Kubernetes Operators

Making on-prem infrastructure feel Cloud-Native with the Java Operator SDK

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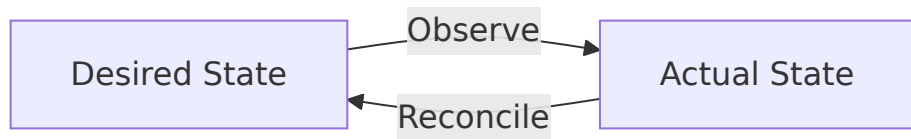
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- 🪪 Valentin Delaye

- 📚 Platform Engineer at ELCA

- Jenkins maintainer and Governance Board

- ORAS Java SDK maintainer

- Google Summer of Code Mentor (2024 & 2025)

- `DevEx` and `Developers portals`

- `K8S Operators` and the `KRM`

- `Java Operator SDK` and it's `Quarkus` extension

- A `GitOps` and (`BackstageOps`) approach via `FluxCD`

- Examples with K8S internal and external resources

- Q&A

Kubernetes reconcile loop

A custom resource

```java
@Group(LDAPGroup.GROUP)
@Version(LDAPGroup.VERSION)
@Plural(LDAPGroup.PLURAL)
@Kind(LDAPGroup.KIND)
public class LDAPGroup
    extends CustomResource<LDAPGroupSpec, LDAPGroupSpecStatus>
    implements Namespaced {

    public static final String KIND = "Group";
    public static final String LOWER_NAME = "group";
    public static final String PLURAL = "groups";
    public static final String GROUP = "ldap.sso.elca.ch";
    public static final String VERSION = "v1";

}
```

> ⓘ **Note**
>
> - Fabric8 CRDGenerator
>
> - Java to CRDs (Own CR)
>
> - CRDs to Java object (External CR)

```yaml
apiVersion: "apiextensions.k8s.io/v1"
kind: "CustomResourceDefinition"
metadata:
  name: "groups.ldap.sso.elca.ch"
spec:
  group: "ldap.sso.elca.ch"
  names:
    kind: "Group"
    plural: "groups"
    singular: "group"
  scope: "Namespaced"
  versions:
    name: "v1"
    schema:
      openAPIV3Schema:
        properties:
          spec:
            properties:
              group:
                description: "The name of the group"
                type: "string"
              required:
```

Thank you!

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- Java Operator SDK Documentation

- 🔗 KRM-Native GitOps: Yes — Without Flux, No. (FluxCD or Nothing.)