



Embracing Batch on Kubernetes

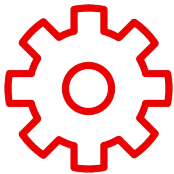
Jason Kincl

Product Solution Architect

Patrick Bruszewski

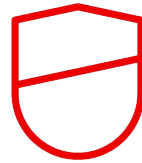
Specialist Solution Architect

What problems are we solving?



Support Both Batch and Service Workloads

Unified compute resource that provides both time-bound batch and long running service-type workloads



Shared Resources

Take advantage of operational efficiencies by doing more with less duplication



Same Platform, Different Infrastructure

Build a stable and scalable platform that can be deployed across different types of infrastructure

Where does it make sense?



Burst workload capability

Have workloads that can be pre-empted or prioritized

Resource Utilization Optimization

<100% utilized HPC resources

Elastic infrastructure

Either cloud-based or on-prem with solutions like HPE Greenlake or Dell Apex

Traditional Batch to Kube-Native



Slurm



Jobs are executed using a Slurm scheduler running directly on a node

Slurm on k8s



Jobs are executed using a Slurm scheduler that is running on top of a Kubernetes cluster

Kueue



Jobs are executed using the Kubernetes-native Kueue job manager

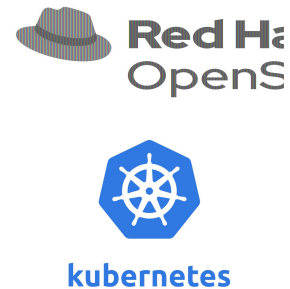
How are we doing this?

Software Stack



Slurm scheduler can be deployed to manage jobs or just slurmd to execute workloads, depending on the environment

Kubernetes



Jobs are executed using a Slurm scheduler that is running on top of a Kubernetes cluster

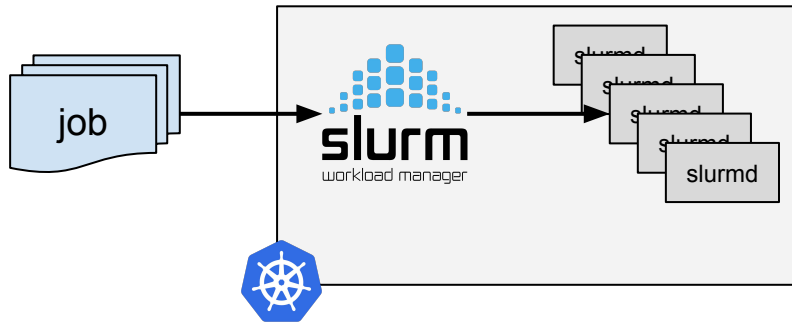
KEDA



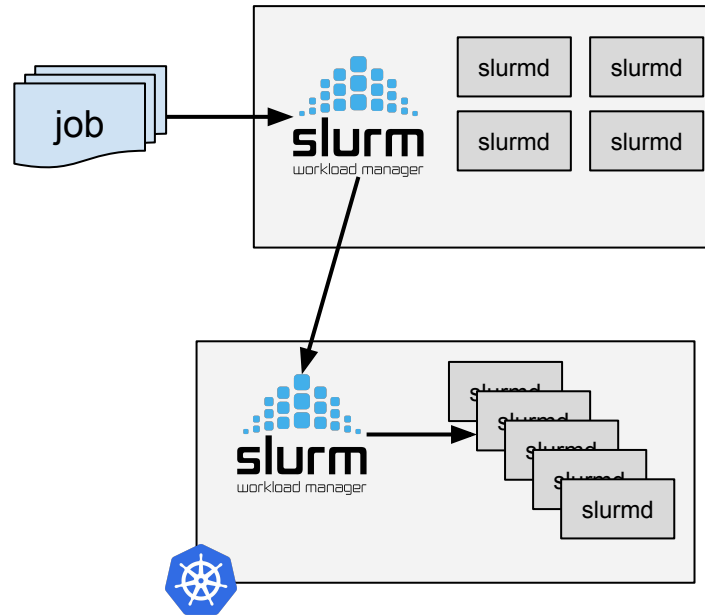
KEDA is used to auto-scale the number of slurmd pods based on the resource requirements in the queue

Deployment Options

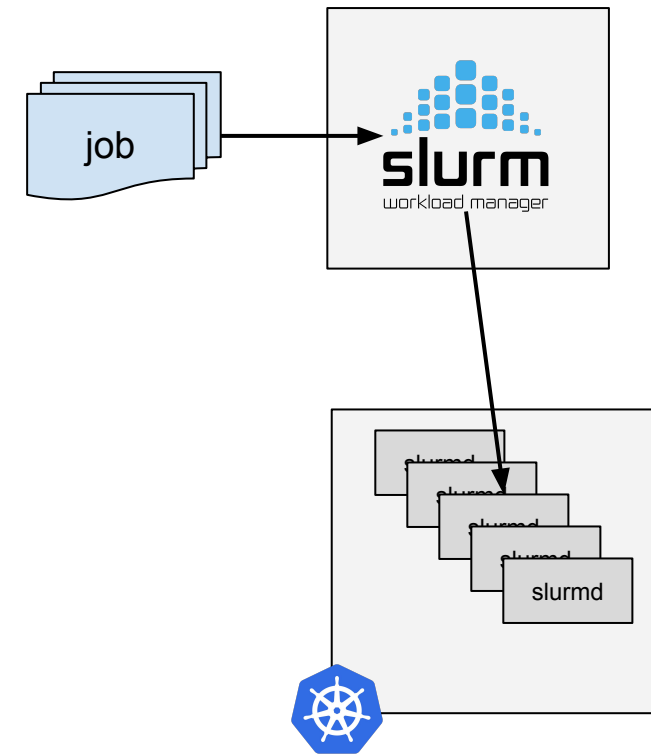
Standalone Slurm



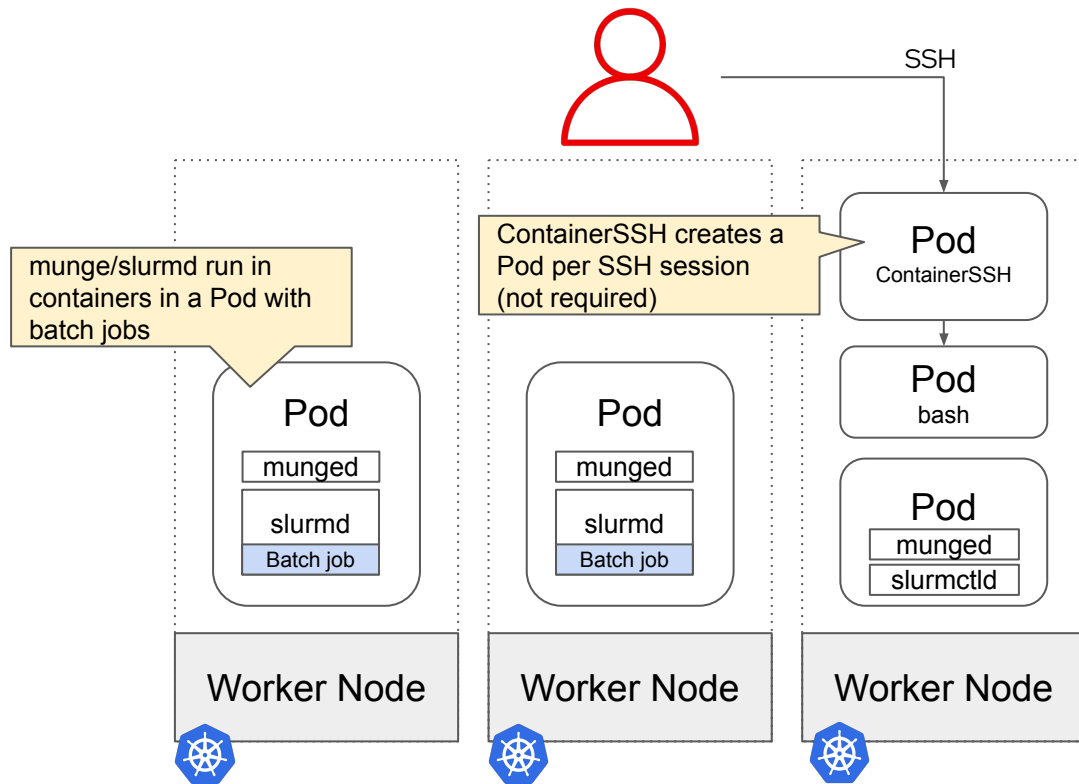
Cross Submission



Submit to Kubernetes

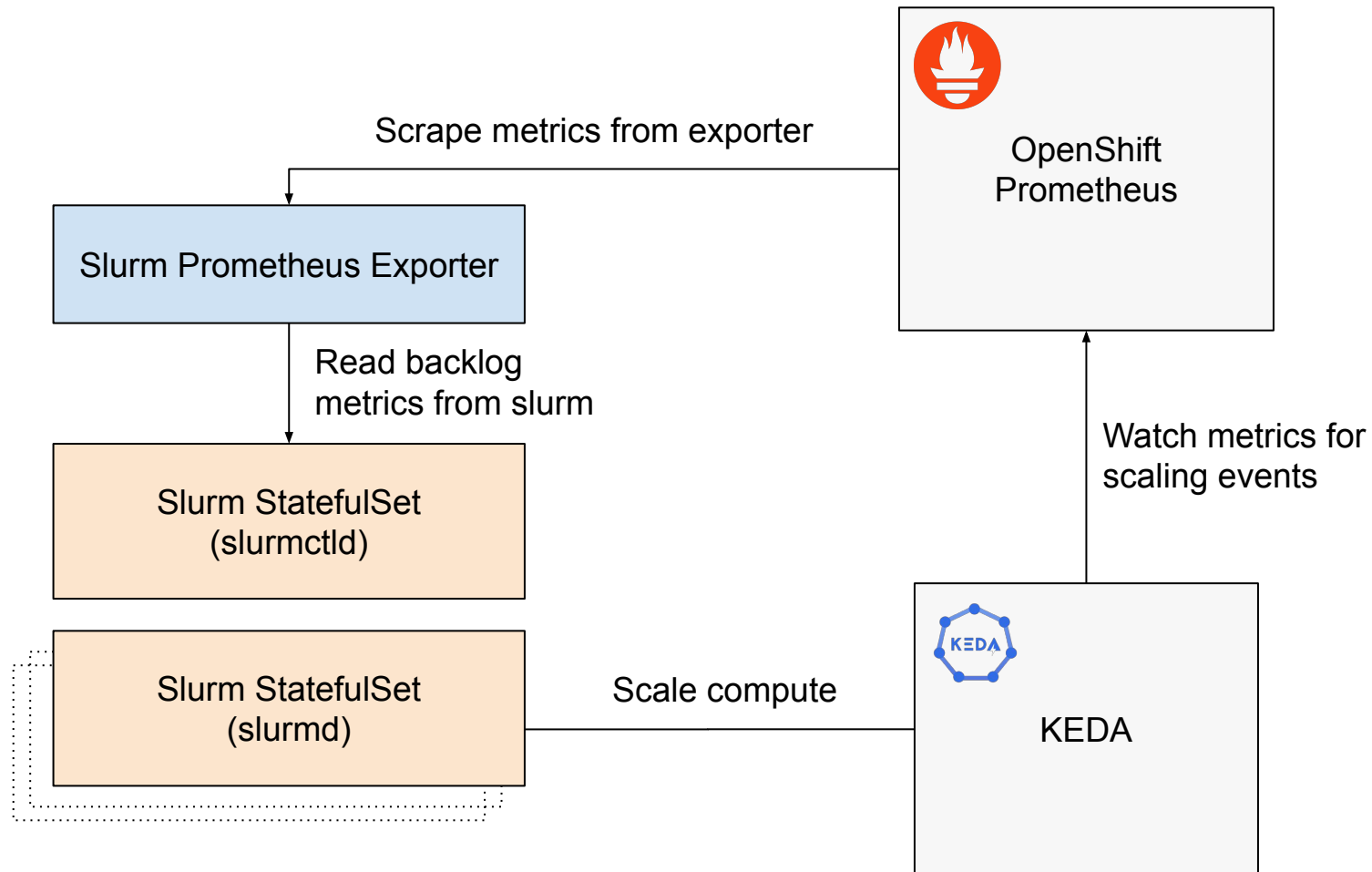


Slurm



- Familiar interface and leveraging Kubernetes
 - ContainerSSH
 - Slurm Dynamic Nodes
- Two-level scheduling
 - Kubernetes schedules Pods running slurmd
 - Slurm schedules batch jobs in running Pods

Auto-scaling Slurm Pods



Code is available:

github.com/naps-product-sa/openshift-batch

Reach out to us!





Thank you

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