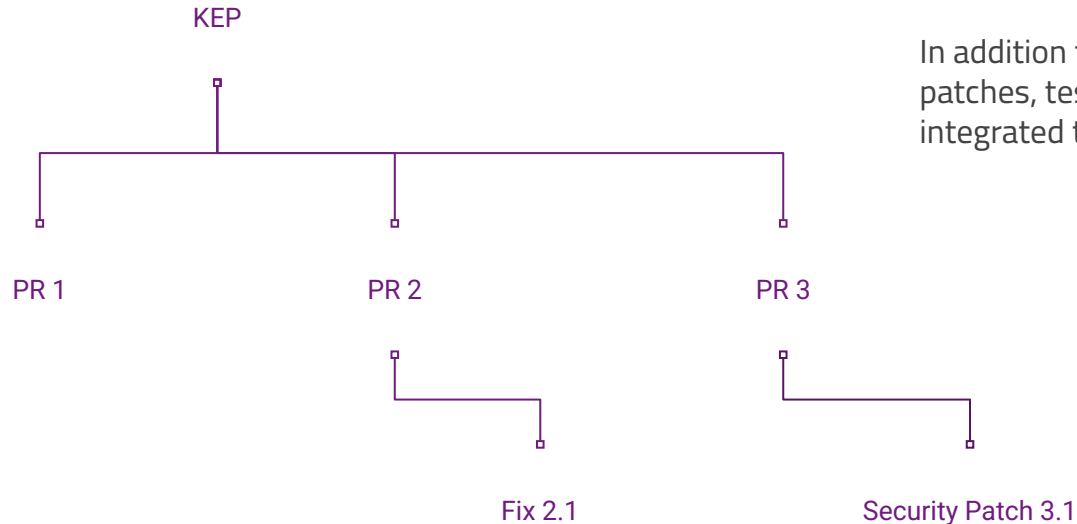
Milestones create a mapping between the opt-in KEP and the truly implemented feature.



A KEP CAN BE ONE OR MANY PR

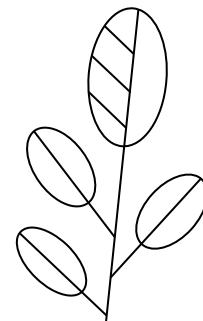
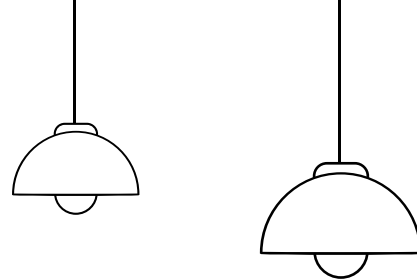
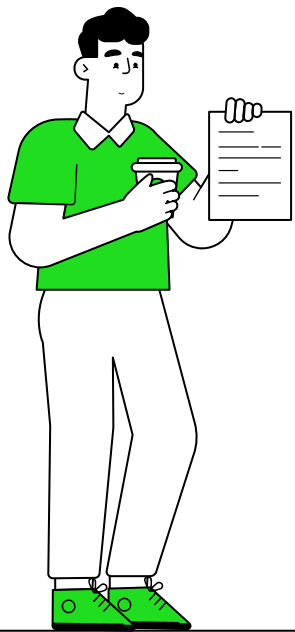
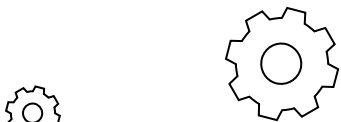
KEPs are not obviously visible. That's also caused by the fact that a KEP normally consist of multiple PRs. In an enterprise this maybe comes close to an Epic.

In addition to KEPs, we also handle fixes, patches, tests and cherry picks, which are integrated through an fast forward push.



04

AFTER THE MERGE



CONTINUOUS TESTING

As soon as the PR is closed and the code is within the main branch - it will get tested within the test infrastructure.

Test are executed within different cycles, but at least once per day.

Tesgrid:
<https://testgrid.k8s.io/sig-release-master-blocking>



The screenshot displays the TestGrid dashboard for the 'sig-release-master-blocking' suite. The dashboard shows a list of test jobs with their status, the number of columns passed, and the total number of columns. A circular arrow icon is overlaid on the top right of the dashboard.

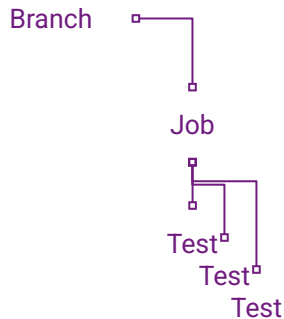
Job Name	Status	Recent Columns Passed	Total Columns	Percentage
build-master	PASSING	9 of 9	18 of 18	100.0%
build-master-fast	PASSING	9 of 9	18 of 18	100.0%
conformance-ga-only	PASSING	10 of 10	3500 of 3500	100.0%
gce-device-plugin-gpu-master	FAILING	0 of 10	70 of 90	77.8%
skew-cluster-latest-kubectl-stable1-gce	PASSING	10 of 10	670 of 670	100.0%
gce-cos-master-default	PASSING	9 of 9	19494 of 19494	100.0%
gce-cos-master-alpha-features	PASSING	9 of 9	450 of 450	100.0%
gci-gce-ingress	FLAKY	8 of 10	476 of 480	99.2%
gce-cos-master-reboot	PASSING	9 of 9	234 of 234	100.0%
gce-cos-master-scalability-100	PASSING	9 of 9	549 of 549	100.0%
gce-ubuntu-master-containerd	PASSING	9 of 9	19494 of 19494	100.0%
Conformance - GCE - master - kubetest2	FAILING	8 of 9	3182 of 3185	99.9%

TESTGRID



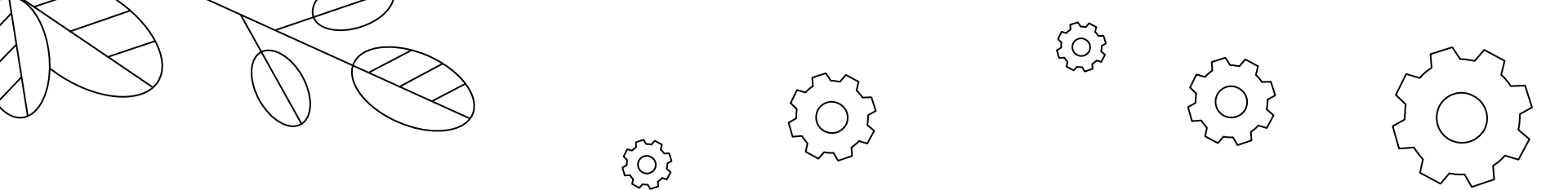
Tesgrid is a system that continuously scrapes the logs of Prow (CI/CD) and shows the results.

Tests are running specifically for the various 3 major versions, the master branch and are differentiated between informing and blocking.



Each branch has therefore two tabs, within each tab are multiple jobs, clustering sometimes hundreds of tests.

7044 tests at the moment!



A short tour through Testgrid

TESTS ARE MULTI-DIMENSIONAL

The test is executed in different jobs. Therefore, a test can be seen multi-dimensional. That's because a job clusters a functionality, while for a functionality multiple components are required.

Testgrid is job oriented, to see the test perspective we have Triage tool in which you can research for the different test.

Example:

Scaling Test - executed at the Replica & load test, as well as for different rollout strategies.

Here you can play around:

<https://storage.googleapis.com/k8s-triage/index.html>

Kubernetes Aggregated Failures from

Show clusters for SIG:

Include results from: CI PR
Sort by total count count in last day error message

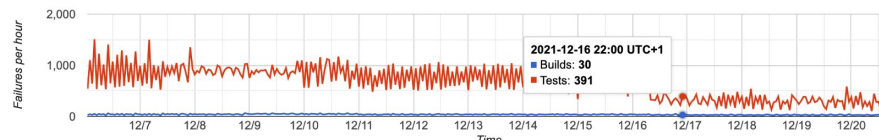
Include Filter (these are regexes):

Failure text
Job
Test

Exclude Filter (these are regexes):

Failure text
Job
Test

1642 clusters of 231814 failures (6018 in last day) out of 123694 builds from 6.12.2021, 01:00:34 to 20.12.2021, 17:33:46.

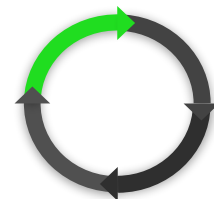


05

THE RELEASE



PREPARATION AND EXECUTION

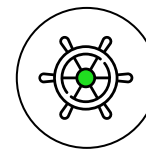


BRANCHING

Split off of the release
branche & e2e test of the
new release version

DOCUMENTATION

Publishing release notes,
K8s documentation and
communication are
prepared



RELEASE CUT

A Release Manager runs
the krel tooling to create a
release

A OWN SET OF TOOLS WAS DEVELOPED FOR THE RELEASE CUT

Kubernetes release Toolbox - KREL

Krel is the central and critical component for the release cuts. The release cut is the step where within kubernetes/kubernetes main Branch a new release is created and packaged.

- Release Management
 - `krel`
 - `schedule-builder`
- Artifact Management
 - `kpromo`
 - `kubepkg`
 - `cip-mm`
 - `gh2gcs`
- End User
 - `bom`
 - `release-notes`
 - `gcbuilder`
 - `publish-release`
- Legacy
 - `push-build.sh`
- Contributing

Subcommand	Description
<code>announce</code>	Build and announce Kubernetes releases
<code>changelog</code>	Automate the lifecycle of CHANGelog-x.y.{md,html} files in a k/k repository
<code>ci-build</code>	Build Kubernetes in CI and push release artifacts to Google Cloud Storage (GCS)
<code>cve</code>	Add and edit CVE information
<code>ff</code>	Fast forward a Kubernetes release branch
<code>history</code>	Run history to build a list of commands that ran when cutting a specific Kubernetes release
<code>push</code>	Push Kubernetes release artifacts to Google Cloud Storage (GCS)
<code>release</code>	Release a staged Kubernetes version
<code>release-notes</code>	The subcommand of choice for the Release Notes subteam of SIG Release
<code>stage</code>	Stage a new Kubernetes version
<code>testgridshot</code>	Take a screenshot of the testgrid dashboards



THE RELEASE PROCESS USER PERSPECTIVE

veronica vor 13 Tagen
Release cut v1.23.0 (track)

veronica vor 13 Tagen
No-mock Stage logs

puerco vor 13 Tagen
Current status: Compiling

amwat vor 13 Tagen
I'm around now

puerco vor 13 Tagen
Hey @amwat 🙌 Stage is running now, it will take about 30-40 mins more. The release will be ready for the packages in around 1 hr.

palnabarun vor 13 Tagen
Promotion PR ->
<https://github.com/kubernetes/k8s.io/pull/3155>

```
kpromo pr -i --project=kubernetes --fork=palnabarun --tag v1.23.0 --tag v1.23.1-rc.0
```

palnabarun vor 13 Tagen
Monitoring
<https://prow.k8s.io/view/gs/kubernetes-jenkins/logs/post-k8sio-image-promo/1468313522629775360>

puerco vor 13 Tagen
Checked the images with `skopeo inspect`

```
docker://k8s.gcr.io/kube-apiserver:v1.23.0 - --raw and they are available (bearbe...
```

puerco vor 13 Tagen
@amwat heads up, we are about to start release. Release should be read in 10-20 min

palnabarun vor 13 Tagen
Yay! The job also passed. ✅

palnabarun vor 13 Tagen
Nomock Release logs

veronica vor 13 Tagen
Thanks for taking over @palnabarun 🌟

puerco vor 13 Tagen
One thing I have to say is that this release I've missed @oikiki's emojisactivate call to action: https://kubernetes.slack.com/archives/CJH2GF7Y/p1628111066094800?thread_ts=1628025465.036900&cid=CJH2GF7Y

oikiki
EMOJISACTIVATE
Aus einem Thread in #release-management 4. Aug. Antwort anzeigen

oikiki vor 13 Tagen
I am here to support: EMOJISACTIVATE!!!! 🙌

oikiki vor 13 Tagen
yall are all AMAZING 💖

puerco vor 13 Tagen
Thanks for dropping that! 🙌

oikiki vor 13 Tagen
I gotchu boo 🤗

palnabarun vor 13 Tagen
Nomock Release (logs) ✅

Wurde auch an den Channel gesendet

palnabarun vor 13 Tagen
Kubernetes v1.23.0 is live!!! 🎉

PS: Hold on for an announcement from @Rey Lejano before tweeting/sharing about it.

Wurde auch an den Channel gesendet

justaugustus (he/him) vor 13 Tagen
@release-team-leads @release-managers @amwat -- Great work everyone!!! 🙏🙏🙏🙏🙏🙏🙏🙏

palnabarun vor 13 Tagen
@release-managers -- whenever you can -> <https://github.com/kubernetes/test-infra/pull/24577>

GitHub
kubekins-e2e: bump 1.23 version marker to stable-1.23 by palnabarun · Pull Request #24577 · Kubernetes/test-infra

Part of the 1.23 Stable Release tasks /cc @kubernetes/release-managers /priority critical-urgent /kind feature (93 kB)

kubernetes/test-infra
#24577 kubekins-e2e: bump 1.23 version marker to stable-1.23

2 comments 1 review 1 file +1 -1

palnabarun · December 8, 2021 · 1 commit

ADDING SOME NOISE CANCELING

veronica vor 13 Tagen
No-mock Stage logs
Current status: Compiling

veronica vor 14 Tagen
Mock Stage logs

veronica vor 14 Tagen
build version verified

veronica vor 14 Tagen
Mock Release logs

veronica vor 14 Tagen
mock runs are done. @Rey Lej: that he'll run another GO/NO-we'll wait for that to resume th

puerco vor 13 Tagen
Current status: Generating SBOMs

puerco vor 13 Tagen
Current status: Copying staged artifacts (almost done)

puerco vor 13 Tagen
Current status: pushing images to staging registry

puerco vor 13 Tagen
Current status: Pushing 1.23.1-rc.0 images to staging registry

veronica vor 13 Tagen
staging done!

palnabarun vor 13 Tagen
Promotion PR ->
<https://github.com/kubernetes/k8s.io/pull/3155>

```
kpromo pr -i --project=kubernetes --fork=palnabarun --tag v1.23.0 --tag v1.23.1-rc.0
```

palnabarun vor 13 Tagen
Monitoring
<https://prow.k8s.io/view/gs/kubernetes-jenkins/logs/post-k8sio-image-promo/1468313522629775360>

puerco vor 13 Tagen
Checked the images with `skopeo inspect`
`docker://k8s.gcr.io/kube-apiserver:v1.23.0 -raw` and they are available (bearbe...

palnabarun vor 13 Tagen
Yay! The job also passed. ✓

palnabarun vor 13 Tagen
Nomock Release logs

palnabarun vor 13 Tagen
Nomock Release (logs) ✓

palnabarun vor 13 Tagen
Kubernetes v1.23.0 is live!!! 🎉

PS: Hold on for an announcement from @Rey Lejano before tweeting/sharing about it.

palnabarun vor 13 Tagen
@release-managers -- whenever you can -> <https://github.com/kubernetes/test-infra/pull/24577>

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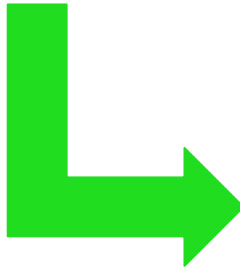
kubernetes/test-infra
#24577 **kubekins-e2e: bump 1.23 version marker to stable-1.23**

2 comments 1 review 1 file +1 -1 - -

palnabarun · December 8, 2021 · 1 commit

YOU NEED TO KNOW WHAT YOU ARE LOOKING FOR

 **palnabarun** vor 13 Tagen
Monitoring
<https://prow.k8s.io/view/gs/kubernetes-jenkins/logs/post-k8sio-image-promo/1468313522629775360>



post-k8sio-image-promo #1468313522629775360

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

Test started 12/07/2021 **passed** after 11m19s. ([more info](#))

Build Log

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

skipped 42545 lines

Job Pod Info

POD	VOLUMES	EVENTS	CLONEREFS	INITUPLOAD	PLACE-ENTRYPOINT	TEST	SIDECAR	YAML
Image	k8s.gcr.io/artifact-promoter/kpromo:v3.3.0-beta.1-3							
Status	Terminated (Completed) at 2021-12-07 20:28:04 +0000 UTC with exit code 0							
Command	/tools/entrypoint							
Decorated Command	/kpromo cip --thin-manifest-dir=/home/prow/go/src/github.com/kubernetes/k8s.io/k8s.gcr.io --confirm							
Volume mounts	logs at /logs tools at /tools code at /home/prow/go k8s-infra-gcr-promoter-token-gr5t5 at /var/run/secrets/kubernetes.io/serviceaccount (read-only)							

EVERY BUILD RUNS IN THE CLOUD

Google Cloud Platform | kubernet-release-test | Produkte und Ressourcen suchen

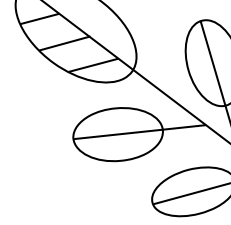
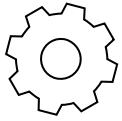
Cloud Build | Build-Details | NEU ERSTELLEN | URL KOPIEREN | LERNEN

Dashboard | Verlauf | Trigger | Einstellungen

Erfolgreich: 3774f31e
Gestartet am 07.12.2021, 21:39:43

Schritte	Dauer	BUILD-LOG	AUSFÜHRUNGSDETAILS	BUILD-ARTEFAKTE
Build-Zusammenfassung 4 Schritte	00:13:33	<input type="checkbox"/> Zeilen umbrechen <input type="checkbox"/> Neueste Einträge zuerst anzeigen <input type="checkbox"/> MAXIMIEREN <input type="checkbox"/> ROHDATENLOGS ANSEHEN		
0: gcr.io/cloud-builders/git clone https://github.com/kubern...	00:00:04	2431 Step #3: INFO[2021-12-07T20:47:49Z] Found the following Go version: 1.17.3 2432 Step #3: INFO[2021-12-07T20:47:49Z] Release announcement created 2433 Step #3: INFO[2021-12-07T20:47:50Z] Successfully created issue #33: Update publishing-bot for release-1.23		
1: gcr.io/cloud-builders/git bash -c git fetch echo "Checking o...	00:00:01	2434 Step #3: INFO[2021-12-07T20:47:50Z] Publishing bot issue created #33! 2435 Step #3: INFO[2021-12-07T20:47:50Z] Updating GitHub release page step=10/11 2436 Step #3: INFO[2021-12-07T20:47:51Z] Posting the v1.23.0 release on github...		
2: gcr.io/k8s-staging-releng/k8s-cl... ./compile-release-tools krel	00:01:47	2437 Step #3: INFO[2021-12-07T20:47:51Z] Updating release page for v1.23.0 2438 Step #3: INFO[2021-12-07T20:47:51Z] No assets found in release 2439 Step #3: INFO[2021-12-07T20:47:51Z] Uploading /workspace/src/k8s.io/kubernetes/_output-v1.23.0/gcs-stage/v1.23.0/kub		
3: gcr.io/k8s-staging-releng/k8s-cl... bin/krel release --submit=false --no...	00:11:38	2440 Step #3: INFO[2021-12-07T20:47:51Z] Asset filetype will be application/x-gzip 2441 Step #3: INFO[2021-12-07T20:47:51Z] Uploading kubernetes.tar.gz to release 54824547 2442 Step #3: INFO[2021-12-07T20:47:53Z] Successfully uploaded asset #51241872 2443 Step #3: INFO[2021-12-07T20:47:53Z] Release v1.23.0 published on GitHub 2444 Step #3: INFO[2021-12-07T20:47:53Z] Archiving release step=11/11 2445 Step #3: INFO[2021-12-07T20:47:54Z] Deleting previous staged build: gs://kubernetes-release/stage/v1.23.0-rc.0.15+43 2446 Step #3: INFO[2021-12-07T20:47:58Z] Compressing /workspace/src/k8s.io to /workspace/src/k8s.io.tar.gz 2447 Step #3: INFO[2021-12-07T20:52:49Z] Removing source path /workspace/src/k8s.io before syncing 2448 Step #3: INFO[2021-12-07T20:52:51Z] Rsync /workspace/src to gs://kubernetes-release/archive/anago-v1.23.0 2449 Step #3: INFO[2021-12-07T20:53:12Z] Trying to copy file /tmp.k8s/temp-release-log-81686645 to /tmp.k8s/release.log 2450 Step #3: INFO[2021-12-07T20:53:12Z] Copied release.log 2451 Step #3: INFO[2021-12-07T20:53:12Z] Copying /tmp.k8s/release.log to /workspace/src/logs 2452 Step #3: INFO[2021-12-07T20:53:12Z] Trying to copy file /tmp.k8s/release.log to /workspace/src/logs/release.log (req 2453 Step #3: INFO[2021-12-07T20:53:12Z] Copied release.log 2454 Step #3: INFO[2021-12-07T20:53:12Z] Rsyncing logs to remote bucket gs://kubernetes-release/archive/anago-v1.23.0/log 2455 Step #3: INFO[2021-12-07T20:53:14Z] Ensure PRIVATE ACL on gs://kubernetes-release/archive/anago-v1.23.0/logs/* 2456 Step #3: INFO[2021-12-07T20:53:16Z] Release archive complete 2457 Step #3: INFO[2021-12-07T20:53:16Z] To announce this release, run: 2458 Step #3: 2459 Step #3: \$ krel announce send --nomock --tag=v1.23.0 2460 Step #3: INFO[2021-12-07T20:53:16Z] Release done 2461 Finished Step #3 2462 PUSH 2463 DONE		

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LESSONS LEARNED

06

TAKE AWAY

STRONG AUTOMATION

Every single step within the release is automated and tested

NEVER TRUST A COMMIT

“Everyone” can commit, every commit & PR is tested and reviewed

WITHOUT A RELEASE TEAM IT WILL NOT WORK

Even with a high automation you need someone to ensure the quality and drive further development

OWN PROCESSES

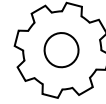
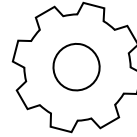
... require sometimes own tools

TESTS MUST BE CONSISTENT

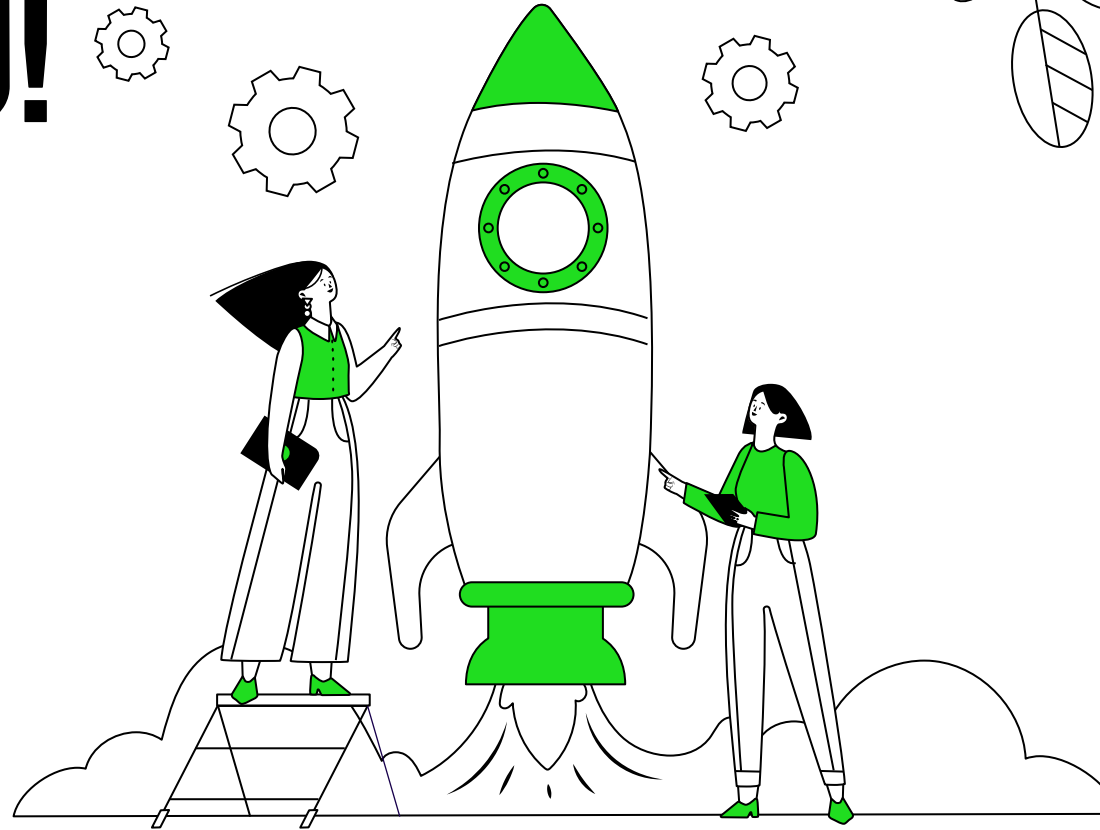
Sometime a commit is just a few lines long, sometimes they are tens of thousands of lines

DID I MENTION ATOMIZATION?

THANK YOU!



Max Körbächer - Co-Founder



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