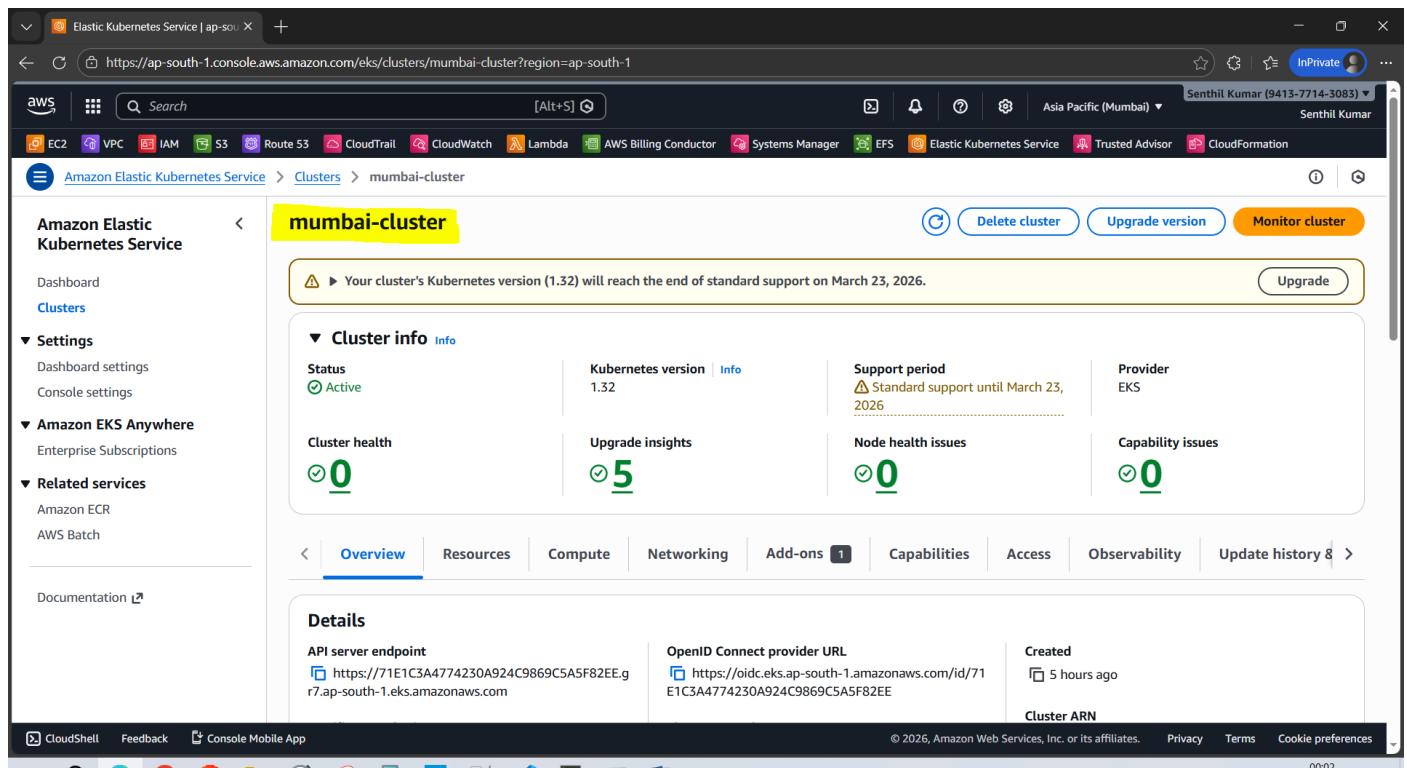


ArgoCD ApplicationSet Controller

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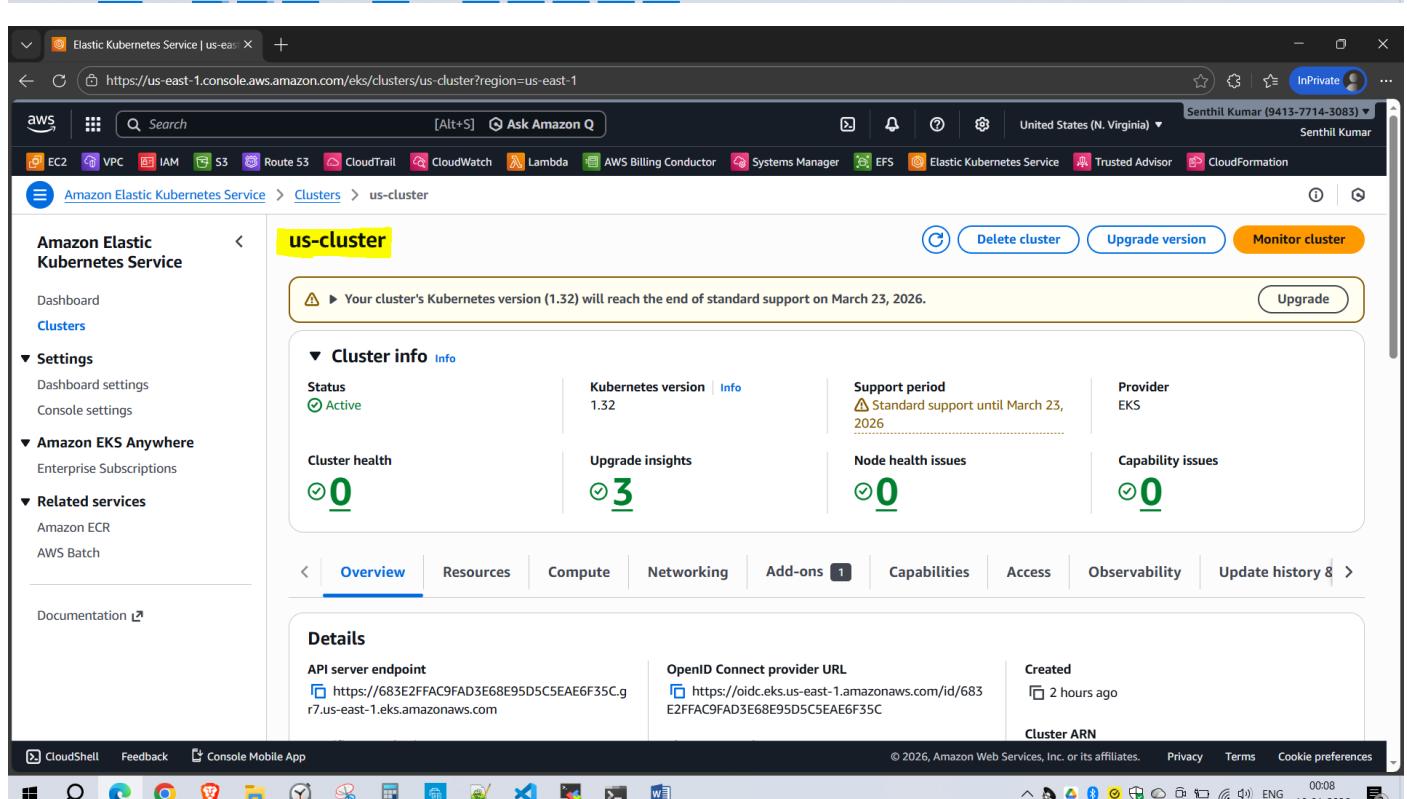
Designed and implemented a multi-cluster Kubernetes setup by provisioning Amazon EKS clusters in both Mumbai and US regions



The screenshot shows the AWS Cloud Console interface for the Mumbai EKS cluster. The cluster name 'mumbai-cluster' is highlighted in yellow. Key details shown include:

- Status:** Active
- Kubernetes version:** 1.32
- Support period:** Standard support until March 23, 2026
- Provider:** EKS
- Cluster health:** 0 issues
- Upgrade insights:** 5 issues
- Node health issues:** 0 issues
- Capability issues:** 0 issues

The 'Overview' tab is selected. Other tabs include Resources, Compute, Networking, Add-ons (1), Capabilities, Access, Observability, and Update history.



The screenshot shows the AWS Cloud Console interface for the US East EKS cluster. The cluster name 'us-cluster' is highlighted in yellow. Key details shown include:

- Status:** Active
- Kubernetes version:** 1.32
- Support period:** Standard support until March 23, 2026
- Provider:** EKS
- Cluster health:** 0 issues
- Upgrade insights:** 3 issues
- Node health issues:** 0 issues
- Capability issues:** 0 issues

The 'Overview' tab is selected. Other tabs include Resources, Compute, Networking, Add-ons (1), Capabilities, Access, Observability, and Update history.

Established VPC peering between two EKS clusters to enable secure inter-cluster communication

The screenshot shows the AWS VPC Peering connections page. A single peering connection is listed:

Name	Peering connection ID	Status	Requester VPC	Acceptor VPC
vpc-mumbai-to-us	pcx-0dfd40c66cd29c4b1	Active	vpc-0d923181c459c0592 / eksctl-mumbai-cluster	vpc-066027c8e9ab86ca0

Detailed view of the peering connection:

Details

Requester owner ID	Acceptor owner ID	VPC Peering connection ARN
941377143083	941377143083	arn:aws:ec2:ap-south-1:941377143083:vpc-peering-connection/pcx-0dfd40c66cd29c4b1
Peering connection ID	Requester VPC	Acceptor VPC
pcx-0dfd40c66cd29c4b1	vpc-0d923181c459c0592 / eksctl-mumbai-cluster	vpc-066027c8e9ab86ca0
Status	Requester CIDRs	Acceptor CIDRs
Active		

Fetched node information from both EKS clusters through a secure bastion host

```
ubuntu@ip-172-31-106-234:~$ kubectl config get-contexts
CURRENT NAME CLUSTER                                     AUTHINFO                                     NAMESPACE
*   cluster1  arn:aws:eks:ap-south-1:941377143083:cluster/mumbai-cluster  arn:aws:eks:ap-south-1:941377143083:cluster/mumbai-cluster
*   cluster2  arn:aws:eks:us-east-1:941377143083:cluster/us-cluster        arn:aws:eks:us-east-1:941377143083:cluster/us-cluster
ubuntu@ip-172-31-106-234:~$ kubectl get nodes -o wide --context cluster1
NAME          STATUS ROLES AGE VERSION INTERNAL-IP      EXTERNAL-IP    OS-IMAGE             KERNEL-VERSION   CONTAINERS
ip-192-168-105-61.ap-south-1.compute.internal Ready   <none>   4h39m v1.32.6   192.168.105.61  <none>       Ubuntu 22.04.5 LTS  6.8.0-1040-aws  conta
inerd://1.7.28
ip-192-168-88-103.ap-south-1.compute.internal Ready   <none>   4h39m v1.32.6   192.168.88.103  <none>       Ubuntu 22.04.5 LTS  6.8.0-1040-aws  conta
inerd://1.7.28
ubuntu@ip-172-31-106-234:~$ kubectl get nodes -o wide --context cluster2
NAME          STATUS ROLES AGE VERSION INTERNAL-IP      EXTERNAL-IP    OS-IMAGE             KERNEL-VERSION   CONTAINER-RUNTIME
ip-10-0-118-138.ec2.internal Ready   <none>   83m   v1.32.6   10.0.118.138  <none>       Ubuntu 22.04.5 LTS  6.8.0-1040-aws  containerd://1.7.28
ip-10-0-70-164.ec2.internal Ready   <none>   83m   v1.32.6   10.0.70.164   <none>       Ubuntu 22.04.5 LTS  6.8.0-1040-aws  containerd://1.7.28
ubuntu@ip-172-31-106-234:~$
```

Validated inter-cluster communication by performing successful ping tests from the Mumbai cluster to US cluster via VPC peering

A screenshot of a Windows desktop showing a terminal window titled "Instance details | EC2 | ap-south-1" and "Systems Manager | ap-south-1". The terminal shows the command \$ ping 10.0.118.138 followed by its output. The ping command sent 56(84) bytes of data with 64 bytes from 10.0.118.138 over five consecutive ICMP sequences (seq=1 to seq=5) with TTL=64 and times ranging from 184 ms to 197 ms. The terminal interface includes a "Shortcuts" button, an "Instance ID" field (i-0e2890963f3c2eeef), and a "Terminate" button. The taskbar at the bottom shows various icons and the date/time as 16-01-2026 00:11.

```
$ ping 10.0.118.138
PING 10.0.118.138 (10.0.118.138) 56(84) bytes of data.
64 bytes from 10.0.118.138: icmp_seq=1 ttl=64 time=184 ms
64 bytes from 10.0.118.138: icmp_seq=2 ttl=64 time=184 ms
64 bytes from 10.0.118.138: icmp_seq=3 ttl=64 time=184 ms
64 bytes from 10.0.118.138: icmp_seq=4 ttl=64 time=184 ms
64 bytes from 10.0.118.138: icmp_seq=5 ttl=64 time=184 ms
```

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Performed reverse connectivity tests by pinging Mumbai cluster from US cluster to validate bidirectional communication over VPC peering

A screenshot of a Windows desktop showing a terminal window titled "Instance details | EC2 | us-east-1" and "Systems Manager | us-east-1". The terminal shows the command \$ ping 192.168.105.61 followed by its output. The ping command sent 56(84) bytes of data with 64 bytes from 192.168.105.61 over eight consecutive ICMP sequences (seq=1 to seq=8) with TTL=64 and times ranging from 197 ms to 199 ms. The terminal interface includes a "Shortcuts" button, an "Instance ID" field (i-06a0ef2c7cf1292f1), and a "Terminate" button. The taskbar at the bottom shows various icons and the date/time as 16-01-2026 00:13.

```
$ ping 192.168.105.61
PING 192.168.105.61 (192.168.105.61) 56(84) bytes of data.
64 bytes from 192.168.105.61: icmp_seq=1 ttl=64 time=197 ms
64 bytes from 192.168.105.61: icmp_seq=2 ttl=64 time=197 ms
64 bytes from 192.168.105.61: icmp_seq=3 ttl=64 time=198 ms
64 bytes from 192.168.105.61: icmp_seq=4 ttl=64 time=197 ms
64 bytes from 192.168.105.61: icmp_seq=5 ttl=64 time=197 ms
64 bytes from 192.168.105.61: icmp_seq=6 ttl=64 time=197 ms
64 bytes from 192.168.105.61: icmp_seq=7 ttl=64 time=198 ms
64 bytes from 192.168.105.61: icmp_seq=8 ttl=64 time=197 ms
```

Added and configured both EKS clusters in ArgoCD to enable multi-cluster application deployment and management

The screenshot shows the Argo CD web interface at <https://localhost:8080/settings/clusters>. The left sidebar has icons for Applications, Settings (selected), User Info, and Documentation. The main area displays a table of clusters:

NAME	URL	VERSION	CONNECTION STATUS
arn:aws:eks:ap-south-1:941377143083:cluster/mumbai-cluster	https://71E1C3A4774230A924C9869C5A5F82EE.gr7.ap-south-1.eks...	Unknown	⋮
arn:aws:eks:ap-south-1:94137714...	https://683E2FFAC9FAD3E68E95D5C5EAE6F35C.gr7.us-east-1.eks...	Unknown	⋮
in-cluster	https://kubernetes.default.svc	Unknown	⋮

A tooltip for the first cluster row says: "Refer to CLI Documentation for adding clusters."

At the bottom of the screen, a watermark "using this is Argo project which is a trial" is visible.

The screenshot shows the Argo CD web interface at <https://localhost:8080/settings/clusters>. The left sidebar has icons for Applications, Settings (selected), User Info, and Documentation. The main area displays a table of clusters:

NAME	URL	VERSION	CONNECTION STATUS
arn:aws:eks:ap-south-1:941377143083:cluster/us-cluster	https://71E1C3A4774230A924C9869C5A5F82EE.gr7.ap-south-1.eks...	Unknown	⋮
arn:aws:eks:us-east-1:94137714...	https://683E2FFAC9FAD3E68E95D5C5EAE6F35C.gr7.us-east-1.eks...	Unknown	⋮
in-cluster	https://kubernetes.default.svc	Unknown	⋮

A tooltip for the first cluster row says: "Refer to CLI Documentation for adding clusters."

At the bottom of the screen, a watermark "using this is Argo project which is a trial" is visible.

Executed application deployments to two EKS clusters using a centralized control (main) cluster

The screenshot shows the Argo CD interface with three application cards displayed:

- main-app**: Project: default, Labels: none. Status: Healthy & Synced. Repository: https://github.com/semever24/argocd-main-app. Target Ref: master. Path: apps. Destination: in-cluster. Namespace: argocd. Created: 01/16/2026 02:36:03 (7 minutes ago). Last Sync: 01/16/2026 02:36:04 (7 minutes ago).
- mumbai-sock-shop**: Project: default, Labels: none. Status: Healthy & Synced. Repository: https://github.com/semever24/argocd-mumbai-sock-shop. Target Ref: master. Path: sock-shop. Destination: arm:aws:eks:ap-south-1:941377143083:sock-shop. Namespace: default. Created: 01/16/2026 02:36:04 (7 minutes ago). Last Sync: 01/16/2026 02:36:08 (7 minutes ago).
- us-sock-shop**: Project: default, Labels: none. Status: Healthy & Synced. Repository: https://github.com/semever24/argocd-us-sock-shop. Target Ref: master. Path: sock-shop. Destination: arm:aws:eks:us-east-1:941377143083:cl... Namespace: default. Created: 01/16/2026 02:36:04 (7 minutes ago). Last Sync: 01/16/2026 02:36:13 (7 minutes ago).

On the left sidebar, there are filters for Favorites Only, SYNC STATUS (Unknown: 0, Synced: 3, OutOfSync: 0), and HEALTH STATUS (Progressing: 0, Suspended: 0, Healthy: 3, Degraded: 0, Missing: 0).

The screenshot shows the Argo CD interface for the **main-app** application. The sync status is **Synced to master (8f690fd)**. Auto sync is enabled by Senthil Kumar Rajan (semever@hotmail.com) with a comment "Added new files". The last sync was successful a minute ago.

The application details tree shows the following dependencies:

- main-app** application (Synced to master) depends on **AS** applicationset (Synced to master).
- AS** applicationset depends on **main-app** application (Synced to master) and **mumbai-sock-shop** application (Synced to master).
- mumbai-sock-shop** application depends on **AS** applicationset (Synced to master).
- AS** applicationset depends on **us-sock-shop** application (Synced to master).
- us-sock-shop** application depends on **AS** applicationset (Synced to master).

On the left sidebar, there are filters for NAME, KINDS (Synced: 1, OutOfSync: 0), and HEALTH STATUS (Progressing: 0, Suspended: 0).

Verified live health and sync status of applications deployed on Mumbai cluster

The screenshot shows the Argo application details interface for the 'mumbai-sock-shop' application. The left sidebar includes navigation links for Argo, Applications, Settings, User Info, Documentation, Resource filters, SYNC STATUS, and HEALTH STATUS. The main panel displays the application tree under 'mumbai-sock-shop'. Key components shown include 'user-db' (SVC), 'carts' (deploy), 'carts-db' (deploy), 'catalogue' (deploy), 'catalogue-db' (deploy), 'front-end' (deploy), and 'orders' (orders). Each component is shown with its current state (Synced to master) and revision information. A 'LAST SYNC' section indicates a successful sync 7 minutes ago. The bottom right corner shows the system tray with the date and time as 02:43, 16-01-2026.

Verified live health and sync status of applications deployed on US cluster

The screenshot shows the Argo application details interface for the 'us-sock-shop' application. The left sidebar is identical to the Mumbai cluster view. The main panel displays the application tree under 'us-sock-shop'. Key components shown include 'payment' (deploy), 'queue-master' (deploy), 'rabbitmq' (deploy), 'session-db' (deploy), 'shipping' (deploy), and 'user' (deploy). Each component is shown with its current state (Synced to master) and revision information. A 'LAST SYNC' section indicates a successful sync 14 minutes ago. The bottom right corner shows the system tray with the date and time as 02:49, 16-01-2026.

```

ubuntu@ip-172-31-106-234:~$ kubectl config get-contexts
CURRENT  NAME      CLUSTER
*   cluster1  arn:aws:eks:ap-south-1:941377143083:cluster/mumbai-cluster
      cluster2  arn:aws:eks:us-east-1:941377143083:cluster/us-cluster
ubuntu@ip-172-31-106-234:~$ 

```

Ensured all application resources were correctly deployed and managed in Mumbai cluster

```

ubuntu@ip-172-31-106-234:~$ kubectl config use-context cluster1
Switched to context "cluster1".
ubuntu@ip-172-31-106-234:~$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
carts-6d4c64b486-tj4dt   1/1     Running   0          9m40s
carts-db-6b68658c5c-vsnr5 1/1     Running   0          9m40s
catalogue-cb49cf7-vhdgp  1/1     Running   0          9m40s
catalogue-db-76986f6766-q4lm5 1/1     Running   0          9m40s
front-end-758976979f-7xczn 1/1     Running   0          9m40s
orders-5f4649c895-1842z  1/1     Running   0          9m39s
orders-db-6dbd876695-c878f 1/1     Running   0          9m38s
payment-69c4b47bbc-mzh79 1/1     Running   0          9m40s
queue-master-7bc6c66fb7-nt2vs 1/1     Running   0          9m40s
rabbitmq-66748fcbedc-6zxk7 2/2     Running   0          9m40s
session-db-5ddcd457f7-t8fxb 1/1     Running   0          9m40s
shipping-bcf5b787-f5bxh  1/1     Running   0          9m39s
user-875dbf8d-9szgx  1/1     Running   0          9m39s
user-db-586b466b65-bjrxl  1/1     Running   0          9m39s
ubuntu@ip-172-31-106-234:~$ kubectl get svc
NAME        TYPE      CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
carts       ClusterIP  10.100.17.170 <none>        80/TCP    9m52s
carts-db    ClusterIP  10.100.101.142 <none>        27017/TCP 9m51s
catalogue   ClusterIP  10.100.173.298 <none>        80/TCP    9m51s
catalogue-db ClusterIP  10.100.126.198 <none>        3306/TCP  9m51s
front-end   ClusterIP  10.100.72.4   <none>        80/TCP    9m51s
kubernetes  ClusterIP  10.100.0.1   <none>        443/TCP   7h26m
orders      ClusterIP  10.100.22.79  <none>        80/TCP    9m51s
orders-db   ClusterIP  10.100.180.195 <none>        27017/TCP 9m51s
payment     ClusterIP  10.100.120.19 <none>        80/TCP    9m51s
queue-master ClusterIP  10.100.80.183 <none>        80/TCP    9m51s
rabbitmq    ClusterIP  10.100.168.26  <none>        5672/TCP, 9090/TCP 9m51s
session-db  ClusterIP  10.100.255.231 <none>        6379/TCP  9m51s
shipping    ClusterIP  10.100.15.196 <none>        80/TCP    9m51s
user        ClusterIP  10.100.61.51  <none>        80/TCP    9m51s
user-db     ClusterIP  10.100.45.168 <none>        27017/TCP 9m51s
ubuntu@ip-172-31-106-234:~$ 

```

ip-172-31-106-234 0% 0.42 GB / 1.87 GB 0.01 Mb/s 0.00 Mb/s 5 hours ubuntu :/23% /boot: 19% /boot/efi: 6%

port MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>

Ensured all application resources were correctly deployed and managed in US cluster

```
ubuntu@ip-172-31-106-234:~$ kubectl config use-context cluster2
Switched to context "cluster2".
ubuntu@ip-172-31-106-234:~$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
carts-6d4c64b486-2vc2n   1/1     Running   0          11m
carts-db-6b68658c5c-vc5cb 1/1     Running   0          11m
catalogue-cb49cf7-x5bh4   1/1     Running   0          11m
catalogue-db-76986f6766-56jkr 1/1     Running   0          11m
front-end-758976979f-zrpzm 1/1     Running   0          11m
orders-5f4649c895-mzjg9   1/1     Running   0          11m
orders-db-60db876695-jq2xr 1/1     Running   0          11m
payment-69c4b47bbc-ncp9n   1/1     Running   0          11m
queue-master-7bc6c66fb7-9s9k5 1/1     Running   0          11m
rabbitmq-66748fcdbc-q6dpv 2/2     Running   0          11m
session-db-5dc4d457f7-7dnrx 1/1     Running   0          11m
shipping-bcf1d5b787-mm4nw   1/1     Running   0          11m
user-875dbf8d-szxfl      1/1     Running   0          11m
user-db-586b466b65-j69t6   1/1     Running   0          11m
ubuntu@ip-172-31-106-234:~$ kubectl get svc
NAME        TYPE      CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
carts       ClusterIP  172.20.243.98 <none>        80/TCP    12m
carts-db    ClusterIP  172.20.172.56 <none>        27017/TCP 12m
catalogue   ClusterIP  172.20.61.218 <none>        80/TCP    12m
catalogue-db ClusterIP  172.20.19.200 <none>        3306/TCP  12m
front-end   ClusterIP  172.20.197.42 <none>        80/TCP    12m
kubernetes  ClusterIP  172.20.0.1  <none>        443/TCP   4h11m
orders      ClusterIP  172.20.104.201 <none>        80/TCP    12m
orders-db   ClusterIP  172.20.169.240 <none>        27017/TCP 12m
payment     ClusterIP  172.20.244.54 <none>        80/TCP    12m
queue-master ClusterIP  172.20.230.141 <none>        80/TCP    12m
rabbitmq    ClusterIP  172.20.198.26 <none>        5672/TCP, 9090/TCP 12m
session-db  ClusterIP  172.20.69.115 <none>        6379/TCP  12m
shipping    ClusterIP  172.20.201.59 <none>        80/TCP    12m
user        ClusterIP  172.20.67.170 <none>        80/TCP    12m
user-db     ClusterIP  172.20.10.50 <none>        27017/TCP 12m
ubuntu@ip-172-31-106-234:~$
```

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