GridGain Operator

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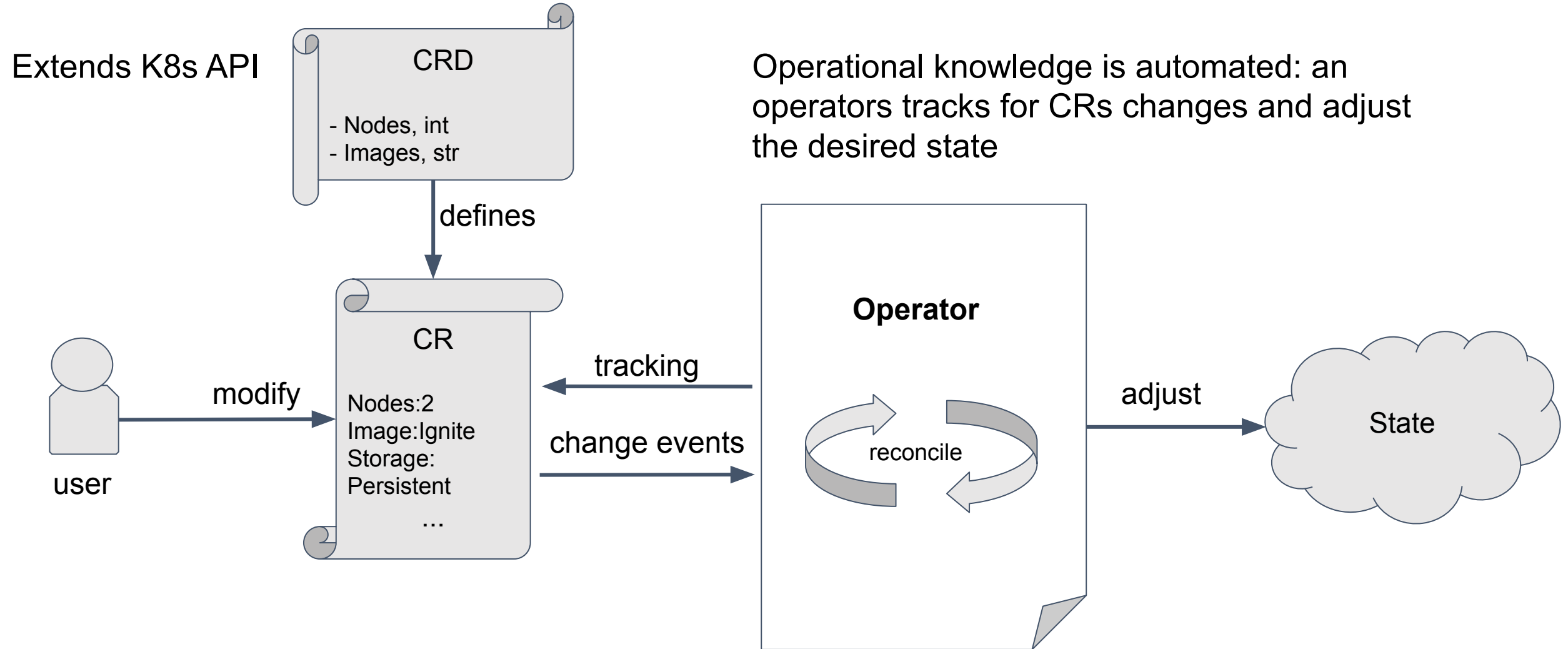
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Why do we need a Kubernetes operator?

New version upgrade?
Rolling Restart?
Failure Recovery?
Configuration update?

user

Automation tool?

apache-ignite-cluster

StatefulSet

POD 1
POD 2
POD 3
POD 4

Load Balancer

ConfigMap

Persistent Volume

Cluster Roles
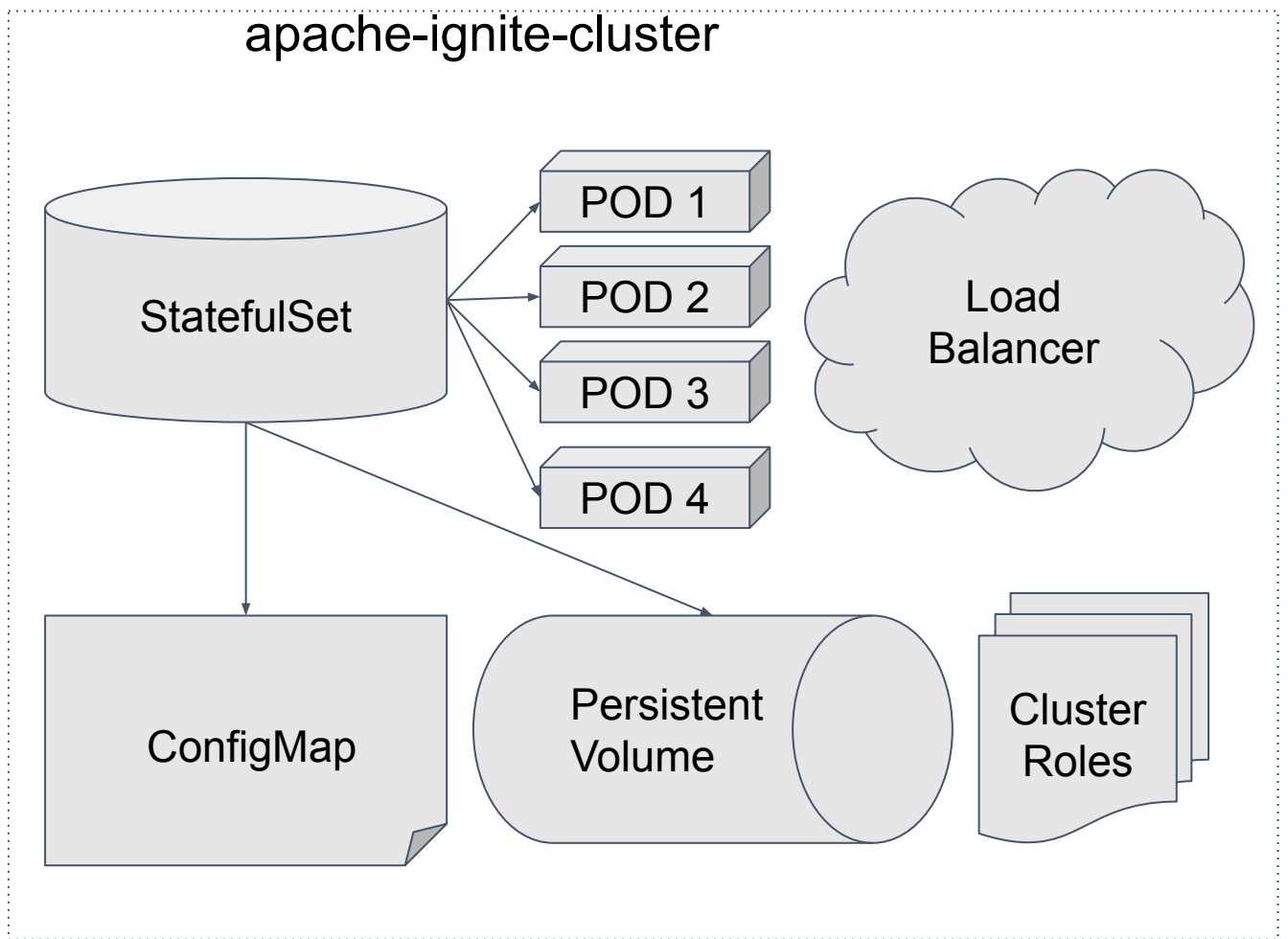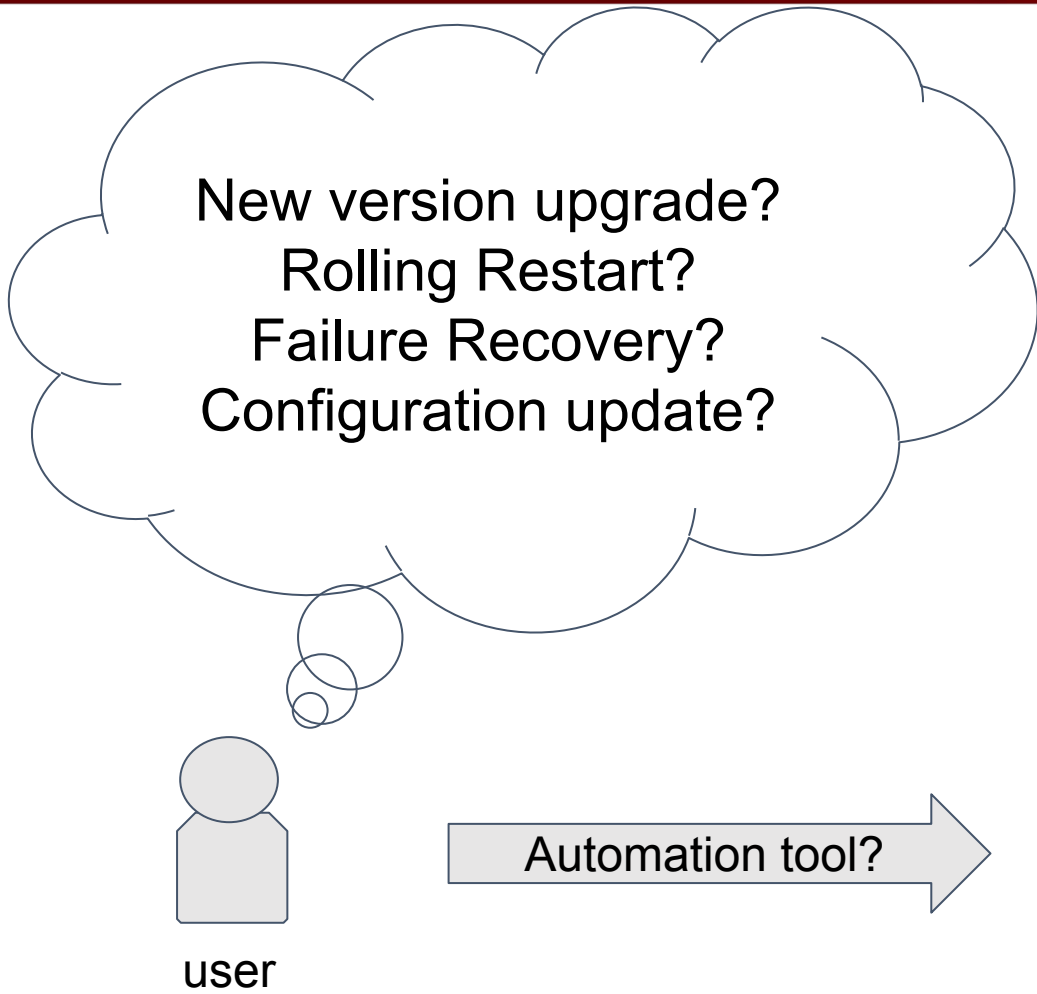
GridGain

Operator Pattern for Building and Managing Kubernetes Applications

Extends K8s API

Operational knowledge is automated: an operators tracks for CRs changes and adjust the desired state

CRD
- Nodes, int
- Images, str

defines

CR

Nodes:2
Image:Ignite
Storage:
Persistent
...

user

modify

tracking

change events

Operator

reconcile

adjust

State

GridGain

GridGain Operator Overview

- It's free
- Designed for GridGain/Apache Ignite cluster
- Supports most popular cloud providers (AWS, GKE, Azure, etc)
- Follows declarative pattern (CRs)
- Automates cluster deployment (deployment mode, memory, storage)
- Automates cluster maintenance (updates, configuration adjustment)

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GridGain Operator Internals
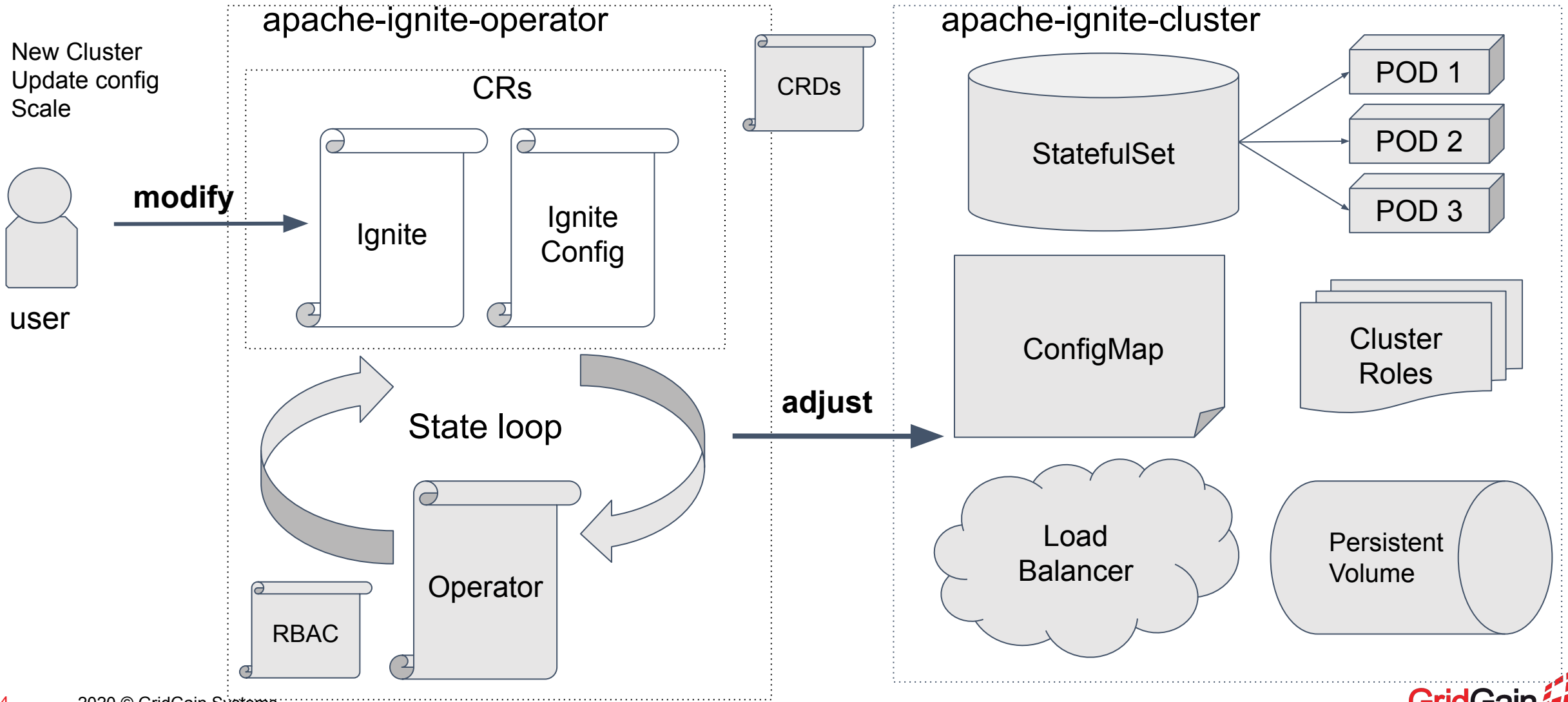
Ignite Resource

gridgain.com_v1_ignite_cr.yaml

- **namespace**: "apache-ignite-test"
- **cluster_name**: "apache-ignite-test-cluster"
- **number_of_nodes**: 2
- **cluster_type**: "persistence"
- **storage_class_name**: "hostpath"
- **cluster_image**: "gridgain/community:latest"
- **option_libs**: "ignite-kubernetes,ignite-rest-http"
- **jvm_opts**: "-DIGNITE_WAL_MMAP=false"

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IgniteConfig Resource

gridgain.com_v1_ignite_configmap_cr.yaml

```
gridgian_conf: |-
        <bean class="org.apache.ignite.configuration.IgniteConfiguration">

                …

        <property name="discoverySpi">
          <bean class="org.apache.ignite.spi.discovery.tcp.TcpDiscoverySpi">
            <property name="ipFinder">
              <bean
class="org.apache.ignite.spi.discovery.tcp.ipfinder.kubernetes.TcpDiscoveryKubernetesIpFinder">
                <property name="namespace" value="<namespace>"/>
                <property name="serviceName" value="<cluster_name>-service"/>
              </bean>
            </property>
        </property>
```

Demo

Requirements:

- A Kubernetes cluster that conforms to one of the supported environments
- kubectl configured
- GridGain Operator bundle (gridgain-operator-0.1.7.-alpha.zip)

Demo

1. The operator installation
2. Default GridGain cluster deployment
3. Hosted Control Center access
4. Cluster scaling
5. Cleanup the existing cluster

1. Switching to Apache Ignite deployment
2. IgniteConfig adjustment
3. Manual baseline activation
4. Logs inspection from within a pod

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What's Else?

- Private repositories
- Readiness/liveness hooks
- Rolling upgrade (GridGain only)
- And more

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What's Next?

- Distribution enhancements (Helm, OLM)
- Integration with on-premise Control Center
- Security Configuration
- Multiple StatefulSets and different AZs support
- Ultimately - autopilot mode

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Summary

GridGain Operator:

- Provides declarative cluster configuration
- Reduces deployment time
- Avoids maintenance errors
- Switches focus from configuration to development
- More features to be released

Links

Operator bundle:

https://www.gridgain.com/resources/download#extensions

Operator docs:

https://www.gridgain.com/docs/latest/installation-guide/operator/operator

Control Center:

https://www.gridgain.com/products/software/control-center

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