

Kubernetes Integrated Applications in Julia

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 - Kuber.jl - Julia Package for interacting with Kubernetes
- Kuber.jl APIs
 - Basic APIs - get, put, delete
 - Monitoring Cluster Events - the watch API
- Example: Code Search Server on Kubernetes
 - Pipeline to crawl sources, download and index them
 - Serve HTTP APIs to search the index
 - Update index periodically
- Q & A

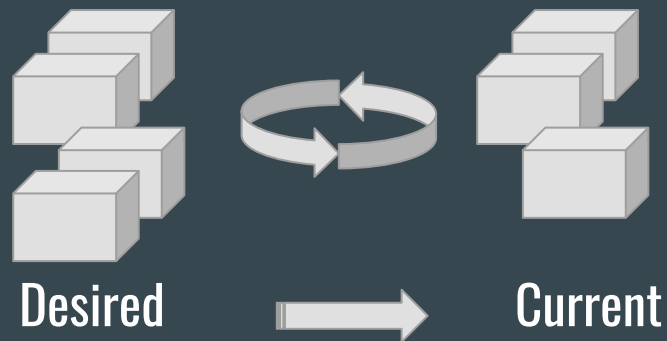
Kubernetes & Kuber.jl

Kubernetes (k8s)

- Container orchestration tool (<https://kubernetes.io/>)
 - Automate container deployment, scaling and management
- API: Open, Unified and Extensible
- Popular Distributions
 - AWS - EKS, Google - GKE, Azure - AKS, Red Hat Openshift
 - K3S, minikube, microk8s
- Example with Azure AKS
 - <https://github.com/JuliaComputing/Kuber.jl/blob/master/WalkThrough.md>
- Kubeadm used for this demo
 - <https://kubernetes.io/docs/setup/production-environment/tools/kubeadm/install-kubeadm/>

Kubernetes (k8s) - Under the Hood

- State store stores desired state of entities
- Machinery to match current state to desired state
- APIs to store, update and query state of entities
- Controllers
 - Create entities on the cluster
 - Monitor current state and desired state
 - Act to bring current state to the one desired



Kuber.jl

- REST API paradigm - entities and verbs
 - get/list
 - put
 - update!
 - delete!
- Watch for changes
 - watch

Using Kuber.jl

Screencast - Using Kuber.jl to deploy and watch a nginx server

<https://asciinema.org/a/462454>

Search Server on Kubernetes

Search Server Core

- A simple search server for demo.
 - Fetches source code for Julia packages from github releases
 - Extracts them
 - Indexes them using GoogleCodeSearch.jl
 - Serves a REST API that provides results using the index
- To simplify things and highlight the important parts, we use
 - only certain pre-downloaded sources, from the file system
 - a single index, no incremental re-indexing
 - the search server provided by GoogleCodeSearch.jl
- References:
 - <https://github.com/tanmaykm/KubernetesIntegratedJulia/blob/main/src/utils.jl>
 - <https://github.com/tanmaykm/GoogleCodeSearch.jl>

Search Server K8S Integration

- Building the Docker Image
- Indexing pipeline on k8s
- Search server on k8s
- Re-indexing
- References:
 - <https://github.com/tanmaykm/KubernetesIntegratedJulia/blob/main/Dockerfile>
 - <https://github.com/tanmaykm/KubernetesIntegratedJulia/blob/main/src/main.jl>
 - <https://github.com/tanmaykm/KubernetesIntegratedJulia/blob/main/src/k8sutils.jl>
- Screencast:
 - <https://asciinema.org/a/462469>

Q & A