**AY: 2023-24**

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| **Class:** |  | **Semester:** |  |
| **Course Code:** |  | **Course Name:** |  |

|  |  |
| --- | --- |
| **Name of Student:** |  |
| **Roll No. :** |  |
| **Experiment No.:** | 9 |
| **Title of the Experiment:** | To study and Implement Containerization using Docker |
| **Date of Performance:** |  |
| **Date of Submission:** |  |

Evaluation

|  |  |  |
| --- | --- | --- |
| **Performance Indicator** | **Max. Marks** | **Marks Obtained** |
| Performance | 5 |  |
| Understanding | 5 |  |
| Journal work and timely submission | 10 |  |
| Total | 20 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Performance Indicator** | **Exceed Expectations (EE)** | **Meet Expectations (ME)** | **Below Expectations (BE)** |
| Performance | 4-5 | 2-3 | 1 |
| Understanding | 4-5 | 2-3 | 1 |
| Journal work and timely submission | 8-10 | 5-8 | 1-4 |

# Checked by

**Name of Faculty :**

# Signature :

**Date :**

**Experiment No.** 9

**Aim**: To study and Implement Containerization using Docker

**Objective**:  To know the basic differences between Virtual machine and Container. It involves demonstration of creating, finding, building, installing, and running Linux/Windows application containers inside a local machine or cloud platform.

**Theory**:

* open platform for developing, shipping and running applications
* enables you to separate your applications from your infrastructure so you can deliver software quickly
* you can manage your infrastructure in the same ways you manage your applications
* Docker provides the ability to package and run an application in a loosely isolated environment called a container.
* Containers are lightweight and contain everything needed to run the application, so you do not need to rely on what is currently installed on the host.
* Develop your application and its supporting components using containers.
* The container becomes the unit for distributing and testing your application.
* When you’re ready, deploy your application into your production environment, as a container or an orchestrated service. This works the same whether your production environment is a local data center, a cloud provider, or a hybrid of the two.

Diagram

Description automatically generated

Figure 1: Docker Architecture

Containerization:

* Containerization is OS-based virtualization that creates multiple virtual units in the user space, known as Containers.
* Containers share the same host kernel but are isolated from each other through private namespaces and resource control mechanisms at the OS level.
* Container-based Virtualization provides a different level of abstraction in terms of virtualization and isolation when compared with hypervisors.
* Hypervisors use a lot of hardware which results in overhead in terms of virtualizing hardware and virtual device drivers.
* containers implement isolation of processes at the operating system level, thus avoiding such overhead.
* Containerization has better resource utilization compared to VMs and a short boot-up process. It is the next evolution in virtualization.
* Containers can run virtually anywhere, greatly easy development and deployment: on Linux, Windows, and Mac operating systems; on virtual machines or bare metal, on a developer’s machine or in data centers on-premises; and of course, in the public cloud.
* Containers virtualize CPU, memory, storage, and network resources at the OS level, providing developers with a sandboxed view of the OS logically isolated from other applications.
* Docker is the most popular open-source container format available and is supported on Google Cloud Platform and by Google Kubernetes Engine.

Diagram

Description automatically generated

**Steps:**

1. Open docker.com Scroll down, Click on ‘Get started for free’ tab.
2. Click on Docker Desktop, Download it
3. After downloading, Open ‘Docker Desktop Installer’ & start installation
4. After Installation, Restart your device.
5. Accept the terms and conditions, Click on Accept
6. Click on the link - https://aka.ms/wsl2kernel. (Do not close this window).
7. Download the WSL2 Linux kernel update package for x64 machines.
8. A ft e r D o w nlo a d is c o m ple t e, R u n t h e . m s i p a c k a g e. Click on next
9. After, the setup is complete, Click on finish.
10. Open Powershell as an Administrator
11. Run the following Command:

wsl --set-default-version 2

1. Now, Click on Restart
2. Docker should now restart. Click on Start.
3. Open Command Prompt, run the following commands:
4. To check the version of Docker:

 docker --version

1. To install image of ubuntu

docker pull ubuntu

1. Check downloaded images

docker images

1. Run ubuntu OS

docker run -it ubuntu /bin/bash

1. Open another Command Prompt and follow the steps shown below

-docker ps

docker container ls –a

docker container rm b71e3e6b1118 //copy docker id for remove but first

(Use your container ID in the above command)

stop your docker

- docker container stop b71e3e6b1118

- docker container rm b71e3e6b1118

- docker ps

- docker //list all docker commands

- docker images

- docker image rm ff0fea8310f3 // copy image id from previous output

(Use your image ID in the above command)

- docker run -it ubuntu /bin/bash //check output

**Output/Observation:**

**Conclusion:**

Comment on implementation of Containerization using Docker