Docker Desktop in Python

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Allen Thomas Varghese
12th Nov 2023

Introduction

- Introduce a desktop GUI library
- Build a python based GUI for Docker Desktop
- Perform basic operations related to docker containers

Required Experience

- Familiarity with Python
- Object Oriented programming
- Use of packages
- Familiarity with Docker

Agenda

- Install dependencies
- UI Walkthrough
- PySimpleGUI introduction
- Problem definition and breakdown
- Creating the UI
- Exploring docker python package
- Connecting docker client to UI elements
- Trigger actions in a table

Install Dependencies

- Required software
  - Docker Desktop
  - VS Code IDE
  - Python 3.9+
- Create a new folder called pycon2023-docker-desktop
- Inside the folder, create python virtual environment: `python -m venv .venv`
- Activate virtualenv: `./.venv/bin/activate` or `.\.venv\Scripts\activate`
- Install required python packages: `pip install pysimplegui docker`
- Save PySimpleGUI cookbook as PDF: pysimplegui.org/en/latest/cookbook as reference

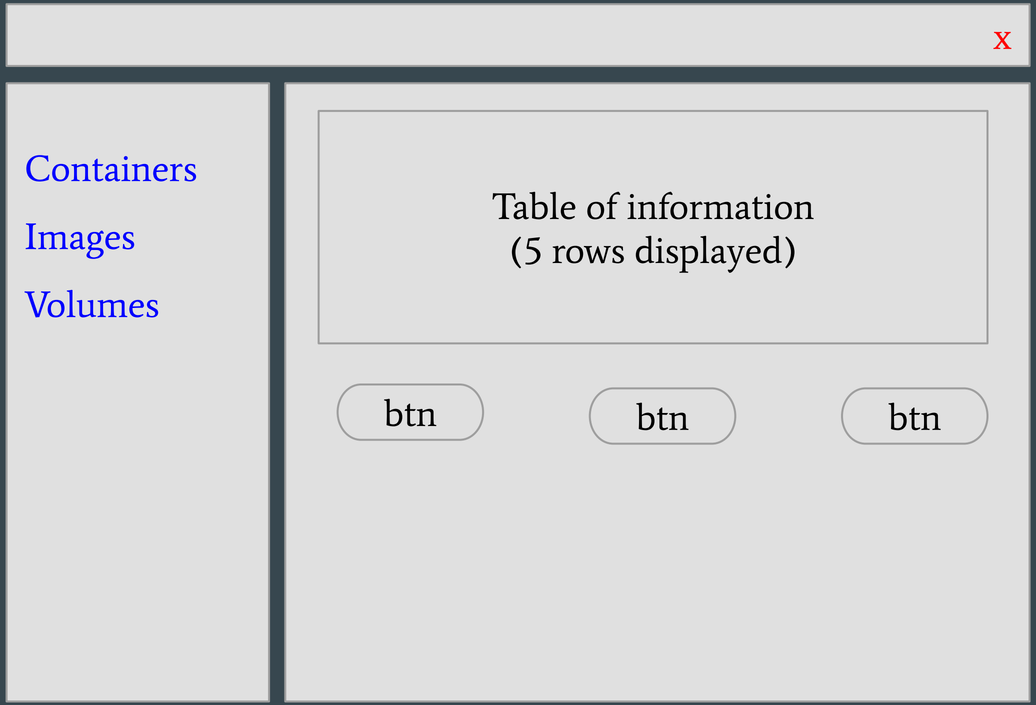
Use Powershell for running all commands

Folder Structure

Within the workspace folder pycon2023-docker-desktop create the following:

- src folder: for all source files
- requirements.txt file: for keeping track of package dependencies
  - docker==6.1.3
  - pysimplegui==4.60.5
- src/screen.py file: entrypoint for the application

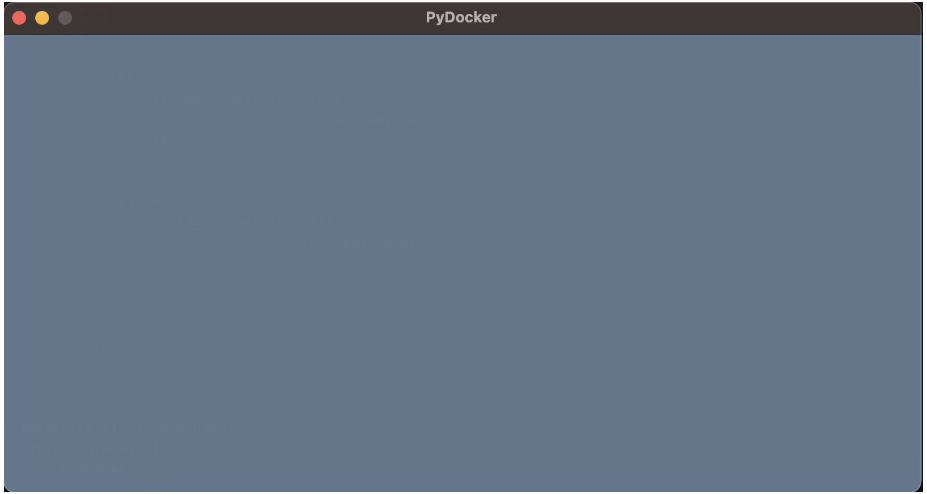
UI Prototype



Phase 1

Display Window

Output



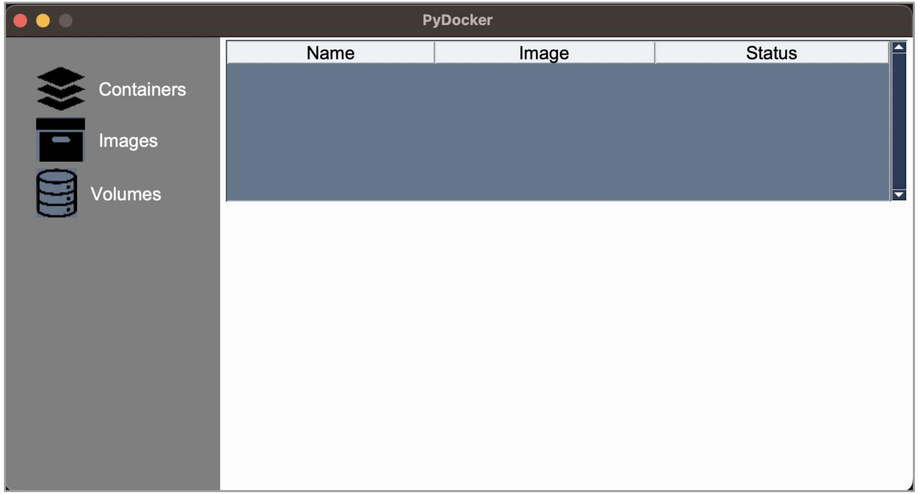
Steps

- Open the PySimpleGUI cookbook PDF
- Search for creating a window
- Copy the code to screen.py file
- Run the above file

Phase 2

Sidebar and Info UI

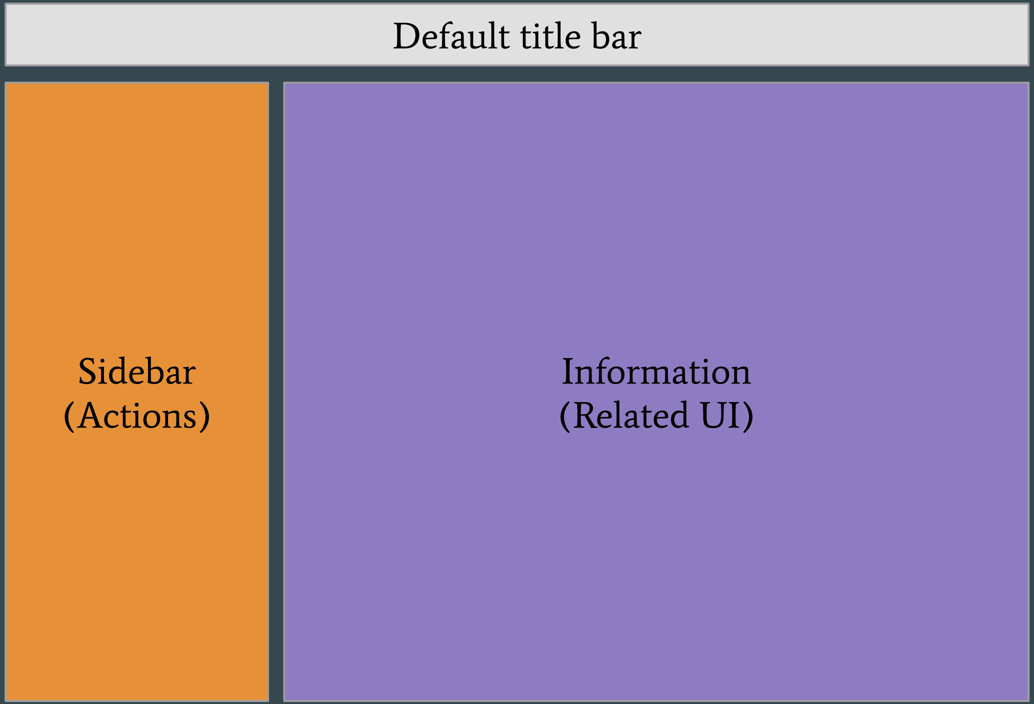
Output



PyDocker

Name	Image	Status

UI Layout



Default title bar

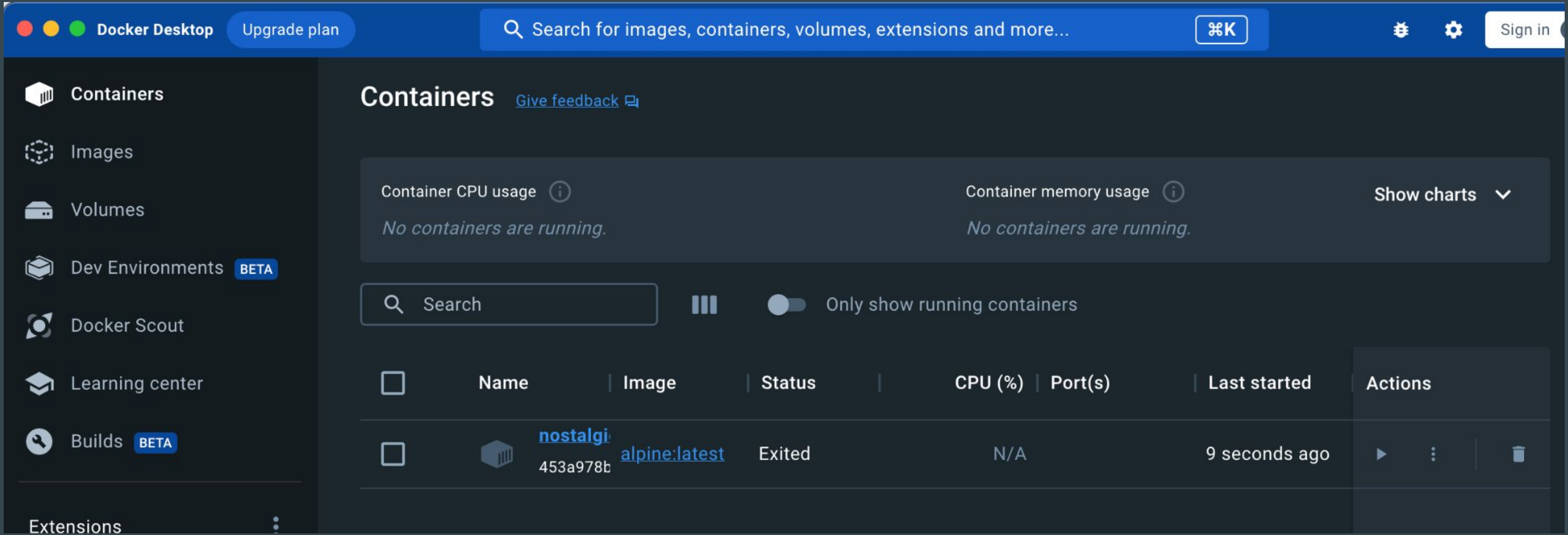
Sidebar
(Actions)

Information
(Related UI)

Steps

- Open the PySimpleGUI cookbook PDF
- Explore how layouts work in PySimpleGUI (hint: list of lists)
- Create the sidebar as a component and render it
- Create the info section as a component and render it next to the sidebar
- Add a table to the info section
- Convert the info component to a class to handle click events

Container Information



Containers

Container CPU usage

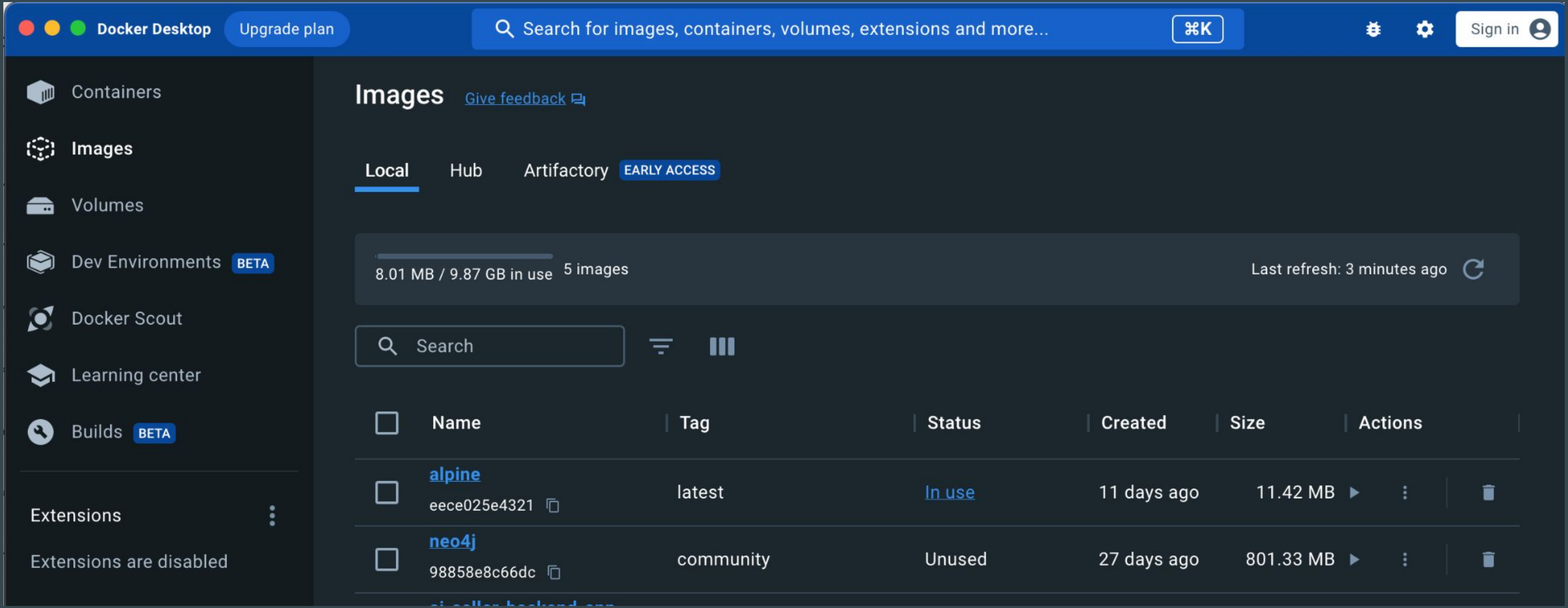
No containers are running.

Container memory usage

No containers are running.

□	Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
□	nostalgi 453a978b	alpine:latest	Exited	N/A		9 seconds ago	▶ ⋮ 🗑

Image Information



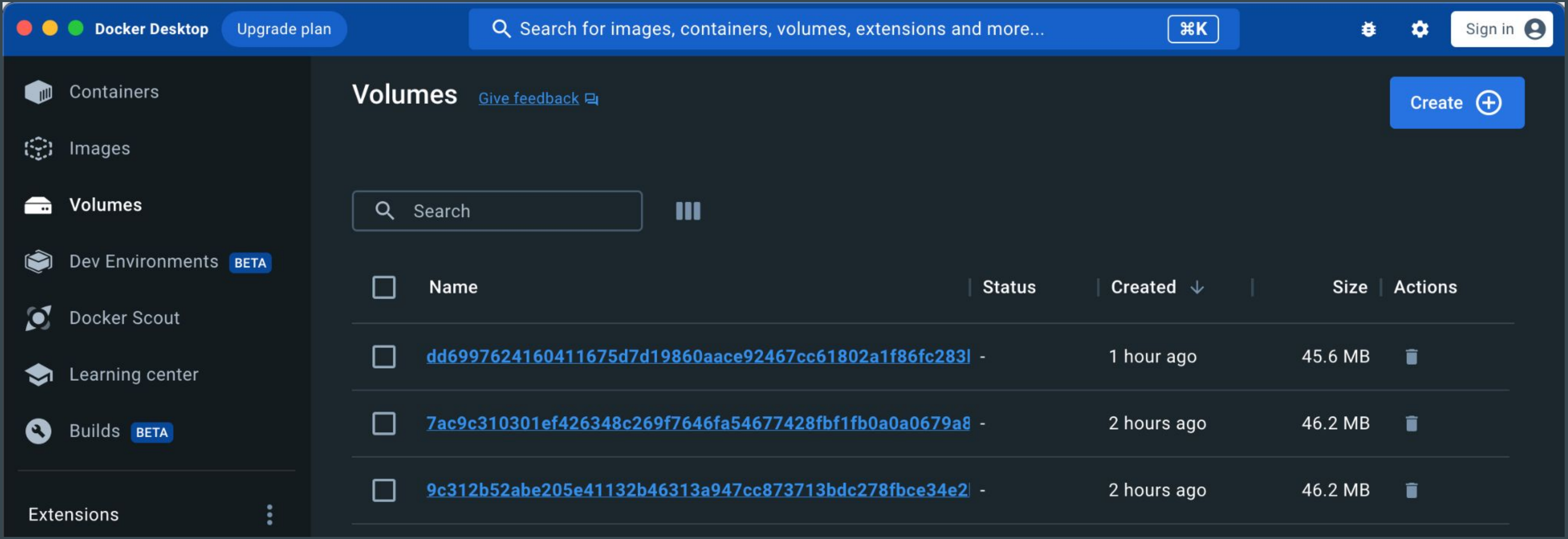
Images

8.01 MB / 9.87 GB in use 5 images

Last refresh: 3 minutes ago

□	Name	Tag	Status	Created	Size	Actions
□	alpine eece025e4321	latest	In use	11 days ago	11.42 MB	▶ ⋮ 🗑
□	neo4j 98858e8c66dc	community	Unused	27 days ago	801.33 MB	▶ ⋮ 🗑

Volume Information



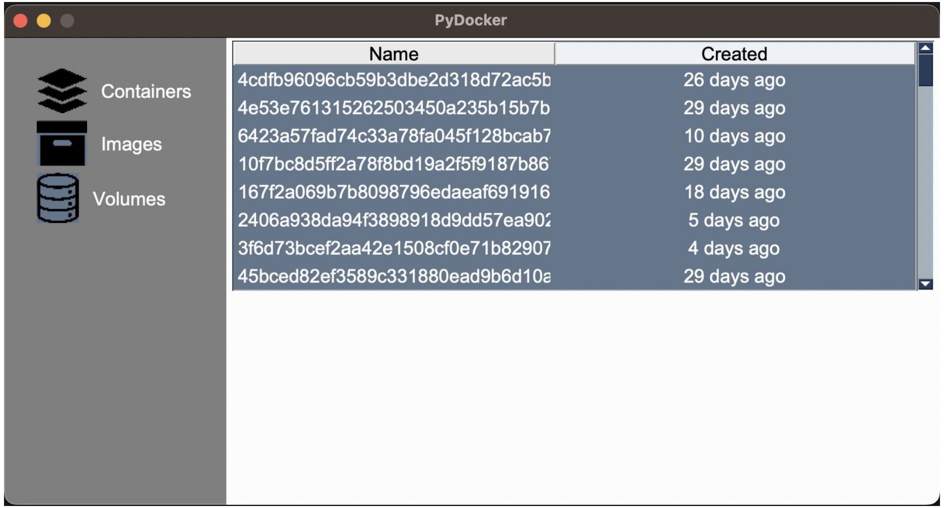
Volumes

□	Name	Status	Created ↓	Size	Actions
□	dd6997624160411675d7d19860aace92467cc61802a1f86fc283	-	1 hour ago	45.6 MB	🗑
□	7ac9c310301ef426348c269f7646fa54677428fbf1fb0a0a0679a8	-	2 hours ago	46.2 MB	🗑
□	9c312b52abe205e41132b46313a947cc873713bdc278fbce34e2	-	2 hours ago	46.2 MB	🗑

Phase 3

Load Info based on actions

Output



Name	Created
4cdfb96096cb59b3dbe2d318d72ac5b	26 days ago
4e53e761315262503450a235b15b7b	29 days ago
6423a57fad74c33a78fa045f128bcab7	10 days ago
10f7bc8d5ff2a78f8bd19a2f5f9187b86	29 days ago
167f2a069b7b8098796edaeaf691916	18 days ago
2406a938da94f3898918d9dd57ea902	5 days ago
3f6d73bcef2aa42e1508cf0e71b82907	4 days ago
45bced82ef3589c331880ead9b6d10a	29 days ago

Docker Python Package

- Requires docker desktop running in the background
- Can retrieve information about containers, images and volumes
- Can trigger operations
- Details available at github.com/docker/docker-py
- In a python shell, explore how to fetch information about:
  - All containers
  - All images
  - All volumes

Steps

- Add a new python module that will handle docker interactions
- Create a class with methods for fetching:
  - List of active containers
  - List of all images
  - List of all volumes
- Parse and render the above information when the specific link is clicked. For ex: load images when the images button is clicked
- Show only the fields in the table that has information from the docker package
- Use the humanize package for showing relative time like 2 hours ago

Phase 4

Trigger docker operations

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Output