

Capstone project – blue green  
deployment

Shree Iyer

12/06/2020



## 2. Spin EC2 instance for Jenkins, Docker, Kubectl



Instances | EC2 Management C x Drivers | Downloads | MFC-L27 x +

us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#Instances:search=jenkins;sort=instanceState

aws Services Resource Groups shreeni123 Ohio Support

New EC2 Experience Tell us what you think

EC2 Dashboard New

Events New

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Limits

INSTANCES

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts New

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK

Launch Instance Connect Actions

search : jenkins Add filter

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status
jenkins	i-033743f8f61cb2fc1	t3.medium	us-east-2a	running	2/2 checks ...	None

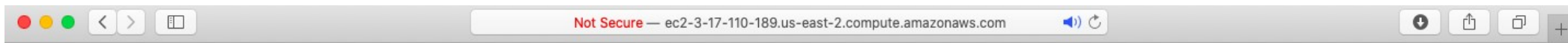
Instance: i-033743f8f61cb2fc1 (jenkins) Public DNS: ec2-3-17-110-189.us-east-2.compute.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID	i-033743f8f61cb2fc1	Public DNS (IPv4)	ec2-3-17-110-189.us-east-2.compute.amazonaws.com
Instance state	running	IPv4 Public IP	3.17.110.189
Instance type	t3.medium	IPv6 IPs	-
Finding	Opt-in to AWS Compute Optimizer for recommendations. <a href="#">Learn more</a>	Elastic IPs	
Private DNS	ip-172-31-7-68.us-east-2.compute.internal	Availability zone	us-east-2a
Private IPs	172.31.7.68	Security groups	<a href="#">jenkins. view inbound rules.</a> <a href="#">view outbound rules</a>
Secondary private IPs		Scheduled events	<a href="#">No scheduled events</a>
VPC ID	vpc-63e62908	AMI ID	<a href="#">ubuntu/images/hvm-</a>

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# 3. Jenkins up and running



**Welcome to Jenkins!**

Sign in

☐ Keep me signed in



# 4. “Create cluster” pipeline



Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ create-cluster < 24 > Pipeline Changes Tests Artifacts Logout

Branch: — 15m 15s No changes  
Commit: — a day ago Started by user Shree

Start — Create K8S Cluster — Configure Kubeconfig — End

Configure Kubeconfig - 1s [Restart Configure Kubeconfig](#) 1s

✓ > Shell Script

# 4a. Create K8S cluster Slide 1



Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ create-cluster < 24 > Pipeline Changes Tests Artifacts Logout

Branch: — 15m 15s No changes  
Commit: — a day ago Started by user Shree

Start Create K8S Cluster Configure Kubeconfig End

Create K8S Cluster - 15m 13s [Restart Create K8S Cluster](#)

✓ Check out from version control <1s

```
1 No credentials specified
2 > /usr/bin/git rev-parse --is-inside-work-tree # timeout=10
3 Fetching changes from the remote Git repository
4 > /usr/bin/git config remote.origin.url https://github.com/shreeni123/project5_blue-green.git # timeout=10
5 Fetching upstream changes from https://github.com/shreeni123/project5_blue-green.git
6 > /usr/bin/git --version # timeout=10
7 > /usr/bin/git fetch --tags --progress -- https://github.com/shreeni123/project5_blue-green.git +refs/heads/*:refs/remotes/origin/* # timeout=10
8 > /usr/bin/git rev-parse refs/remotes/origin/master^{commit} # timeout=10
9 > /usr/bin/git rev-parse refs/remotes/origin/origin/master^{commit} # timeout=10
10 Checking out Revision 304f27512fdbd601e008370d23184bfd3c125b10 (refs/remotes/origin/master)
11 > /usr/bin/git config core.sparsecheckout # timeout=10
12 > /usr/bin/git checkout -f 304f27512fdbd601e008370d23184bfd3c125b10 # timeout=10
13 Commit message: "Update Jenkinsfile"
14 > /usr/bin/git rev-list --no-walk 304f27512fdbd601e008370d23184bfd3c125b10 # timeout=10
```

✓ Shell Script 15m 13s

```
1 + eksctl create cluster --name blue-green --region us-east-2 --nodegroup-name standard-workers --node-type t2.micro --nodes 3 --nodes-min 1 --nodes-max 4 --ssh-
2 access --ssh-public-key id_rsa.pub --managed
3 [i] eksctl version 0.21.0
4 [i] using region us-east-2
```

# 4a. Create K8S cluster Slide 2



Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ [create-cluster](#) < 24 > Pipeline Changes Tests Artifacts Logout X

Branch: — 15m 15s No changes  
Commit: — a day ago Started by user Shree

Start — Create K8S Cluster — Configure Kubeconfig — End

Create K8S Cluster - 15m 13s [Restart Create K8S Cluster](#)

✓ Check out from version control <1s

```
1 No credentials specified
2 > /usr/bin/git rev-parse --is-inside-work-tree # timeout=10
3 Fetching changes from the remote Git repository
4 > /usr/bin/git config remote.origin.url https://github.com/shreeni123/project5_blue-green.git # timeout=10
5 Fetching upstream changes from https://github.com/shreeni123/project5_blue-green.git
6 > /usr/bin/git --version # timeout=10
7 > /usr/bin/git fetch --tags --progress -- https://github.com/shreeni123/project5_blue-green.git +refs/heads/*:refs/remotes/origin/* # timeout=10
8 > /usr/bin/git rev-parse refs/remotes/origin/master^{commit} # timeout=10
9 > /usr/bin/git rev-parse refs/remotes/origin/origin/master^{commit} # timeout=10
10 Checking out Revision 304f27512fdbd601e008370d23184bfd3c125b10 (refs/remotes/origin/master)
11 > /usr/bin/git config core.sparsecheckout # timeout=10
12 > /usr/bin/git checkout -f 304f27512fdbd601e008370d23184bfd3c125b10 # timeout=10
13 Commit message: "Update Jenkinsfile"
14 > /usr/bin/git rev-list --no-walk 304f27512fdbd601e008370d23184bfd3c125b10 # timeout=10
```

✓ Shell Script 15m 13s

```
1 + eksctl create cluster --name blue-green --region us-east-2 --nodegroup-name standard-workers --node-type t2.micro --nodes 3 --nodes-min 1 --nodes-max 4 --ssh-
  access --ssh-public-key id_rsa.pub --managed
2 [i] eksctl version 0.21.0
3 [i] using region us-east-2
```

# 4a. Kubernetes cluster formed in EC2



The screenshot displays the AWS Management Console interface for a Kubernetes cluster named "blue-green" in the us-east-2 region. The left-hand navigation pane shows the "Amazon EKS" section expanded, with "Clusters" selected. The main content area shows the cluster's configuration and details.

**Cluster configuration**

Kubernetes version <a href="#">Info</a>	Status
1.16	✓ Active
Platform version <a href="#">Info</a>	
eks.1	

**Details** | Compute | Networking | Logging | Updates | Tags

**Details**

API server endpoint <a href="#">Copy</a>	OpenID Connect provider URL <a href="#">Copy</a>	Cluster ARN <a href="#">Copy</a>
<a href="https://73F68A6CFFA8AE2FC2273436D6F2483D.sk1.us-east-2.eks.amazonaws.com">https://73F68A6CFFA8AE2FC2273436D6F2483D.sk1.us-east-2.eks.amazonaws.com</a>	<a href="https://oidc.eks.us-east-2.amazonaws.com/id/73F68A6CFFA8AE2FC2273436D6F2483D">https://oidc.eks.us-east-2.amazonaws.com/id/73F68A6CFFA8AE2FC2273436D6F2483D</a>	arn:aws:eks:us-east-2:692963223244:cluster/blue-green

# 4b. Configure Kubeconfig



Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ [create-cluster](#) < 24 > Pipeline Changes Tests Artifacts Logout

Branch: — 15m 15s No changes  
Commit: — a day ago Started by user Shree

Start — Create K8S Cluster — Configure Kubeconfig — End

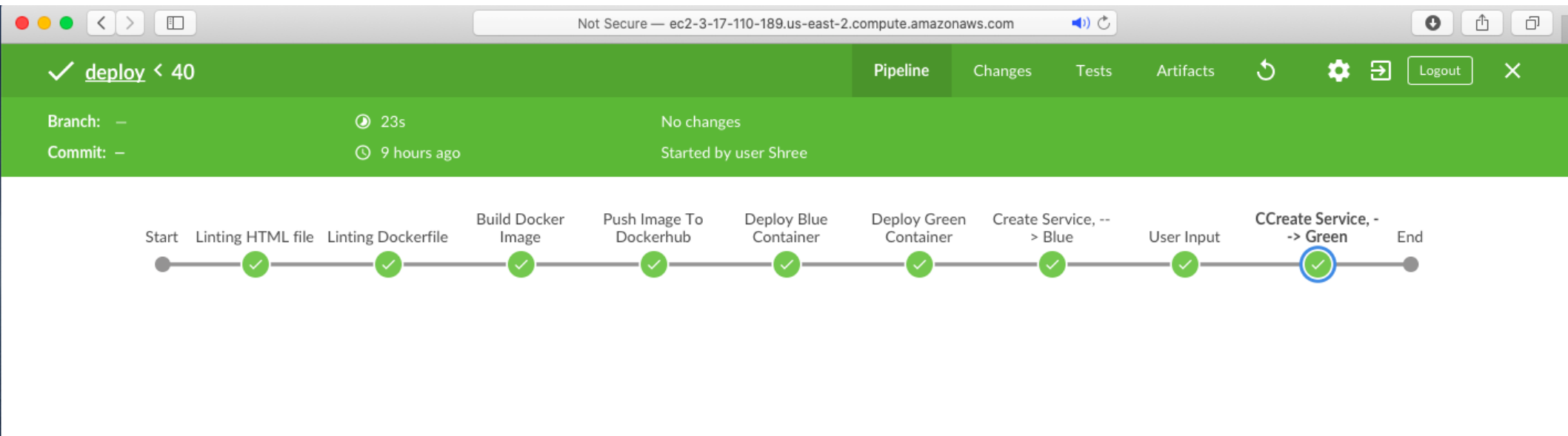
Configure Kubeconfig - 1s [Restart Configure Kubeconfig](#)

✓ ▾ Shell Script 1s

```
1 + aws eks --region us-east-2 update-kubeconfig --name blue-green
2 Updated context arn:aws:eks:us-east-2:692963223244:cluster/blue-green in /var/lib/jenkins/.kube/config
```



# 5. “Deploy” pipeline



## 5a. Linting HTML file



Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts Logout

Branch: — 23s No changes  
Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub Deploy Blue Container Deploy Green Container Create Service, --> Blue User Input CCreate Service, -> Green End

## 5b. Linting Dockerfile

Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts Logout

Branch: — 23s No changes  
Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub Deploy Blue Container Deploy Green Container Create Service, --> Blue User Input CCreate Service, -> Green End

Linting Dockerfile - <1s

[Restart Linting Dockerfile](#)

```
✓ ▾ cp Deploy/Dockerfile . — Shell Script <1s
1 + cp Deploy/Dockerfile .

✓ ▾ dockerlint Dockerfile — Shell Script <1s
1 + dockerlint Dockerfile
2
3 INFO: Dockerfile is OK.
```

## 5c. Build Docker Image



Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts

Branch: — 23s No changes  
Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile **Build Docker Image** Push Image To Dockerhub Deploy Blue Container Deploy Green Container Create Service, --> Blue User Input CCreate Service, -> Green End

Build Docker Image - 3s

Restart Build Docker Image

✓ docker build -t shreeni123/shree-capstone . — Shell Script 2s

```
1 + docker build -t shreeni123/shree-capstone .
2 Sending build context to Docker daemon 124.2MB
3 Step 1/3 : FROM nginx
4 ----> 2622e6cca7eb
5 Step 2/3 : RUN rm /usr/share/nginx/html/index.html
6 ----> Using cache
7 ----> f2b54e4000b5
8 Step 3/3 : COPY Deploy/index.html /usr/share/nginx/html
9 ----> Using cache
10 ----> 0542c4e1a787
11 Successfully built 0542c4e1a787
12 Successfully tagged shreeni123/shree-capstone:latest
```

## 5d. Push image to Docker Hub



Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts

Branch: — 23s No changes

Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image **Push Image To Dockerhub** Deploy Blue Container Deploy Green Container Create Service, --> Blue User Input CCreate Service, --> Green End

Push Image To Dockerhub - 2s

[Restart Push Image To Dockerhub](#)

✓ docker push shreeni123/shree-capstone — Shell Script 1s

```
1 + docker push shreeni123/shree-capstone
2 The push refers to repository [docker.io/shreeni123/shree-capstone]
3 3484648ebb57: Preparing
4 07cb53464d6c: Preparing
5 f978b9ed3f26: Preparing
6 9040af41bb66: Preparing
7 7c7d7f446182: Preparing
8 d4cf327d8ef5: Preparing
9 13cb14c2acd3: Preparing
10 d4cf327d8ef5: Waiting
11 13cb14c2acd3: Waiting
12 3484648ebb57: Layer already exists
13 9040af41bb66: Layer already exists
14 f978b9ed3f26: Layer already exists
15 7c7d7f446182: Layer already exists
16 07cb53464d6c: Layer already exists
17 d4cf327d8ef5: Layer already exists
18 13cb14c2acd3: Layer already exists
19 latest: digest: sha256:95fd075923bba978897847f35551e70bd19de668cda4b1af161d1b70b5f0dff7 size: 1776
```

## 5d. DockerHub



jenkins / deploy / #40 Docker Hub

Thank you for attending DockerCon 2020! [Watch the recordings.](#)

dockerhub Search for great content (e.g., mysql) Explore Repositories Organizations Get Help ▼ shreeni123

Repositories shreeni123 / shree-capstone Using 1 of 1 private repositories. [Get more](#)

General Tags Builds Timeline Collaborators Webhooks Settings

### shreeni123 / shree-capstone

*This repository does not have a description*

⌚ Last pushed: 9 hours ago


**Docker commands** [Public View](#)

To push a new tag to this repository,

```
docker push shreeni123/shree-capstone:tagname
```

### Tags

This repository contains 1 tag(s).

latest		⌚ 9 hours ago
--------	---	---------------

[See all](#)

### Recent builds

*Link a source provider and run a build to see build results here.*

Readme ⓘ ✎

## 5f. Deploy blue container



jenkins / deploy / #40

Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts Logout

Branch: — 23s No changes

Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub **Deploy Blue Container** Deploy Green Container Create Service, --> Blue User Input CCreate Service, -> Green End

Deploy Blue Container - <1s

Restart Deploy Blue Container

✓ ▾ `kubectl apply -f Deploy/blue-controller.yaml` — Shell Script <1s

```
1 + kubectl apply -f Deploy/blue-controller.yaml
2 replicationcontroller/blue unchanged
```

## 5g. Deploy green container



jenkins / deploy / #40

Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ **deploy** < 40

Pipeline Changes Tests Artifacts Logout

Branch: — 23s No changes  
Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub Deploy Blue Container **Deploy Green Container** Create Service, --> Blue User Input CCreate Service, --> Green End

Deploy Green Container - <1s [Restart Deploy Green Container](#)

✓ `kubectl apply -f Deploy/green-controller.yaml` — Shell Script <1s

```
1 + kubectl apply -f Deploy/green-controller.yaml
2 replicationcontroller/green unchanged
```

## 5h. Create blue service



jenkins / deploy / #40

Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts

Branch: — 23s No changes  
Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub Deploy Blue Container Deploy Green Container **Create Service, --> Blue** User Input CCreate Service, --> Green End

Create Service, --> Blue - <1s

Restart Create Service, --> Blue

✓ ▾ kubectl apply -f Deploy/blue-service.yaml — Shell Script <1s

```
1 + kubectl apply -f Deploy/blue-service.yaml
2 service/bluegreenlb unchanged
```



## 5j. Scenario 1 – Abort green service



jenkins / deploy / #39

Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

— deploy < 39 > Pipeline Changes Tests Artifacts Logout

Branch: — 24s Changes by shreenivas.i  
Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub Deploy Blue Container Deploy Green Container Create Service, --> Blue User Input CCreate Service, -> Green End

User Input - 14s [Restart User Input](#)

Ready to redirect traffic to green? — Wait for interactive input 14s

```
1 Ready to redirect traffic to green?
2 Proceed or Abort
```

## 5k. Scenario 2 – Approved for green



jenkins / deploy / #40

Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts

Branch: — 23s No changes

Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub Deploy Blue Container Deploy Green Container Create Service, --> Blue User Input CCreate Service, --> Green End

User Input - 13s

Restart User Input

✓ Ready to redirect traffic to green? — Wait for interactive input 13s

```
1 Ready to redirect traffic to green?
2 Proceed or Abort
3 Approved by Shree
```

## 5l. Scenario 2 – Create green service



jenkins / deploy / #40

Not Secure — ec2-3-17-110-189.us-east-2.compute.amazonaws.com

✓ deploy < 40

Pipeline Changes Tests Artifacts Logout

Branch: — 23s No changes

Commit: — 9 hours ago Started by user Shree

Start Linting HTML file Linting Dockerfile Build Docker Image Push Image To Dockerhub Deploy Blue Container Deploy Green Container Create Service, --> Blue User Input CCreate Service, --> Green End

CCreate Service, --> Green - <1s

Restart CCreate Service, --> Green

✓ ▾ kubectl apply -f Deploy/green-service.yaml — Shell Script <1s

```
1 + kubectl apply -f Deploy/green-service.yaml
2 service/bluegreenlb configured
```

## 6. Jenkins master “kubectl get all” output



```
,name,template,templatefile,wide,yaml
root@ip-172-31-7-68:/home/ubuntu# kubectl get all --all-namespaces
NAMESPACE   NAME                                     READY   STATUS    RESTARTS   AGE
default     pod/blue-62ph4                         1/1     Running   0           3m27s
default     pod/green-8w4b9                        1/1     Running   0           3m26s
kube-system pod/aws-node-bvb9z                     1/1     Running   0           16h
kube-system pod/aws-node-rcdrq                     1/1     Running   0           16h
kube-system pod/aws-node-xt5fj                     1/1     Running   0           16h
kube-system pod/coredns-bd44f767b-kb26r        1/1     Running   0           16h
kube-system pod/coredns-bd44f767b-sk9tm       1/1     Running   0           16h
kube-system pod/kube-proxy-7wwvz           1/1     Running   0           16h
kube-system pod/kube-proxy-g9l59            1/1     Running   0           16h
kube-system pod/kube-proxy-swtdf            1/1     Running   0           16h

NAMESPACE   NAME                                     DESIRED   CURRENT   READY   AGE
default     replicationcontroller/blue              1         1         1       3m27s
default     replicationcontroller/green            1         1         1       3m26s

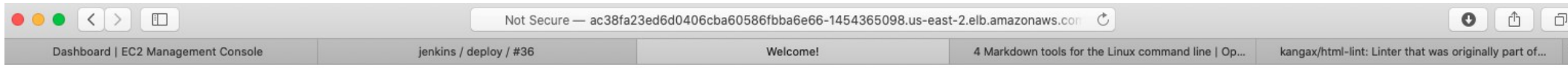
NAMESPACE   NAME                TYPE           CLUSTER-IP   EXTERNAL-IP   PORT(S)          AGE
default     service/bluegreenlb LoadBalancer  10.100.60.216 ac38fa23ed6d0406cba60586fbb6e66-1454365098.us-east-2.elb.amazonaws.com 8000:30942/TCP 3m25s
default     service/kubernetes  ClusterIP     10.100.0.1    <none>         443/TCP          16h
kube-system service/kube-dns     ClusterIP     10.100.0.10   <none>         53/UDP,53/TCP   16h

NAMESPACE   NAME                DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
kube-system daemonset.apps/aws-node  3         3         3        3             3           <none>          16h
kube-system daemonset.apps/kube-proxy  3         3         3        3             3           <none>          16h

NAMESPACE   NAME                READY   UP-TO-DATE   AVAILABLE   AGE
kube-system deployment.apps/coredns  2/2     2             2           16h

NAMESPACE   NAME                DESIRED   CURRENT   READY   AGE
kube-system replicaset.apps/coredns-bd44f767b  2         2         2       16h
root@ip-172-31-7-68:/home/ubuntu#
```

## 7. Output



Hello World! Welcome to Shree's Blue-Green Deployment!

