Exercise - Deploy the ratings front end

100 XP

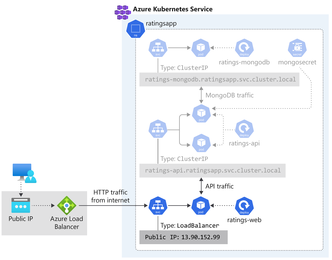
20 minutes

The Fruit Smoothies' ratings website consists of several components. There's a web frontend, a document database that stores captured data, and a RESTful ratings API that allows the web frontend to communicate with the database. The development team is using MongoDB as the document store database of choice for the ratings website.

In the previous unit, you deployed the ratings API. You'll continue your deployment and deploy the ratings web front end. The ratings web front end is a Node.js application. Recall that you've already created an Azure Container Registry instance. You used it to build a Docker image of the front end and store it in a repository.

In this exercise, you will:

- Create a Kubernetes deployment for the web front end
- Create a Kubernetes service manifest file to expose the web front end as a load-balanced service
- Test the web front end



Create a Kubernetes deployment for the ratings web front end

Let's start by creating a deployment for the ratings front end.

1. Create a file called `ratings-web-deployment.yaml` by using the integrated editor.

   bash
   ```
   code ratings-web-deployment.yaml
   ```

2. Paste the following text in the file.

   YAML
   ```
   apiVersion: apps/v1
   kind: Deployment
   metadata:
     name: ratings-web
   spec:
     selector:
       matchLabels:
         app: ratings-web
     template:
       metadata:
         labels:
           app: ratings-web # the label for the pods and the deployments
       spec:
         containers:
         - name: ratings-web
           image: <acrname>.azurecr.io/ratings-web:v1 # IMPORTANT: update with your own repository
           imagePullPolicy: Always
           ports:
           - containerPort: 8080 # the application listens to this port
           env:
           - name: API # the application expects to connect to the API at this endpoint
             value: http://ratings-api.ratingsapp.svc.cluster.local
           resources:
             requests: # minimum resources required
               cpu: 250m
               memory: 64Mi
             limits: # maximum resources allocated
               cpu: 500m
               memory: 512Mi
   ```

3. In the `image` key-update, the value replaces `<acrname>` with the name of your Container Registry instance.

4. Review the file, and note the following points:

   - `image`: You'll create a deployment running the image you pushed in the Container Registry instance you created earlier, for example, `acr4229.azurecr.io/ratings-web:v1`. The container listens to port `8080`. The deployment and the pods are labeled with `app=ratings-web`.
   - `env`: The ratings front end expects to connect to the API endpoint configured in an `API` environment variable. If you used the defaults and deployed the ratings API service in the `ratingsapp` namespace, the value of that should be `http://ratings-api.ratingsapp.svc.cluster.local`.
   - `resources`: Each container instance is given a minimum of 0.25 cores and 64 Mb of memory. The Kubernetes scheduler looks for a node with available capacity to schedule such a pod. A container might or might not be allowed to exceed its CPU limit for extended periods. But it won't be killed for excessive CPU usage. If a container exceeds its memory limit, it could be terminated.

5. To save the file, select `Ctrl+S`. To close the editor, select `Ctrl+Q`.

6. Apply the configuration by using the `kubectl apply` command and deploy the application in the `ratingsapp` namespace.

   bash
   ```
   kubectl apply \
   --namespace ratingsapp \
   -f ratings-web-deployment.yaml
   ```

   You'll see an output like this example.

   output
   ```
   deployment.apps/ratings-web created
   ```

7. You can *watch* the pods rolling out using the `-w` flag with the `kubectl get pods` command. Make sure to query for pods in the `ratingsapp` namespace that are labeled with `app=ratings-web`. Select `Ctrl+C` to stop watching.

   bash
   ```
   kubectl get pods --namespace ratingsapp -l app=ratings-web -w
   ```

   In a few seconds, you'll see the pods transition to the `Running` state. Select `CTRL+C` to stop watching.

   output
   ```
   NAME                           READY   STATUS    RESTARTS   AGE
   ratings-web-fcc464b8d-vck96   1/1     Running   0          37s
   ```

   If the pods aren't starting, aren't ready, or are crashing, you can view their logs by using `kubectl logs <pod name> --namespace ratingsapp` and `kubectl describe pod <pod name> --namespace ratingsapp`.

8. Check the status of the deployment.

   bash
   ```
   kubectl get deployment ratings-web --namespace ratingsapp
   ```

   The deployment should show that one replica is ready.

   output
   ```
   NAME          READY   UP-TO-DATE   AVAILABLE   AGE
   ratings-web   1/1     1            1           2m
   ```

Create a Kubernetes service for the ratings API service

Your next step is to simplify the network configuration for your application workloads. Use a Kubernetes service to group your pods and provide network connectivity.

You'll use a Kubernetes `LoadBalancer` instead of a `ClusterIP` for this service. A `LoadBalancer` allows you to expose a Kubernetes service on a public IP in the cluster. The type makes the service reachable from outside the cluster.

1. Create a file called `ratings-web-service.yaml` by using the integrated editor.

   bash
   ```
   code ratings-web-service.yaml
   ```

2. Paste the following text in the file.

   YAML
   ```
   apiVersion: v1
   kind: Service
   metadata:
     name: ratings-web
   spec:
     selector:
       app: ratings-web
     ports:
     - protocol: TCP
       port: 80
       targetPort: 8080
     type: LoadBalancer
   ```

3. Review the file, and note the following points:

   - `selector`: The set of pods targeted by a service is determined by the selector. In the following example, Kubernetes load balances traffic to pods that have the label `app: ratings-web`. The label was defined when you created the deployment. The controller for the service continuously scans for pods that match that label to add them to the load balancer.
   - `ports`: A service can map an incoming `port` to `targetPort`. The incoming port is what the service responds to. The target port is what the pods are configured to listen to. For example, the service is exposed externally at port `80` and load balances the traffic to the ratings-web pods listening on port `8080`.
   - `type`: A service of type `LoadBalancer` creates a public IP address in Azure and assigns it to Azure Load Balancer. Choosing this value makes the service reachable from outside the cluster.

4. To save the file, select `Ctrl+S`. To close the editor, select `Ctrl+Q`.

5. Apply the configuration by using the `kubectl apply` command to deploy the service in the `ratingsapp` namespace.

   bash
   ```
   kubectl apply \
       --namespace ratingsapp \
       -f ratings-web-service.yaml
   ```

   You'll see an output like this example.

   output
   ```
   service/ratings-web created
   ```

6. Next, let's check the status of the service. It takes a few minutes for the service to acquire the public IP. Run the `kubectl get service` command with a *watch* by adding the `-w` flag to see it update in real time. Select `Ctrl+C` to stop watching.

   bash
   ```
   kubectl get service ratings-web --namespace ratingsapp -w
   ```

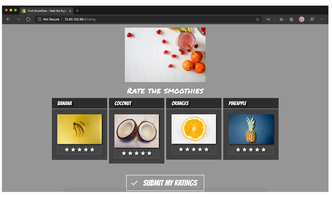
   The service shows `EXTERNAL-IP` as `<pending>` for a while until it finally changes to an actual IP.

   output
   ```
   NAME          TYPE           CLUSTER-IP    EXTERNAL-IP     PORT(S)        AGE
   ratings-web   LoadBalancer   10.2.0.112    <pending>       80:32747/TCP   11s
   ratings-web   LoadBalancer   10.2.0.112    13.90.152.99    80:32747/TCP   5m
   ```

   Make note of that EXTERNAL-IP, for example, `13.90.152.99`. You'll use the address to access the application.

Test the application

Now that the ratings-web service has a public IP, open the IP in a web browser, for example, at http://13.90.152.99, to view and interact with the application.



Summary

In this exercise, you created a deployment of **ratings-web** and exposed it to the internet through a LoadBalancer type service.

- **Deployment/ratings-web**: The web front end.
- **Service/ratings-web**: The load-balanced service, which is exposed on Azure Load Balancer through a public IP.

Next, we'll improve the network accessibility of the application by using Ingress.

Next unit: Exercise - Deploy an ingress for the front end

Continue

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