Practical No.1

Aim: Building APT.NET Core MVC Application.

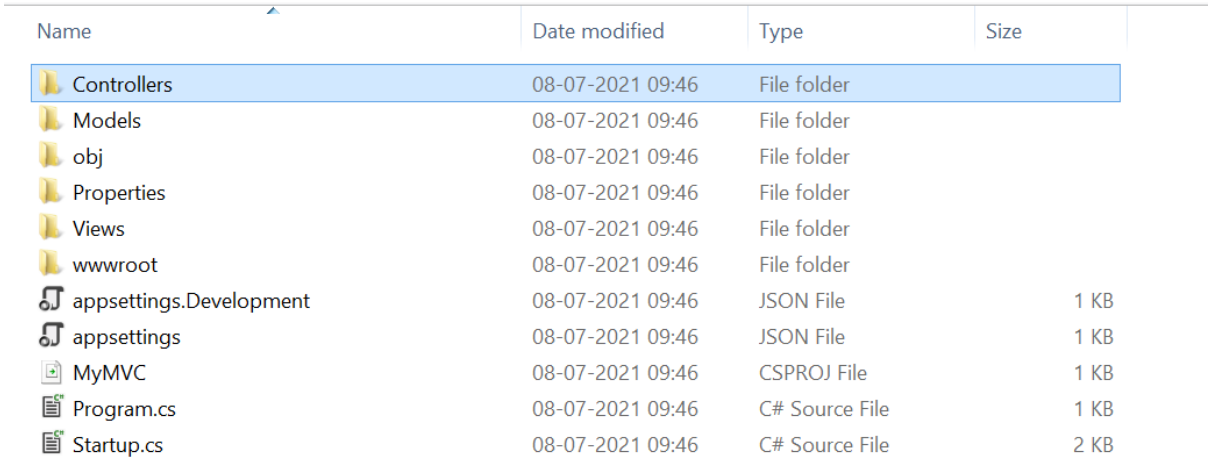
1)Install .Net Core Sdk (Link: https://dotnet.microsoft.com/learn/dotnet/hello-world-tutorial/install)

2)create folder MyMVC folder in C: drive or any other drive

3)open command prompt and perform following operations
Command: to create mvc project
dotnet new mvc --auth none

Output:

4) Go to controllers folder and modify HomeController.cs file to match following:



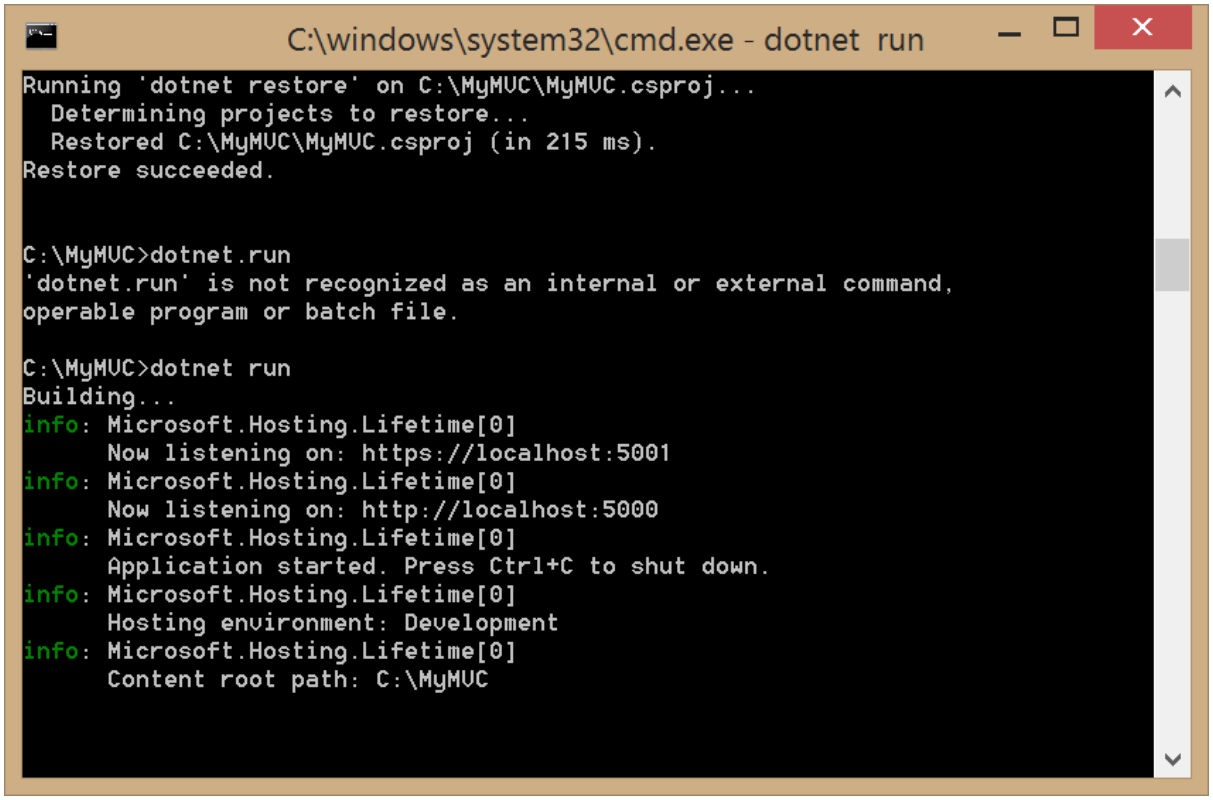
Name	Date modified	Type	Size
Controllers	08-07-2021 09:46	File folder	
Models	08-07-2021 09:46	File folder	
obj	08-07-2021 09:46	File folder	
Properties	08-07-2021 09:46	File folder	
Views	08-07-2021 09:46	File folder	
wwwroot	08-07-2021 09:46	File folder	
appsettings.Development	08-07-2021 09:46	JSON File	1 KB
appsettings	08-07-2021 09:46	JSON File	1 KB
MyMVC	08-07-2021 09:46	CSPROJ File	1 KB
Program.cs	08-07-2021 09:46	C# Source File	1 KB
Startup.cs	08-07-2021 09:46	C# Source File	2 KB

HomeController.cs - Notepad

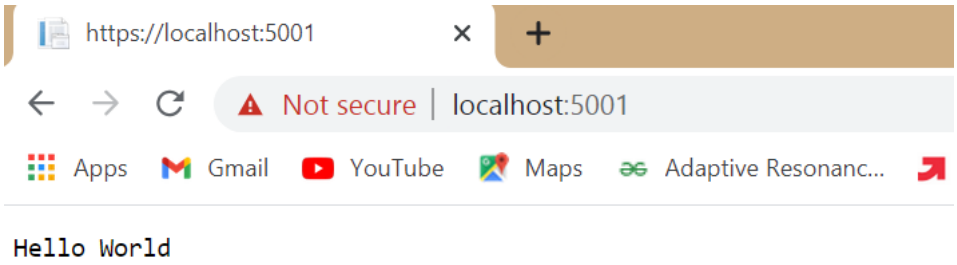
File Edit Format View Help

```
using System.Diagnostics;
using System.Linq;
using System.Threading.Tasks;
using Microsoft.AspNetCore.Mvc;
using Microsoft.Extensions.Logging;
using MyMVC.Models;

namespace MyMVC.Controllers
{
    public class HomeController : Controller
    {
        public String Index()
        { return "Hello World"; }

    }
}
```

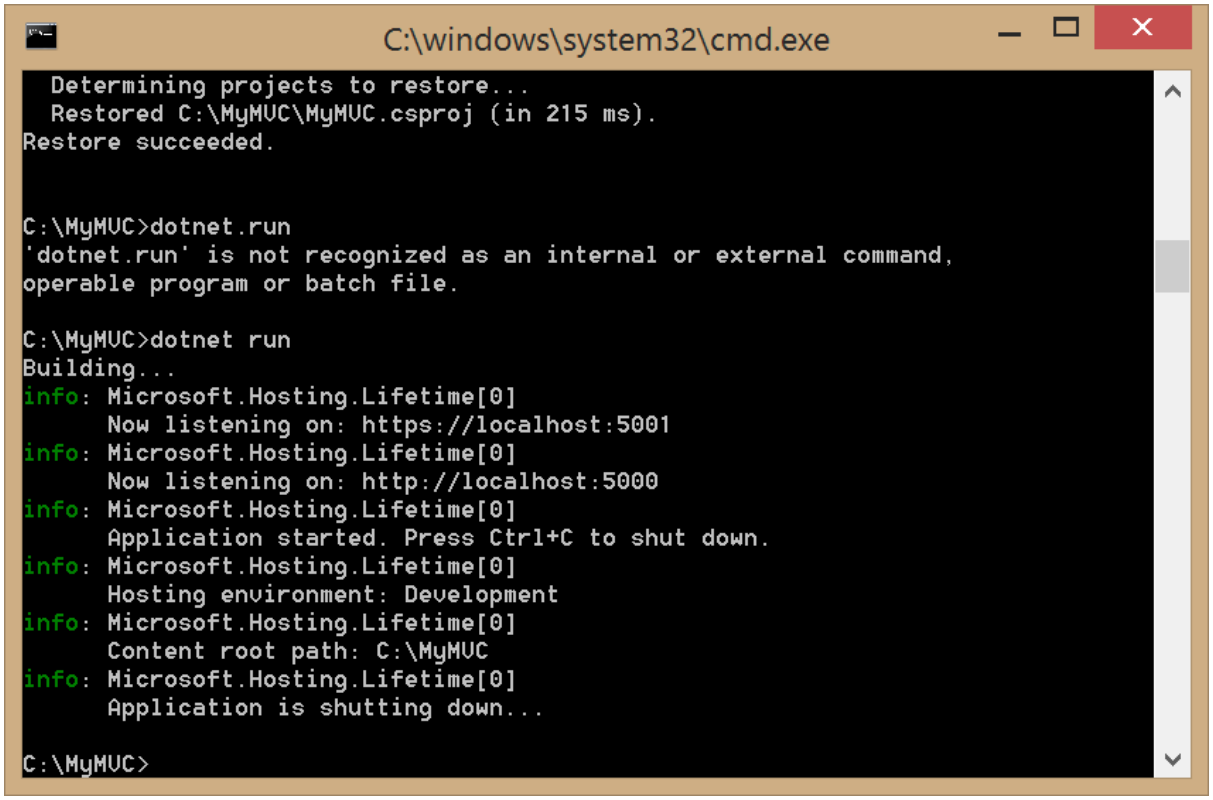
Run the Project



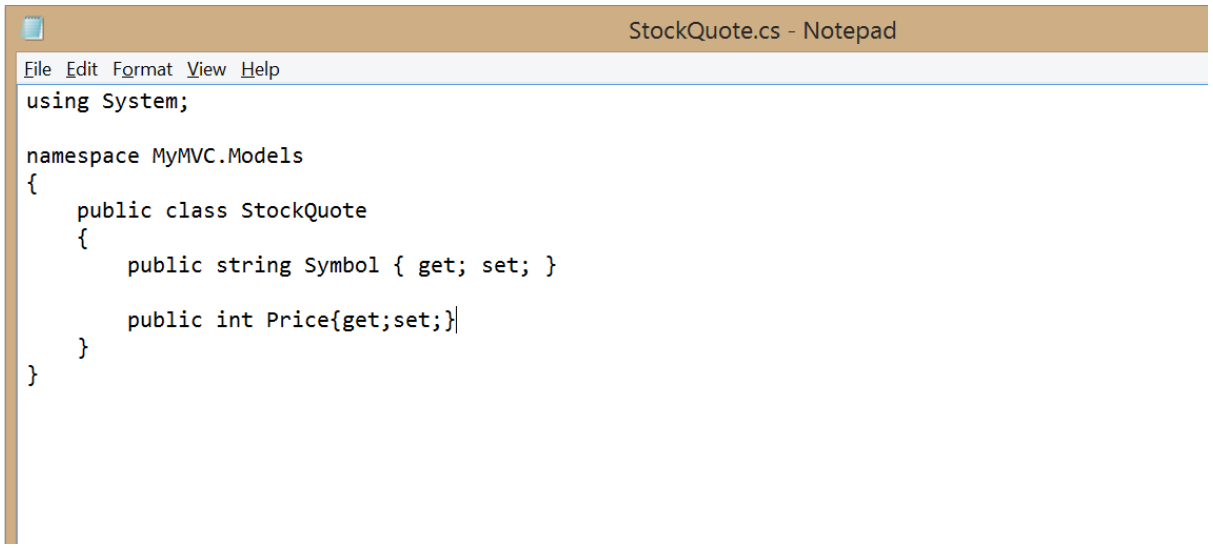
Now open browser and and type URL: localhost:5000



Now go back to command prompt and stop running project using CTRL+C



Go to models folder and add new file StockQuote.cs to it with following content



Now Add View to folder then home folder in it and modify index.cshtml file to match following

Index.cshtml

```
@{
    ViewData["Title"] = "Home Page";
}

<div>
    Symbol: @Model.Symbol <br />
    Price: $@Model.Price <br />
</div>
```

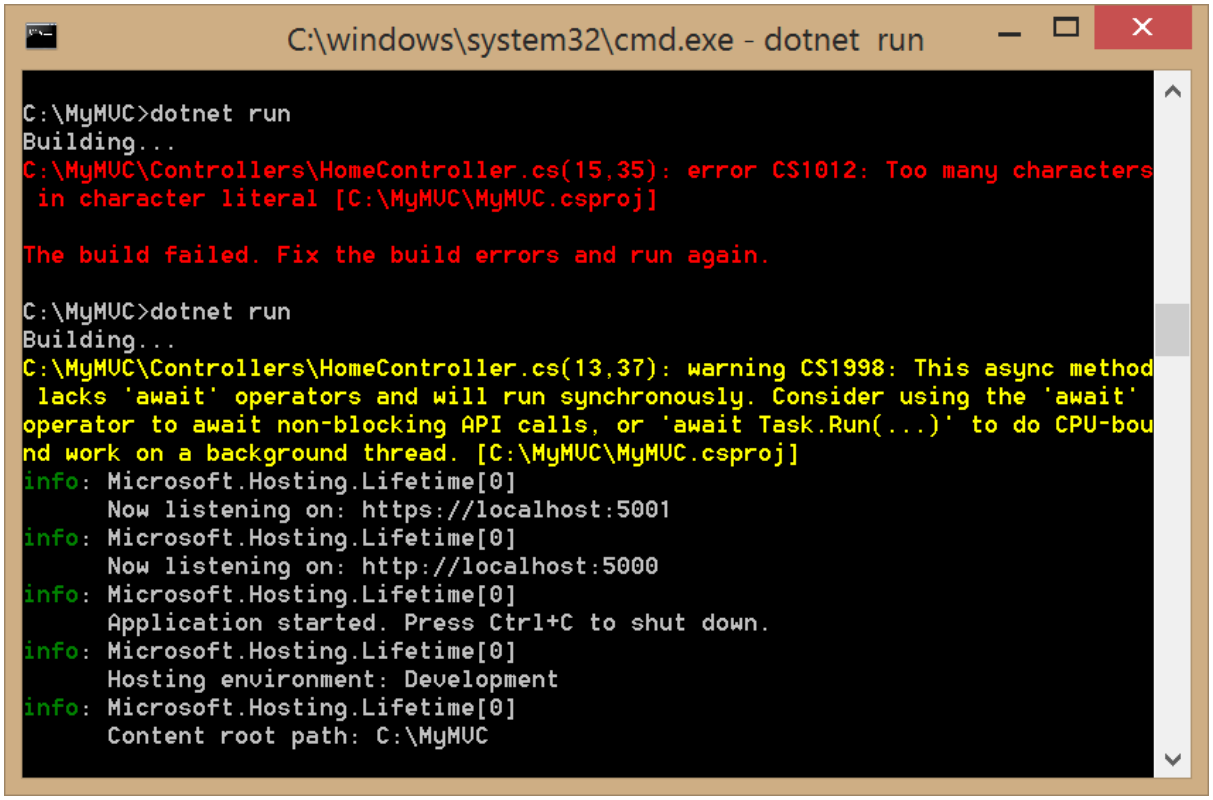
Now modify HomeController.cs file to match following:

HomeController.cs - Notepad

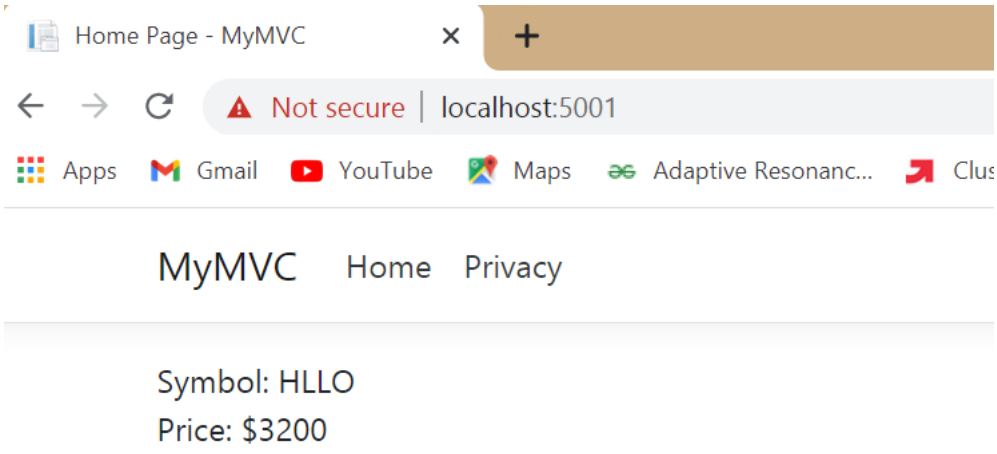
File Edit Format View Help

```
using System;
using System.Collections.Generic;
using System.Diagnostics;
using System.Linq;
using System.Threading.Tasks;
using Microsoft.AspNetCore.Mvc;
using Microsoft.Extensions.Logging;
using MyMVC.Models;

namespace MyMVC.Controllers
{
public class HomeController : Controller
{ public async Task <IActionResult> Index()
{
var model= new StockQuote{ Symbol="HLLO", Price=3200};
return View(model);
}
```

Now run the project using



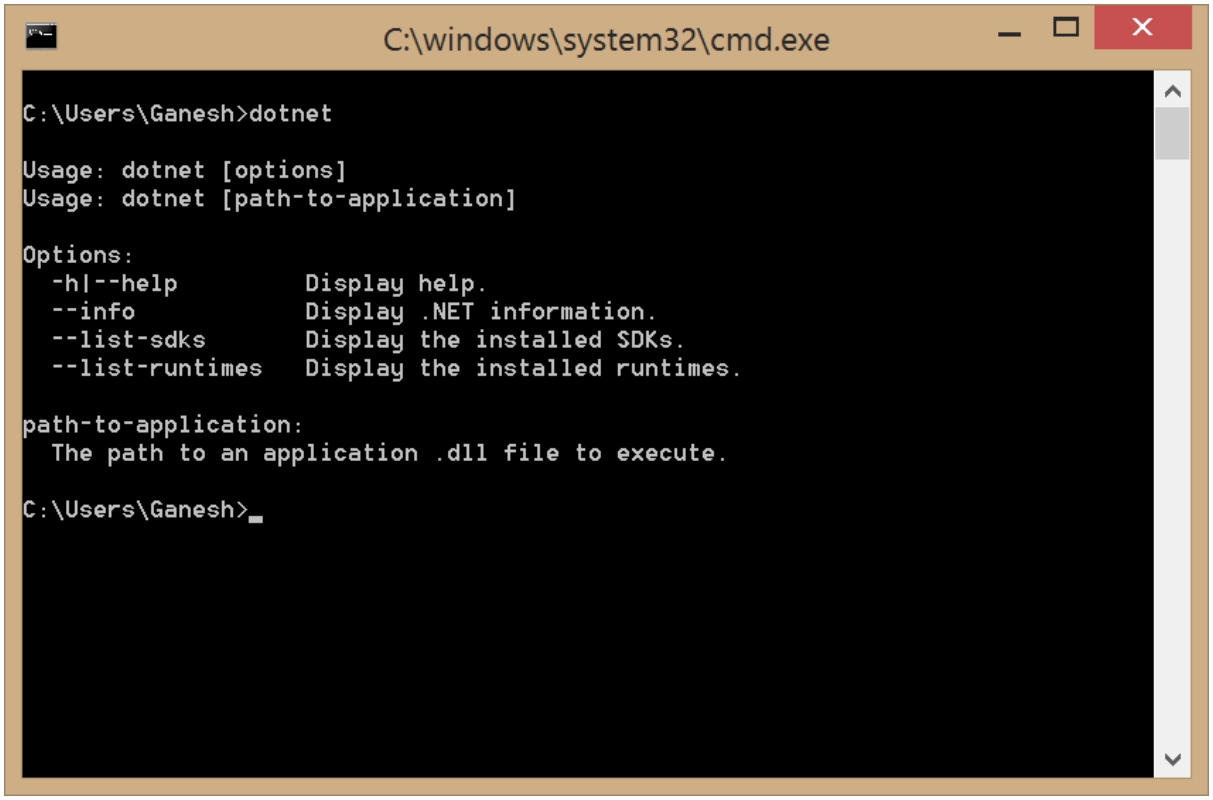
Now go back to browser and refresh to get modified view response



Practical NO. 2

Aim:Building ASP.NET Core REST API.

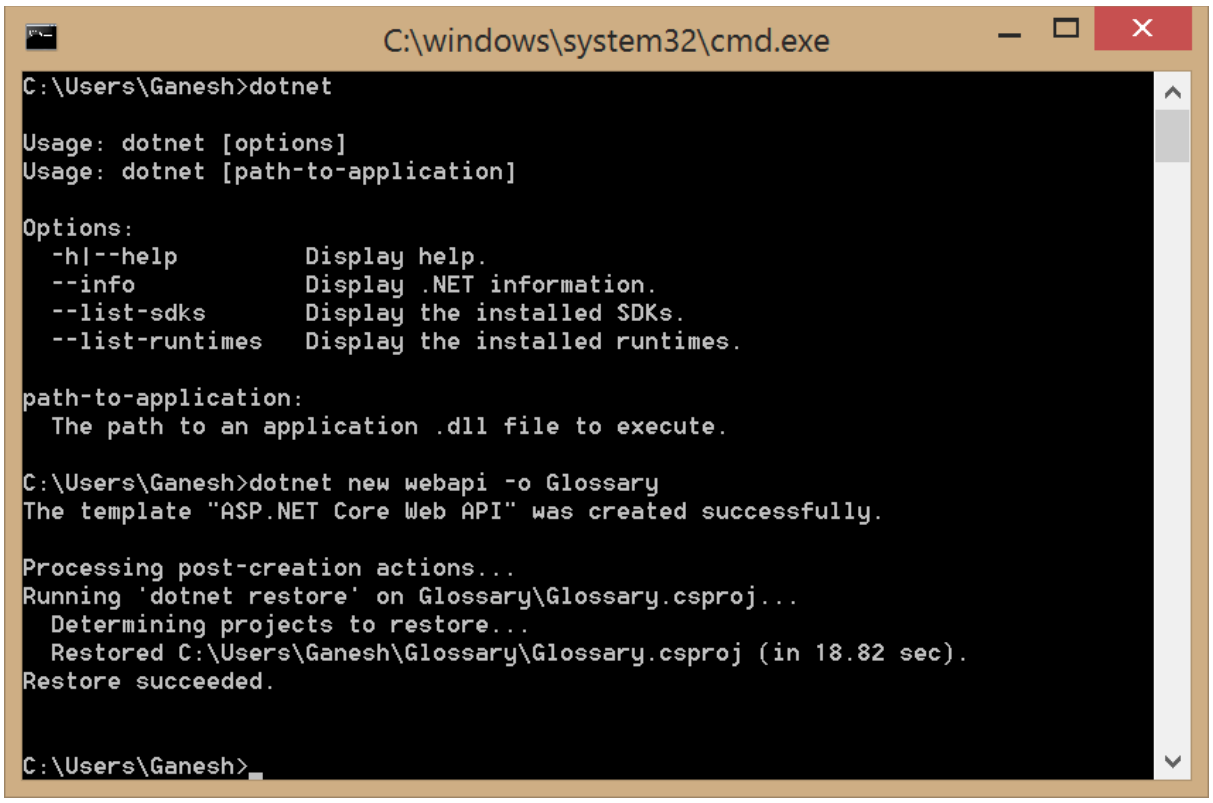
Software requirement:
1. Download and install
To start building .NET apps you just need to download and install the .NET SDK (Software Development Kit version
3.0 above).
Link:
https://dotnet.microsoft.com/learn/dotnet/hello-world-tutorial/install
2. Check everything installed correctly
Once you've installed, open a new command prompt and run the following command:
Command prompt
> dotnet



Create your web API
1. Open two command prompts

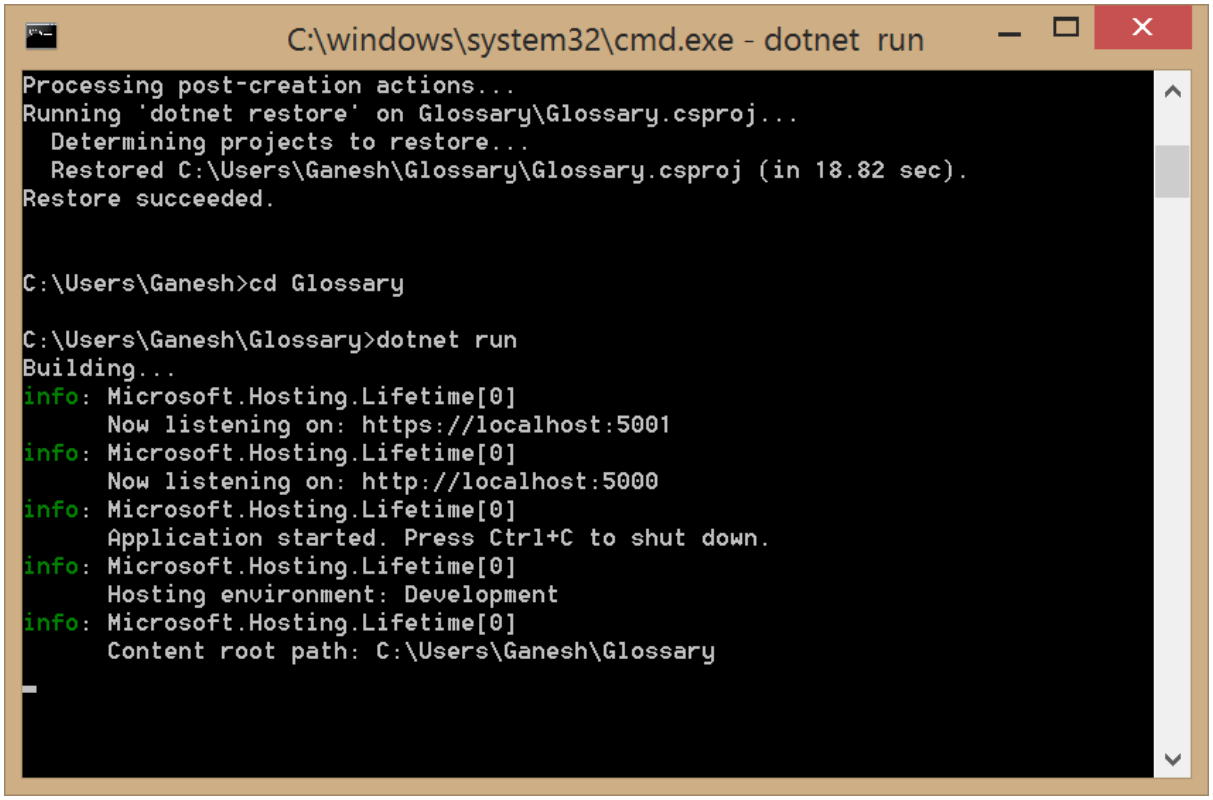
Command prompt 1:
Command:
dotnet new webapi -o Glossary

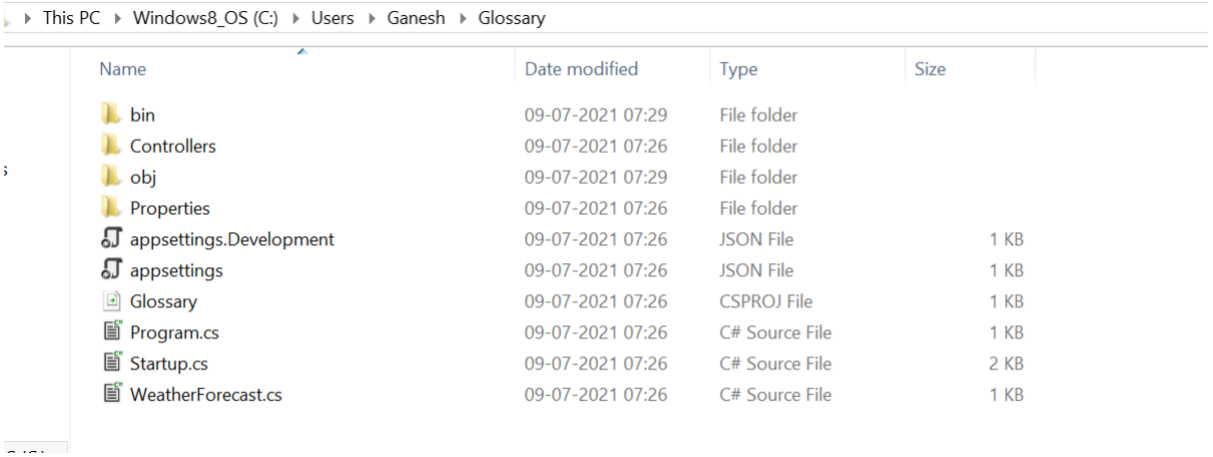
output:



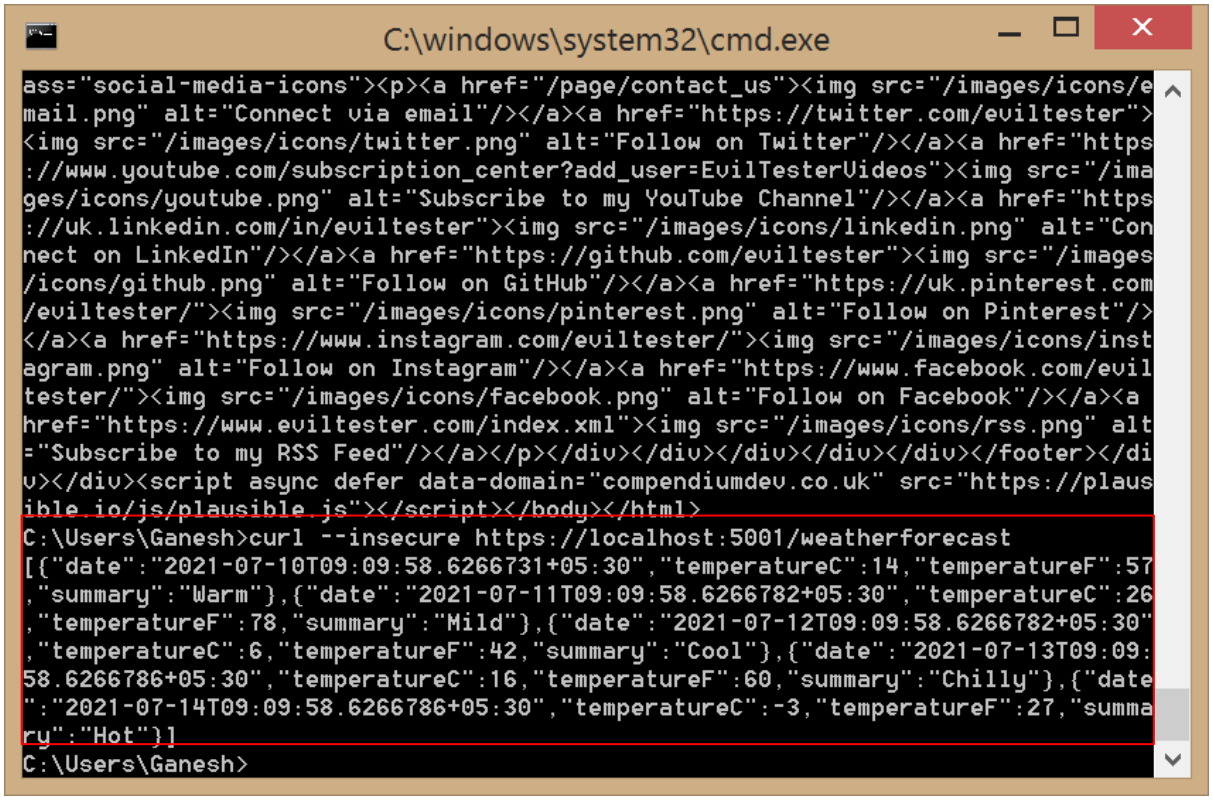
Command:
cd Glossary
dotnet run

Output:





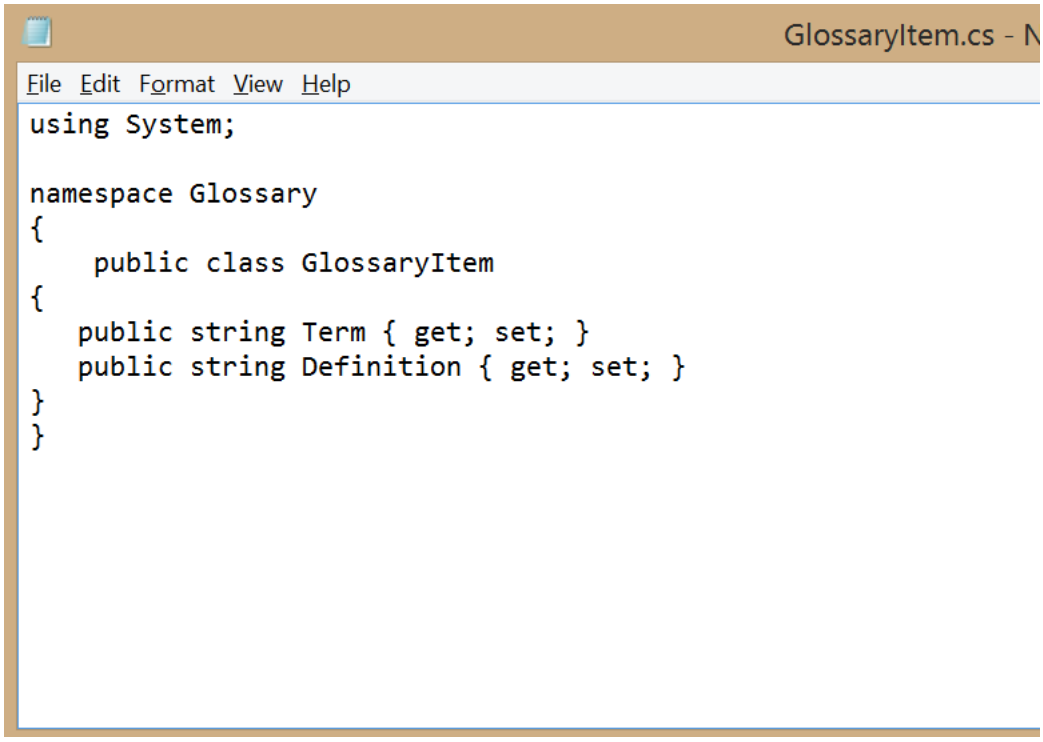
Command Prompt 2: (try running readymade weatherforecast class for testing)
Command:
curl --insecure https://localhost:5001/weatherforecast
output:



Now change the content:
To get started, remove the WeatherForecast.cs file from the root of the project and the WeatherForecastController.cs file from the Controllers folder.
Add Following two files

1) D:\Glossary\GlossaryItem.cs (type it in notepad and save as all files)

```
//GlossaryItem.cs
namespace Glossary
{
public class GlossaryItem
{
public string Term { get; set; }
public string Definition { get; set; }
}
}
```



D:\Glossary\Controllers\ GlossaryController.cs (type it in notepad and save as all files)

```
//Controllers/GlossaryController.cs
using System;
using System.Collections.Generic;
using Microsoft.AspNetCore.Mvc;
using System.IO;
namespace Glossary.Controllers
{
[ApiController]
[Route("api/[controller]")]
public class GlossaryController: ControllerBase
{
private static List<GlossaryItem> Glossary = new List<GlossaryItem> {
new GlossaryItem
{
Term= "HTML",
Definition = "Hypertext Markup Language"
},
new GlossaryItem
{
Term= "MVC",
Definition = "Model View Controller"
},
new GlossaryItem
{
Term= "OpenID",
Definition = "An open standard for authentication"
}
```

```
};
[HttpGet]
public ActionResult<List<GlossaryItem>> Get()
{ return Ok(Glossary);
}
[HttpGet]
[Route("{term}")]
public ActionResult<GlossaryItem> Get(string term)
{
var glossaryItem = Glossary.Find(item =>
item.Term.Equals(term, StringComparison.InvariantCultureIgnoreCase));
if (glossaryItem == null)
{ return NotFound();
} else
{
return Ok(glossaryItem);
}
}
[HttpPost]
public ActionResult Post(GlossaryItem glossaryItem)
{
var existingGlossaryItem = Glossary.Find(item =>
item.Term.Equals(glossaryItem.Term, StringComparison.InvariantCultureIgnoreCase));
if (existingGlossaryItem != null)
{
return Conflict("Cannot create the term because it already exists.");
}
else
{
Glossary.Add(glossaryItem);
var resourceUrl = Path.Combine(Request.Path.ToString(), Uri.EscapeUriString(glossaryItem.Term));
return Created(resourceUrl, glossaryItem);
}
}
[HttpPut]
public ActionResult Put(GlossaryItem glossaryItem)
{
var existingGlossaryItem = Glossary.Find(item =>
item.Term.Equals(glossaryItem.Term, StringComparison.InvariantCultureIgnoreCase));
if (existingGlossaryItem == null)
{
return BadRequest("Cannot update a nont existing term.");
} else
{
existingGlossaryItem.Definition = glossaryItem.Definition;
return Ok();
}
}
[HttpDelete]
[Route("{term}")]
public ActionResult Delete(string term)
```

```
{
var glossaryItem = Glossary.Find(item =>
item.Term.Equals(term, StringComparison.InvariantCultureIgnoreCase));
if (glossaryItem == null)
{ return NotFound();
}
else
{ Glossary.Remove(glossaryItem);
return NoContent();
}
}
}
}
```

GlossaryController.cs - Notepad

File Edit Format View Help

```
using System;
using System.Collections.Generic;
using Microsoft.AspNetCore.Mvc;
using System.IO;
namespace Glossary.Controllers
{
[ApiController]
[Route("api/[controller]")]
public class GlossaryController: ControllerBase
{
private static List<GlossaryItem> Glossary = new List<GlossaryItem> {
new GlossaryItem
{
Term= "HTML",
Definition = "Hypertext Markup Language"
},
new GlossaryItem
```

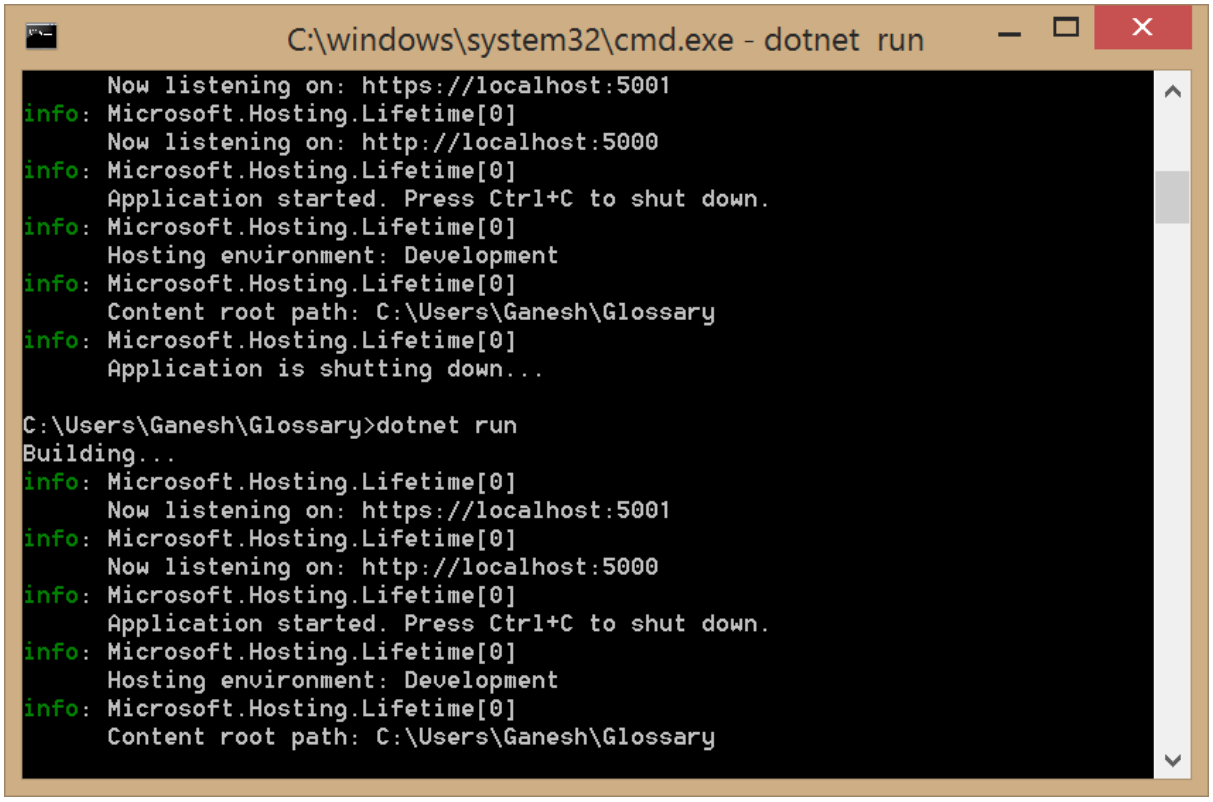
Output:

Name	Date modified	Type	Size
bin	09-07-2021 07:29	File folder	
Controllers	09-07-2021 09:20	File folder	
obj	09-07-2021 07:29	File folder	
Properties	09-07-2021 07:26	File folder	
appsettings.Development	09-07-2021 07:26	JSON File	1 KB
appsettings	09-07-2021 07:26	JSON File	1 KB
Glossary	09-07-2021 07:26	CSPROJ File	1 KB
GlossaryItem.cs	09-07-2021 09:19	C# Source File	1 KB
Program.cs	09-07-2021 07:26	C# Source File	1 KB
Startup.cs	09-07-2021 07:26	C# Source File	2 KB

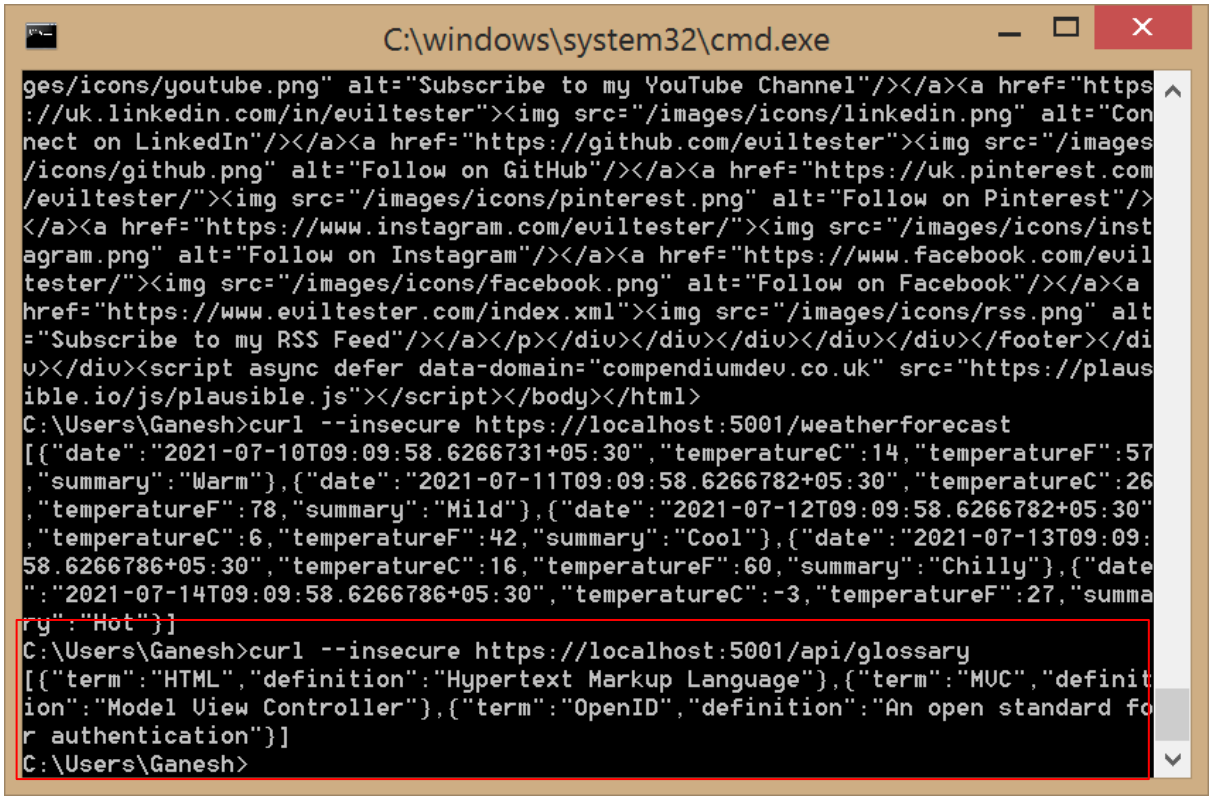
Name	Date modified	Type
GlossaryController.cs	09-07-2021 09:22	C# Source File

Now stop running previous dotnet run on command prompt 1 using Ctrl+C. and Run it again for new code.
On Command prompt1:
Command:
dotnet run

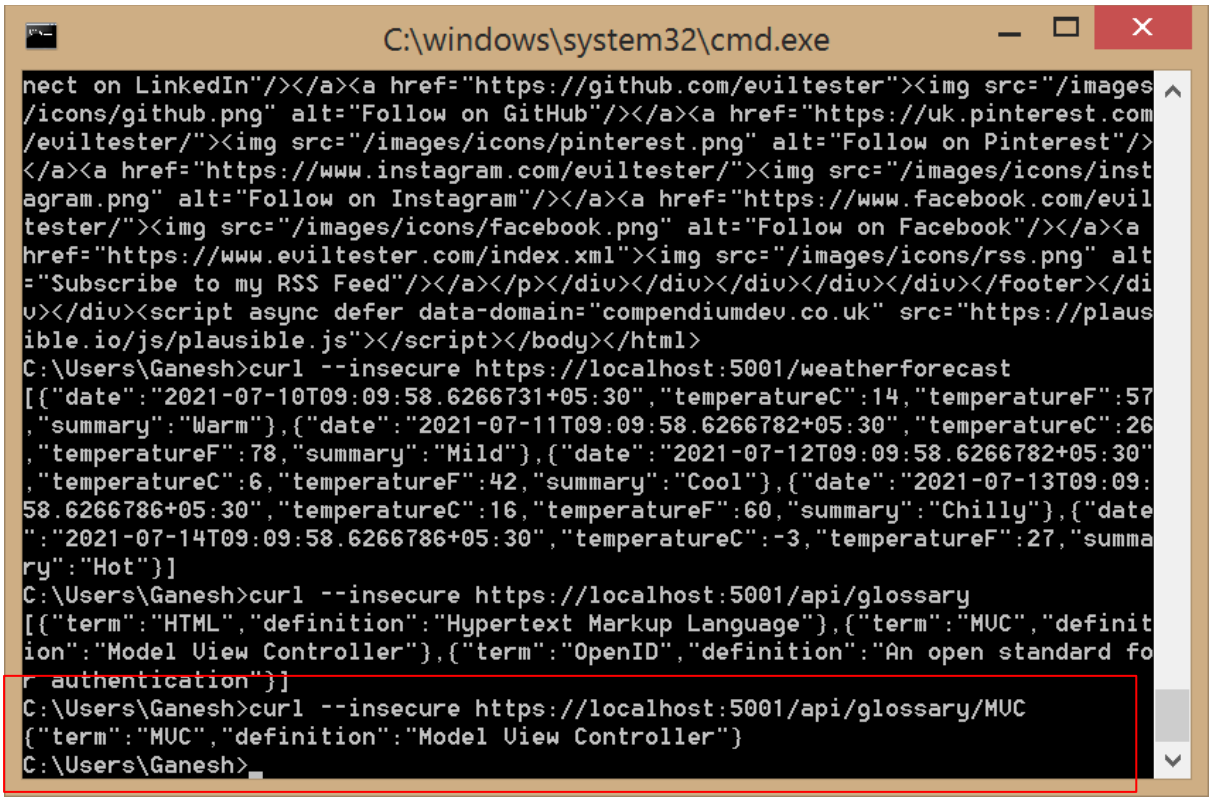
output:



On Command prompt2:
1) Getting a list of items:
Command:
curl --insecure https://localhost:5001/api/glossary

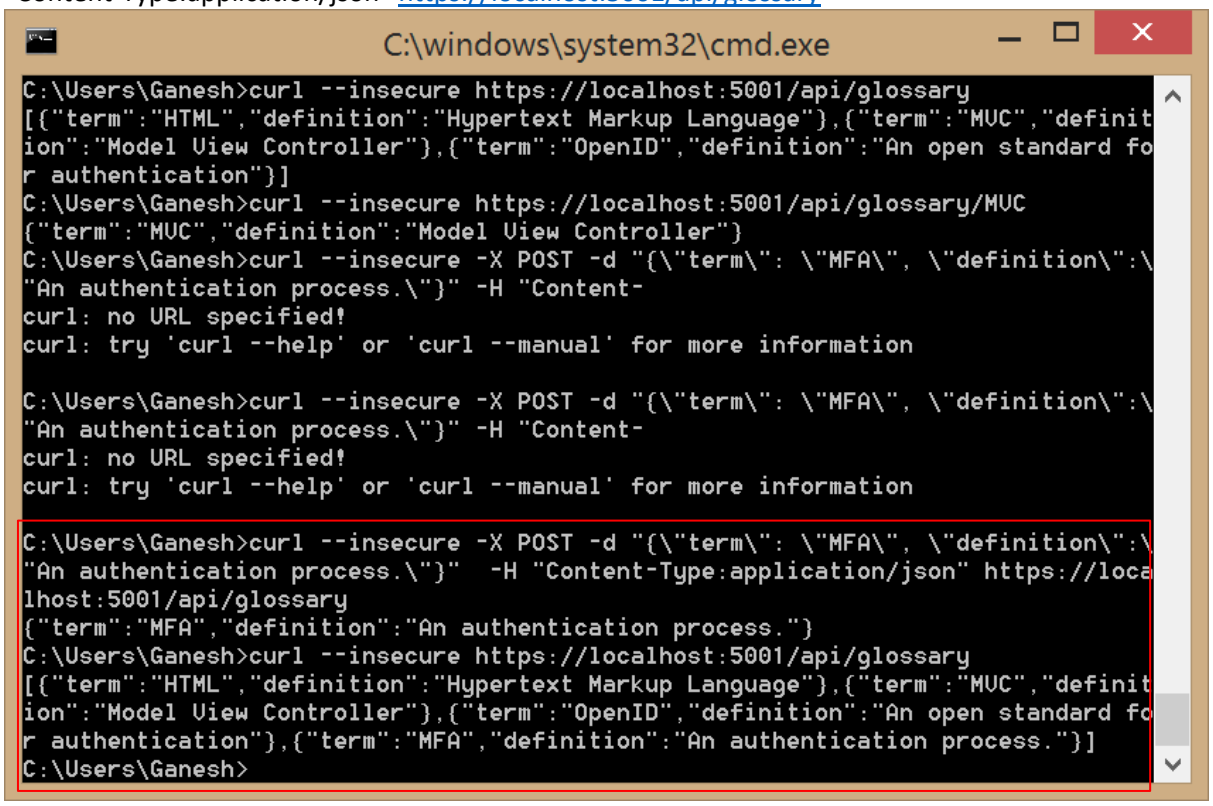


Getting a single item
Command:
curl --insecure https://localhost:5001/api/glossary/MVC
Output:

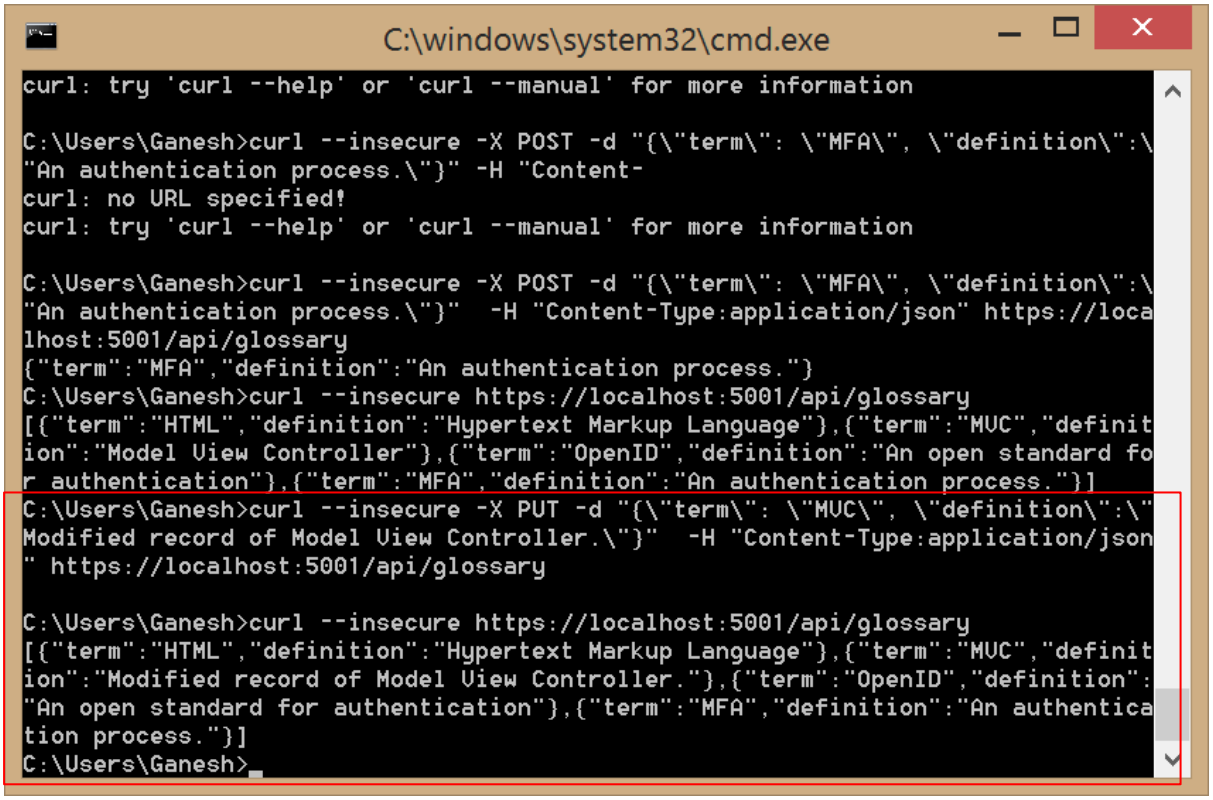


Creating an item

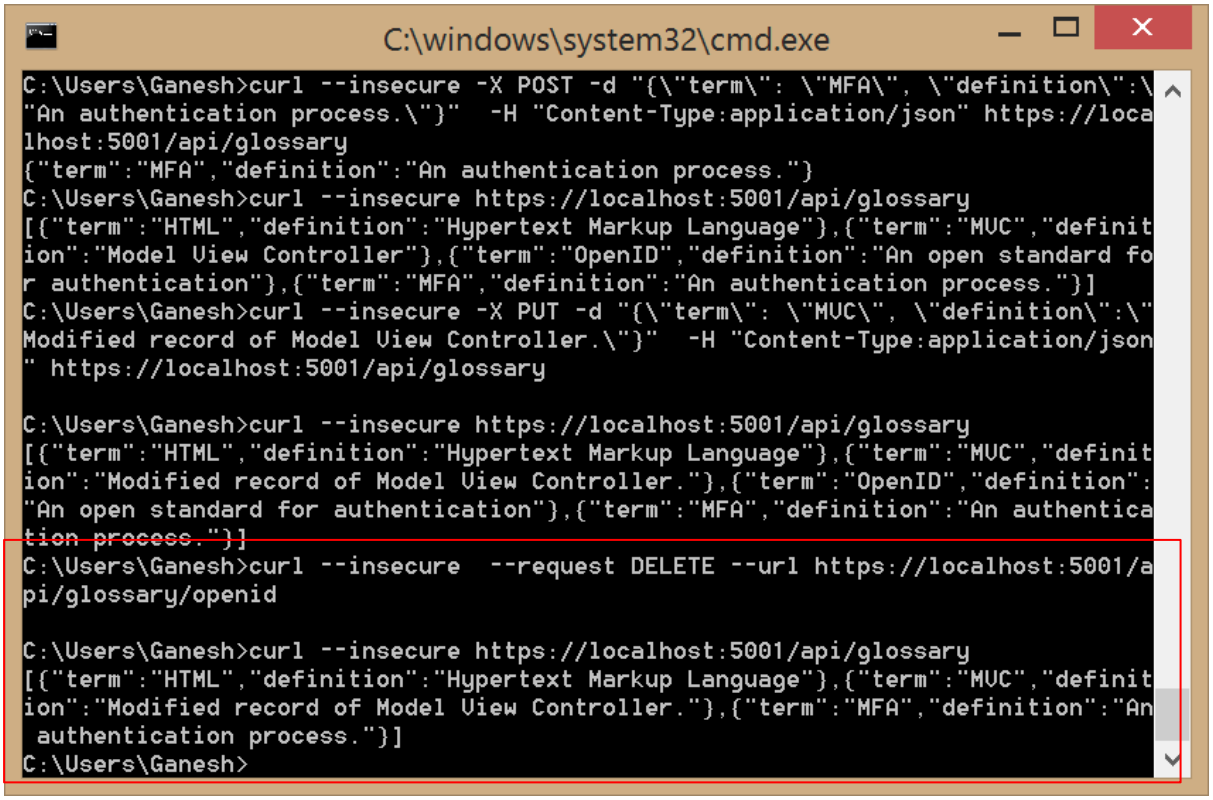
Command:
curl --insecure -X POST -d "{\"term\": \"MFA\", \"definition\":\"An authentication process.\"}" -H "Content-Type:application/json" https://localhost:5001/api/glossary



Update Item
Command:
curl --insecure -X PUT -d "{\"term\": \"MVC\", \"definition\":\"Modified record of Model View Controller.\"}" -H "Content-Type:application/json" https://localhost:5001/api/glossary
Output:



Delete Item
Command:
curl --insecure --request DELETE --url https://localhost:5001/api/glossary/openid
Output:

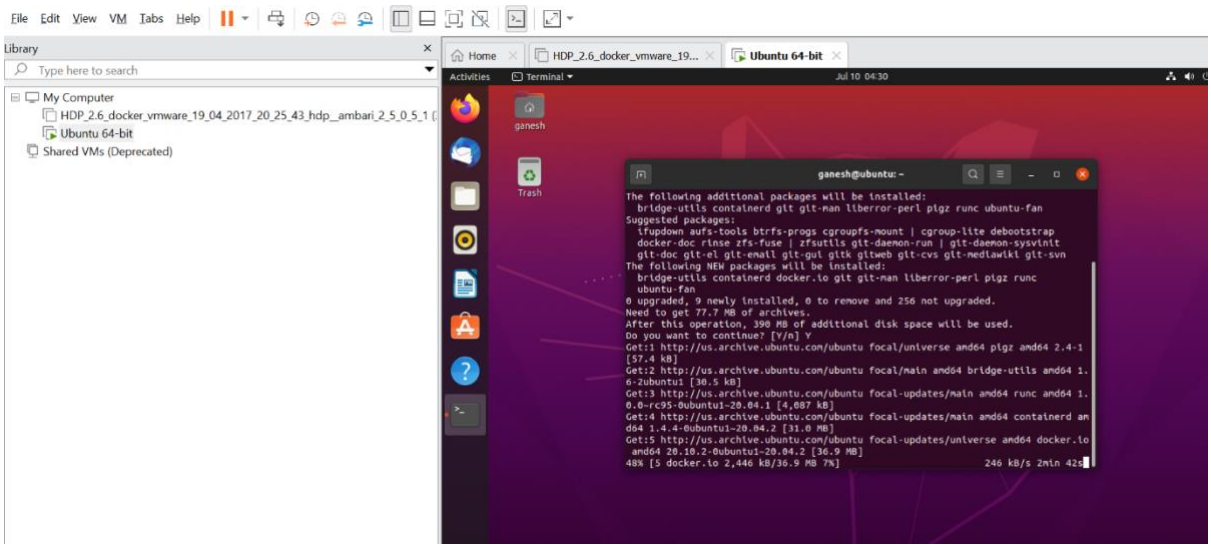


Practical No. 3

Aim: Working with Docker, Docker Commands, Docker Images and Containers

After install ubuntu in vmware. Install docker

Command: sudo apt-get install docker.io



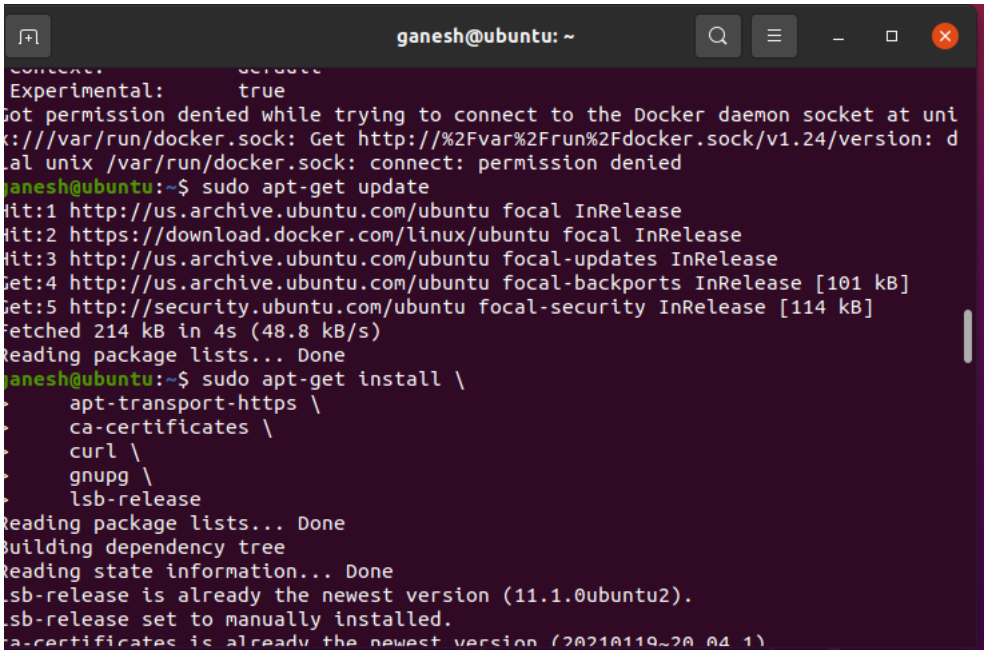
Install using the repository

Before you install Docker Engine for the first time on a new host machine, you need to set up the Docker repository. Afterward, you can install and update Docker from the repository.

Set up the repository

Update the `apt` package index and install packages to allow `apt` to use a repository over HTTPS:

```
1. $ sudo apt-get update
2. $ sudo apt-get install \
   apt-transport-https \
   ca-certificates \
   curl \
   gnupg \
   lsb-release
```

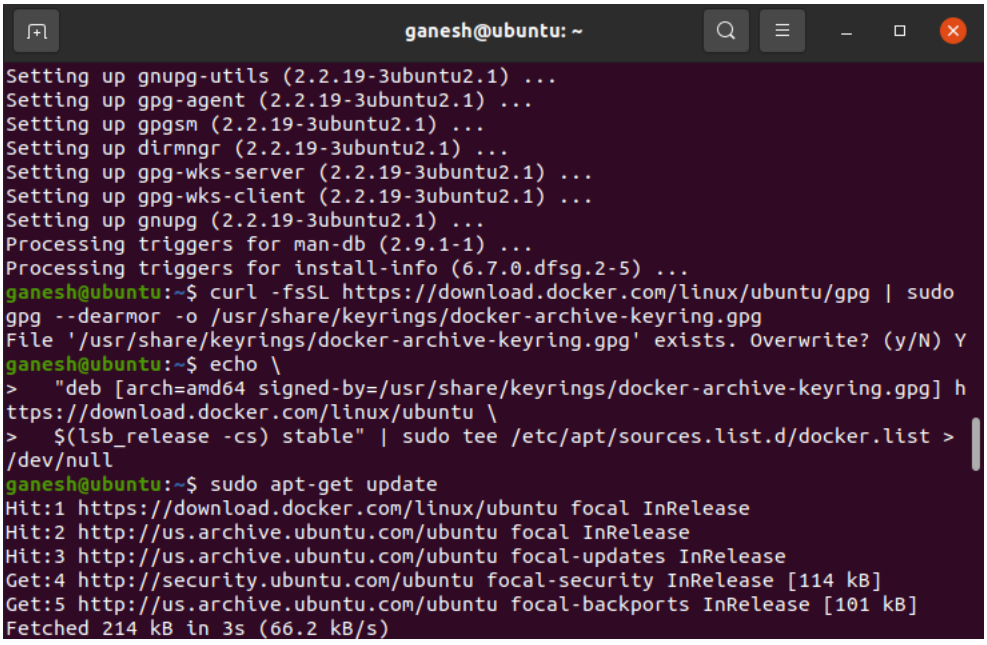


1. Add Docker's official GPG key:

```
$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --
dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
```

Use the following command to set up the **stable** repository

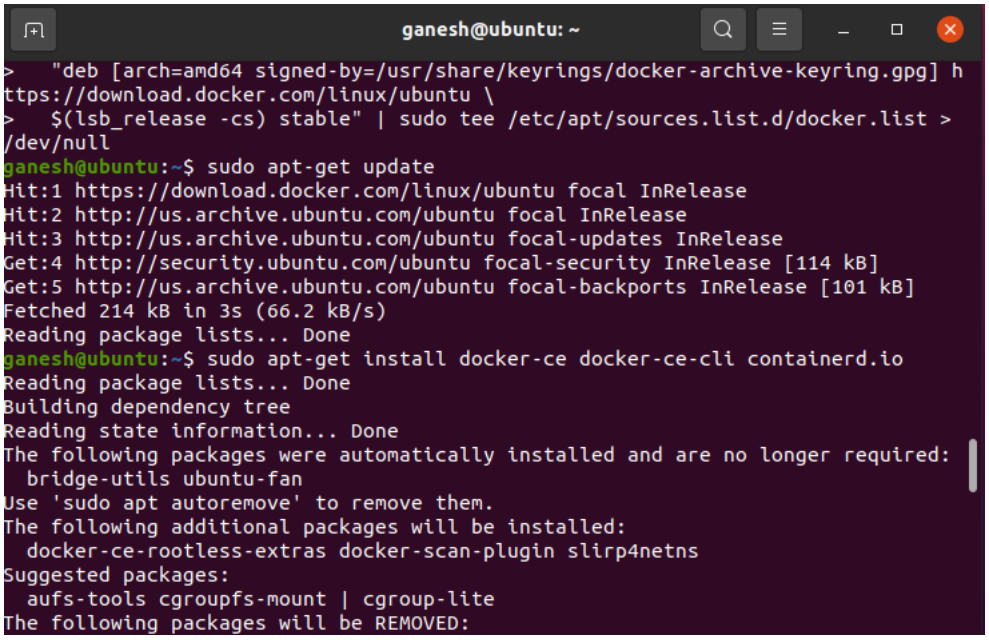
```
$ echo \
  "deb [arch=amd64 signed-by=/usr/share/keyrings/docker-archive-
keyring.gpg] https://download.docker.com/linux/ubuntu \
  $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list
> /dev/null
```



Install Docker Engine

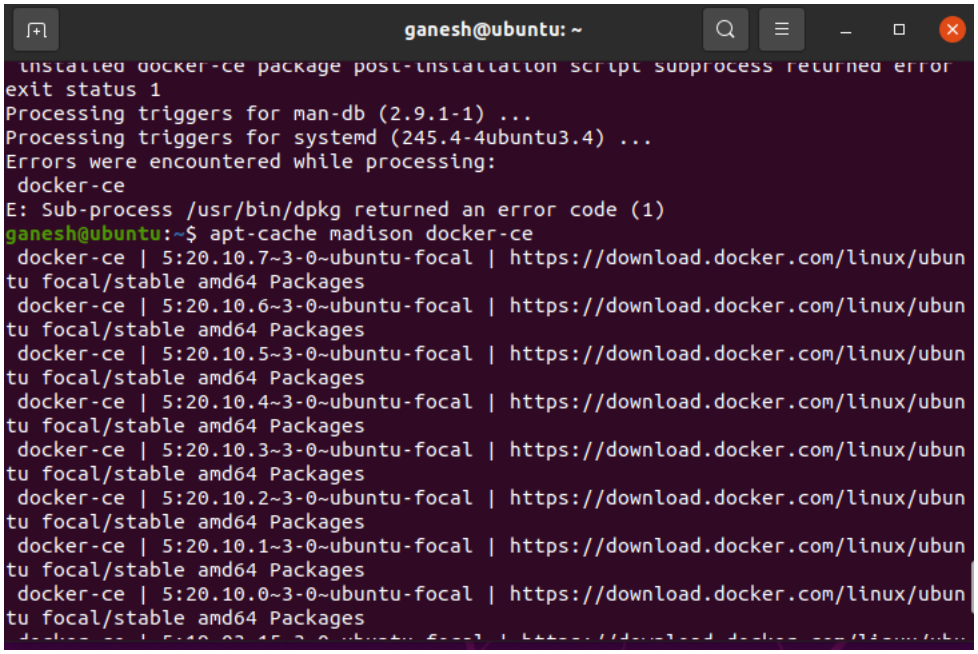
Update the apt package index, and install the *latest version* of Docker Engine and containerd, or go to the next step to install a specific version:

```
$ sudo apt-get update
$ sudo apt-get install docker-ce docker-ce-cli containerd.io
```



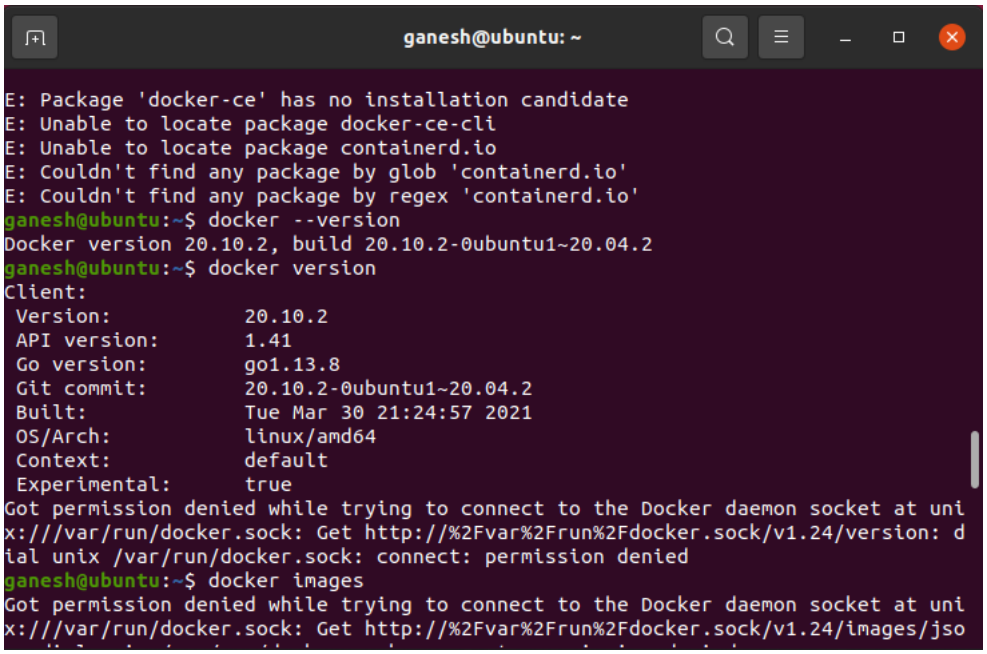
To install a *specific version* of Docker Engine, list the available versions in the repo, then select and install:

```
apt-cache madison docker-ce
```



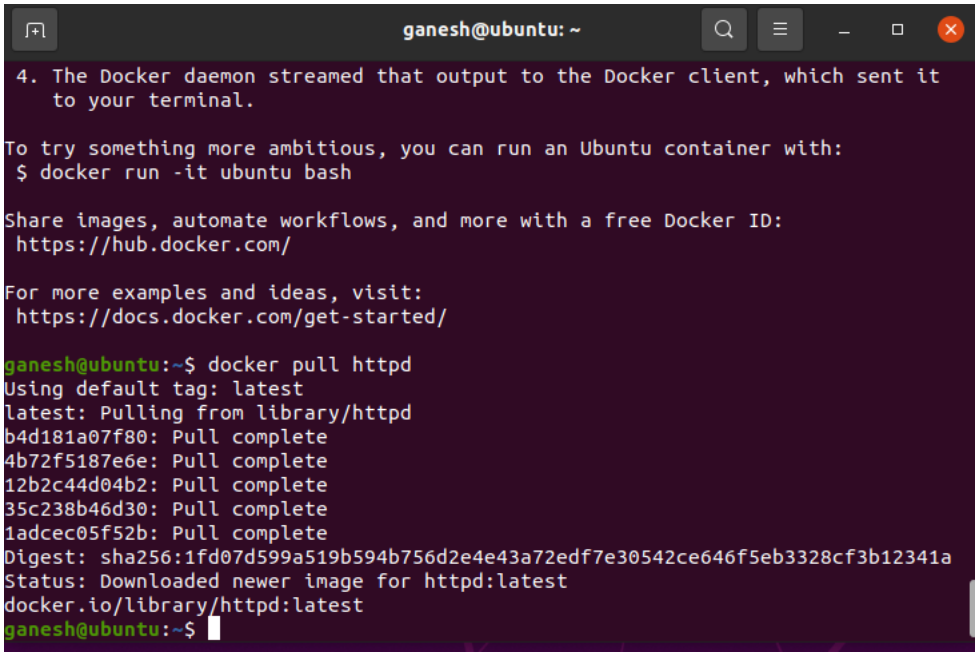
Docker Commands:

Docker –version
Docker version



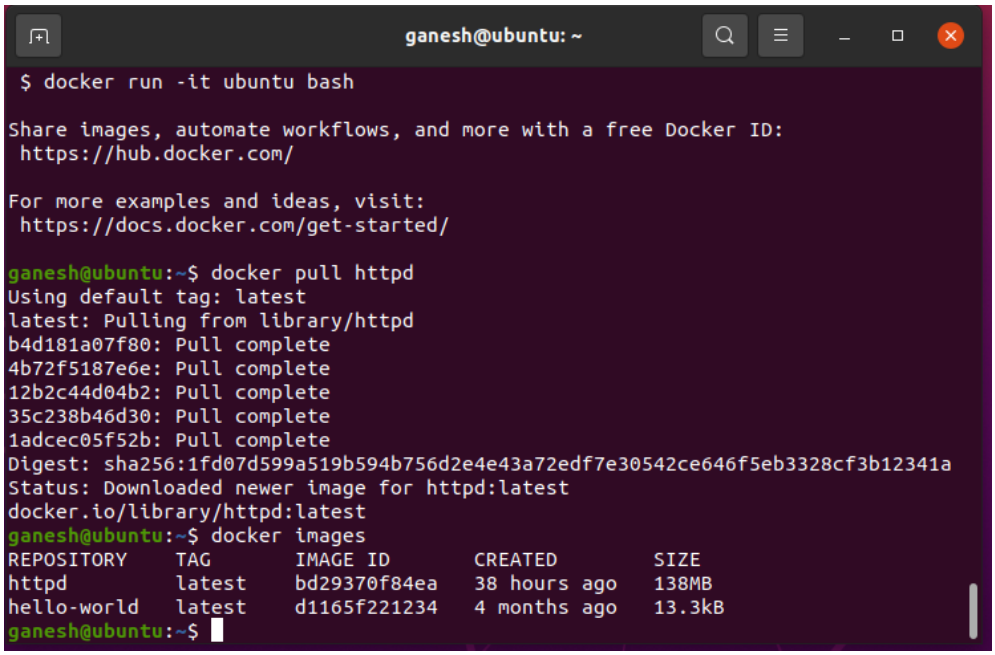
Docker pull httpd

Pull an image or a repository from a registry



Docker images

It lists all the images

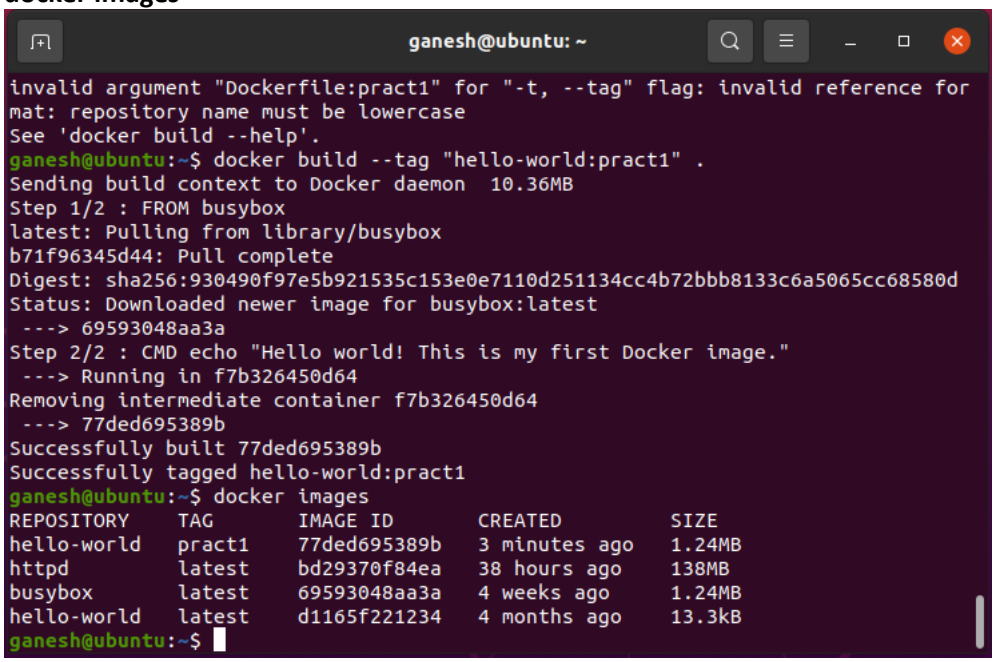


#nano Dockerfile
FROM busybox
CMD echo "Hello world! This is my first Docker image."

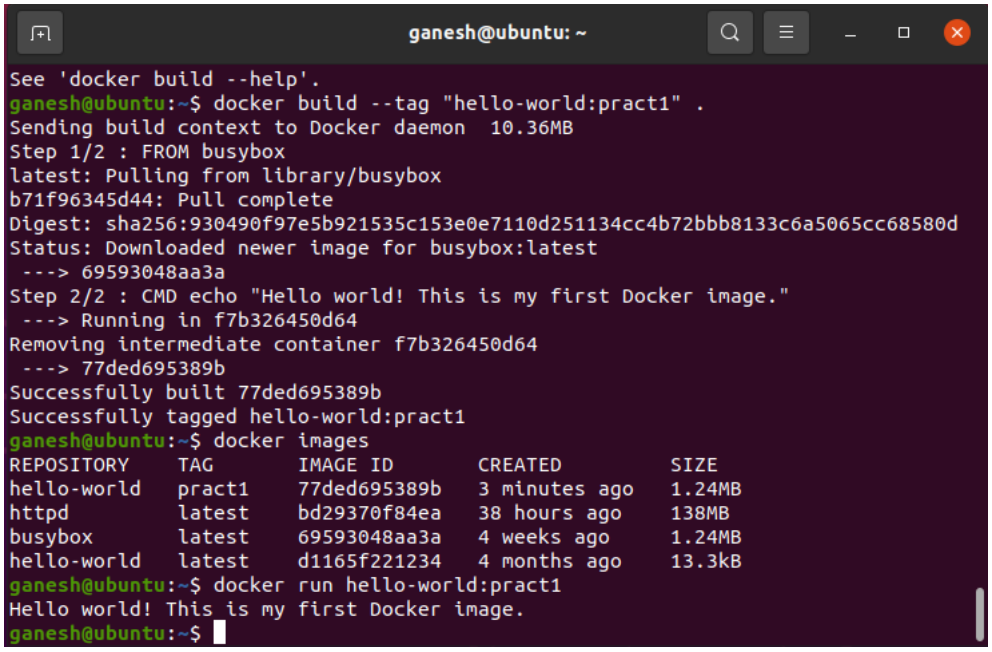
//above two line we have to add into dockerfile
to save press ctrl+o(to write) then enter then ctrl+x (to exit)

docker build --tag "hello-world:pract1" .

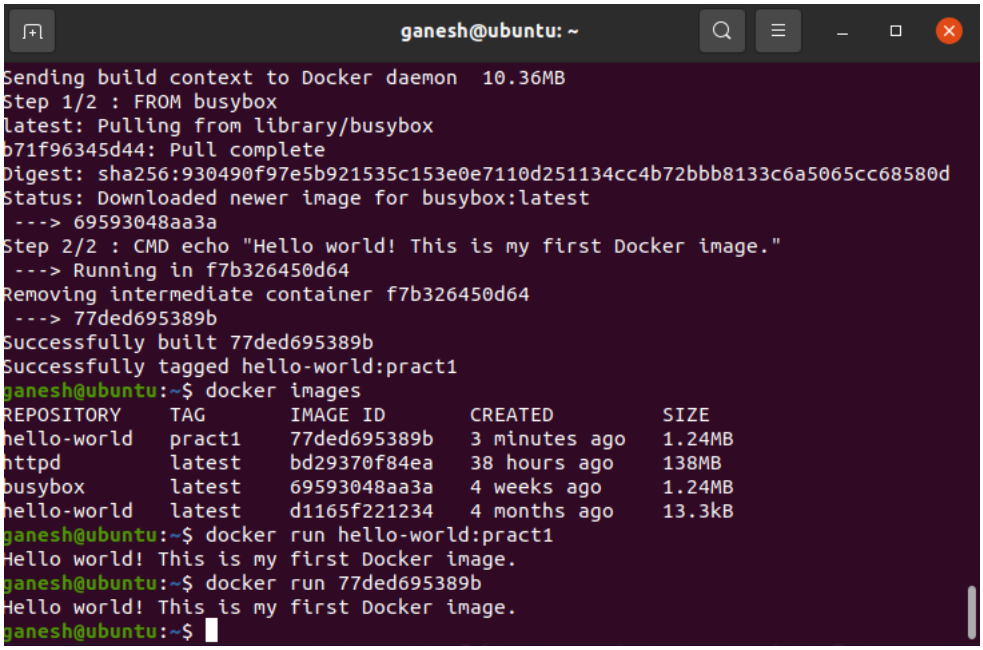
docker images



docker run hello-world:pract1

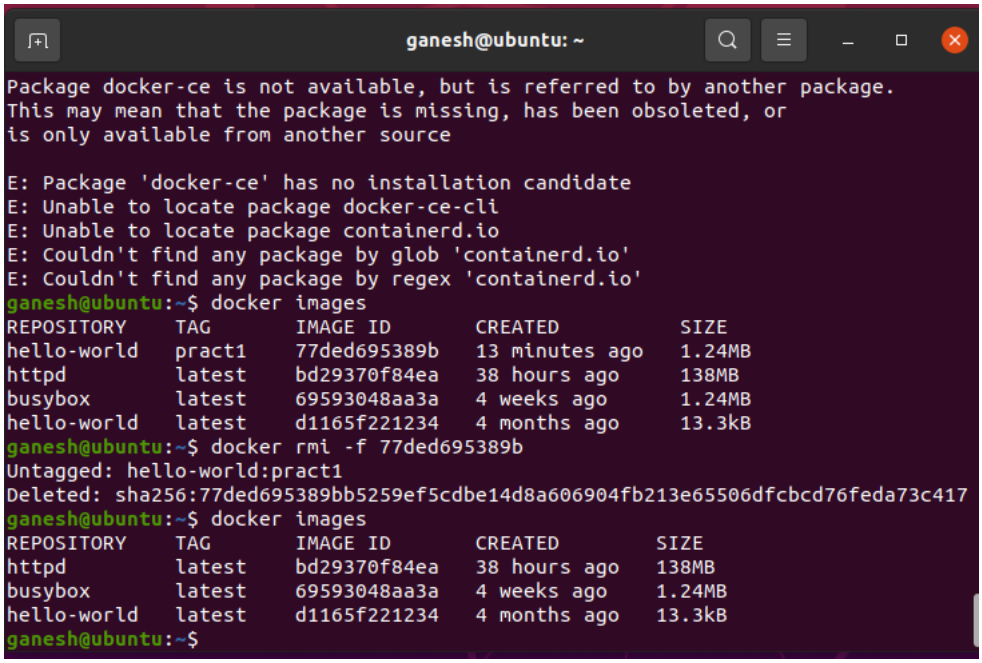


docker run 77ded695389b



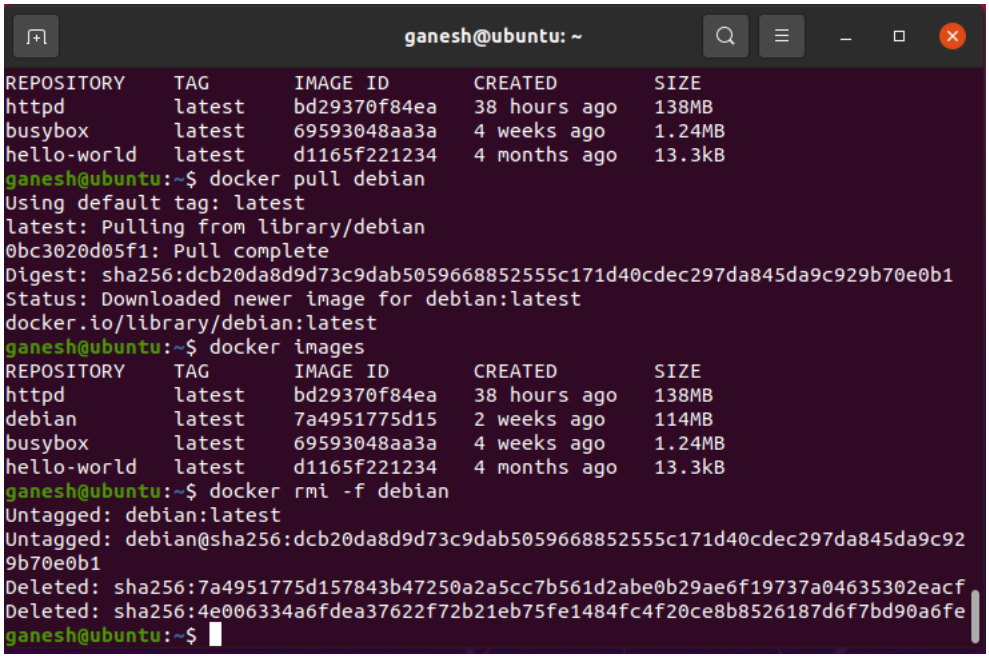
Docker rmi
Remove one or more images

docker rmi -f images-id
docker rmi -f 77ded695389b
After running docker images we can see that 77ded695389b is deleted.



docker rmi -f Respository-name

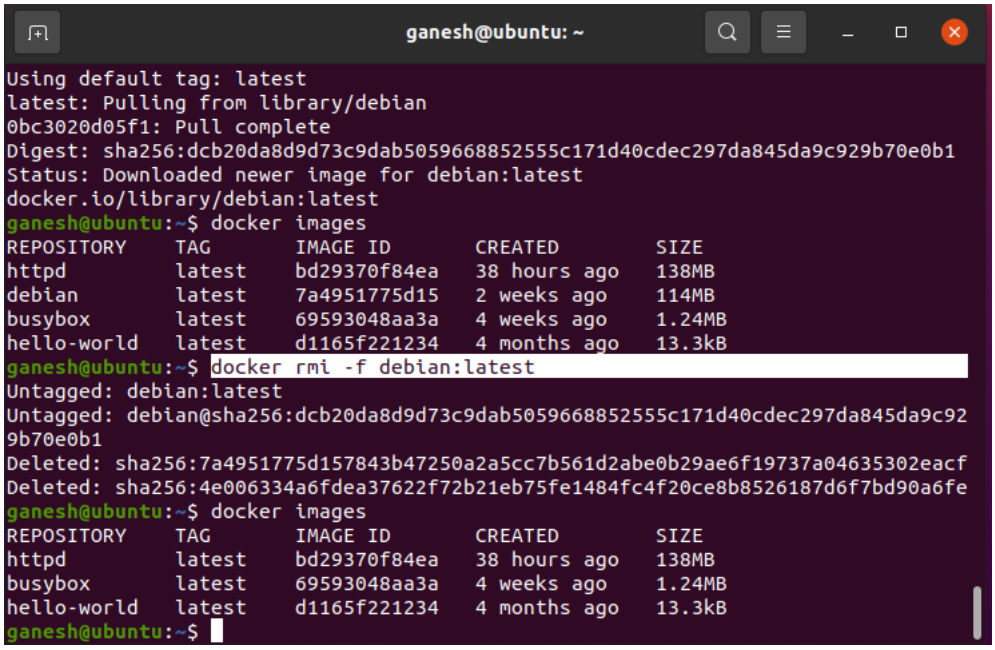
docker rmi -f Debian



docker rmi -f Respository-name:tag

docker rmi -f debian:latest

After this debain image will be deleted


ganesh@ubuntu: ~
Using default tag: latest
latest: Pulling from library/debian
0bc3020d05f1: Pull complete
Digest: sha256:dcb20da8d9d73c9dab5059668852555c171d40cdec297da845da9c929b70e0b1
Status: Downloaded newer image for debian:latest
docker.io/library/debian:latest
ganesh@ubuntu:~$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
httpd latest bd29370f84ea 38 hours ago 138MB
debian latest 7a4951775d15 2 weeks ago 114MB
busybox latest 69593048aa3a 4 weeks ago 1.24MB
hello-world latest d1165f221234 4 months ago 13.3kB
ganesh@ubuntu:~$ docker rmi -f debian:latest
Untagged: debian:latest
Untagged: debian@sha256:dcb20da8d9d73c9dab5059668852555c171d40cdec297da845da9c92
9b70e0b1
Deleted: sha256:7a4951775d157843b47250a2a5cc7b561d2abe0b29ae6f19737a04635302eacf
Deleted: sha256:4e006334a6fdea37622f72b21eb75fe1484fc4f20ce8b8526187d6f7bd90a6fe
ganesh@ubuntu:~$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
httpd latest bd29370f84ea 38 hours ago 138MB
busybox latest 69593048aa3a 4 weeks ago 1.24MB
hello-world latest d1165f221234 4 months ago 13.3kB
ganesh@ubuntu:~$

Practical No. 4

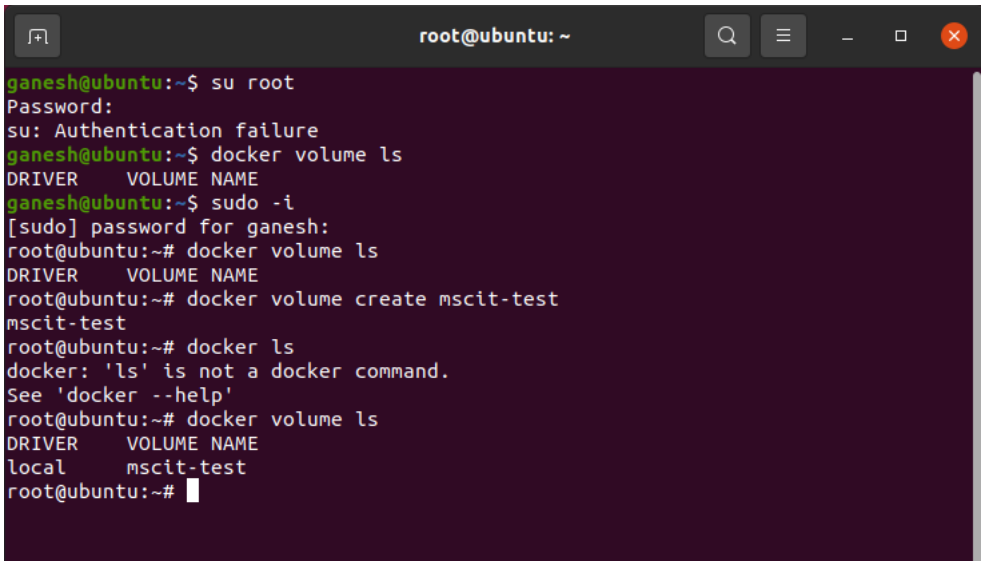
Aim: Installing software packages on Docker, Working with Docker Volumes and Networks.

Volumes are the preferred mechanism for persisting data generated by and used by Docker containers. While bind mounts are dependent on the directory structure and OS of the host machine, volumes are completely managed by Docker.

List volumes created

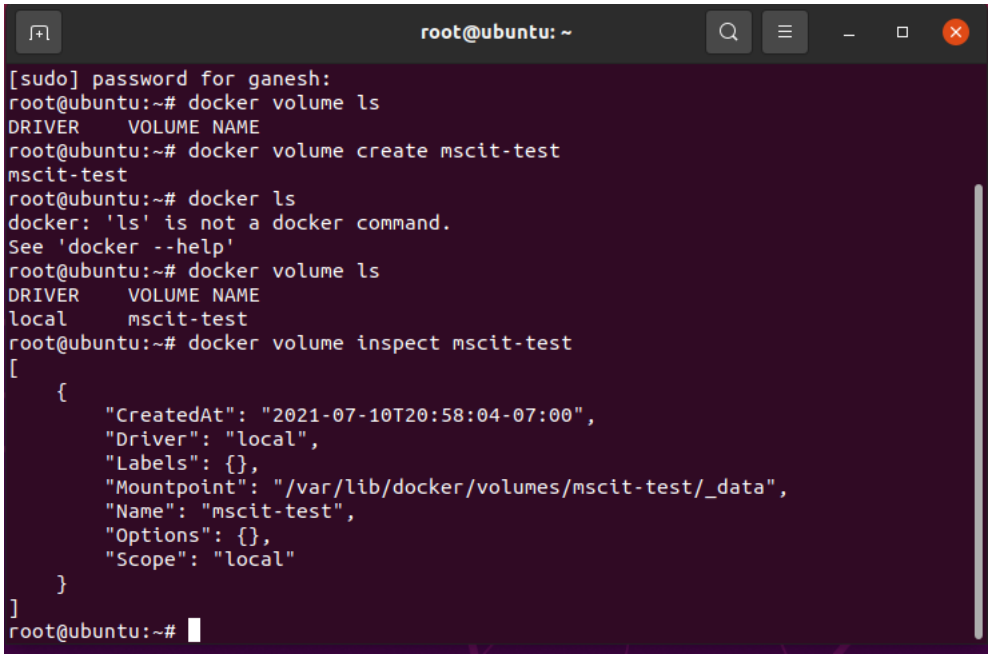
Command: docker volume ls

To create volume.
Command: docker volume create mscit-test



Return low-level information on Docker objects

Command: docker volume inspect mscit-test

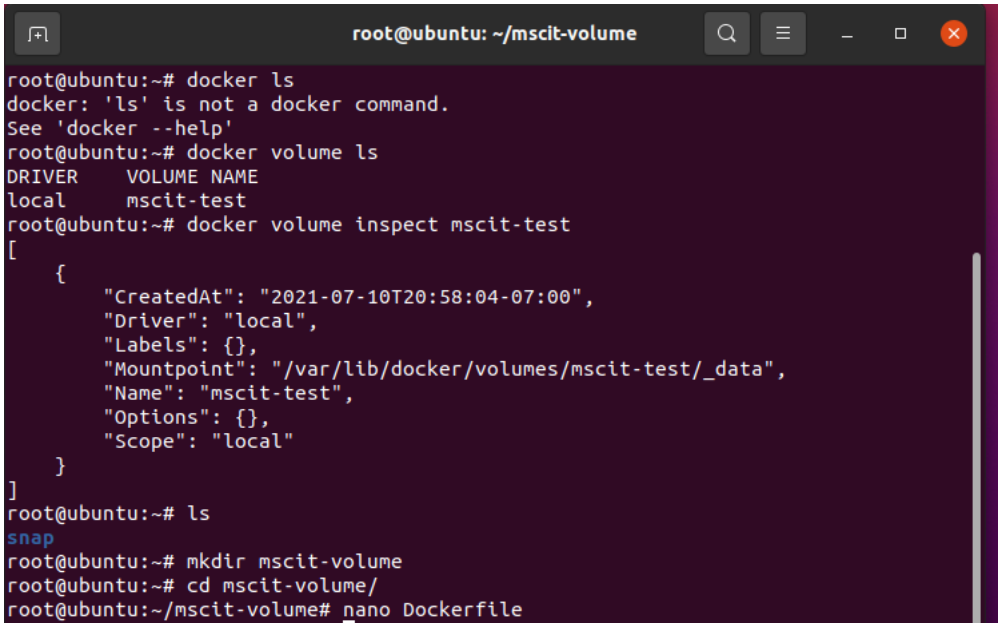


Create a directory

mkdir mscit-volume

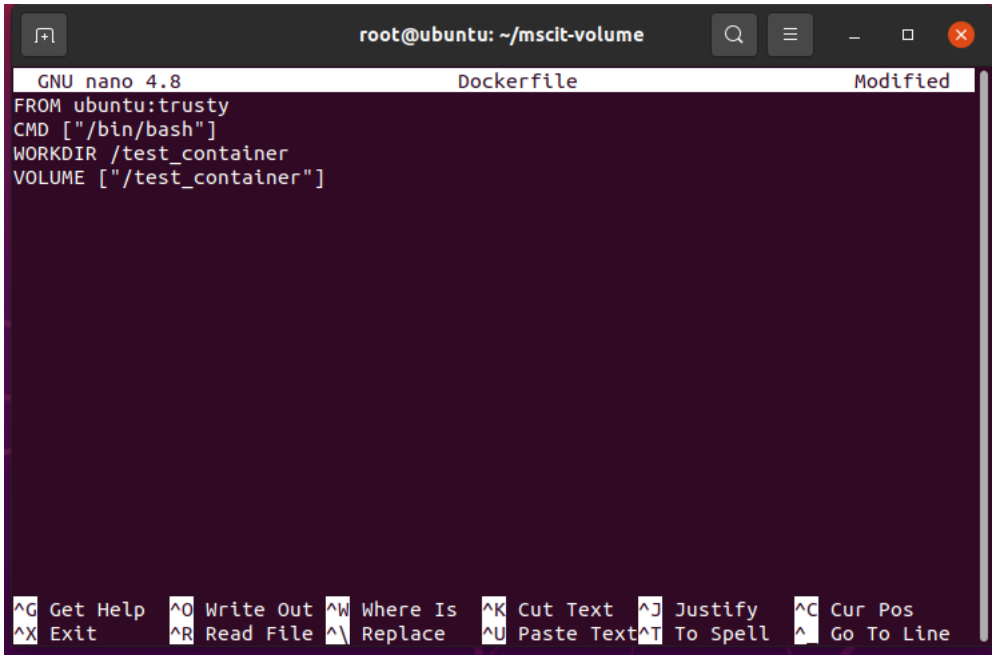
Now, change directory to mscit-volume

cd mscit-volume/



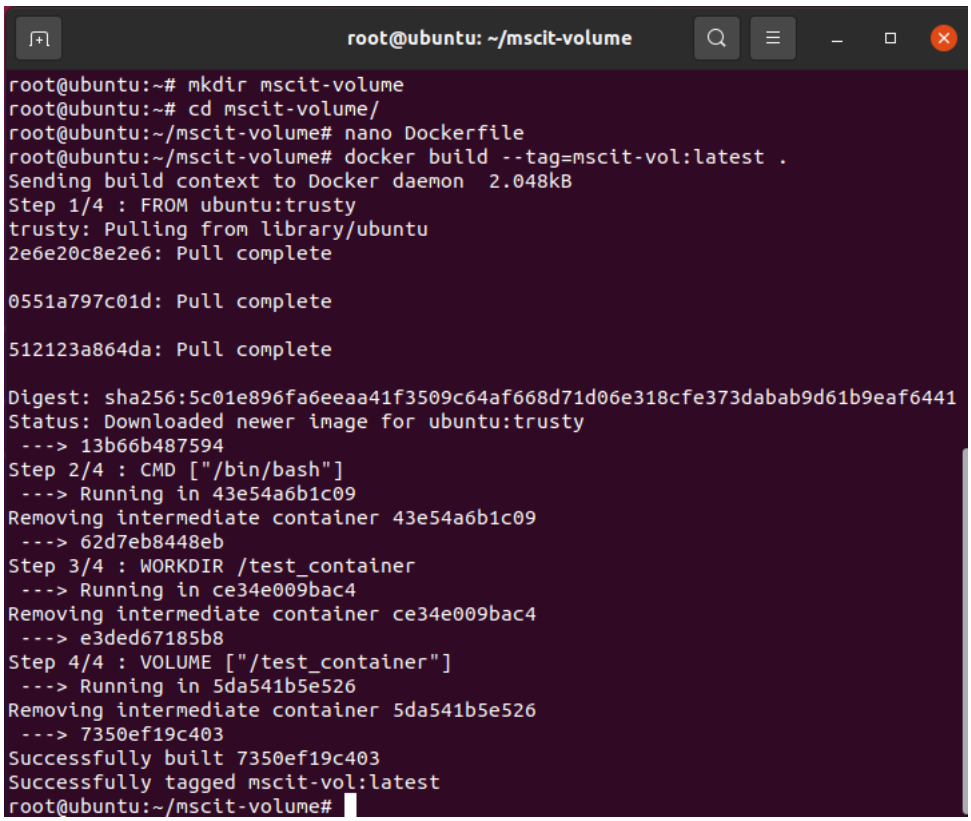
Create a file

Nano Dockerfile



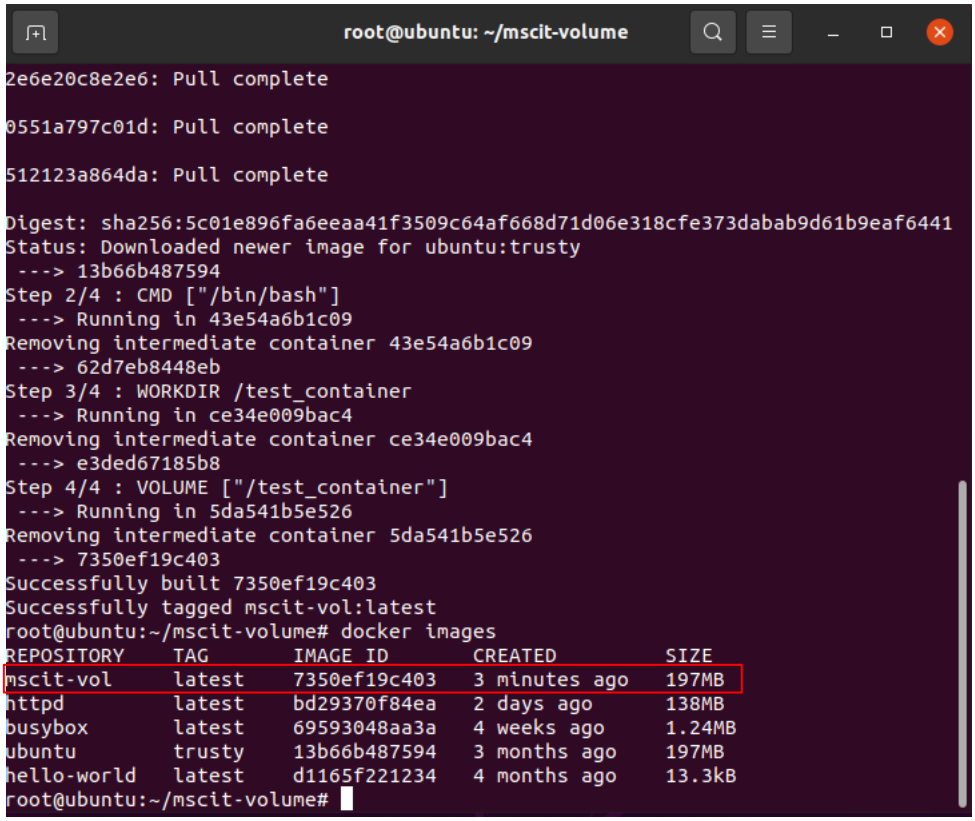
To create an image file

docker build --tag=mscit-vol:latest .



Check the image create

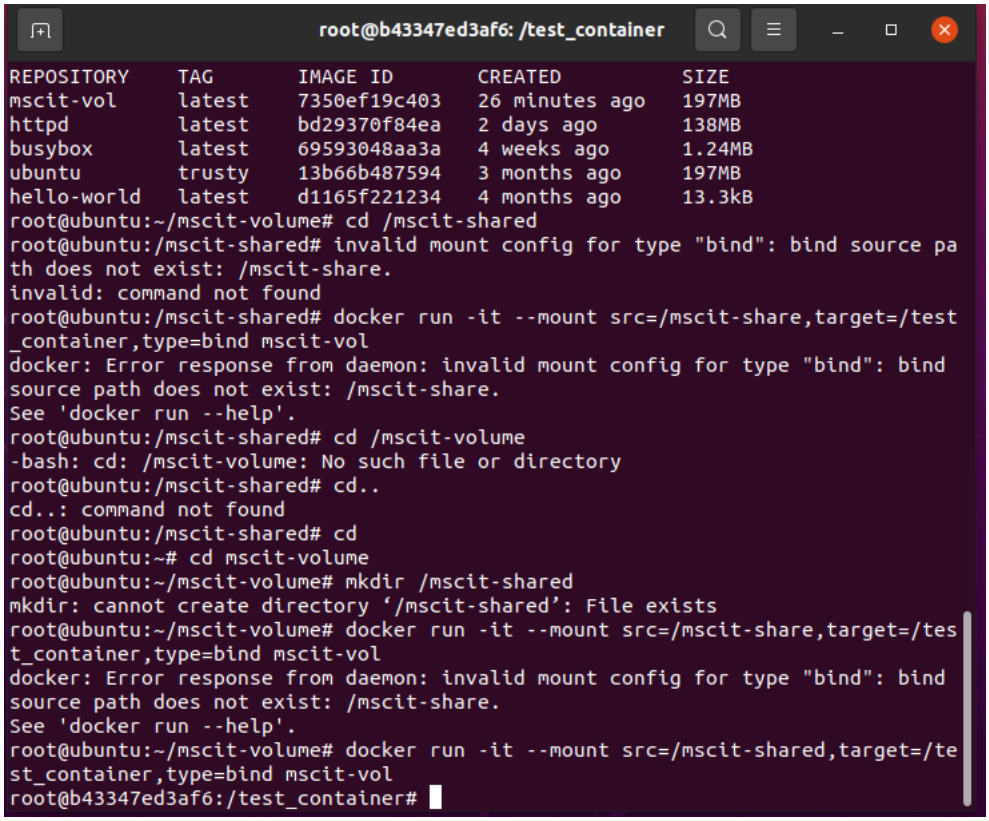
Command: docker images



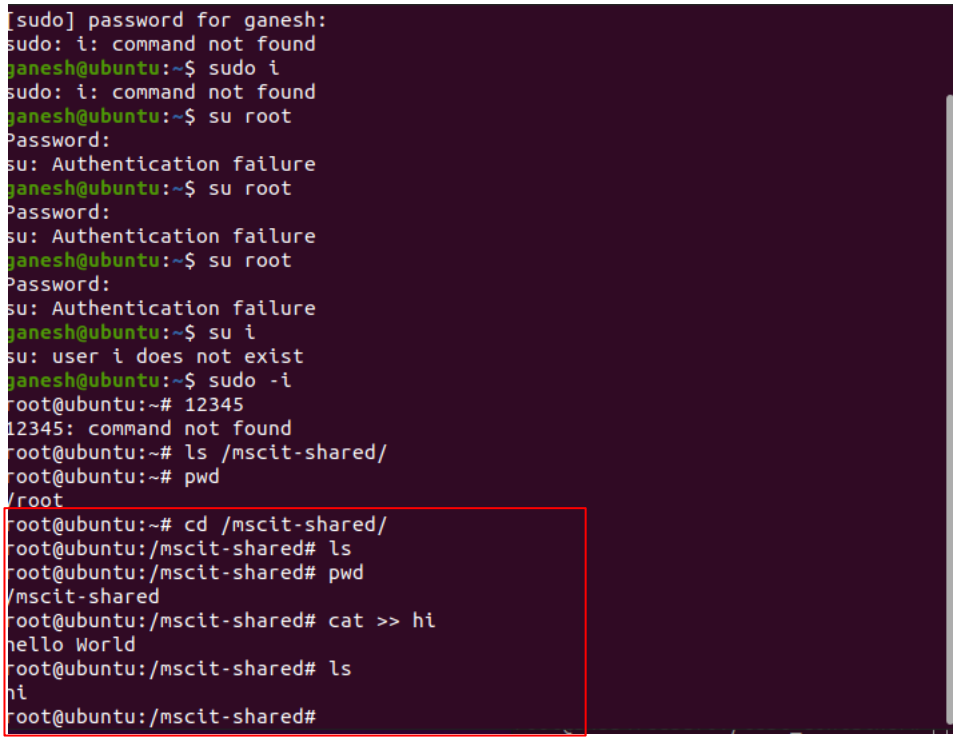
Mounting the container

docker run -it --mount src=/mscit-shared,target=/test_container,type=bind mscit-vol

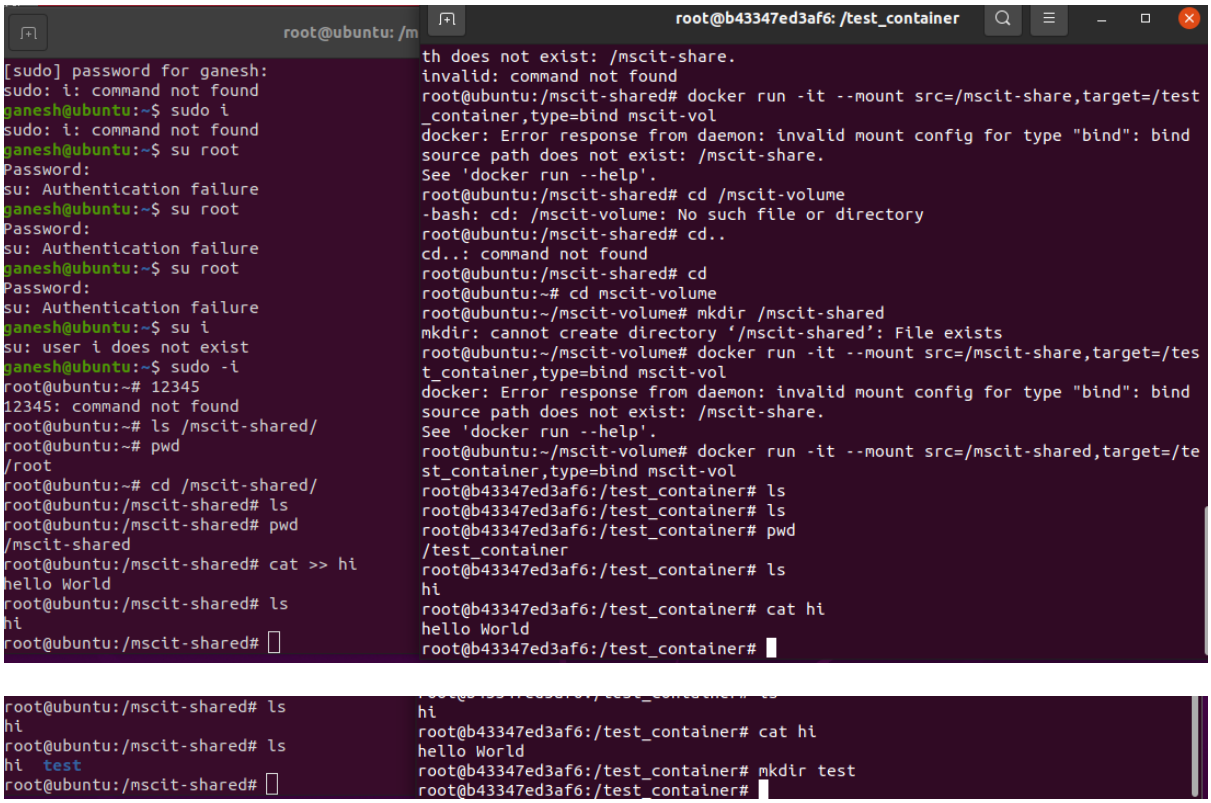
It will change in root and show test_Container



Now open other terminal and get into mscit-shared directory and create a file called hi



Now check the file created in root is listed in test_Container and vice-versa.



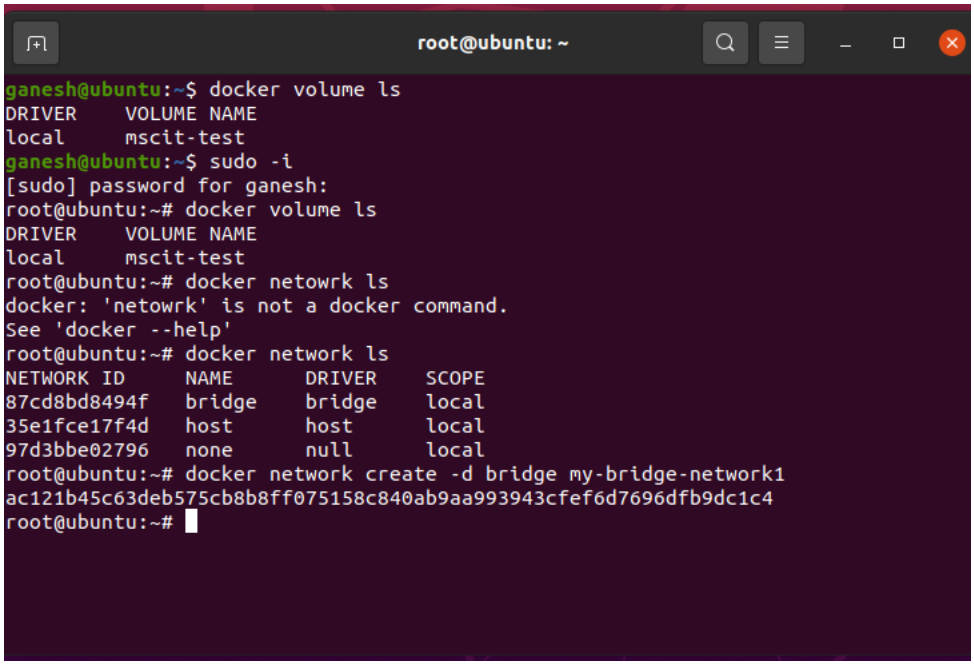
We can see that file location are mapped.

When below command is executed, it will delete the volume.
docker volume rm mscit-test

Network:

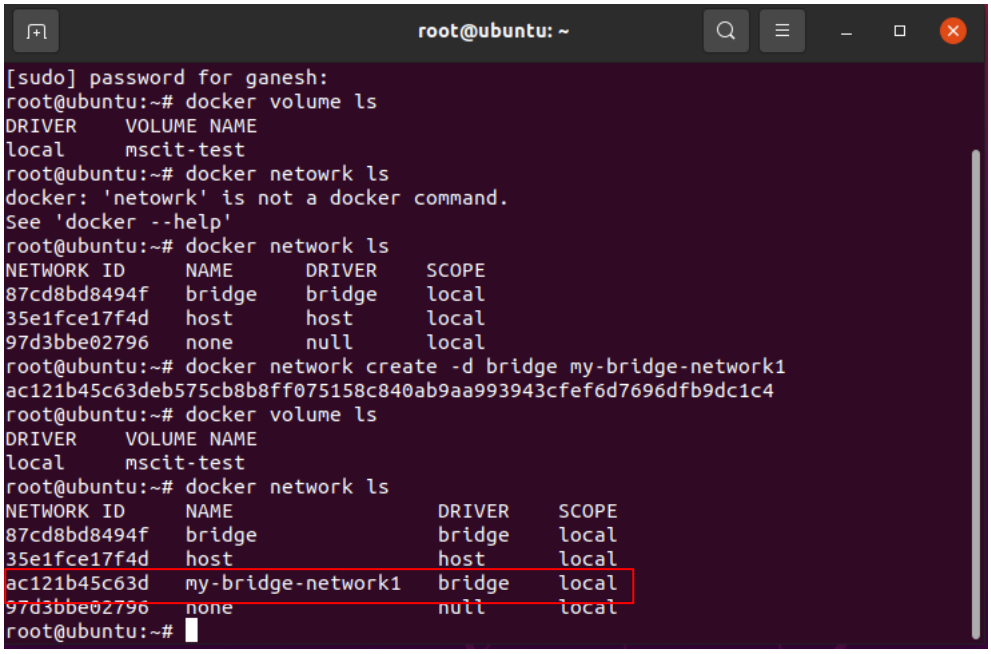
Create network with following command

docker network create -d bridge my-bridge-network1

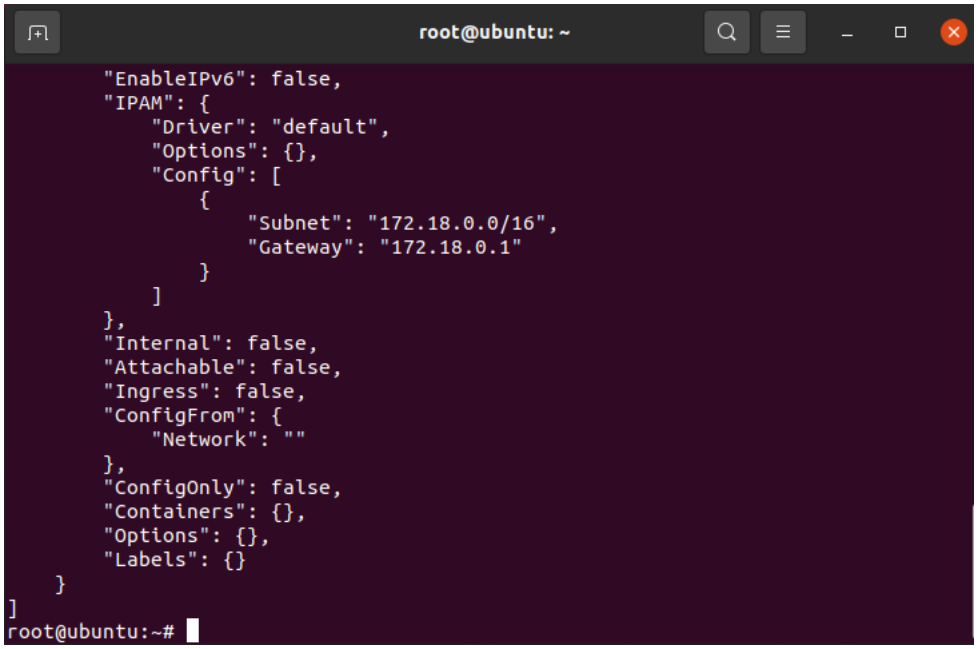


Check network is created with below command

Command: docker network ls



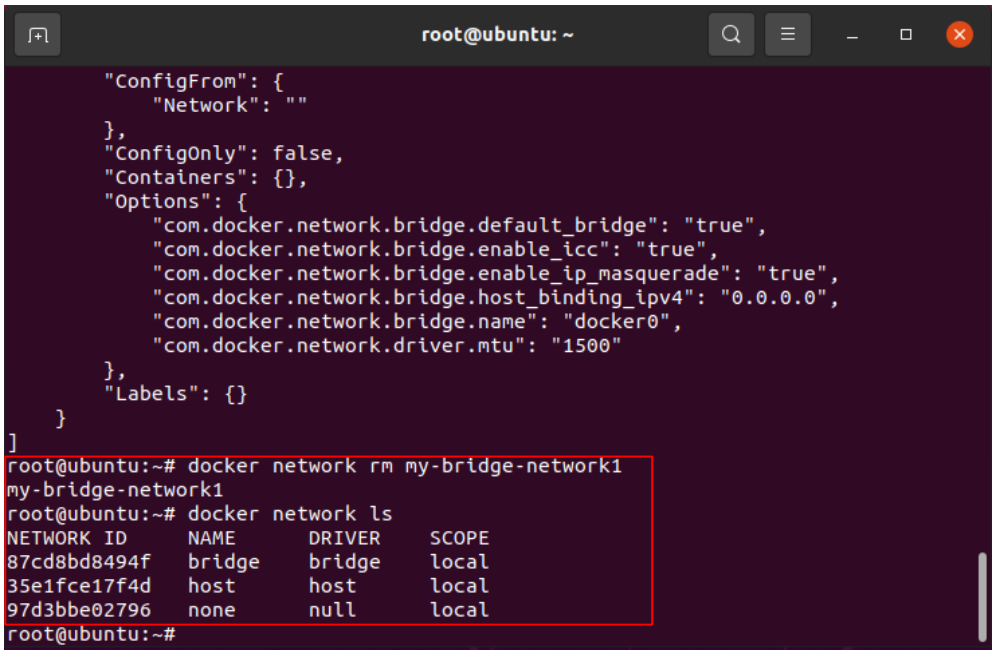
We can inspect the created network with below command
docker network inspect bridge (network name)



Now, lets remove the create network using below command.

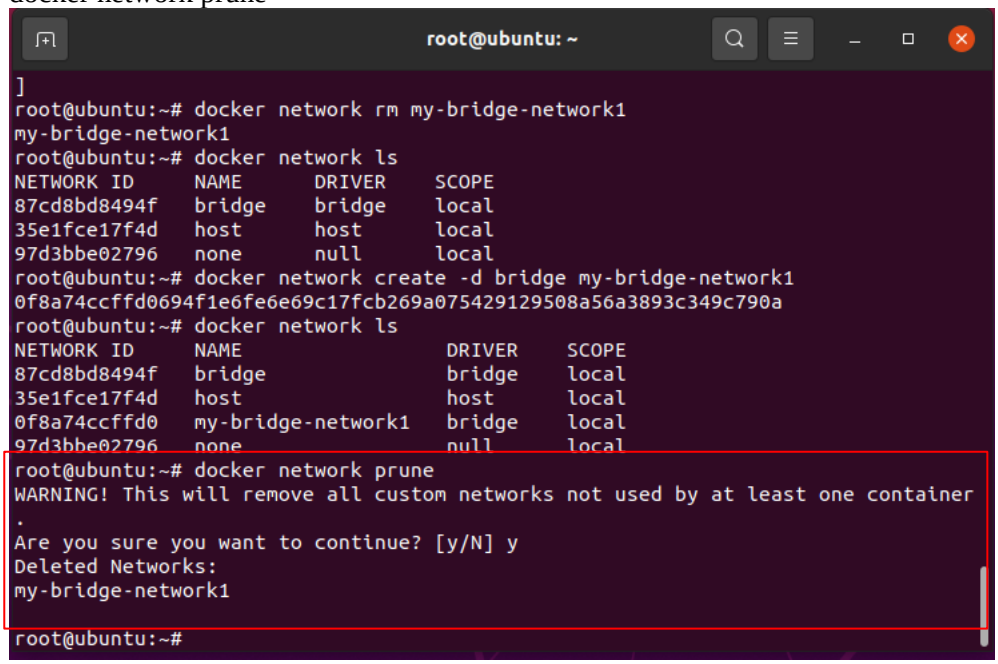
docker network rm network-name

With docker network ls we can see the my-bridge-network1 is delected.



With below command we can delete unused networks

docker network prune



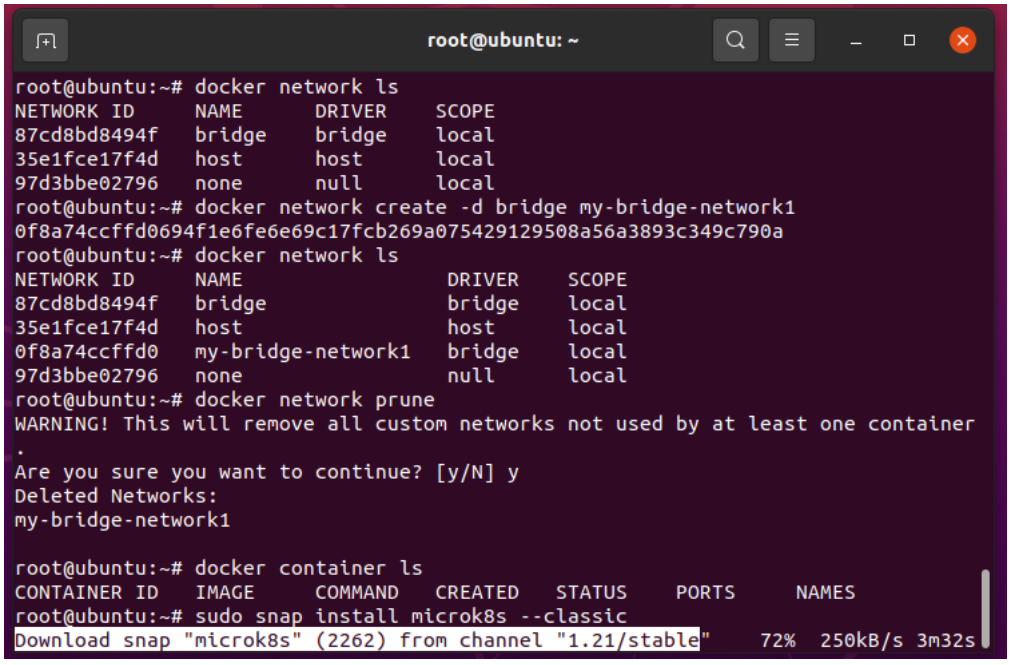
Practical No. 5

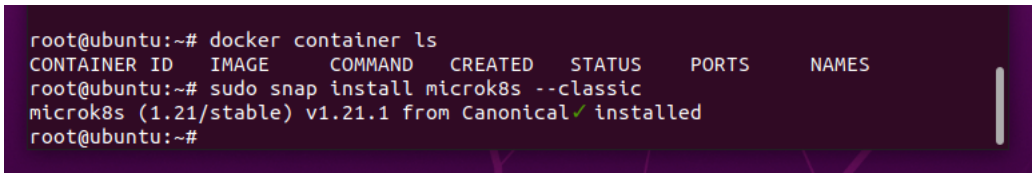
Aim: Working with Kubernetes.

Kubernetes, or k8s, is an open-source platform that automates Linux container operations. It eliminates many of the manual processes involved in deploying and scaling containerized applications. “In other words, you can cluster together groups of hosts running Linux containers, and Kubernetes helps you easily and efficiently manage those clusters.”

Install MicroK8s on Linux

sudo snap install microk8s --classic



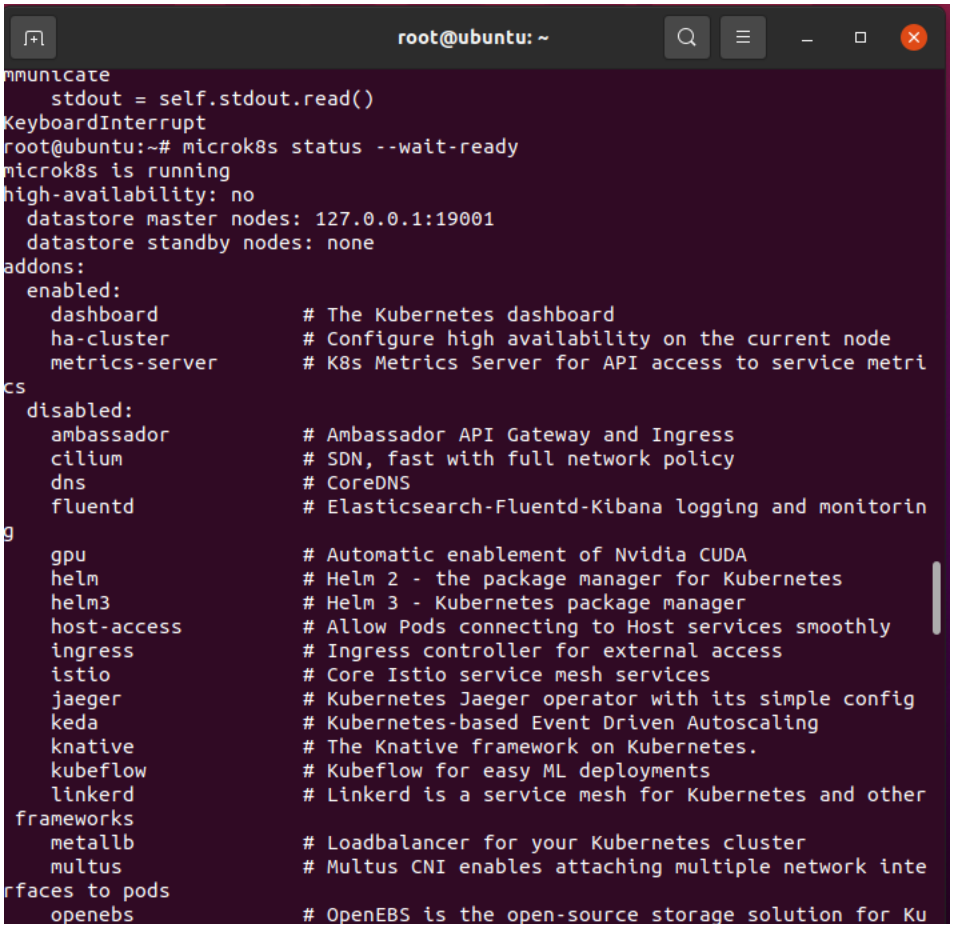


Add your user to the microk8s admin group
MicroK8s creates a group to enable seamless usage of commands which require admin privilege. Use the following commands to join the group:
sudo usermod -a -G microk8s $USER
sudo chown -f -R $USER ~/.kube
su - $USER

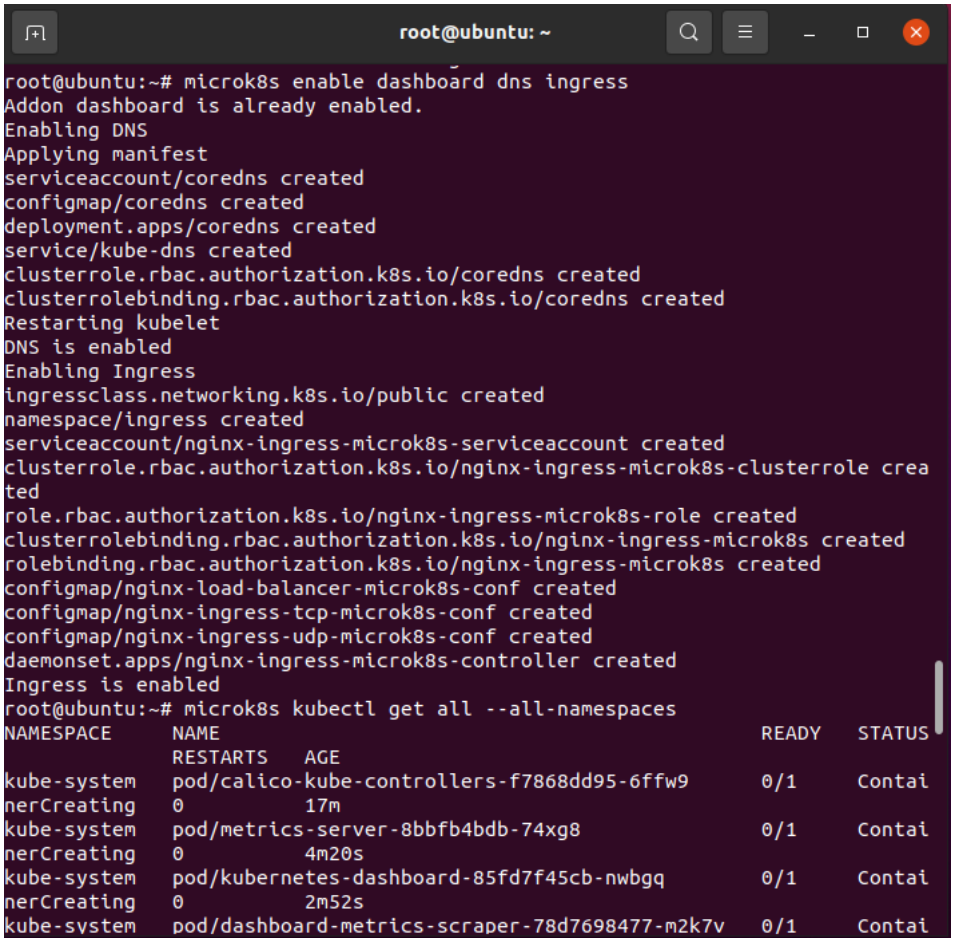
```
root@ubuntu:~# docker container ls
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
root@ubuntu:~# sudo snap install microk8s --classic
microk8s (1.21/stable) v1.21.1 from Canonical✓ installed
root@ubuntu:~# sudo usermod -a -G microk8s $USER
root@ubuntu:~# sudo chown -f -R $USER ~/.kube
root@ubuntu:~# su - $USER
```

Check the status while Kubernetes starts

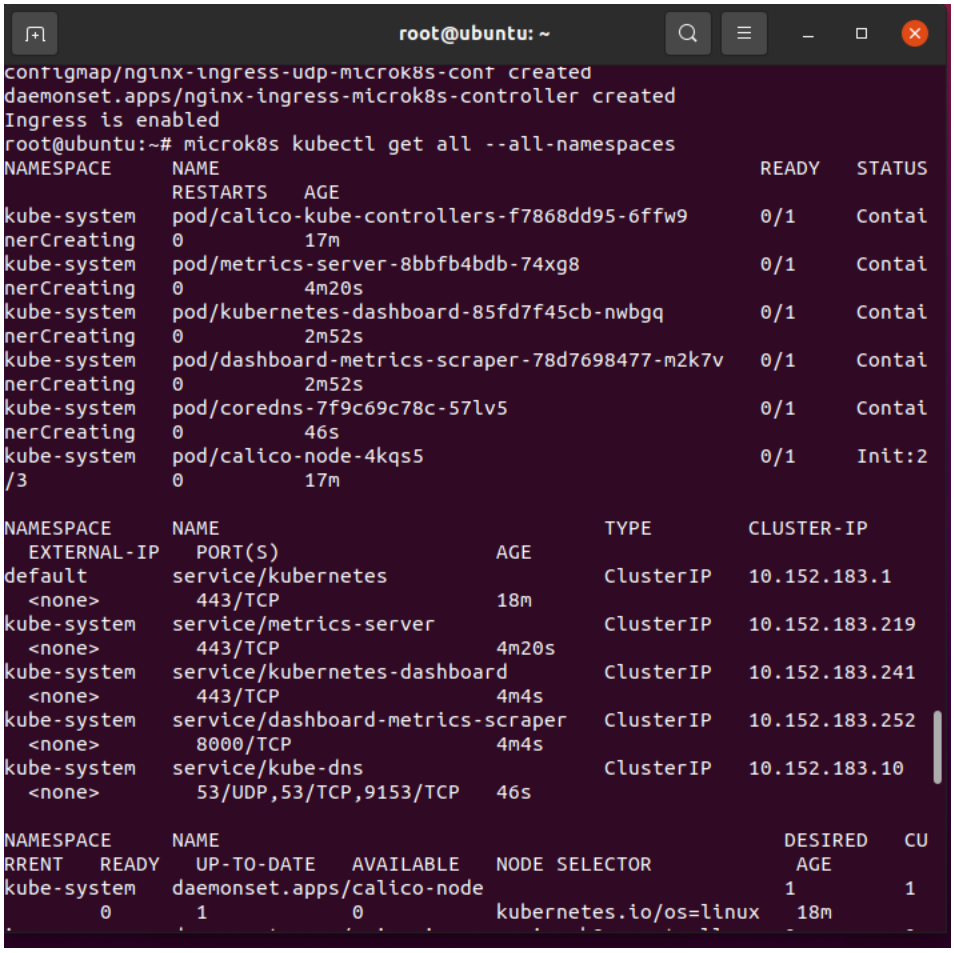
`microk8s status --wait-ready`



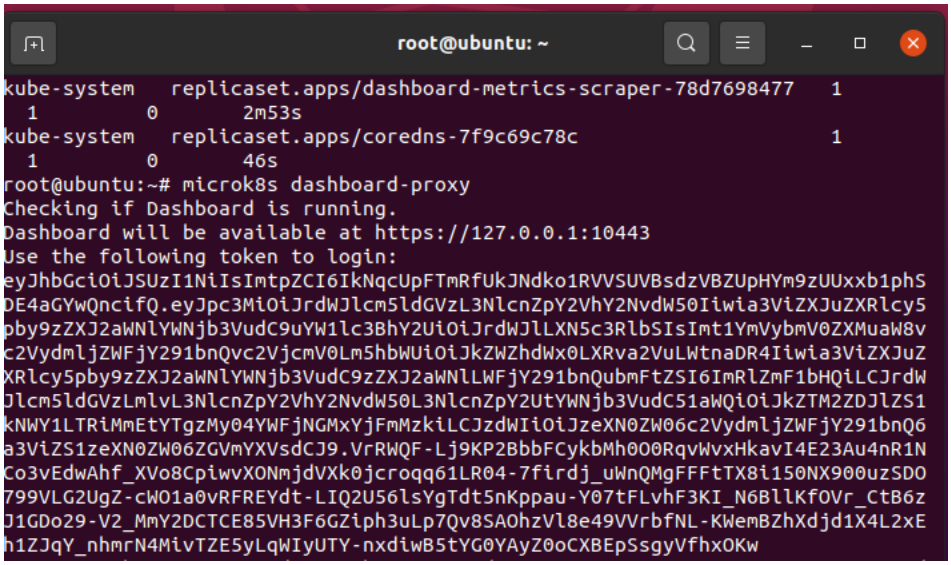
Turn on the services you want
microk8s enable dashboard dns ingress



Start using Kubernetes
microk8s kubectl get all --all-namespaces



Access the Kubernetes dashboard
microk8s dashboard-proxy

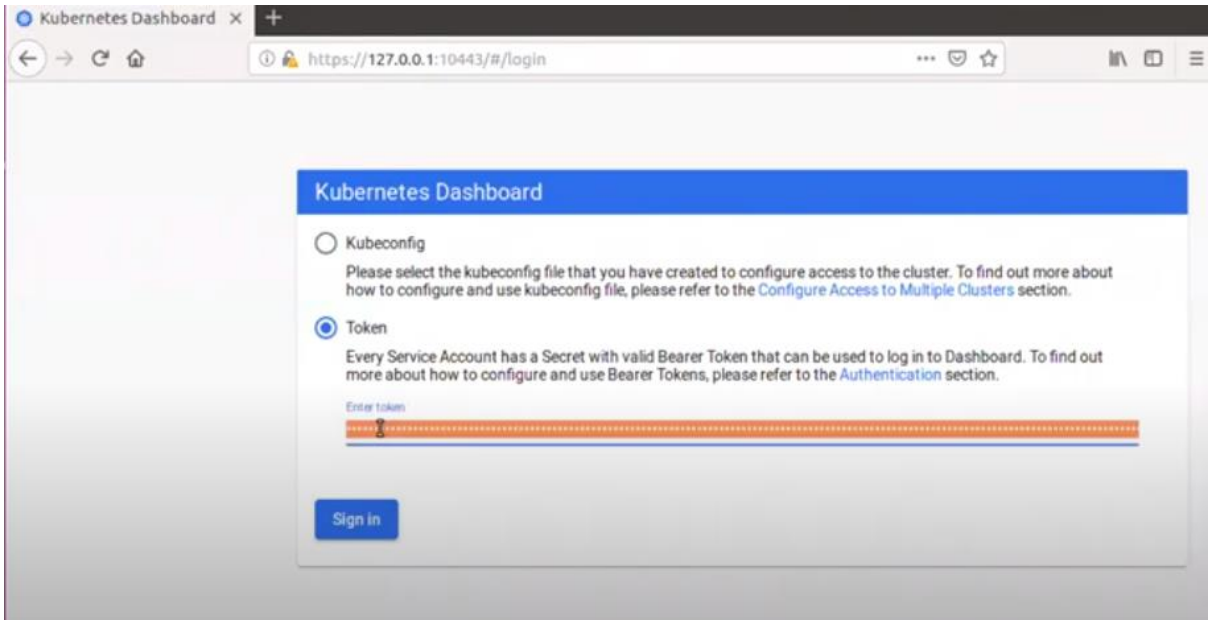


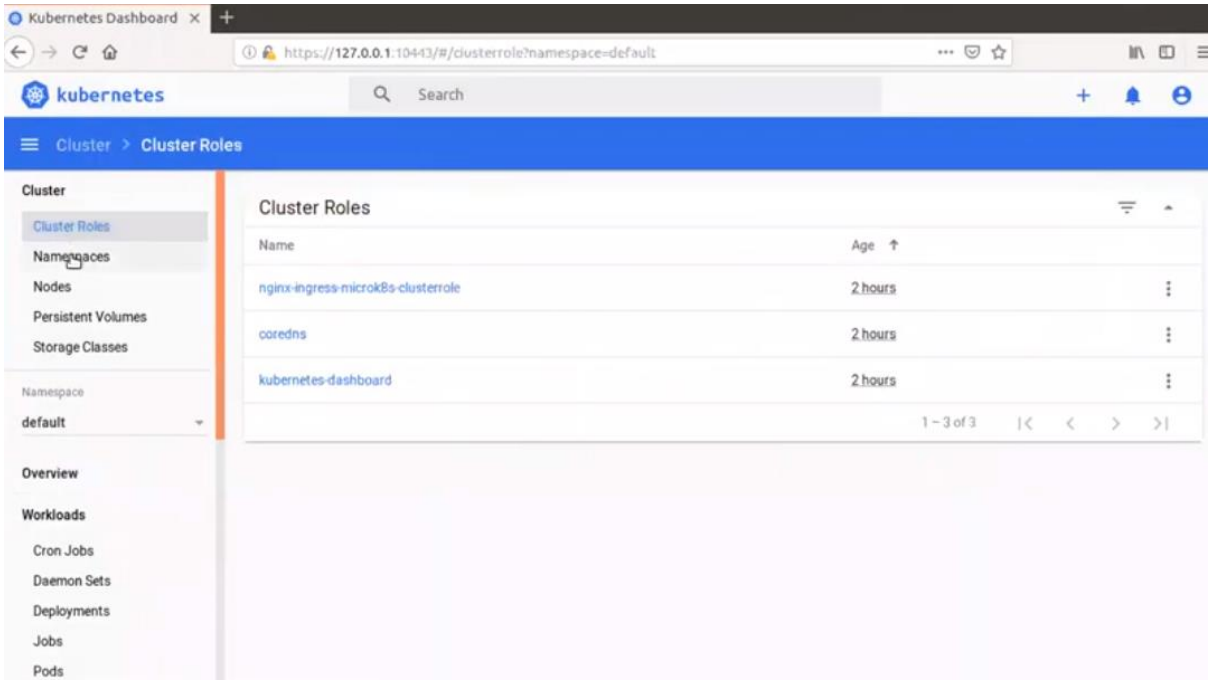
Token for login:

eyJhbGciOiJSUzI1NiIsImtpZCI6IkNqcUpFTmRfUkJNdko1RVVSUVBsdzVBZUpHYm9z
UUxxb1phSDE4aGYwQncifQ.eyJpc3MiOiJrdWJlcm5ldGVzL3NlcnZpY2VhY2NvdW50I
iwia3ViZXJuZXRlcy5pby9zZXJ2aWNlYWNjb3VudC9uYW1lc3BhY2UiOiJrdWJlLXN5c
3RlbSIsImt1YmVybmV0ZXMuaW8vc2VydmljZWFjY291bnQvc2VjcmV0Lm5hbWUiOiJkZ

WZhdWx0LXRva2VuLWtnaDR4Iiwia3ViZXJuZXRlcy5pby9zZXJ2aWNlYWNjb3VudC9zZXJ2aWNlLWFjY291bnQubmFtZSI6ImRlZmF1bHQiLCJrdWJlcm5ldGVzLmlvL3NlcnZpY2VhY2NvdW50L3NlcnZpY2UtYWNjb3VudC51aWQiOiJkZTM2ZDJlZS1kNWY1LTRiMmEtYTgzMy04YWFjNGMxYjFmMzkiLCJzdWIiOiJzeXN0ZW06c2VydmljZWFjY291bnQ6a3ViZS1zeXN0ZW06ZGVmYXVsdCJ9.VrRWQF-Lj9KP2BbbFCykbMh0O0RqvWvxHkavI4E23Au4nR1NCo3vEdwAhf_XVo8CpiwvXONmjdVXk0jcroqq61LR04-7firdj_uWnQMgFFFtTX8i150NX900uzSDO799VLG2UgZ-cWO1a0vRFREYdt-LIQ2U56lsYgTdt5nKppau-Y07tFLvhF3KI_N6BllKfOVr_CtB6zJ1GDo29-V2_MmY2DCTCE85VH3F6GZiph3uLp7Qv8SAOhzVl8e49VVrbfNL-KWemBZhXdjd1X4L2xEh1ZJqY_nhmrN4MivTZE5yLqWIyUTY-nxdiwB5tYG0YAyZ0oCXBEpSsgyVfhxOKw

Sign in with token:




Kubernetes Dashboard
https://127.0.0.1:10443/#/clusterrole?namespace=default
kubernetes
Search
Cluster > Cluster Roles
Cluster
Cluster Roles
Namespaces
Nodes
Persistent Volumes
Storage Classes
Namespace
default
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Cluster Roles
Name
Age
nginx-ingress-microk8s-clusterrole
2 hours
coredns
2 hours
kubernetes-dashboard
2 hours
1 – 3 of 3