
Software Containerization

Group: 43

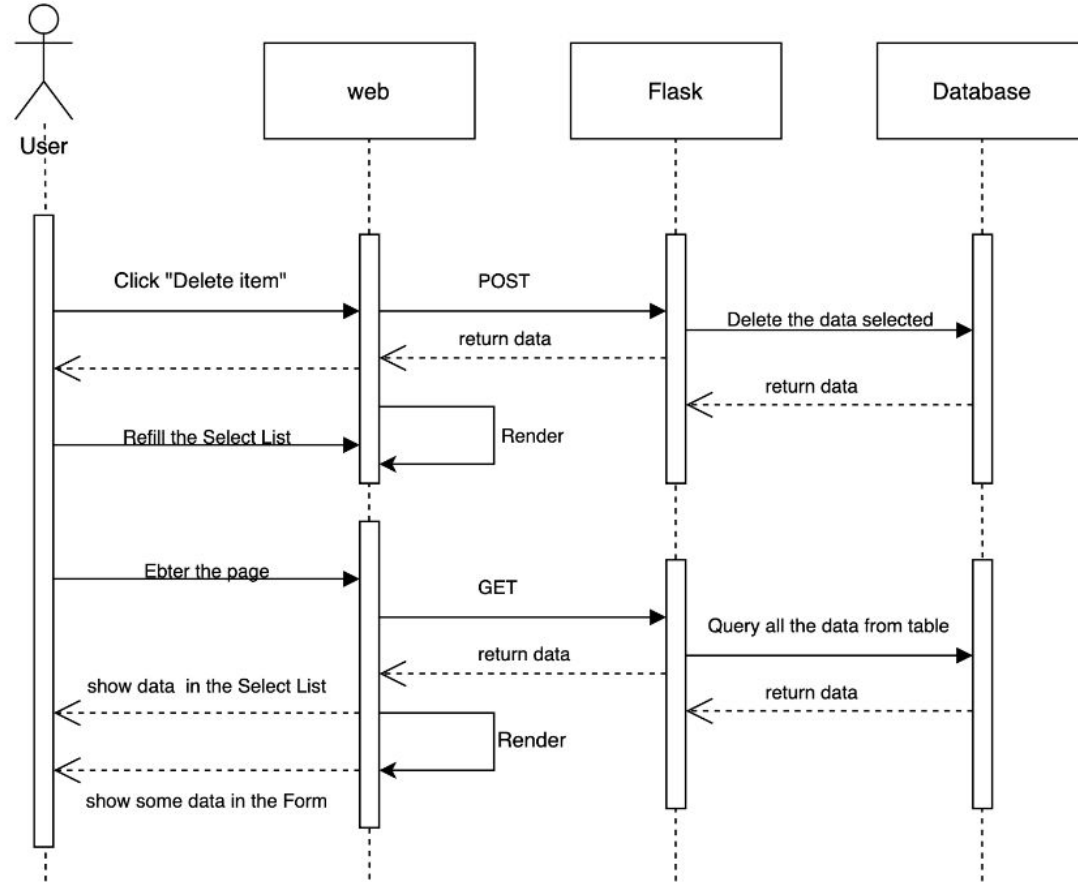
Yinghao Luo, Zheyuan Zhang

Two short, horizontal, olive-green bars are positioned symmetrically on either side of the center, below the names.

Agenda

- Project architecture
- Pre-requisites
- container build and first deployment, scaling and uninstallation
- Application upgrade and redeployment

Project architecture

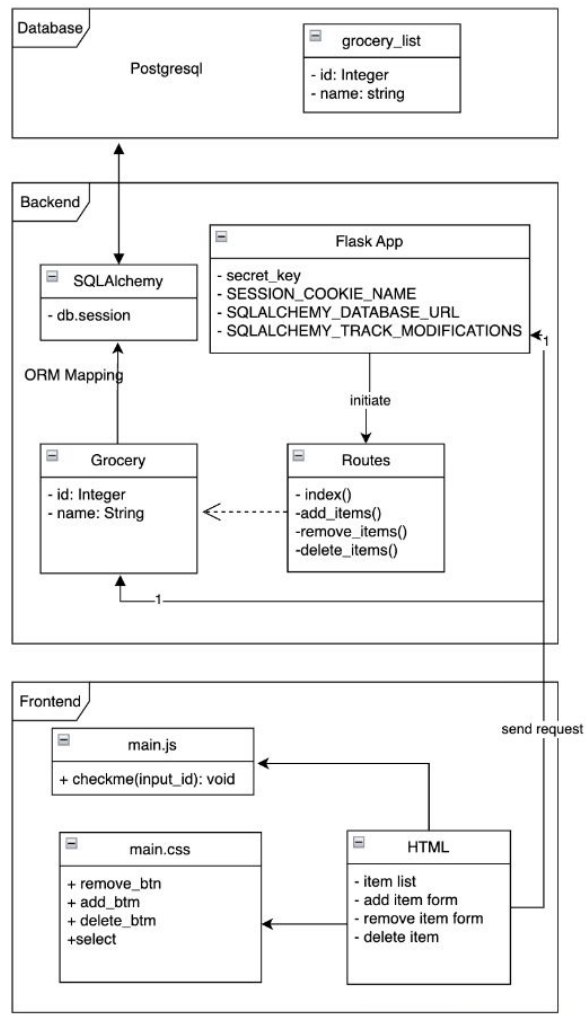


flask

```
1  FROM python:3.9-alpine
2
3  WORKDIR /code
4
5  ENV FLASK_APP=app.py
6
7  ENV FLASK_RUN_HOST=0.0.0.0
8
9  COPY requirements.txt requirements.txt
10
11 RUN pip install -r requirements.txt
12
13 EXPOSE 5000
14
15 COPY . .
16
17 CMD ["flask", "run"]
```

postgresql

```
1 FROM postgres:latest
2
3 ENV POSTGRES_PASSWORD 123456
4
5 COPY *.sql /docker-entrypoint-initdb.d
```



Pre-requisites

1. **Loadbalancer**
2. **storage class**
3. **Image registry**
4. **Roles**
5. **Certificates**
6. **Network policy**

LoaBalancer && storageclass&& image registry

```
postgres-deployment-g43-1-34b1c1c136-connv 1/1 Running 0 12h
calvinlismmm@cloudshell:~/software_containerization_G43/G43/grocery (poised-rock-413209)$ kubectl get svc
NAME                                TYPE                CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE
grocery-service-1                   LoadBalancer        10.60.15.117   34.118.115.214 80:31255/TCP      12h
kubernetes                          ClusterIP            10.60.0.1      <none>          443/TCP           26h
postgres-service-g43-1              NodePort             10.60.12.5     <none>          5432:30002/TCP    12h
calvinlismmm@cloudshell:~/software_containerization_G43/G43/grocery (poised-rock-413209)$ kubectl get pv
NAME                                CAPACITY  ACCESS MODES  RECLAIM POLICY  STATUS  CLAIM                                STORAGECLASS  REASON  AGE
postgres-pv-volume-1               5Gi       RWX           Retain          Bound   default/postgres-pv-claim-g43-1     microk8s-hostpath  12h
calvinlismmm@cloudshell:~/software_containerization_G43/G43/grocery (poised-rock-413209)$ cd ..
```


Roles



admin

```
rules:
- apiGroups: [""]
  resources: ["pods", "services", "deployment", "configmaps", "namespaces"]
  verbs: ["get", "watch", "list", "update"]
```



podwatch

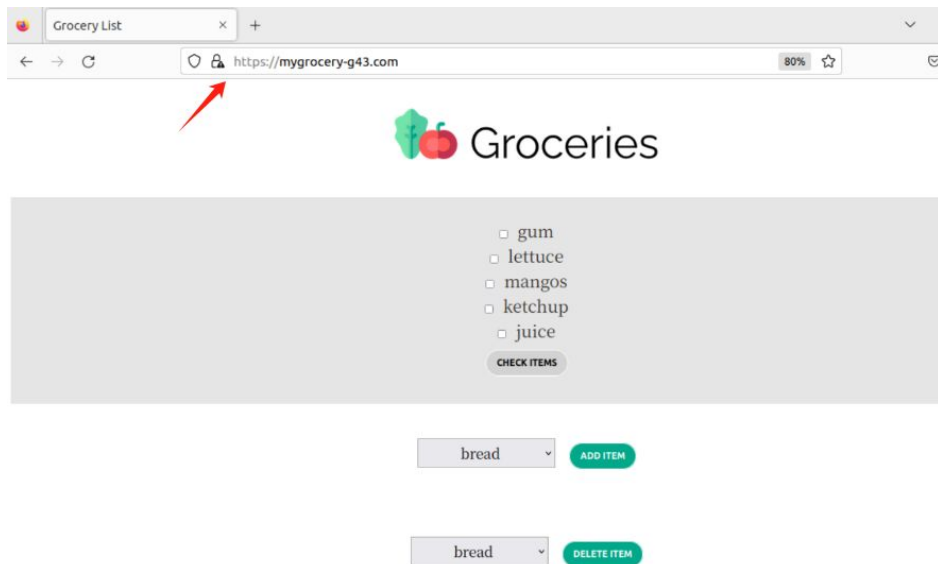
```
rules:
- apiGroups: [""]
  resources: ["pods"]
  verbs: ["get", "watch", "list"]
```



secretwatch

```
rules:
- apiGroups: [""]
  resources: ["secrets"]
  verbs: ["get", "watch", "list"]
```

TLS



证书

mygrocery-g43-1.com	
主题名称	
通用名称	mygrocery-g43-1.com
颁发者名称	
通用名称	my-selfsigned-ca-1
有效性	
起始时间	Wed, 31 Jan 2024 23:24:04 GMT
终止时间	Tue, 30 Apr 2024 23:24:04 GMT
主题替代名称	
DNS 名称	mygrocery-g43-1.com
公钥信息	
算法	RSA
密钥大小	2048
指数	65537
模块	97:22:8A:F5:C3:17:08:AA:D5:AB:E1:55:0C:4E:A4:F1:71:32:09:0A:36:E6:D3:0B...
杂项	
序列号	16:7D:DE:35:43:DE:5D:63:14:57:8F:2F:CA:B8:B2:F9
签名算法	ECDSA with SHA-256
版本	3
下载	PEM (证书) PEM (证书链)

Network policy



deny-dns.
yaml



grocery-
deny-all.
yaml



multiple-
egress.
yaml



network-
backend.
yaml



postgres-
network.
yaml

Container build and first deployment, scale and uninstall

1. Container build and push it to registry
2. Deploy the application via Helm
3. scale the application horizontally
4. Update it through Rollout and Canary
5. uninstallation

Google Cloud Platform

- Build the docker image
- Push to the GCP registry
- Adapt to the ingress template to api
- Use the Helm package
- Expose the app via LoadBalancer

project code repository:

https://github.com/calvinhaooo/software_containerization_G43