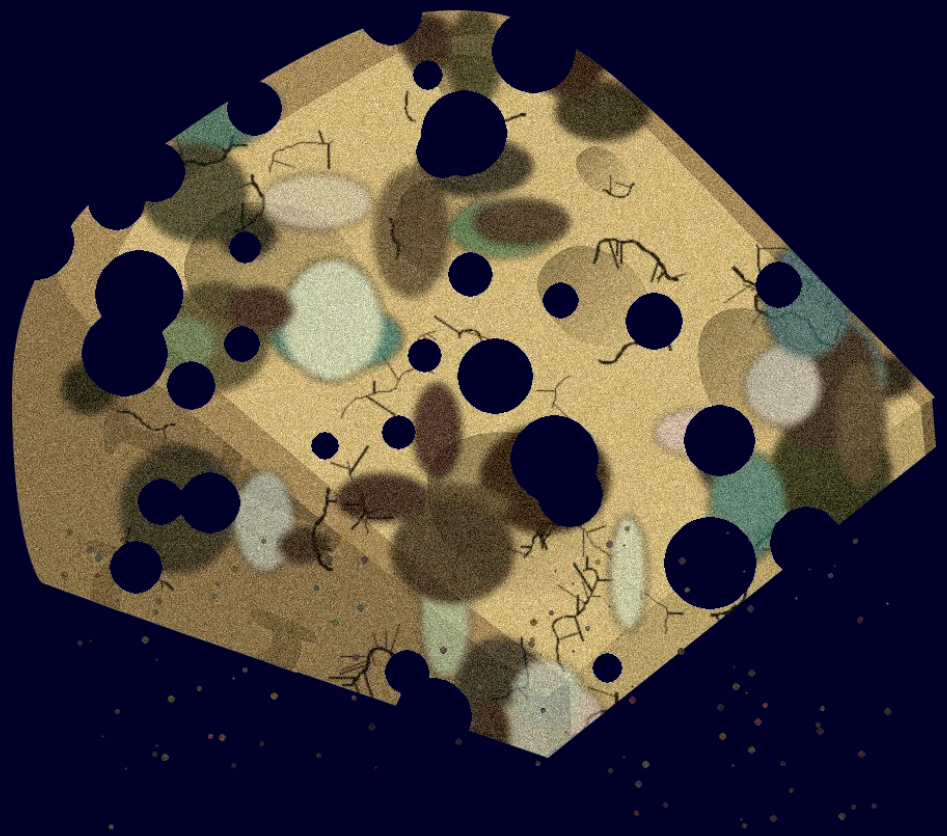
# Is It Time To Retire kas?





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# About Us



## Felix Moessbauer

<felix.moessbauer@siemens.com>

- Siemens Foundational Technology
- (In-house) Embedded Linux consultant & developer
- Contributes to major OSS projects for Siemens, including kas
- Tooling developer (static / dyn. analysis, build tools, …)



## Jan Kiszka

<jan.kiszka@siemens.com>

- Siemens Foundational Technology
- (In-house) Embedded Linux consultant & developer
- kas maintainer since 2019
- Maintainer and contributor to various other OSS projects



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# Quick Survey (1)

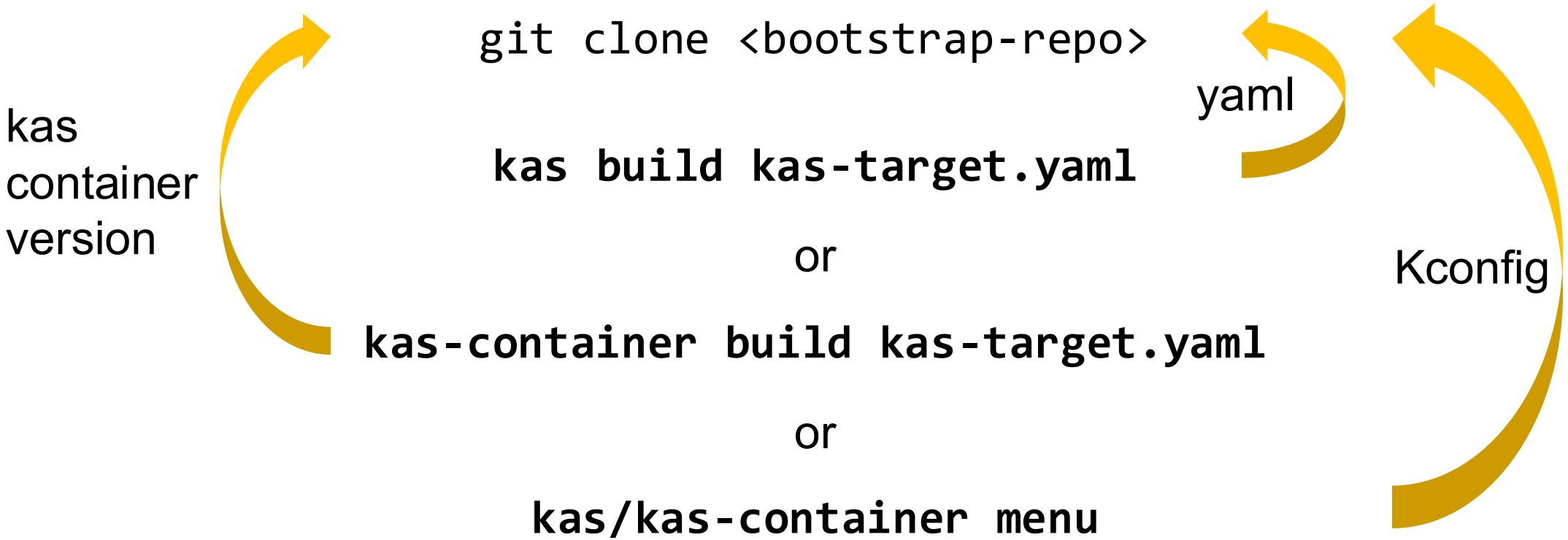
Who knows kas?

Who is using it already?


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# kas: Single-Statement Setup & Build for Bitbake Projects





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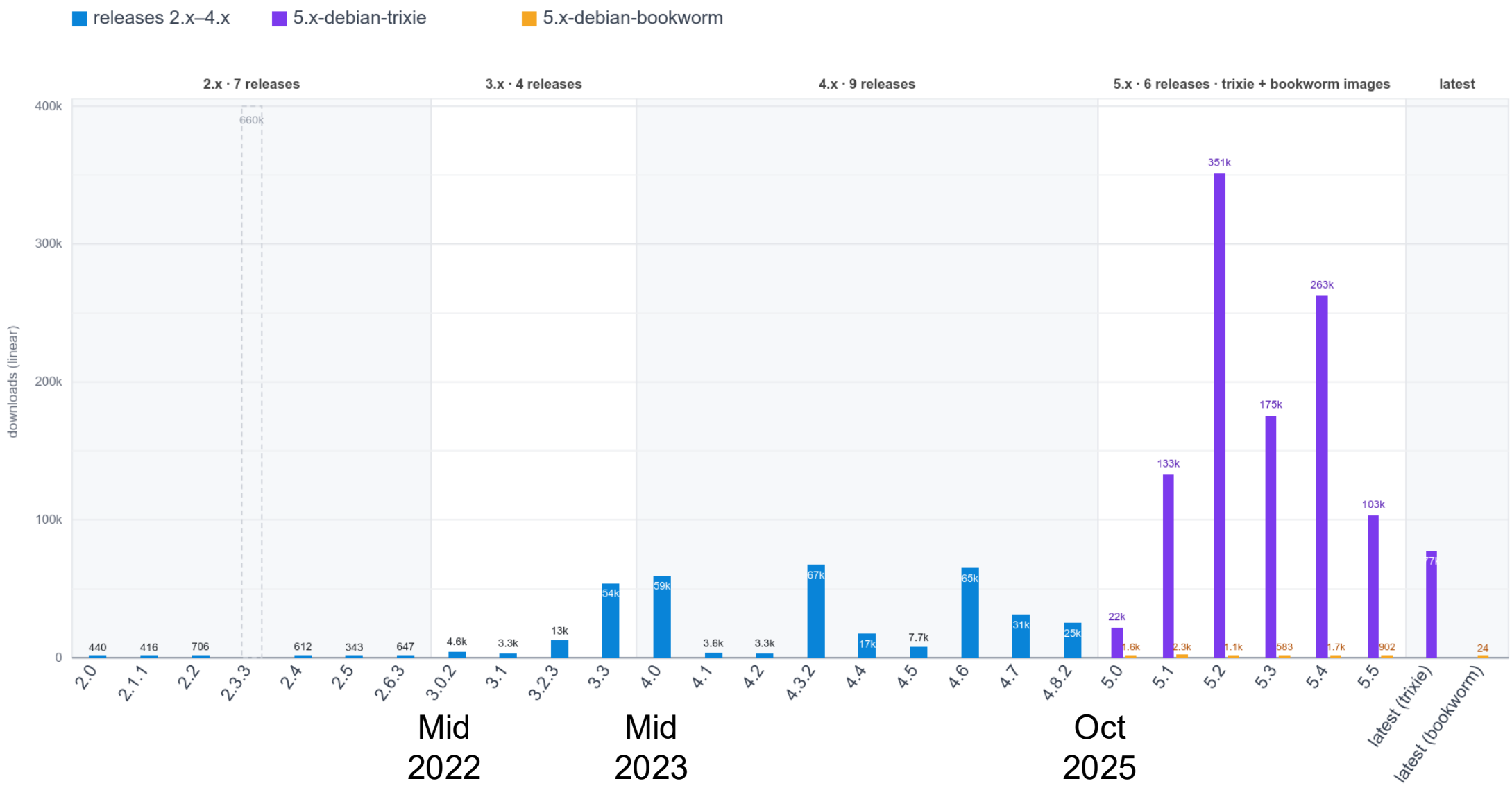
# Quick Survey (2)

Who is using kas-container?


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# Downloads of Yocto kas container

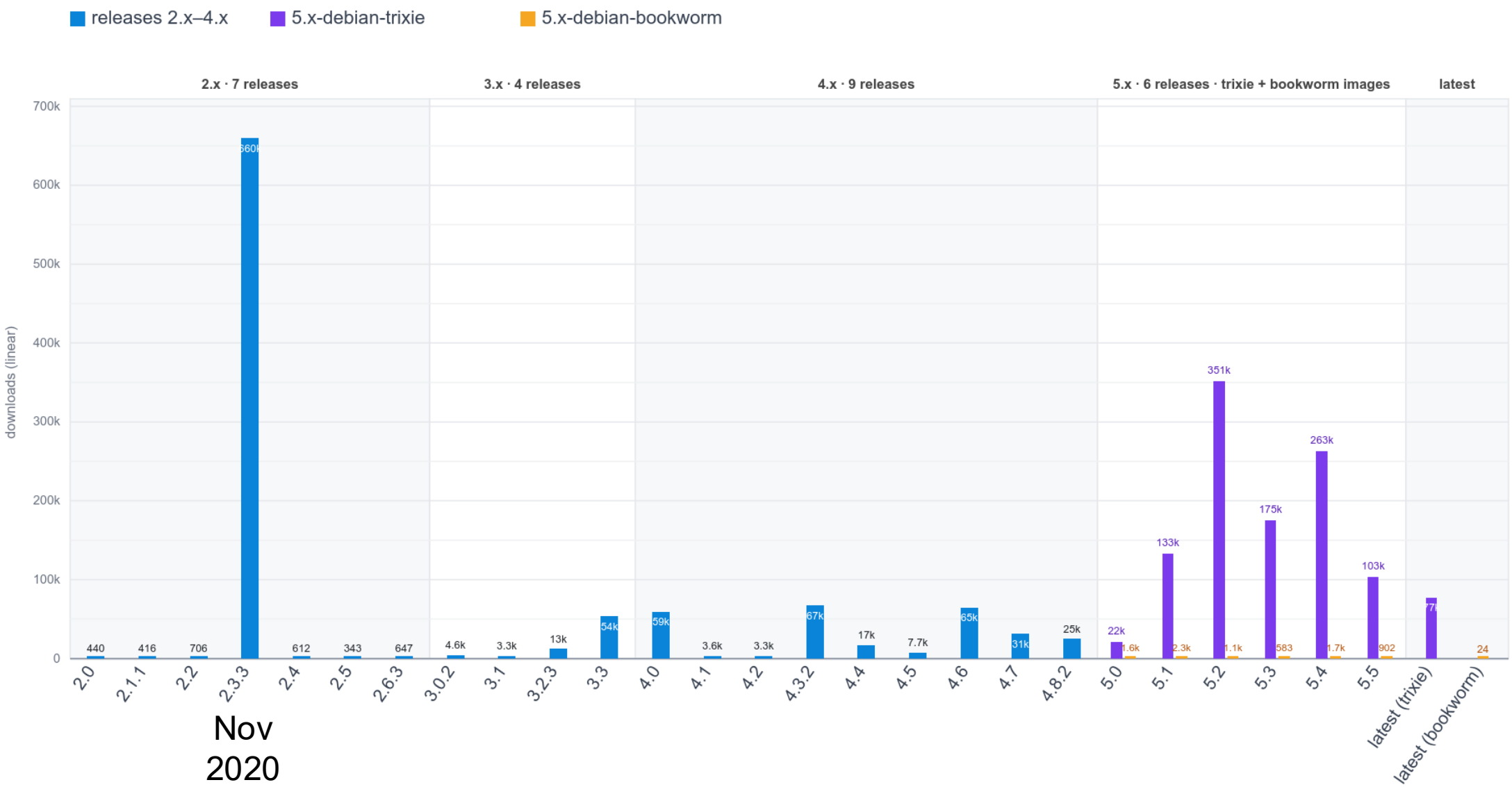




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# Downloads of Yocto kas container





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# Latest Developments
## Debian packaging & man pages

**Both kas & kas-container are packaged**

- Backports needed?
- We have man pages

| versions | |
|---|---|
| **o-o-stable:** | 2.3.3-2 |
| **oldstable:** | 3.1-2 |
| **stable:** | 4.8.1-2 |
| **testing:** | 5.5-1 |
| **unstable:** | 5.5-1 |

```
$ man kas
kas                     kas-cleanall          kas-dump                kas-project-config
kas-build               kas-cleansstate       kas-for-all-repos       kas-purge
kas-build-attestation   kas-container         kas-format-changelog    kas-shell
kas-checkout            kas-credentials       kas-lock
kas-clean               kas-diff              kas-menu
```

```
man kas
```


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# Latest Developments
## Plugins: diff & lock

**diff plugin**

- shows delta between two kas configurations
- config diff, commit log diff of referenced repos

**lock plugin**

- shows "diff" on `--update`
- performs update of lockfile that carries the locked commit

**Renovate bot support**

- Native support of kas configs in renovate is upcoming (PR renovate PR#46374)
- Works without kas tool

**Lockfiles are looked up next to each kas file**

```
example.yml [includes meta-foo.yml]
-> opt/meta-foo.yml
-> opt/meta-foo.lock.yml
```

```
man kas-diff
man kas-lock
```


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```
$ kas diff --oneline openembedded.yml openembedded-new.yml
2026-10-06 09:45:31 - INFO     - kas 5.5 started on Debian GNU/Linux forky
2026-10-06 09:45:31 - INFO     - Repository poky already contains 7e081bd98fdc5435e
2026-10-06 09:45:31 - INFO     - Repository poky signature valid: Fingerprint 2AFB
o Build and Release <releases@yoctoproject.org>"
2026-10-06 09:45:31 - INFO     - Repository poky checked out to 7e081bd98fdc5435e85
2026-10-06 09:45:31 - INFO     - Repository poky already contains ff9ca74e170480578
2026-10-06 09:45:31 - INFO     - Repository poky signature valid: Fingerprint 2AFB
o Build and Release <releases@yoctoproject.org>"
2026-10-06 09:45:31 - INFO     - Repository poky checked out to ff9ca74e170480578fc
kas diff openembedded.yml openembedded-new.yml
---  openembedded.yml
+++  openembedded-new.yml
@@ config changed @@
     repos.poky.tag:
         @@ -1 +1 @@
-        yocto-5.1.1
+        yocto-5.1.2
     repos.poky.commit:
         @@ -1 +1 @@
-        7e081bd98fdc5435e850d1df79a5e0f1e30293d0
+        ff9ca74e170480578fcdb1f7bcd897f0e69e46a5
@@ poky commits diff @@
ff9ca74 build-appliance-image: Update to styhead head revision
ad45230 poky.conf: bump version for 5.1.2
d55092f lttng-modules: fix sched_stat_runtime changed in Linux 6.6.66
66f9cec oeqa/ssh: Improve performance and log sizes
```



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# Latest Developments
## Build Attestations

**Capture build state in SLSA provenance format**

- Build-timestamps
- Build-materials (project-config)
- Repos and versions
- Build platform
- (env vars, only in mode=max)
- Attestation can be passed to cosign

```
kas build --provenance mode=max \
    kas-project.yml

cosign attest-blob \
    --type=slsaprovenance1 \
    --predicate=provenance.json \
    --output-signature=kas-build.dsse.json \
    --output-certificate=cert.pem \
    <image>.wic
```

```
man kas-build
man kas-build-attestation
```


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# Latest Developments
## Commit Signature Verification

**Security model *(a thing AIs never get right)***

- User manually inspects dependencies (once)
- Kas ensures that the expected state is checked out

**Verifying git commits is hard!**

- GHSA-6p9r-86f2-f954 (short commit id confusion)
- CVE-2026-47191 (branch commit confusion)
- CVE-2026-47192 (TOCTOU)

```
# Optionally provide keys to verify signed repositories
signers:
  YoctoBuildandRelease:
    fingerprint: 2AFB13F28FBBB0D1B9DAF63087EB3D32FB631AD9
    gpg_keyserver: keyserver.ubuntu.com

repos:
  poky:
    url: https://git.yoctoproject.org/poky.git
    # when specifying a tag, optionally provide a commit hash
    tag: yocto-5.1.1
    commit: 7e081bd98fdc5435e850d1df79a5e0f1e30293d0
    signed: true
    allowed_signers:
      - YoctoBuildandRelease
```

`man kas-project-config`

**Use of "refspec" is deprecated for security reasons**



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# Latest Developments
## Buildtools Support

```yaml
header:
  version: 19
repos:
  poky:
    url: https://git.yoctoproject.org/poky.git
    commit: 9b96fdbb0cab02f4a6180e812b02bc9d4c41b1a5
    layers:
      meta:
      meta-poky:

buildtools:
  version: "5.2"
  sha256sum: "6f69fba75c8f3142bb49558afa3ed5dd0723a3beda169b057a5238013623462d"
  # optional
  base_url: "https://downloads.mysources.com/yocto/buildtools/"
  filename: "x86_64-buildtools-beta-testing-1.0.0.sh"
```

- kas downloads the buildtools and verifies integrity
- Buildtools are cached
- kas checks the `Distro Version` of the version file and re-downloads if not identical to version

```
man kas-project-config
```

https://docs.yoctoproject.org/dev/ref-manual/system-requirements.html#downloading-a-pre-built-buildtools-tarball



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# Latest Developments
## kas-container & CI Features

### kas-container

- works perfectly well rootless podman
  (and reasonably well on docker rootless)
- aligns ownerships of files between host and container
- `kas-container --preserve-paths`
  uses identical path inside and outside of the container
  (YMMV)
- OCI containers are Debian based, bit-by-bit
  reproducible and use fixed Debian snapshot
  (run apt update && apt upgrade if updates are needed)

### kas in CI

- Explicit support for well-known CI environments
  (GitLab CI, GitHub Actions via
  `webfactory/ssh-agent`)
- Configures git to rewrite URLs and inject tokens
  so fetching works transparently (including in
  bitbake recipes)
- Support for AWS SSO
- Support for OCI registry authentication

```
man kas-container
man kas-credentials
```


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# Upcoming kas Features

**Improved kas diff**

- Compare current commit against edited config (like "git diff")

**External Plugins?**

- Often requested, never completed – still desired?

**Support for OE Fragments?**

- Not explored in details yet
- Maybe enrich upstream with dependency modeling?



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## Quick Survey (3)

# **Primary** Reason To (Still) Use kas?

1. Build container
2. kas menu
3. Too ~~lazy~~ busy to migrate
4. Other reason



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# Open Mic

What are you missing from kas?



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# kas Compared To Native Bitbake/OE Features

| Feature | Bitbake + Yocto Concept | kas |
|---|---|---|
| Bootstrapping | bitbake-setup init | kas build/menu |
| Container environment | n/a | kas-container |
| Configuration format(s) | JSON (config templates) + bitbake conf (fragments) + INI (settings.conf) | YAML (core configs) + Kconfig (interactive menu) |
| Dynamic configuration | OE fragments, querried during init, Q&A style | kas config snippets -> local.conf, interactive menu |
| Configuration constraints | limited (one-of...) | rich (Kconfig language) |
| Dependency integrity | limited (git revision) | git commit, tag signatures |
| buildtools | ✅ (with checksum) | ✅ (with checksum) |
| Revision locking | partially (Source Overrides) | ✅ |
| Build attestation | WIP (see Tim Orling's talk) | ✅ |
| Layer patching, config dump, diff | n/a | ✅ |


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# Elephant in the Room: Will We Retire kas?

**No: kas is state-of-the-art for us**

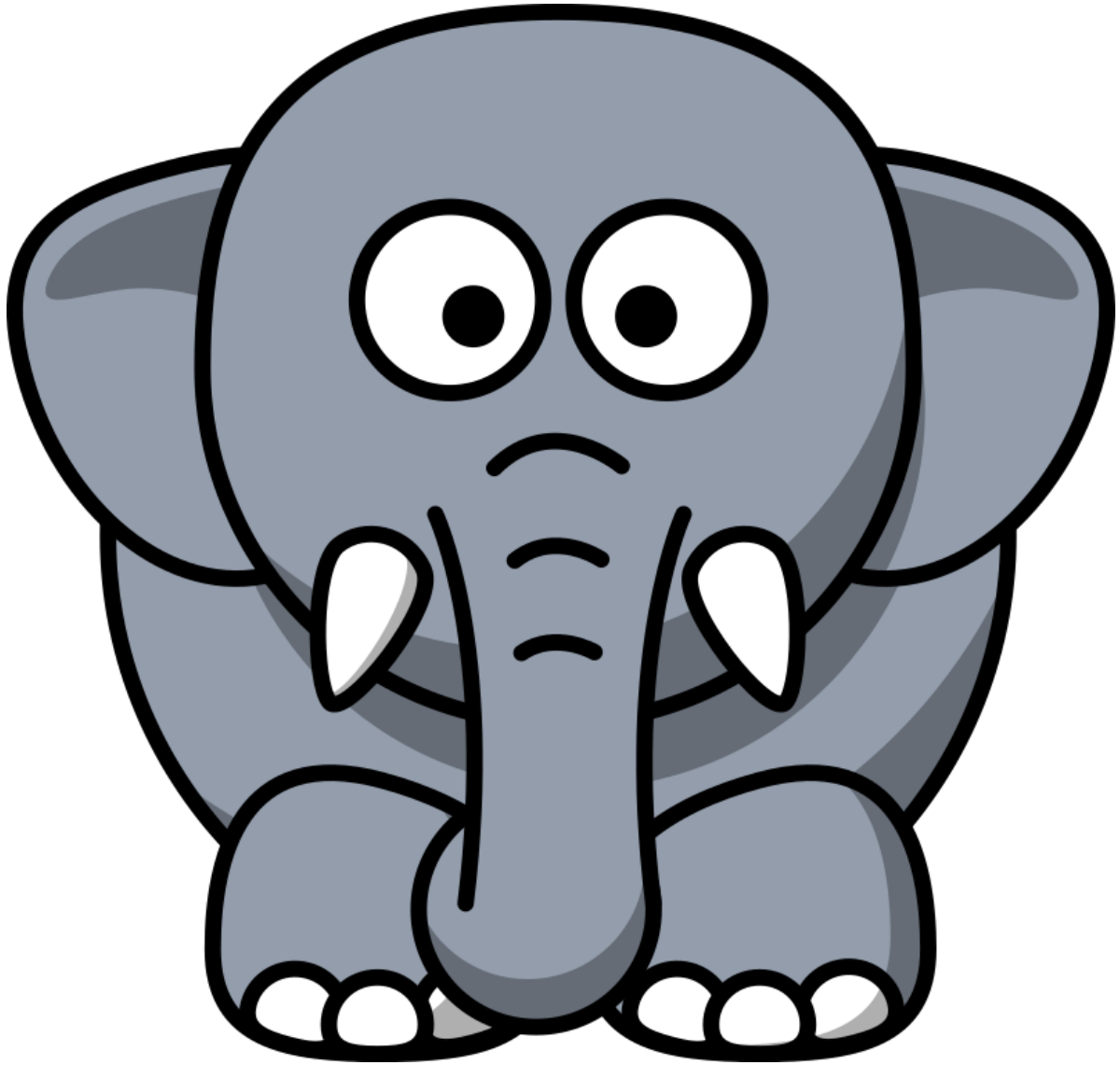
- (Too) many existing projects, also internal
- Many of them long-living (5 years, 10 years, ...)

**No: We use it beyond Yocto**

- Isar: bitbake-based Debian image builder
- Would need a Isar/Debian build container

**Maybe: All key features provided by Yocto & Isar**

- Currently not in sight
- Would still need a longer transition path
- Or compat tooling
- ...and users willing to migrate





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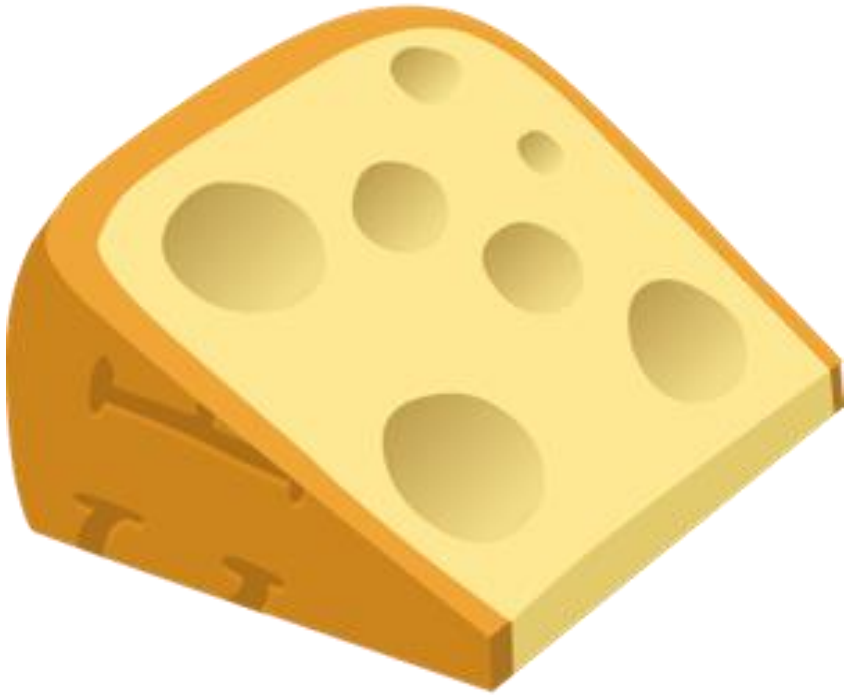
# Summary

**The cheese is still fine**

- We rely on it, we continue it
- Build container interface is USP
- Healthy community with many contributions

**The cheese is even getting better**

- Continuous influx of differentiating features
- Recent bitbake/OE improvements to be adopted



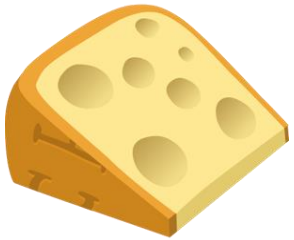
**Resources**

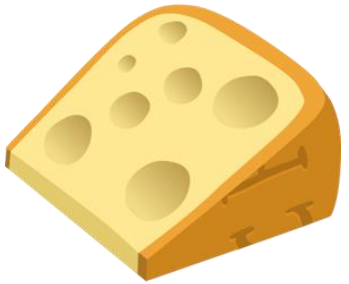
- https://github.com/siemens/kas
- https://kas.readthedocs.io
- kas-devel@googlegroups.com

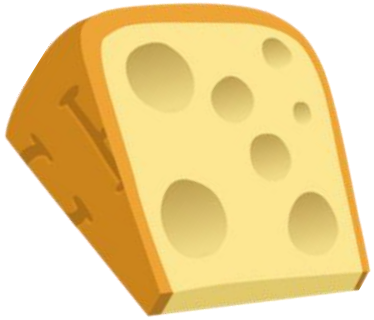


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# Thank You!







Questions?





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# Contact

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