# Lab: Create and Use a Custom Resource Definition (CRD)

### Goal

Create a Fruit CRD that allows you to define fruits like apple, banana, etc., and deploy a controller that prints them.

## Prerequisites

- Kubernetes cluster (e.g. Minikube)
- kubectl installed
- Optional: kustomize and controller-gen if building a full controller

### Lab Structure

```
crd-lab/
├─ crds/
  └─ fruit-crd.yaml
 — examples/
  └─ apple.yaml
  - controller/
   └─ fruit-controller.sh
```

## Define the CRD



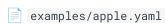
crds/fruit-crd.yaml

```
apiVersion: apiextensions.k8s.io/v1
kind: CustomResourceDefinition
metadata:
  name: fruits.example.com
spec:
  group: example.com
  versions:
    - name: v1
      served: true
      storage: true
      schema:
        openAPIV3Schema:
          type: object
          properties:
            spec:
              type: object
              properties:
                color:
                  type: string
                taste:
                  type: string
      subresources:
        status: {}
  scope: Namespaced
  names:
    plural: fruits
    singular: fruit
    kind: Fruit
    shortNames:
      - frt
```

#### Apply the CRD:

```
kubectl apply -f crds/fruit-crd.yaml
```

# Create a Custom Resource (CR)



```
apiVersion: example.com/v1
kind: Fruit
metadata:
   name: apple
spec:
   color: red
   taste: sweet
```

#### Apply the CR:

```
kubectl apply -f examples/apple.yaml
```

#### Verify:

```
kubectl get fruits
kubectl get fruit apple -o yaml
```

## Create a Simple Controller (optional)

This is a demo controller (bash script) that watches the fruit CRs and prints them. In real apps you'd use a proper controller with client-go or Kubebuilder.

controller/fruit-controller.sh

```
#!/bin/bash
echo "Watching for Fruit resources..."
kubectl get fruit --watch -o json | jq -c '.'
```

#### Run:

```
bash controller/fruit-controller.sh
```

#### Then try creating more fruits:

```
# examples/banana.yaml
apiVersion: example.com/v1
kind: Fruit
metadata:
 name: banana
spec:
  color: yellow
  taste: sweet
```

```
kubectl apply -f examples/banana.yaml
```

# Clean Up

```
kubectl delete -f examples/
kubectl delete -f crds/
```

# Summary

Component	Description
Fruit CRD	Defines the structure of a fruit
Custom Resources	Concrete fruit instances
Controller	Watches and prints changes

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