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Introdução a Kubernetes Operators com Go

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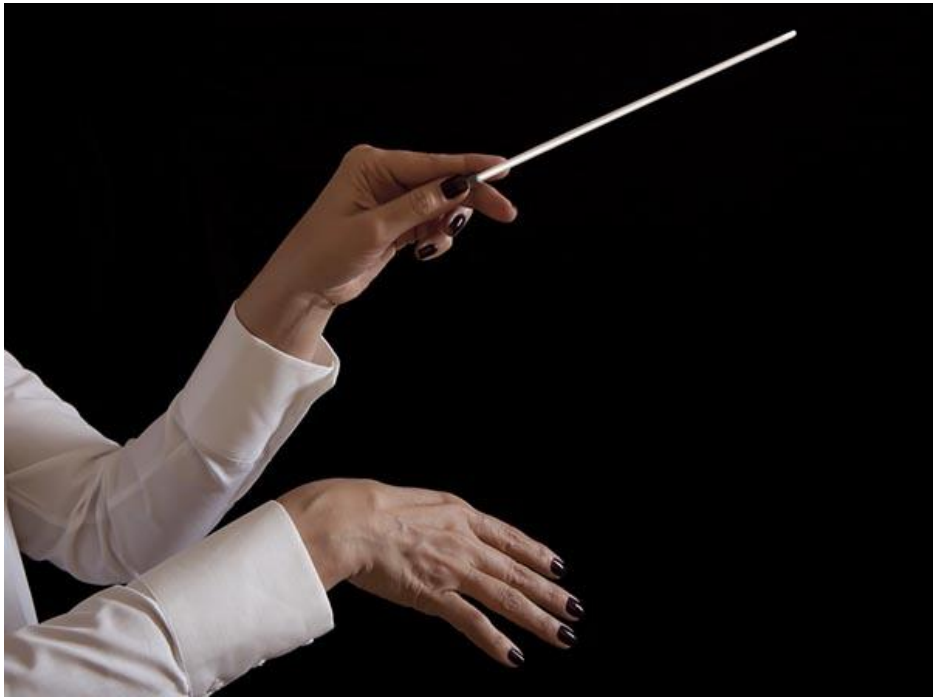
Kubernetes?



Para saber mais: An Idiot's Guide to Kubernetes

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O que é um Operator?

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Para saber mais: Understanding OpenShift Container Platform development

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Qual a missão?

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Implementação em vários sabores

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Nexus Operator (Red Hat GPTE)

Strimzi

Memcached Operator

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Fluxo básico de um Operator

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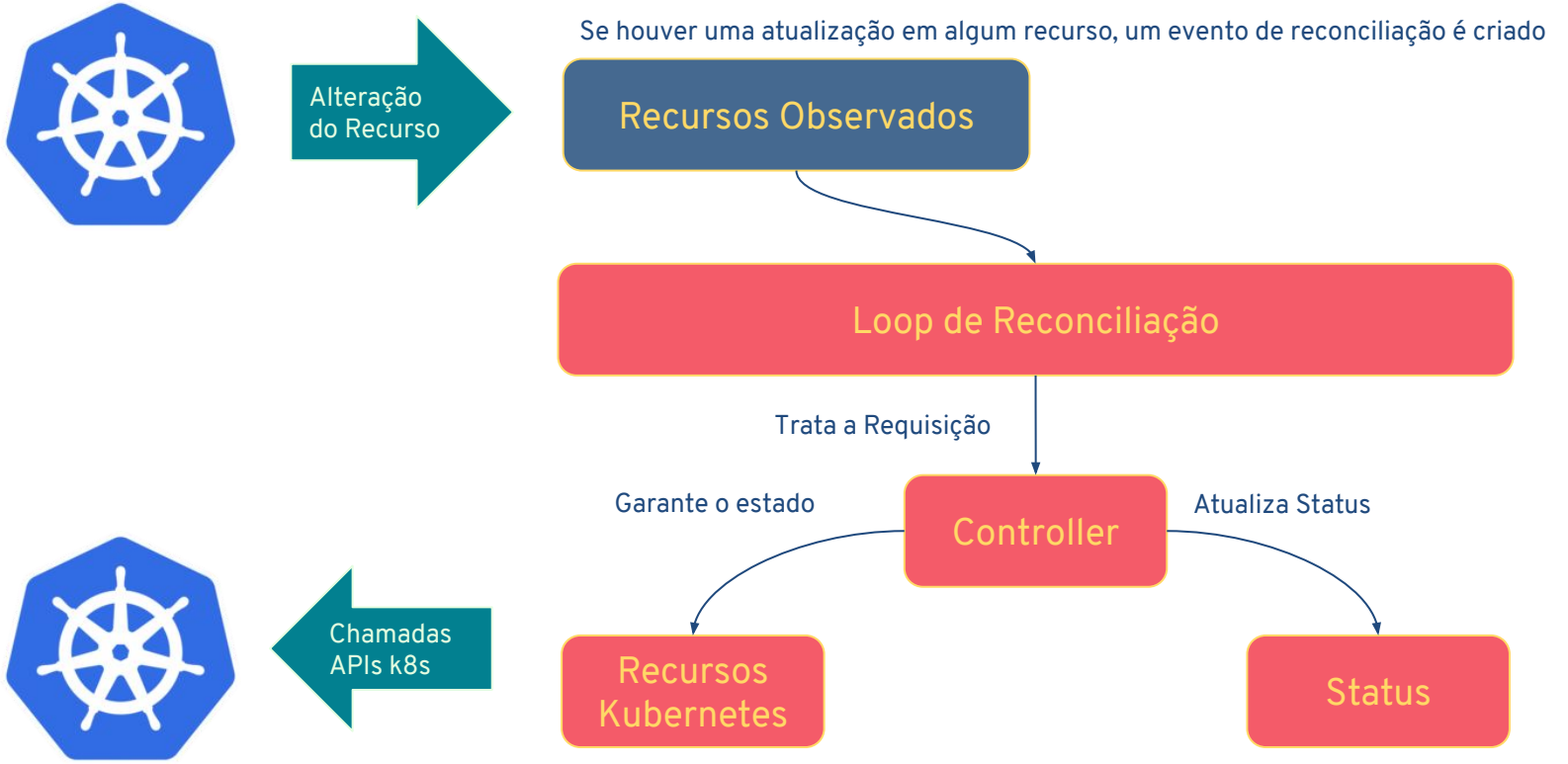

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PLAN
A
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Dicas para construir um Operator

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1. Planeje! Um Operator é composto por recursos e controllers controlados pelo Kubernetes. Como isso será estruturado?
2. Quais recursos o meu operator precisa criar para suportar sua missão?
3. E sobre o status? Número de réplicas de pods, endpoints, variáveis de ambiente?
4. Uma vez que um usuário atualize um recurso, como o operator vai reagir? Exemplo: atualização do número de réplicas do pod

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Exemplo de Domínio

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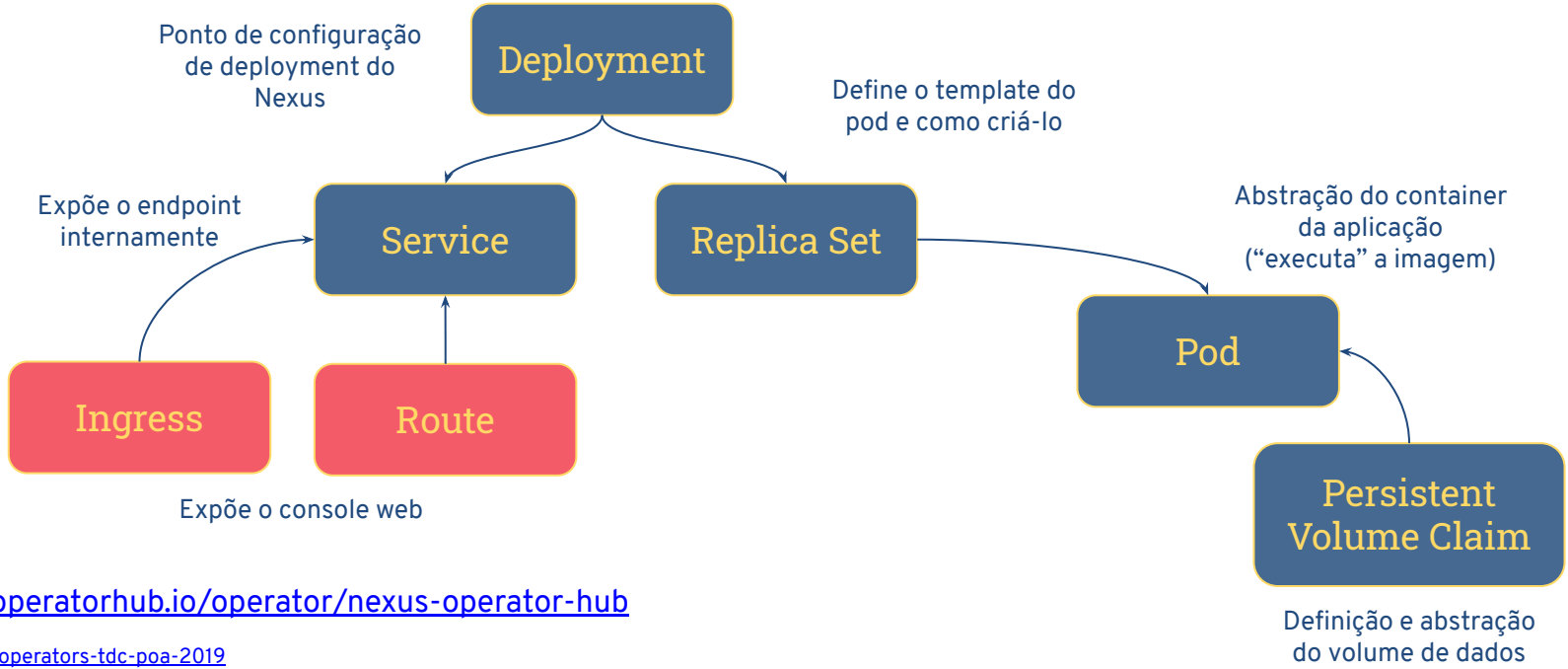
Nexus Operator: Recursos Kubernetes para suportar o deployment do Nexus 3.x



https://operatorhub.io/operator/nexus-operator-hub

```yaml
apiVersion: apps.m88i.io/v1alpha1
kind: Nexus
metadata:
  name: my-nexus
spec:
  # Number of Nexus pod replicas (can't be increased after creation)
  replicas: 1
  # Here you can specify the image version to fullfil your needs
  image: "docker.io/sonatype/nexus3:latest"
  # Set the resources requests and limits for Nexus pods
  resources:
    cpuRequest: 1
    cpuLimit: 2
    # Request memory will be set to the JVM args in runtime
    memoryRequest: 2Gi
    memoryLimit: 2Gi
  # Administrator credentials that will be kept into a Secret attached to the Nexus pod
  credentials:
    # Username for the Admin
    user: admin
    # Password (will be masked after Secret creation)
    password: admin123
  # Data persistence details
  persistence:
    # Should we persist Nexus libraries? Yes, please. (turn this to false only if you're evaluating this resource)
    persistent: true
    # Size of the volume reserved for the pods. Be aware that if replicas greater then 1, a RWX Persistent Volume will be created, hence
    # make sure that your cluster has support for this configuration. Ignored if persistent is set to false
    volume_size: 10Gi
```

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Implementação em GO \o/

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Operator SDK scaffold

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```
$ operator-sdk new nexus-operator --dep-manager modules

INFO[0000] Creating new Go operator 'nexus-operator'.
INFO[0000] Created go.mod
INFO[0000] Created tools.go
INFO[0000] Created cmd/manager/main.go
INFO[0000] Created build/Dockerfile
INFO[0000] Created build/bin/entrypoint
INFO[0000] Created build/bin/user_setup
INFO[0000] Created deploy/service_account.yaml
INFO[0000] Created deploy/role.yaml
INFO[0000] Created deploy/role_binding.yaml
INFO[0000] Created deploy/operator.yaml
INFO[0000] Created pkg/apis/apis.go
INFO[0000] Created pkg/controller/controller.go
INFO[0000] Created version/version.go
INFO[0000] Created .gitignore
INFO[0000] Validating project
go: finding github.com/operator-framework/operator-sdk master
INFO[0010] Project validation successful.
INFO[0010] Project creation complete.
```

http:/

```
$ operator-sdk add api --api-version=apps.m88i.io/v1alpha1 --kind=Nexus

INFO[0000] Generating api version apps.m88i.io/v1alpha1 for kind Nexus.
INFO[0000] Created pkg/apis/apps/group.go
INFO[0000] Created pkg/apis/apps/v1alpha1/nexus_types.go
INFO[0000] Created pkg/apis/addtoscheme_apps_v1alpha1.go
INFO[0000] Created pkg/apis/apps/v1alpha1/register.go
INFO[0000] Created pkg/apis/apps/v1alpha1/doc.go
INFO[0000] Created deploy/crds/apps_v1alpha1_nexus_cr.yaml
INFO[0004] Created deploy/crds/apps_v1alpha1_nexus_crd.yaml
INFO[0004] Running deepcopy code-generation for Custom Resource group versions: [apps:[v1alpha1], ]
INFO[0006] Code-generation complete.
INFO[0006] Running OpenAPI code-generation for Custom Resource group versions: [apps:[v1alpha1], ]
INFO[0012] Created deploy/crds/apps_v1alpha1_nexus_crd.yaml
INFO[0012] Code-generation complete.
INFO[0012] API generation complete.
```

```
$ operator-sdk add controller  --api-version=apps.m88i.io/v1alpha1 --kind=Nexus

INFO[0000] Generating controller version apps.m88i.io/v1alpha1 for kind Nexus.
INFO[0000] Created pkg/controller/nexus/nexus_controller.go
INFO[0000] Created pkg/controller/add_nexus.go
INFO[0000] Controller generation complete.
```

Operator Lifecycle Manager

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Home › Nexus Operator

Nexus Operator

Creates a new Nexus 3.x deployment in a Kubernetes cluster. Will help DevOps to have a quick Nexus application exposed to the world that can be used in a CI/CD process:

- Deploys a new Nexus 3.x server based on either Community or Red Hat images
- Creates an Ingress controller in Kubernetes (1.14+) environments to expose the application to the world
- On OpenShift, creates a Route to expose the service outside the cluster

After installing it, you will have to grab the `admin` user password from the deployed container. There's a file auto generated in `/nexus-data/admin.password`. Use `cat` to read the file and view the password. Use it to login for the first time and follow the on screen instructions to have the Nexus server ready for use.

If you experience any issues or have any ideas for new features, please file an issue in our Github repository.

Please note that the operator is an individual work and it's not provided nor supported by Sonatype.

Para saber mais:
Operator OLM GitHub repository

Como contribuir?

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Imagem:
https://www.flickr.com/photos/donkeyhotey/5666065982

Recursos e Referências

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- Generating CRDs
- Generating a Cluster Service Version (CSV)
- Building a Cluster Service Version (CSV) for the Operator Framework
- Operatorhub.io Contribution Guide
- Testing your Operator with Operator Framework
- Writing Controllers
- Kubernetes API Conventions
- Extending Kubernetes Design Principles
- Operator SDK
- Learn Operators: the Basics
- Demystifying Kubernetes Operators with the Operator SDK
- Kubernetes Operators Best Practices
- Writing Kubernetes Operator using Operator SDK
- Writing Operators using the Operator Framework SDK

Obrigado!

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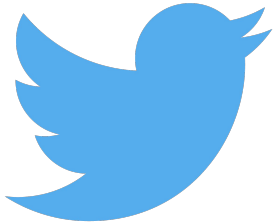
@zanini_os



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