

How we build and maintain Kairos

A day in the life of a meta distribution

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Open-Source Developer

FOSDEM 23



About me



Mauro Morales



Originally from Guatemala, now living in Belgium



My first distro was MEPIS and my daily driver is openSUSE
Tumbleweed



Ruby & Go developer



github: <https://github.com/mauromorales>

twitter: [@mauomrls](https://twitter.com/mauomrls)

web: <https://mauromorales.com>



What is Kairos?

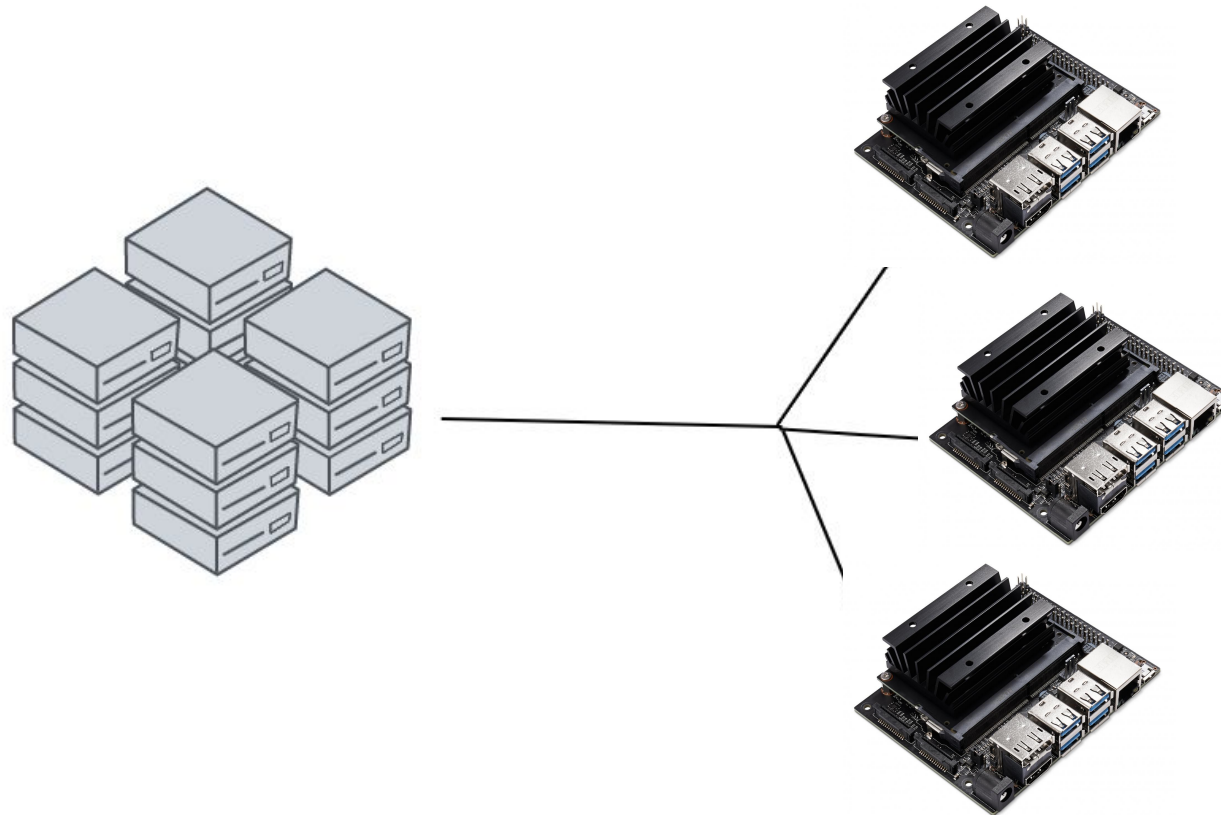


What is Kairos?



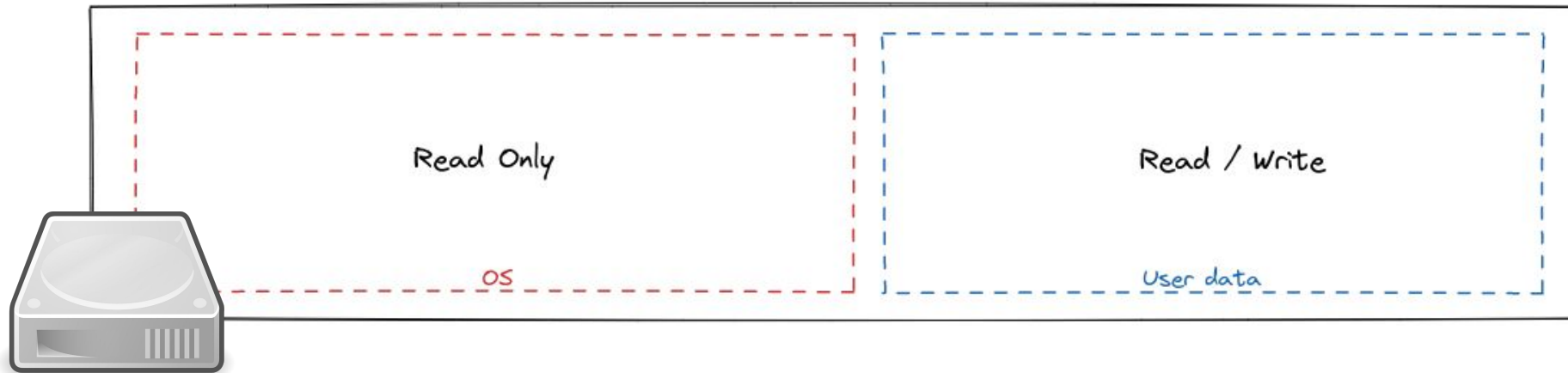
The immutable Linux meta-distribution for edge Kubernetes

What is Edge Computing?



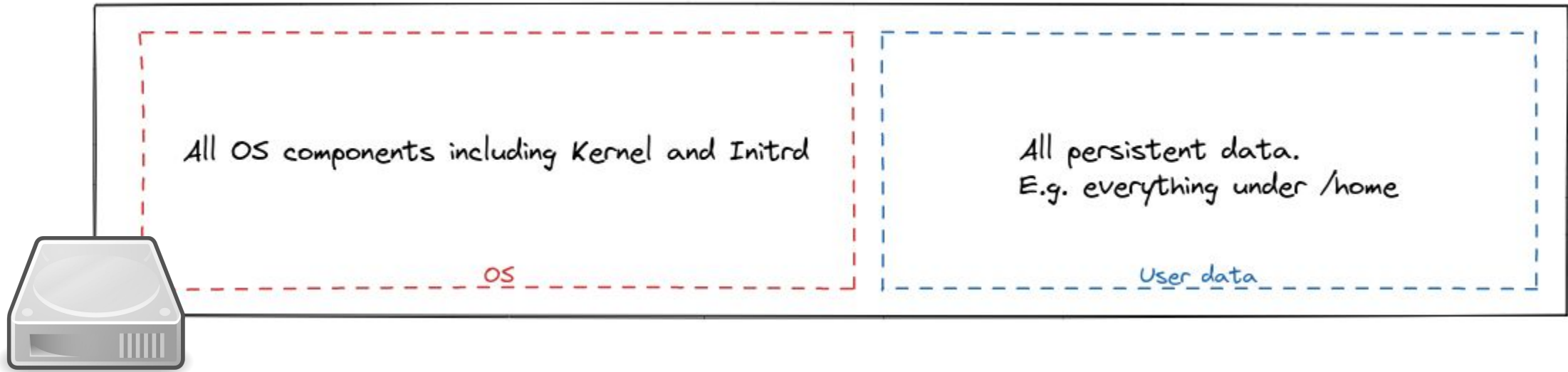


Kairos is Immutable





Kairos is Immutable



Kairos is Distribution Agnostic

Know-how

Licensing

Golden Images



Kairos is easy to configure & maintain

```
#cloud-config

# Define the user accounts on the node.
users:
- name: "kairos"                # The username for the user.
  passwd: "kairos"              # The password for the user.
  ssh_authorized_keys:
  - github:mudler               # A key from the user's GitHub account.
  - "ssh-rsa AAA..."          # A raw SSH key.

# Enable K3s on the node.
k3s:
  enabled: true                  # Set to true to enable K3s.
```

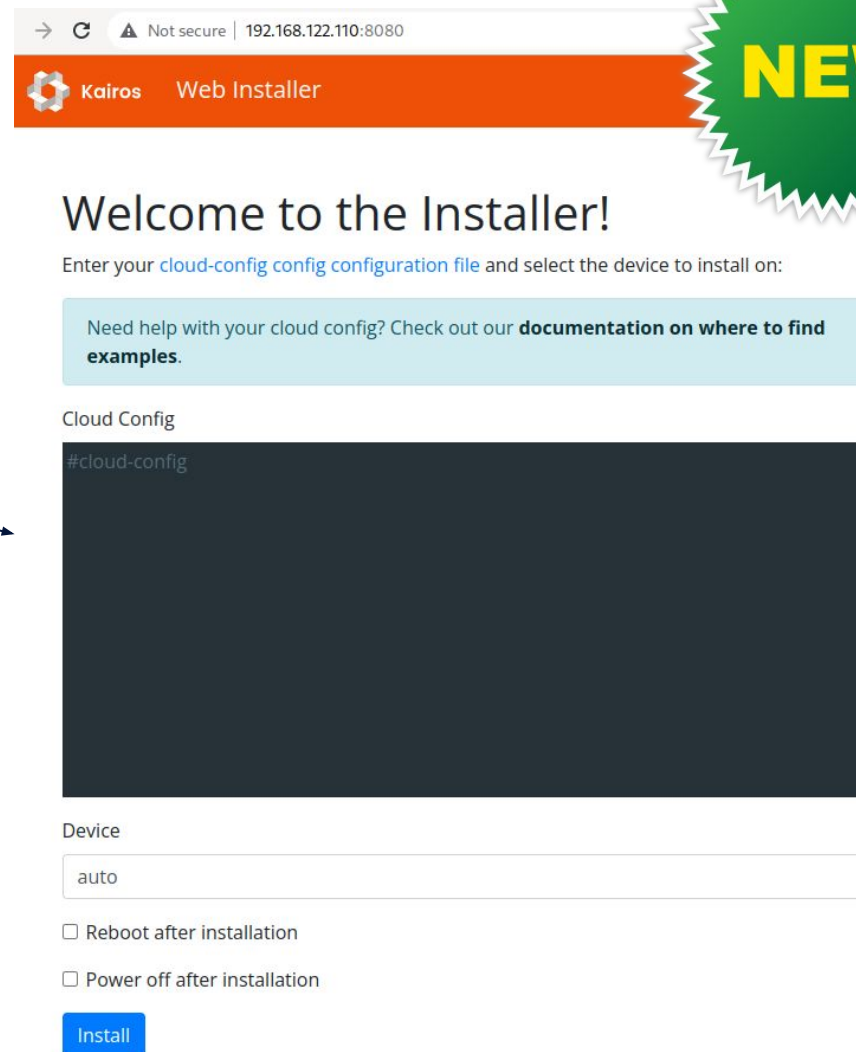
Kairos is easy to configure & maintain




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# Enable K3s on the node.
k3s:
  enabled: true
```



→ ↻ ⚠ Not secure | 192.168.122.110:8080

 Kairos Web Installer

Welcome to the Installer!

Enter your [cloud-config config configuration file](#) and select the device to install on:

Need help with your cloud config? Check out our [documentation on where to find examples](#).

Cloud Config

```
#cloud-config
```

Device

auto

☐ Reboot after installation

☐ Power off after installation

[Install](#)

♥ Kairos is easy to configure & maintain

```
#cloud-config

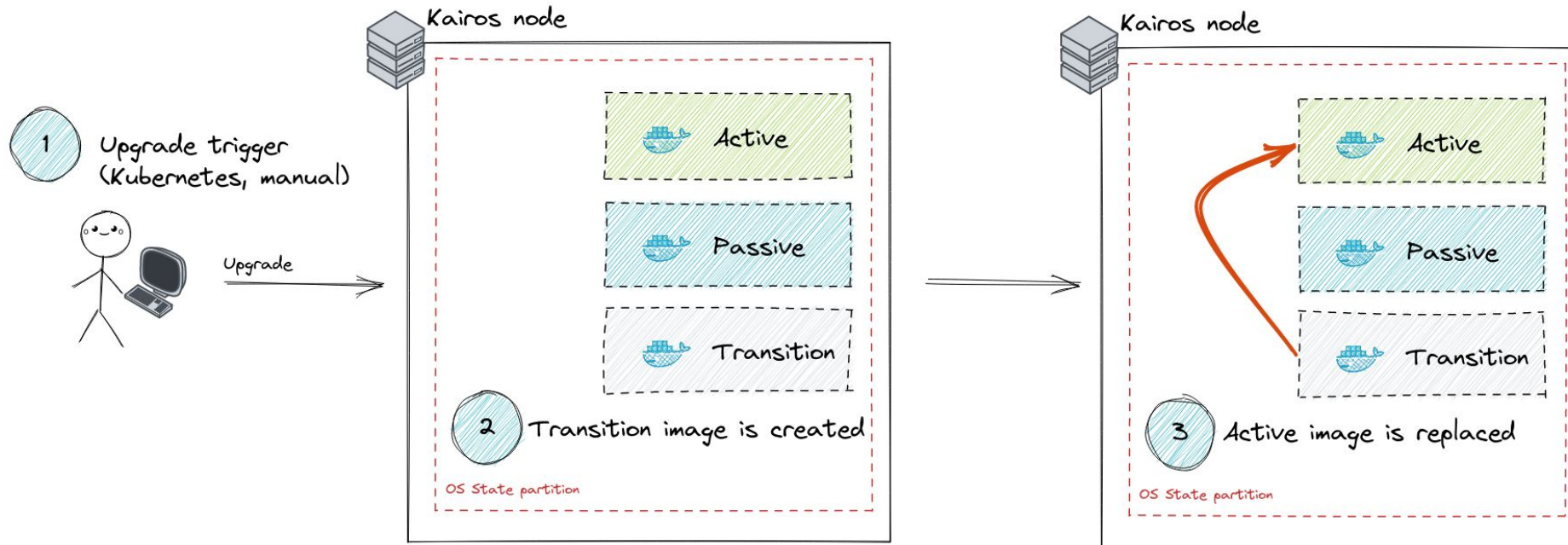
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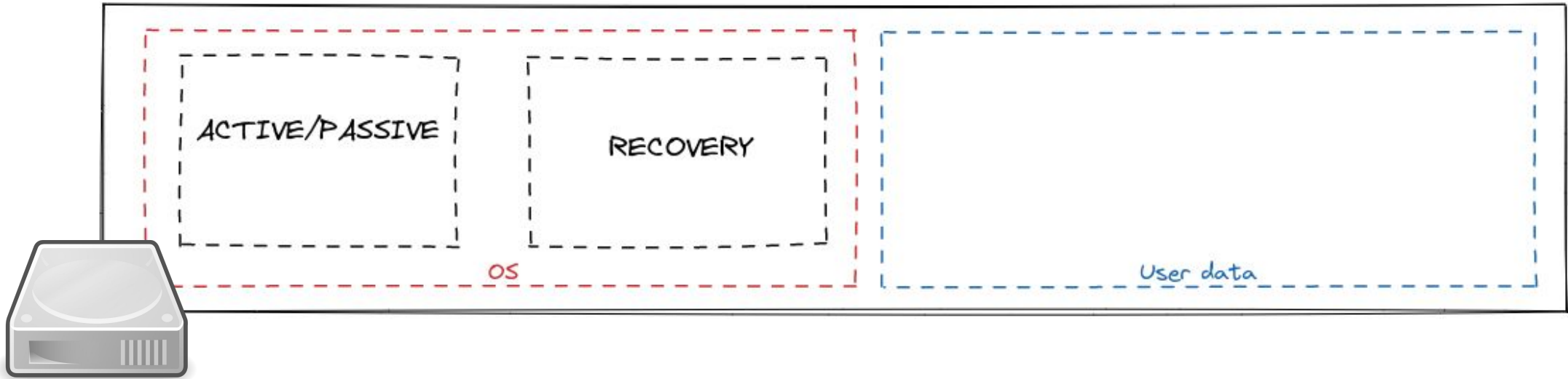
```
$ kairos register --reboot \
  --device /dev/sda \
  --config config.yaml \
  /path/to/qr.jpg
```



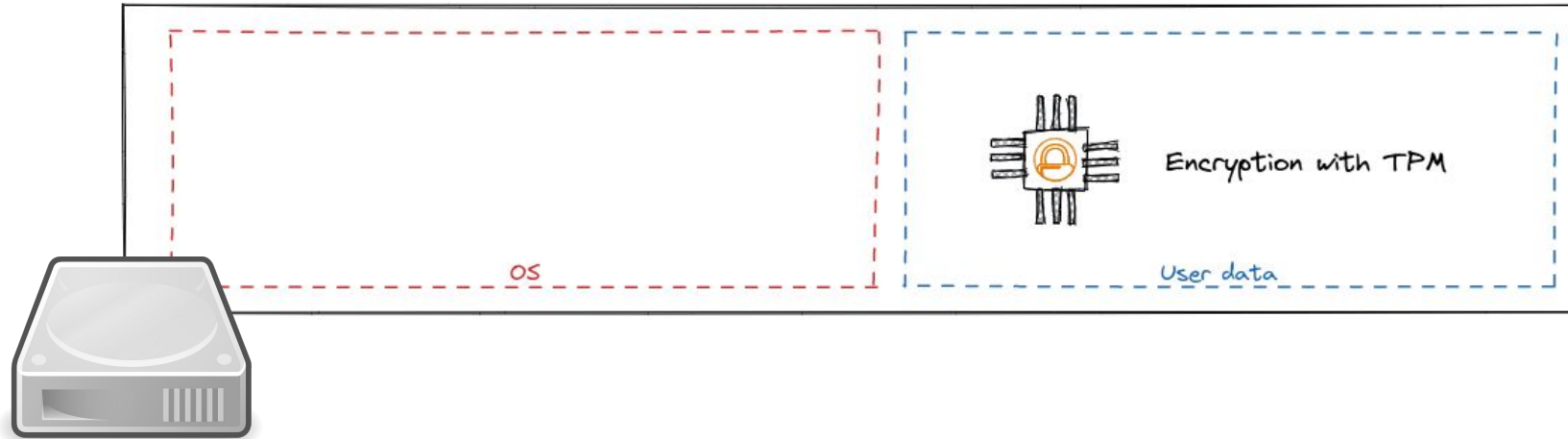
▲ Kairos performs A/B Upgrades



▲ Kairos performs A/B Upgrades



Kairos uses TPM Encryption



Kairos is great for Edge Computing!



Immutable



Distribution Agnostic



A/B Upgrades



TPM Encryption



P2P Network



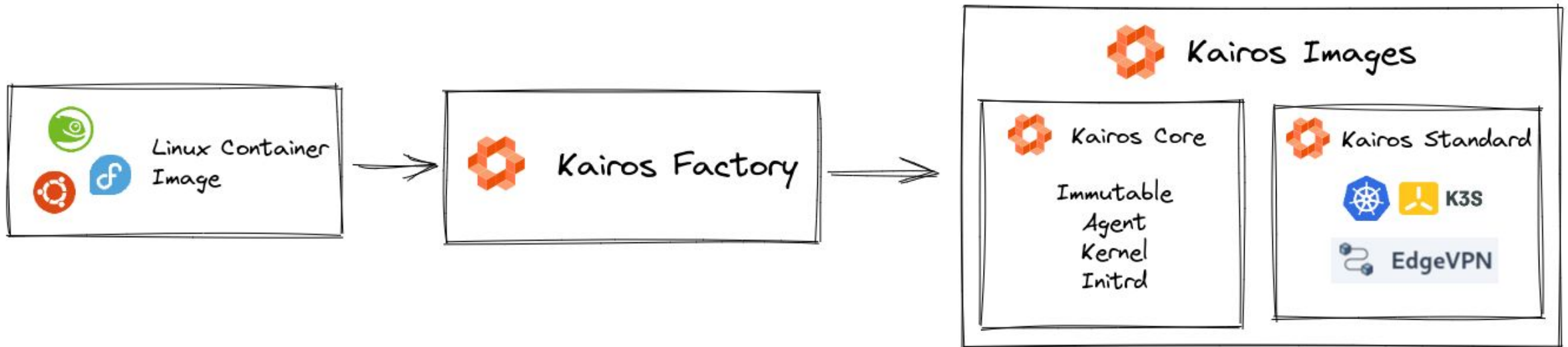
Easy to configure & maintain

The Kairos Factory





Build process overview





Releases

https://kairos.io/docs/reference/image_matrix/

<https://github.com/kairos-io/kairos/releases>

-  [kairos-opensuse-v1.4.0-initrd](#)
-  [kairos-opensuse-v1.4.0-ipxe-usb.img.ipxe](#)
-  [kairos-opensuse-v1.4.0-ipxe.iso.ipxe](#)
-  [kairos-opensuse-v1.4.0-kernel](#)
-  [kairos-opensuse-v1.4.0-ipxe](#)
-  [kairos-opensuse-v1.4.0.iso](#)
-  [kairos-opensuse-v1.4.0.iso.sha256](#)
-  [kairos-opensuse-v1.4.0.squashfs](#)

Flavor/Variant	Core (no k3s)	Standard(k3s)
openSUSE Leap based	https://quay.io/repository/kairos/core-opensuse-leap	https://quay.io/repository/kairos/kairos-opensuse-leap
openSUSE Tumbleweed based	https://quay.io/repository/kairos/core-tumbleweed-leap	https://quay.io/repository/kairos/kairos-opensuse-tumbleweed
Fedora based	https://quay.io/repository/kairos/core-fedora	https://quay.io/repository/kairos/kairos-fedora
Debian based	https://quay.io/repository/kairos/core-debian	https://quay.io/repository/kairos/kairos-debian
Ubuntu based (rolling) **	https://quay.io/repository/kairos/core-ubuntu	https://quay.io/repository/kairos/kairos-ubuntu
Ubuntu based (22 LTS) **	https://quay.io/repository/kairos/core-ubuntu-22-lts	https://quay.io/repository/kairos/kairos-ubuntu-22-lts
Ubuntu based (20 LTS) **	https://quay.io/repository/kairos/core-ubuntu-20-lts	https://quay.io/repository/kairos/kairos-ubuntu-20-lts
Alpine Linux based (openSUSE kernel)	https://quay.io/repository/kairos/core-alpine-opensuse-leap	https://quay.io/repository/kairos/kairos-alpine-opensuse-leap
Alpine Linux based (Ubuntu kernel)	https://quay.io/repository/kairos/core-alpine-ubuntu	https://quay.io/repository/kairos/kairos-alpine-ubuntu
openSUSE Leap based (RaspberryPi 3 and 4, arm64)	https://quay.io/repository/kairos/core-opensuse-leap-arm-rpi	https://quay.io/repository/kairos/kairos-opensuse-leap-arm-rpi
openSUSE Tumbleweed based (RaspberryPi 3 and 4, arm64)	https://quay.io/repository/kairos/core-opensuse-tumbleweed-arm-rpi	https://quay.io/repository/kairos/kairos-opensuse-tumbleweed-arm-rpi
Alpine Linux based (RaspberryPi 3 and 4, arm64)	https://quay.io/repository/kairos/core-alpine-arm-rpi	https://quay.io/repository/kairos/kairos-alpine-arm-rpi
Rocky Linux based	https://quay.io/repository/kairos/core-rockylinux	
Debian Linux based	https://quay.io/repository/kairos/core-debian	https://quay.io/repository/kairos/kairos-debian



Kairos



Customizable system image

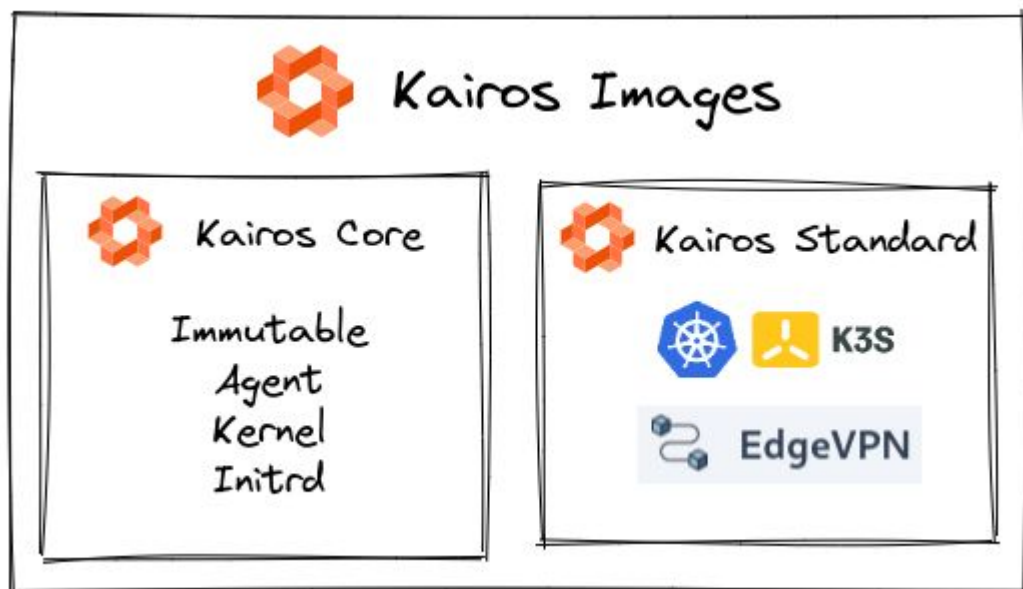
```
# Use images from docs/reference/image_matrix/  
FROM quay.io/kairos/kairos:opensuse-latest  
  
RUN zypper in -y figlet  
  
RUN export VERSION="my-version"  
RUN envsubst '${VERSION}' </etc/os-release
```





Providers

Images can be extended with providers



Kairos

Repositories

provider

6 results for all repositories matching **provider** sorted by **last updated**

provider-kairos

Public

k3s and optional libp2p support for Kairos. Build decentralized clust

Go 18 Apache-2.0 5 1 (1 issue needs help) 1

provider-kubeadm

Public

Go 1 1 1 2 Updated yesterday

provider-microk8s

Public

Go 0 1 0 1 Updated 3 weeks ago

provider-rke2

Public

Provider for Rancher's rke2

Shell 0 Apache-2.0 4 1 1 Updated last mo

provider-k3s

Public

Go 0 5 1 2 Updated last month

cluster-api-provider-kairos

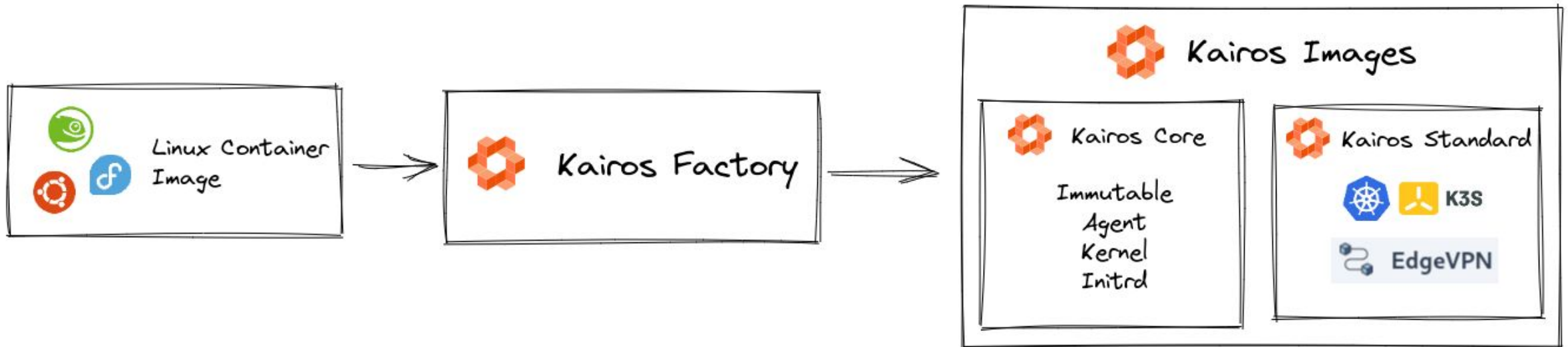
Public

Kairos CAPI shim provider

Go 0 1 0 1 Updated on Oct 29, 2022



Build process overview





Challenges of being distribution agnostic



Packages



Base configuration



Init system

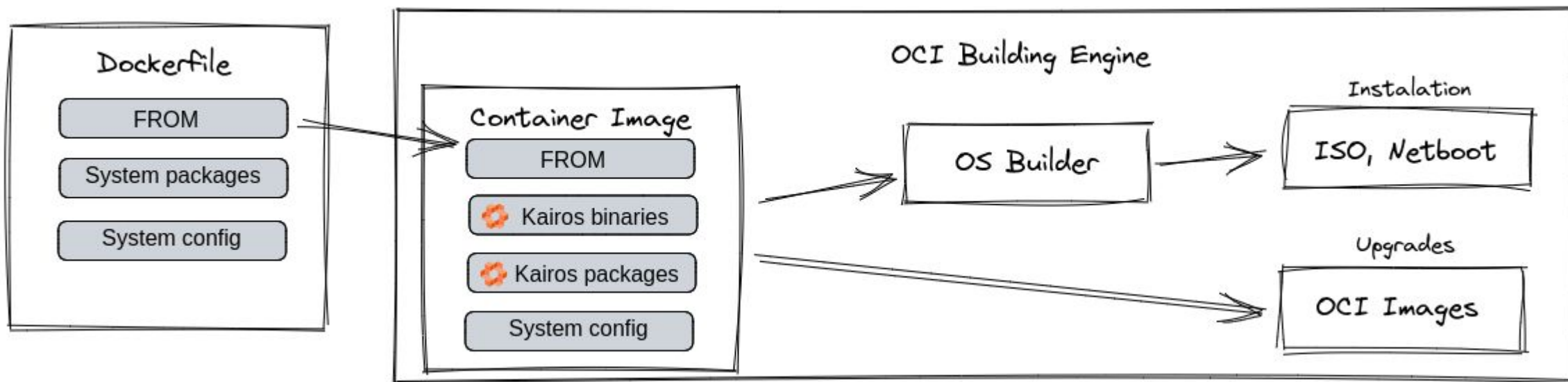


C standard library



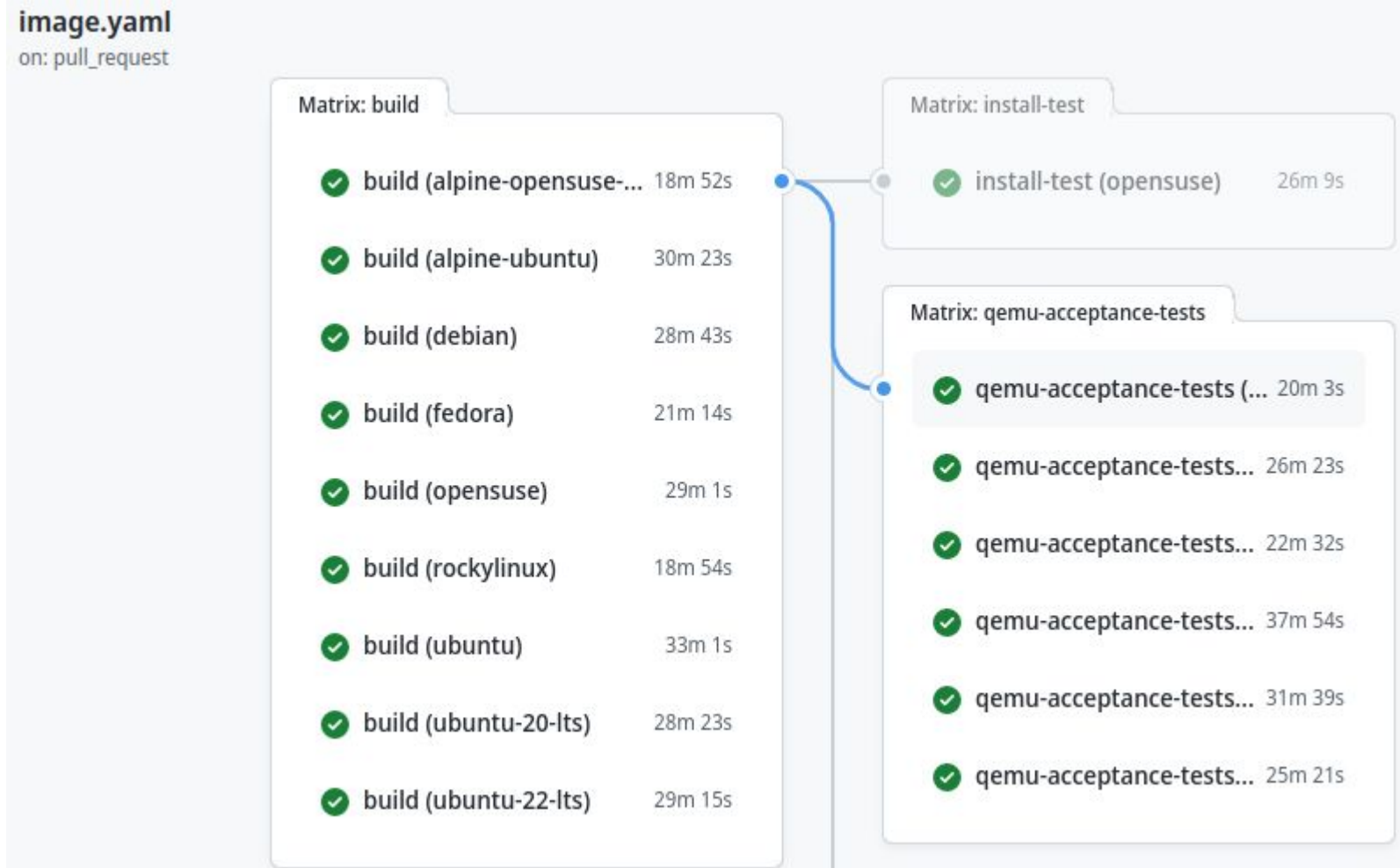


Kairos Factory

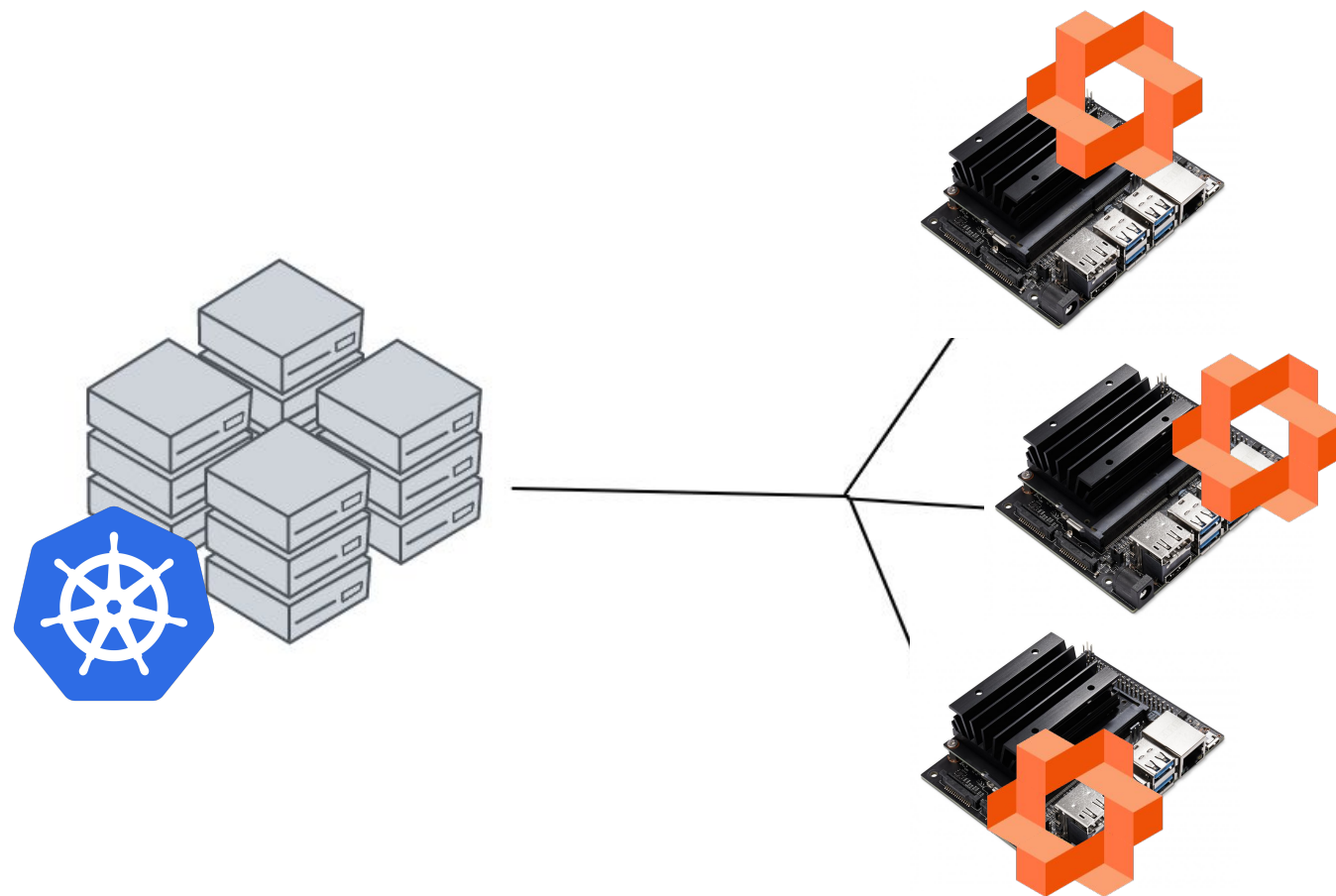




Automated tests



Et voilà!





Want to know more or try it out?

Learn more about Kairos at <https://kairos.io/>

Check out the code at <https://github.com/kairos-io/kairos>

Download a release <https://github.com/kairos-io/kairos/releases>

Matrix: [#kairos-io:matrix.org](https://matrix.org/#/kairos-io:matrix.org)

GitHub Discussions: <https://github.com/kairos-io/kairos/discussions>

Office Hours (Wednesdays 17:30-18:00 CET): <https://meet.google.com/aus-mhta-azb>



Q&A



github: <https://github.com/kairos-io/>

matrix: [#kairos-io:matrix.org](https://matrix.org/#/kairos-io:matrix.org)

web: <https://kairos.io/>