Intro to Telepresence:

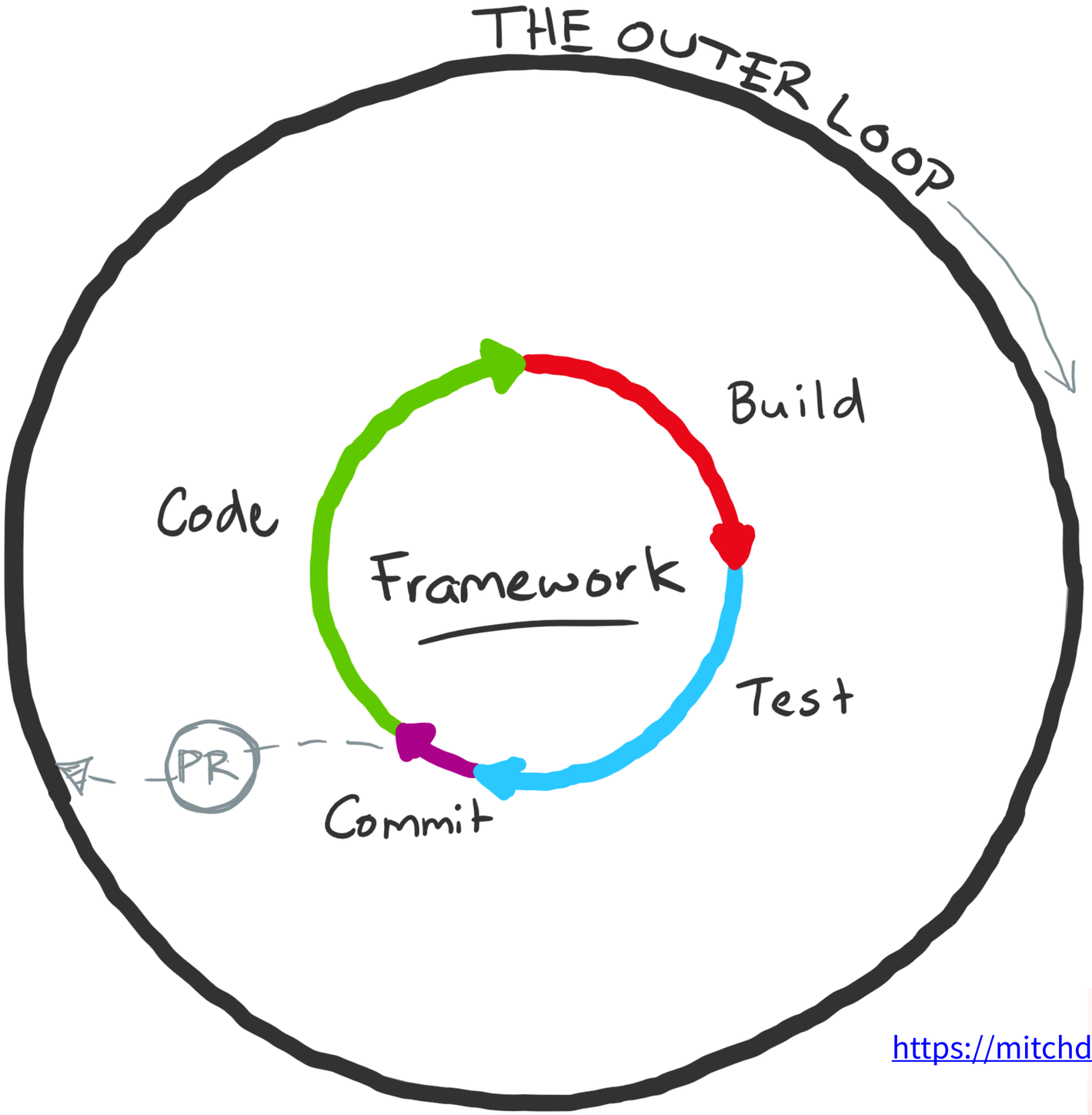
Fast Development Workflows for Kubernetes

tl;dr

- → The inner development loop can be painful with microservices + Kubernetes
- → Telepresence proxies your dev machine into the cluster
- → Telepresence supports several workflows, from small to large systems
- → Ongoing work for splitting client and cluster components
- → Please support this CNCF project — get involved!

Setting the Scene

DATAWIRE



https://mitchdenny.com/the-inner-loop/

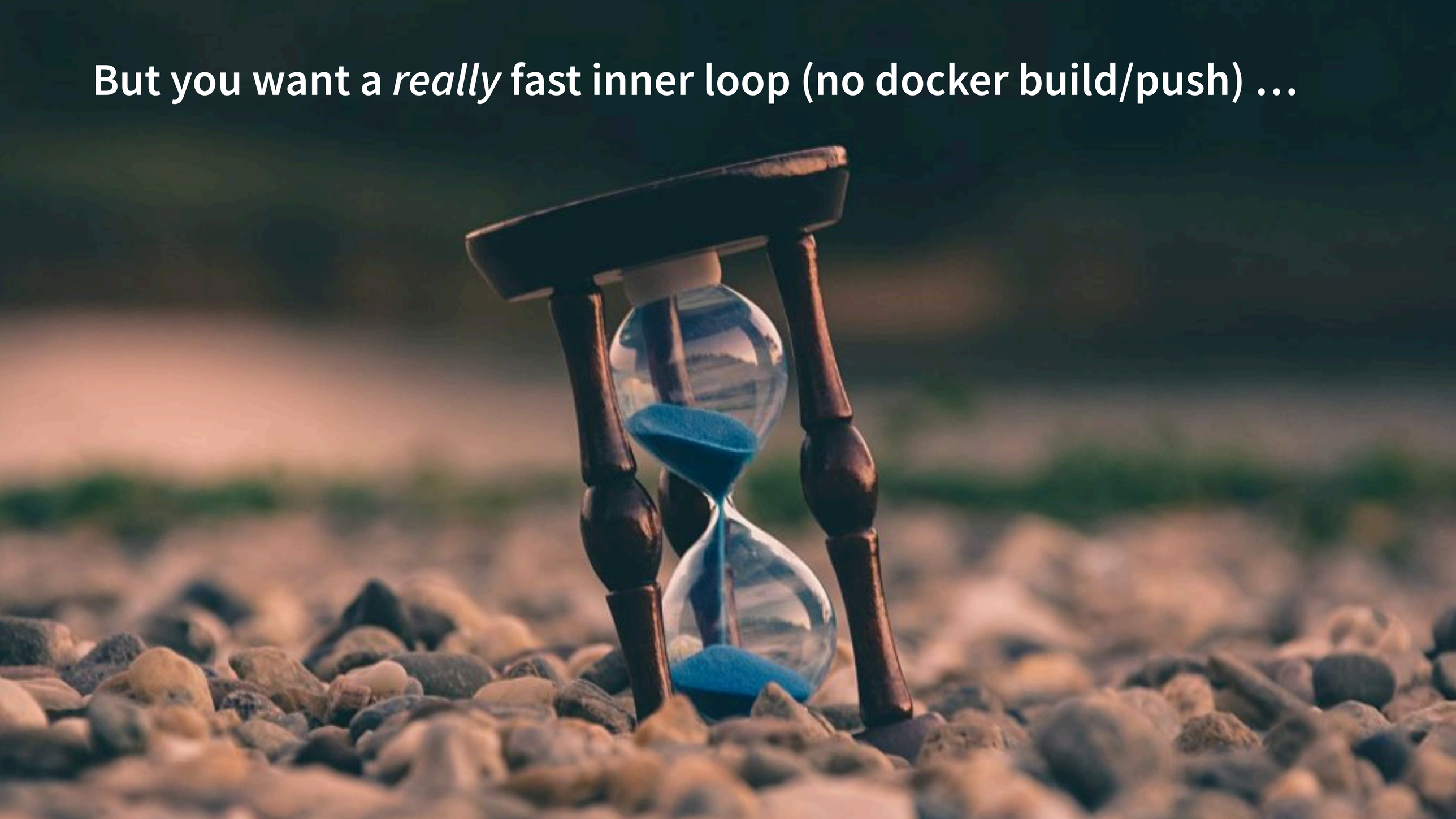
The Kubernetes inner & outer loop can be the same…

- → Write code
- → Build container
- → Push to registry
- → Deploy to cluster
- → Test

And can be …. SLOW.

Automation helps speed it up …

But you want a *really* fast inner loop (no docker build/push) …

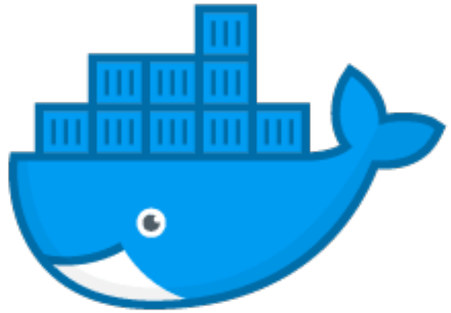


And you want to use your own tools.

Let’s do everything locally…

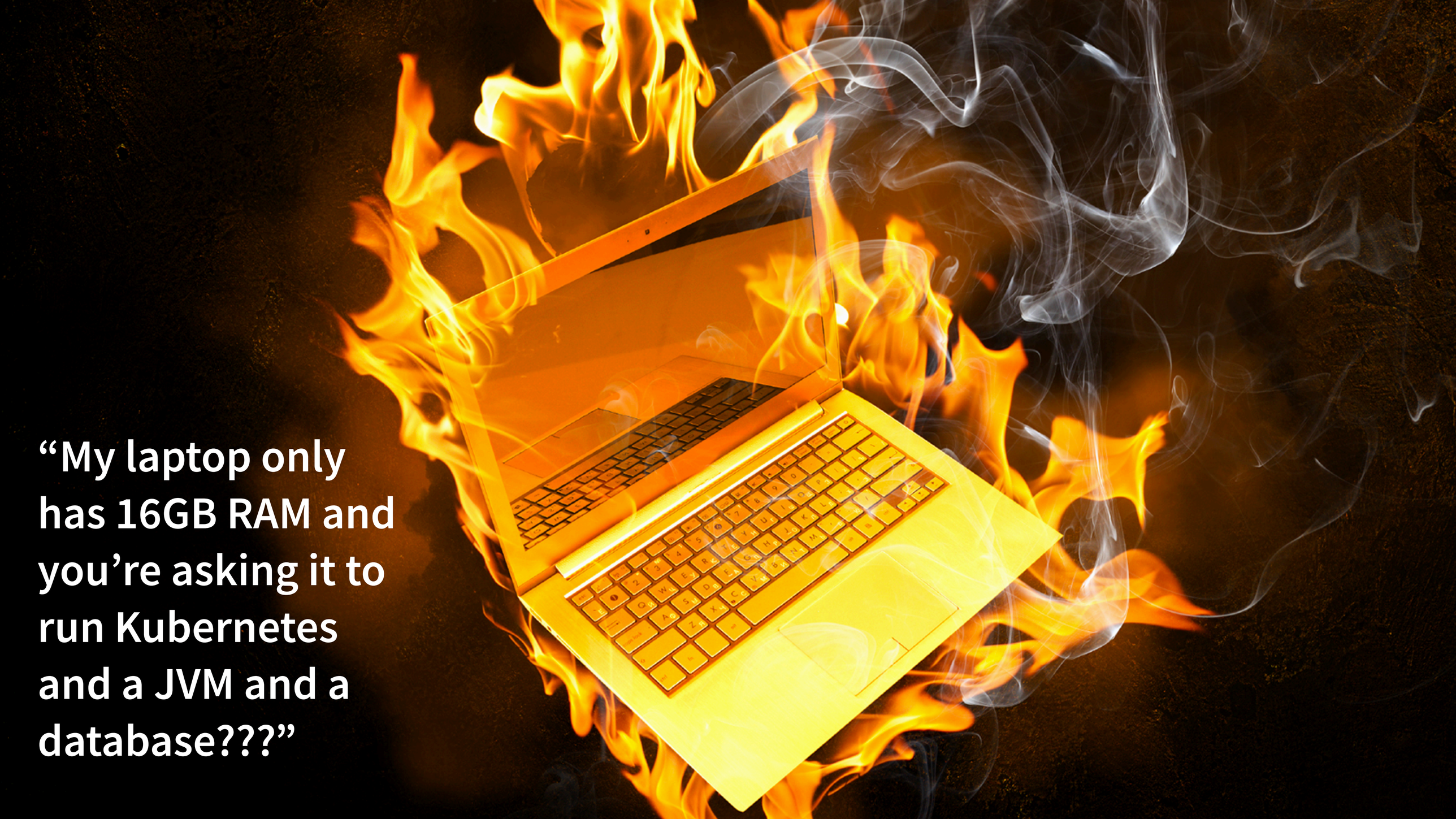
…so it’s really fast and I can use my tools!

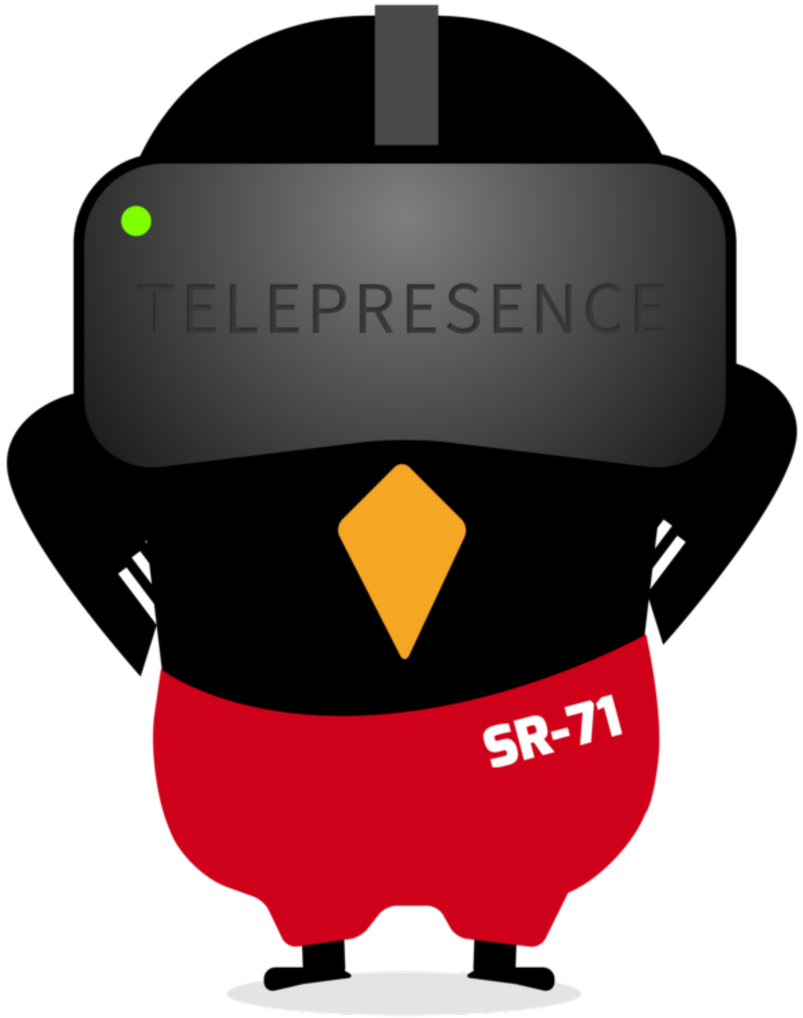
minikube



docker

MicroK8s


“My laptop only has 16GB RAM and you’re asking it to run Kubernetes and a JVM and a database???”


TELEPRESENCE
SR-71

TELEPRESENCE

What is Telepresence?

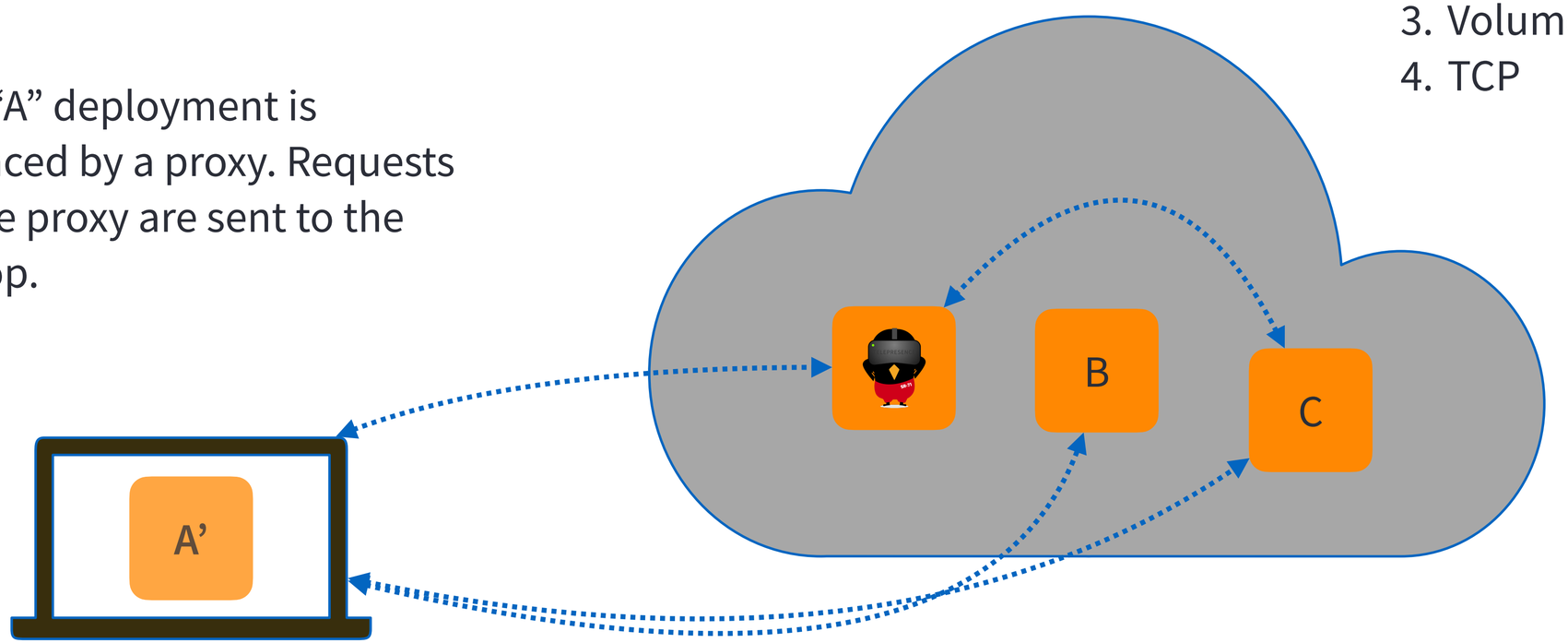
- “Fancy Kubernetes VPN for development”
- “kubectl port-forward on steroids”
- A network bridge between your laptop and the Kubernetes cluster

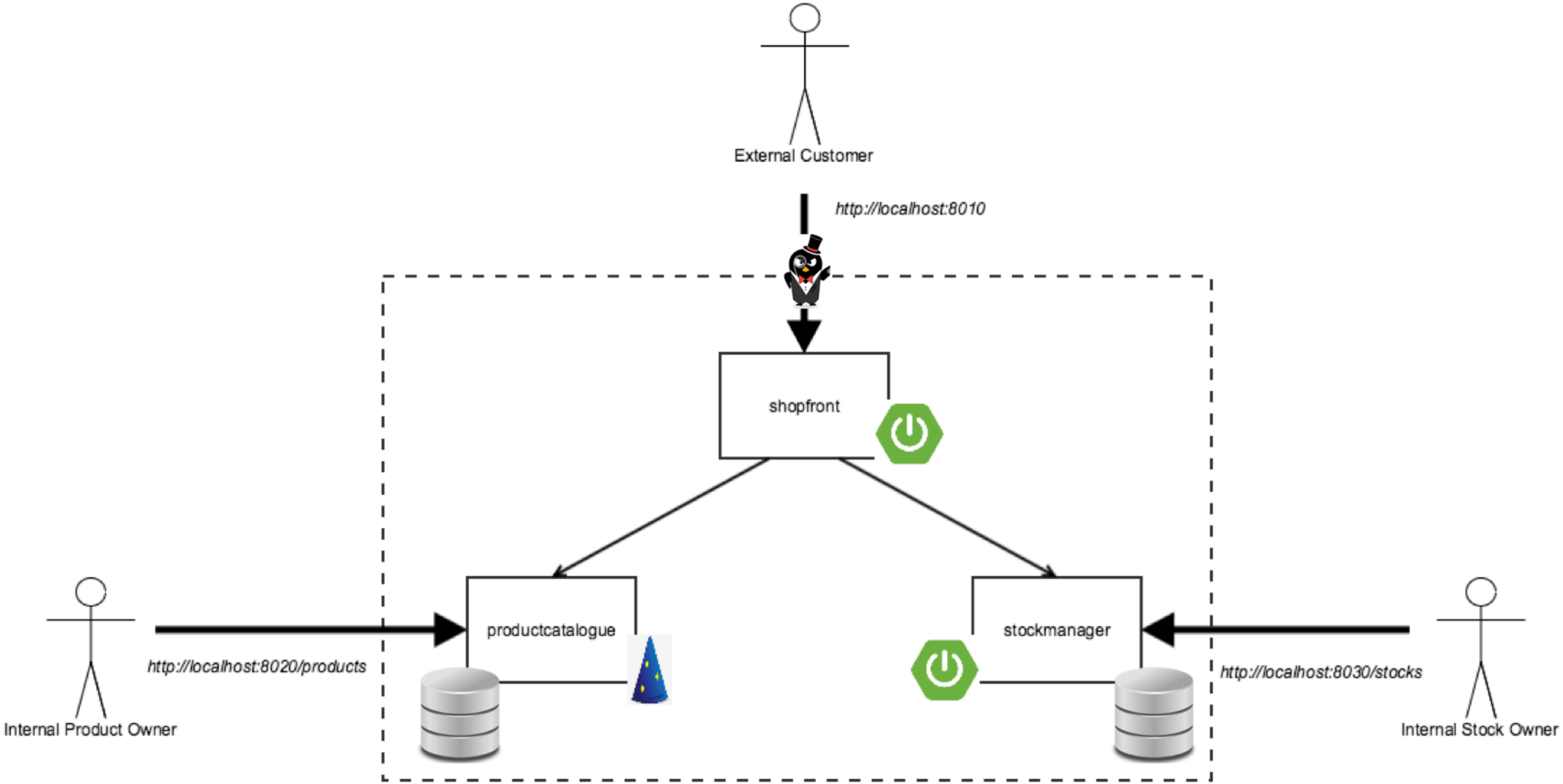
How it works

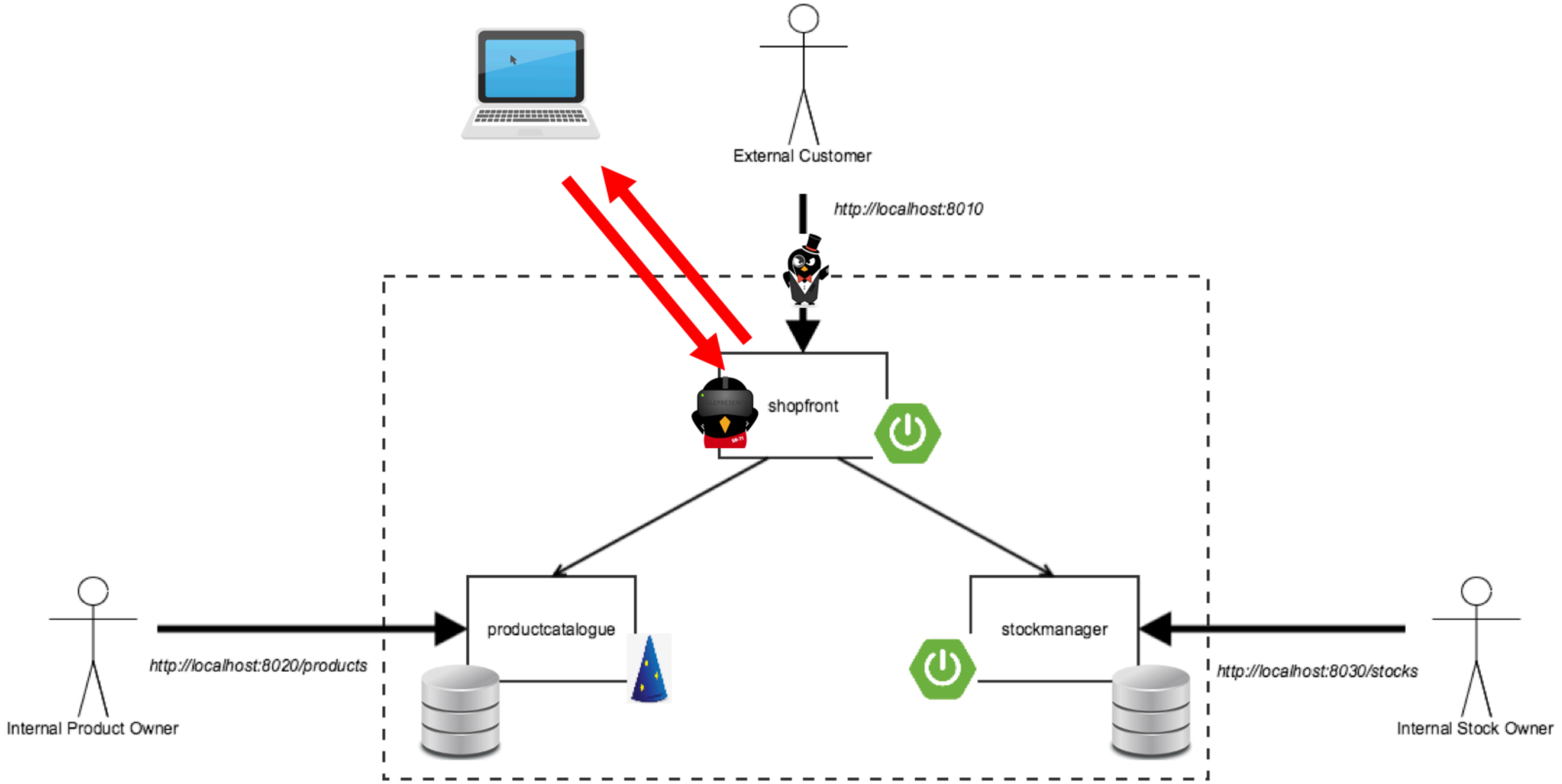
Telepresence:

1. Intercepts DNS
2. Environment variables & secrets
3. Volumes
4. TCP

The “A” deployment is replaced by a proxy. Requests to the proxy are sent to the laptop.




External Customer
http://localhost:8010
shopfront
productcatalogue
stockmanager
http://localhost:8020/products
http://localhost:8030/stocks
Internal Product Owner
Internal Stock Owner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DEMO

Benefits

- → Use any tool that runs on your laptop: IDE, profiler, debugger, …
- → Connect to cloud-based resources
- → Same network namespace (e.g., nslookup works)
- → Very fast inner loop!
- → Requirements
  - Network connection
  - kubectl access to cluster
  - Mac or Linux

Telepresence is a CNCF project, with a wide variety of users.


Hacker News new | threads | past | comments | ask | show | jobs | submit
TELEPRESENCE
Why's that c y so big? I could do that in a weekend (danluu.com)
712 points on Oct 3, 2016 | hide | past | web | favorite | 423 comments | add to buffer

- Capturing DNS and routing only part of it to the cluster is tricky
- No two laptops are alike
- Swapping out your (real) deployment for a (proxy) deployment is tricky

USING THIS IN YOUR WORKFLOW

Simple Workflow (YOLO)

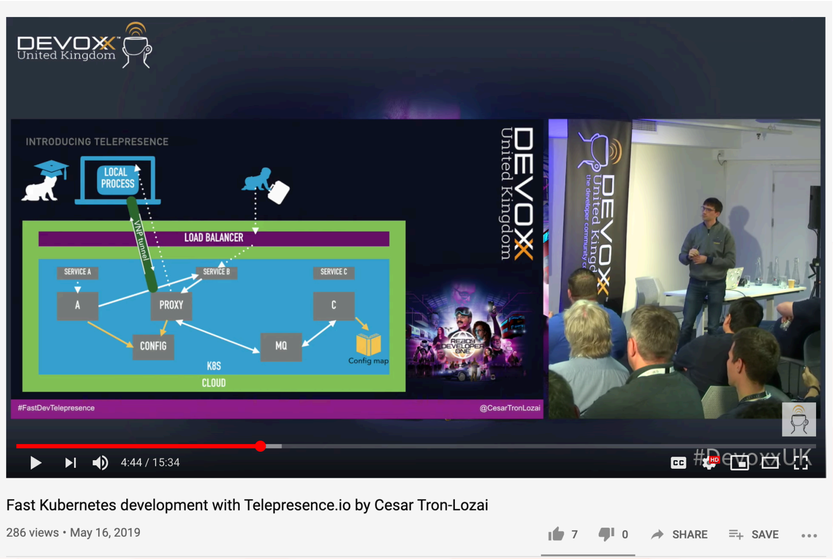
- One (production) cluster for single-source-of-truth microservices
- Developer checks out code and works on microservices
- Swapping services on demand using Telepresence + IDE
- Telepresence is used in default (vpn-tcp) mode
- Once code is done, microservices are built and deployed via pipeline

https://www.youtube.com/watch?v=75soljoqhjY


joyreactor.com

Typical Workflow (SME)

- One (dev) cluster for single-source-of-truth microservices
- Developers check out one of the microservices (and coordinate with other devs)
- Developers Telepresence + IDE
- Telepresence is used in default (vpn-tcp) mode
- Once code is done, CircleCI is used to run tests, build, and deploy

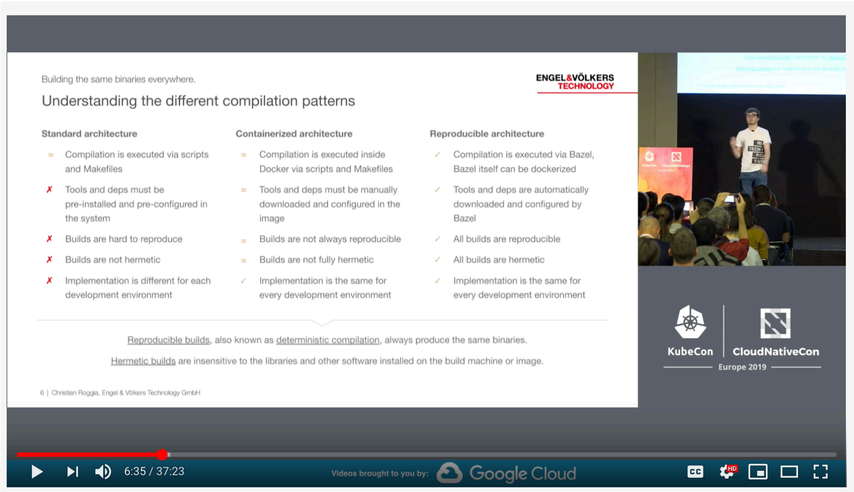


https://www.youtube.com/watch?v=75soljoqhjY

Advanced Workflow

ENGEL & VÖLKERS®

- One cluster with multiple namespaces for all single-source-of-truth microservices
- Developers check out one of the microservices
- Developers use Bazel + Telepresence + IDE
- Telepresence is used in container mode with Bazel images
- Once code is done, Jenkins is used to run tests, build, and deploy



https://www.youtube.com/watch?v=tD0FIlxO1AQ

Reproducible Development and Deployment with Bazel and Telepresence - Christian Roggia

987 views • May 22, 2019

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WHAT'S NEXT?

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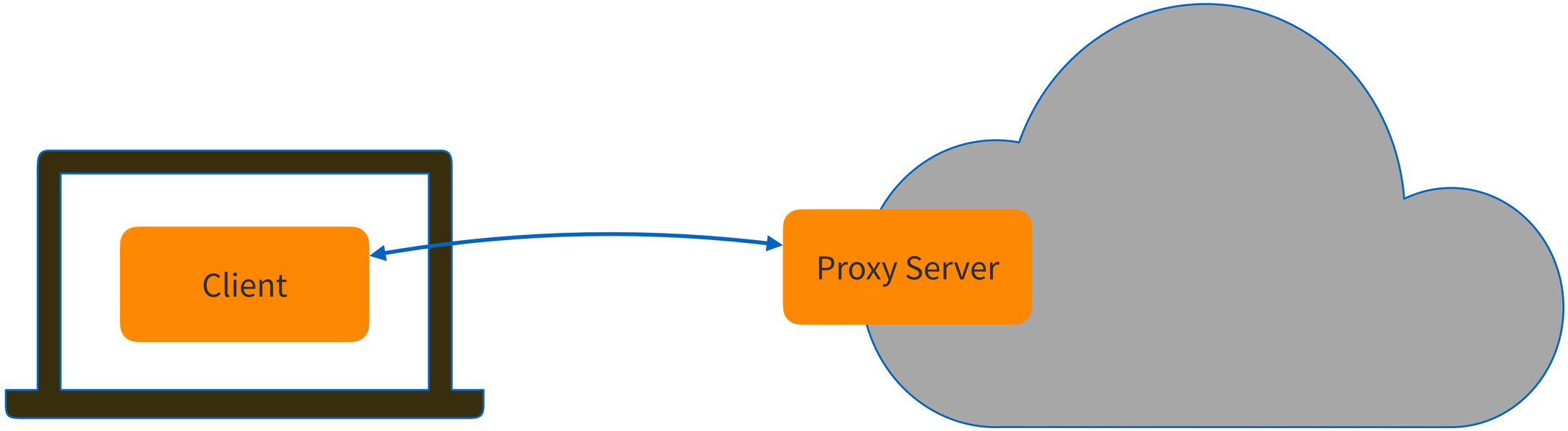
Telepresence components



- Capture DNS requests for Kubernetes resources
- DNS resolution for Kubernetes resources
- Proxy TCP connections to cluster
- Proxy TCP connections to laptop
- Canonical DNS for Kubernetes resources

Telepresence Client

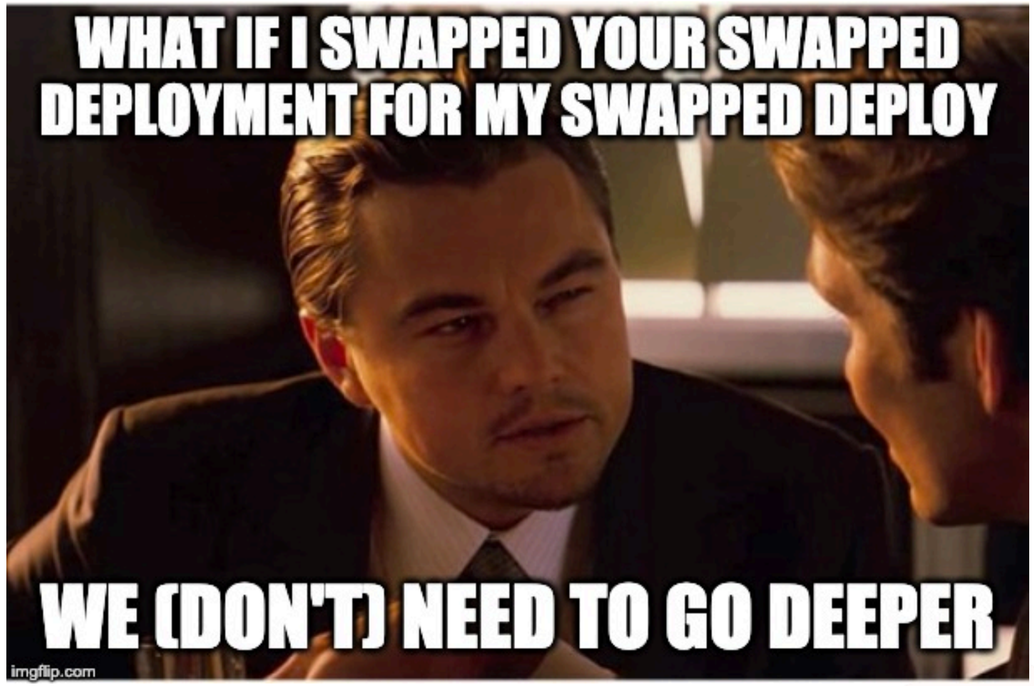
- Use kubectl port-forward to bootstrap sshuttle (ssh-based VPN)
- sshuttle has a lot of functionality that is not used by Telepresence (it's a VPN, after all)
- Replace sshuttle with something else — designed for Kubernetes
  - Capture DNS locally
  - Do DNS resolution intelligently
  - Redirect TCP connections to the right destination
- Already in progress, will replace VPN-TCP method
- Also support multiple simultaneous swaps

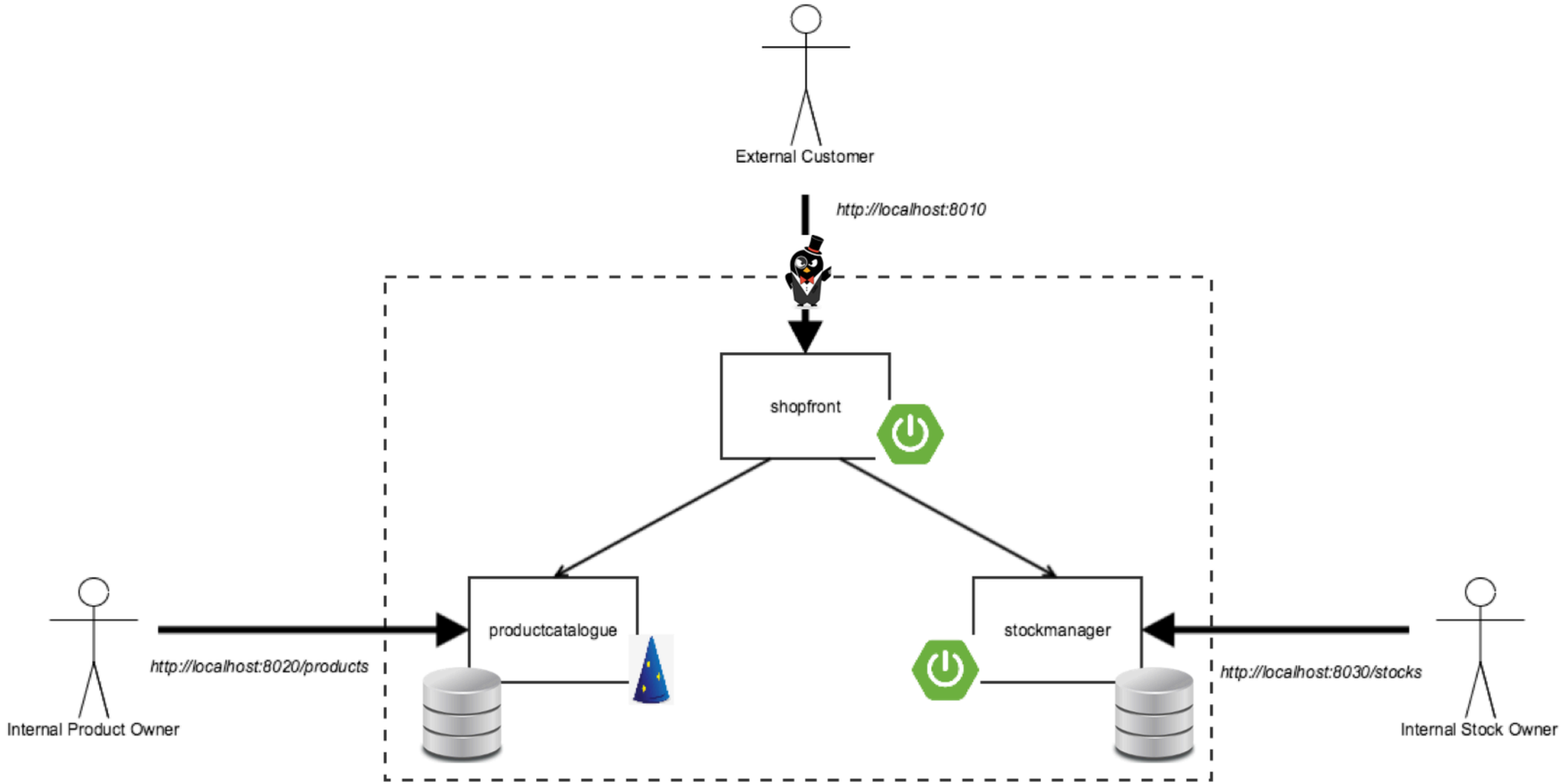
Telepresence Proxy Server

- → Currently deployed every time you do a swap-deployment (and then deleted)
- → Switch mode to be persistent (this is what Kubernetes is good for)
  - Speeds up startup
  - Support reconnect

Multi-User Development

- Swap deployment doesn’t work well for multi-user development
- Solution today is to use namespaces and/or individual clusters
  - Expensive (more hardware & setup)
  - Delays integration testing until after commit

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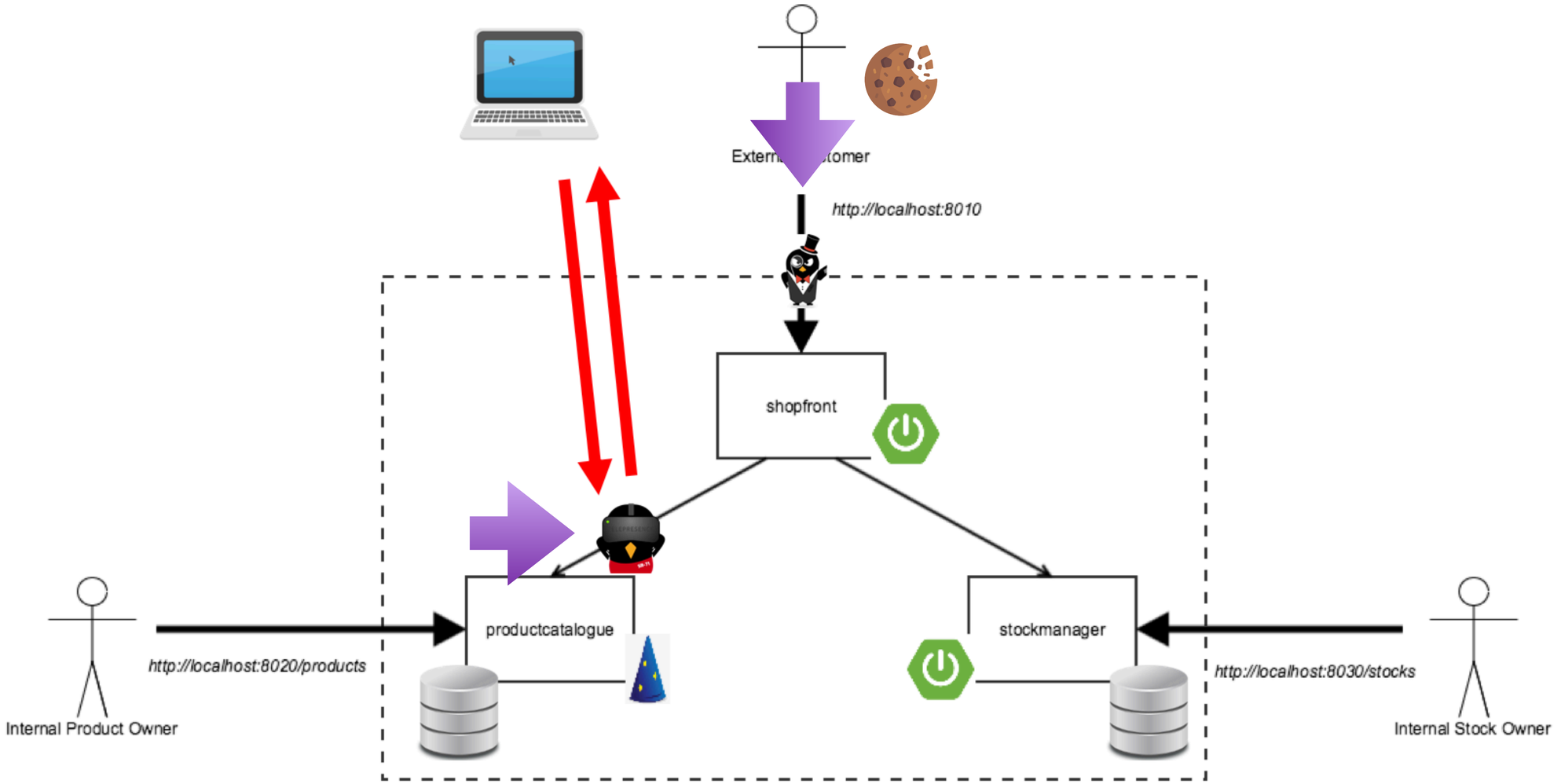
Service Preview



Wrapping Up

DATAWIRE

Contributing to Telepresence

- **Documentation and workflows**
  - *how* you integrate Telepresence into your development workflow
- Let us know if you're a user!
- Triage
  - Lots of folks use GitHub for support, which doesn't scale well
- Join Slack to help other users **https://d6e.co/slack** #telepresence

Thank you! Questions?

- db@datawire / @danielbryantuk
- www.telepresence.io
- https://github.com/telepresenceio
- Check out the Ambassador Edge Stack (with service preview)
  - https://www.getambassador.io/