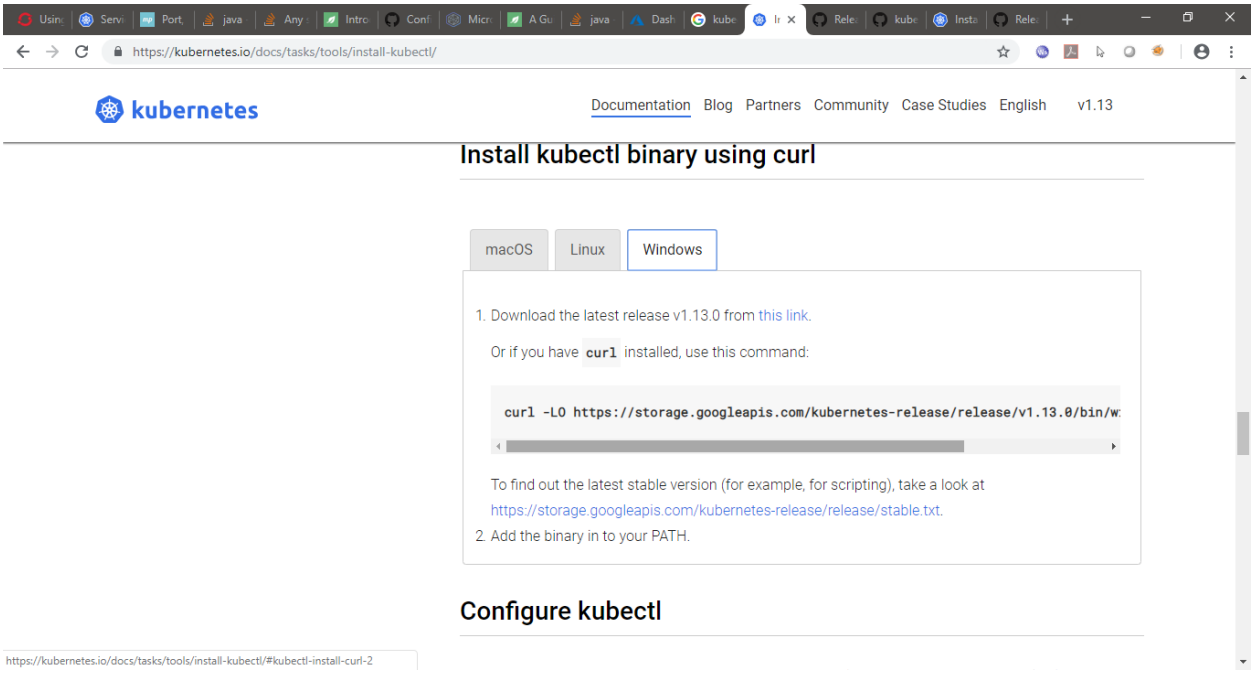
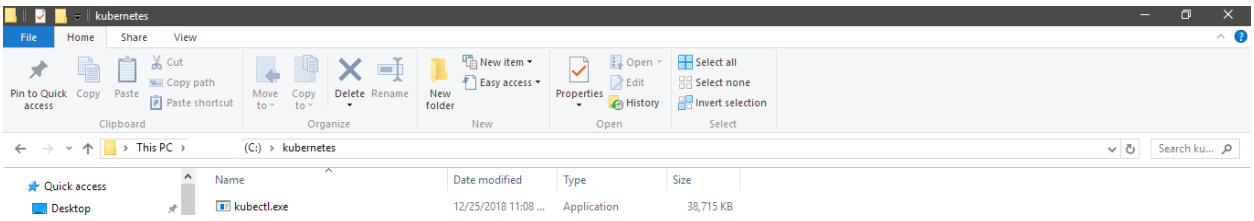
Kubernetes Local setup

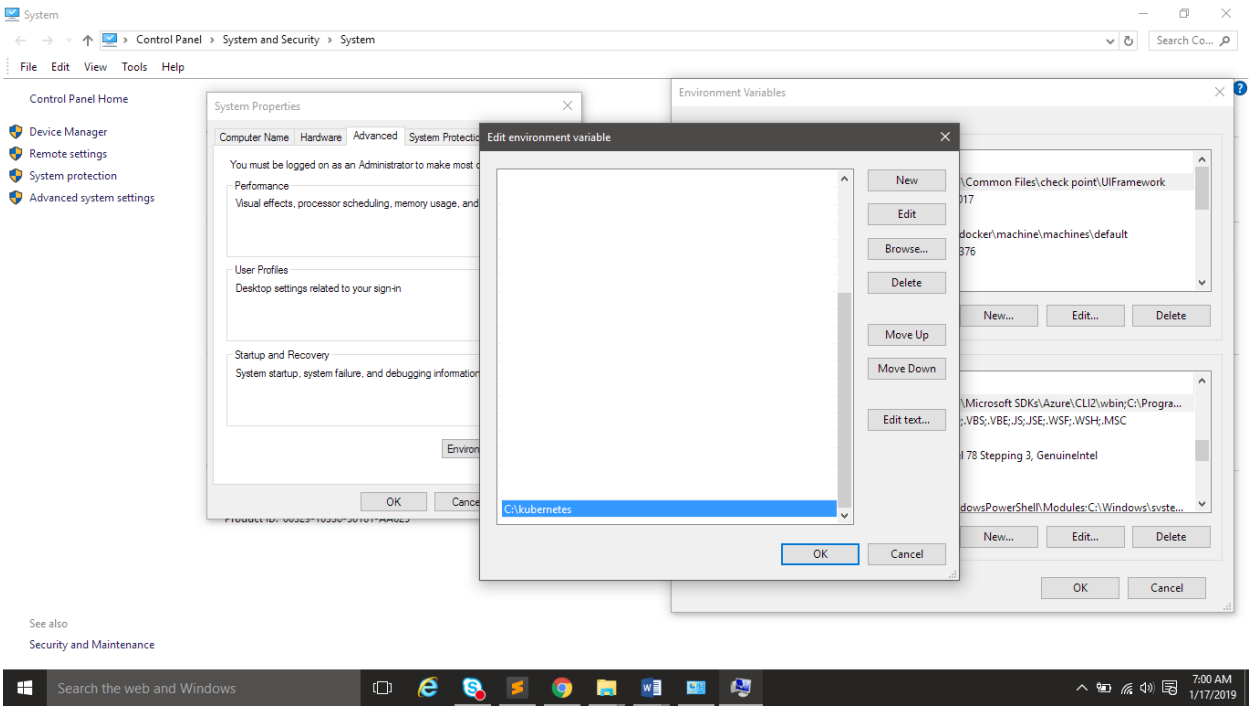
https://kubernetes.io/docs/tasks/tools/install-kubectl/



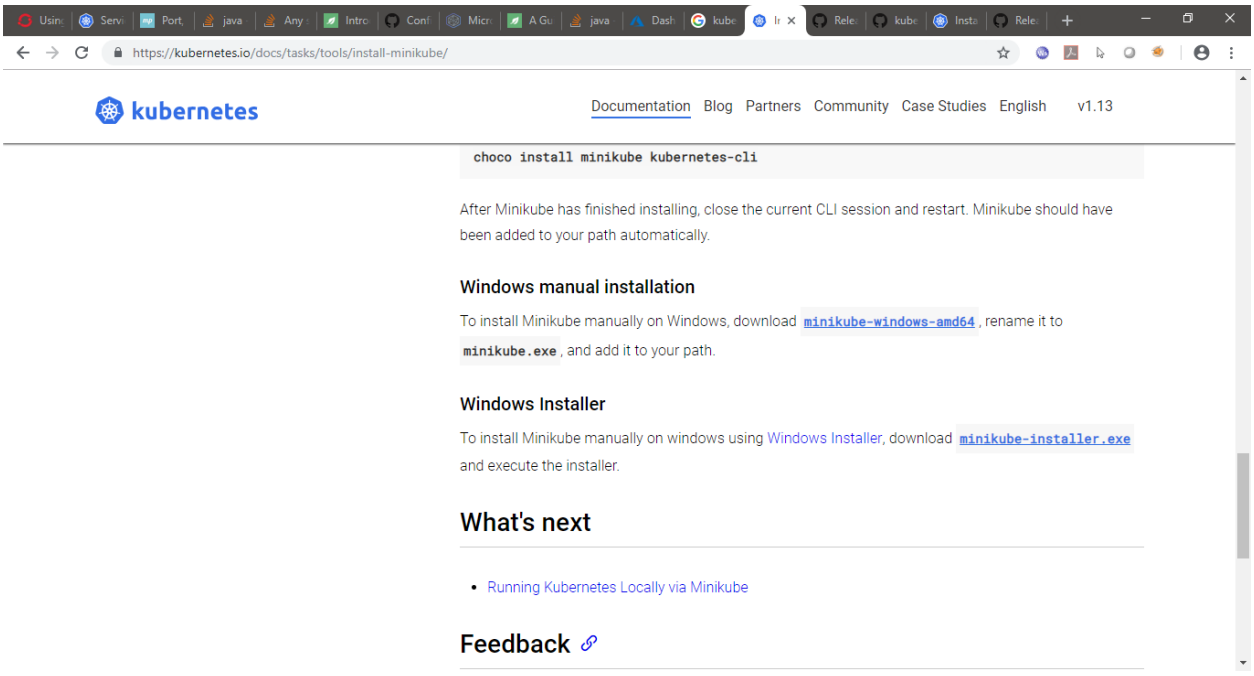
https://storage.googleapis.com/kubernetes-release/release/v1.13.0/bin/windows/amd64/kubectl.exe

Download above file and save in some folder (Better not have spaces in folder structure, as we add it to path in environment variables)

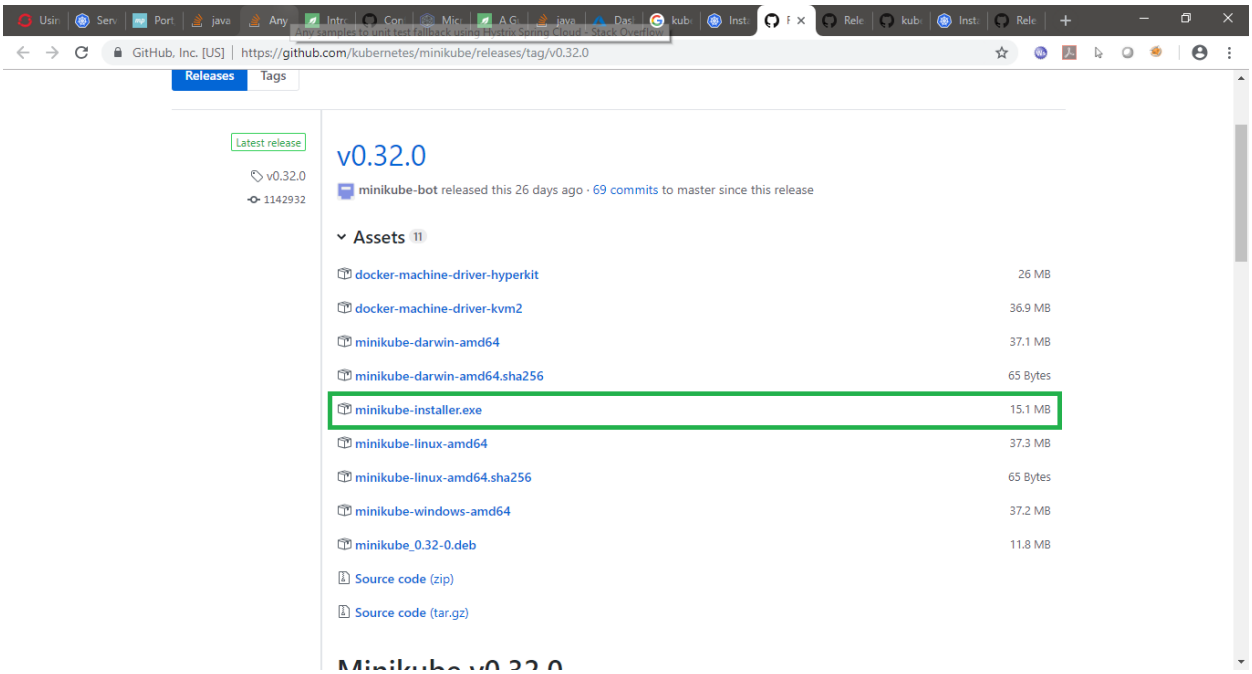


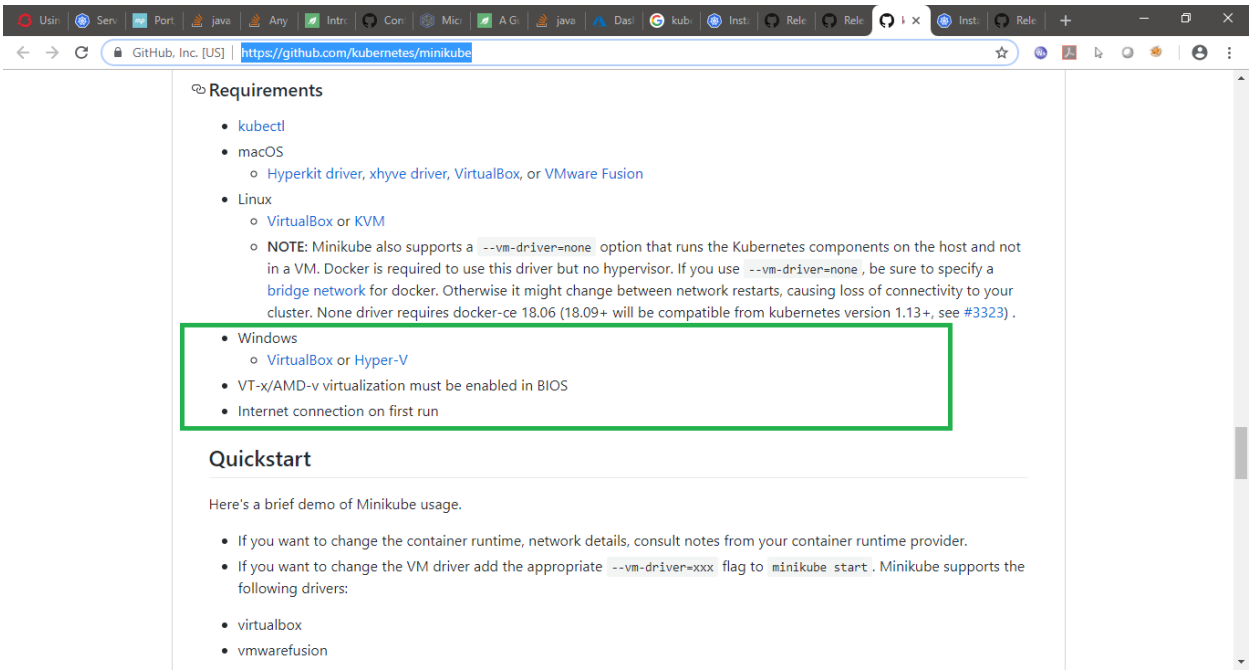


https://kubernetes.io/docs/tasks/tools/install-minikube/
https://github.com/kubernetes/minikube

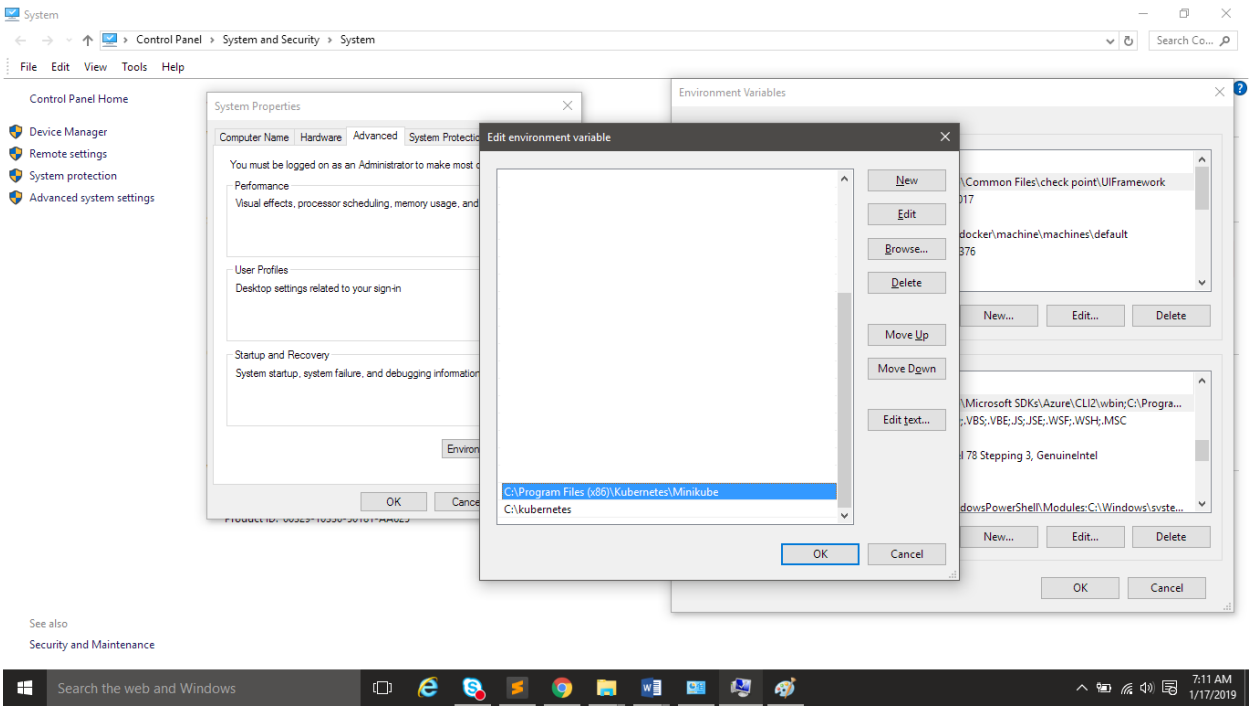


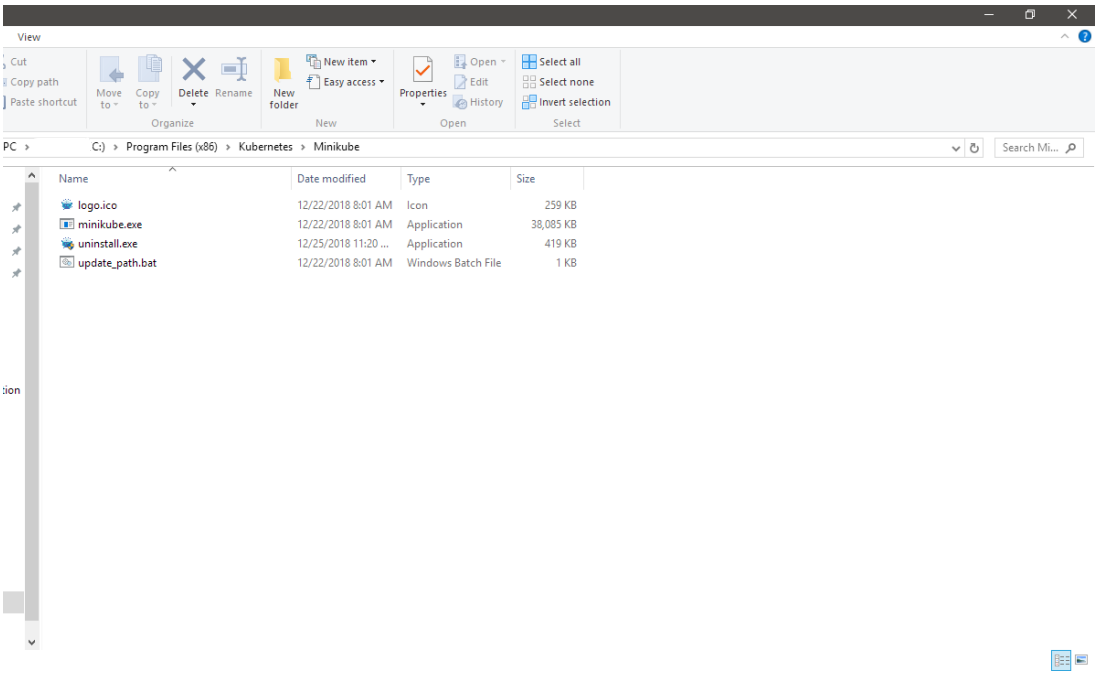
I have tried second option installer





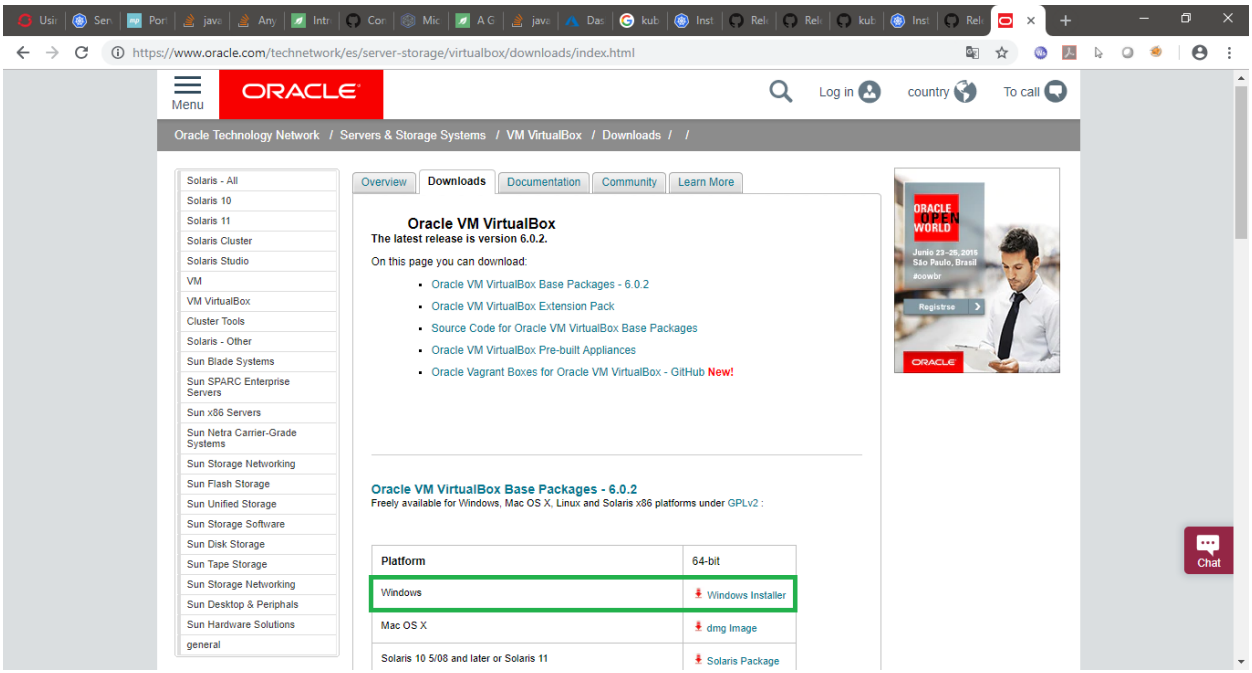
After installing add minikube path from program files to environment variables



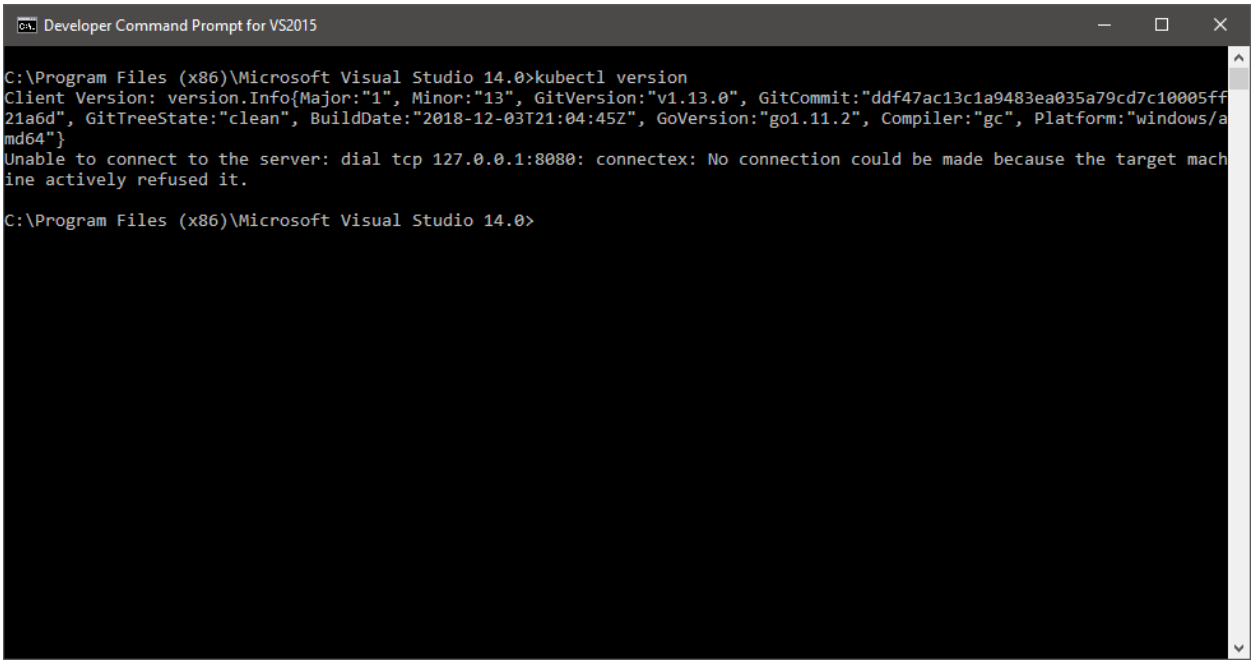


Download Oracle VM box

https://www.oracle.com/technetwork/es/server-storage/virtualbox/downloads/index.html

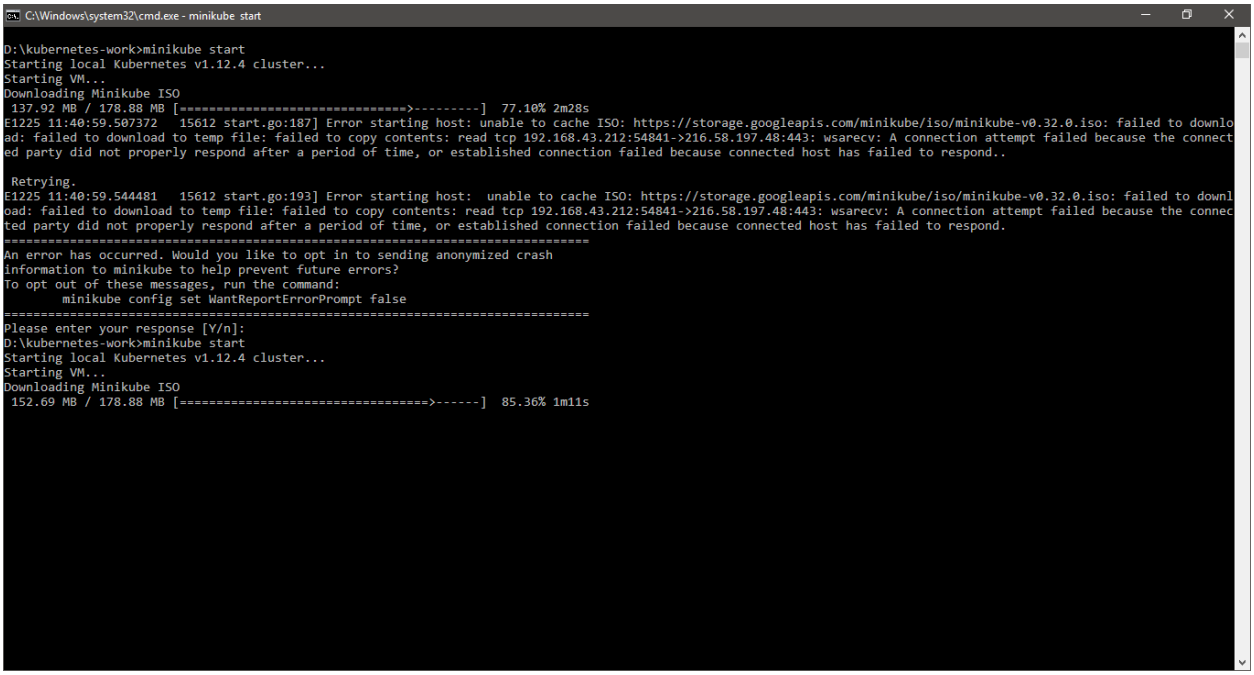


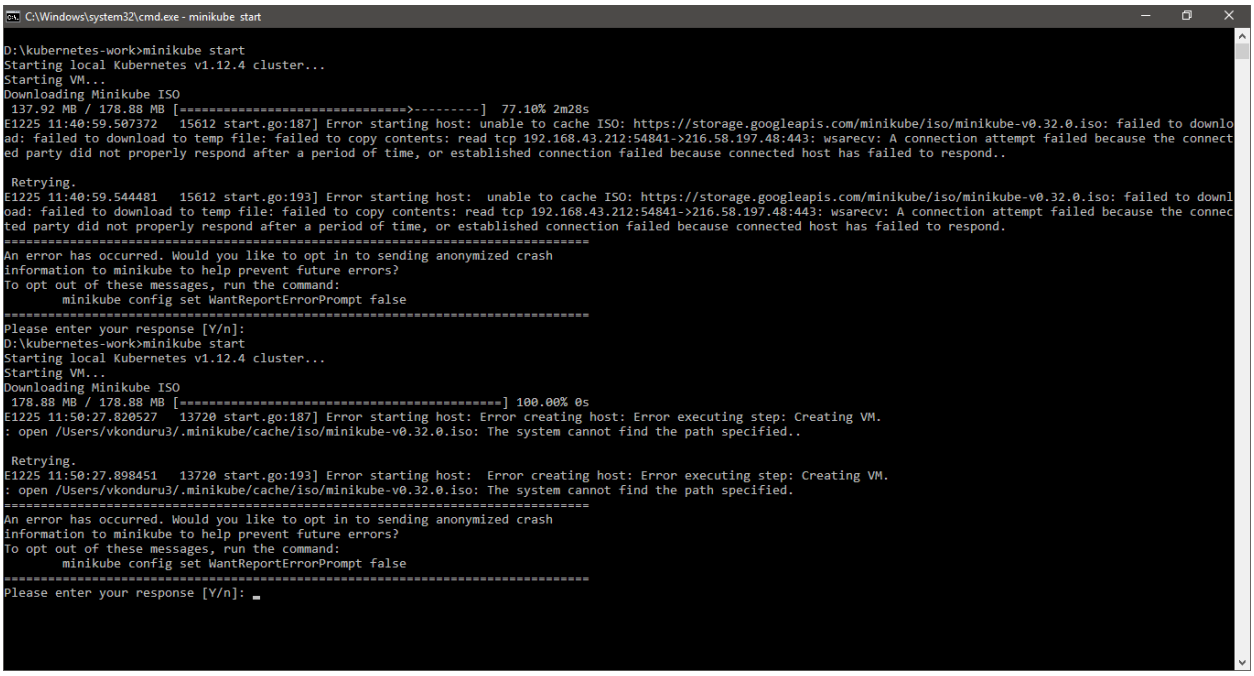
To verify kubectl is working or not – try command **kubectl version**

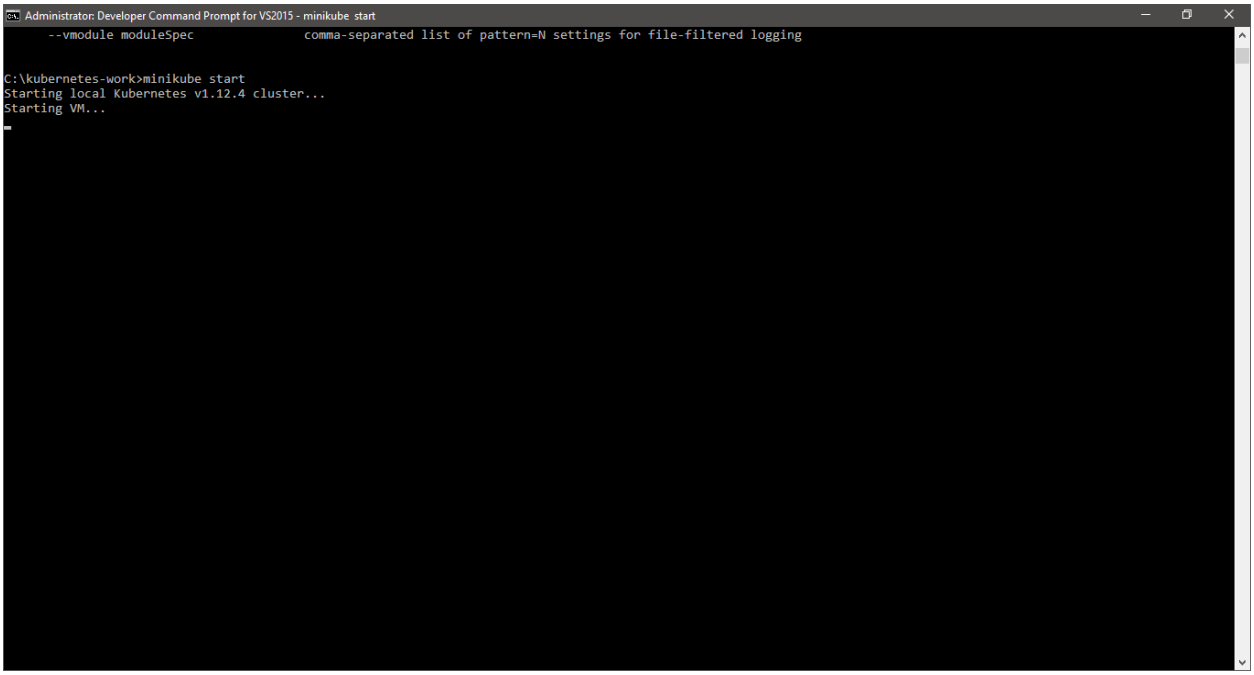


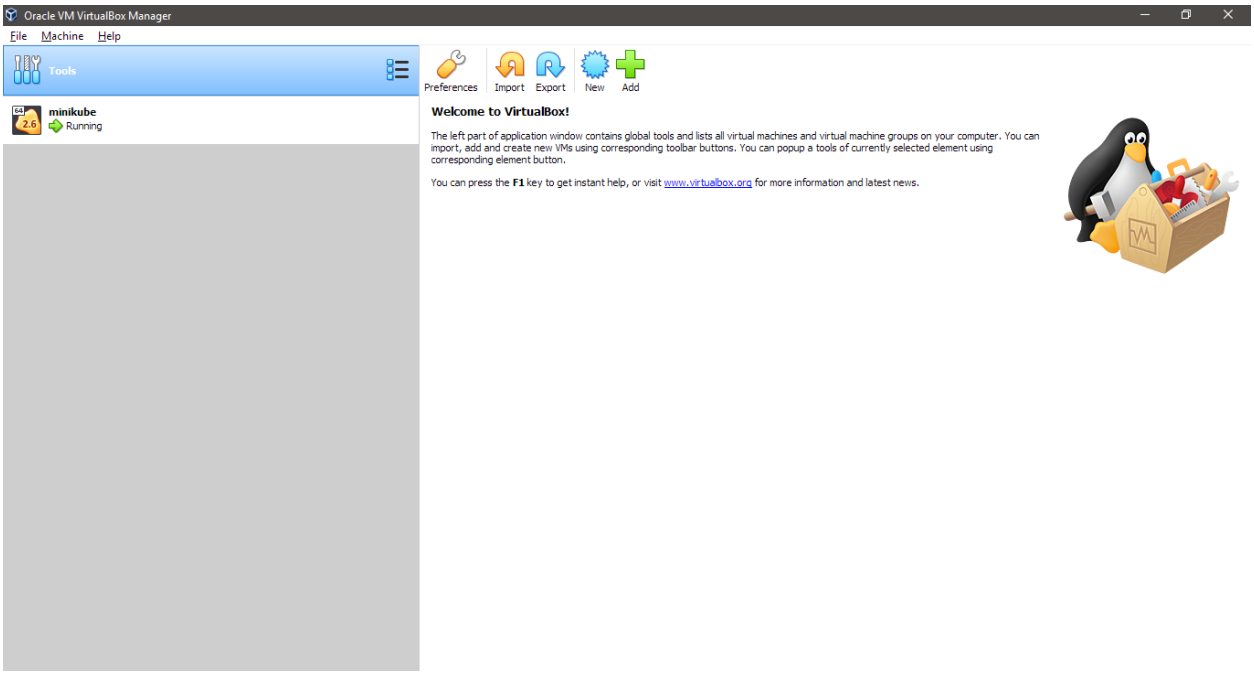
Now run the command **minikube start**

This will download the required files initially, if any failures you observe. Please run the above command until it successfully downloads and starts.

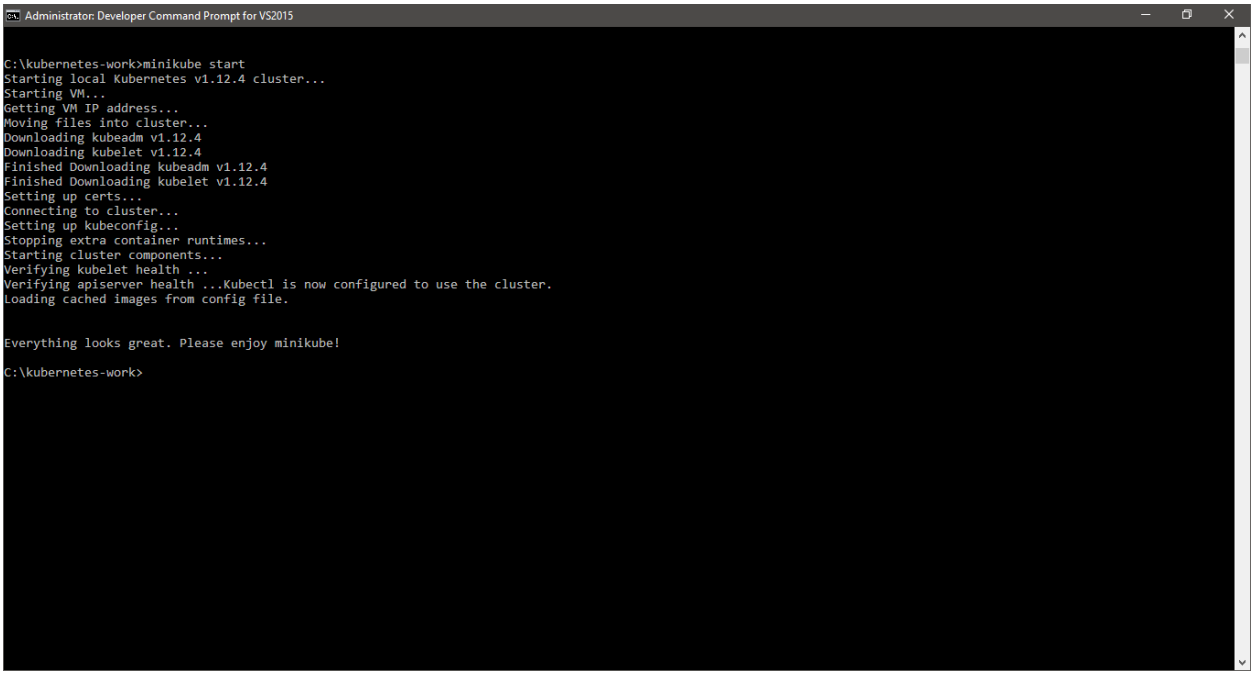

C:\Windows\system32\cmd.exe - minikube start
D:\kubernetes-work>minikube start
Starting local Kubernetes v1.12.4 cluster...
Starting VM...
Downloading Minikube ISO
137.92 MB / 178.88 MB [==============================>---------] 77.10% 2m28s
E1225 11:40:59.507372 15612 start.go:187] Error starting host: unable to cache ISO: https://storage.googleapis.com/minikube/iso/minikube-v0.32.0.iso: failed to downlo
ad: failed to download to temp file: failed to copy contents: read tcp 192.168.43.212:54841->216.58.197.48:443: wsarecv: A connection attempt failed because the connect
ed party did not properly respond after a period of time, or established connection failed because connected host has failed to respond..
Retrying.
E1225 11:40:59.544481 15612 start.go:193] Error starting host: unable to cache ISO: https://storage.googleapis.com/minikube/iso/minikube-v0.32.0.iso: failed to downl
oad: failed to download to temp file: failed to copy contents: read tcp 192.168.43.212:54841->216.58.197.48:443: wsarecv: A connection attempt failed because the connec
ted party did not properly respond after a period of time, or established connection failed because connected host has failed to respond.
An error has occurred. Would you like to opt in to sending anonymized crash
information to minikube to help prevent future errors?
To opt out of these messages, run the command:
minikube config set WantReportErrorPrompt false
Please enter your response [Y/n]:
D:\kubernetes-work>minikube start
Starting local Kubernetes v1.12.4 cluster...
Starting VM...
Downloading Minikube ISO
152.69 MB / 178.88 MB [================================>------] 85.36% 1m11s


C:\Windows\system32\cmd.exe - minikube start
D:\kubernetes-work>minikube start
Starting local Kubernetes v1.12.4 cluster...
Starting VM...
Downloading Minikube ISO
137.92 MB / 178.88 MB [==============================>---------] 77.10% 2m28s
E1225 11:40:59.507372 15612 start.go:187] Error starting host: unable to cache ISO: https://storage.googleapis.com/minikube/iso/minikube-v0.32.0.iso: failed to downlo
ad: failed to download to temp file: failed to copy contents: read tcp 192.168.43.212:54841->216.58.197.48:443: wsarecv: A connection attempt failed because the connect
ed party did not properly respond after a period of time, or established connection failed because connected host has failed to respond..
Retrying.
E1225 11:40:59.544481 15612 start.go:193] Error starting host: unable to cache ISO: https://storage.googleapis.com/minikube/iso/minikube-v0.32.0.iso: failed to downl
oad: failed to download to temp file: failed to copy contents: read tcp 192.168.43.212:54841->216.58.197.48:443: wsarecv: A connection attempt failed because the connec
ted party did not properly respond after a period of time, or established connection failed because connected host has failed to respond.
An error has occurred. Would you like to opt in to sending anonymized crash
information to minikube to help prevent future errors?
To opt out of these messages, run the command:
minikube config set WantReportErrorPrompt false
Please enter your response [Y/n]:
D:\kubernetes-work>minikube start
Starting local Kubernetes v1.12.4 cluster...
Starting VM...
Downloading Minikube ISO
178.88 MB / 178.88 MB [==] 100.00% 0s
E1225 11:50:27.820527 13720 start.go:187] Error starting host: Error creating host: Error executing step: Creating VM.
: open /Users/vkonduru3/.minikube/cache/iso/minikube-v0.32.0.iso: The system cannot find the path specified..
Retrying.
E1225 11:50:27.898451 13720 start.go:193] Error starting host: Error creating host: Error executing step: Creating VM.
: open /Users/vkonduru3/.minikube/cache/iso/minikube-v0.32.0.iso: The system cannot find the path specified.
An error has occurred. Would you like to opt in to sending anonymized crash
information to minikube to help prevent future errors?
To opt out of these messages, run the command:
minikube config set WantReportErrorPrompt false
Please enter your response [Y/n]:





Meanwhile you can observer that on VM box, minikube is getting created and trying to start it



Now it is successfully started

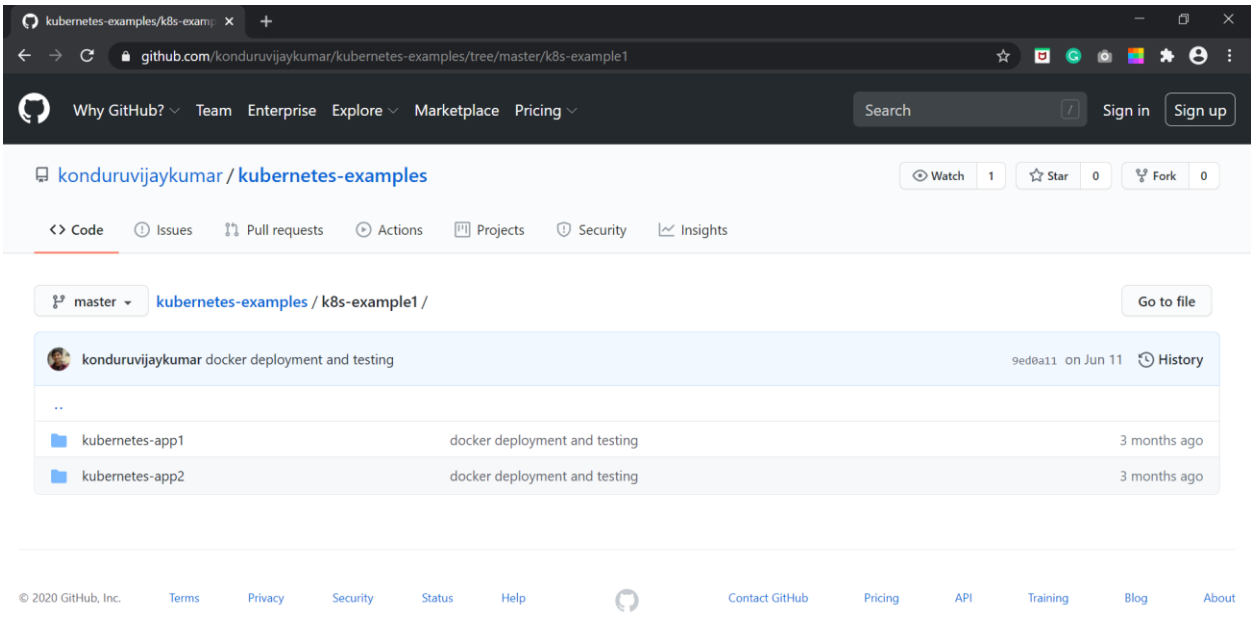
https://kubernetes.io/docs/home/
https://kubernetes.io/docs/tutorials/
https://kubernetes.io/docs/reference/kubectl/
https://kubernetes.io/docs/reference/kubectl/cheatsheet/

Some important commands are attached below, please verify. The cheat sheet given below is asset of the respective owners and is only used for knowledge sharing.

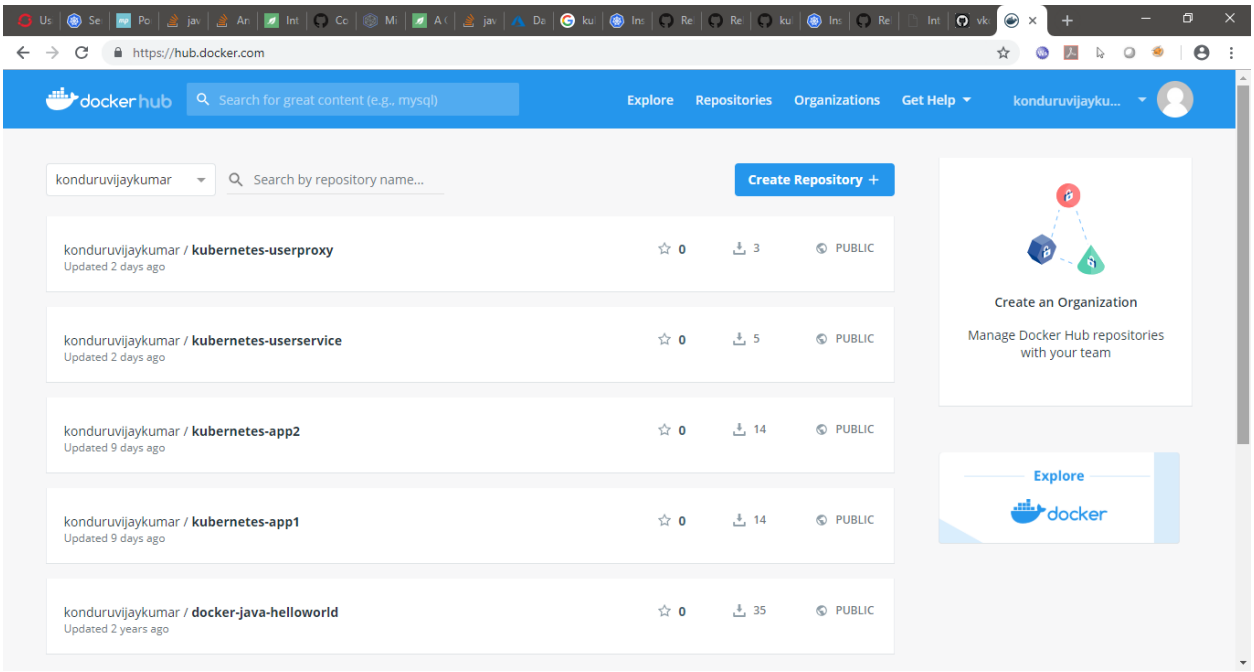
K8S-Command-Reference.pdf

https://github.com/konduruvijaykumar/kubernetes-examples

Clone the above project and we will use kubernetes-app1 and kubernetes-app2 for deploying, testing and verifying service discovery.

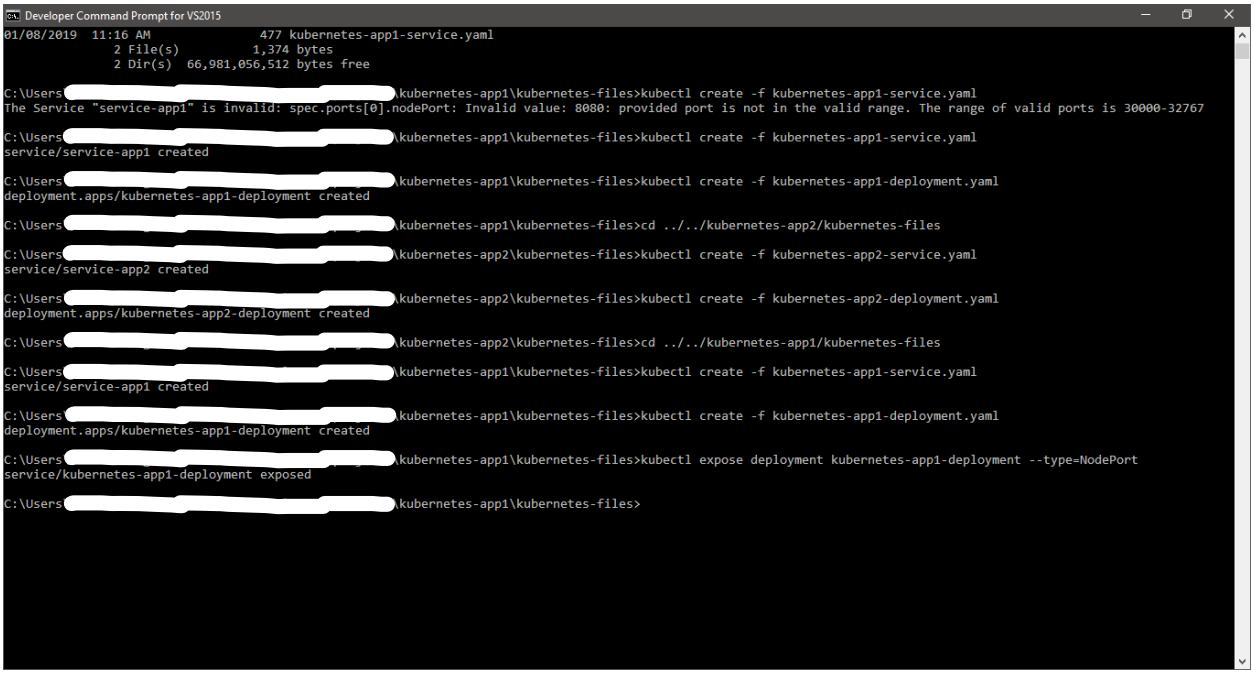


Docker images for both applications are already created and published to docker hub.



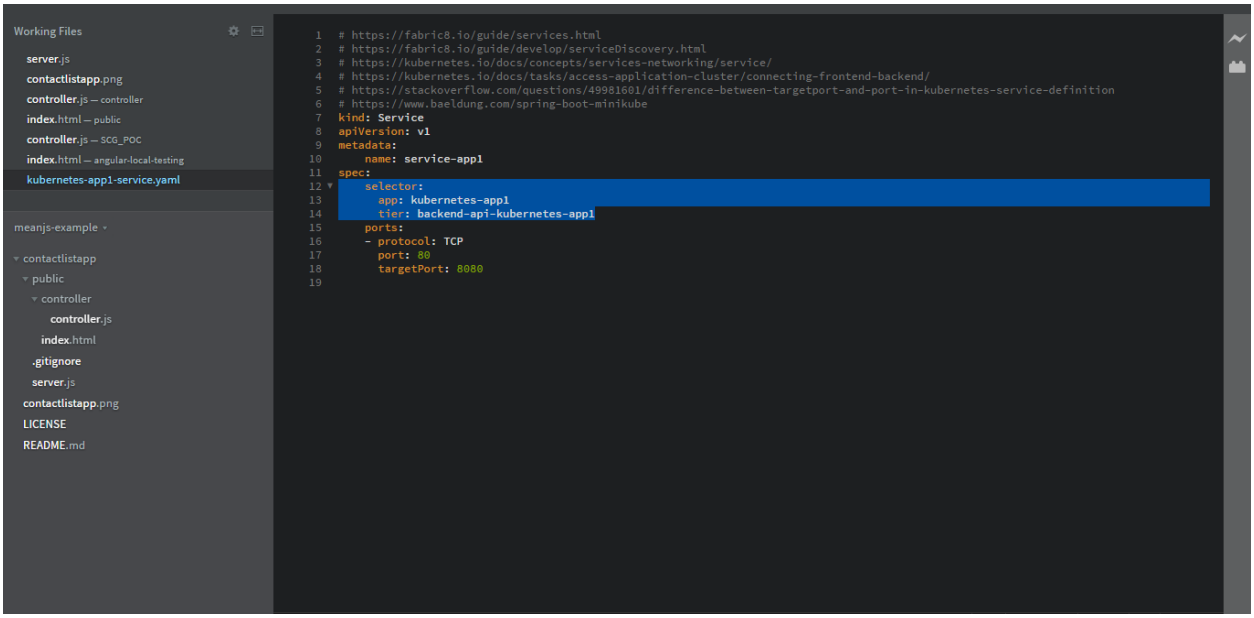
Deployment files are already having the right image tag configured.

https://fabric8.io/guide/develop/serviceDiscovery.html



I have executed steps in wrong order, after which I have deleted all deployments/pods, services and recreated services and then deployments.

This will create services first and when app/deployment with selector tags are created will get attached to this service



Important commands

kubectl get nodes
kubectl get services
kubectl get pods
kubectl get deployments

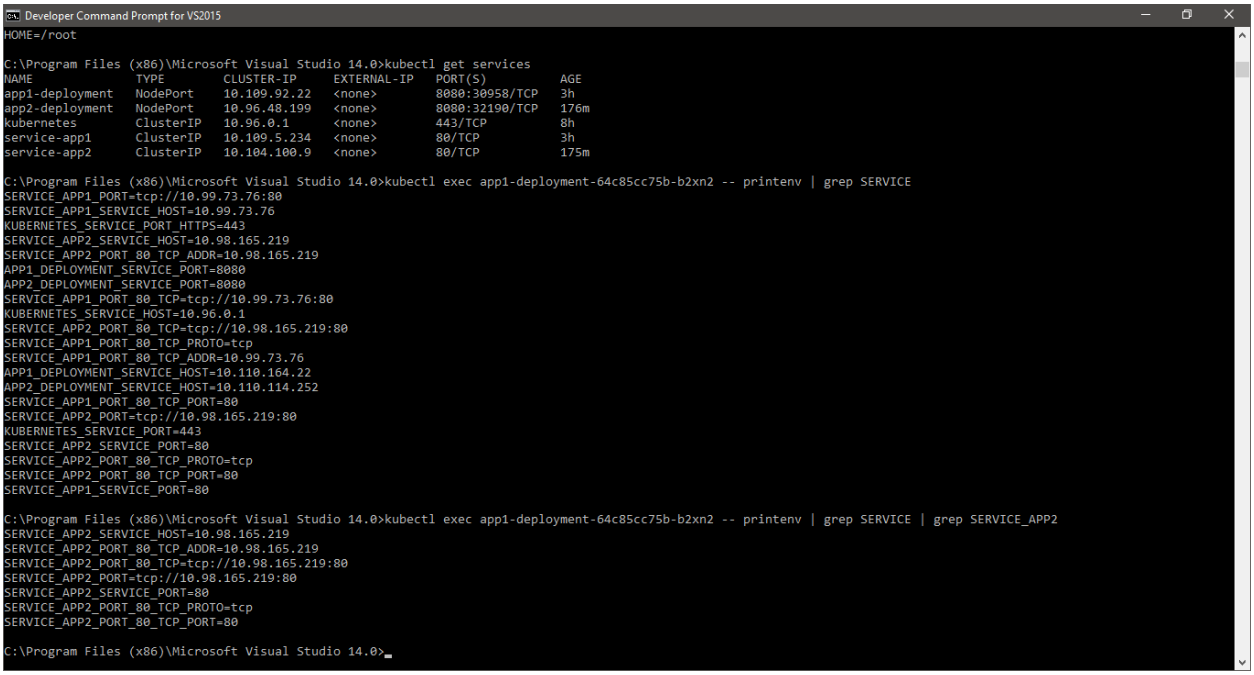
kubectl describe deployments
kubectl describe deployment <deployment name>
kubectl describe pods
kubectl describe pod <pod name>
kubectl describe services
kubectl describe service <pod name>
kubectl describe nodes
kubectl describe node <node name>
kubectl rollout status <resource name (Ex: deployments/kubernetes-app1)>
kubectl rollout history < resource name (Ex: deployments/kubernetes-app1)>
kubectl get ep <service name>
kubectl cluster-info

kubectl delete service <service name>
kubectl delete pod <pod name>

kubectl create -f <deployment/service yaml file>
kubectl apply -f <deployment/service yaml file>
kubectl expose deployment <deployment name> --type=NodePort
kubectl exec <specific deployment/pod name> -- printenv | grep SERVICE
minikube service <service name> --url

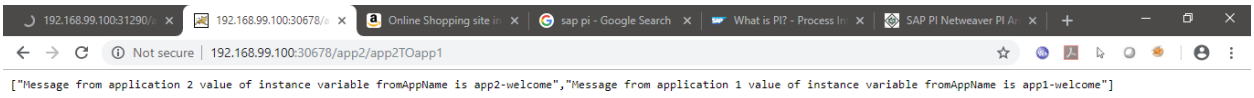
minikube start
minikube dashboard
minikube stop

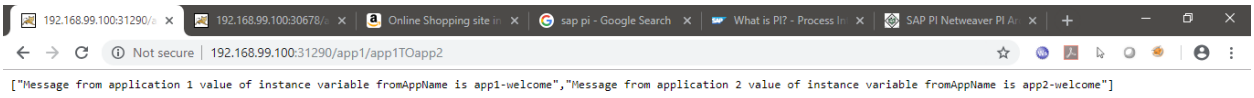
Carefully Use the below commands, always against individual services instead of all (delete services can delete your main **kubernetes** service also, which is needed. This might get recreated on stop and start of minikube but might face some issues.)
kubectl delete pods –all
kubectl delete services –all



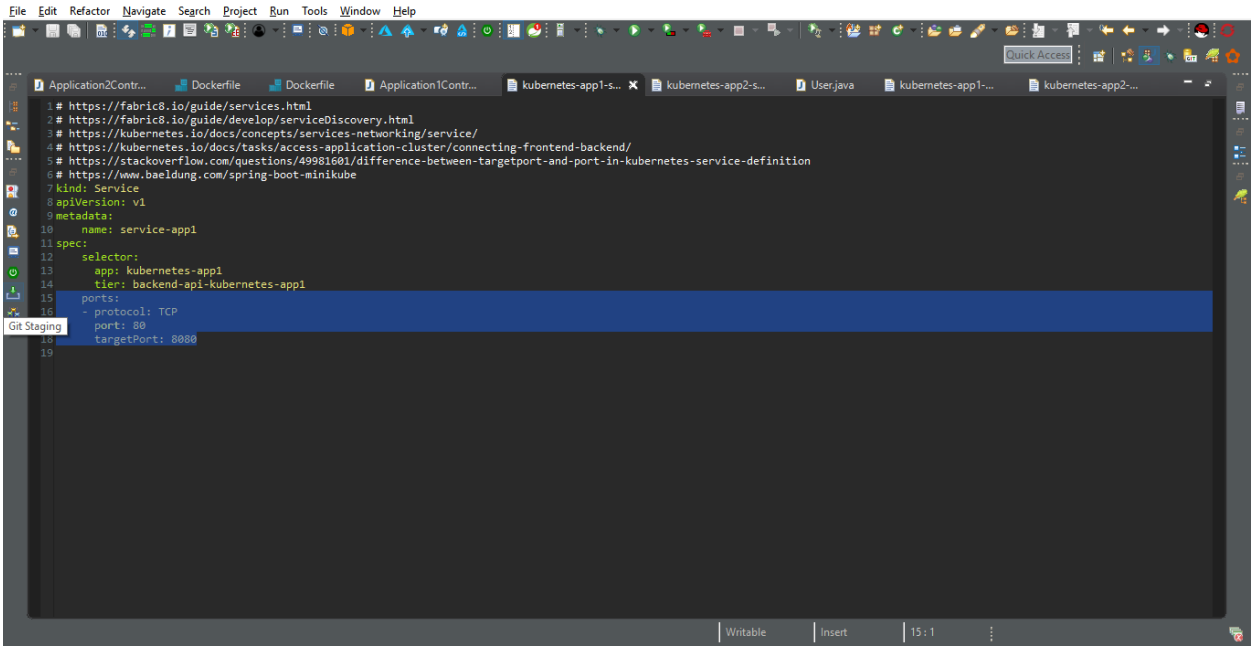
kubectl exec kubernetes-app2-deployment-69d966bb9d-fjtdx -- printenv | grep SERVICE
kubectl exec kubernetes-app2-deployment-69d966bb9d-fjtdx -- printenv | grep SERVICE_APP

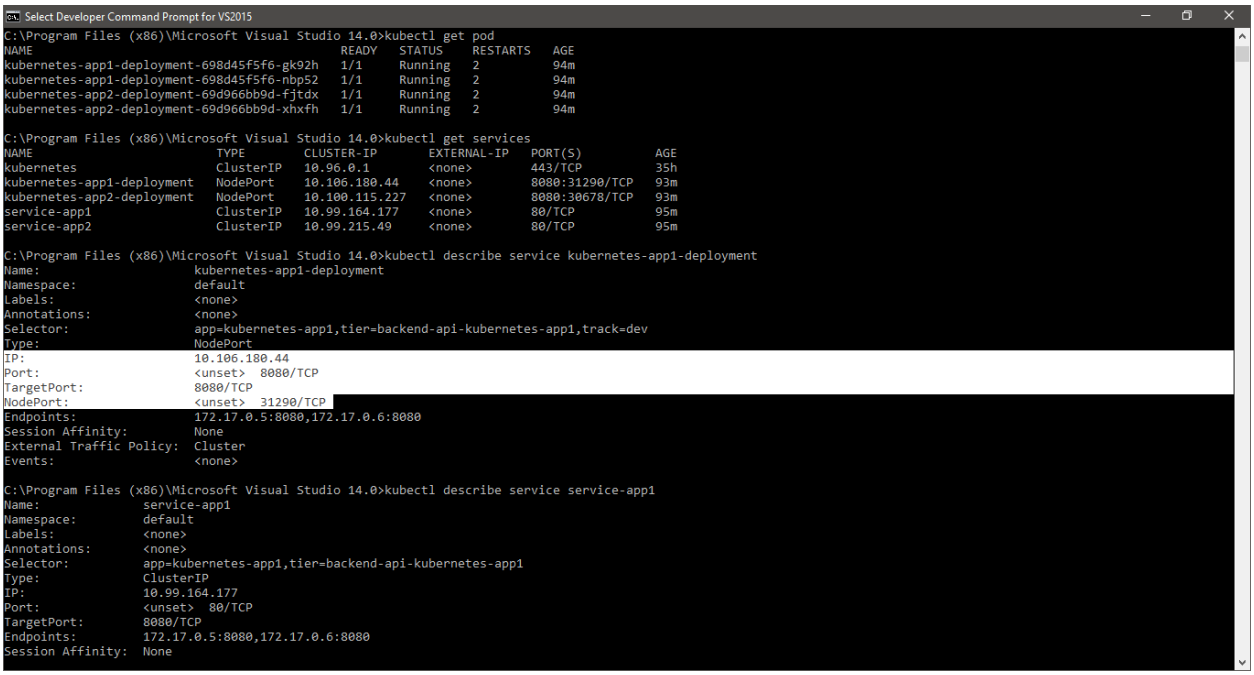
The API End point can get changed, please verify the code for API end point URL’s to be used

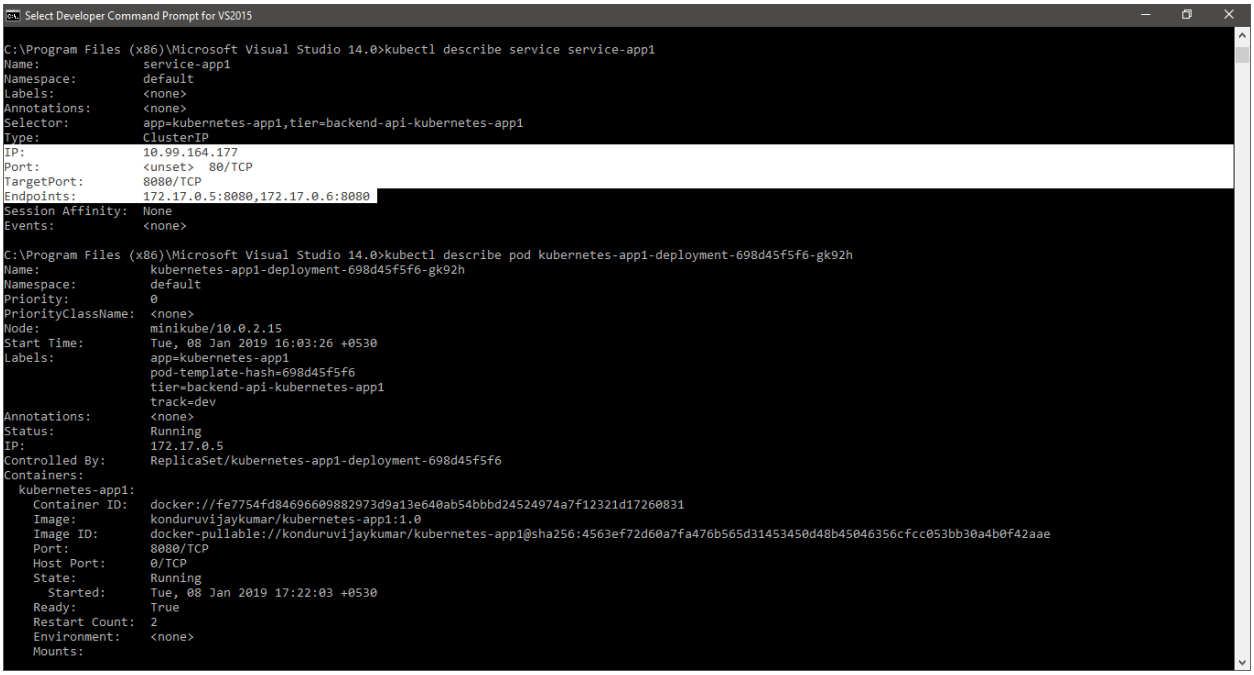


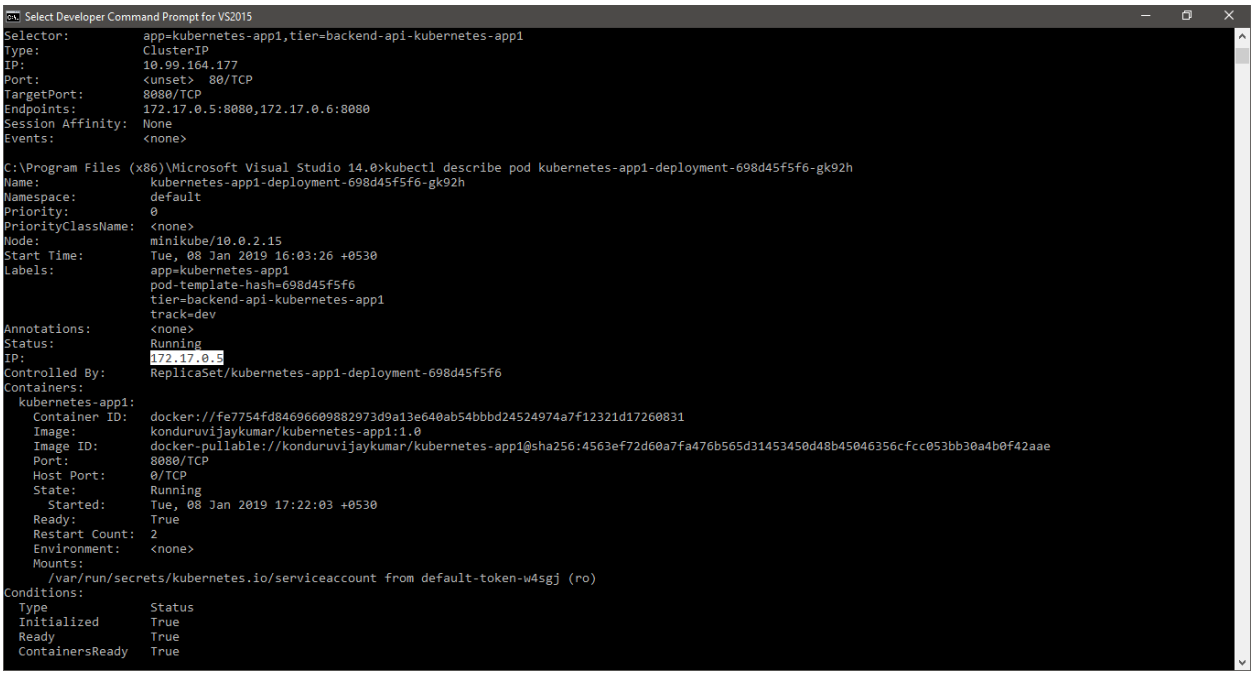


Finally, success after configuring service properly with target port as the port exposed by application deployment i.e., 8080


File Edit Refactor Navigate Search Project Run Tools Window Help
Quick Access
Application2Contr...
Dockerfile
Dockerfile
Application1Contr...
kubernetes-app1-s...
kubernetes-app2-s...
User.java
kubernetes-app1-...
kubernetes-app2-...
1 # https://fabric8.io/guide/services.html
2 # https://fabric8.io/guide/develop/serviceDiscovery.html
3 # https://kubernetes.io/docs/concepts/services-networking/service/
4 # https://kubernetes.io/docs/tasks/access-application-cluster/connecting-frontend-backend/
5 # https://stackoverflow.com/questions/49981601/difference-between-targetport-and-port-in-kubernetes-service-definition
6 # https://www.baeldung.com/spring-boot-minikube
7 kind: Service
8 apiVersion: v1
9 metadata:
10 name: service-app1
11 spec:
12 selector:
13 app: kubernetes-app1
14 tier: backend-api-kubernetes-app1
15 ports:
16 - protocol: TCP
17 port: 80
18 targetPort: 8080
19
Git Staging
Writable
Insert
15 : 1

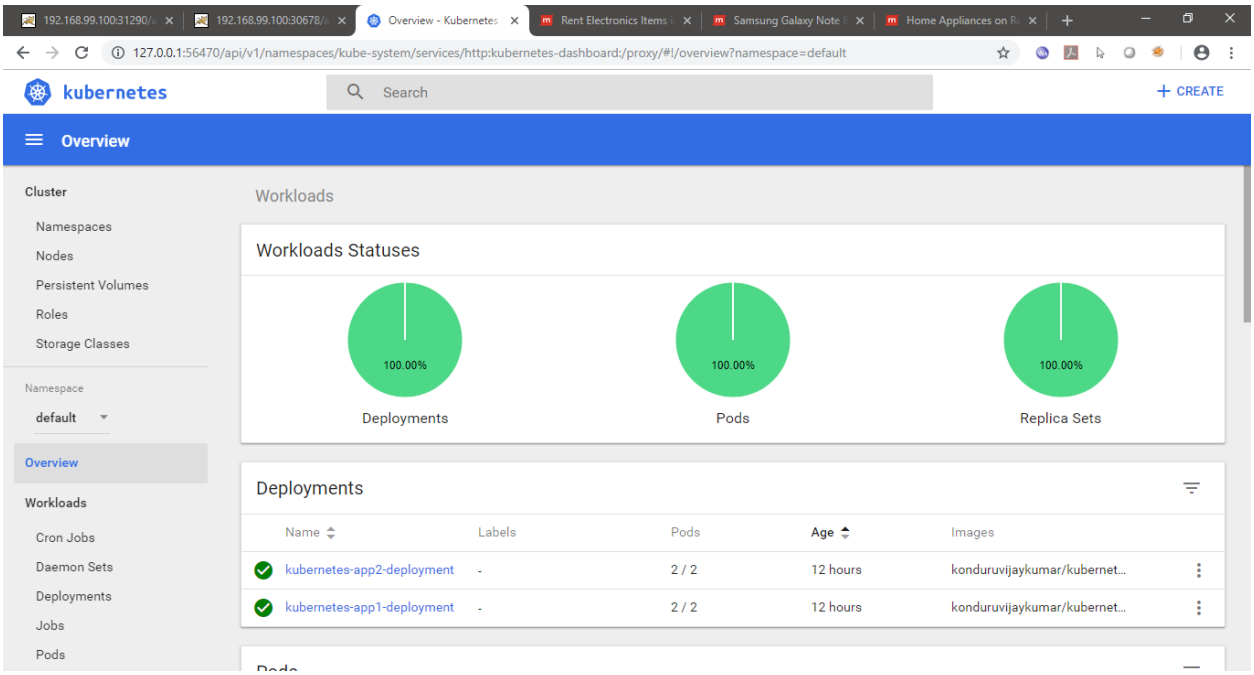

Select Developer Command Prompt for VS2015
C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl get pod
NAME READY STATUS RESTARTS AGE
kubernetes-app1-deployment-698d45f5f6-gk92h 1/1 Running 2 94m
kubernetes-app1-deployment-698d45f5f6-nbp52 1/1 Running 2 94m
kubernetes-app2-deployment-69d966bb9d-fjtdx 1/1 Running 2 94m
kubernetes-app2-deployment-69d966bb9d-xhxfh 1/1 Running 2 94m
C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
kubernetes ClusterIP 10.96.0.1 <none> 443/TCP 35h
kubernetes-app1-deployment NodePort 10.106.180.44 <none> 8080:31290/TCP 93m
kubernetes-app2-deployment NodePort 10.100.115.227 <none> 8080:30678/TCP 93m
service-app1 ClusterIP 10.99.164.177 <none> 80/TCP 95m
service-app2 ClusterIP 10.99.215.49 <none> 80/TCP 95m
C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl describe service kubernetes-app1-deployment
Name: kubernetes-app1-deployment
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=kubernetes-app1,tier=backend-api-kubernetes-app1,track=dev
Type: NodePort
IP: 10.106.180.44
Port: <unset> 8080/TCP
TargetPort: 8080/TCP
NodePort: <unset> 31290/TCP
Endpoints: 172.17.0.5:8080,172.17.0.6:8080
Session Affinity: None
External Traffic Policy: Cluster
Events: <none>
C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl describe service service-app1
Name: service-app1
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=kubernetes-app1,tier=backend-api-kubernetes-app1
Type: ClusterIP
IP: 10.99.164.177
Port: <unset> 80/TCP
TargetPort: 8080/TCP
Endpoints: 172.17.0.5:8080,172.17.0.6:8080
Session Affinity: None

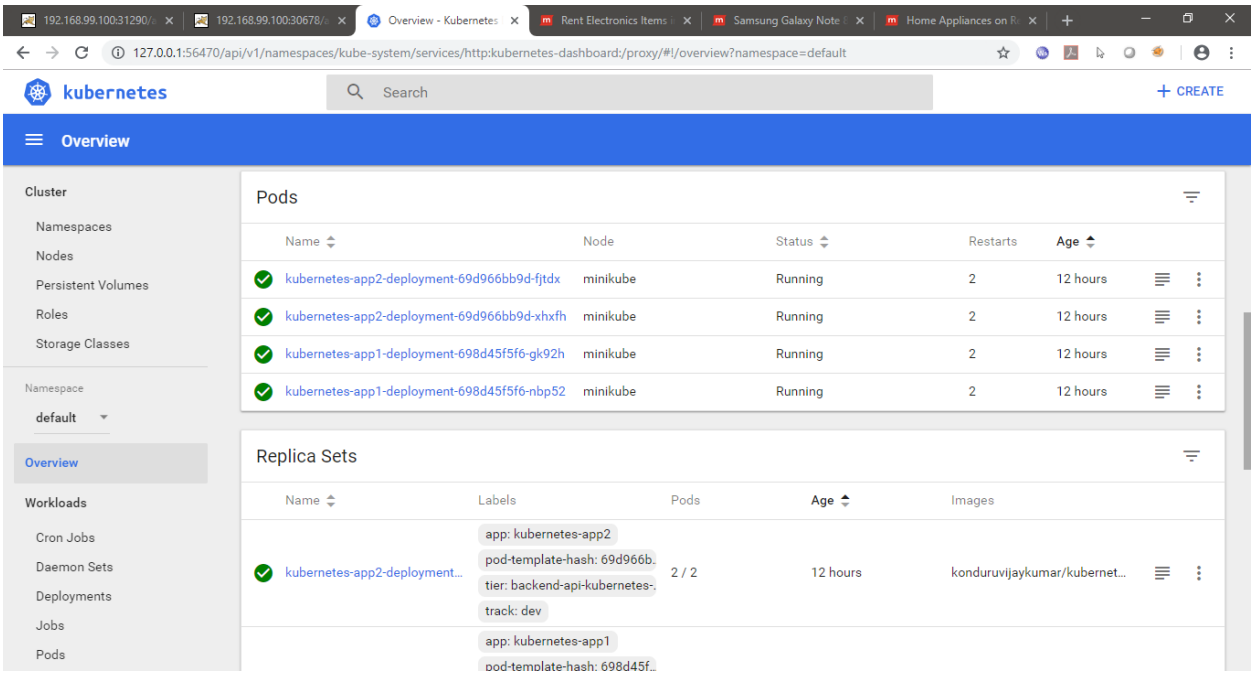

Select Developer Command Prompt for VS2015
C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl describe service service-app1
Name: service-app1
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=kubernetes-app1,tier=backend-api-kubernetes-app1
Type: ClusterIP
IP: 10.99.164.177
Port: <unset> 80/TCP
TargetPort: 8080/TCP
Endpoints: 172.17.0.5:8080,172.17.0.6:8080
Session Affinity: None
Events: <none>
C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl describe pod kubernetes-app1-deployment-698d45f5f6-gk92h
Name: kubernetes-app1-deployment-698d45f5f6-gk92h
Namespace: default
Priority: 0
PriorityClassName: <none>
Node: minikube/10.0.2.15
Start Time: Tue, 08 Jan 2019 16:03:26 +0530
Labels: app=kubernetes-app1
pod-template-hash=698d45f5f6
tier=backend-api-kubernetes-app1
track=dev
Annotations: <none>
Status: Running
IP: 172.17.0.5
Controlled By: ReplicaSet/kubernetes-app1-deployment-698d45f5f6
Containers:
kubernetes-app1:
Container ID: docker://fe7754fd84696609882973d9a13e640ab54bbbd24524974a7f12321d17260831
Image: konduruvijaykumar/kubernetes-app1:1.0
Image ID: docker-pullable://konduruvijaykumar/kubernetes-app1@sha256:4563ef72d60a7fa476b565d31453450d48b45046356cfcc053bb30a4b0f42aae
Port: 8080/TCP
Host Port: 0/TCP
State: Running
Started: Tue, 08 Jan 2019 17:22:03 +0530
Ready: True
Restart Count: 2
Environment: <none>
Mounts:

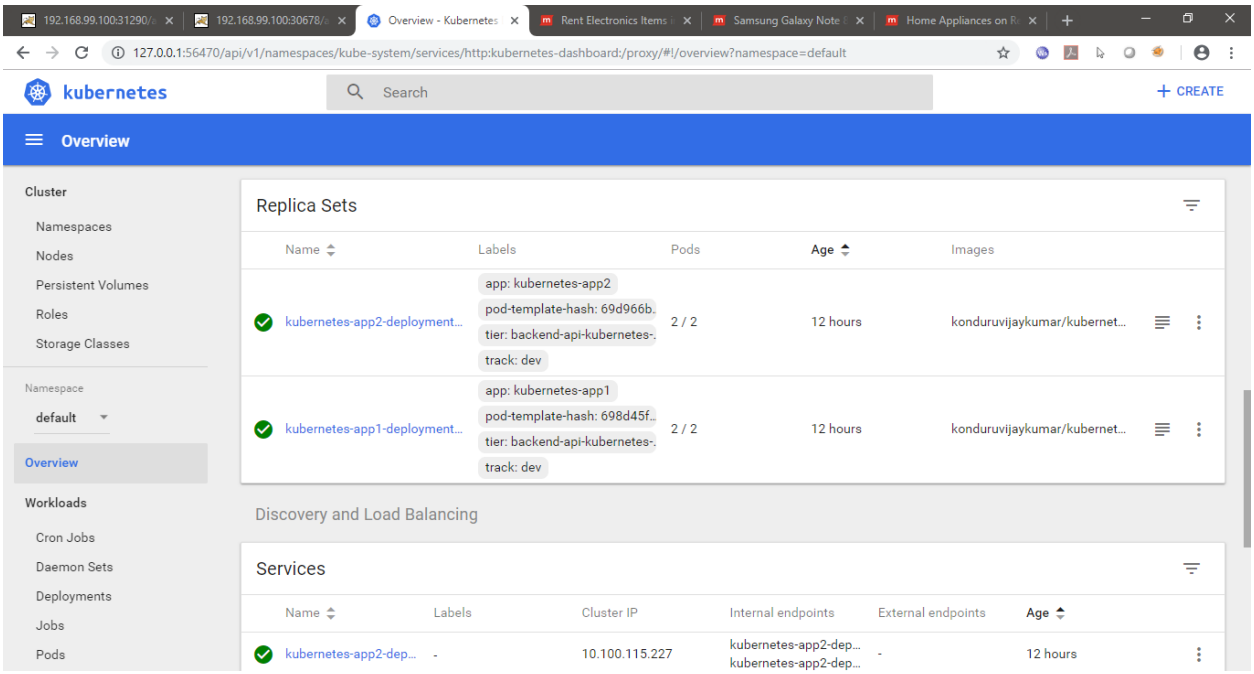

Select Developer Command Prompt for VS2015
Selector: app=kubernetes-app1,tier=backend-api-kubernetes-app1
Type: ClusterIP
IP: 10.99.164.177
Port: <unset> 80/TCP
TargetPort: 8080/TCP
Endpoints: 172.17.0.5:8080,172.17.0.6:8080
Session Affinity: None
Events: <none>
C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl describe pod kubernetes-app1-deployment-698d45f5f6-gk92h
Name: kubernetes-app1-deployment-698d45f5f6-gk92h
Namespace: default
Priority: 0
PriorityClassName: <none>
Node: minikube/10.0.2.15
Start Time: Tue, 08 Jan 2019 16:03:26 +0530
Labels: app=kubernetes-app1
pod-template-hash=698d45f5f6
tier=backend-api-kubernetes-app1
track=dev
Annotations: <none>
Status: Running
IP: 172.17.0.5
Controlled By: ReplicaSet/kubernetes-app1-deployment-698d45f5f6
Containers:
kubernetes-app1:
Container ID: docker://fe7754fd84696609882973d9a13e640ab54bbbd24524974a7f12321d17260831
Image: konduruvijaykumar/kubernetes-app1:1.0
Image ID: docker-pullable://konduruvijaykumar/kubernetes-app1@sha256:4563ef72d60a7fa476b565d31453450d48b45046356cfcc053bb30a4b0f42aae
Port: 8080/TCP
Host Port: 0/TCP
State: Running
Started: Tue, 08 Jan 2019 17:22:03 +0530
Ready: True
Restart Count: 2
Environment: <none>
Mounts:
/var/run/secrets/kubernetes.io/serviceaccount from default-token-w4sgj (ro)
Conditions:
Type   Status
Initialized   True
Ready   True
ContainersReady   True

```
Select Developer Command Prompt for VS2015
    Started:      Tue, 08 Jan 2019 17:22:03 +0530
    Ready:        True
    Restart Count:  2
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from default-token-w4sgj (ro)
Conditions:
  Type              Status
  Initialized       True
  Ready             True
  ContainersReady   True
  PodScheduled      True
Volumes:
  default-token-w4sgj:
    Type:        Secret (a volume populated by a Secret)
    SecretName:  default-token-w4sgj
    Optional:    false
QoS Class:       BestEffort
Node-Selectors:  <none>
Tolerations:     node.kubernetes.io/not-ready:NoExecute for 300s
                 node.kubernetes.io/unreachable:NoExecute for 300s
Events:          <none>

C:\Program Files (x86)\Microsoft Visual Studio 14.0>kubectl describe pod kubernetes-app1-deployment-698d45f5f6-nbp52
Name:               kubernetes-app1-deployment-698d45f5f6-nbp52
Namespace:          default
Priority:           0
PriorityClassName:  <none>
Node:               minikube/10.0.2.15
Start Time:         Tue, 08 Jan 2019 16:03:26 +0530
Labels:             app=kubernetes-app1
                    pod-template-hash=698d45f5f6
                    tier=backend-api-kubernetes-app1
                    track=dev
Annotations:        <none>
Status:             Running
IP:                 172.17.0.6
Controlled By:      ReplicaSet/kubernetes-app1-deployment-698d45f5f6
Containers:
  kubernetes-app1:
    Container ID:   docker://84fe66869218923983fc7cae12474492511733278 46e6092d4abd5957bb9df10
    Image:          konduruvijaykumar/kubernetes-app1:1.0
    Image ID:       docker-pullable://konduruvijaykumar/kubernetes-app1@sha256:4563ef72d60a7fa476b565d31453450d48b45046356cfcc053bb30a4b0f42aae
```




192.168.99.100:31290/
192.168.99.100:30678/
Overview - Kubernetes
Rent Electronics Items
Samsung Galaxy Note
Home Appliances on
127.0.0.1:56470/api/v1/namespaces/kube-system/services/http:kubernetes-dashboard:/proxy/#!/overview?namespace=default
kubernetes
Search
+ CREATE
Overview
Cluster
Namespaces
Nodes
Persistent Volumes
Roles
Storage Classes
Namespace
default
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Pods
Name
Node
Status
Restarts
Age
kubernetes-app2-deployment-69d966bb9d-fjtdx
minikube
Running
2
12 hours
kubernetes-app2-deployment-69d966bb9d-xhxfh
minikube
Running
2
12 hours
kubernetes-app1-deployment-698d45f5f6-gk92h
minikube
Running
2
12 hours
kubernetes-app1-deployment-698d45f5f6-nbp52
minikube
Running
2
12 hours
Replica Sets
Name
Labels
Pods
Age
Images
kubernetes-app2-deployment...
app: kubernetes-app2
pod-template-hash: 69d966b.
tier: backend-api-kubernetes-.
track: dev
2 / 2
12 hours
konduruvijaykumar/kubernet...
app: kubernetes-app1
pod-template-hash: 698d45f...


192.168.99.100:31290/
192.168.99.100:30678/
Overview - Kubernetes
Rent Electronics Items
Samsung Galaxy Note
Home Appliances on
127.0.0.1:56470/api/v1/namespaces/kube-system/services/http:kubernetes-dashboard:/proxy/#!/overview?namespace=default
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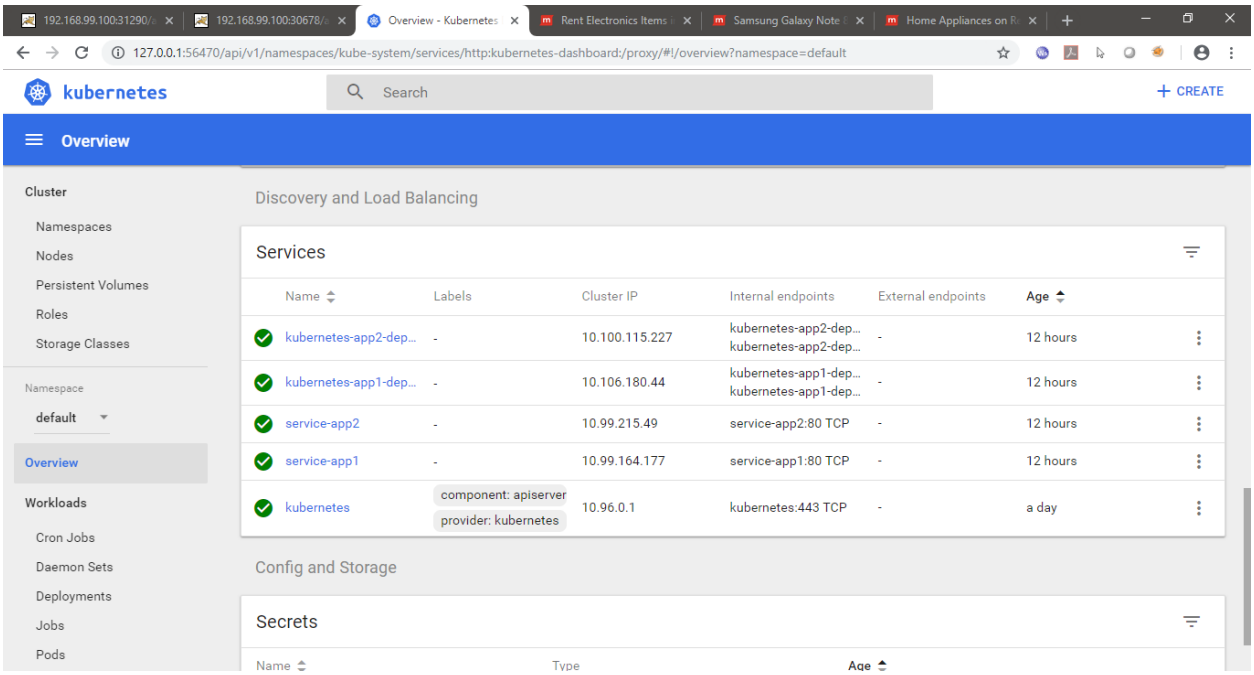
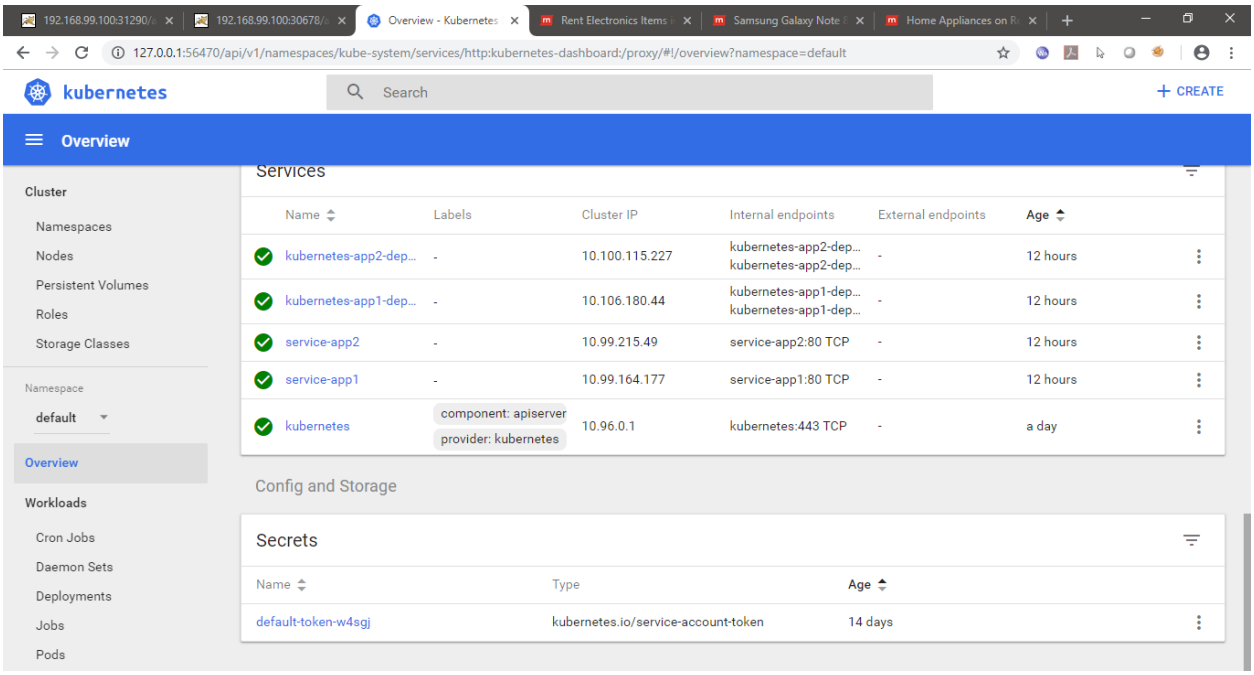
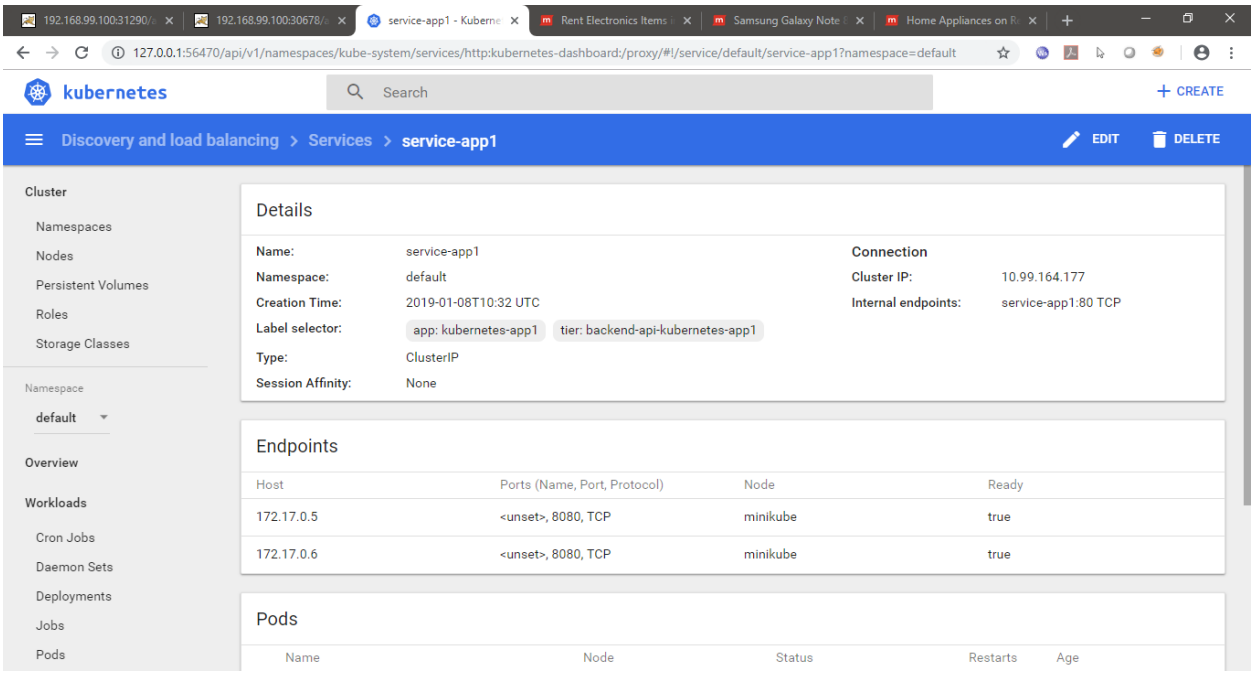
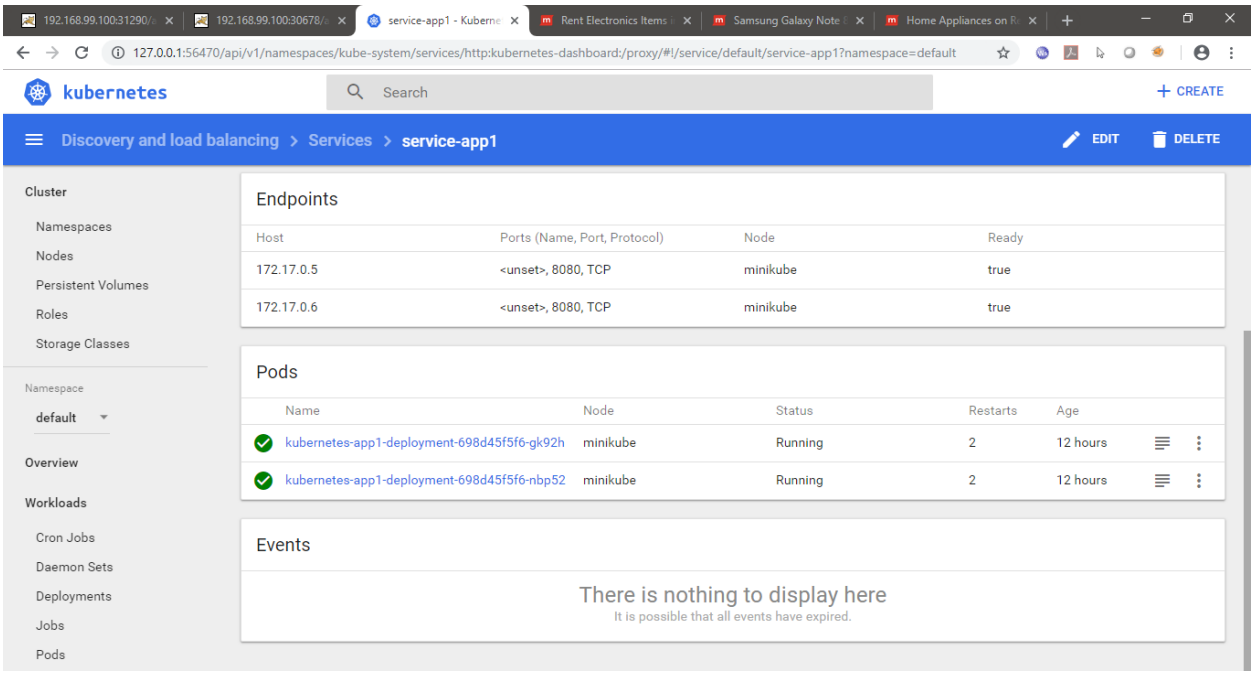
default
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Replica Sets
Name
Labels
Pods
Age
Images
kubernetes-app2-deployment...
app: kubernetes-app2
pod-template-hash: 69d966b.
tier: backend-api-kubernetes-.
track: dev
2 / 2
12 hours
konduruvijaykumar/kubernet...
kubernetes-app1-deployment...
app: kubernetes-app1
pod-template-hash: 698d45f...
tier: backend-api-kubernetes-.
track: dev
2 / 2
12 hours
konduruvijaykumar/kubernet...
Discovery and Load Balancing
Services
Name
Labels
Cluster IP
Internal endpoints
External endpoints
Age
kubernetes-app2-dep...
-
10.100.115.227
kubernetes-app2-dep...
kubernetes-app2-dep...
-
12 hours

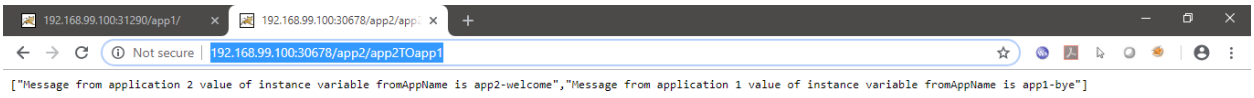

192.168.99.100:31290/
192.168.99.100:30678/
Overview - Kubernetes
Rent Electronics Items
Samsung Galaxy Note
Home Appliances on
127.0.0.1:56470/api/v1/namespaces/kube-system/services/http:kubernetes-dashboard:/proxy/#!/overview?namespace=default
kubernetes
Search
+ CREATE
Overview
Cluster
Namespaces
Nodes
Persistent Volumes
Roles
Storage Classes
Namespace
default
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Discovery and Load Balancing
Services
Name
Labels
Cluster IP
Internal endpoints
External endpoints
Age
kubernetes-app2-dep...
-
10.100.115.227
kubernetes-app2-dep...
kubernetes-app2-dep...
-
12 hours
kubernetes-app1-dep...
-
10.106.180.44
kubernetes-app1-dep...
kubernetes-app1-dep...
-
12 hours
service-app2
-
10.99.215.49
service-app2:80 TCP
-
12 hours
service-app1
-
10.99.164.177
service-app1:80 TCP
-
12 hours
kubernetes
component: apiserver
provider: kubernetes
10.96.0.1
kubernetes:443 TCP
-
a day
Config and Storage
Secrets
Name
Type
Age


192.168.99.100:31290/
192.168.99.100:30678/
Overview - Kubernetes
Rent Electronics Items
Samsung Galaxy Note
Home Appliances on
127.0.0.1:56470/api/v1/namespaces/kube-system/services/http:kubernetes-dashboard:/proxy/#!/overview?namespace=default
kubernetes
Search
+ CREATE
Overview
Cluster
Namespaces
Nodes
Persistent Volumes
Roles
Storage Classes
Namespace
default
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Services
Name
Labels
Cluster IP
Internal endpoints
External endpoints
Age
kubernetes-app2-dep...
-
10.100.115.227
kubernetes-app2-dep...
kubernetes-app2-dep...
-
12 hours
kubernetes-app1-dep...
-
10.106.180.44
kubernetes-app1-dep...
kubernetes-app1-dep...
-
12 hours
service-app2
-
10.99.215.49
service-app2:80 TCP
-
12 hours
service-app1
-
10.99.164.177
service-app1:80 TCP
-
12 hours
kubernetes
component: apiserver
provider: kubernetes
10.96.0.1
kubernetes:443 TCP
-
a day
Config and Storage
Secrets
Name
Type
Age
default-token-w4sgj
kubernetes.io/service-account-token
14 days



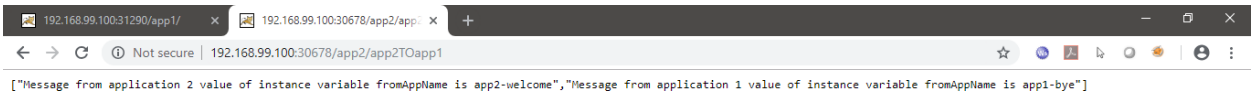


I have updated one app1 deployment with instance variable as app1-bye, as per below URL under the covers Kubernetes will load balance over all the service endpoints for you
https://fabric8.io/guide/develop/serviceDiscovery.html

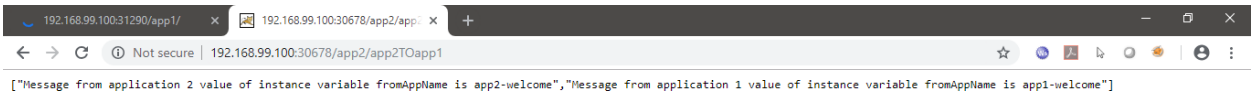


Hence proven

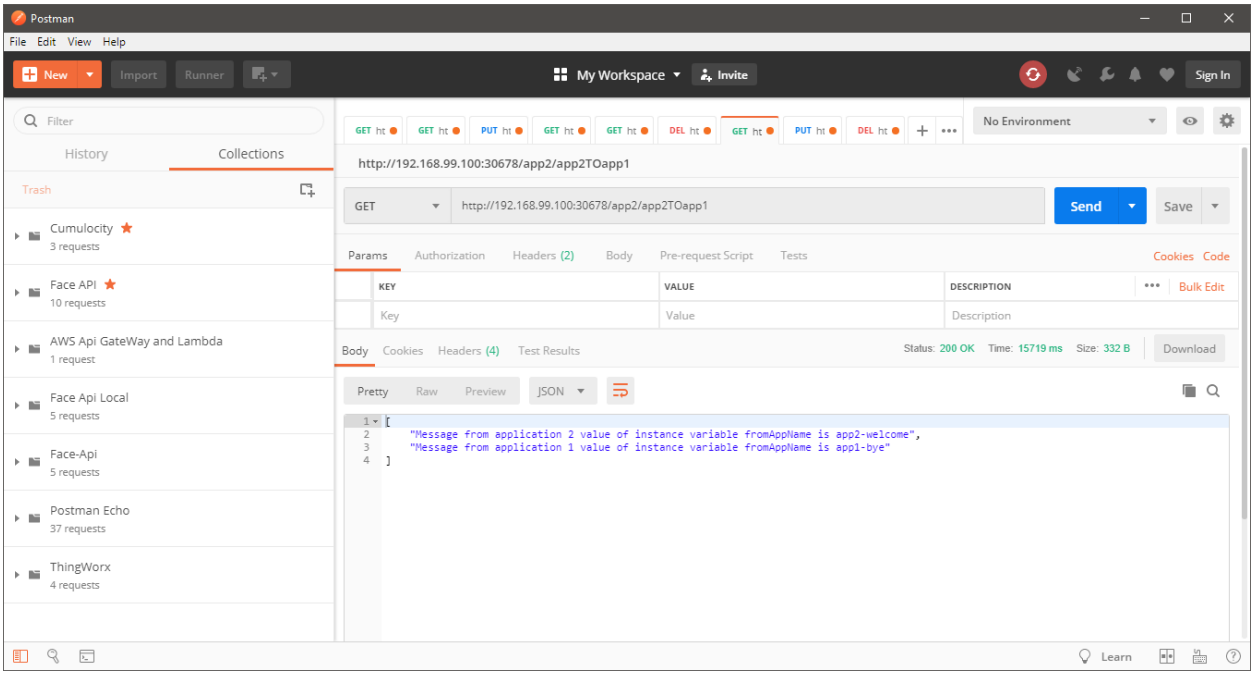
We can see that app1-bye and app1-welcome are shown randomly when we try the calls many times

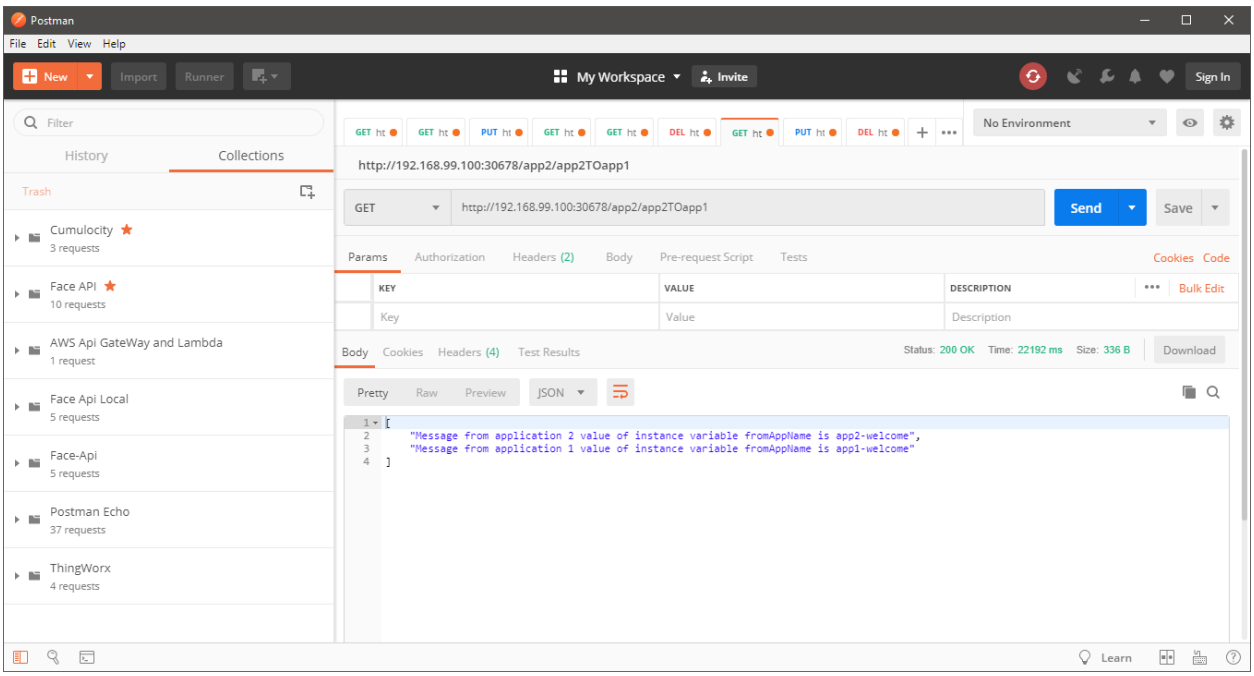


["Message from application 2 value of instance variable fromAppName is app2-welcome","Message from application 1 value of instance variable fromAppName is app1-bye"]



["Message from application 2 value of instance variable fromAppName is app2-welcome","Message from application 1 value of instance variable fromAppName is app1-welcome"]


Postman
File Edit View Help
New Import Runner
My Workspace
Invite
Sign In
Filter
History
Collections
Trash
Cumulocity
3 requests
Face API
10 requests
AWS Api GateWay and Lambda
1 request
Face Api Local
5 requests
Face-Api
5 requests
Postman Echo
37 requests
ThingWorx
4 requests
No Environment
http://192.168.99.100:30678/app2/app2TOapp1
GET
http://192.168.99.100:30678/app2/app2TOapp1
Send
Save
Params Authorization Headers (2) Body Pre-request Script Tests
Cookies Code
KEY VALUE DESCRIPTION
Bulk Edit
Key Value Description
Body Cookies Headers (4) Test Results
Status: 200 OK Time: 15719 ms Size: 332 B
Download
Pretty Raw Preview JSON
[
"Message from application 2 value of instance variable fromAppName is app2-welcome",
"Message from application 1 value of instance variable fromAppName is app1-bye"
]
Learn


Postman
File Edit View Help
New Import Runner
My Workspace
Invite
Sign In
Filter
History
Collections
Trash
Cumulocity
3 requests
Face API
10 requests
AWS Api GateWay and Lambda
1 request
Face Api Local
5 requests
Face-Api
5 requests
Postman Echo
37 requests
ThingWorx
4 requests
No Environment
http://192.168.99.100:30678/app2/app2TOapp1
GET
http://192.168.99.100:30678/app2/app2TOapp1
Send
Save
Params Authorization Headers (2) Body Pre-request Script Tests
Cookies Code
KEY VALUE DESCRIPTION
Bulk Edit
Key Value Description
Body Cookies Headers (4) Test Results
Status: 200 OK Time: 22192 ms Size: 336 B
Download
Pretty Raw Preview JSON
[
"Message from application 2 value of instance variable fromAppName is app2-welcome",
"Message from application 1 value of instance variable fromAppName is app1-welcome"
]
Learn