

Kairos

The immutable edge Kubernetes



Kairos



Introduction

Kairos - Immutable Edge Infrastructure



Kairos

Introduction - Kubernetes at the Edge

- Why K8s at the edge
 - Move compute close to data
 - Cloud-native app at the edge
 - Local data AI/ML analytics, processing, user interactive applications
- What's the challenge
 - Machine image management nightmare
 - Deployment/update OS & K8s at the Edge is too hard
 - Security at the edge?
 - Incremental updates?
 - What if update fails?
 - Customization and integration at host OS level?



Kairos

- Enabling Kubernetes workload at the Edge with an easy but resilient approach
- Immutable OS, Tamperproof
- OS & K8s agnostic (openSUSE, Ubuntu, Alpine, K3s, PXC-E, MicroK8s, ...)
- Customizable and composable
- OCI - Container based infra
- Highly engineered and automatic QA process



Design and Architecture

Kubernetes Immutable Edge Infrastructure



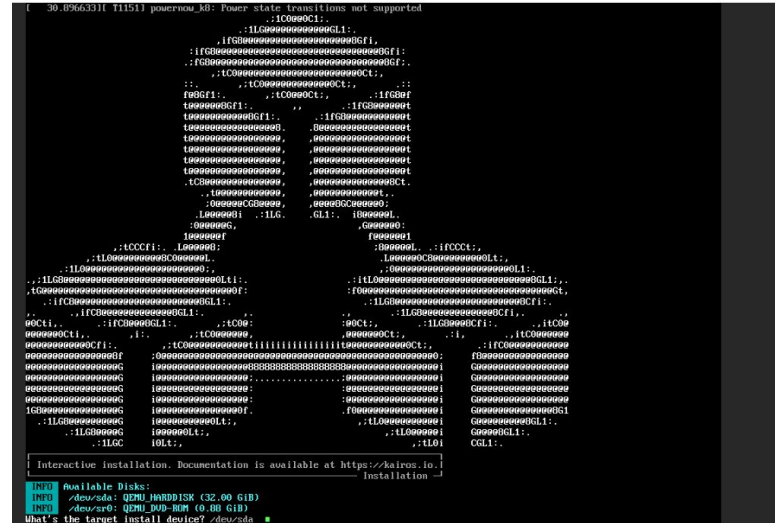
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Ease of use



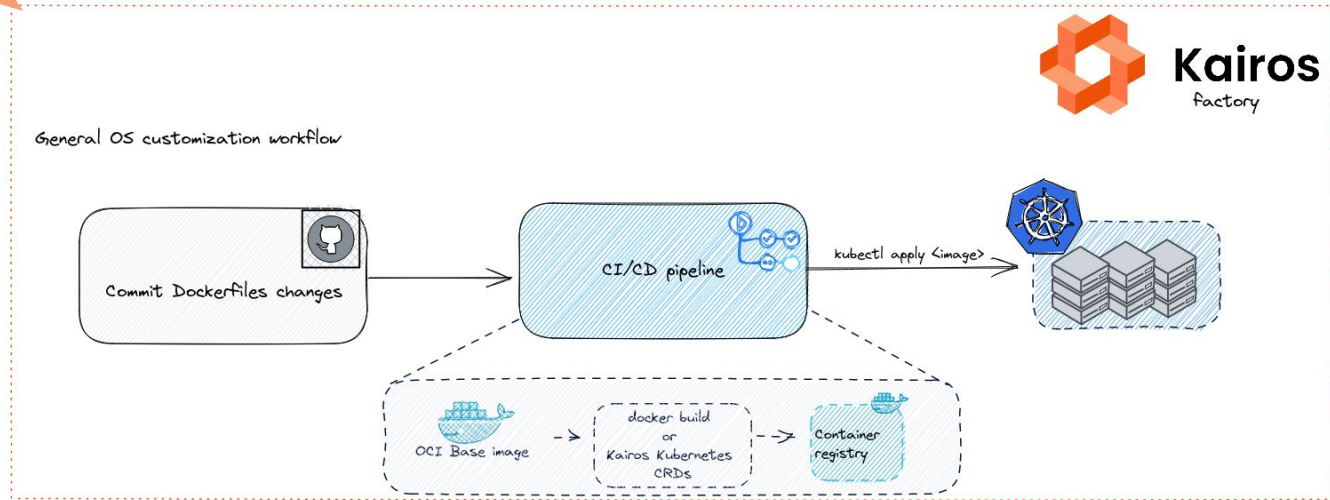
Onboarding of nodes can be done via:

- QR code also from non-technical people on the site
- manually and interactively
- remotely via SSH, or completely automated with Kubernetes, with zero touch provisioning



Cloud native

Cloud-init support, extended customizations with Dockerfiles



Immutability

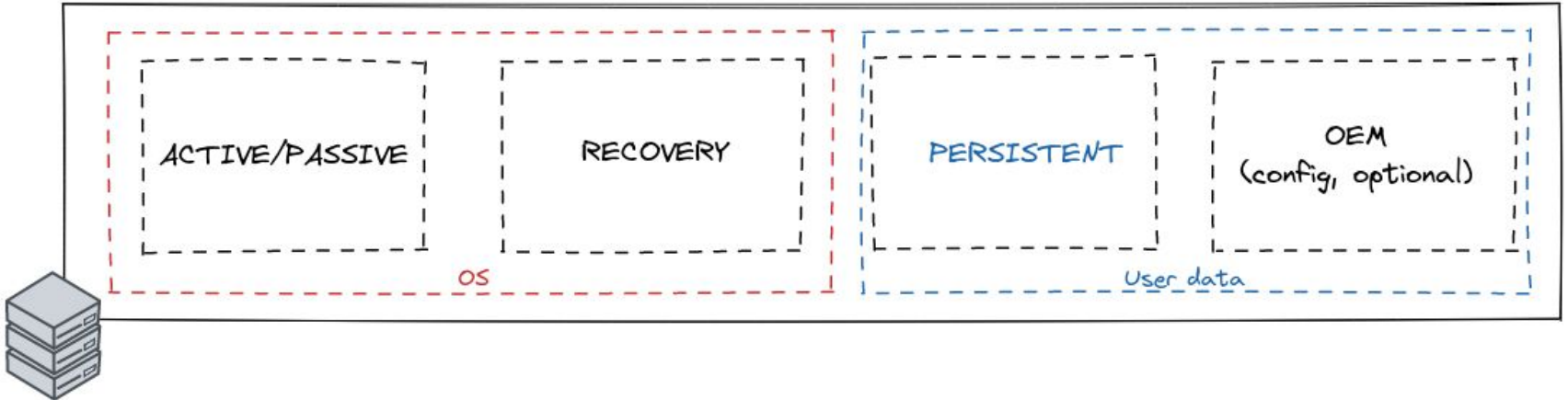


The OS is :

- Immutable and tamper-proof
- separated from your data
- encrypted

Tamper-proof yet flexible, with no runtime engine overhead to run containerized OS.

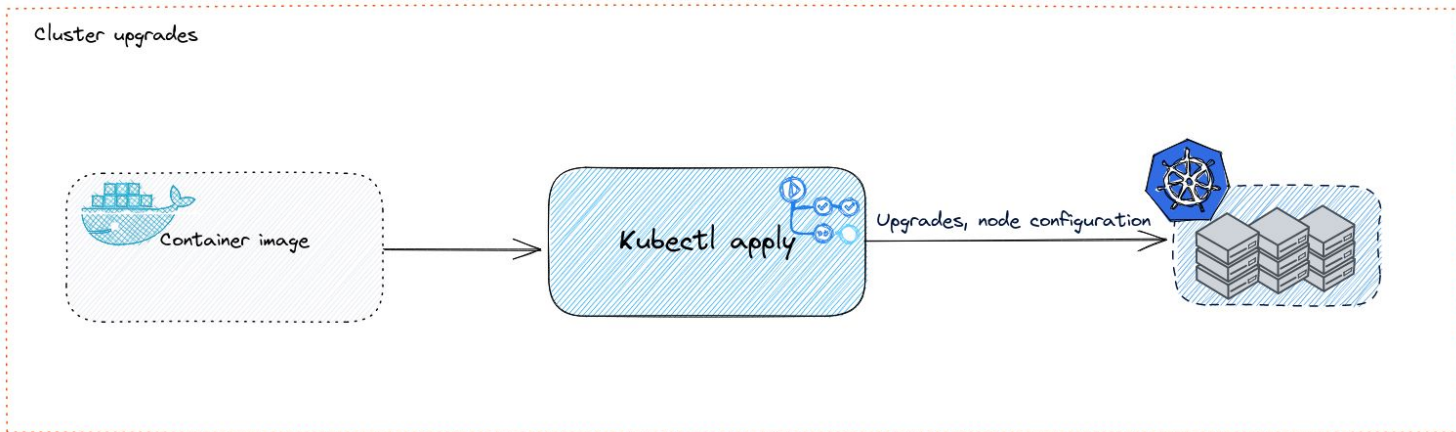
Installation partitioning



Simplify infra lifecycle management with containers



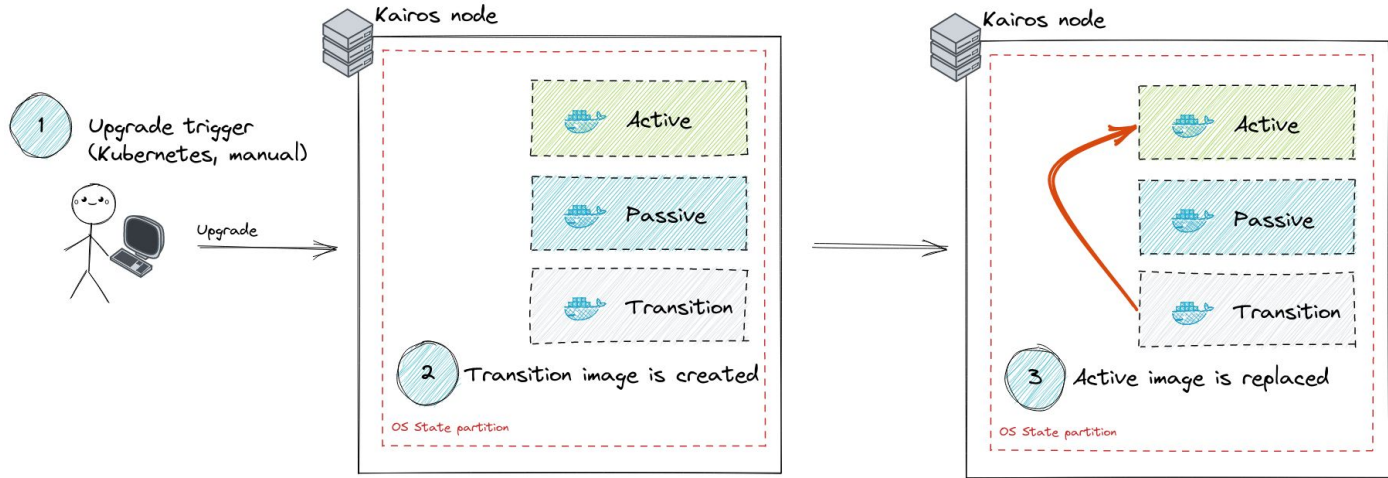
Containers images are booted as standard systems, and upgrades are distributed with container registries



Distro agnostic



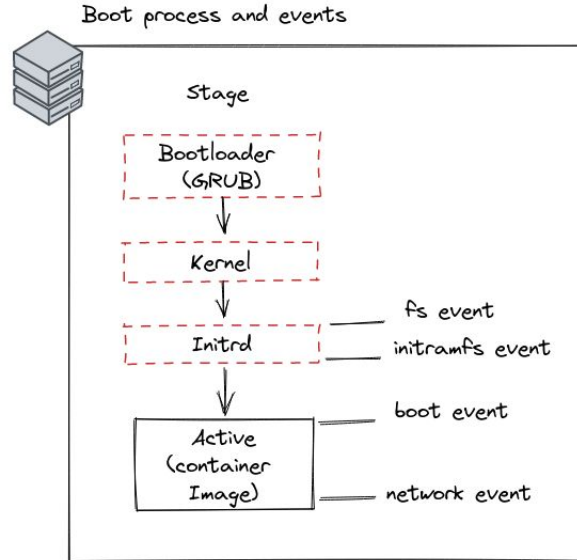
A design which works on every Linux Distribution.
Upgrades are served via OTA and are OCI container
images



Flexibility



A modular approach allows to interact with the system and extend configuration on runtime and during build



Kairos deployment strategies

- Auto-Installer images deploying a target container image
- Automatic install with ISO
- Interactive, Manual installation
- Netboot
- Custom OS images with Kairos Kubernetes Native Extensions
- Automatic onboarding with Kairos CAPI Kubernetes Native Extensions (on Roadmap)



Thanks!



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