



Cloud Management System using QEMU & Docker

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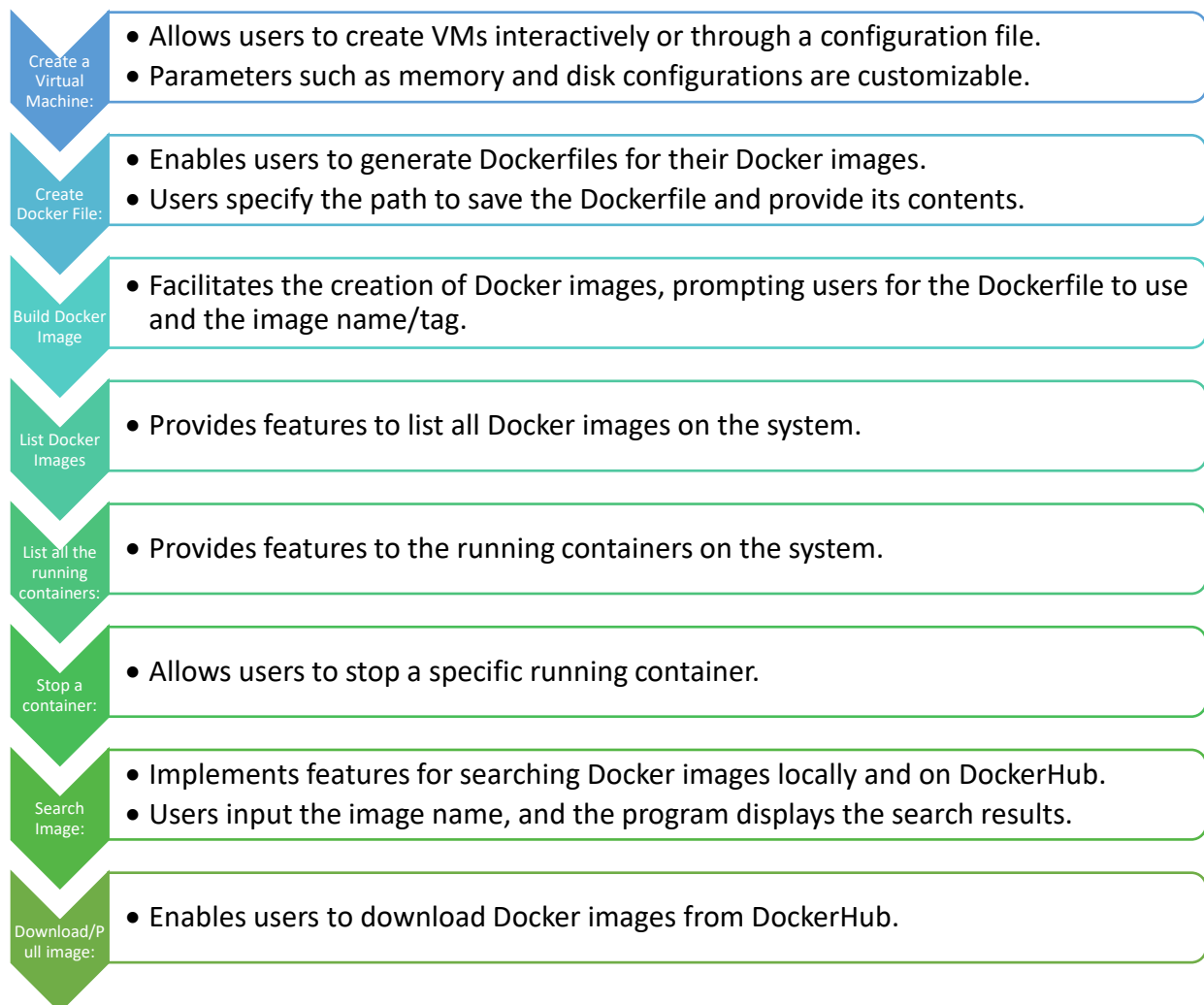
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Introduction

This project's Cloud Management System intends to give users with the ability to manage both Virtual Machines (VMs) and Docker containers in a GUI Application. Users may use the system to create virtual machines, produce Docker images, list images and containers, stop containers, search for images, and pull images from Docker Hub. The goal of the project is to improve understanding of virtualization technologies and cloud administration.

Design

The application consists of seven main functionalities:



All the functions ensure the correctness of user input, validating paths, and generating errors for invalid inputs.

Challenges Faced & Solutions Implemented

1) Challenges:

- Integration of VM Creation with Docker Features: Maintaining modularity when managing the VM creation & Docker image management inside the GUI.
- Using strong input validation to handle a variety of circumstances, such as faulty file paths or wrong Docker image names.

2) Solution:

- Modular design, we placed every implemented function into a different separate file. Then we called it all in a one function in the GUI. As well as to maintain the code readability and reusability.
- Implemented an input validation tools to detect mistakes before execution.

Testing Methodologies

- Unit testing: Performed unit tests on individual functions to ensure proper functionality.

Evaluation of System's Performance (Output)

1) Test Case 1: Create a VM

VM Name:

Disk Image Path:

OS Type:

CPU Cores:

RAM (MB):

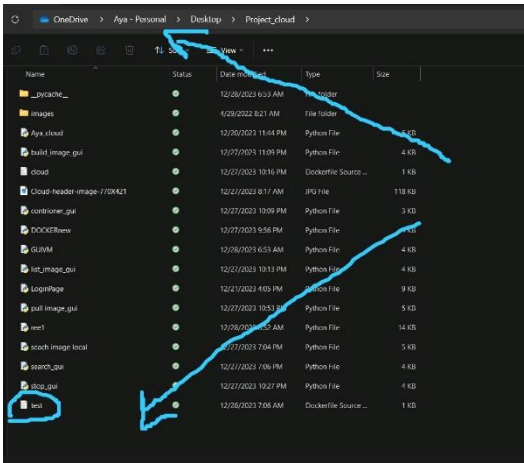
Network Model:

Create VM

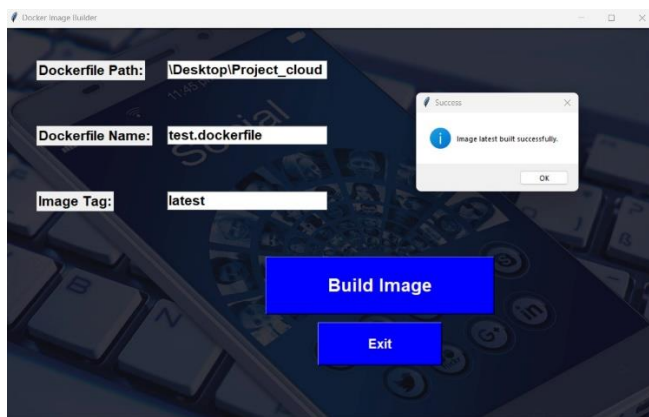
Exit

2) Test Case 2: Create a Docker File

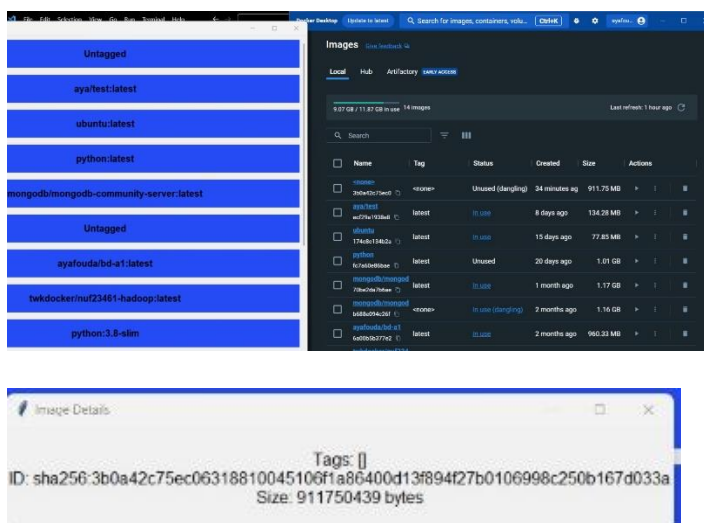
[illegible]



3) Test Case 3: Build a Docker Image

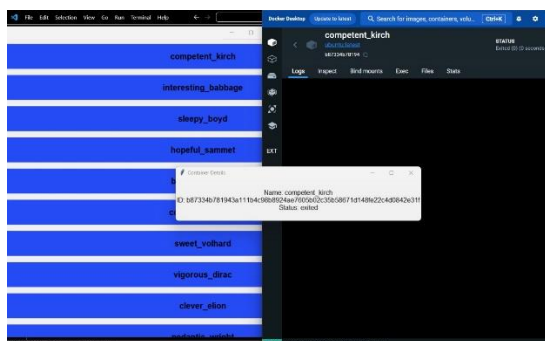
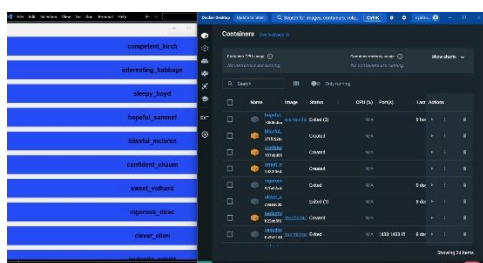


4) Test Case 4: List Docker Image

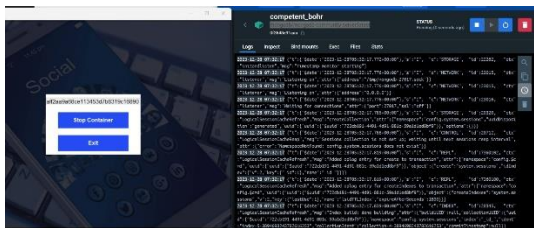
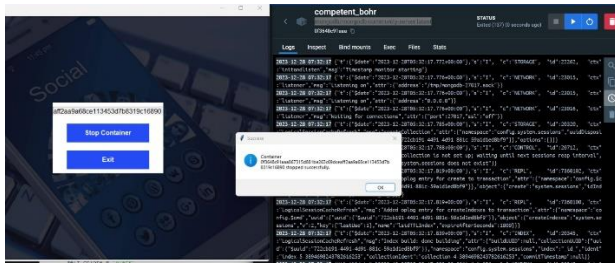




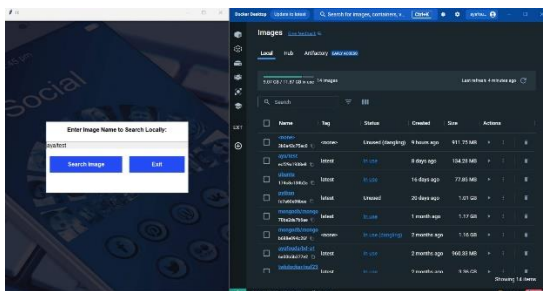
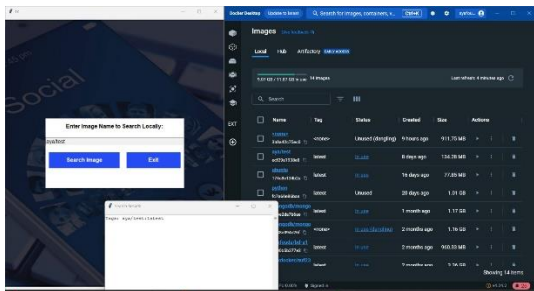
5) Test Case 5: List all Containers.



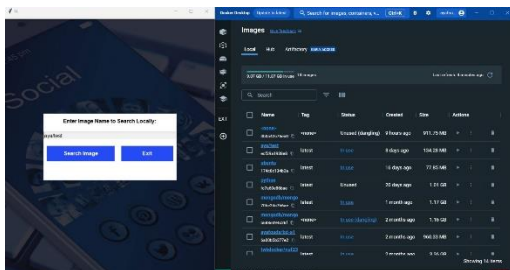
6) Test Case 6: Stop Container



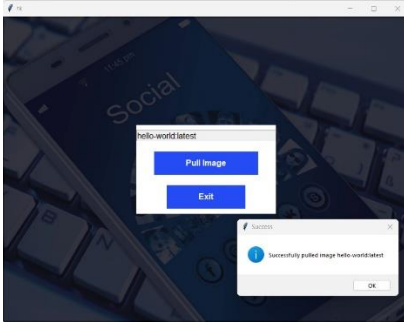
7) Test Case 7: Search Image



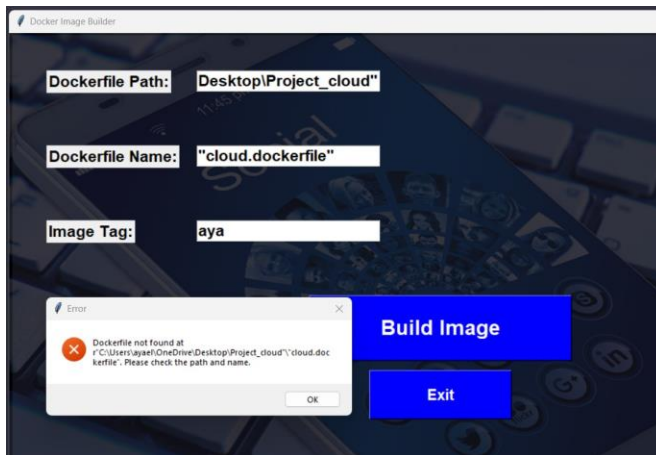
8) Test Case 8: Search for Image on DockerHub



9) Test Case 9: Download/Pull Image



10) Test Case 9: Validation



Conclusion

To sum up, Virtualization and Containerization Tool offers a complete solution for managing virtual machines and Docker containers. This cloud management system aimed first to create a virtual machine, based on the user specific requirements in RAM, OS type, CPU cores, and paths and then connect it to docker. There is a list of functionalities for each task including build image, list images, list container, search image, pull image, or stop a container. The functions are connected to each other, to transfer the processes, and to the backend basis as VM and Docker. The whole GUI is implemented in python by tkinter library.