Entwicklung eines Microservices auf OpenShift mit Spring Boot

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Wer bin ich?

- Stefan Zaufl
- Geboren 1991 in Wien
- Absolviertes Informatik-Masterstudium (Visual Computing) an der TU Wien
- Seit 5 Jahren für IBM CIC Wien tätig

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Inhalt

- Was ist ein Container?
- Was ist OpenShift?
- Microservices & Spring Boot
- Wie setzte ich CI/CD hier um?

Was ist ein Container?

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Warum brauchen wir Container?

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Wer mag System Administration?

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SYSTEMS ADMINISTRATOR

What my friends think I do

What society thinks I do

What my boss thinks I do

What my users think I do

What I think I do

What I actually do

Source: https://i.imgur.com/okjA9.jpg

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Probleme

- Unterschiedliche Programme benötigen unterschiedliche Libraries/Runtimes
- Unterschiedliche Betriebssysteme
- „Runs on my machine“

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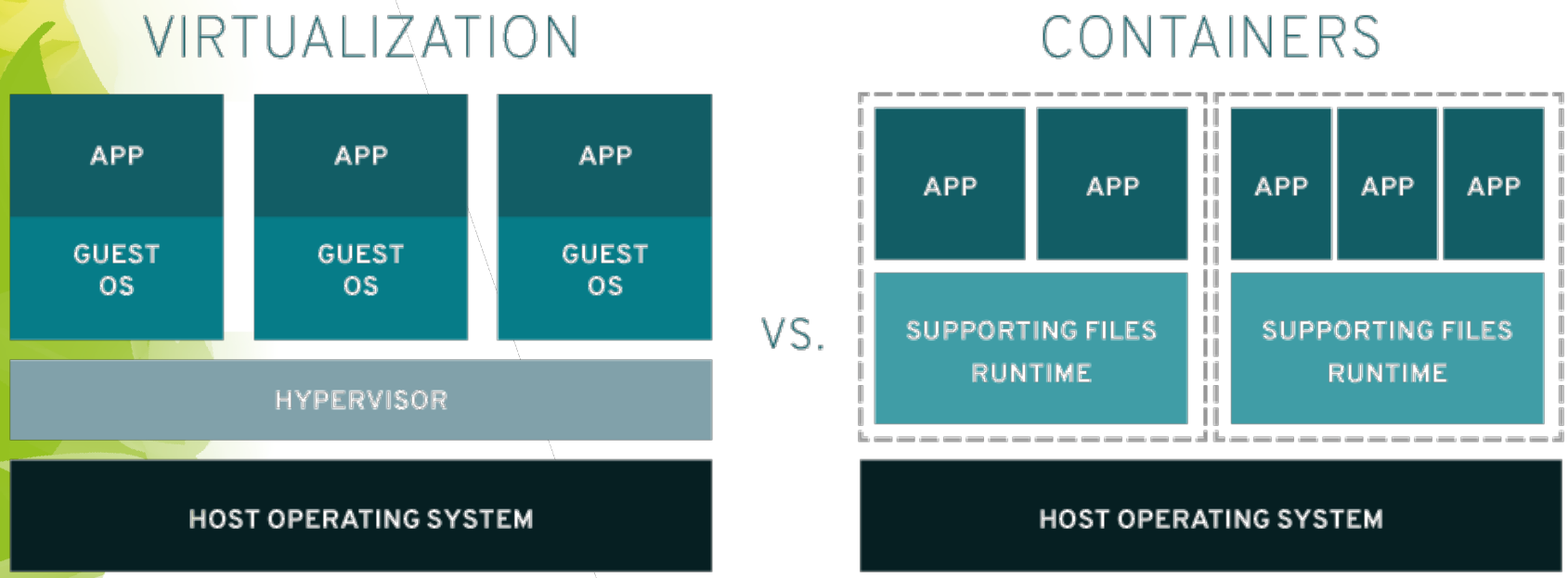
Containers



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Source: https://www.redhat.com/en/topics/containers/containers-vs-vms

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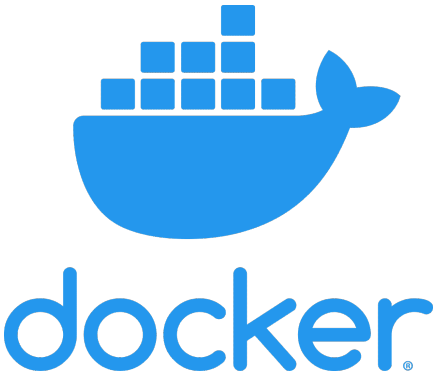
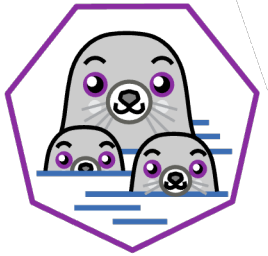
Container Engines





podman

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Containerfile

```
1 FROM adoptopenjdk/openjdk11:ubi

2 ARG JAR_FILE=target/*.jar

3 COPY ${JAR_FILE} app.jar

4 ENTRYPOINT ["java","-jar","/app.jar"]
```

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Run it

```
$ podman build -t myjavaapp:v1 .

$ podman run --name myapp -d myjavaapp:v1
```

Und Fertig!
Problem Gelöst!

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Tatsächlich Fertig?
Problem Gelöst?

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Source: https://www.dttuk.co.uk/blog/post/messy-network-cables

Source: https://www.itrw.net/2016/06/27/organized-cabling-is-better-cabling-avoid-server-room-spaghetti/

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Offene Fragen

- Wie verteilen wir Container auf mehrere Maschinen?
- Wie können wir bei Bedarf mehr Instanzen erzeugen?
- Wie verwalten wir das alles im großen Stil?

Container Orchestration

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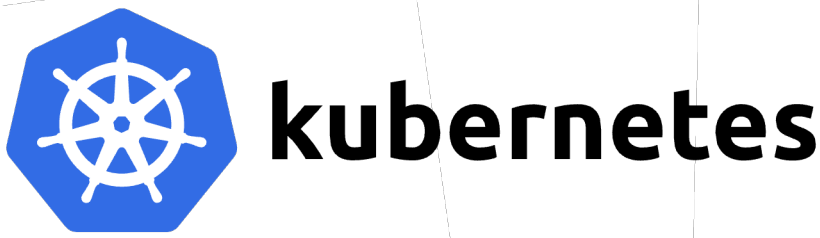
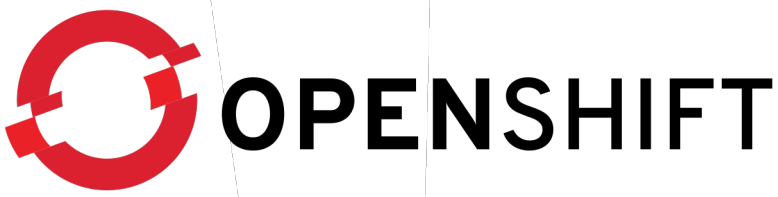
Verfügbare Software





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OpenShift

- Open Source
- ABER: OpenShift Container Plattform ist closed
  - Fertiges Installationspaket
  - Mit Support
  - Getestet
  - Für Enterprise Kunden gedacht

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https://www.redhat.com/en/blog/openshift-and-kubernetes-whats-difference

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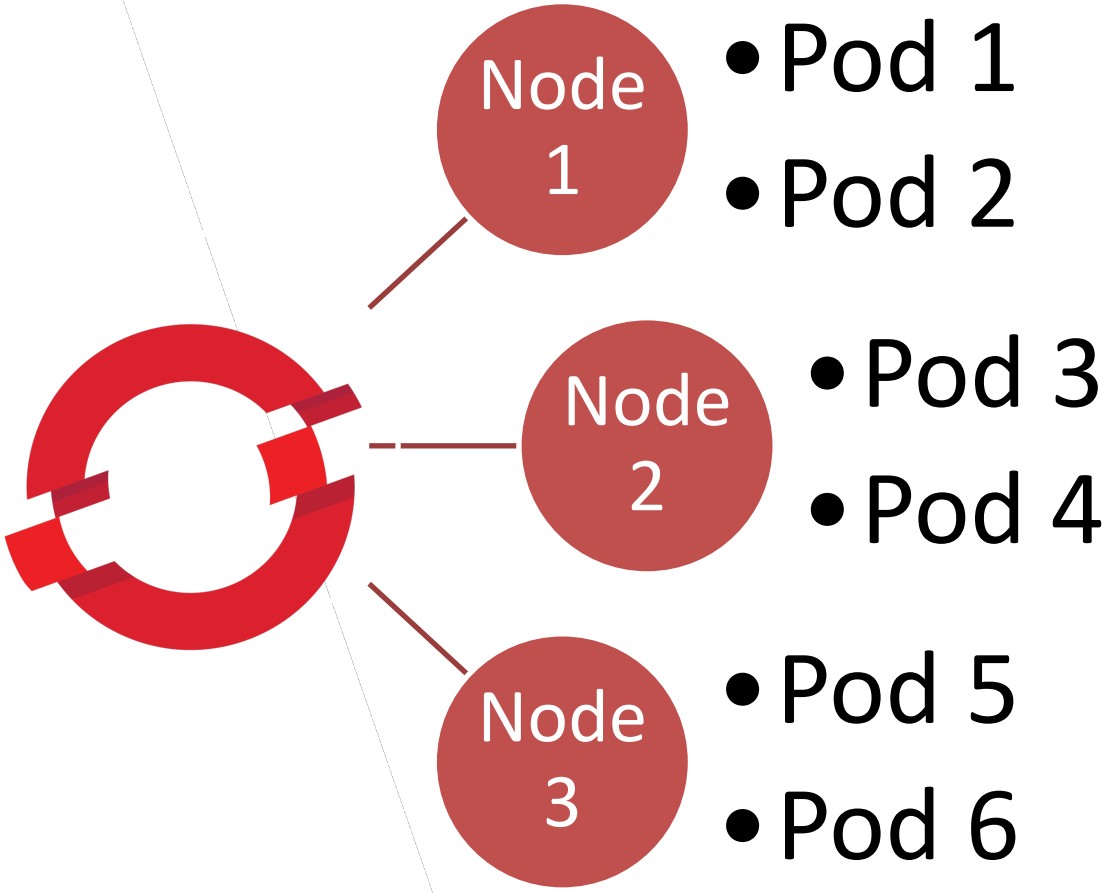
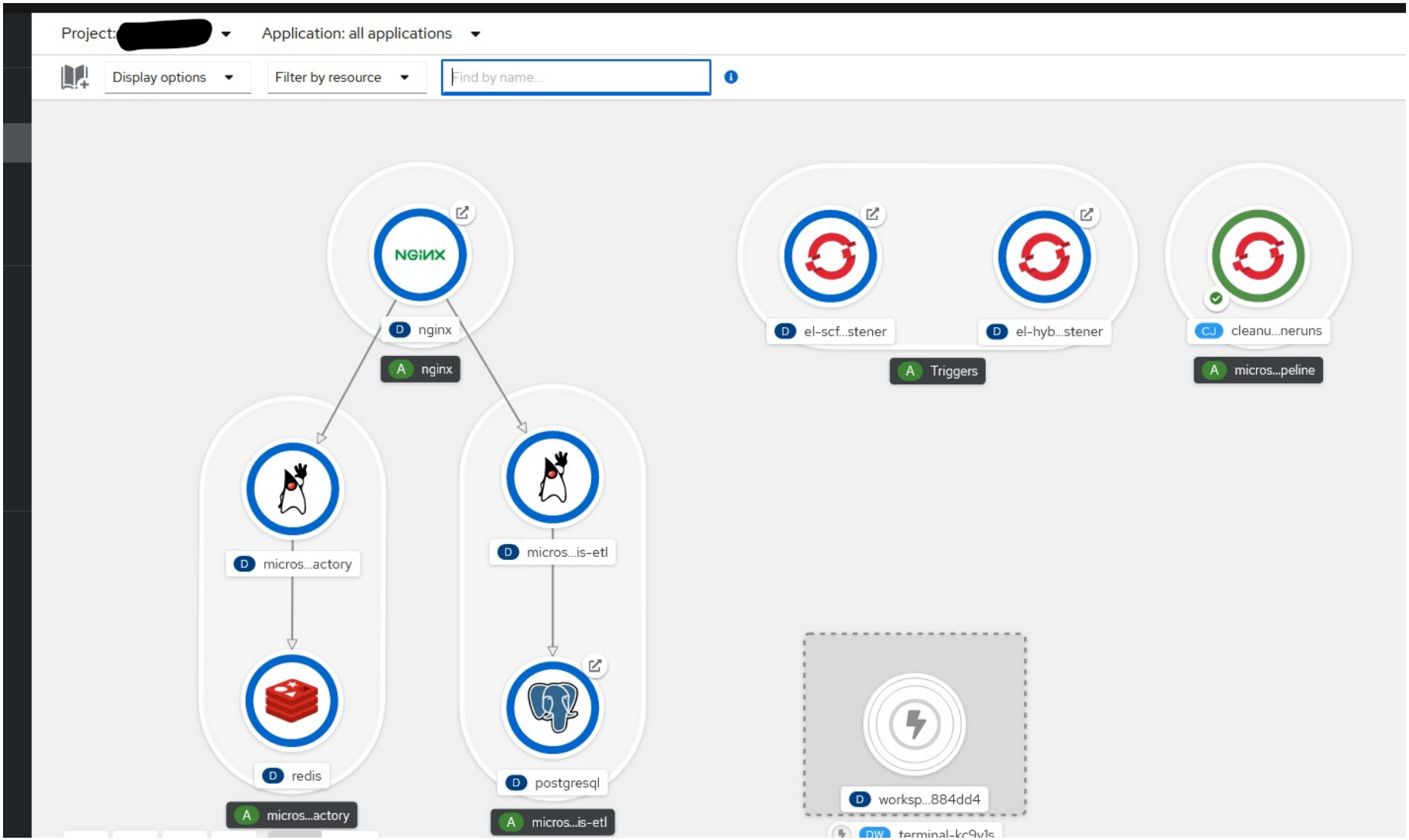
Was bringt Container Orchestration?



OpenShift – Topologie Ansicht



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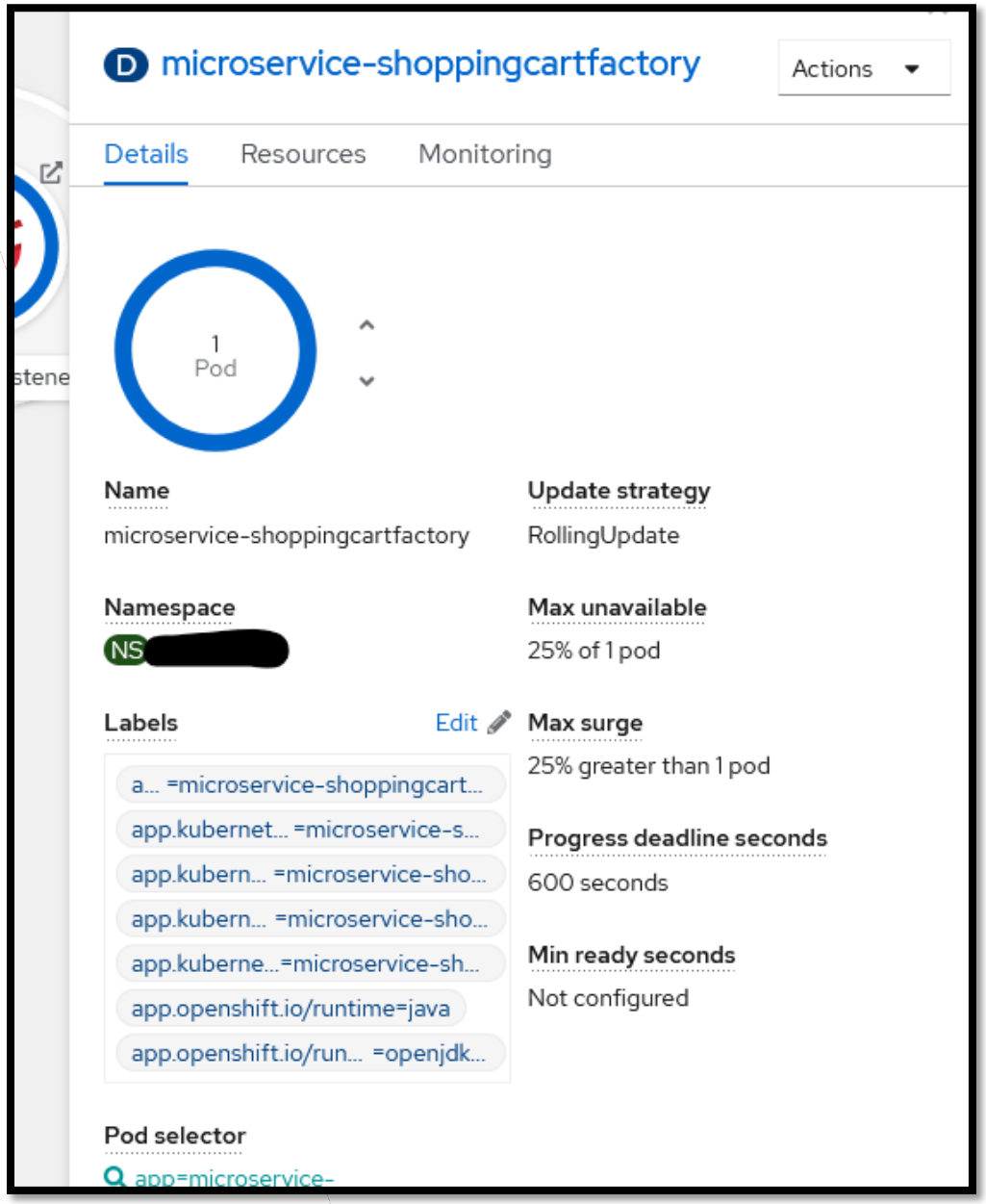
OpenShift – Deployments



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deployment.yaml

```yaml
kind: Deployment
apiVersion: apps/v1
metadata:
  name: my-app
spec:
  replicas: 1
  selector:
    matchLabels:
      deploymentconfig: my-app
  template:
    metadata:
      labels:
        deploymentconfig: my-app
    spec:
      containers:
        - name: my-app
          image: my-registry/my-app:latest
          ports:
            - containerPort: 8080
              protocol: TCP
          env:
            - name: SPRING_DATASOURCE_PASSWORD
              valueFrom:
                secretKeyRef:
                  name: postgresql
                  key: database-password
```

Microservices & Spring Boot

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Spring Boot

- Viele Teile schon vorhanden
  - Healthchecks
  - DB Connections
  - Configuration

- Einfach über maven zu nutzen

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In der pom.xml

```
<parent>
  <groupId>org.springframework.boot</groupId>
  <artifactId>spring-boot-starter-parent</artifactId>
  <version>2.4.13</version>
</parent>
```

Unser Anwendungsfall

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Microservice für einen Einkaufswagen

- Komplizierte Einkaufswägen
- Microservice soll helfen
- Integration mit Backend Systemen

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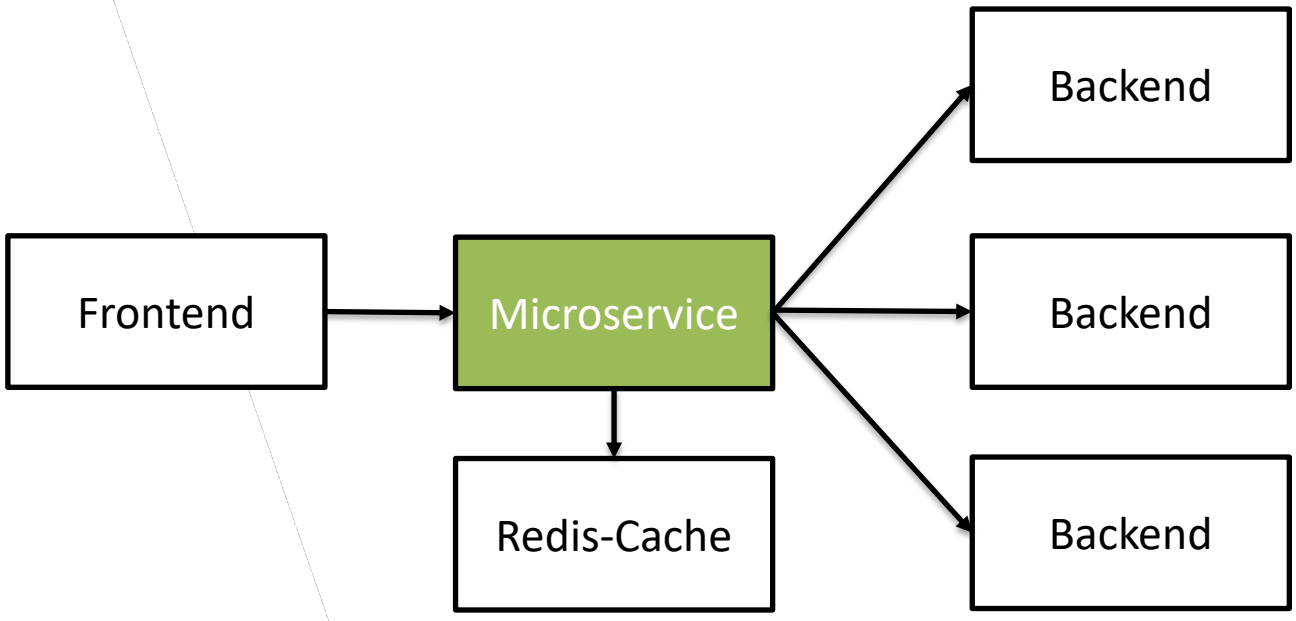
Architektur



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Microservice für einen Einkaufswagen

- REST Interfaces
  - Swagger definitionen
  - swagger-codegen-maven-plugin

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Cluster Endpoints

- Health Check
- Metrics
- logging

Health Check

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Spring Boot - application.yaml

```yaml
management:
 endpoints:
  web:
   exposure:
    include: "health"
```

OpenShift - deployment.yaml

```yaml
readinessProbe:
  httpGet:
    path: /actuator/health/readiness
    port: 8080
    scheme: HTTP
livenessProbe:
  httpGet:
    path: /actuator/health/liveness
    port: 8080
    scheme: HTTP
startupProbe:
  httpGet:
    path: /actuator/health
    port: 8080
    scheme: HTTP
```

Clusterspezifische Konfiguration

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Spring Boot - application.yaml

```yaml
spring:
  application:
    name: shoppingcartfactory
  redis:
    host: ${redis.host}
    port: ${redis.port}
  profiles:
    active: local

redis:
  host: localhost
  port: 6379
```

OpenShift - deployment.yaml

```yaml
env:
  - name: REDIS_HOST
    value: redis
```

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Continuous Integration / Continuous Deployment

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CI: OpenShift Pipelines

- Basieren auf Tekton
  - Pipeline läuft am Cluster
  - Selbe Umgebung -> gut für Tests
  - Wenig Fertiges
  - Das Meiste ist Eigenentwicklung

CD: Git Ops

- Infrastructure as Code in GIT
  - YAML Files für Ressourcen in GIT
  - Geben Soll-Zustand an
  - CD Software hält Cluster und Repo in Sync

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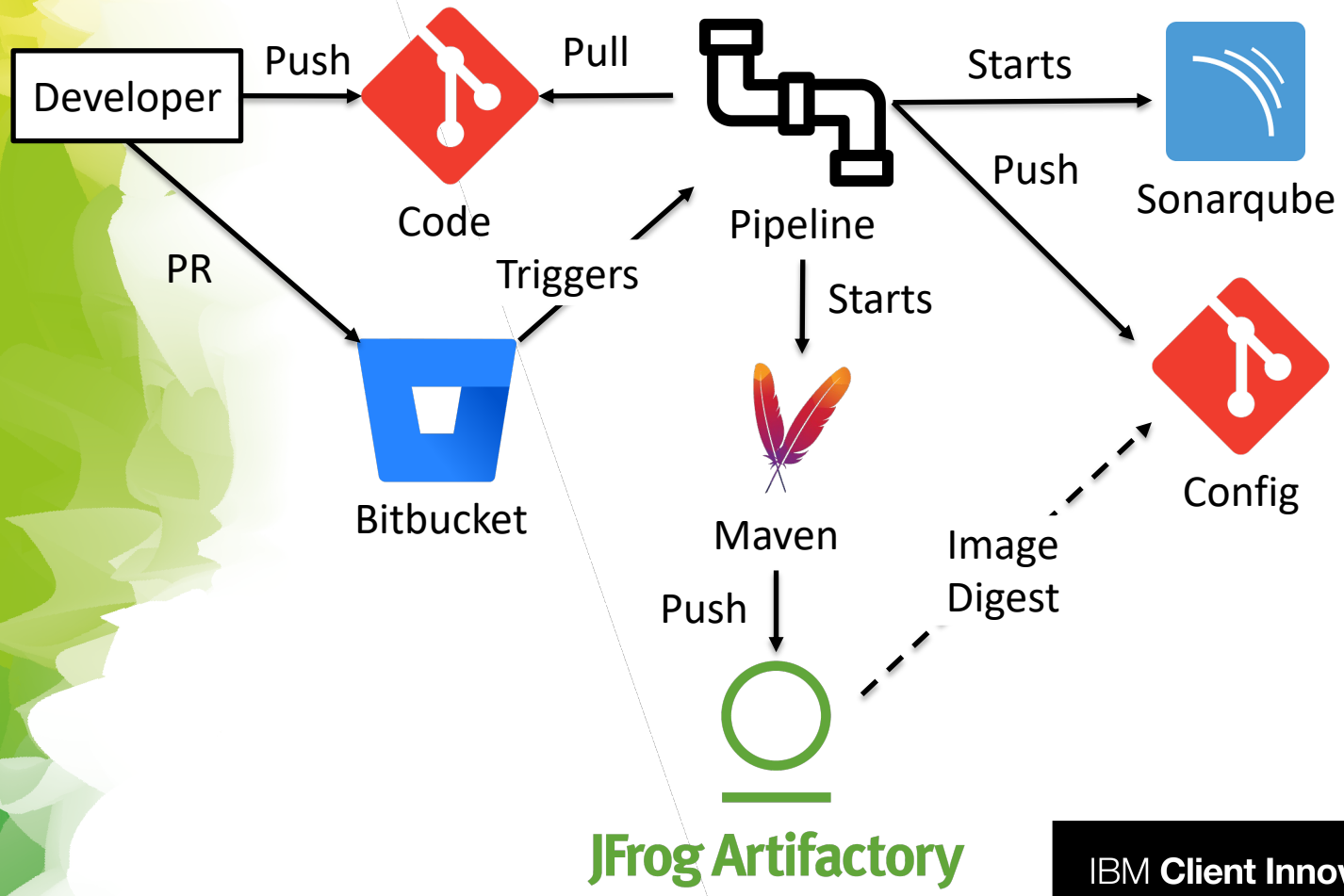
Architektur - CI



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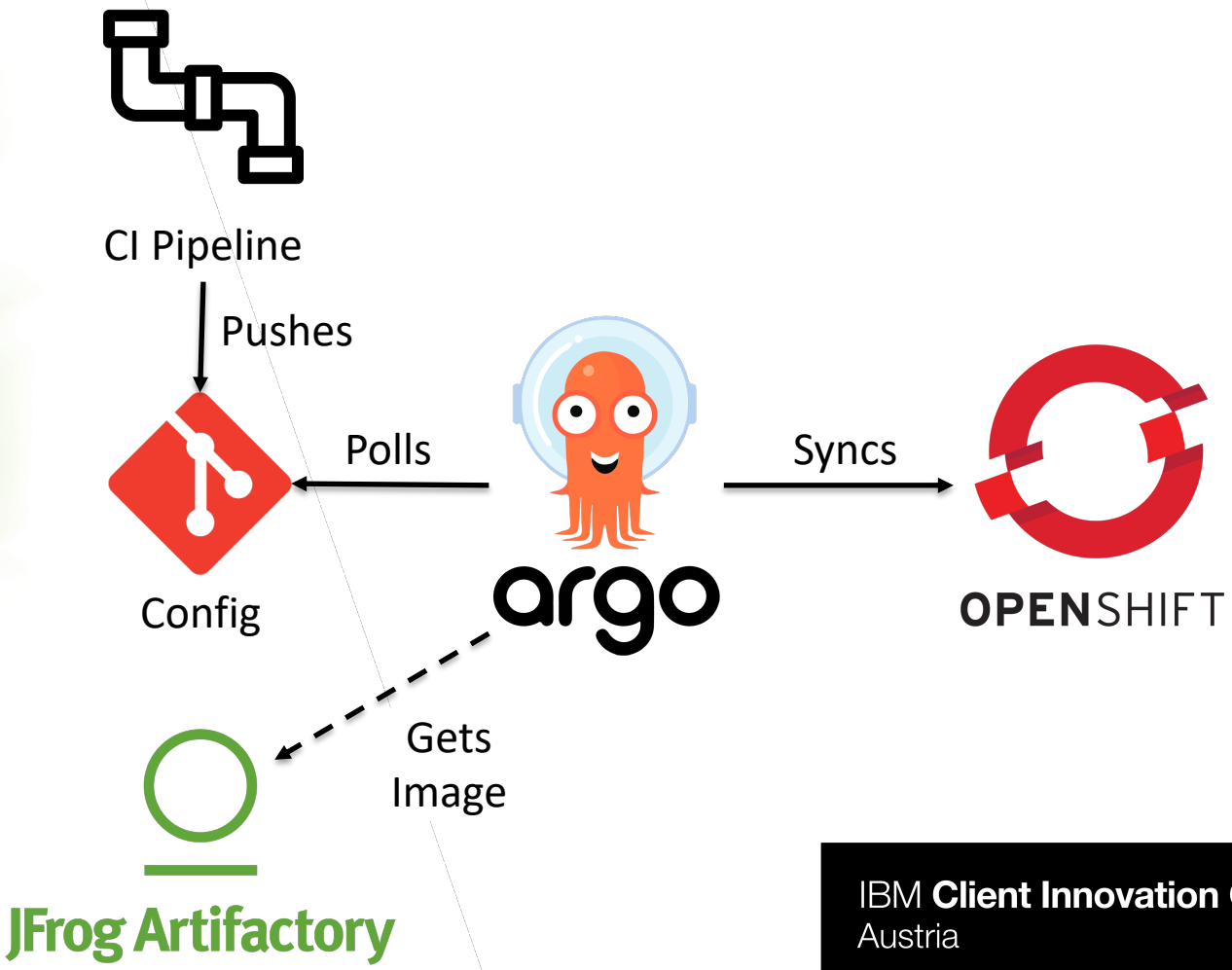
Architektur - CD



Fragen?

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