Selenium Docker

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What is Docker ?

Docker is nothing but a virtual machine packed in containers, we use the docker to run our selenium Grid. Docker server as a Virtual machine with a specific product like Unit with Chrome or firefox.

Most of the Companies use the docker to create their own applications just like firefox inside a container. Docker is worth a thing for cross browser testing, instead of paying more money to cloud-based companies it is better to use the Docker.

I know there is too much of explanation for Docker but this much is enough for our automation and for all.

FYi : I am using Win10 operating system for this tutorial because i have only one laptop, silly.

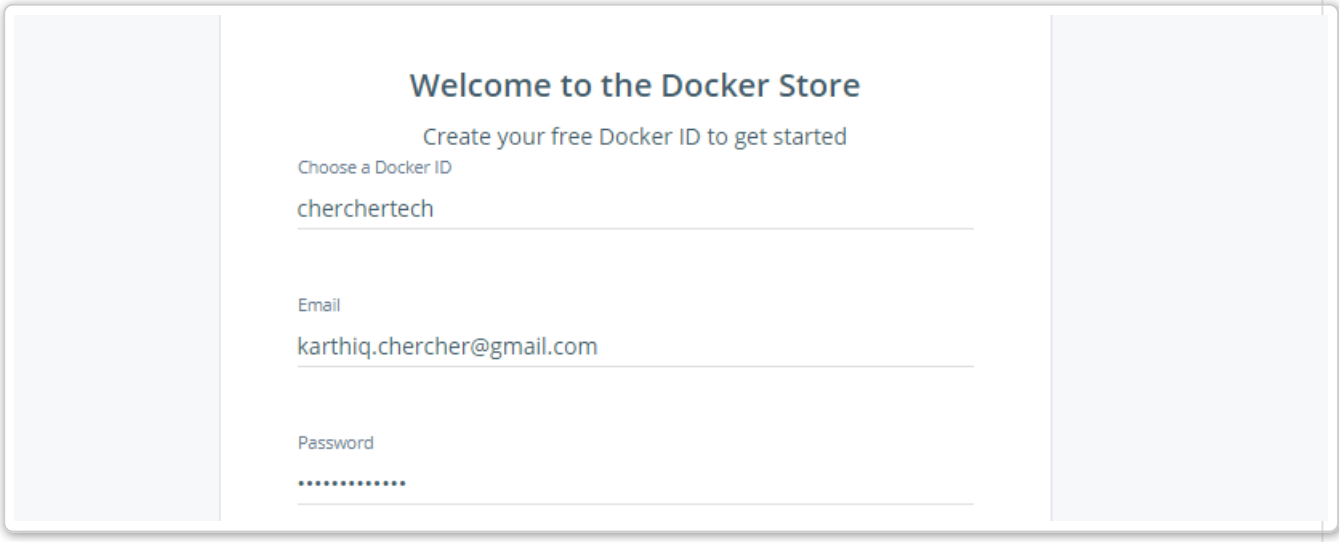
Install Docker for selenium

Open the Docker url : ***https://www.docker.com/products/docker-desktop***

Download the docker according to your Operating System

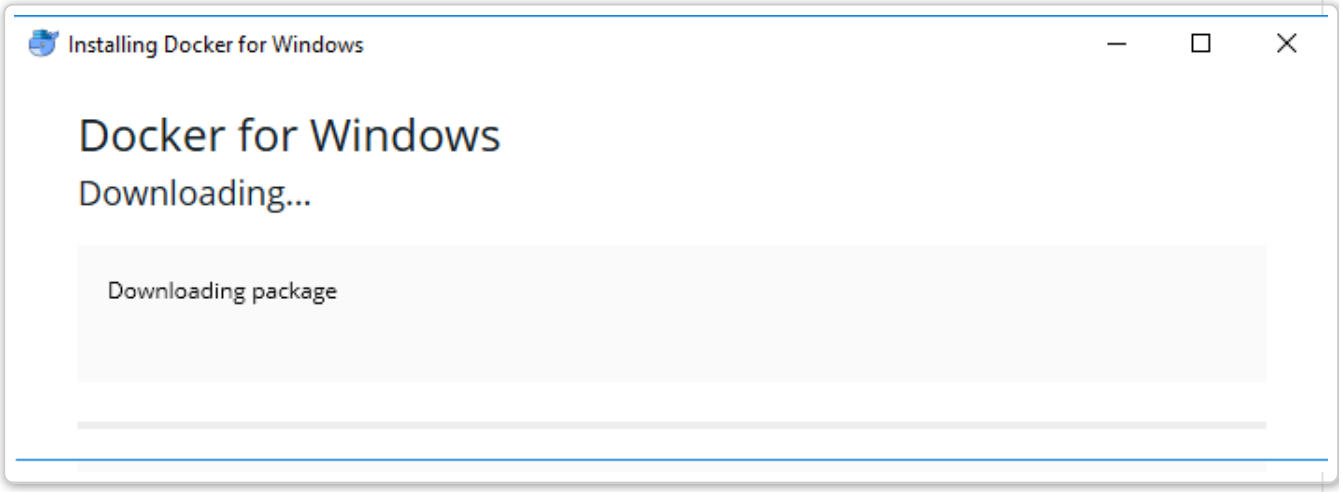
If you are using the docker for the first time then you need to sign-up and download the Docker, it is free

Fill your details on sign up page and verify the confirmation message

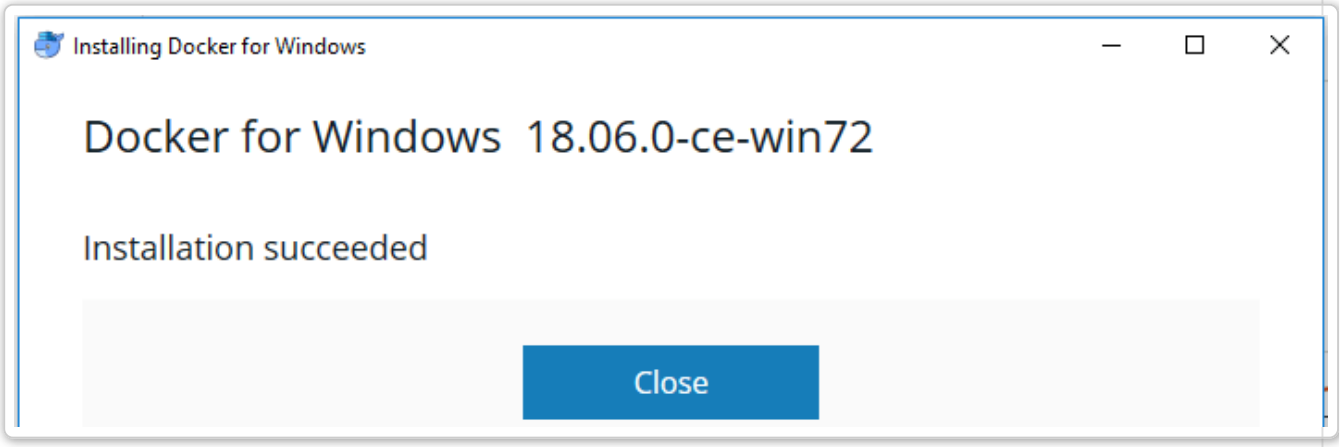


Click on Get docker and wait for sometime to get the Docker to be downloaded

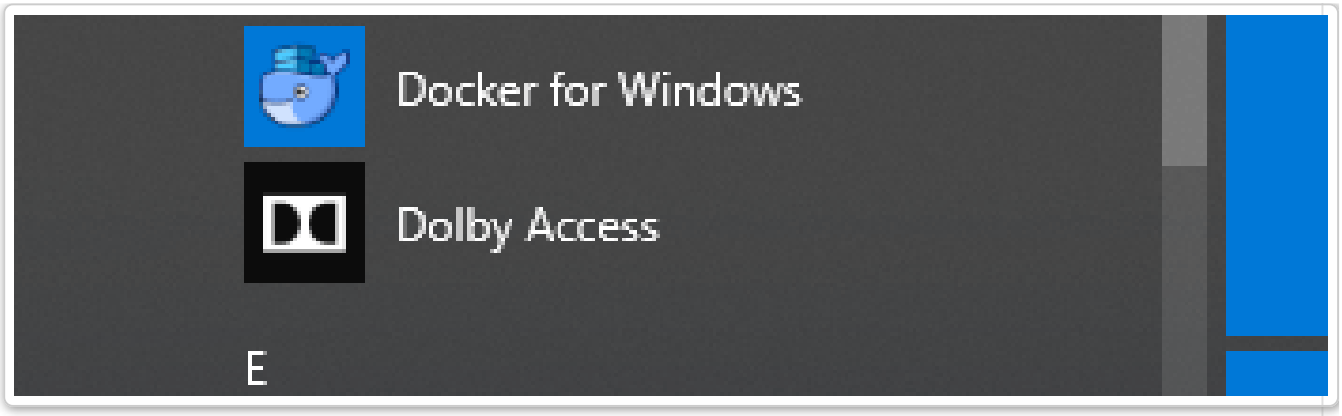
After downloading Open the docker exe file, it may again download few more packages



You may see below image if docker exe is installed successfully



*Press Start Icon/ win key and select **Docker for Windows** Option*



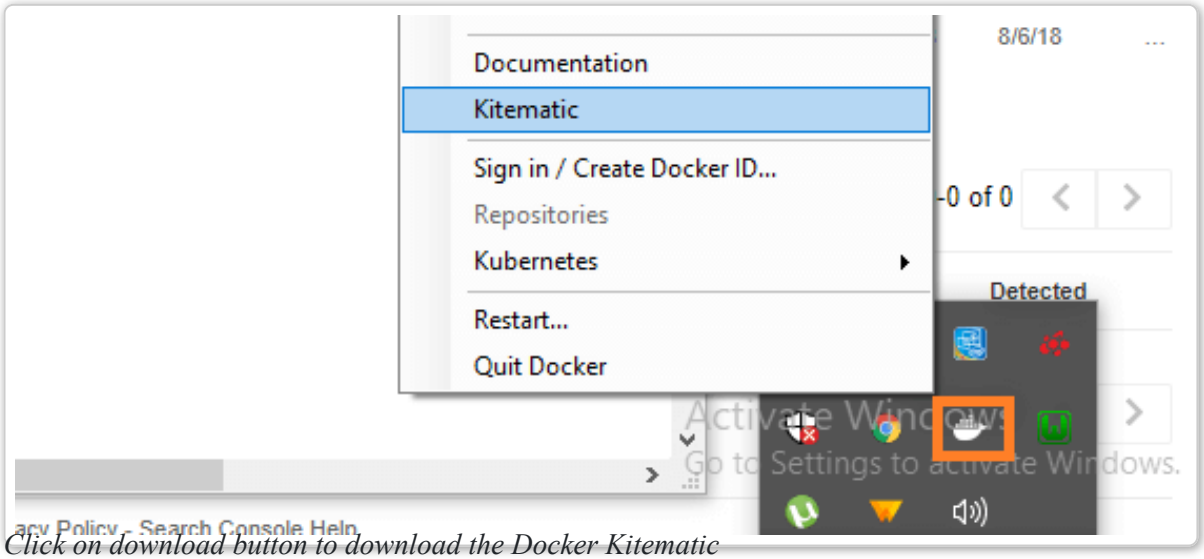
Install Kitematic with Docker aka Docker UI

Kitematic provides the UI for the Docker, When you download docker it will be like a cli/cmd terminal, so let's download it.

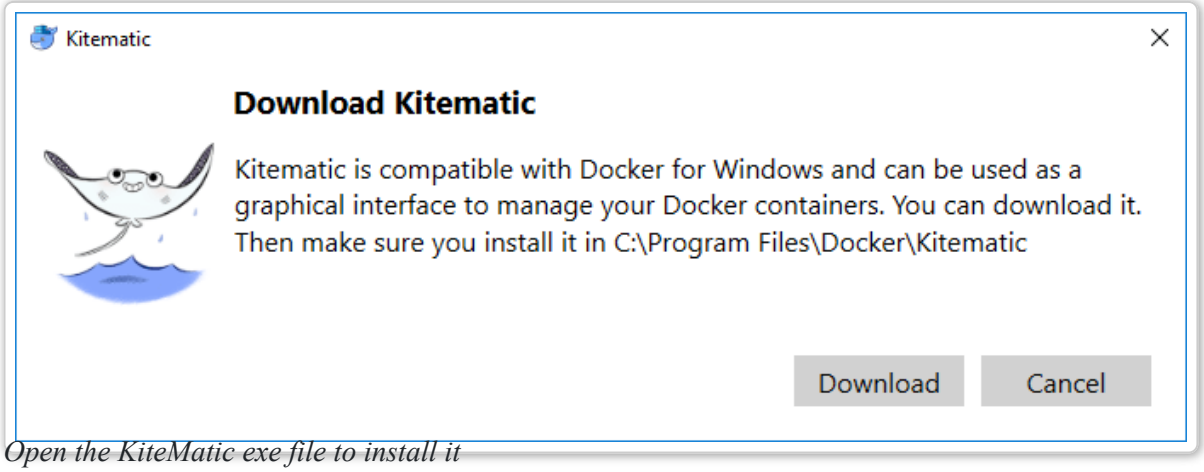
But sometimes this KiteMatic may not work during those time please do use the Docker cli or Command prompt to install things.

Go to Dock of the right bottom side in windows operation system, you may find Triangle click it.

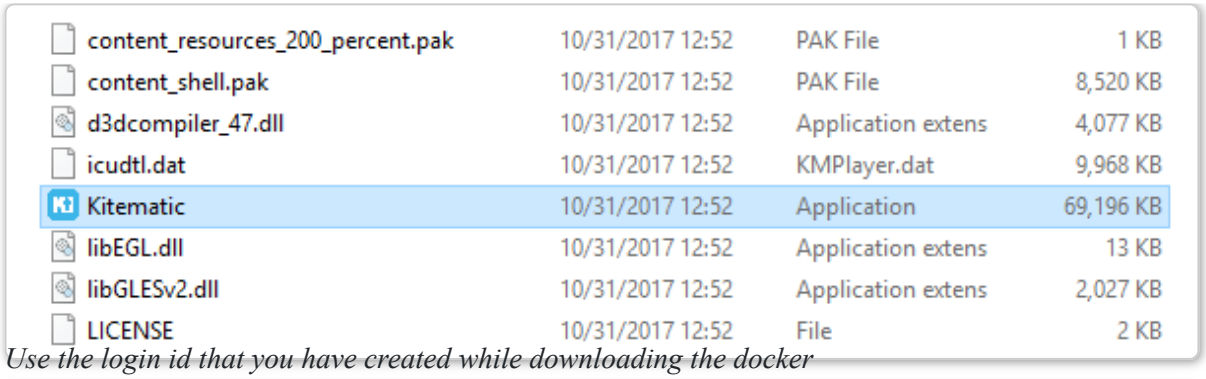
Now you can see Docker icon, do right click on it and select Kitematic



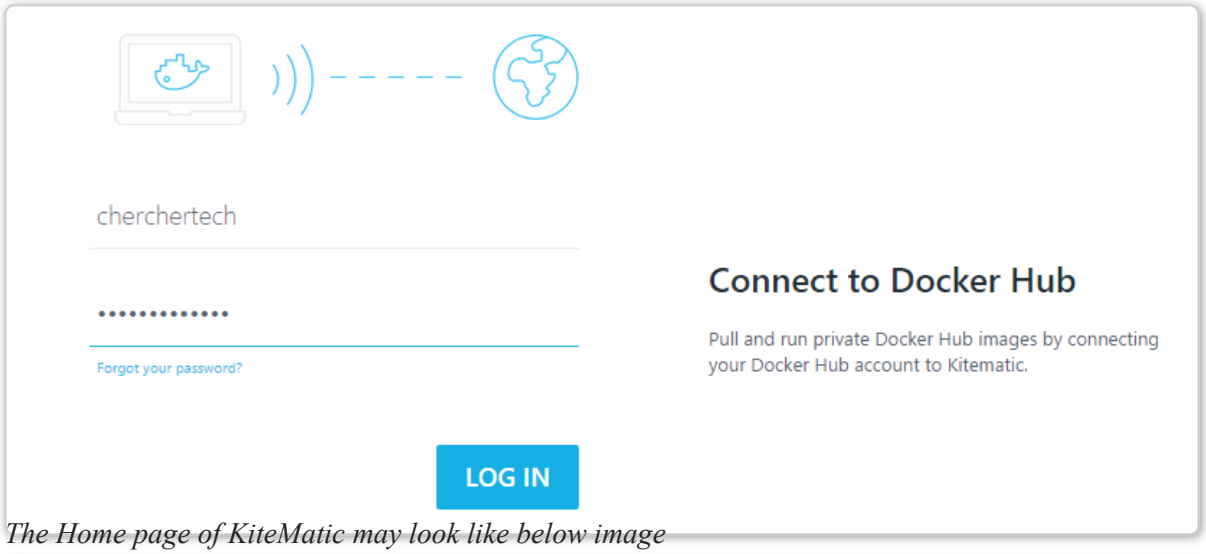
Click on download button to download the Docker Kitematic



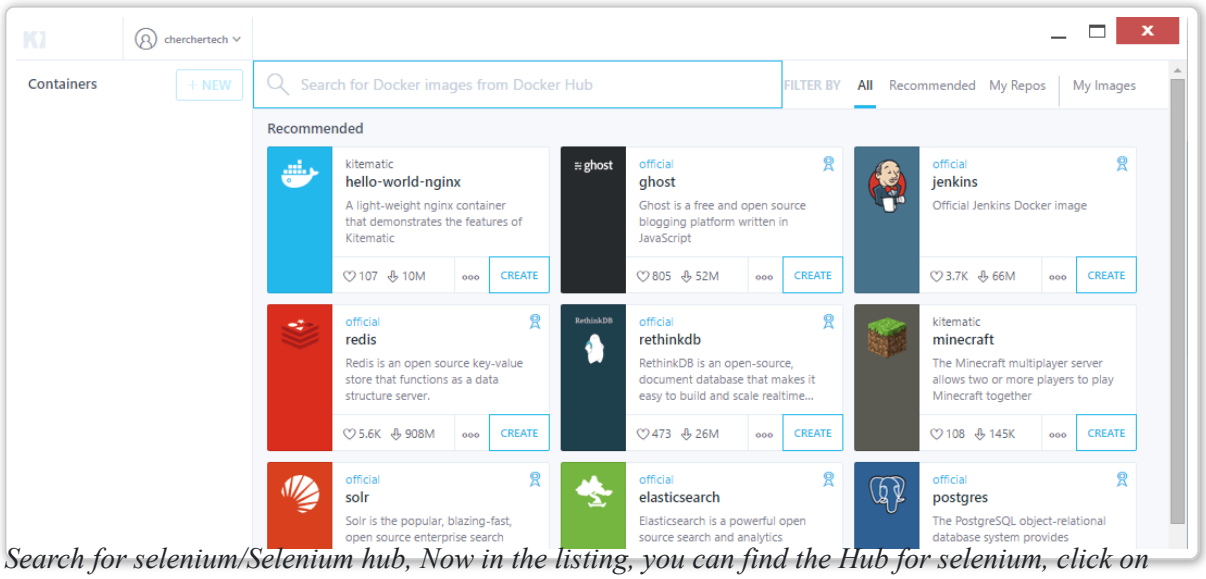
Open the KiteMatic exe file to install it



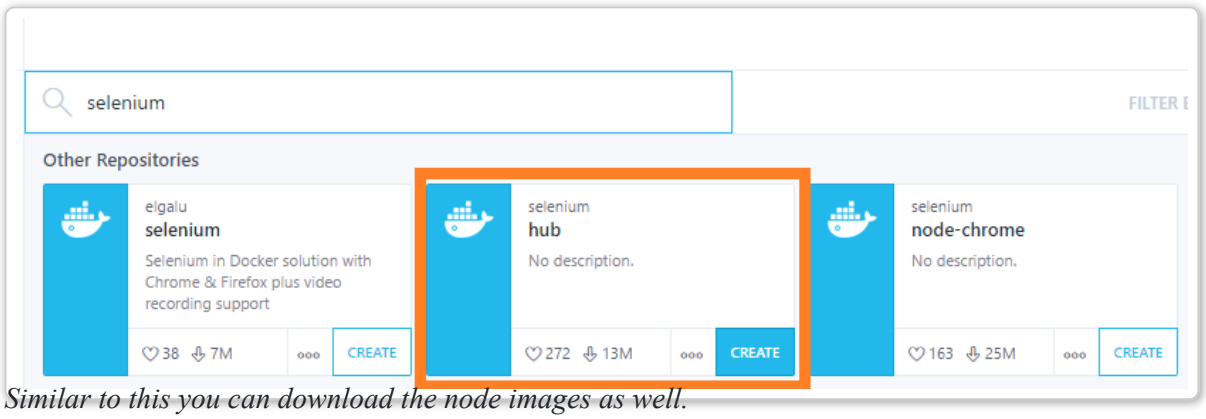
Use the login id that you have created while downloading the docker



The Home page of KiteMatic may look like below image



Search for selenium/Selenium hub, Now in the listing, you can find the Hub for selenium, click on create to download it



Similar to this you can download the node images as well.

Docker repository with CLi/Command Prompt for selenium

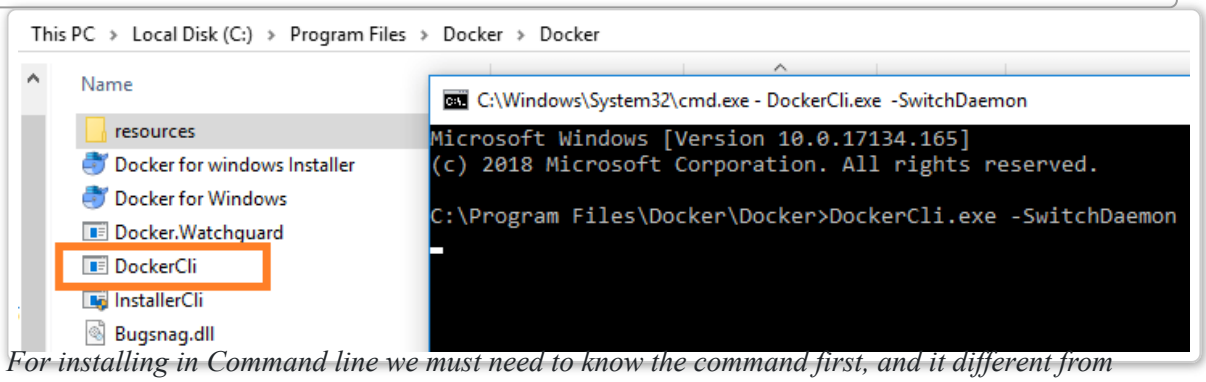
Sometimes, you might face issue with the installation of the image in Kitematic UI, and same issues you will face with Cli/Cmd as well

First and for most thing about Docker is, docker is mainly used with Linux, So We have to switch to Windows mode.

To switch to Windows mode, Navigate to the folder where you have installed your docker using CMD/Terminal, Now if you are able to see the DockerCli file the type the below command in the CMD to switch to windows/or to other operating systems.

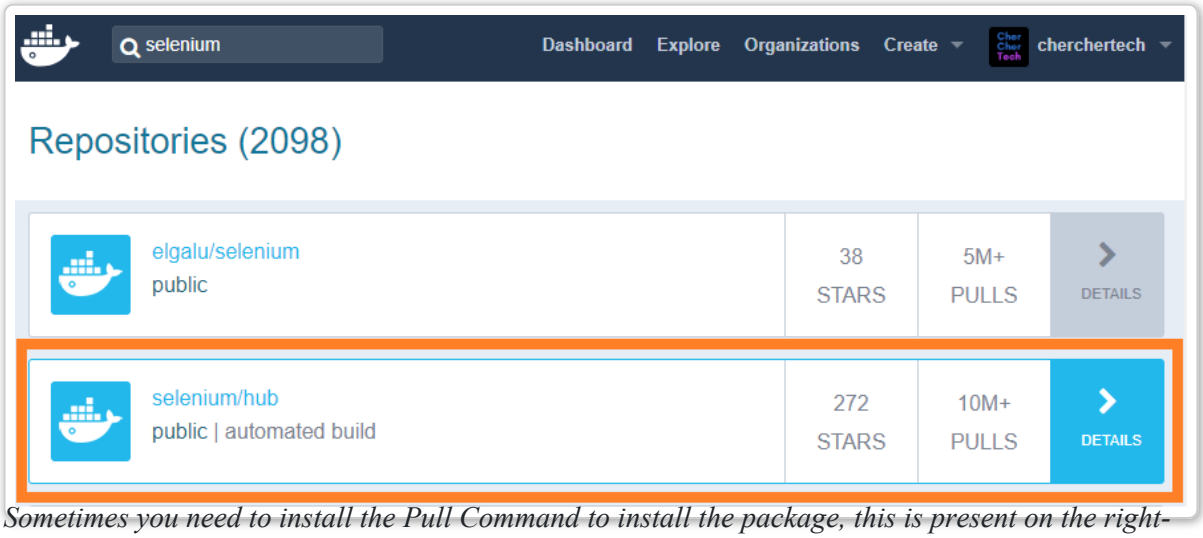
It's not like with one switch you will be able to go windows, it is trial and error switch and try to install, it goes till you are able to install.

```
DockerCli.exe -SwitchDaemon
```

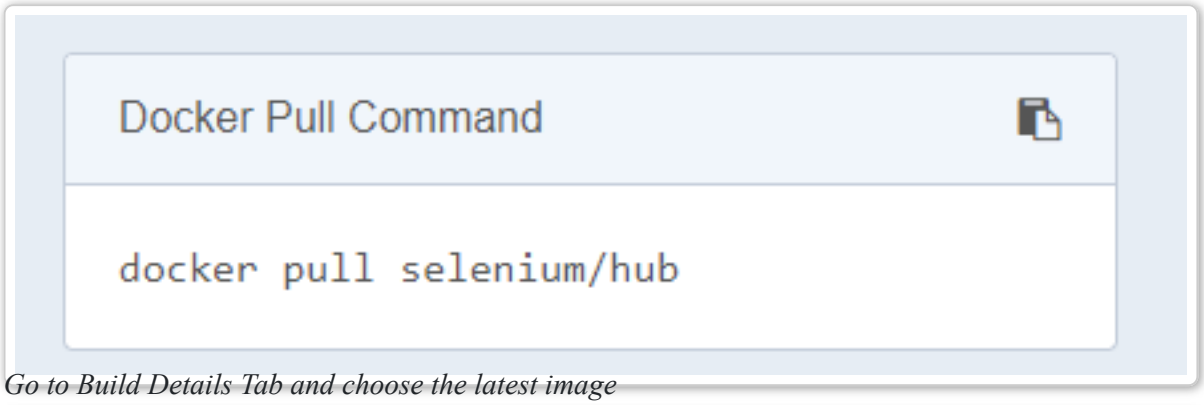


For installing in Command line we must need to know the command first, and it different from image to image.

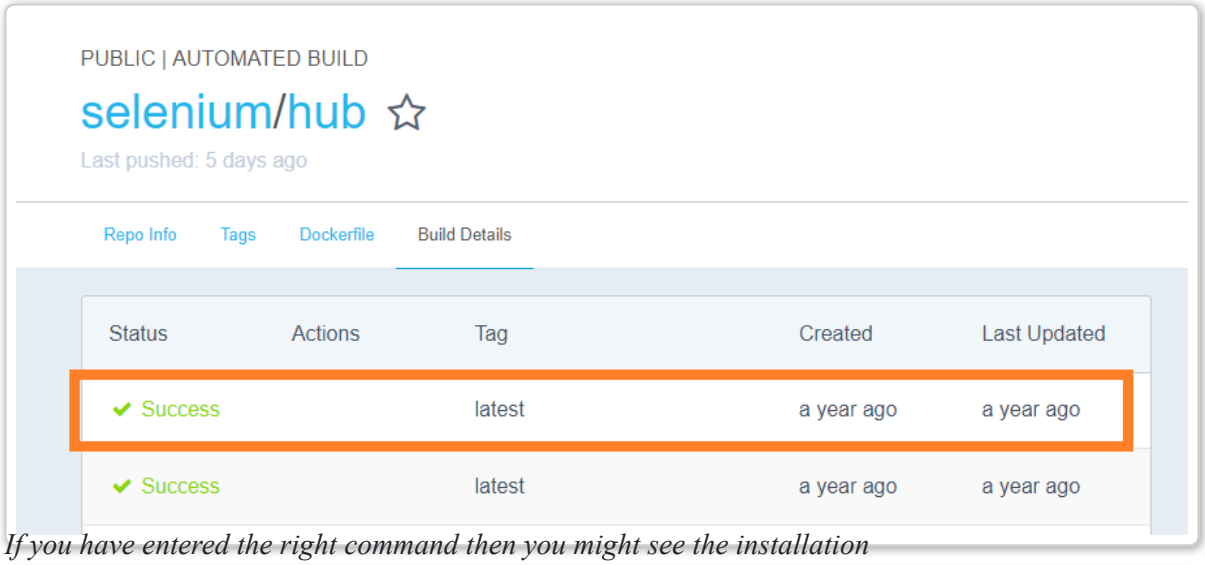
*Navigate to : **https://hub.docker.com/** and search for selenium and click the highlighted item*



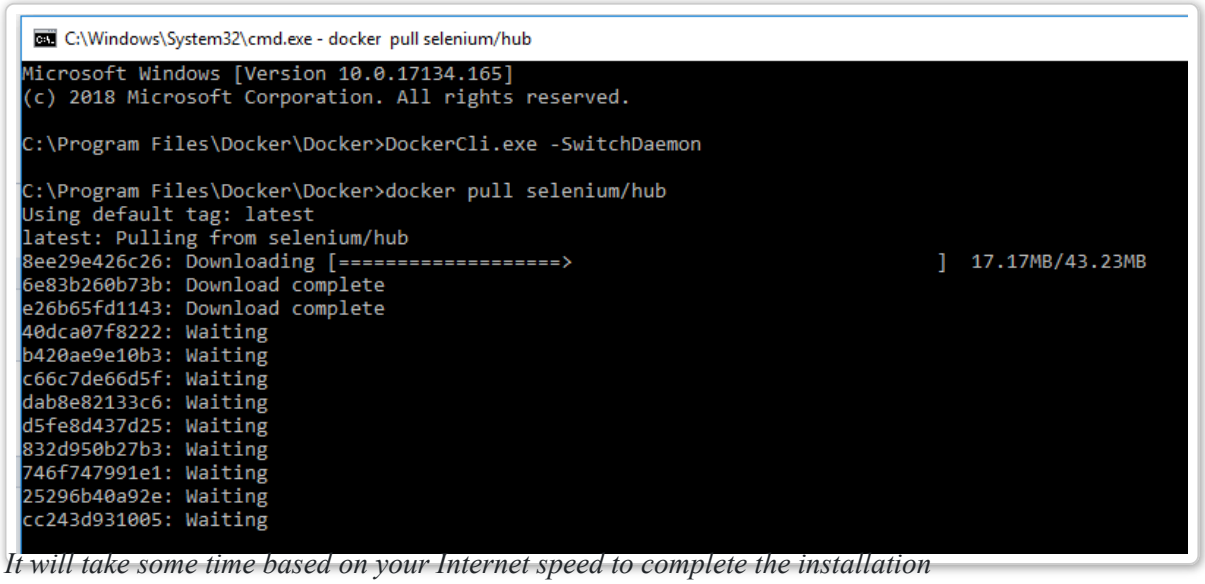
Sometimes you need to install the Pull Command to install the package, this is present on the right-hand side



Go to Build Details Tab and choose the latest image



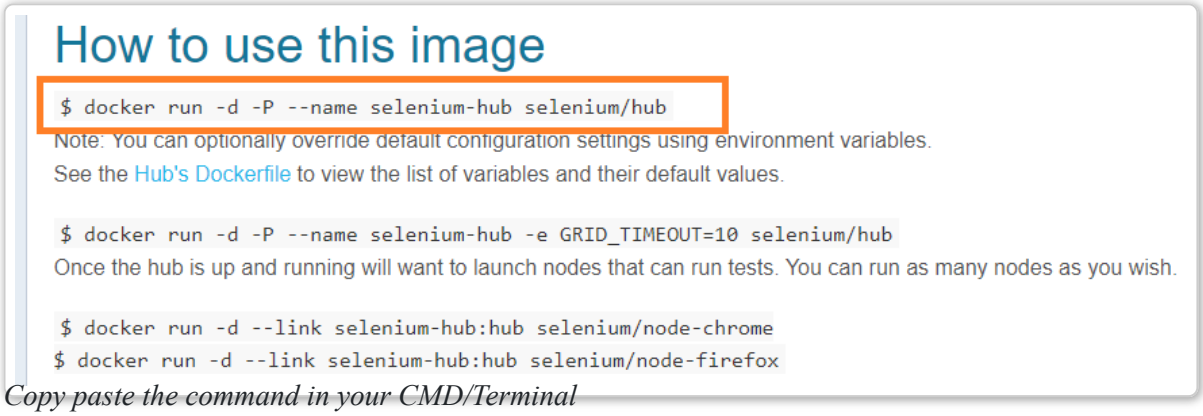
If you have entered the right command then you might see the installation



It will take some time based on your Internet speed to complete the installation

```
Select C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.17134.165]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Program Files\Docker\Docker>DockerCli.exe -SwitchDaemon

C:\Program Files\Docker\Docker>docker pull selenium/hub
Using default tag: latest
latest: Pulling from selenium/hub
8ee29e426c26: Pull complete
6e83b260b73b: Pull complete
e26b65fd1143: Pull complete
40dca07f8222: Pull complete
b420ae9e10b3: Pull complete
c66c7de66d5f: Pull complete
dab8e82133c6: Pull complete
d5fe8d437d25: Pull complete
832d950b27b3: Pull complete
746f747991e1: Pull complete
25296b40a92e: Pull complete
cc243d931005: Pull complete
Digest: sha256:352cb961fc5ab51c3abbd4887bfb5b2b32895eb11efa1ebdbb0f7a65c6c716ff
Status: Downloaded newer image for selenium/hub:latest

C:\Program Files\Docker\Docker>
```

Use the highlighted command to install the Hub



Copy paste the command in your CMD/Terminal

```
docker run -d -P --name selenium-hub selenium/hub
```

```
Command Prompt

C:\Users\user>docker run -d -P --name selenium-hub selenium/hub
```

Above command will start the Hub service

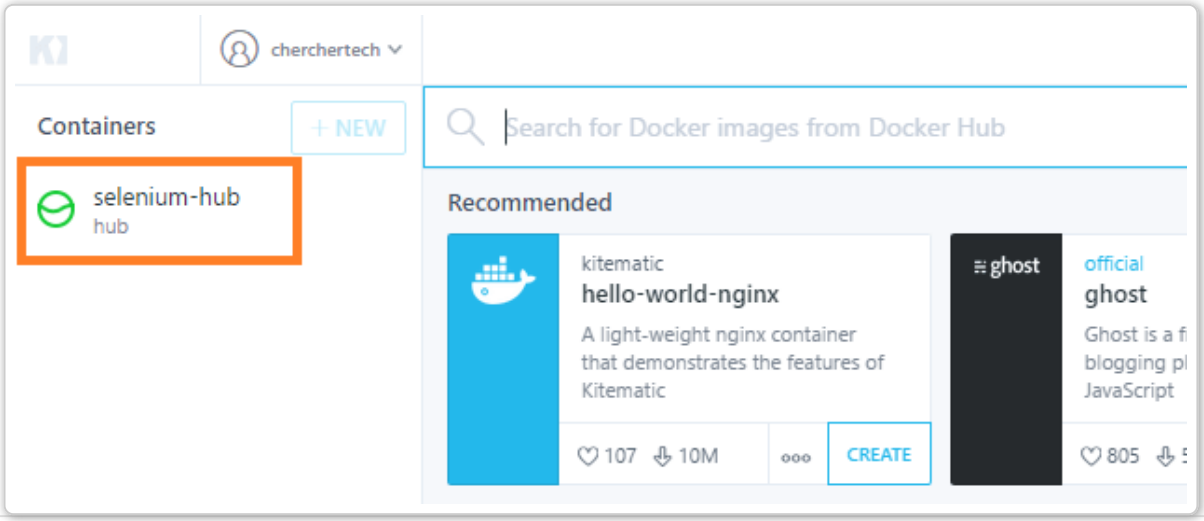
```
C:\Program Files\Docker\Docker>docker run -d -P --name selenium-hub selenium/hub
082eba803ef5a5b7680a91d5208b201f00629393aabc4b78ac1eea643d45d574
```

Use ps command to check the service which are up

```
docker ps
```

```
C:\Windows\System32\cmd.exe

C:\Program Files\Docker\Docker>docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS
                    NAMES
082eba803ef5        selenium/hub        "/opt/bin/entry_poin…"   7 minutes ago       Up 7 minutes        0.0.0.0:32768->
4444/tcp   selenium-hub

C:\Program Files\Docker\Docker>
```

You can also check the Images which are running in the KiteMatic UI as well, you can view them on the left side



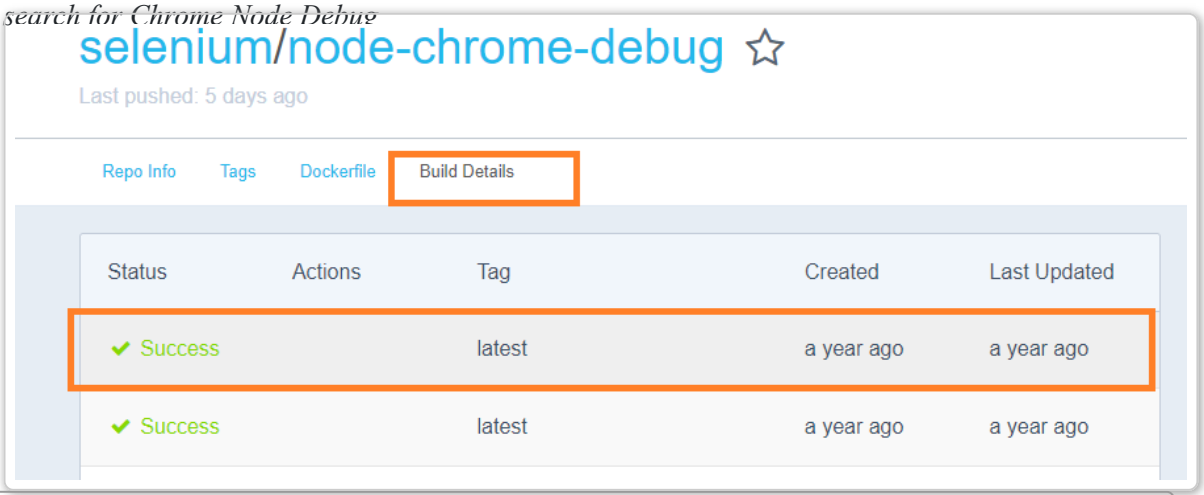
Selenium Node Installation in Docker for selenium

Yes, you can install the node just like a hub but there are two kind of nodes, which one to chose.

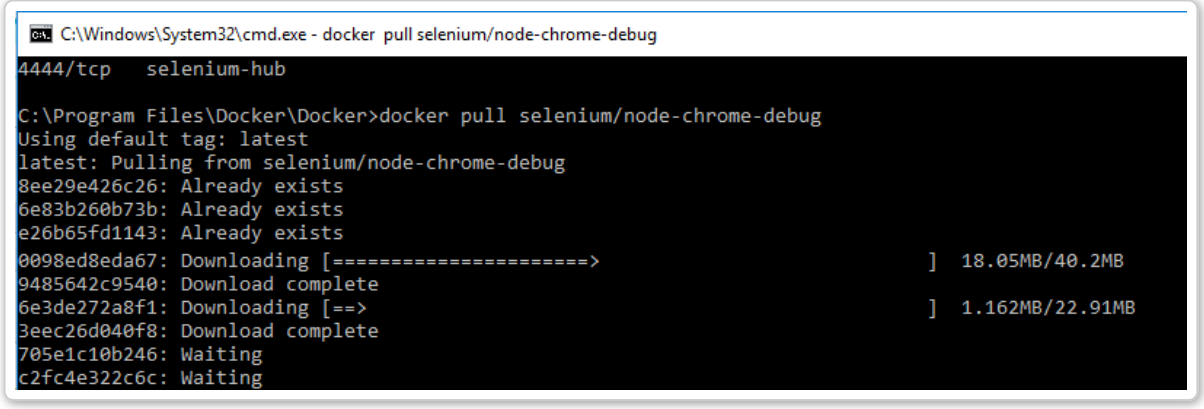
Chrome-Node : *Chrome node does not provide any UI to view the execution of the program*

Chrome-Node-Debug : *Chrome Node Debug provides a UI to see the execution of the program*

For this tutorial purpose I would be using the Chrome with UI, i.e ***Chrome-Node-Debug****, so search for Chrome Node Debug*



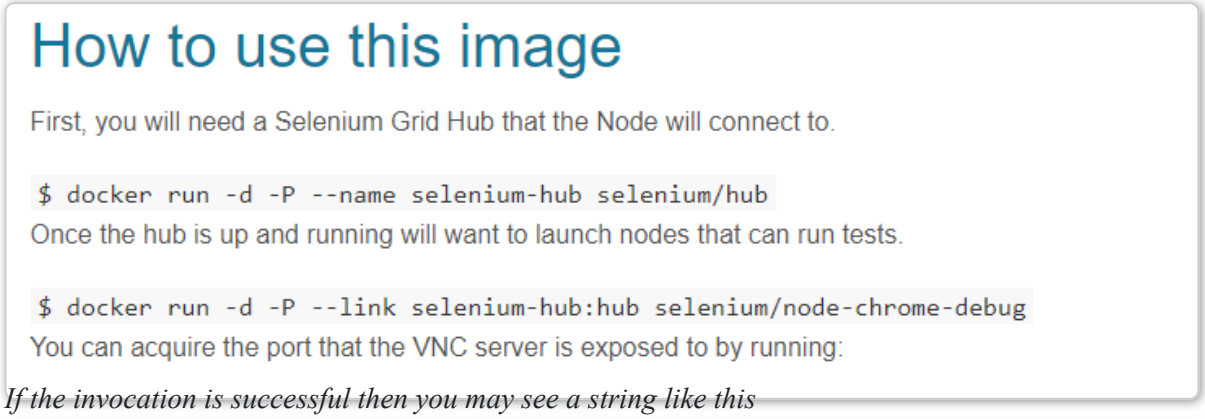

```
docker run -d -P --link selenium-hub:hub selenium/node-chrome-debug
```



You can use the same command to check whether it got installed or not.

```
C:\Program Files\Docker\Docker>docker pull selenium/node-chrome-debug
Using default tag: latest
latest: Pulling from selenium/node-chrome-debug
Digest: sha256:fa07b5fa04005df0756f2a6d57424342f198f1a66600fe6de11b1ccaa71557e0
Status: Image is up to date for selenium/node-chrome-debug:latest
```

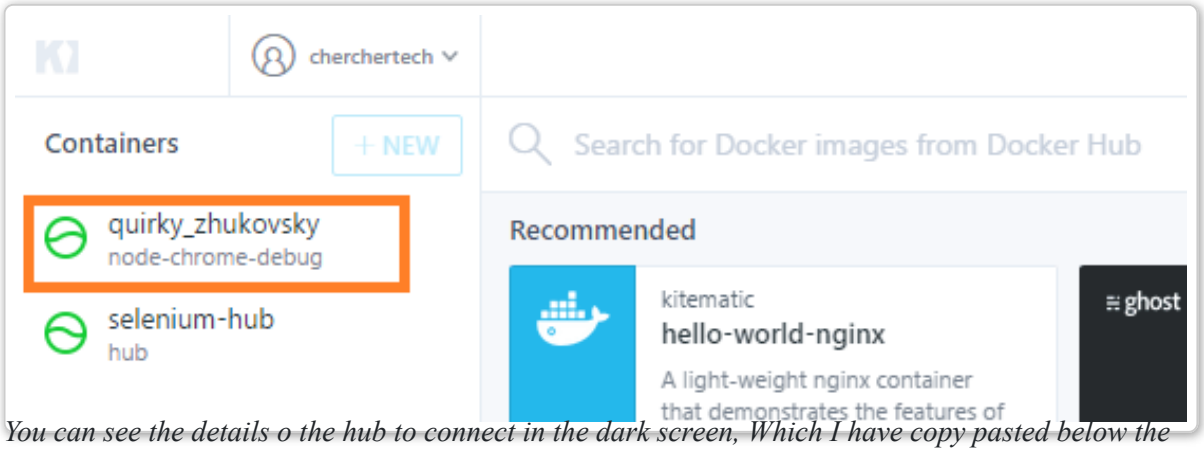
You view the command to Invoke the Chrome Node Debug by navigating to 'How to use this section'



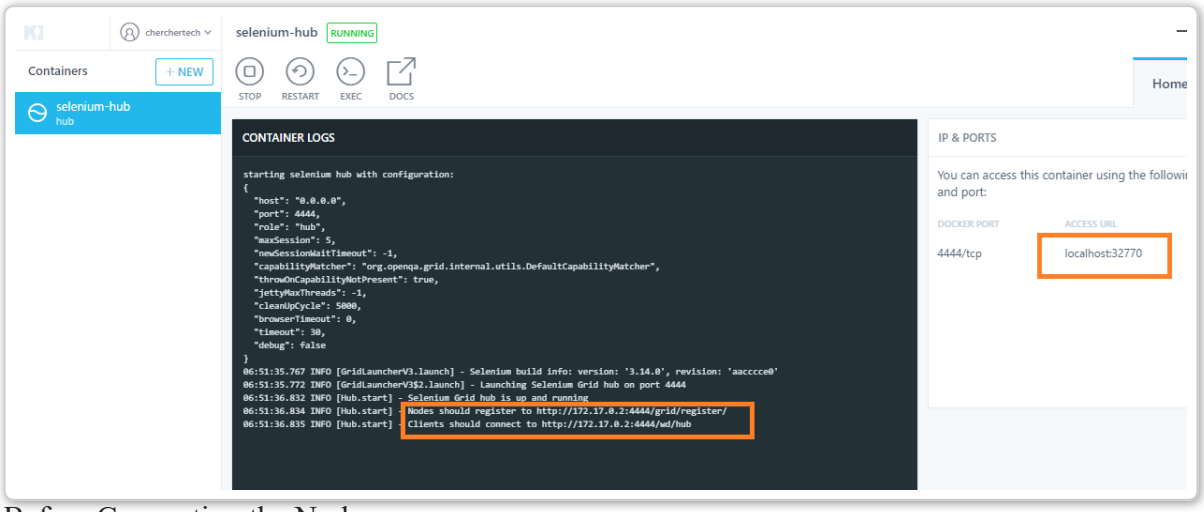
If the invocation is successful then you may see a string like this

```
C:\Windows\System32\cmd.exe

C:\Program Files\Docker\Docker>docker run -d -P --link selenium-hub:hub selenium/node-chrome-debug
b466b0286d2f7bc2842433f83420da40f76888516ab208ad7db5264afb368e24

C:\Program Files\Docker\Docker>
```

You can see the Running node in the KiteMatic UI, the name of the node changes each time



You can see the details o the hub to connect in the dark screen, Which I have copy pasted below the image



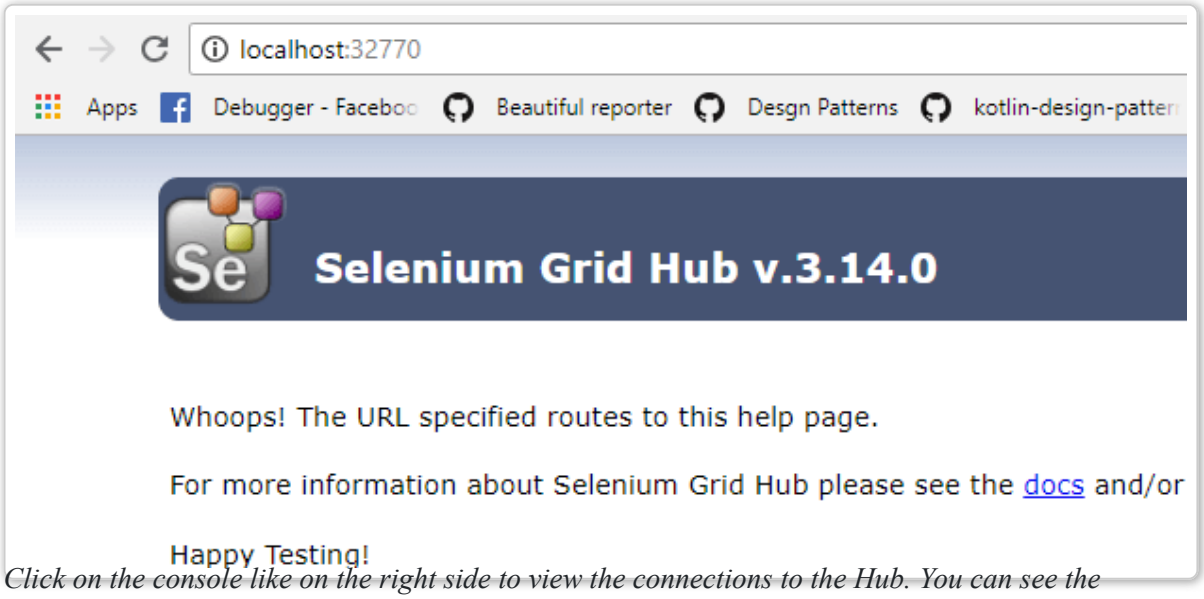
Before Connecting the Node

```
[Hub.start] - Nodes should register to http://172.17.0.2:4444/grid/register/
[Hub.start] - Clients should connect to http://172.17.0.2:4444/wd/hub
```

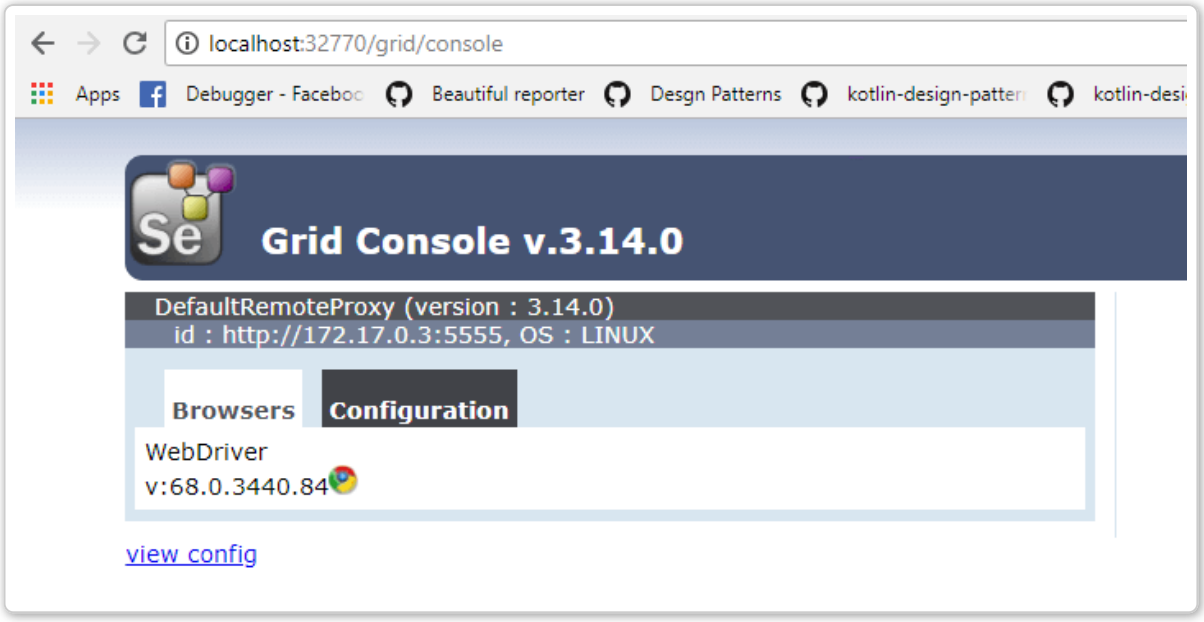
After Connecting the Node

```
# after node installation
[Hub.start] - Nodes should register to http://172.17.0.2:4444/grid/register/
[Hub.start] - Clients should connect to http://172.17.0.2:4444/wd/hub
[DefaultGridRegistry.add] - Registered a node http://172.17.0.3:5555
```

To confirm the Node Connection, do visit to the given detail, the post number you can see by click on the HUB



Click on the console like on the right side to view the connections to the Hub. You can see the details like what the nodes connected and what browsers are connected

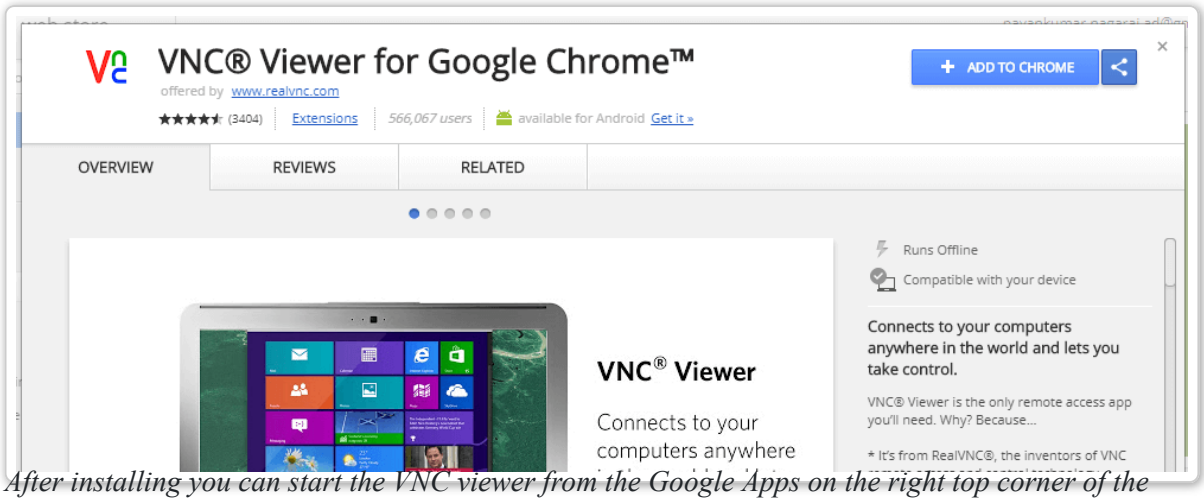


VNC Viewer for Docker

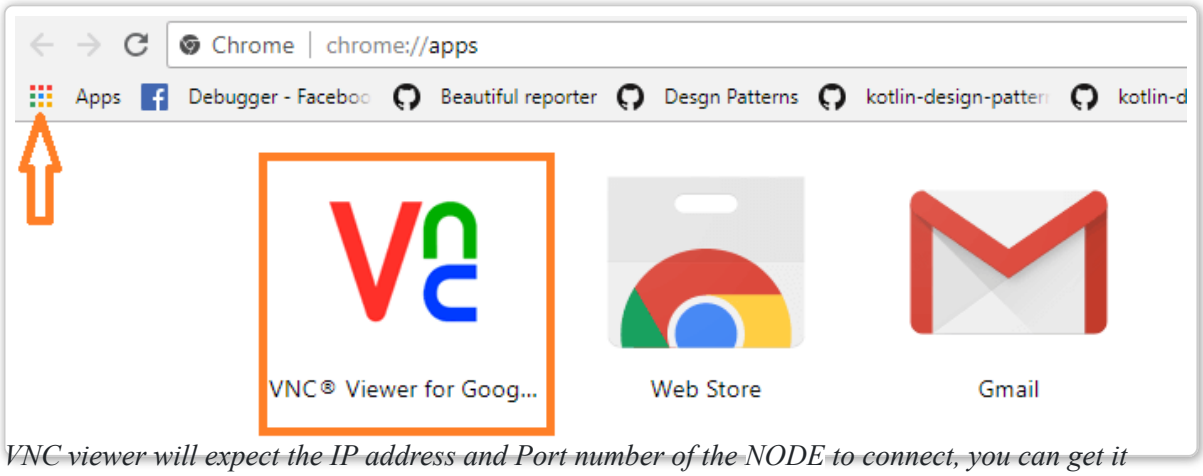
As I said earlier, you may want to see the execution of the program in the given docker. You cannot view a docker just like that, we have to connect the docker with our system using some tool.

I would recommend using the VNC viewer to connect the Docker. VNC viewer helps to connect the Remote machine with Local machine.

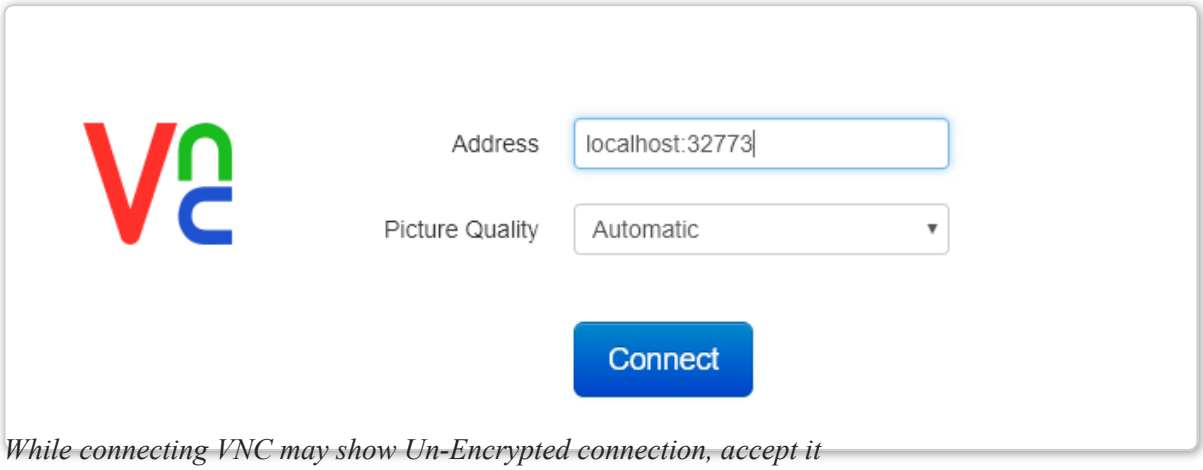
Go to Google APP store and select VNC viewer or directly search in Google



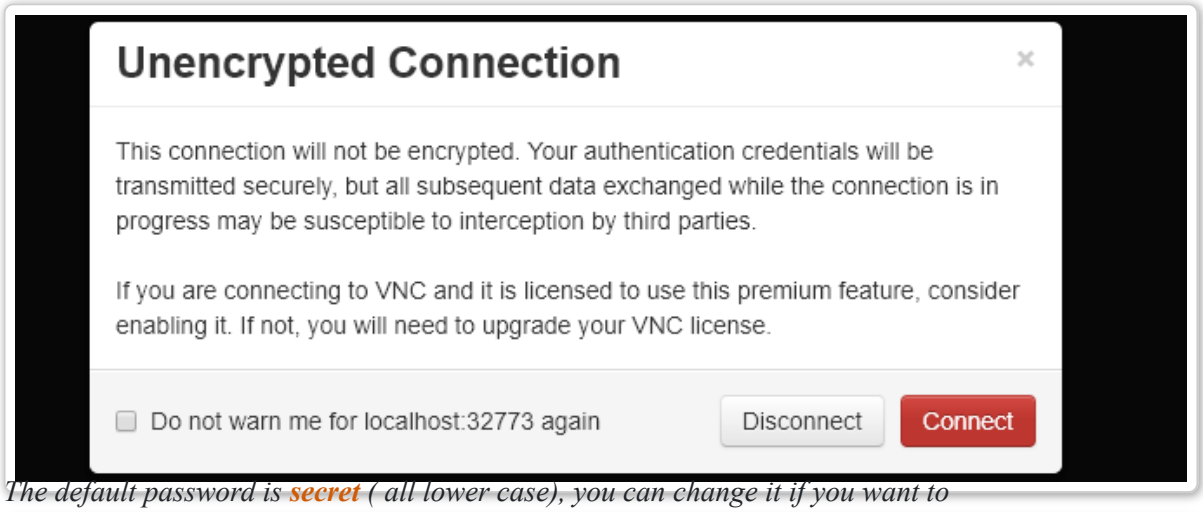
After installing you can start the VNC viewer from the Google Apps on the right top corner of the browser (square dots)



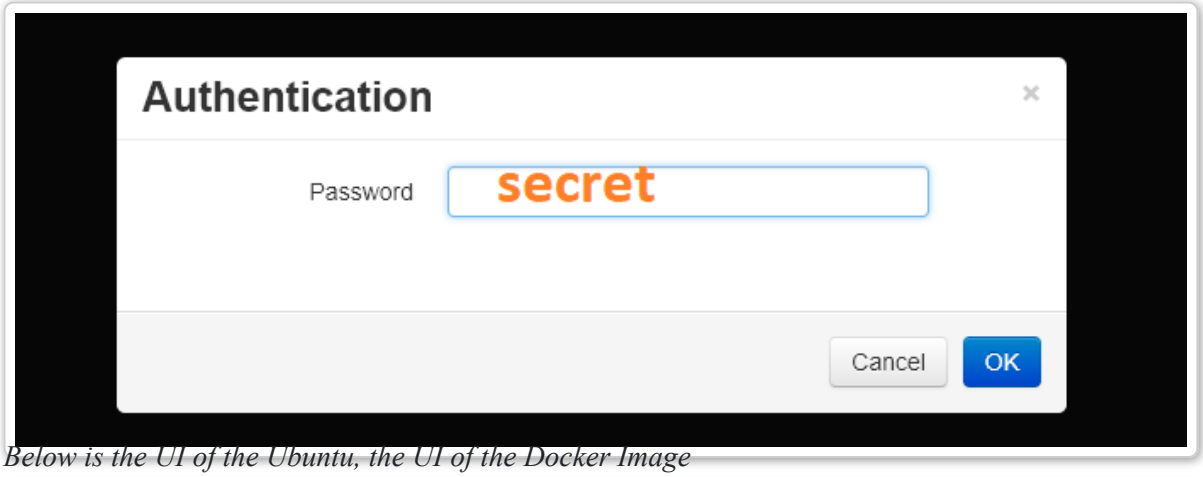
VNC viewer will expect the IP address and Port number of the NODE to connect, you can get it from the kitematic UI or from the ps command in CMD



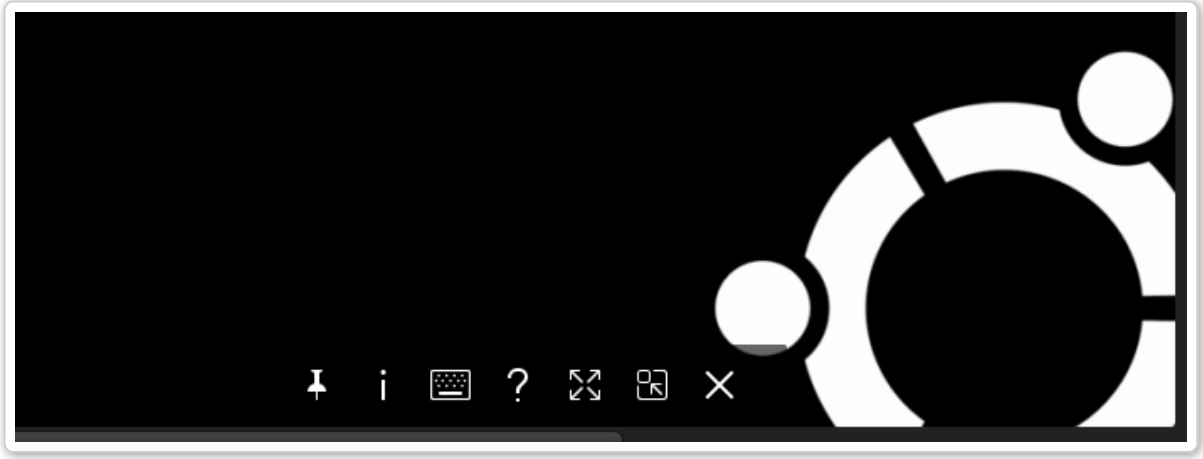
While connecting VNC may show Un-Encrypted connection, accept it



*The default password is **secret** (all lower case), you can change it if you want to*



Below is the UI of the Ubuntu, the UI of the Docker Image



Commands required for Docker and selenium

```
// install the Hub
docker pull selenium/hub
// invoke the hub
docker run -d -P --name selenium-hub selenium/hub
// install the Node
docker pull selenium/node-chrome-debug
// invoke the node
docker run -d -P --link selenium-hub:hub selenium/node-chrome-debug
// list the running process
```

```
docker ps
// list all the running process
docker ps -a
```

selenium Integration with Docker

Now let's come the important part of the tutorial, Let's integrate the selenium scripts with Docker. We have to remove our browser classes and we need to add remote webdriver

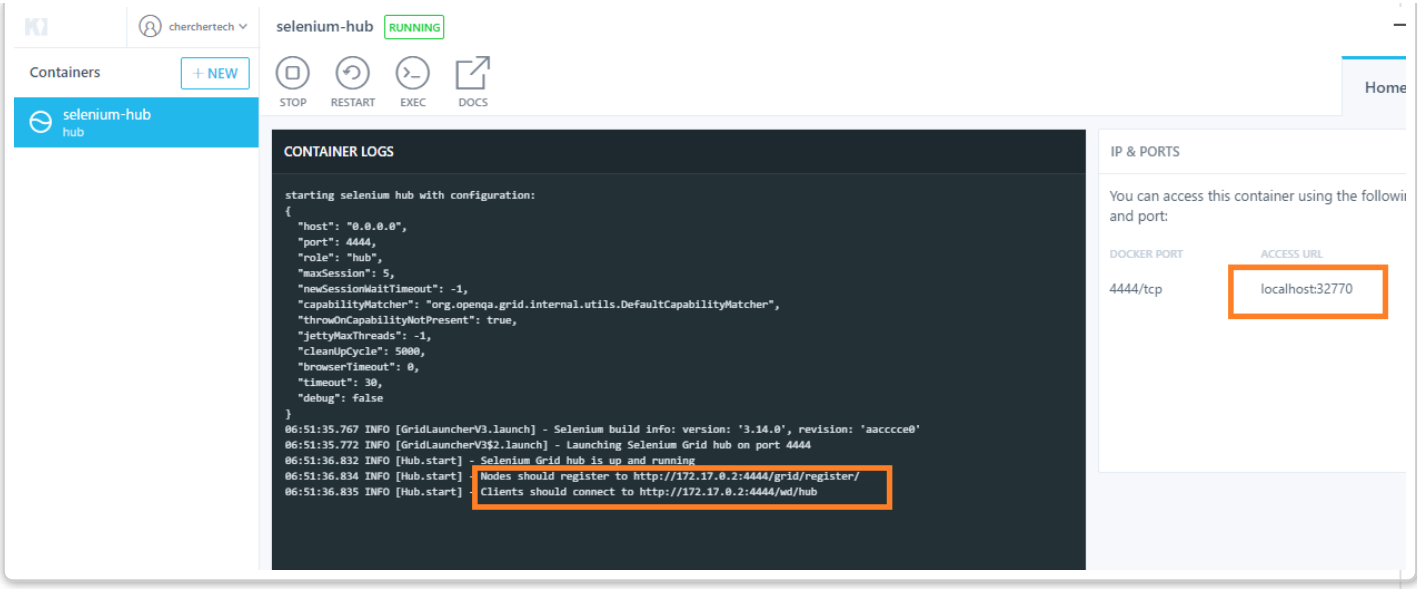
Consider below selenium Test file for docker integration, this script will navigate to **https://chercher.tech** and prints the title of the page. We have to get the Details of the hub configuration from the Selenium-hub in the Kitematic UI.

After Connecting the Node

```
# after node installation
[Hub.start] - Nodes should register to http://172.17.0.2:4444/grid/register/
[Hub.start] - Clients should connect to http://172.17.0.2:4444/wd/hub
[DefaultGridRegistry.add] - Registered a node http://172.17.0.3:5555
```

Lets configure the Remote webdriver in selenium just like our Selenium Grid along with desired capabilities

```
import java.net.URL;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.remote.DesiredCapabilities;
import org.openqa.selenium.remote.RemoteWebDriver;
import org.testng.annotations.Test;
public class TestJenkins {
    @Test
    public void runTestOnDocker() throws Exception {
        DesiredCapabilities dcap = DesiredCapabilities.chrome();
        String driverPath = "D:\\\\Eclipse progs\\\\driverserver\\\\geckodriver.exe";
        System.setProperty("webdriver.gecko.driver", driverPath);
        // Hub Port at 4444
        URL url = new URL("http://localhost:4444/wd/hub");
        WebDriver driver = new RemoteWebDriver(url, dcap);
        // Get URL
        driver.get("https://chercher.tech/");
        // Print Title
        System.out.println(driver.getTitle());
        driver.quit();
    }
}
```



> Please do visit the VNC viewer while running the Script

Errors I have faced during Docker installation

docker: image operating system "linux" cannot be used on this platform.

This issue happens because you have not switched the Operating system in CMD, so change Operating system using below command

```
C:\Program Files\Docker\Docker>DockerCli.exe -SwitchDaemon
```

Error: ETIMEDOUT connect ETIMEDOUT 172.17.0.2:4444

You will get this error because you might have used some IP for seleniumAddress rather than using the localhost, so seleniumAddress must be localhost then port.

```
seleniumAddress:'http://localhost:4444/wd/hub',
```

Docker Compose in selenium

Compose is a tool for defining and running multi-container Docker applications. With Compose, you use a YAML file to configure your application’s services. Then, with a single command, you create and start all the services from your configuration.

In layman terms, Compose is contains a set of commands just like a batch file in your windows operating system.

```
services:
    NameOfHub:
```

```
    image: selenium/hub
    container_name: NameOfHub
    privileged: true
    ports:
      - 4444:4444
    environment:
      - GRID_TIMEOUT=240000
      - GRID_BROWSER_TIMEOUT=240000
  NameOfNode:
    image: selenium/node-chrome-debug
    privileged: true
    depends_on:
      - NameOfHub
    ports:
      - 5900
    environment:
      - HUB_PORT_4444_TCP_ADDR=NameOfHub
      - HUB_PORT_4444_TCP_PORT=4444
```

Recommended Readings

- **Selenium interview questions**
- **Selenium tricky interview questions**
- **selenium framework interview questions**
- **Core Java Interview Questions Set 1**
- **Selenium Relative Locators But I am hesitant to use**
- **Robot class in selenium**
- **Tags & Hooks in Cucumber with Selenium | BDD**
- **Parameterize Cucumber BDD with selenium**