

# Running Large-Scale Scheduling Simulations with Virtual Kubelet

KubeCon NA 2023 – Nov. 8

David R. Morrison

Applied Computing Research Labs

<https://appliedcomputing.io>

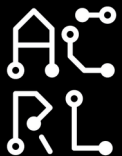


Applied Computing does open-source research and development in distributed systems, with a particular focus on modeling, scheduling, and optimization.

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Applied Computing Research Labs

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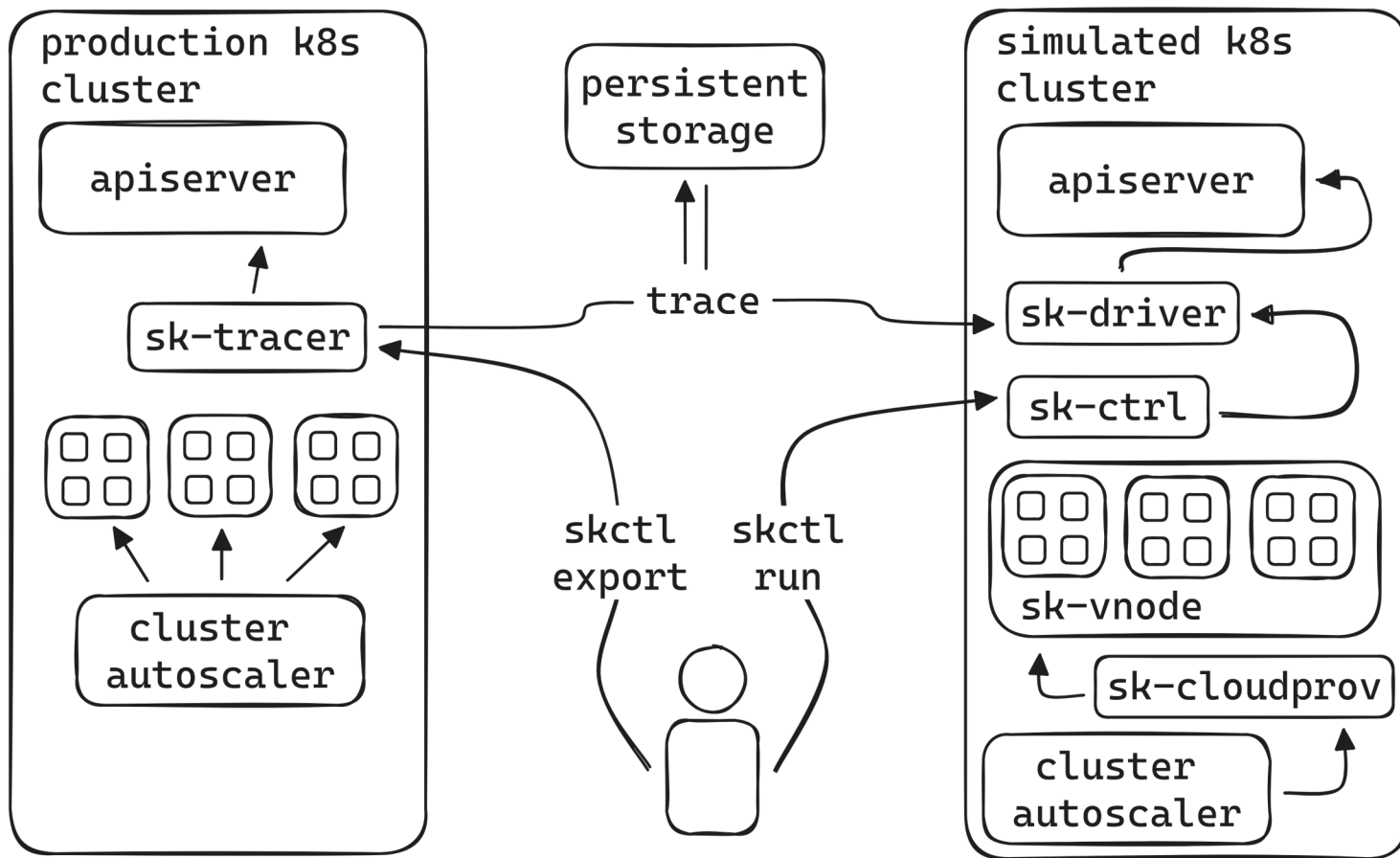
# Why simulation?

David R. Morrison

Applied Computing Research Labs

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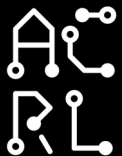


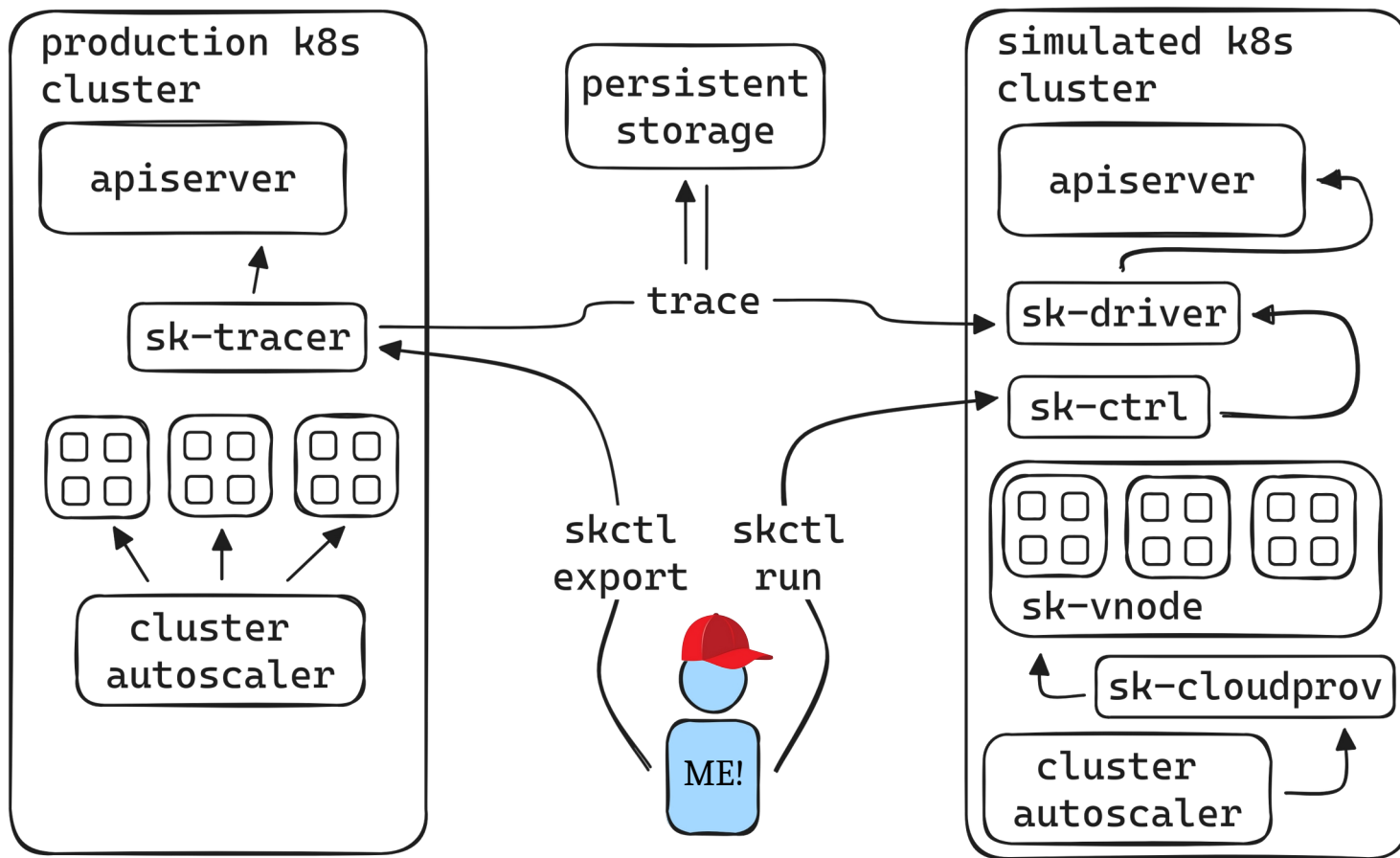


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Applied Computing Research Labs

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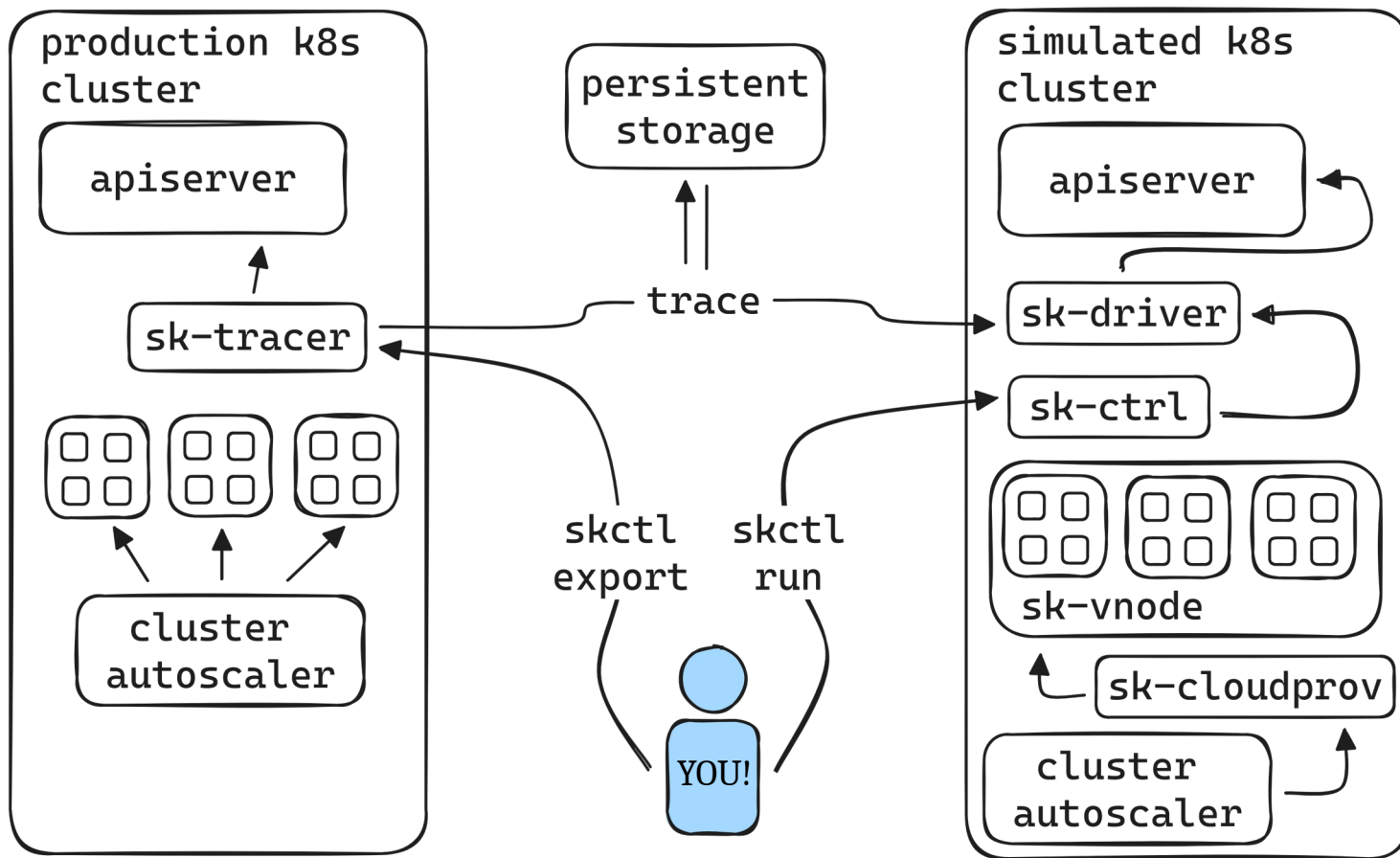


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Applied Computing Research Labs

<https://appliedcomputing.io>



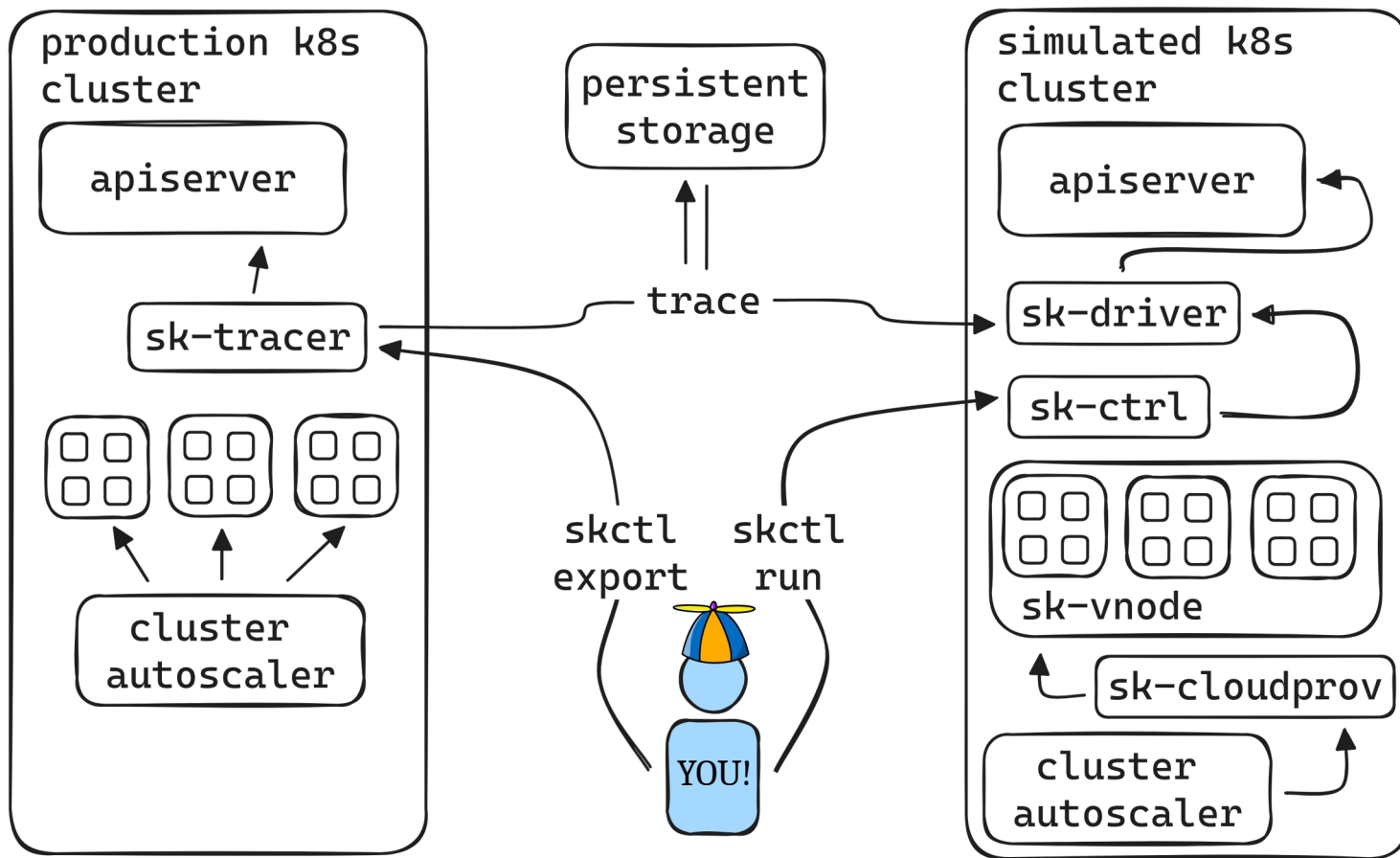


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Applied Computing Research Labs

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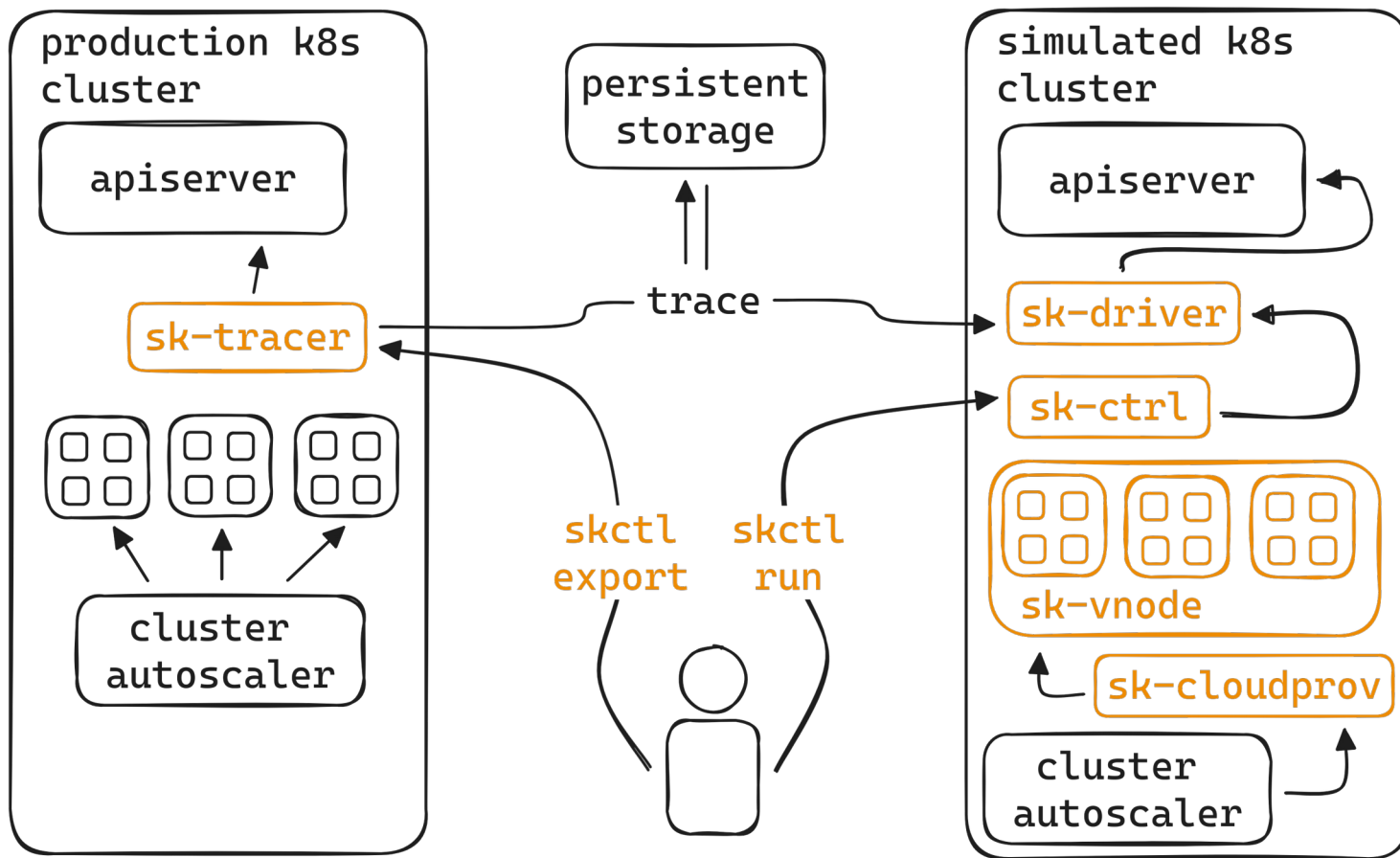


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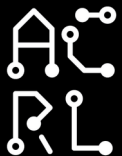




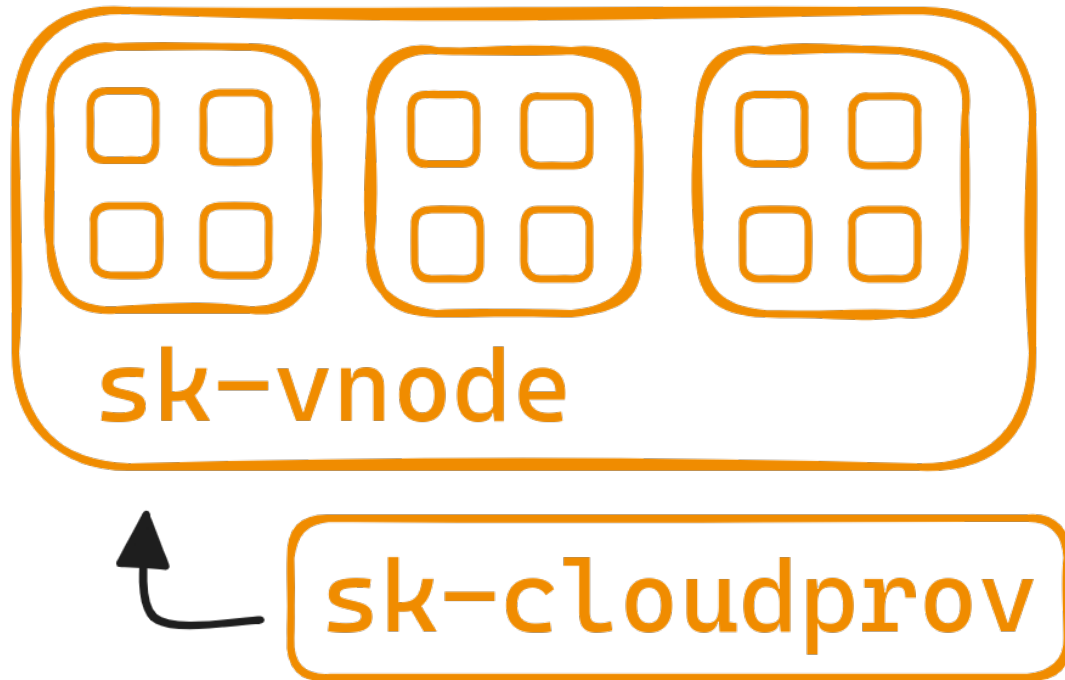
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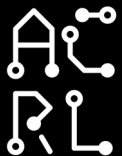


- sk-vnode:
  - [Virtual Kubelet](#)-based
  - Configurable node properties
  - Watches annotations to control pod lifecycle
- sk-cloudprov
  - [gRPC cloud provider](#) for Cluster Autoscaler
  - Scales the sk-vnode deployment up and down
  - Uses [pod deletion cost](#) feature to select nodes to terminate

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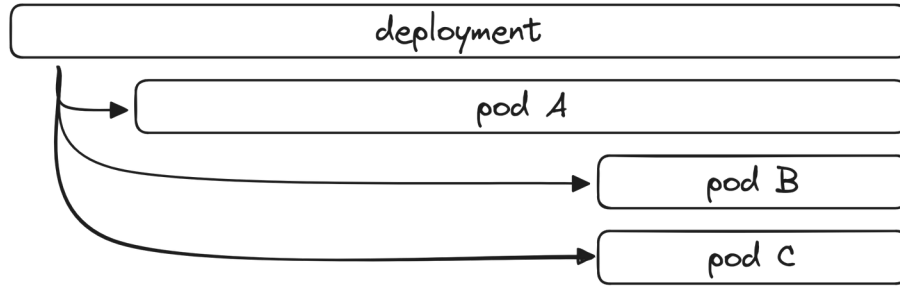
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# sk-tracer

- sk-tracer:
  - Watches apiserver for resources and pods
  - Records a timeline of “important” events
  - Exports data to persistent storage on-demand

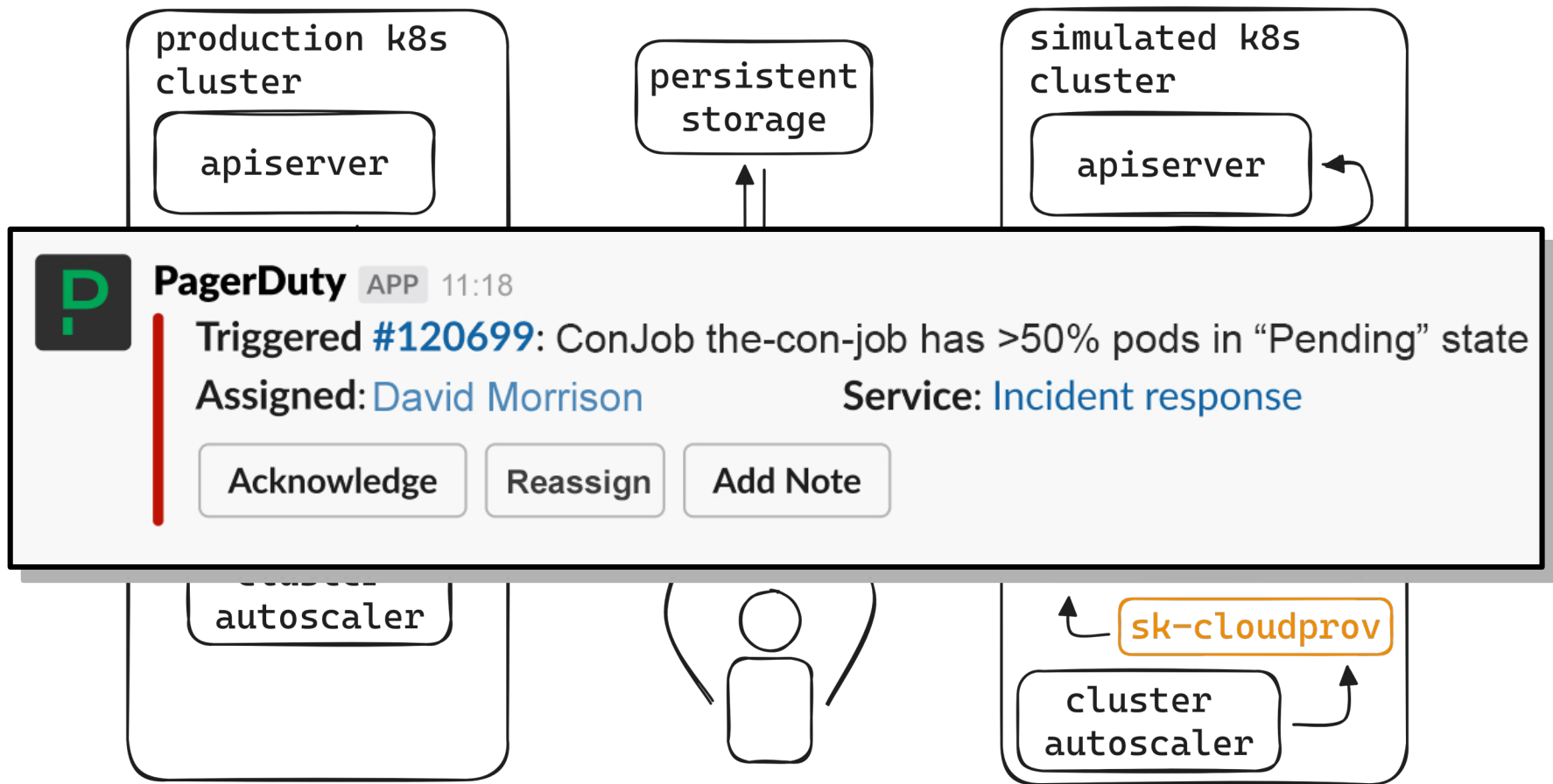


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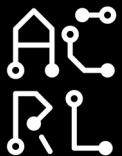


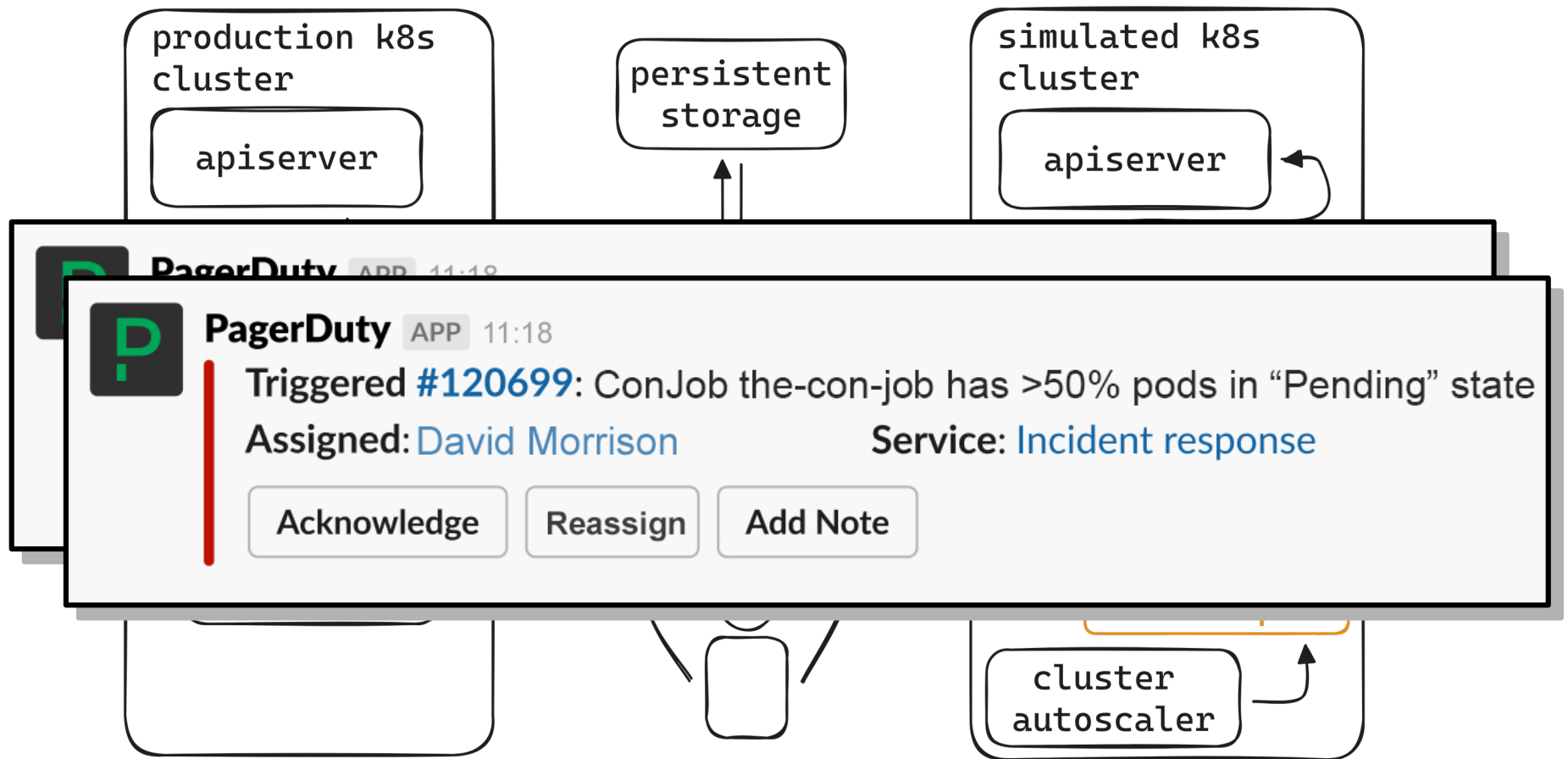


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# Future directions for SimKube

- Garbage collection
- Trace generation and modification
- Integrate with KWOK or similar
  - (two KWOK talks at KubeCon! [1](#), [2](#))
- Golang rewrite?

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Are you interested in contributing to, using, or sponsoring SimKube? Come talk to me!

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Thank you! Any questions?

<https://github.com/acrlabs/simkube>

<https://github.com/acrlabs/kubecon-na2023>

<https://blog.appliedcomputing.io>

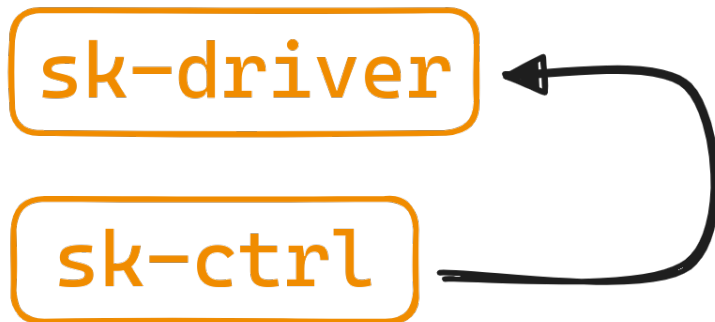
<https://hachyderm.io/@drmorrr>

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- `sk-ctrl`: watches for simulation CR, creates driver
- `sk-driver`
  - Runner: replays recorded trace
  - Mutator: watches incoming pod objects, applies appropriate labels, annotations, and node-selectors