

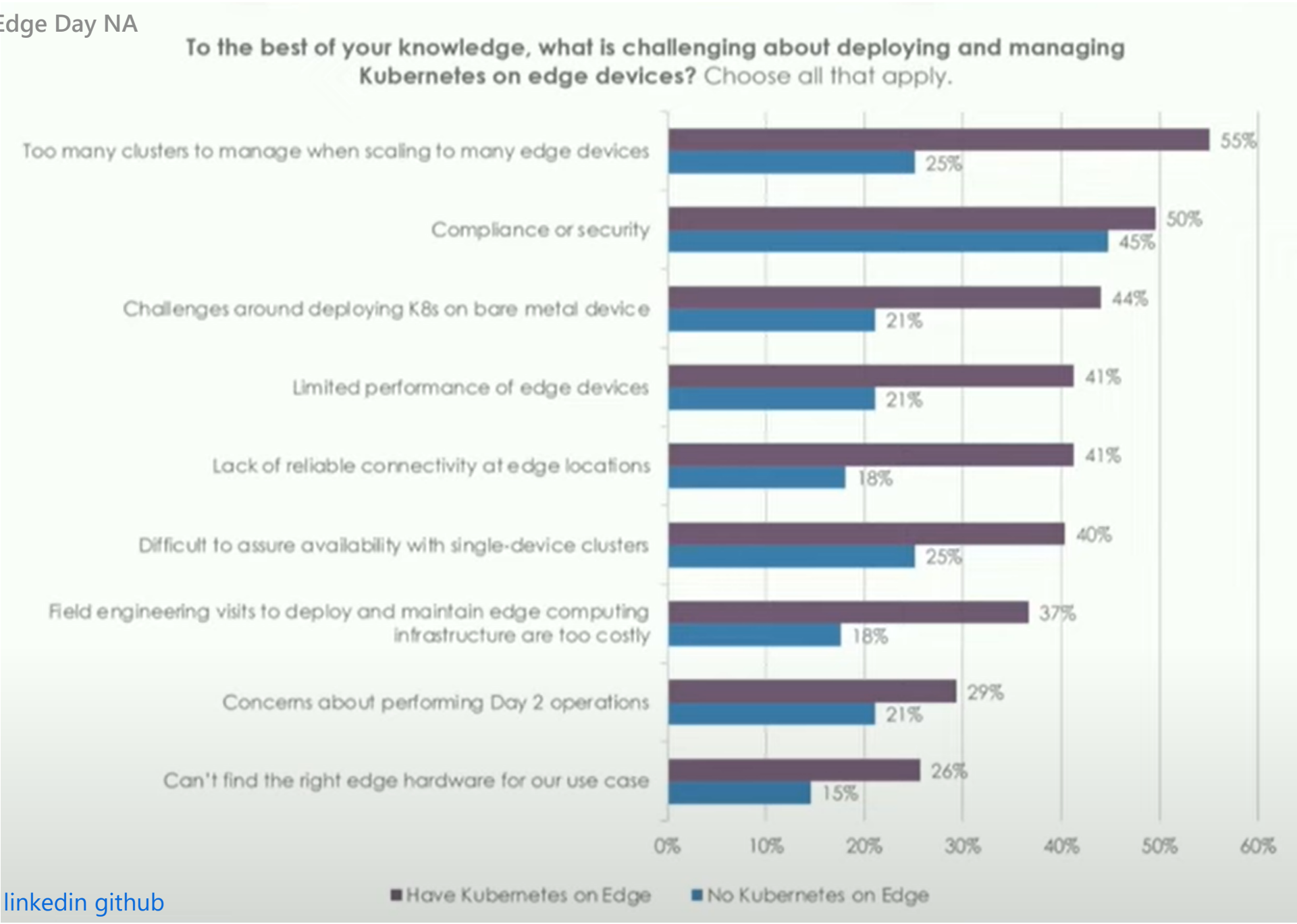
KubeCon 2022 Edge Day NA

Opening Remarks

- 75 % Data generated by Edge IoT devices?
- Bringing application to the people and environment.
- Consideration about energy, performance, security from many aspect.
- It is all about community, take the effort to meet people!

Time to Unlock the Edge Potential at Scale

- **kairos**
 - The immutable Linux meta-distribution for edge Kubernetes.
 - <https://github.com/kairos-io/kairos>
 - <https://kairos.io/docs/>

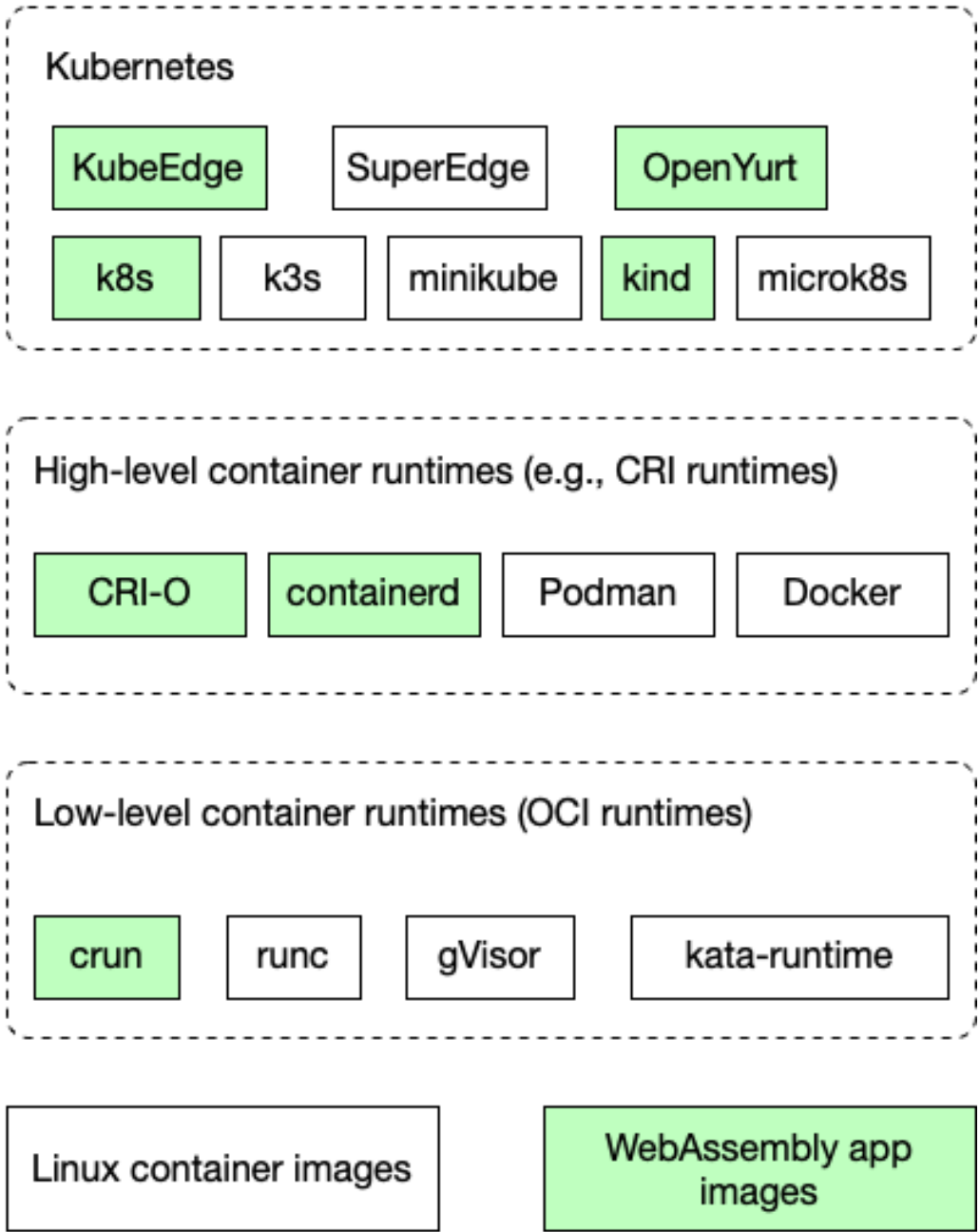


Containers Where YOU Want Them: All the Way to the Edge

- Using upstream mainline as architecture.
- Probably all kubernetes feature would not be required to edge use cases.
- Workload should be adjusted such as AI models during drone flying.
- [Redhat Device Edge](#)
 - 100% Open Source / Supported
 - ARM 64 supported (2GB / 2 cores / device)

WebAssembly Based AI as a Service on the Edge with Kubernetes

- high-performance machine-independent byte code.
- expecting use case for far edge devices such as AI processing.
- lightweight container compared to linux container such as docker.
- extreme resource constrained platform, image size is pretty small.



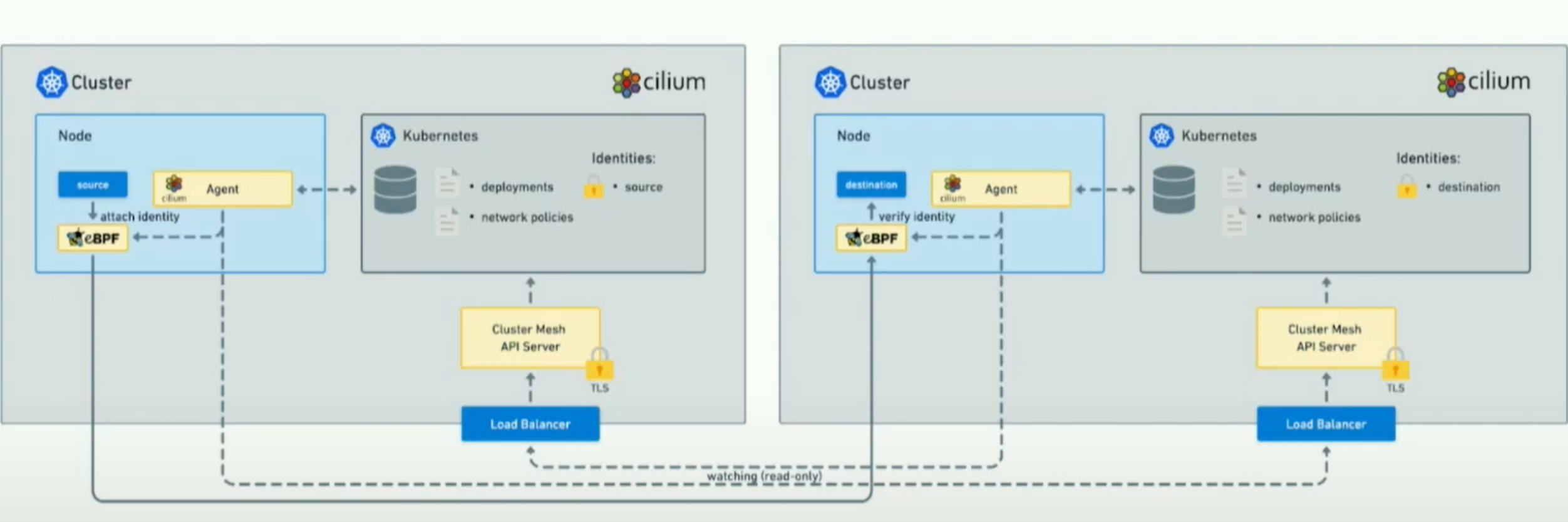
- Wasm can be future of serverless computing instead of typical FaaS as JavaScript and Python.
- AI interface as FaaS for future.
- also comes with easy deployment and management.
- constrained interfaces would be the situation against regular container. for example, complicated application using network or distributed system cannot be supported.
- Reference
 - [wasmtime](#)
 - [wasi](#)

Accelerating Data Processing and Consumption for Building Modern Apps

- Workloads are moving to the edge devices.
- 1st half is about business background and motivation.
- Example Workflow: Automated Package Sort.

Which Edge Are You on? Service Affinity with Cilium Cluster Mesh

- Cilium and eBPF introduction.
- cross-cluster unified network data plane and service mesh.
- eBPF kernel configuration must be enabled.
- Cluster mesh for High Availability, Shared Services, Local/Remote Service Affinity,



Enable a Cloud Native Edge Without Lock-Ins - Marc Meunier, Arm

- pain to migrate the application one platform to another.
- arm PROJECT CASSIN
 - SystemReady, standard OS just boots.
 - PARSEC, security abstraction to access the hardware root of trust. (CNCF incubation)
 - common API for security interfaces.

Kubernetes deployments at the Edge

Desire

- Portable solution
 - Cloud to Edge
 - Device to device
 - Upgrade path
- Secure by design
 - ID of the product
 - Protect your AI/ML models
 - Isolation between apps

Challenges

- Diversity of HW
 - Variability of CPU platforms
 - Firmware differences
 - OS support
- Greater surface of attack
 - Exposed in the field
 - 3rd party HW
 - Multi-tenant access to RoT

Energy Efficient Placement of Edge Workloads

- ICT sector consumes 1.8-3.9 % carbon emissions.
- Kepler, Kubernetes based Efficient Power Level Exporter. (Prometheus Metrics)
- Proving via eBPF to measure the consumption.
- Sustainable application deployment, and fleet management based on carbon intensity.

