# BAZEL, BUCK, AND FRIENDS.
# HOW TO SCALE YOUR BUILDS?

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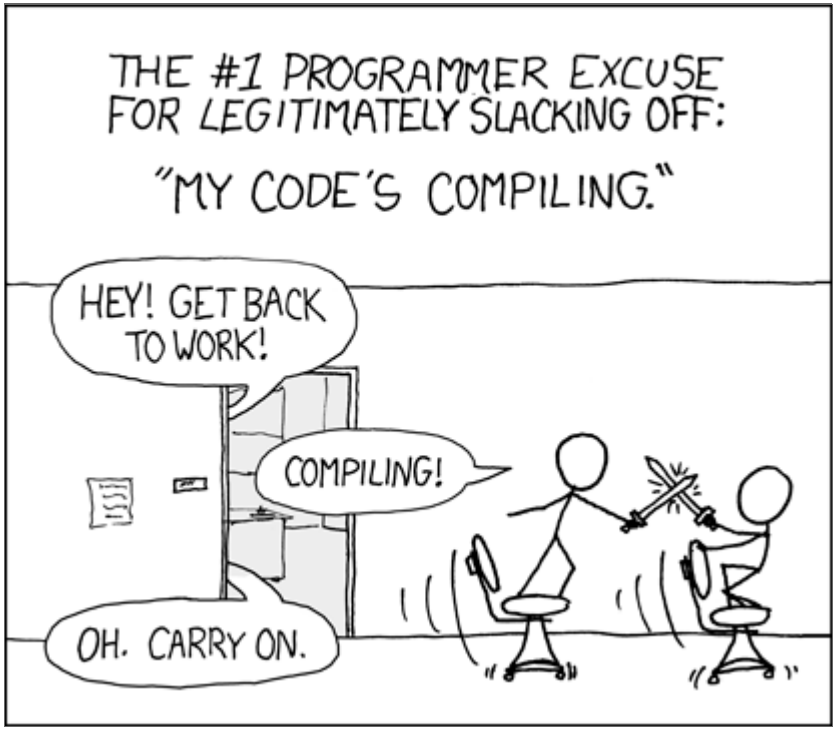
Open Source @ Siemens — June 4th, 2025

# WHY?




https://3d.xkcd.com/303

## WHAT IS A BUILD SYSTEM?

- code → artifact
- Make, Ninja, Maven
- tests, dependencies, ...

## WHAT IS SCALABLE?

> ***Scalability*** *is the property of a system to handle a growing amount of work.*
>
> *— Wikipedia*

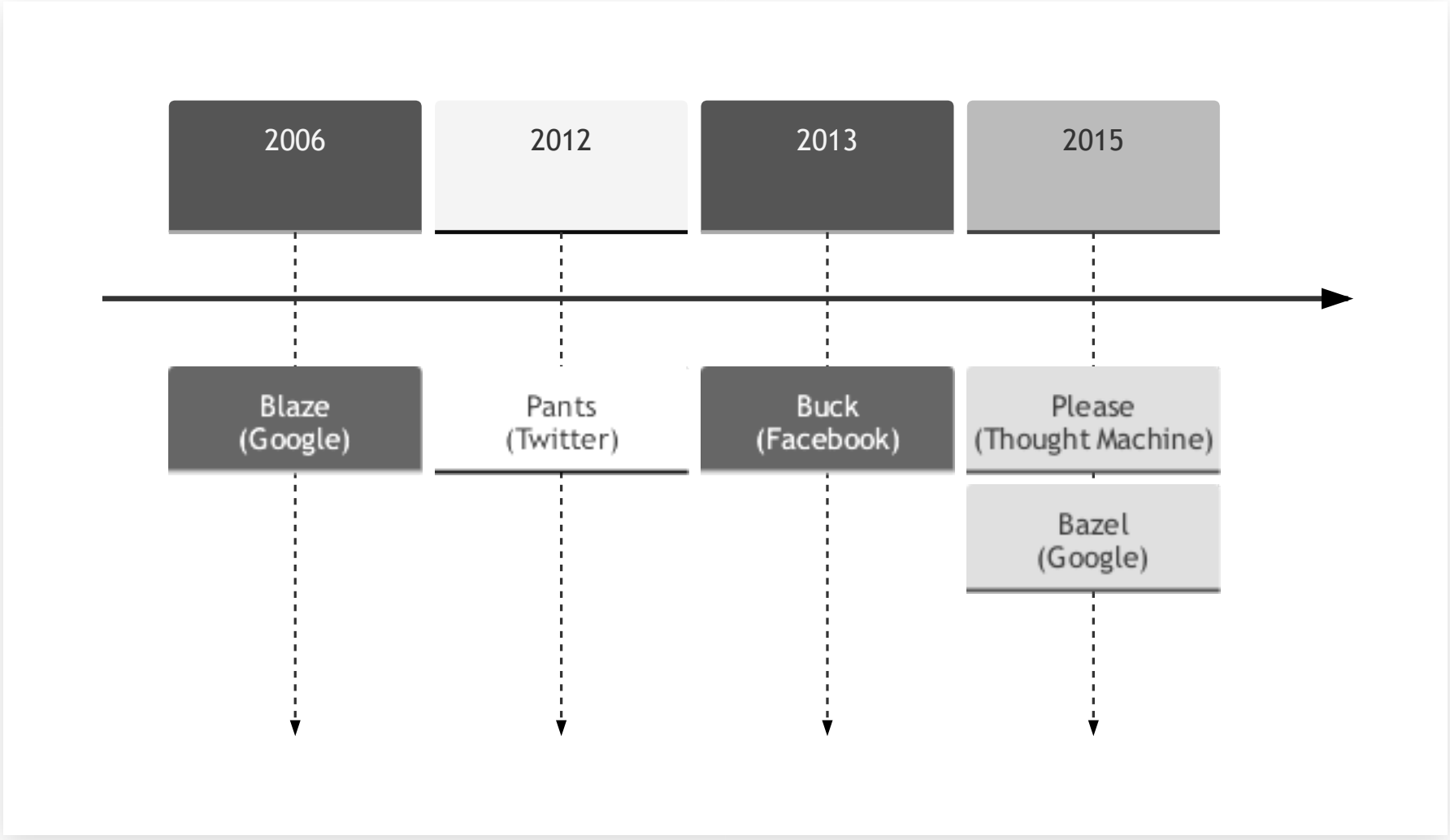
## SCALABILITY

- code size
- team size
- complexity

## SCALABLE BUILD SYSTEMS

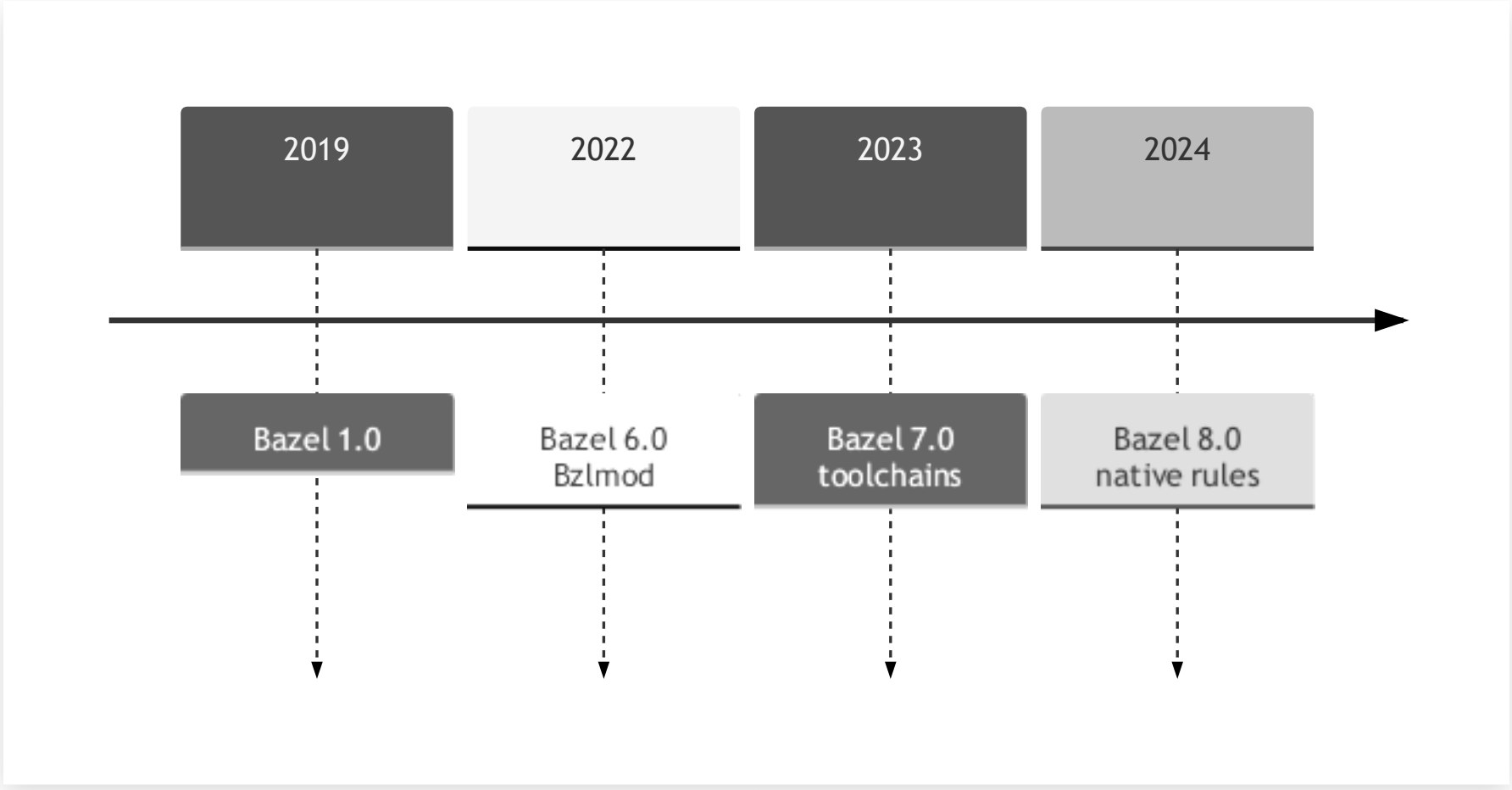
- incremental
- distributed
- extensible
- fast feedback

## HISTORY



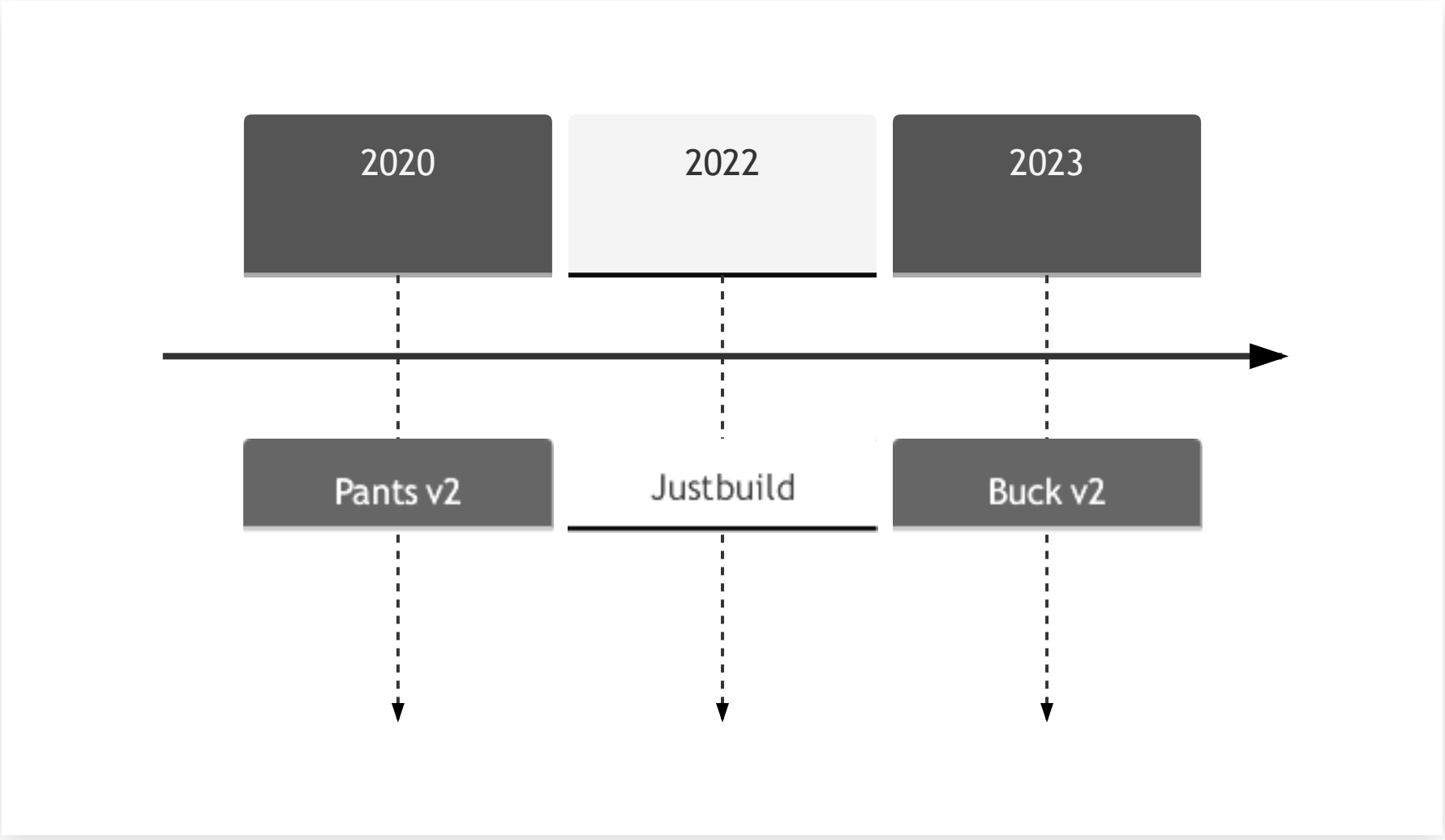

[Pearce 2013; Twitter 2016; Montgomery 2020; Vermeulen 2023; Nienhuys 2024]

## BAZEL EVOLUTION




[Lomov 2019; Yang 2023; Yang and Kumar 2023; Bazel Team 2025]

## NEXT GENERATION




[Weinberger 2020; Aehlig and Reiche 2022; Hopman and Mitchell 2023]

# FEATURES

## EXTENSIBLE

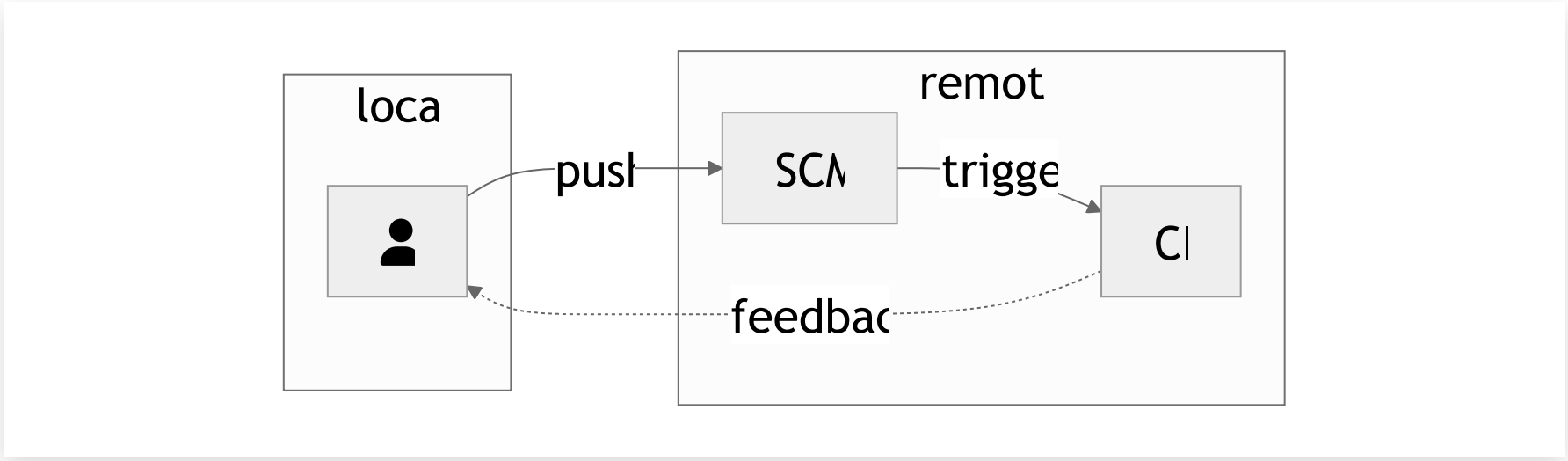
```
cc_library(name = "native_lib", ...)
genrule(name = ..., outs = ["bindings.py"], ...)
py_library(
    name = "py_lib",
    srcs = [":bindings.py"],
    deps = [":native_lib"],
)
py_test(
    name = "test",
    srcs = ["main.py"],
    deps = [":py_lib"],
    data = ["golden.out"],
)
```

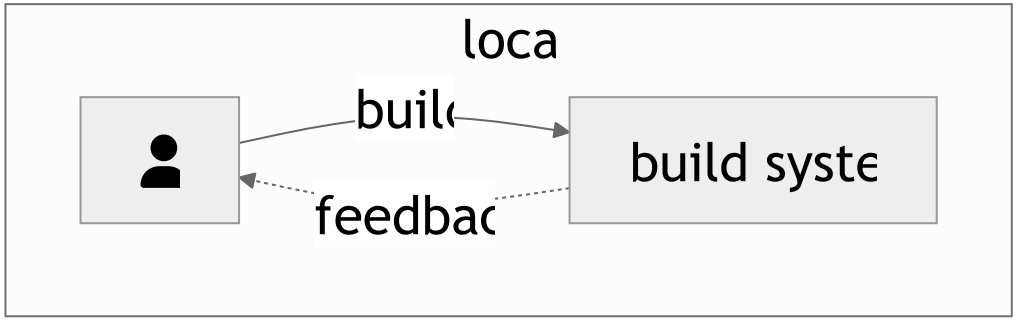
## DISTRIBUTED

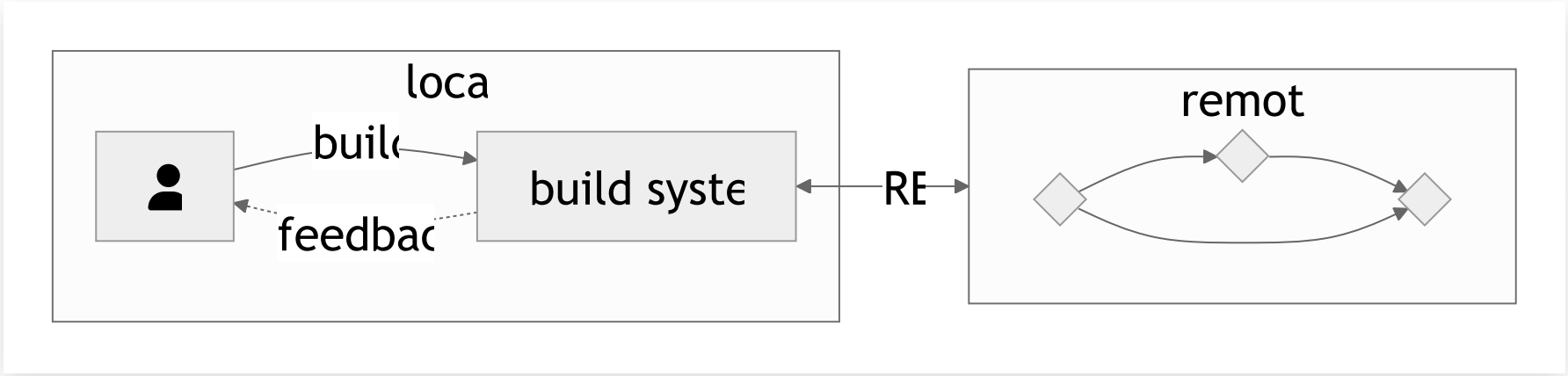
- distributed build
- shared cache
- common API
- cross platform

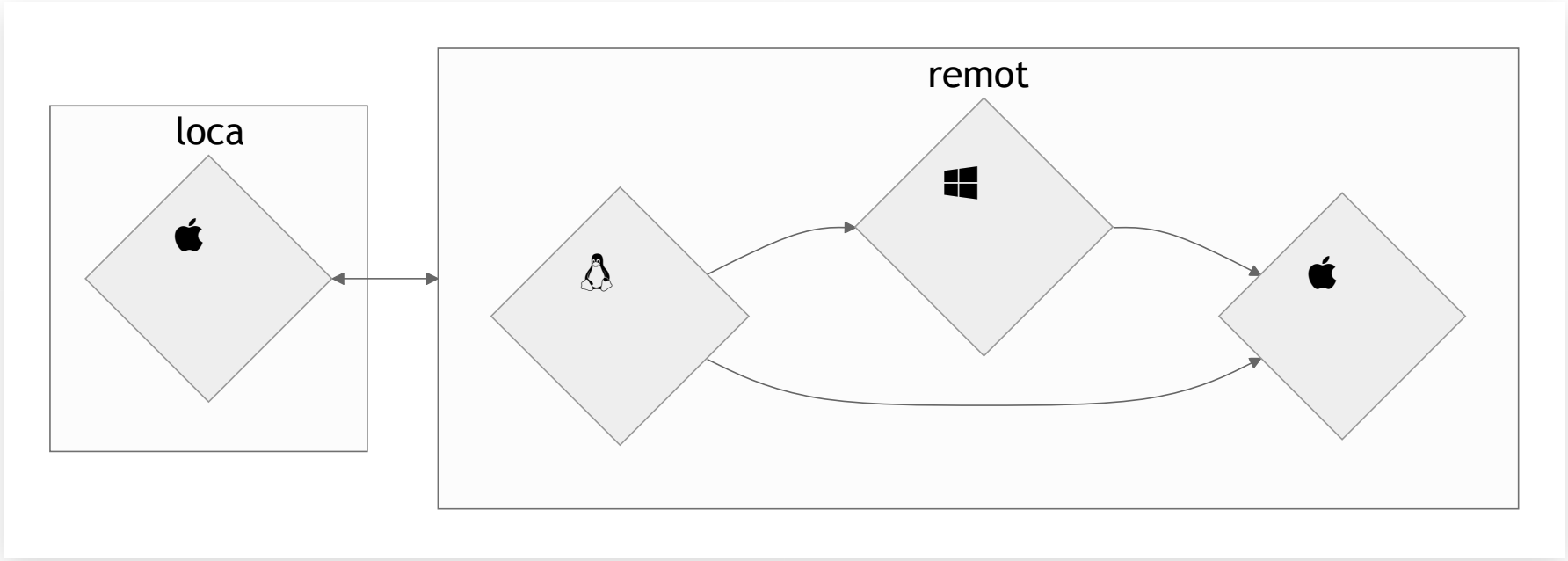
# CI PIPELINES

[Eagle 2023]


loca
remot
push
SCM
trigge
CI
feedbac


loca
build
build syste
feedbac


loca
buil
feedbac
build syste
RE
remot


loca
remot

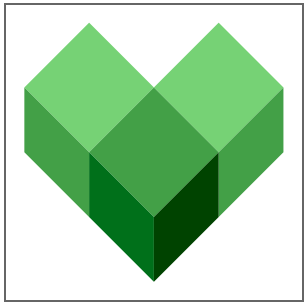
## CORRECT

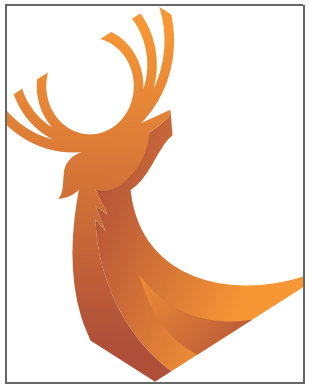
- { Fast, Correct } — Choose two
- Correct → Fast
- Hermetic
- Explicit

## MONOREPO

- external dependencies
- unified & consistent
- continuous integration

# CHOICE





## MIGRATION

- assess & plan
- incremental
- measure
- communicate
- help is available

## REFERENCES


- Aehlig, K. and Reiche, O. 2022. Justbuild. **https://github.com/just-buildsystem/justbuild/releases/tag/v1.0.0**.
- Bazel Team. 2025. Bazel roadmap. Bazel. **https://bazel.build/about/roadmap**.
- Eagle, A. 2023. What is a build system and what is CI? Aspect Development. **https://www.aspect.dev/blog/what-is-a-build-system-and-what-is-ci**.
- Hopman, C. and Mitchell, N. 2023. Build faster with Buck2: Our open source build system. Engineering at Meta. **https://engineering.fb.com/2023/04/06/open-source/buck2-open-source-large-scale-build-system/**.
- Lomov, D. 2019. Bazel Reaches 1.0 Milestone. Bazel Blog. **https://blog.bazel.build/2019/10/17/bazel-reaches-10-milestone.html**.
- Montgomery, W. 2020. When we created Please we were currently using Buck from Facebook. Hackernews. **https://news.ycombinator.com/item?id=25238453#25246684**.
- Nienhuys, H.-W. 2024. Birth of the Bazel. EngFlow Blog. **https://blog.engflow.com/2024/10/01/birth-of-the-bazel/**.
- Pearce, J. 2013. 2013: A Year of Open Source at Facebook. Engineering at Meta.

https://engineering.fb.com/2013/12/20/web/2013-a-year-of-open-source-at-facebook/.

- Twitter. 2016. The release of Pants 1.0. X Engineering. https://blog.x.com/engineering/en_us/a/2016/the-release-of-pants-10.
- Vermeulen, S. 2023. From Blaze to Buck2 — A Brief History of Modern Monorepo Build Systems. Better Programming. https://medium.com/better-programming/from-blaze-to-buck2-a-brief-history-of-modern-monorepo-build-systems-563becbcb987.
- Weinberger, B. 2020. Introducing Pants v2. Pantsbuild. https://www.pantsbuild.org/blog/2020/10/27/introducing-pants-v2.
- Yang, X. 2023. What's new with Bzlmod? Bazel blog. https://blog.bazel.build/2023/07/24/whats-new-with-bzlmod.html.
- Yang, X. and Kumar, K. 2023. Bazel 7.0 LTS. Bazel Blog. https://blog.bazel.build/2023/12/11/bazel-7-release.html.

# THANK YOU

aherrmann.github.io/2025-06-04-siemens

Speaker notes