

How to: Setup guide

1/ Log in to your [DigitalOcean](#) account. Navigate to the **Kubernetes** section and create a new Kubernetes cluster.

Search by resource name or public IP (Ctrl+B)

← Back to Clusters

Create a Kubernetes cluster

Select a version

We generally recommend the latest version unless your team has a specific need. Check out [DigitalOcean Kubernetes release notes](#).

1.32.2-do.0 - Recommended

Choose a datacenter region

Your Kubernetes cluster will be located in a single datacenter.

Choose a datacenter region

Bangalore • Datacenter 1 • BLR1

Note: GPUs are supported in TOR1 and NYC2 datacenter regions

VPC network

Nodes, pods, and services will belong to this [VPC network](#) and can communicate securely using their private IP addresses. Each datacenter has a default network.

default-blr1 DEFAULT

Size pod and service networks ?

Network subnets can't be changed after creating the cluster.

Size network subnets for me RECOMMENDED
We will assign non-overlapping subnets and size the network.

2/ Choose Cluster Capacity.

Select the Droplet, Node Plan and Min/Max nodes to configure cluster capacity settings.

Choose cluster capacity ?

Select a plan that [best suits your workload type](#) ? for overall availability and performance. You can add or remove nodes and node pools at any time.

Node pool name

pool-lq06xtajw

Shared CPU

Dedicated CPU

Best for testing, low-traffic servers, and workloads that are not CPU-intensive. CPUs are shared between multiple other Droplets.

Machine type (Droplet) ?

Basic

Regular SSD



Node plan ?

\$24/month per node (\$0.036/hour)

4 GB total RAM / 2 vCPUs / 80 GB storage



☒ Set node pool to autoscale

Minimum nodes

—

1

+

to

Maximum nodes

—

3

+

Cost of all nodes: **\$24 - \$72/month** (\$0.04 - \$0.11/hour)


Add Another Node Pool

3/ Make your cluster more resilient and remove any single point of failure situation.


Check “**Add High Availability**” option, which will create replicas of kubernetes’s control plane components.

Select additional options

You can add these cluster upgrades at any time. They can't be removed from the cluster after they are added.


 We recommend high availability to eliminate a single point of failure and increase peace of mind for production workloads.

Get extra reliability for critical workloads

A [high availability control plane](#)  creates multiple replicas of control plane components to maximize cluster access and uptime with a 99.95% SLA.



☒ Add high availability

 **\$40/month** (\$0.06/hour)

Automate database management

Create and automatically link managed databases to your cluster with the [operator](#) .



☐ Add database operator **BETA**

Free 

4/ Set name for cluster and Confirm pricing details. Click on “Create Cluster”

Finalize

You can change the cluster's name, project, and tags at any time.

Name*

Can only contain lowercase alphanumeric characters and dashes.

k8s-1-32-2-do-0-blr1-1745234881124

Project





 first-project 

Tags

Use tags to organize and relate resources. They are not added as labels or taints to the cluster.
Tags may contain letters, numbers, colons, dashes, and underscores.


 TAM... 

Total Cost


	1 to 3 Basic nodes 4 GB total RAM / 2 vCPUs / 80 GB storage Autoscaling enabled	\$24.00 - \$72.00
	HA control plane - 99.95% SLA	\$40.00
	Total cost 	\$64 - \$112/month (\$0.10 - \$0.17/hour)

Create Cluster

5/ Download the Kubernetes Config file



tam-poc-1

in  [first-project](#) / BLR1 - 1.32.2-do.0

Overview


Resources


Insights


Marketplace

Settings

Check out these recommendations

 **Connect a container registry**
[Create or connect a registry](#) to store and manage your images.


 **Add DigitalOcean Resources**
[Add a Load Balancer](#) for traffic distribution or [Volumes](#) for storage.


 **Install**
[Deploy to DigitalOcean](#)

Overview


CONFIGURATION


CPU	Memory	Disk
2 vCPUs	4 GB	80 GB

Download Config File 

Remind me how to use this file to connect to the cluster 

NODE POOL STATUS

 **1/1 Running**

 [pool-lq06xtajw](#)

[View resource details](#)

6/ Create Container registry

Search by resource name or public IP (Ctrl+B) Create ?

Create a container registry

Store your Docker images in private repositories and easily integrate with any DigitalOcean Kubernetes Cluster.

Choose a subscription plan

Subscription plan

<input checked="" type="radio"/> Starter 1 Registry / 1 Repository / 500 MB Storage	Free
<input type="radio"/> Basic 1 Registry / 5 Repositories / 5 GB Storage	\$5.00/month
<input type="radio"/> Professional 1 Registry / Unlimited Repositories / 100 GB Storage	\$20.00/month

Basic and Professional storage overages are billed at \$0.02/GB. The Starter plan is limited to 500 MB with no overages. [Learn more about pricing](#)

Create a registry

Choose a datacenter region

Bangalore • Datacenter 1 • BLR1

Enter a unique name
Can only contain lowercase alphanumeric characters and dashes.

sunny-do-tam-demo

This registry's name cannot be changed, so choose wisely my friend.

Summary

Subscription plan Free

Plan: Starter
Registries: 1
Repositories: 1
Storage: 500 MB

Total cost Free

Create Registry

7/ Authenticate with registry with doctl.

```
saryas@iamsaryal:~/DO/docker/app$ doctl registry login --never-expire
```

Logging Docker in to registry.digitalocean.com

8/ Integrate registry with K8S cluster. This will add a secret to all namespaces for chosen Kubernetes clusters. Allowing read-only access to pull images from this container registry.



Getting Started

Hide

- ✓ Create a container registry
- ✓ Connecting to the registry
- 3 Integrating with Kubernetes
- 4 Next steps

Integrating with Kubernetes

This will add a secret to all namespaces for chosen Kubernetes clusters. Allowing read-only access to [pull images from this container registry](#).

Tip: We recommend integrating with clusters that share the same region for the best performance.

☒ Integrate all clusters

1 / 1

Need more granular control over namespace access? [You can use Docker credentials to create a secret for specific namespaces](#).

Save & Continue

Skip

9/ Build and Push Docker Image, authenticate to container registry and push image to repository.

```
saryas@iamsaryal:~/DO/docker/app$ sudo docker build -t registry.digitalocean.com/sunny-do-tam-demo/saas-app:latest ./
[+] Building 2.3s (10/10) FINISHED
=> [internal] load build definition from dockerfile
=> => transferring dockerfile: 177B
=> [internal] load metadata for docker.io/library/python:3.9-slim
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [1/5] FROM docker.io/library/python:3.9-slim@sha256:9aa5793609640ecea2f06451a0d6f379330880b413f954933289cf3b27a78567
0.0s
=> [internal] load build context
0.0s
=> => transferring context: 128B
0.0s
=> CACHED [2/5] WORKDIR /app
0.0s
=> CACHED [3/5] COPY requirements.txt .
0.0s
=> CACHED [4/5] RUN pip install --upgrade -r requirements.txt
0.0s
=> CACHED [5/5] COPY . .
0.0s
=> exporting to image
0.0s
=> => exporting layers
0.0s
=> => writing image sha256:8747df5c35e5c2870aaa08b8b0924b4243307ee7000f78b9cea700f519d55fd0
0.0s
=> => naming to registry.digitalocean.com/sunny-do-tam-demo/saas-app:latest
0.0s
```

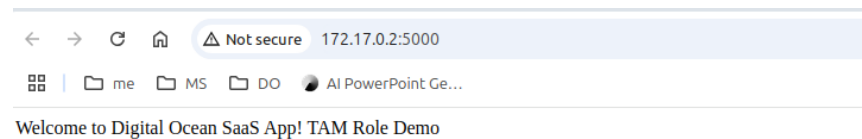
```
saryas@iamsaryal:~/D0/docker/app$ sudo docker login registry.digitalocean.com
Username: iamsaryal@gmail.com
Password:

WARNING! Your credentials are stored unencrypted in '/root/.docker/config.json'.
Configure a credential helper to remove this warning. See
https://docs.docker.com/go/credential-store/

Login Succeeded
saryas@iamsaryal:~/D0/docker/app$ sudo docker tag saas-app:latest registry.digitalocean.com/sunny-do-tam-demo/saas-app:latest
Error response from daemon: No such image: saas-app:latest
saryas@iamsaryal:~/D0/docker/app$ sudo docker tag registry.digitalocean.com/sunny-do-tam-demo/saas-app:latest registry.digitalocean.com/sunny-do-tam-demo/saas-app:latest
saryas@iamsaryal:~/D0/docker/app$ sudo docker push registry.digitalocean.com/sunny-do-tam-demo/saas-app:latest
The push refers to repository [registry.digitalocean.com/sunny-do-tam-demo/saas-app]
c428e231e5e7: Pushed
afc96c6a8b4f: Pushed
32444e5ff190: Pushed
b84ec6a68e26: Pushed
7ad524989e4f: Pushed
e0cc49235ebd: Pushed
185439f46b41: Pushed
ea680fbff095: Pushed
latest: digest: sha256:366eb0043989915e96cfd45e74b9e09b500bfd5811966a3ae2ee49538d9dce64 size: 1990
saryas@iamsaryal:~/D0/docker/app$
```

10/ You can also test locally the image you've built.

```
saryas@iamsaryal:~/D0/docker/app$ sudo docker run registry.digitalocean.com/sunny-do-tam-demo/saas-app
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://172.17.0.2:5000
Press CTRL+C to quit
172.17.0.1 - - [21/Apr/2025 13:53:01] "GET / HTTP/1.1" 200 -
```



11/ Verify cluster setup and

\$ Kubectl config view

```
saryas@iamsaryal:~/D0/docker/app$ k config view
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: DATA+OMITTED
    server: https://2f9e97ca-fc9d-46dd-b3d9-dbbc1369324a.k8s.ondigitalocean.com
    name: do-blr1-tam-poc-1
contexts:
- context:
    cluster: do-blr1-tam-poc-1
    user: do-blr1-tam-poc-1-admin
    name: do-blr1-tam-poc-1
current-context: do-blr1-tam-poc-1
kind: Config
preferences: {}
users:
- name: do-blr1-tam-poc-1-admin
  user:
    token: REDACTED
saryas@iamsaryal:~/D0/docker/app$
```


12/ Deploy Kubernetes Resources:

```
$ kubectl apply -f kubernetes/deployment.yaml
```

```
$ kubectl apply -f kubernetes/service.yaml
```

```
$ kubectl apply -f kubernetes/hpa.yaml
```

13/ Verify Deployment

```
$ kubectl get pods,svc,hpa
```

```
saryas@iamsaryal:~/D0/docker/app$ kubectl get pods -o=wide
NAME                                READY   STATUS    RESTARTS   AGE   IP              NODE                                NOMINATED NODE   READINESS GATES
saas-app-867c8488b-694bn            1/1     Running   0           25m   10.108.0.47     pool-lq06xtajw-6hidu              <none>           <none>
saas-app-867c8488b-ncwmm            1/1     Running   0           25m   10.108.0.124    pool-lq06xtajw-6hidu              <none>           <none>

saryas@iamsaryal:~/D0/docker/app$ k get svc,ep
NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/kubernetes                 ClusterIP           10.109.0.1       <none>            443/TCP           9h
service/saas-app-lb                LoadBalancer       10.109.19.76     2400:6180:100:d0::7179:c001,68.183.246.102  80:32738/TCP     10m

NAME                                ENPOINTS                                AGE
endpoints/kubernetes                100.65.5.147:443                        9h
endpoints/saas-app-lb               10.108.0.124:5000,10.108.0.47:5000     10m
saryas@iamsaryal:~/D0/docker/app$
```

check service running fine inside pods.

```
root@saas-app-867c8488b-694bn:/app# curl localhost:5000
```

```
saryas@iamsaryal:~/D0/docker/app$ k exec -it pod/saas-app-867c8488b-694bn -- /bin/sh
# bash
root@saas-app-867c8488b-694bn:/app# apt-get install curl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
curl is already the newest version (7.88.1-10+deb12u12).
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
root@saas-app-867c8488b-694bn:/app# curl localhost:5000
Welcome to Digital Ocean SaaS App! TAM Role Demoroot@saas-app-867c8488b-694bn:/app#
root@saas-app-867c8488b-694bn:/app#
```

Testing using service/Loadbalancer public endpoint also (**from CLI**)

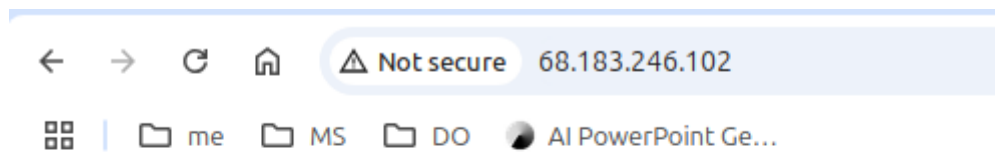
```
saryas@iamsaryal:~/DO/docker/app$ curl 68.183.246.102 ### Loadbalancer external IP
```

Welcome to Digital Ocean SaaS App! TAM Role Demo

```
saryas@iamsaryal:~/DO/docker/app$
```

```
saryas@iamsaryal:~/D0/docker/app$ kubectl get pods -o=wide
NAME READY STATUS RESTARTS AGE IP NODE NOMINATED NODE READINESS GATES
saas-app-867c8488b-694bn 1/1 Running 0 53m 10.108.0.47 pool-lq06xtajw-6hidu <none> <none>
saas-app-867c8488b-ncwmm 1/1 Running 0 53m 10.108.0.124 pool-lq06xtajw-6hidu <none> <none>
saryas@iamsaryal:~/D0/docker/app$ k get svc -o=wide
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE SELECTOR
kubernetes ClusterIP 10.109.0.1 <none> 443/TCP 9h <none>
saas-app-lb LoadBalancer 10.109.19.76 2400:6180:100:d0::7179:c001,68.183.246.102 80:32738/TCP 37m app=saas-app
saryas@iamsaryal:~/D0/docker/app$
saryas@iamsaryal:~/D0/docker/app$
saryas@iamsaryal:~/D0/docker/app$
saryas@iamsaryal:~/D0/docker/app$ curl 68.183.246.102
Welcome to Digital Ocean SaaS App! TAM Role Demosaryas@iamsaryal:~/D0/docker/app$
```

Access LB external IP - From browser:



Welcome to Digital Ocean SaaS App! TAM Role Demo

14/ Check and confirm that loadbalancing is working fine.

```
saryas@iamsaryal:~/DO/docker/app$ k get pods -o=wide
NAME READY STATUS RESTARTS AGE IP NODE NOMINATED NODE READINESS GATES
saas-app-867c8488b-694bn 1/1 Running 0 66m 10.108.0.47 pool-lq06xtajw-6hidu <none> <none>
saas-app-867c8488b-ncwmm 1/1 Running 0 66m 10.108.0.124 pool-lq06xtajw-6hidu <none> <none>
```

POD 1

```
saryas@iamsaryal:~/DO/docker/app$ k logs --follow saas-app-867c8488b-694bn
```

* Serving Flask app 'app'

* Debug mode: off

WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.

* Running on all addresses (0.0.0.0)

* Running on http://127.0.0.1:5000

* Running on http://10.108.0.47:5000

Press CTRL+C to quit

10.122.0.3 - - [21/Apr/2025 21:31:08] "GET / HTTP/1.1" 200 -

10.122.0.3 - - [21/Apr/2025 21:31:23] "GET / HTTP/1.1" 200 -

127.0.0.1 - - [21/Apr/2025 21:47:47] "GET / HTTP/1.1" 200 -

```
saryas@iamsaryal:~/D0/docker/app$ k logs --follow saas-app-867c8488b-694bn
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://10.108.0.47:5000
Press CTRL+C to quit
10.122.0.3 - - [21/Apr/2025 21:31:08] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:31:23] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [21/Apr/2025 21:47:47] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:48:30] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:50:33] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:50:43] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:50:47] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:53:03] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:53:04] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:53:05] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:53:05] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:53:38] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [21/Apr/2025 21:53:53] "GET / HTTP/1.1" 200 -
```

POD 2

```
saryas@iamsaryal:~/DO/docker/app$ k logs --follow saas-app-867c8488b-ncwmm
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://10.108.0.124:5000
Press CTRL+C to quit
10.122.0.3 - - [21/Apr/2025 21:22:15] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:22:53] "GET / HTTP/1.1" 200 -
```

```
saryas@iamsaryal:~/D0/docker/app$ k logs --follow saas-app-867c8488b-ncwmm
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://10.108.0.124:5000
Press CTRL+C to quit
10.122.0.3 - - [21/Apr/2025 21:22:15] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:22:53] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:50:44] "GET /favicon.ico HTTP/1.1" 404 -
10.122.0.3 - - [21/Apr/2025 21:50:47] "GET / HTTP/1.1" 200 -
10.122.0.3 - - [21/Apr/2025 21:50:48] "GET / HTTP/1.1" 200 -
```

15/ Install Metrics Server (refer: [doc link](#))

```
saryas@iamsaryal:~/DO/docker$ helm install metrics-server metrics-server/metrics-server --version "$HELM_CHART_VERSION" --namespace metrics-server --create-namespace -f "Kubernetes-Starter-Kit-Developers/07-scaling-application-workloads/assets/manifests/metrics-server-values-v3.8.2.yaml"
NAME: metrics-server
LAST DEPLOYED: Tue Apr 22 04:32:35 2025
NAMESPACE: metrics-server
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
```

```
*****
* Metrics Server *
*****

Chart version: 3.12.2
App version: 0.7.2
Image tag: registry.k8s.io/metrics-server/metrics-server:v0.7.2
```

```
saryas@iamsaryal:~/D0/docker/app$ sudo apt-get install helm
[sudo] password for saryas:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package helm
saryas@iamsaryal:~/D0/docker/app$ cd ../
saryas@iamsaryal:~/D0/docker$ helm install metrics-server metrics-server/metrics-server --version "$HELM_CHART_VERSION" --namespace metrics-server --create-n
amespace -f "Kubernetes-Starter-Kit-Developers/07-scaling-application-workloads/assets/manifests/metrics-server-values-v3.8.2.yaml"
NAME: metrics-server
LAST DEPLOYED: Tue Apr 22 04:32:35 2025
NAMESPACE: metrics-server
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
*****
* Metrics Server *
*****
Chart version: 3.12.2
App version: 0.7.2
Image tag: registry.k8s.io/metrics-server/metrics-server:v0.7.2
*****
```

16/ Setup HorizontalPodAutoscaler (HPA)

```
saryas@iamsaryal:~/D0/docker/app$ kubectl autoscale deployment saas-app --cpu-percent=20 --min=1 --max=5
horizontalpodautoscaler.autoscaling/saas-app autoscaled
```

```
saryas@iamsaryal:~/D0/docker/app$ kubectl get hpa
NAME      REFERENCE          TARGETS      MINPODS  MAXPODS  REPLICAS  AGE
saas-app  Deployment/saas-app  cpu: 1%/20%  1        5        0         8s
```

```
saryas@iamsaryal:~/D0/docker$ k get hpa
NAME      REFERENCE          TARGETS      MINPODS  MAXPODS  REPLICAS  AGE
saas-app  Deployment/saas-app  cpu: 1%/20%  1        5        1         39m
```