

What's New in Kubernetes 1.20



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Presenters

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Kubernetes 1.20 - The Raddest Release



Agenda

- ★ 1.21 Release Update
- ★ 1.20 Stats
- ★ 1.20 Highlights
- ★ SIG Updates
- ★ Q&A



1.21 Release Updates

Overview

★ 1.21 Release Dates

- Upcoming Deadlines:
 - Enhancement Freeze: Tuesday, Feb 9th
 - Code Freeze: Tuesday, March 9th
- Target Release Date: Thursday, April 8th

★ Future Release Cadence:

- 3 Releases vs 4 Releases
- Feedback: <https://github.com/kubernetes/sig-release/discussions/1290>



1.20 Enhancements

Overview

★ 44 total enhancements tracked in 1.20

- 16 Stable Enhancements
- 15 Graduating to Beta
- 11 Introduced Alpha features
- 2 Deprecations
- AT LEAST 5 new authors



1.20 Highlights



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What about Dockershim?

It isn't as scary as it sounds!



Stability

- ★ Foundational work
 - Work to move CRI toward Beta (Introduced in 1.5)
 - Work to move CronJobs toward Stable (Beta since 1.8)
- ★ Long standing ExecProbe issue fixed
- ★ SIG Node Stability



New Things!

- ★ Graceful node shutdown
- ★ Better Pod Resource Request Metrics
- ★ Container Resource based Pod Autoscaling
- ★ Security related improvements



SIG Updates

API MACHINERY

Priority and Fairness for API Server Requests

Priority and Fairness for API Server Requests

- Allow for self-maintenance under heavy traffic
- Keep components/tenants from crowding out others

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Deprecate and remove SelfLink fields

Deprecate the SelfLink field in both ObjectMeta and ListMeta objects

- Follow-up to v1.16 alpha deprecation.
- Switch off the feature gate which will automatically disable setting SelfLinks. It will still be possible to revert the behavior by changing value of a feature gate.

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Built-in API Types Defaults

Allow new declarative default
marker for built-in API types

// +default=<any>

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



kube-apiserver identity

In HA clusters, each kube-apiserver will have a unique ID: **kube-apiserver-{UUID}** stored in a Lease object.

- Pre-req for using features that involve HA API server coordination (ex: StorageVersionAPI feature gate)

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Apps

CronJons (prev ScheduledJobs)

New alternative implementation of CronJob controller
`CronJobControllerV2`

- provides experimental performance improvements.
- V1 of controller still available

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



ARCHITECTURE

Enable running conformance tests without beta REST APIs or features

Establish a process for ensuring that the Kubernetes components and the Kubernetes conformance tests have no dependencies on beta REST APIs or features.

Status: Phase 1

Identify beta requirements

[Tracking Issue](#)

[Enhancement Proposal](#)



Auth

External client-go credential providers

Allow out-of-tree implementation of obtaining client authentication credentials

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



TokenRequest API and Kubelet integration

Improve security of service
account tokens

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Provide OIDC discovery for service account token issuer

Provide OIDC discovery endpoints for the API server's service account token issuer.

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Autoscaling

Container Resource based Pod Autoscaling

Adds the ability for HPA to make scaling decisions based on individual container usage instead of aggregated pod usage.

metrics:

- type: ContainerResource

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



CLI

kubectl debug

Add a new command to debug pods.

```
kubectl debug mypod  
--image=debian
```

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Cloud Provider

Support Out-of-Tree Azure Cloud Provider

Support Out-of-Tree Azure Cloud Provider by running the cloud-controller-manager

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



CLUSTER LIFECYCLE



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Rename the kubeadm "master" label and taint

Replaces the word "master" with "control plane" in taint and label as part of community wide effort to address non-inclusive language

node-role.kubernetes.io/control-plane

Status: Deprecated

[Tracking Issue](#)

[Enhancement Proposal](#)



Instrumentation

Expose metrics about resource requests and limits that represent the pod model

Exposes an optional set of metrics series that capture the resources a pod is considered to be "consuming" from a scheduling perspective at the current time. The metrics will be exposed via **`/metrics/resources`**

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Kubernetes system components logs sanitization

A new logging filter which can be applied to all Kubernetes system components logs to prevent various types of sensitive information from leaking via logs

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Defend against logging secrets via static analysis

Not directly an end user feature,
but improvement to Kubernetes
Testing

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



NETWORK

Add IPv4/IPv6 dual-stack support

Adding IPv4/IPv6 dual-stack support and awareness for Kubernetes pods, nodes and services.

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



SCTP support for Services, Pod, Endpoint and NetworkPolicy

SCTP is now supported as an additional protocol alongside TCP and UDP in Pod, Service, Endpoint, and NetworkPolicy.

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



New Endpoint API

New Endpoint API to replace the current core/v1 endpoint API to mitigate current performance/scalability issues.

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Support of mixed protocols in Services with type=LoadBalancer

NodeLocal DNSCache is an add-on that runs a dnsCache pod as a daemonset to improve clusterDNS performance and reliability.

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Adding AppProtocol to Services and Endpoints

AppProtocol is a new optional field on ports in Endpoints and Services

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



Tracking Terminating Endpoints

Track terminating endpoints so we can handle terminating endpoints gracefully.

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Optionally Disable NodePorts for Service Type=LoadBalancer

Allow users to disable node ports for Service Type=LoadBalancer. This is useful for bare metal / on-prem environments that rely on VIP based LB implementations.

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



NODE

Streaming Proxy Redirects

There are several features and flags for handling container streaming requests (exec/attach/port-forward). Having so many different ways of handling these requests unnecessarily complicates configuration, and opens the cluster to potential security risks.

Status: Deprecated

[Tracking Issue](#)

[Enhancement Proposal](#)



RuntimeClass

RuntimeClasses are assigned to pods through a runtimeClass field on the PodSpec. This provides a new mechanism for supporting multiple runtimes in a cluster and/or node.

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



PidLimiting

Enables pod-to-pod PID isolation
as well as node-to-pod PID
isolation.

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



Add pod-startup liveness-probe holdoff for slow-starting pods

This proposal adds a new probe called `startupProbe` that holds off all the other probes until the pod has finished its startup.

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



Fixing Kubelet Exec Probe Timeouts

Kubelet previously did not respect exec probe timeouts. Because exec probe timeouts were never respected by kubelet, a new feature gate ExecProbeTimeout will be introduced.

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



Support 3rd party device monitoring plugins

Support 3rd party device monitoring plugins, maintained outside the kubernetes/kubernetes tree.

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



Node Topology Manager

Kubelet component to coordinate fine-grained hardware resource assignments for different components in Kubernetes.

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Configure FQDN as Hostname for Pods

```
# Pod spec
apiVersion: v1
kind: Pod
spec:
  hostname: "foo"
  subdomain: "test"
  setHostnameAsFQDN: "true"
```

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Disable AcceleratorUsage Metrics

Removes collection of threeGPU Accelerator Metrics: MemoryTotal, MemoryUsed, DutyCycle.

Impacts GPU users

FeatureGate:
DisableAcceleratorUsageMetrics

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Support to size memory backed volumes

Improves the portability of pod definitions that use memory backed empty dir volumes. `emptyDir.sizeLimit` used to size volumes.

Feature Gate:
`SizeMemoryBackedVolumes`

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Graceful node shutdown

Makes the kubelet aware of the underlying node shutdown and propagates this signal to pods ensuring they can shutdown as gracefully as possible.

kubeletConfig.ShutdownGracePeriod

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Kubelet CRI support

Starts to move CRI Support to stable. Will move to beta in 1.21

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Add downward API support for hugepages

Add support for hugepage requests and limits for all page sizes in downward API. Previously not available.

Feature Gate:
DownwardAPIHugePages

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



Kubelet Credential Provider

Adds support for exec plugins to retrieve image pull credentials for the kubelet.

Two flags:

--image-credential-provider-config
and
--image-credential-provider-bin-dir

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



SCHEDULING

Add a configurable default constraint to PodTopologySpread

Adds default spreading constraints, i.e. constraints that can be defined at the cluster level and are applied to pods that don't explicitly define spreading constraints.

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



STORAGE

Snapshot / Restore Volume Support for Kubernetes (CRD + External Controller)

Snapshot / restore functionality for Kubernetes and CSI. This provides standardized APIs design (CRDs) and adds PV snapshot/restore support for CSI volume drivers.

Status: Stable

[Tracking Issue](#)

[Enhancement Proposal](#)



Skip Volume Ownership Change

NewPermissionChangePolicy
string field in
PersistentVolumeClaimVolumeSource struct and related conditional
volume ownership change
behavior

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Allow CSI drivers to opt-in to volume ownership change

Add a new field called **CSIDriver.Spec.FSGroupPolicy** that allows the driver to define if it supports volume ownership modifications via fsGroup.

Status: Beta

[Tracking Issue](#)

[Enhancement Proposal](#)



Service Account Token for CSI Driver

feature **CSIServiceAccountToken**
plumbs down pod's service
account token to CSI driver

Status: Alpha

[Tracking Issue](#)

[Enhancement Proposal](#)



WINDOWS



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Support CRI-ContainerD on Windows

Currently CRI support for windows is planned for ContainerD 1.3.

Users will be able to take advantage of the latest container platform improvements that shipped in Windows Server 2019 / 1809 and beyond.

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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