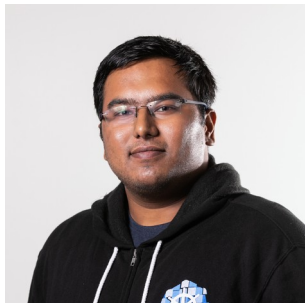# What's New in Kubernetes 1.19

CLOUD NATIVE
COMPUTING FOUNDATION

Presenters

Nabarun Pal

1.19 Enhancements Lead

@theonlynabarun

Taylor Dolezal

1.19 Release Lead

@onlydole

Max Körbächer

*1.19 Communications
Lead & Moderator*

@mkorbi

Agenda

★ 1.20 Release Update

★ 1.19 Stats

★ 1.19 Highlights

★ SIG Updates

★ Q&A

|

1.20 Release Dates

Overview

★ 1.20 Release

- ○ Start Date: 14th of September 2020

- ○ Original Target: 8th of December 2020

1.19 Enhancements

Overview

★ 34 total enhancements tracked in 1.19

- ○ 10 Stable Enhancements

- ○ 15 Graduating to Beta

- ○ 9 Introduced Alpha features

1.19 Highlights

Kubernetes 1.19 - Accentuate The Paw-sitive

image credit: Hannabeth Lagerlöf / @emanate_design

New Things!

- ★ Structured Logging
- ★ Storage Pools for Capacity Management
- ★ Allow users to set a pod's hostname to its Fully Qualified Domain Name (FQDN)
- ★ Allow CSI drivers to opt-in to volume ownership change
- ★ Generic inline volumes

1 Year Support

- ★ Starting with Kubernetes 1.19, the support window for Kubernetes versions will increase from 9 months to one year
- ★ Kubernetes 1.16, 1.17 and 1.18 still fall under the older "three releases support" model
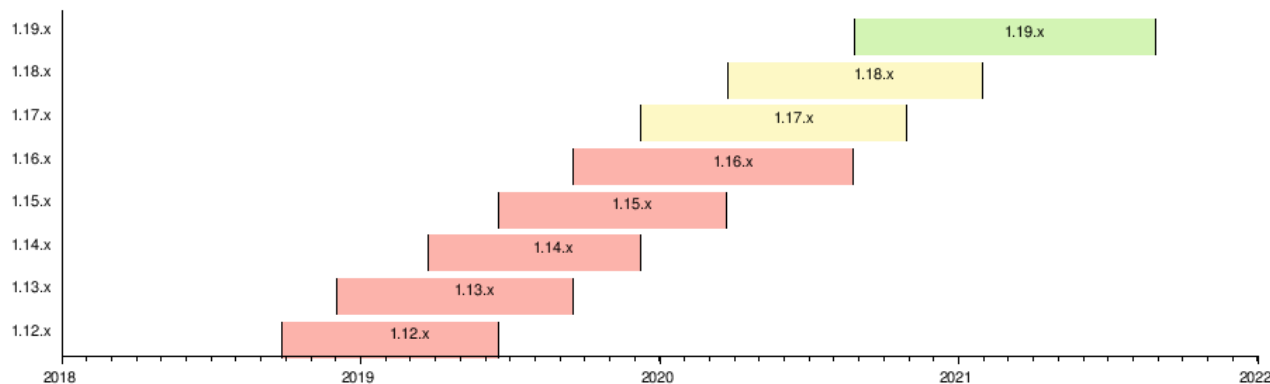
Feature Blog

SIG Updates

CLOUD NATIVE
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API MACHINERY

Provide Recommended .status.conditions Schema

- While many Kubernetes APIs have `.status.conditions`, the schema of condition varies a lot between them
- A common **Condition** type for conditions has been introduced for all new APIs to consume
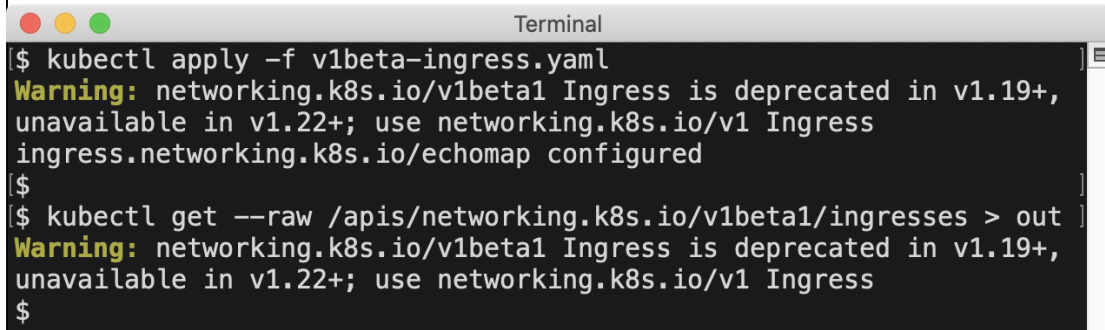
Status: Stable

Tracking Issue

Enhancement Proposal

Warning Mechanism for Use of Deprecated APIs

- standard Warning response header, so it does not change the status code or response body

Status: Beta

Tracking Issue

Enhancement Proposal

```
Terminal
[$ kubectl apply -f v1beta-ingress.yaml
Warning: networking.k8s.io/v1beta1 Ingress is deprecated in v1.19+,
unavailable in v1.22+; use networking.k8s.io/v1 Ingress
ingress.networking.k8s.io/echomap configured
[$
[$ kubectl get --raw /apis/networking.k8s.io/v1beta1/ingresses > out ]
Warning: networking.k8s.io/v1beta1 Ingress is deprecated in v1.19+,
unavailable in v1.22+; use networking.k8s.io/v1 Ingress
$
```

Feature Blog

ARCHITECTURE

Clarify Use of node-role Labels within Kubernetes and Migrate Old Components

- Clarifies that the label `node-role.kubernetes.io/*` is solely intended for use by users and external projects. It should **not** be used to vary Kubernetes behavior
- Provides for a way to existing consumers of the label in migrating out of the behavior

Status: Beta

Tracking Issue

Enhancement Proposal

Enable Running Conformance Tests without Beta REST APIs or Features

- Acts on the expectations of keeping the project stable, reliable and consistent for other projects using Kubernetes as a foundation
- All identified dependencies on beta REST APIs and features to pass conformance have been resolved

Status: Beta

Tracking Issue

Enhancement Proposal

Require Transition from Beta

- When a new feature API reaches beta, the beta-quality API has three releases to either:
  - Reach GA, and deprecate the beta
  - Have a new beta version and deprecate the previous beta
- **Only** REST APIs are affected

Status: Stable

Tracking Issue

Enhancement Proposal

Auth

Kubelet Client TLS Certificate Rotation

- Obtains the kubelet certificate and rotates automatically as the expiration date approaches

Status: Stable

Tracking Issue

Enhancement Proposal

Limit Node Access to API

- A security-conscious enhancement, to prevent Kubelets from self-setting labels within core namespaces like **k8s.io** and **kubernetes.io**

Status: Stable

Tracking Issue Enhancement Proposal

CertificateSigningRequest API

- Every Kubernetes cluster has a root CA used to encrypt traffic between core Kubernetes components. Handled by the Certificates API.
- Adds a Registration Authority to improve both the signing process and bolster cluster security.

Status: Stable

Tracking Issue Enhancement Proposal

CLUSTER LIFECYCLE

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New kubeadm component config scheme

- Kubeadm component configuration management is getting a refresh.
- Some changes include stop defaulting component configs and delegating config validation.

Status: Alpha

Tracking Issue

Enhancement Proposal

kubeadm: Customization with Patches

- A new flag, **--experimental-patches** has been added to allow for different limits for dev, test, prod, or other environments.
- Once this feature reaches beta, it will become **--patches**.

Status: Alpha

Tracking Issue

Enhancement Proposal

INSTRUMENTATION

Redesign Event API

- Reduces the impact Events have on the rest of the cluster
- New API enables users to be able to better track changes in the state of objects

Status: Stable

Tracking Issue

Enhancement Proposal

Structured Logging

- Kubernetes logs have traditionally been unstructured strings
- structured logs support natively "key, value" pairs and object references
- two new methods in the klog library: InfoS and ErrorS

```
klog.InfoS("Pod status updated", "pod", klog.KObj(pod), "status", status)
```

- Result:

```
I1025 00:15:15.525108       1 controller_utils.go:116] "Pod status updated" pod="kube-system/kubedns" status="ready"
```

Status: Alpha

Tracking Issue

Enhancement Proposal

Feature Blog

NETWORK

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SCTP Support for Services, Pod, Endpoint, and NetworkPolicy

Enables specifying SCTP as a protocol by default.

```
kind: Service
apiVersion: v1
metadata:
  name: my-service
spec:
  selector:
    app: MyApp
  ports:
  - protocol: SCTP
    port: 80
    targetPort: 9376
```

Status: Beta

Tracking Issue

Enhancement Proposal

EndpointSlice API

- **10x scalable** alternative to the Endpoint API
- Enabled in kube-proxy by default

Status: Beta

Tracking Issue

Enhancement Proposal

Feature Blog

Graduate Ingress to V1

- After being introduced in Kubernetes 1.1 this API now reaches GA.
- This version includes several changes, like the `ServiceName` and `ServicePort` fields are now `service.name` and `service.port`

Status: Stable

Tracking Issue

Enhancement Proposal

|

Adding AppProtocol to Services and Endpoints

- Brings the `AppProtocol` field introduced to `EndpointSlice` in 1.17 to `ServicePort` and `EndpointPort` as well.
- Removes the necessity of using arbitrary resource annotations
- Increases UX and reduces [user frustration](#)

Status: Beta

[**Tracking Issue**](#)

[**Enhancement Proposal**](#)

NODE

Seccomp

- Provides the ability to set a seccomp profile for a Pod, using Pod Security Policies.
- Allows for control of privilege given to pods

Status: Stable

Tracking Issue

Enhancement Proposal

Node Topology Manager

- Certain workloads perform better when isolated on one CPU core vs. sharing time with other processes.
- Two enhancements were added in 1.19:
  - GetPreferredAllocation
  - GetPodLevelTopologyHints

Status: Beta

Tracking Issue

Enhancement Proposal

Building Kubelet without Docker

- Part of the effort around removing the dependency on the docker Golang package.

- Allows for Kubelet to compile and work without the Docker dependency, but doesn't remove any docker code from the codebase.

Status: Stable

Tracking Issue

Enhancement Proposal

Allow Users to Set a Pod's Hostname to its Fully Qualified Domain Name (FQDN)

- Allows for setting a pod's hostname to its FQDN, allowing for more interoperability with legacy systems.
- `hostnameFQDN: true`

Status: Alpha

Tracking Issue Enhancement Proposal

Kubelet Feature: Disable AcceleratorUsage Metrics

- Summarizes the process to deprecate Kubelet collecting Accelerator Metrics data.

Status: Alpha

Tracking Issue Enhancement Proposal

SCHEDULING

Graduate the kube-scheduler ComponentConfig to v1beta1

- Introduces the v1beta1 version of the scheduler ComponentConfig
- The ComponentConfig is slated for GA in v1.21 after soaking through v1.20

```
apiVersion: kubescheduler.config.k8s.io/v1beta1

kind: KubeSchedulerConfiguration

clientConnection:

  kubeconfig: /etc/srv/kubernetes/kube-scheduler/kubeconfig
```

Status: Beta

Tracking Issue

Enhancement Proposal

Run multiple Scheduling Profiles

- Caters to the scheduling needs of heterogeneous workloads
- Allows for the scheduler to run different logic on the same scheduler
- Removes the concern of race conditions in operating multiple schedulers

Status: Beta

Tracking Issue

Enhancement Proposal

Even Pod Spreading Across Failure Domains

- The `PodTopologySpread` feature gives users more fine-grained control on distribution of pods scheduling, so as to achieve better high availability and resource utilization.
- Provides for switching between a predicate or a priority.

Status: Stable

Tracking Issue

Enhancement Proposal

Add a Configurable Default Constraint to PodTopologySpread

- Allows default spreading constraints for pods not specifying any `.spec.topologySpreadConstraints`

Status: Alpha

Tracking Issue

Enhancement Proposal

Add non-preempting Option to PriorityClasses

- Makes preempting behavior optional for a PriorityClass
- Pods waiting to be scheduled won't trigger preemption if it doesn't have preemption enabled in it's spec.

Status: Beta

Tracking Issue

Enhancement Proposal

STORAGE

Immutable Secrets and ConfigMaps

Immutable Secrets and ConfigMaps

Status: Beta

Tracking Issue

Enhancement Proposal

Azure Disk in-tree to CSI Driver Migration

If you have the Azure Disk CSI Driver, you can turn on the feature gate `CSIMigrationAzureDisk` to enable the same

Status: Beta

Tracking Issue

Enhancement Proposal

vSphere in-tree to CSI driver migration

When enabled via the `CSIMigrationvSphere` feature gate, all plugin operations are shimmed to the CSI Driver instead of the in-tree plugin provided the vSphere CSI Driver is installed on the cluster.

Status: Beta

Tracking Issue

Enhancement Proposal

Storage Capacity Tracking

- Kubernetes scheduler has no information about where a CSI driver might be able to create a volume
- `CSIStorageCapacity` alpha API allows storing the necessary information in etcd
- By setting the `CSIDriver.storageCapacity` flag, the scheduler automatically filters out nodes that do not have access to enough storage capacity

Status: Alpha

Tracking Issue

Enhancement Proposal (1 & 2)

Feature Blog

|

Generic Ephemeral Inline Volumes

- extend Kubernetes with CSI drivers that provide light-weight, local volumes
- new volume source, the so-called EphemeralVolumeSource contains all fields that are needed to created a volume claim
- the Pod is the owner of the volume claim, if the pod gets deleted the garbage collector deletes also the volume

Status: Alpha

Tracking Issue

Enhancement Proposal

Feature Blog

|

Allow CSI Drivers to opt-in to Volume Ownership Change

Add `CSIDriver.Spec.SupportsFSGroup` as a new field allowing the CSI driver to sprecify whether it supports volume ownership modifications via `fsGroup`

Status: Alpha

Tracking Issue

Enhancement Proposal

WINDOWS

Support CRI-ContainerD on Windows

- Improve the matrix of Kubernetes features available on Windows
- Users could choose to run with only CRI-ContainerD instead of Docker EE

Status: Stable

Tracking Issue

Enhancement Proposal

Release Team Shadow Program

Release Team Shadow Program

★ Release Team Roles
  ○ Release Team Lead
  ○ Enhancements
  ○ CI Signal
  ○ Bug Triage
  ○ Docs
  ○ Release Notes
  ○ Communications

★ 1 lead : 3 - 4 shadows

★ ~3 months // weekly workload varies depending on team

★ [Release Team Shadows Github repo](#)

Questions?

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Thank You

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