



Update from the Kubernetes IoT Edge Working Group

Akraino Technical Meeting z

Spring 2021

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March 3, 2021 – 12:00pm-12:20pm



Agenda

Kubernetes at Edge – What is it good at

Challenges with Kubernetes at Edge

Recent changes in Kubernetes

Upcoming Events

How to Learn More and Get Involved with the Project



Kubernetes initial target: container workloads in a central Cloud

What attributes are attractive at edge? What are the challenges?

Similar

Manage *many* nodes with abstracted compute, storage, networking

Manage containerized apps and services

Standardized APIs, broad availability of collateral tools, skilled people

Extendable control plane

Different

Resource constrained (small node counts, low power CPUs, low resources)

Special network requirements (protocols, topologies)

Challenges of physical security (unattended) and disconnected operation



Operational Challenges

containerized app management isn't the only problem

How do you get the application to the edge?

How manage the nodes the apps run on? What about securely identifying, provisioning, updating the nodes?

How do you monitor and report status of containerized apps AND what they run on, and devices that are below the containerized app boundary? How do you update ALL these?

How do you manage data communication?

You can take steps to shrink K8s resource demands but there will always be a lower limit - some devices that can't even run Linux. Are you just going to declare the hard parts to be somebody else's problem?

Is this “I've got 10 problems and Kubernetes handles two of them?”



The K8s IoT edge Working Group

Assessment – state of K8s at edge

Still no clear consensus – run container workload in edge K8s clusters vs run on something else

Use full k8s clusters – maybe based on a special resource frugal distribution

Use “stretch” clusters

Use a different container runtime

Don't use containers at all

- Devices managed as K8s custom resources
- Use event driven abstractions (CloudEvents, Knative eventing)

Maybe there never will be consensus - because there are different edge use cases, with different degrees of available resource (Warning: this is personal opinion)



New in Kubernetes

1.20

Docker runtime deprecation

- A warning at this time – with fuse likely to end in 1.22
- Note this is just the runtime, and Docker images, which are what packages code are unaffected, as are other OCI images. This is about enforcing compliance with the CRI container runtime interface. Multiple popular runtime solutions are available.

Graceful pod termination upon node shutdown is in Alpha

Volume snapshot operation is now designated stable

- However CSI plugins support is also needed, and these may lag

Dual stack IPv6/IPv4 is in Alpha

Full change list [here](#)

Next release (1.21) is slated for mid April



New Kubernetes related projects

Microsoft Akri – expose edge devices as Kubernetes resources

- 0.0.35 came out in Oct with a couple updates since

Edge specific distributions (e.g. K3s, MicroK8s) have tracked the Kubernetes 1.20 release



Upcoming Kubernetes Events

KubeCon(s) 2021

KubeCon Europe will be May 4-7 as a virtual event with session times to serve an EU audience

- Keynote + solution exchange free
- Standard registration is \$75
- The Kubernetes on Edge Day co-located event is May 4 (\$20)
 - Detailed session schedule coming soon

KubeCon North America is October 12-15

- Open for CFPs now (due by April 11)
- Tentatively slated to be a physical conference in Los Angeles



Open Source Communities – how to learn more + get involved

The Kubernetes IoT Edge Working Group + more

Regular Work Group Meetings: [calendar link](#)

USA WG Meeting Wednesday 9am PT, every 4 weeks, next on March 24

APAC WG meeting Wednesday 5 UTC every 4 weeks, next on March 10

- [Meeting notes and agenda](#)
- [YouTube recording playlist](#)

Link to join the group

- groups.google.com/forum/#!forum/kubernetes-wg-iot-edge

Link to join Slack

- <https://kubernetes.slack.com/messages/wg-iot-edge>

White Paper

- <http://bit.ly/iot-edge-whitepaper>

