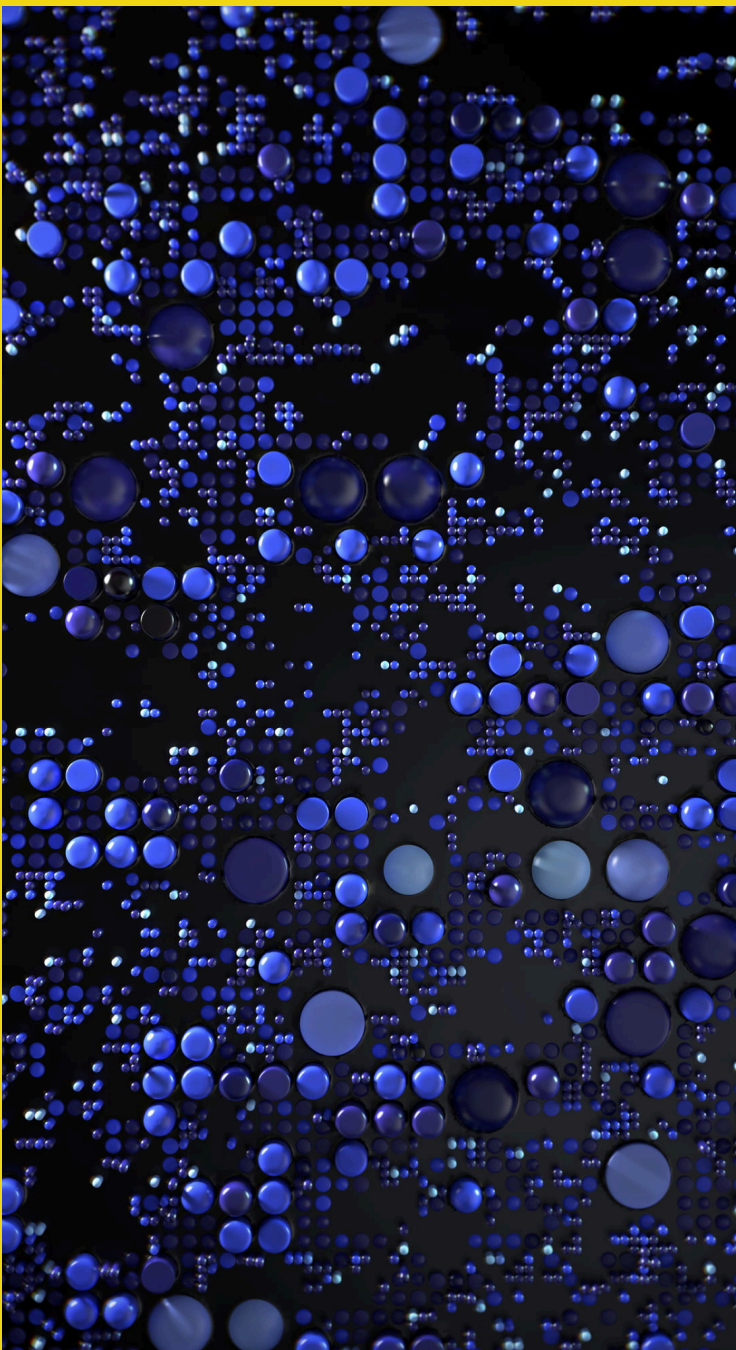


Kubernetes at the Edge



Gaining a Kubernetes Edge



Gaining a Kubernetes Edge

At this juncture, it's not so much a question of whether Kubernetes will be used at the network edge as much as to what degree. There are many classes of edge computing platforms that might host variants of a Kubernetes cluster. Most of them, however, will be running some form of a lighter-weight distribution of Kubernetes.

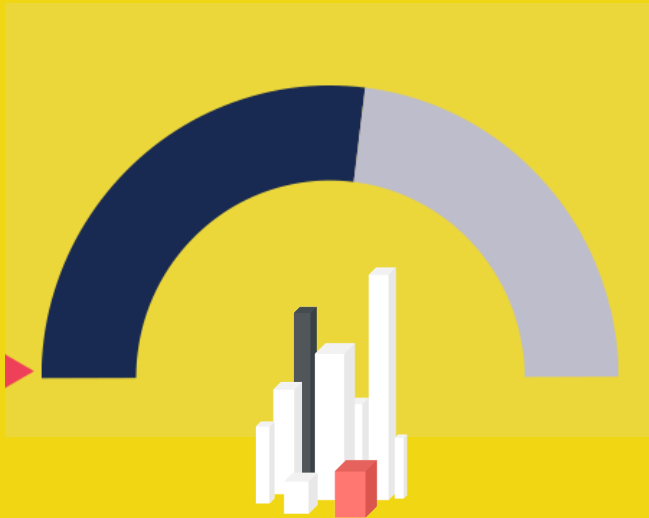
Regardless of the platform, the one thing edge computing applications will all require to varying degrees is the ability to run a distributed application that will be connected to a backend service. As more data is processed and analyzed at the point where it is created and consumed, the underlying platform needs to be light enough to run at the edge while still being robust enough to process data locally.

Once that data is processed, it then becomes a lot less expensive to share the aggregated results than it is to ship a constant stream of raw data over a wide area network to be processed by some backend service using a batch-oriented application.

As 5G wireless networks increase, the number of Kubernetes clusters deployed at the edge will explode. In the meantime, a wide range of use cases that are based on Kubernetes running at the network edge are already being deployed.

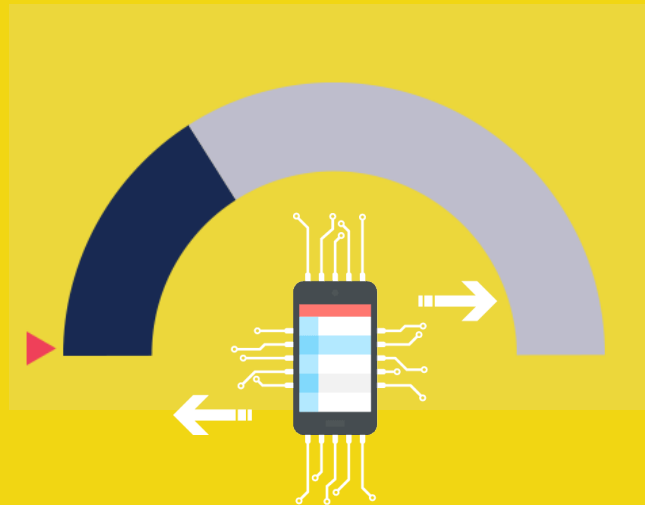
Kubernetes at the Edge Today

The most popular edge use cases are



Manufacturing/Industrial IoT

54%



Telecommunications, Mobile Edge Computing and Image Processing (TIE)

32%



49%

of organizations are already managing between one to ten clusters.¹

Kubernetes Distributions at the Edge

Kubernetes Distributions at the Edge



K3s was originally developed by Rancher Labs and is packaged as a single <50MB binary that reduces the dependencies and steps required to install, run and auto-update a production Kubernetes cluster. It is today being advanced by the Cloud Native Computing Foundation.

The MicroK8s logo consists of a red square with the text 'MicroK8s' in white, sans-serif font.

MicroK8s is a lightweight distribution of Kubernetes provided by Canonical that includes automation capabilities that will, for example, determine the best nodes for the Kubernetes datastore in the event another node is lost or added to the cluster.



k0s is a Kubernetes distribution created by Mirantis that is distributed as a single binary with zero host OS dependencies besides the host OS kernel. New clusters can be bootstrapped in minutes.



KubeEdge is an open source edge computing framework based on Kubernetes based on a 66MB footprint that includes both modules for the edge and the cloud services those platforms need to invoke.



Red Hat OpenShift is based on a curated distribution of Kubernetes that the unit of IBM makes available for edge computing platforms alongside instances for the cloud and local data centers.



Akri is an open source project created by Microsoft based on Kubernetes that makes it simpler to attach devices such as cameras.



Baetyl is an open source edge computing platform, formerly known as OpenEdge that was created by Baidu. It is now being advanced under the auspices of the LF Edge consortium.



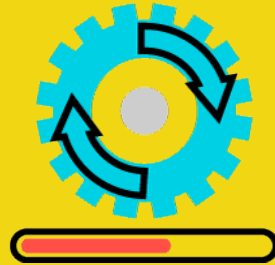
StarlingX is an open source project from Open Infra consortium that combines OpenStack and Kubernetes to run the virtual machines and containers together at the edge.

Kubernetes at the Edge is Just the Start

Other tools and platforms required include:



App Dev Tools



Deployment Tools



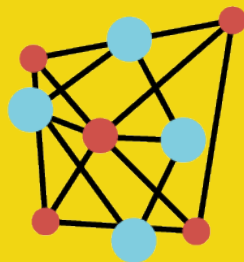
Operating Systems



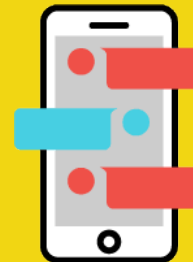
Monitoring Tools



Cluster Management
Tools



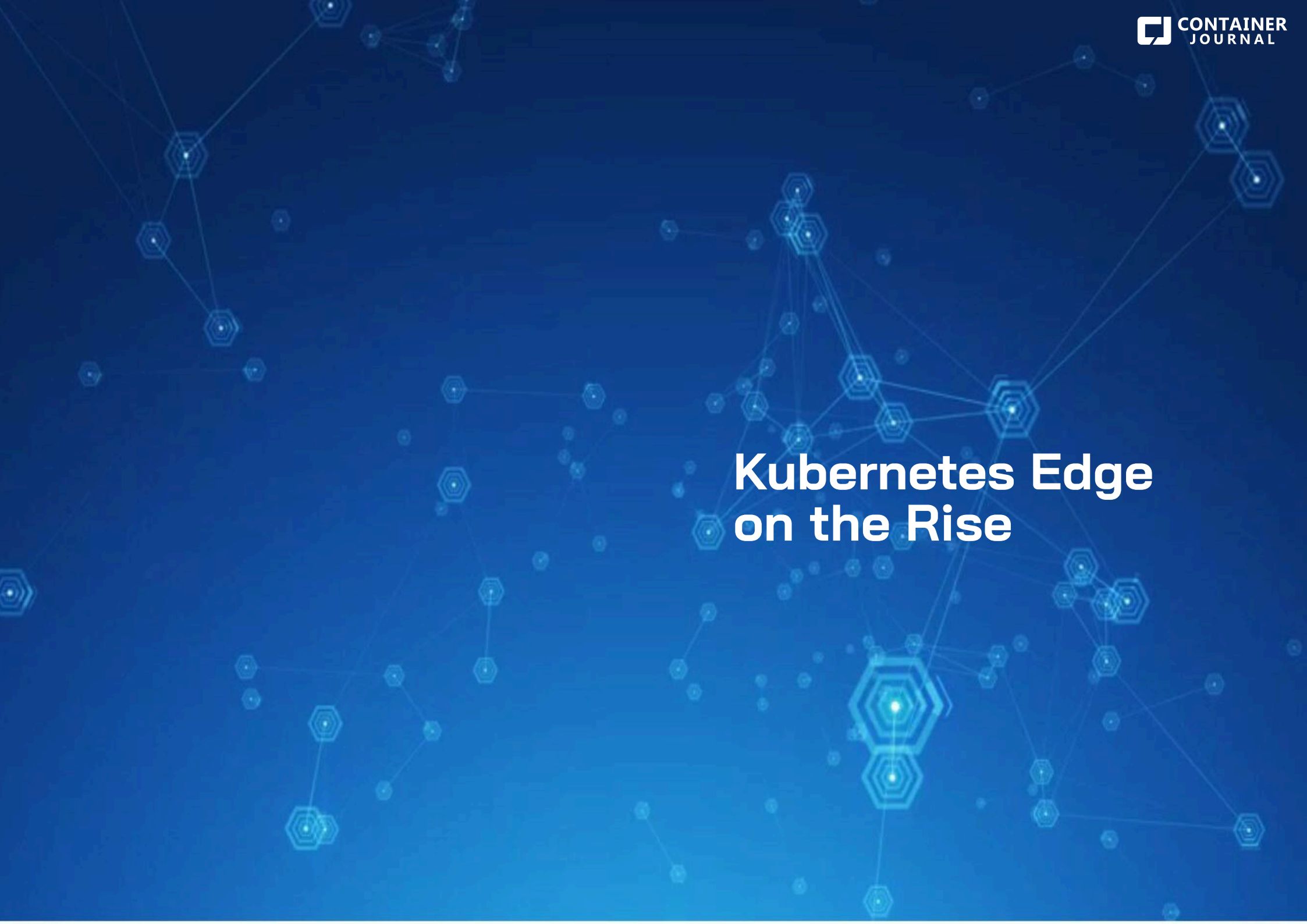
Service Mesh



Message Brokers



Data and Storage
Management Frameworks



Kubernetes Edge on the Rise

The Rise of Cloud-native Network Functions



Cloud-native network functions (CNFs), also known as container network functions, enable networking and security software to run on the same Kubernetes cluster. As a replacement for virtual network functions that run on virtual machines, they provide a critical lighter-weight alternative for delivering networking and security service to the edge.

Build or Subscribe to an As-a-Service Platform

IT teams can either build an edge computing platform or they can subscribe to an edge computing service based on Kubernetes clusters either provided by an IT services firm or a software-as-a-service (SaaS) application.



The Stakes Are High

A battle for control over edge computing environments is expected to drive a total of **\$800 billion** in spending through 2028.

Source



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Gaining a Kubernetes Edge

