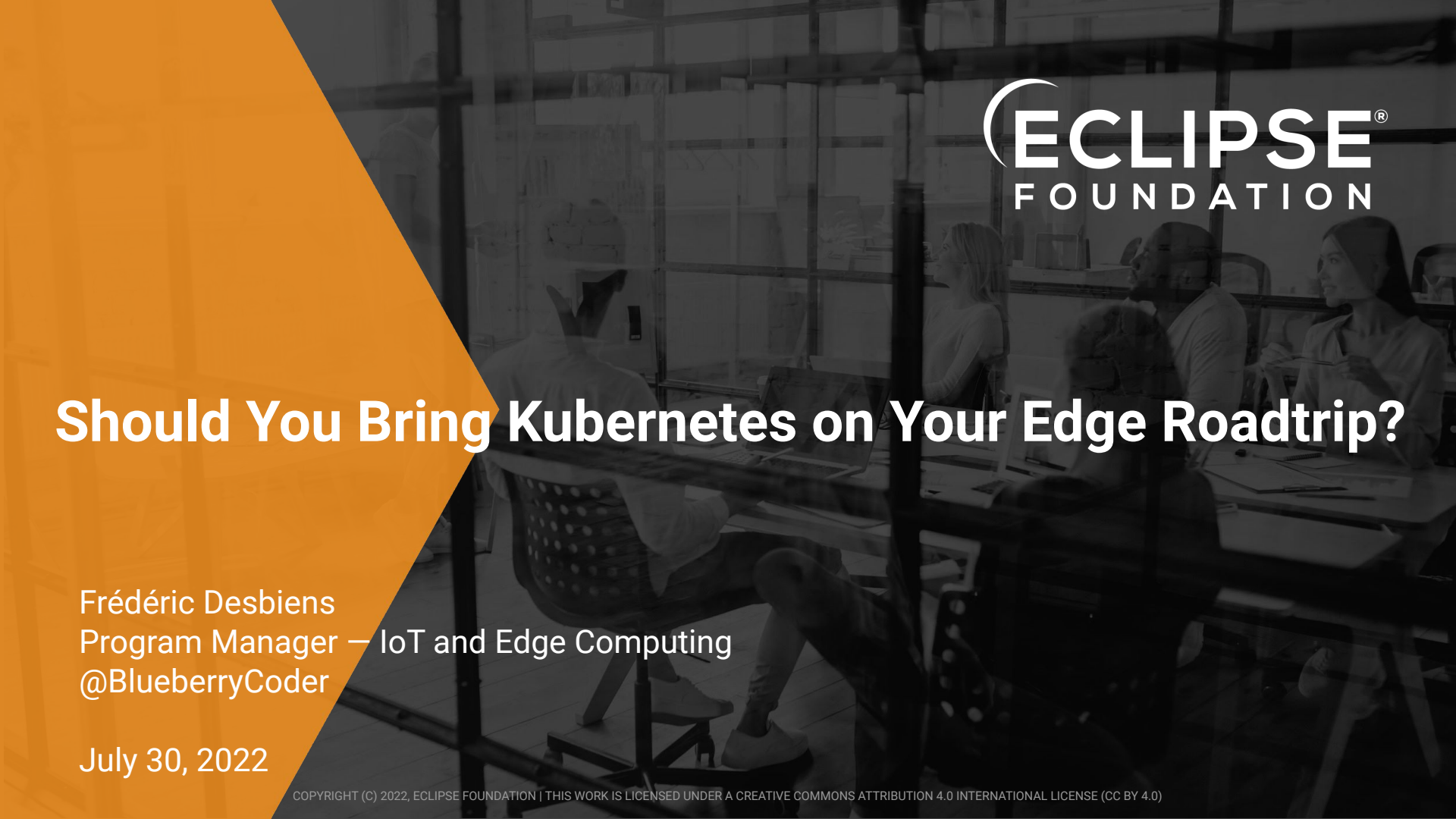

Should You Bring Kubernetes on Your Edge Roadtrip?

Frédéric Desbiens
Program Manager — IoT and Edge Computing
@BlueberryCoder

July 30, 2022

Should You Bring Kubernetes at the Edge?

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Agenda

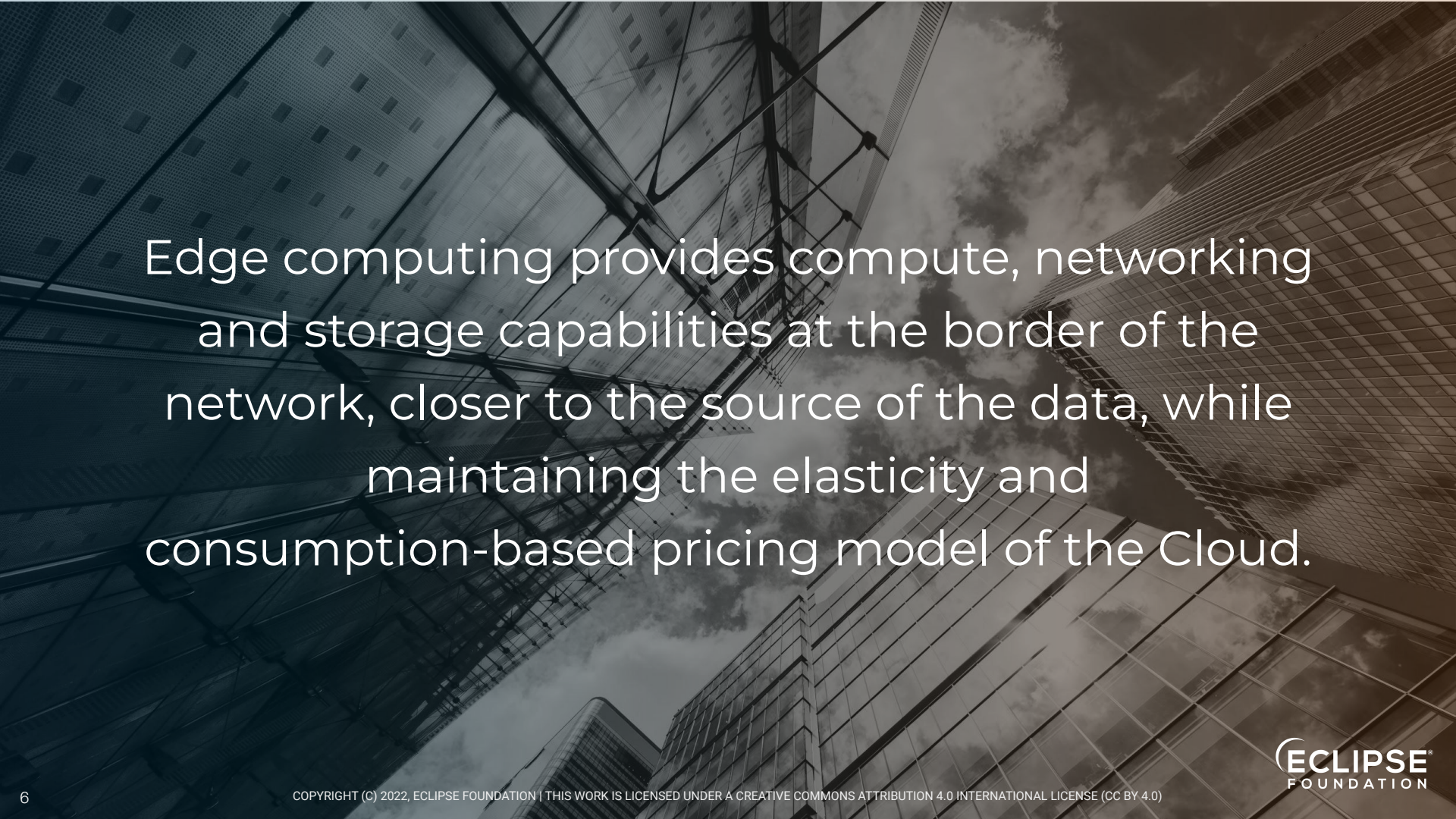
- A Few Definitions
- Edge Computing Workloads
- Kubernetes at the Edge
- Our Vision: EdgeOps

On-demand availability of resources

- Homogeneous
- Large scale
- Centralized

Resources anywhere and everywhere

- Distributed
- Small scale
- Heterogeneous



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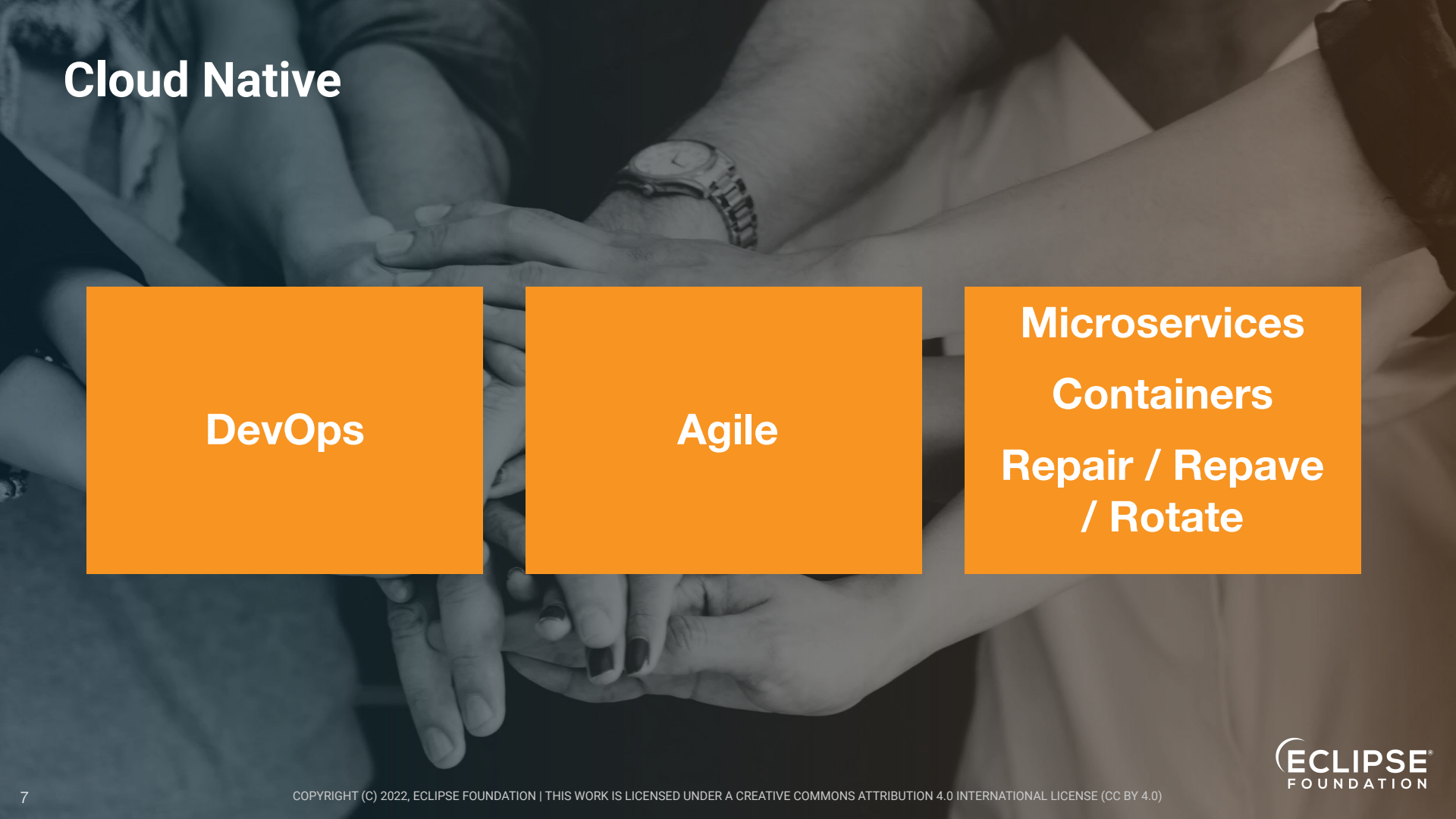
Cloud Native



DevOps

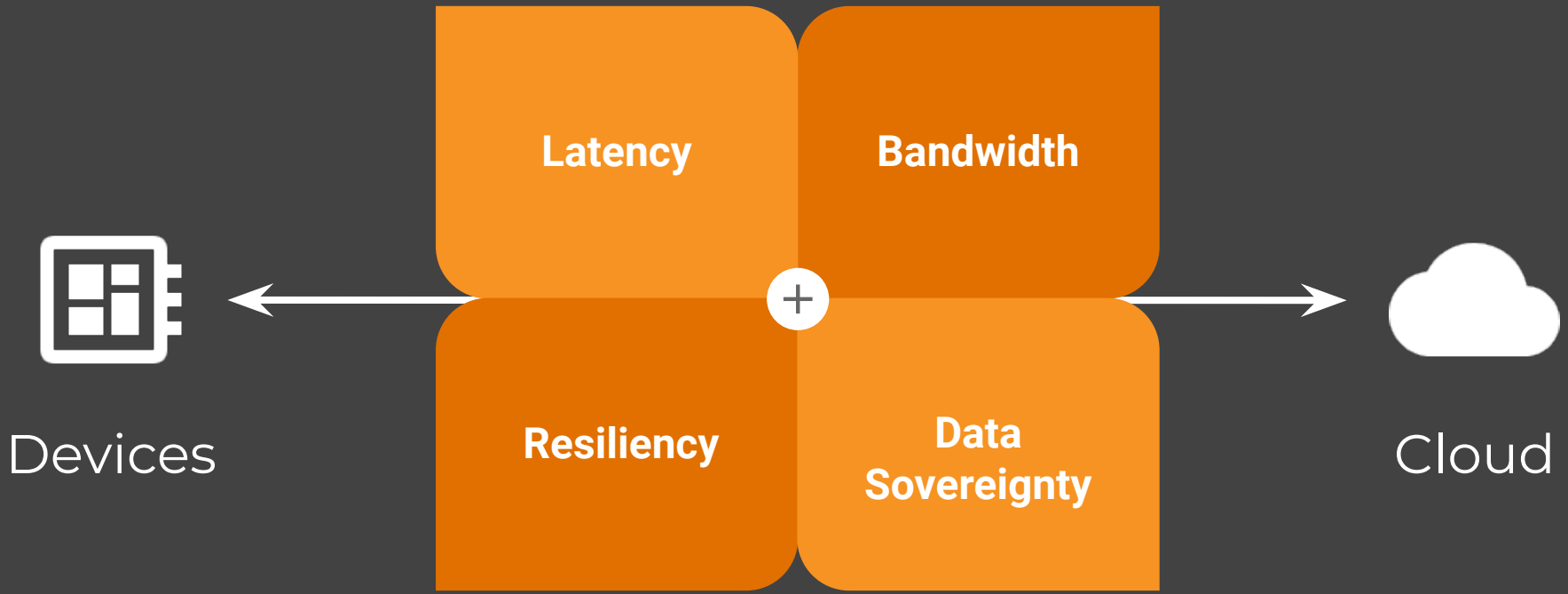
Agile

Microservices

Containers

Repair / Repave / Rotate

The Challenges Edge Computing Addresses



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What Makes Edge Native Different

The network will degrade or fail

Optimize for size and power

Zero Trust

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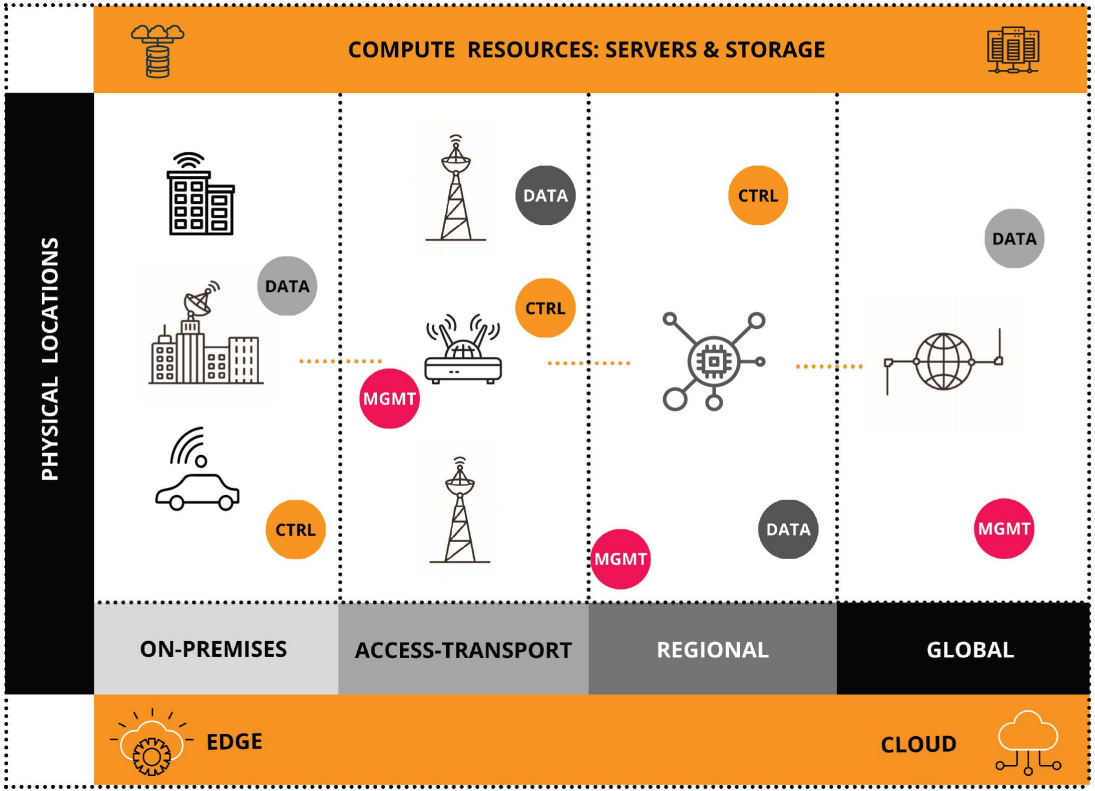
Edge Computing Workloads

Edge-To-Cloud: A Continuum



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One Continuum; Three Planes

Data

Software components being deployed

Control

Control the applications or the infrastructure

Real-time monitoring

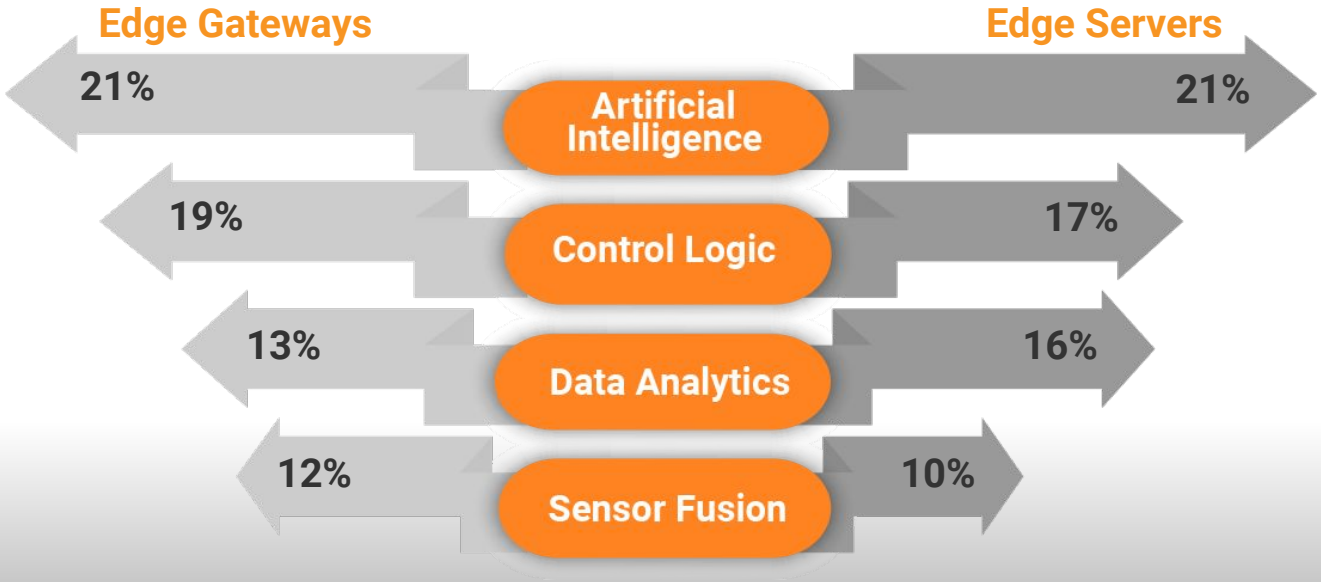
Management

Manage the applications or the infrastructure

Device configuration

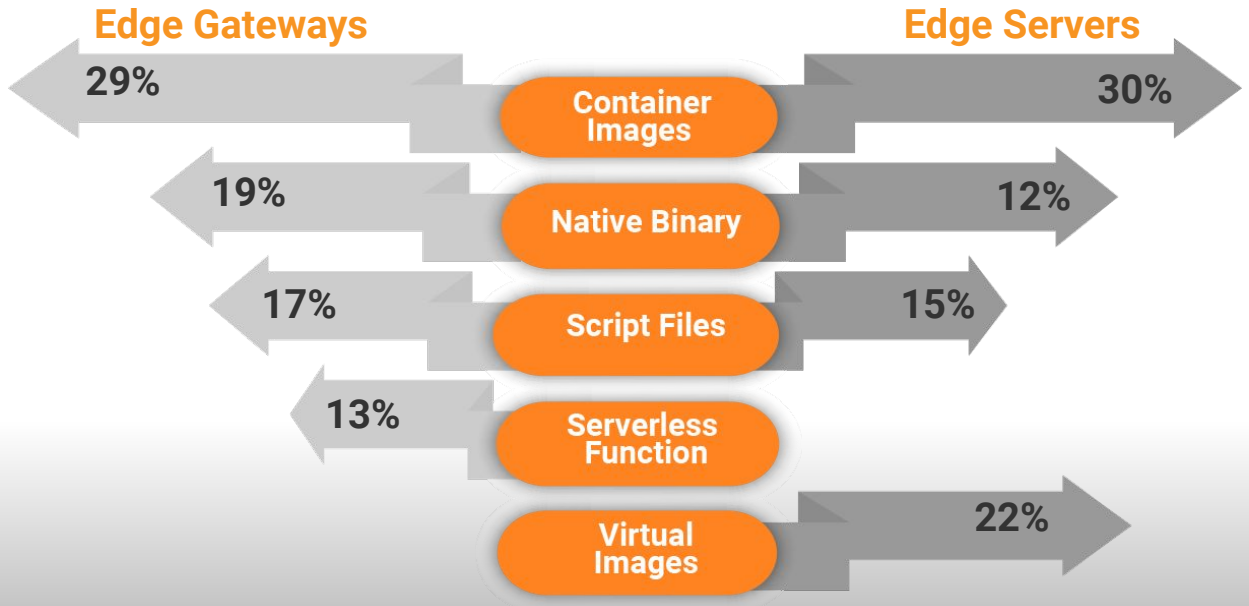
Eclipse IoT Developer Survey 2021

Top Edge Computing Workloads

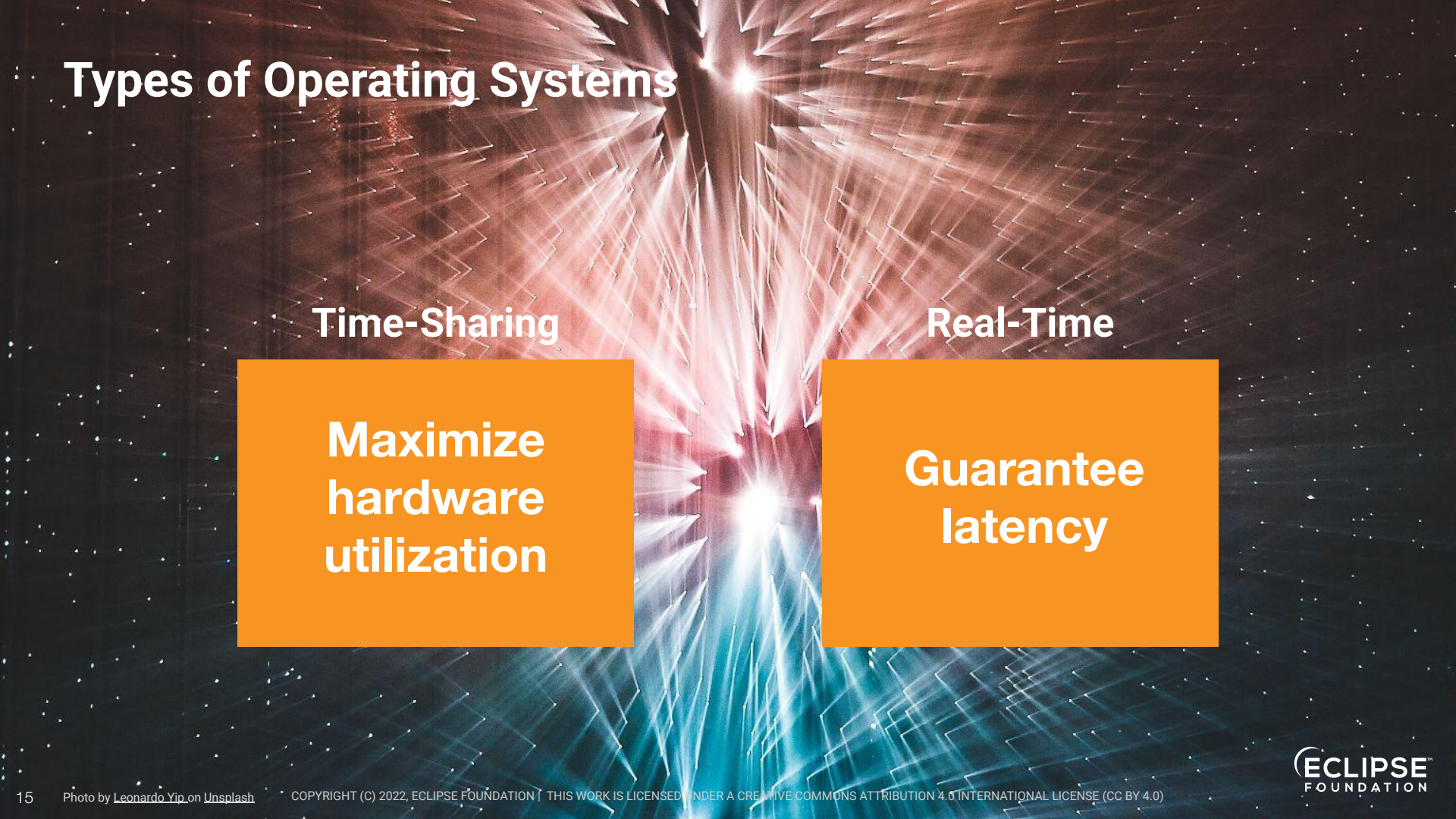


Eclipse IoT Developer Survey 2021

Top Edge Computing Artifacts Deployed for IoT Solutions



Types of Operating Systems



Time-Sharing	Real-Time
Maximize hardware utilization	Guarantee latency

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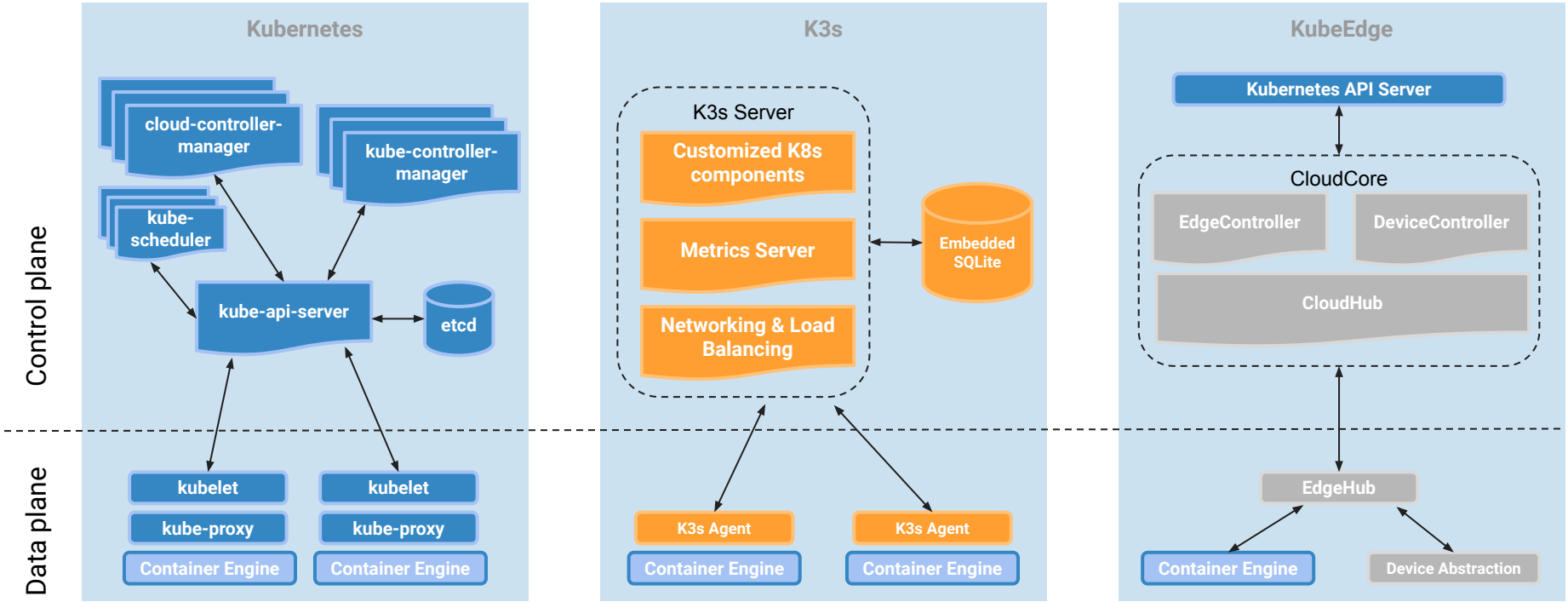
Kubernetes at the Edge



Source: G. Baldoni, L. Cominardi, M. Groshev, A. De la Oliva and A. Corsaro, "Managing the far-Edge: are today's centralized solutions a good fit?".

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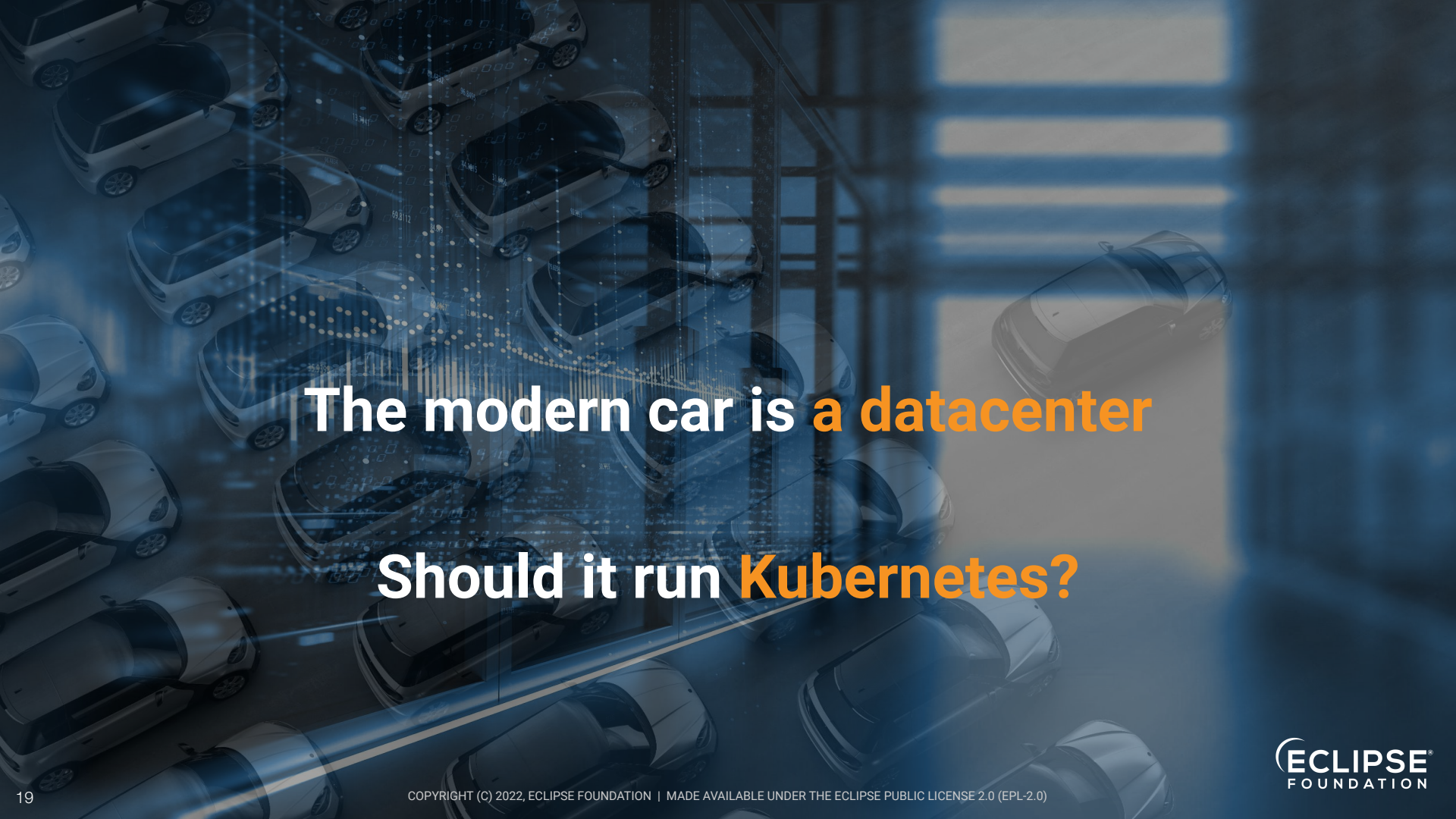
A wider Set of Alternatives

Platform	Cloud Managed	Edge Only	K8s integration	Focus
AWS Outposts	Yes	No	Offers K8s	Containers, VMs
Eclipse fog05	Yes	Yes	Yes	Binaries, Containers, VMs
Eclipse ioFog	Yes	Yes	Yes	Containers
Eclipse Kanto	Yes	Yes	No	Containers
EdgeX Foundry	Yes	No	No	IoT
Fledge	Yes	No	No	Industry 4.0
K3s	No	Yes	Is K8s	Containers
KubeEdge	Yes	Possible	Is K8s	Containers
OpenHorizon	Yes	No	Yes	Containers

Adapted from: G. Baldoni, L. Cominardi, M. Groshev, A. De la Oliva and A. Corsaro, "Managing the far-Edge: are today's centralized solutions a good fit?".



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Use case: Automotive

Which of those would you run in containers?

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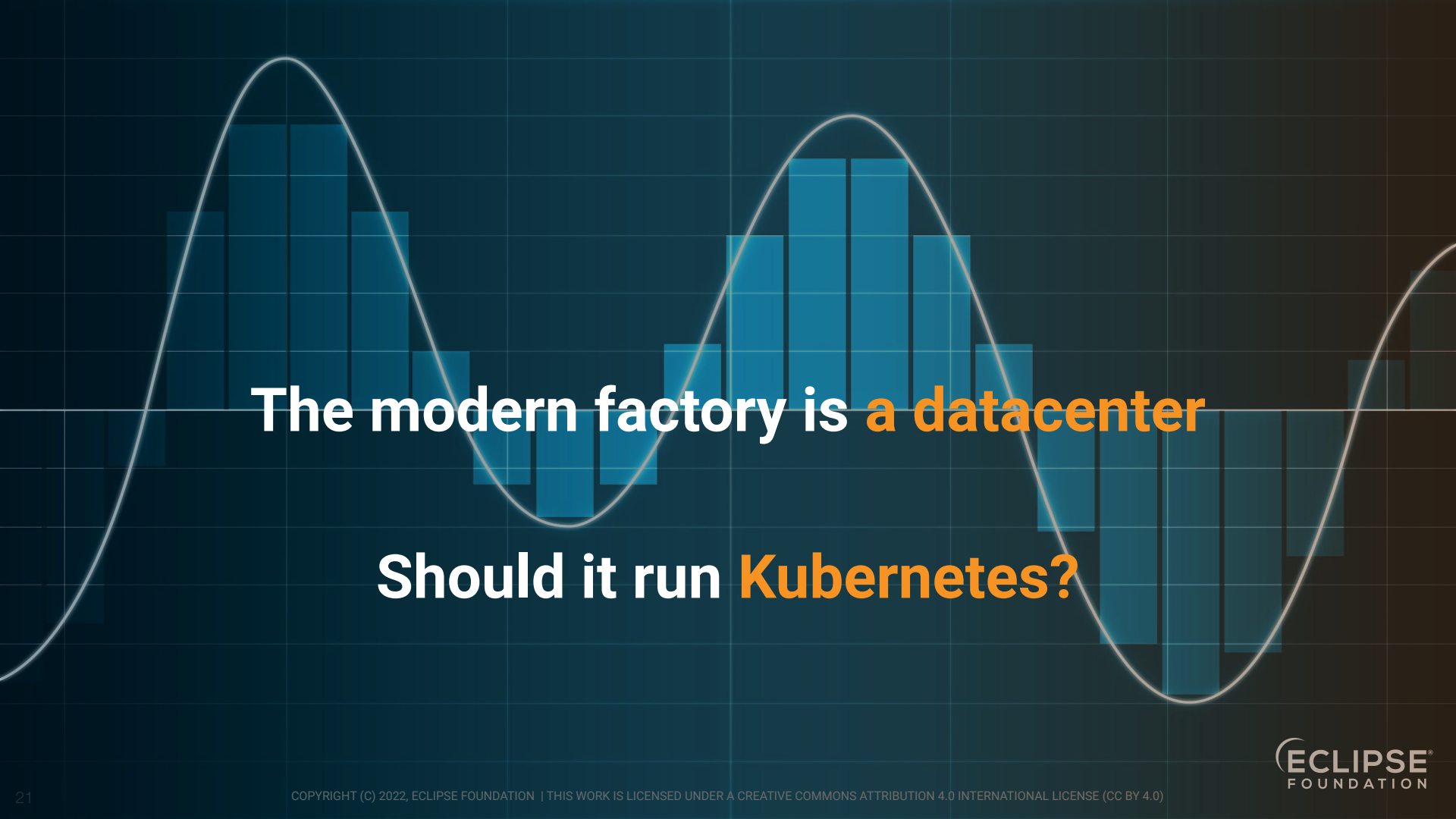

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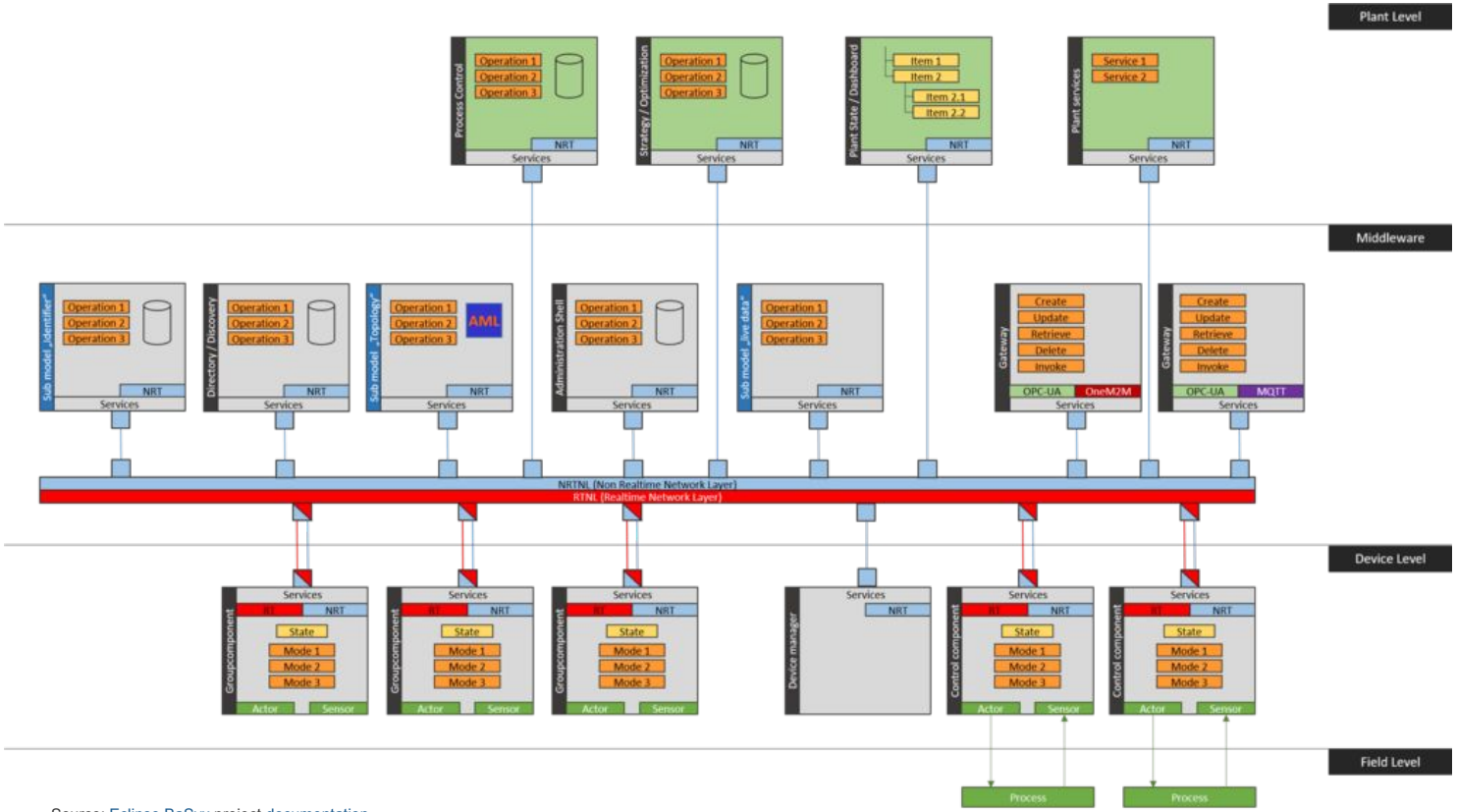
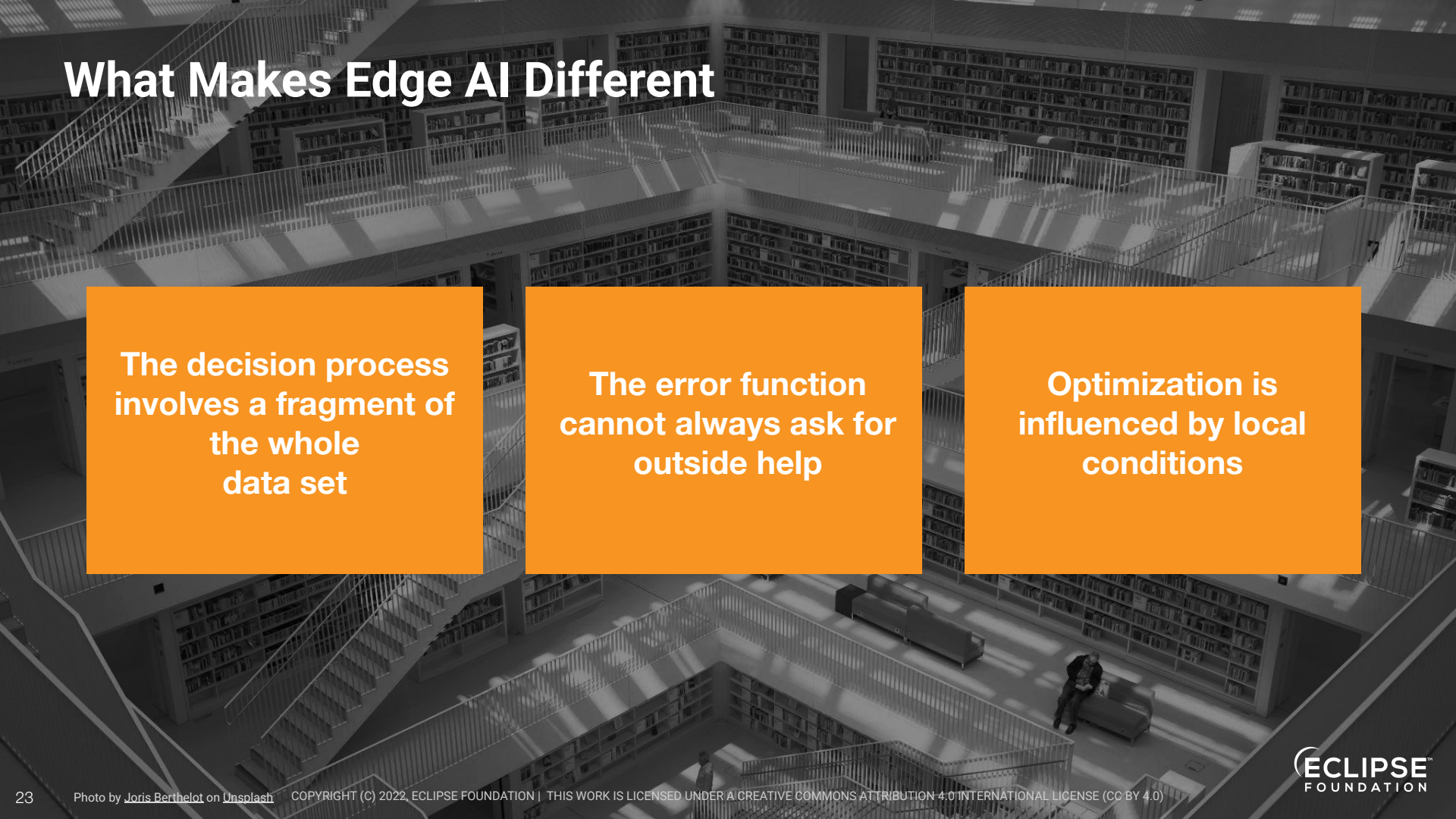
Use Case: Industrial Automation



Source: Eclipse BaSyx project documentation

What Makes Edge AI Different



The decision process involves a fragment of the whole data set

The error function cannot always ask for outside help

Optimization is influenced by local conditions

Architecture Considerations

- **How predictable should the latency of your system be?**
  - Mission-critical systems have real-time requirements
- **Can you afford to lose data?**
  - How stateful is you application?
  - Are your instances unique?
- **How constrained are your edge nodes and infrastructure?**
  - There is little to no elasticity at the far edge
- **How far should the control plane be from the Edge?**
  - How autonomous are your edge devices and servers?

One Last Thing…

How is Stateful Kubernetes Going for You?

When Kubernetes Could Be a Bad Fit

1. Real-Time
2. Mission Critical
3. Constrained Devices
4. Heterogeneous Hardware

It Takes a Village to Build the Edge

Color Logos Represent Eclipse Projects

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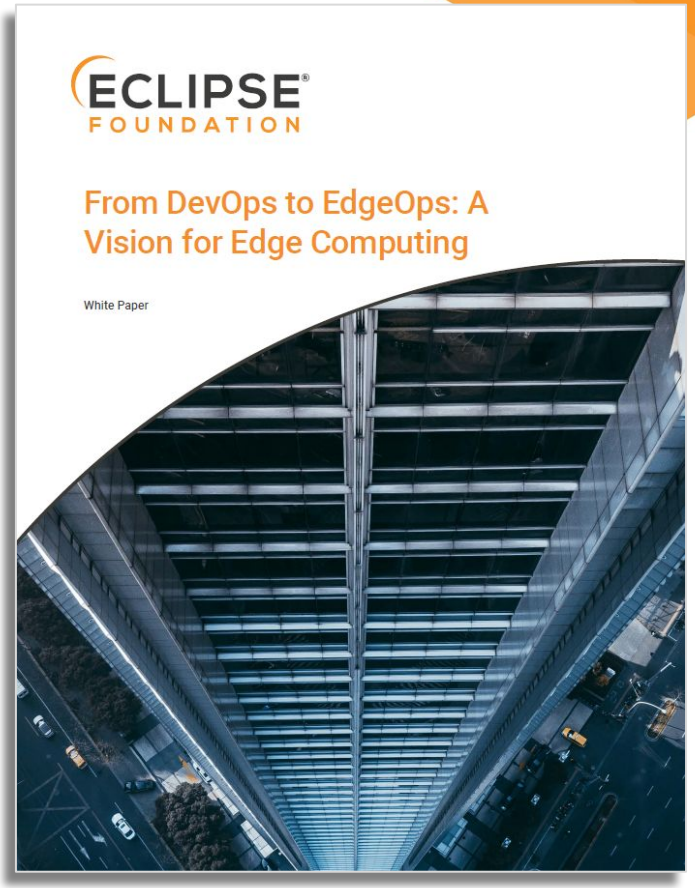
Download the White Paper

SCAN ME

https://hubs.la/H0L379c0



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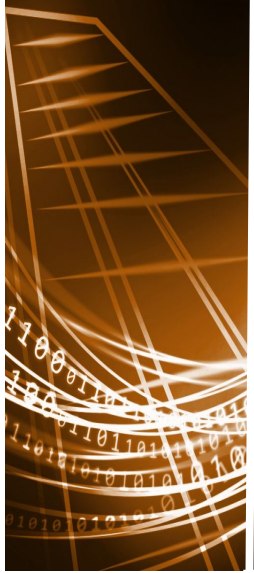
EdgeOps

Adapting DevOps for the Edge



Challenges

- Latency
- Bandwidth
- Resiliency
- Data sovereignty

Characteristics

- Long lifespan
- Heterogeneous
- Constraints
- Connectivity

Deployment

- Workloads
- Artifacts
- Strategies

DevOps Principles

Short Lifecycle, Collaboration, Continuous Integration and Delivery (CI/CD), Microservices, Infrastructure as Code

Delivering Open Source Edge Platforms. Now.

EDGE | NATIVE

Code first

Simplify and streamline production Edge deployments

EdgeOps

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Production quality

code

ioFog

fog05

kanto

Zenoh

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Industry Leaders

ADLINK Leading EDGE COMPUTING

BOSCH Invented for life

edgeworx

EUROTECH Imagine. Build. Succeed.

HUAWEI

kynetics enjoy the art of coding

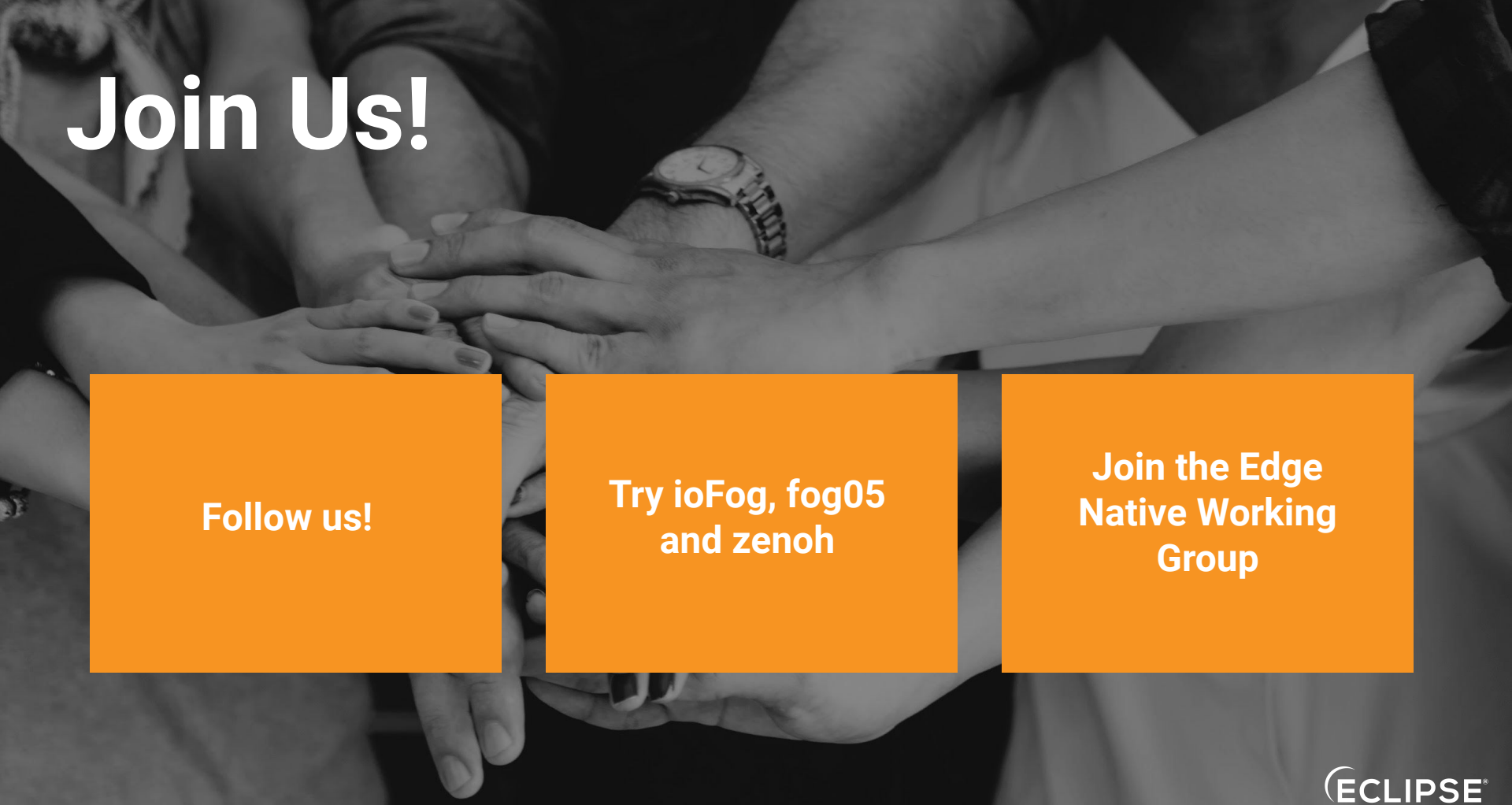
LF EDGE

TOPIO NETWORKS

zetta scale

33

Join Us!



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Try ioFog, fog05 and zenoh

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Thank You

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