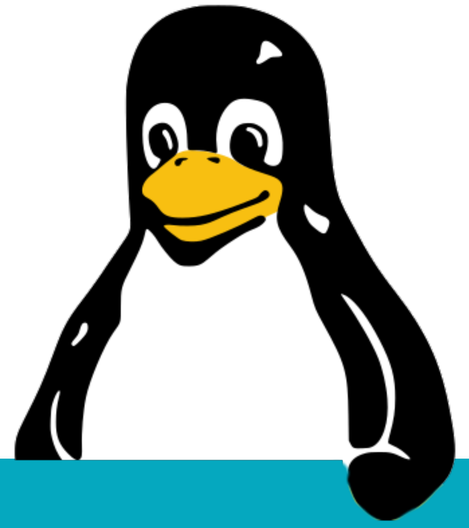
Linux, day 17



Objectives covered

Objective	Summary	Boek
3.2	Container management, container image ops	28
3.4	Virtualization image files	28
3.4	Continuous integration / Continuous deployment	30

LAB: Ansible

Lab setup

- In the files for this lesson,
  - You will find a ZIP file, with a Vagrant project
- It makes:
  - One CentOS server, with Ansible.
  - Five Linux target servers.
- Use the *Vagrantfile*! 😀

Lab setup

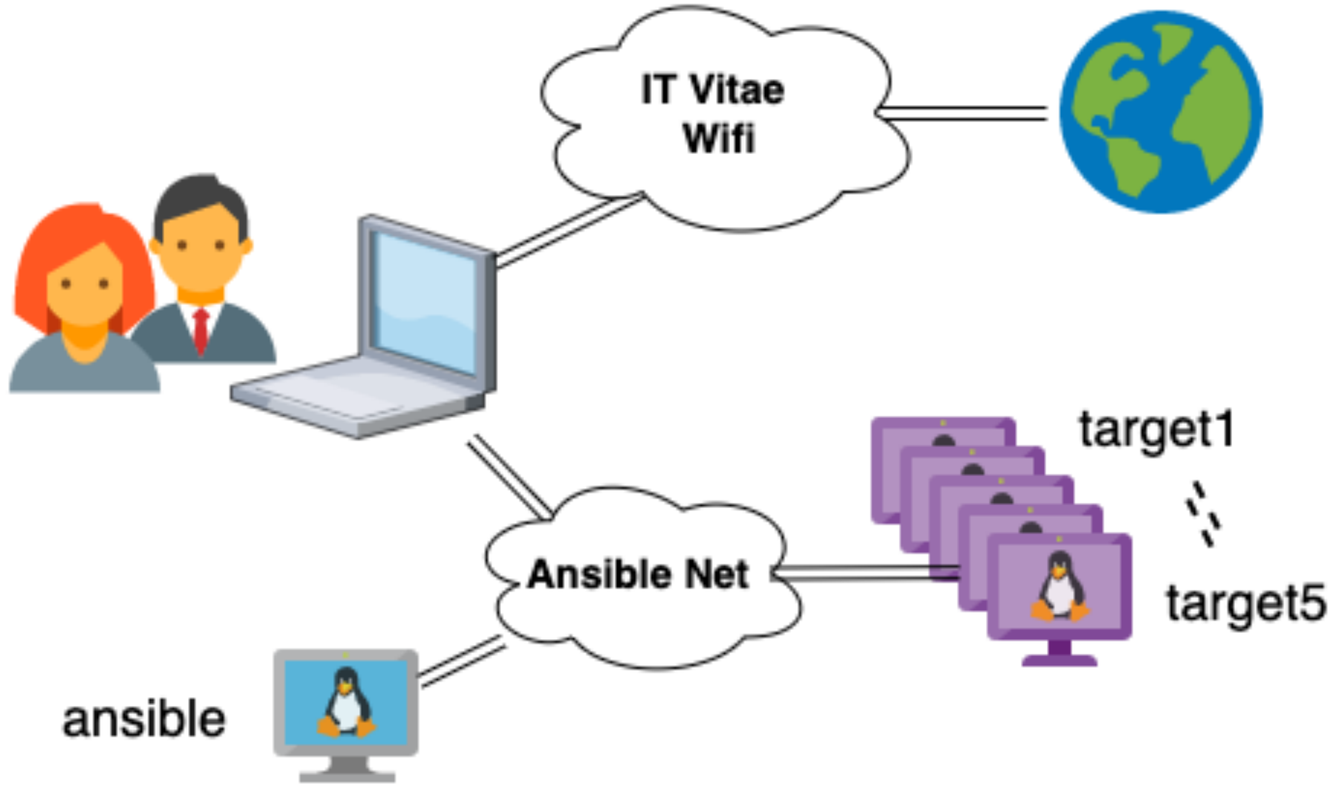
- As a reminder:
  - Make a new project directory on your host OS.
  - Download the file and rename to "*Vagrantfile*".
  - In the project dir, run "*vagrant up*".

- The build will take a few minutes.

Lab setup

- We will practice with Ansible.
  - Using Ansible itself is **not** on the exam.
  - But **reading** the config files is.

Lab setup



Logging in

- Happens as usual, with Vagrant

```
$ vagrant ssh ansible.ansible.lab
```

Task 1: setup SSH key auth

- We want to SSH from vagrant@ansible.ansible.lab
  - To all six hosts in the network.
  - We want this to work without passwords.

- So first task: ensure SSH key authentication works.
  - From the Ansible host, to vagrant@ on all six hosts.

Task 1: setup SSH key auth

- We covered this in lesson 6:
  - *ssh-keygen -t rsa* # Set an EMPTY password!
  - *ssh-copy-id -i ~/.ssh/id_rsa vagrant@${TargetHost}*

- NOTE: The Ansible server **does not** allow password login.
  - You will need to manually authorize the pubkey.

I've prepared something

- There's an existing Ansible configuration.

```
$ cd /var/ansible

$ ls -al
```

The files

- *hostlist.txt* A simple list with all six hostnames.
- *inventory.txt* An Ansible "inventory" of hosts.
- *basics.yml* An Ansible playbook.
- *webserver.yml* A playbook to setup web servers.

- Go read them, see if you get what they do.

Task 2: One-off commands

- Ansible can run single commands, like SSH.

```
$ ansible -i inventory.txt web -m shell \
  -a "hostname"

$ ansible -i inventory.txt all -m shell \
  -a "hostname"

                                # What is different??
```

Task 2: One-off commands

- -i points to the inventory file you want to use.
  - Plus which group from the inventory.
- -m says which module to use.
- -a gives parameters to the module.

Task 3: Syntax check a playbook

- Make sure the configuration is valid.

```
$ ansible-playbook -i inventory.txt \
  --syntax-check basics.yml
```

Task 3: Test-run a playbook

- See what it would do (without breaking stuff).

```
$ ansible-playbook -i inventory.txt \
  --check basics.yml
```

Task 3: Apply a playbook

- Actually making the changes

```
$ ansible-playbook -i inventory.txt \
  basics.yml
```

Task 3: Re-apply a playbook

- Re-running should make (almost) no changes.

```
$ ansible-playbook -i inventory.txt \
  basics.yml
```

Task 4: Break and fix

- Login to one or two of the targets.
  - Delete the "seth" account.
  - On another target, uninstall "*git*".

- Re-apply the "*basics.yml*" playbook.
  - Did it fix the things you broke?

Task 5: Building web servers

- Can you use "*webservers.yml*"?
  - It should setup a web server on three targets.

- Prove that the websites are up and available.
  - Thanks to Vagrant, there are port forwards.
  - Ports 8081, 8082 and 8083 on *localhost*.

Task 6: Build an FTP host

- Using the example playbooks, can you ...
  - Make an inventory group "*ftp*", with "*target3*"?
  - Make a new playbook "*ftp.yml*"?
  - Use it to install and start "*vsftpd*"?

- Prove that you can FTP to host *target3*.

LAB: Docker containers

Vulnerable apps

- Containers let you run all kinds of stuff!
  - From building your own projects,
  - And useful tools for security testing,
  - To actually vulnerable webapps!

OWASP SKF Labs

- You will learn about OWASP later.
  - They're an org with dozens of security projects.
  - Including the SKF and SKF Labs.

- The labs teach you about common vulnerabilities,
  - By letting you hack stuff!

Task 1: Pull and run

- OWASP SKF has many, many container images.
- See if you can run and access:
  - blabla1337/owasp-skf-lab:xss
  - blabla1337/owasp-skf-lab:sqli

- You will need to use -p with the *run* command!

Task 1: SPOILERS!

- The following will give you two running apps.
  - One on http://localhost:5000 ,
  - And one on http://localhost:5005

Task 1: SPOILERS!

- Grabbing pre-existing images.

```
$ docker run -d -p 127.0.0.1:5000:5000 \
blabla1337/owasp-skf-lab:sqli

$ docker run -ti -p 127.0.0.1:5005:5000 \
blabla1337/owasp-skf-lab:xss
```

Task 2: Cleanup

- After playing a bit with these two containers,
  - Kill them.
  - Remove their images from your Docker.

Task 2: SPOILERS!

- You will need:
  - *docker ps*
  - *docker kill*
  - *docker images*
  - *docker rmi*

Task 3: Build from source

- Let's grab the actual SKF Labs source code.
  - We can build the containers from source!

- Clone this repository:
  - https://github.com/blabla1337/skf-labs/

Task 3: build from source

- The code you're looking for is under "*Python*".
  - It's the directories "XSS" and "SQLI".
  - These have Dockerfiles.

- Use the Dockerfile to build your own image.
  - Test it! Run it like before!

Task 3: SPOILERS!

- Building your own.

```
$ git clone https://github.com/blabla1337/skf-labs/; cd skf-labs/python/XSS

$ docker build -t tess:XSS .
$ docker run -d -p 127.0.0.1:5000:5000 tess:XSS
```

LAB: Programming efficiently

Notepad won't cut it

- I admit, I still code in *vi* and *notepad.exe*.
  - But those don't offer features needed by pros!

- No syntax checking, no language reference.
  - No plugins, no integration with cloud or Docker.

IDE: Integrated Dev Env

- There are many IDEs you can choose from.
  - Eclipse and IntelliJ are famous for Java.
  - Jupyter and PyCharm are famous for Python.
  - WebStorm is often used for NodeJS
  - VS:Code is used a lot for .Net

Integrating with Docker

- VS:Code is one IDE which can use "dev containers".
  - Install all your plugins and deps in a container.
  - Use the container for debugging (locally).

- Your main OS will remain clutter-free.
  - No mess of tools and deps!

Download VS:Code

- Let's try this!
  - Download Visual Studio Code.
  - And yes, install it.

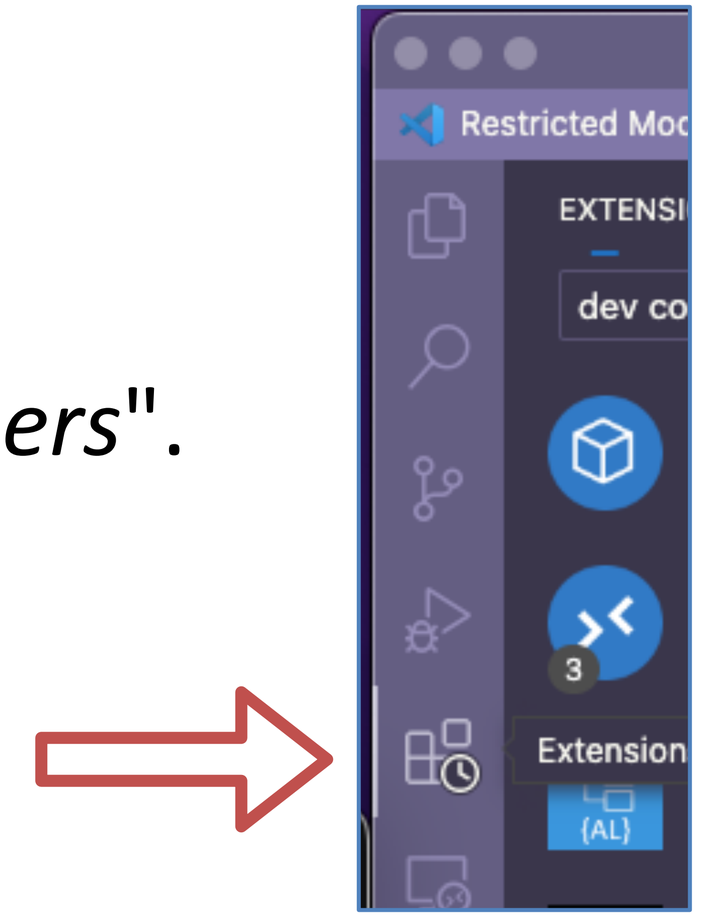
https://code.visualstudio.com

Start Docker (Desktop)

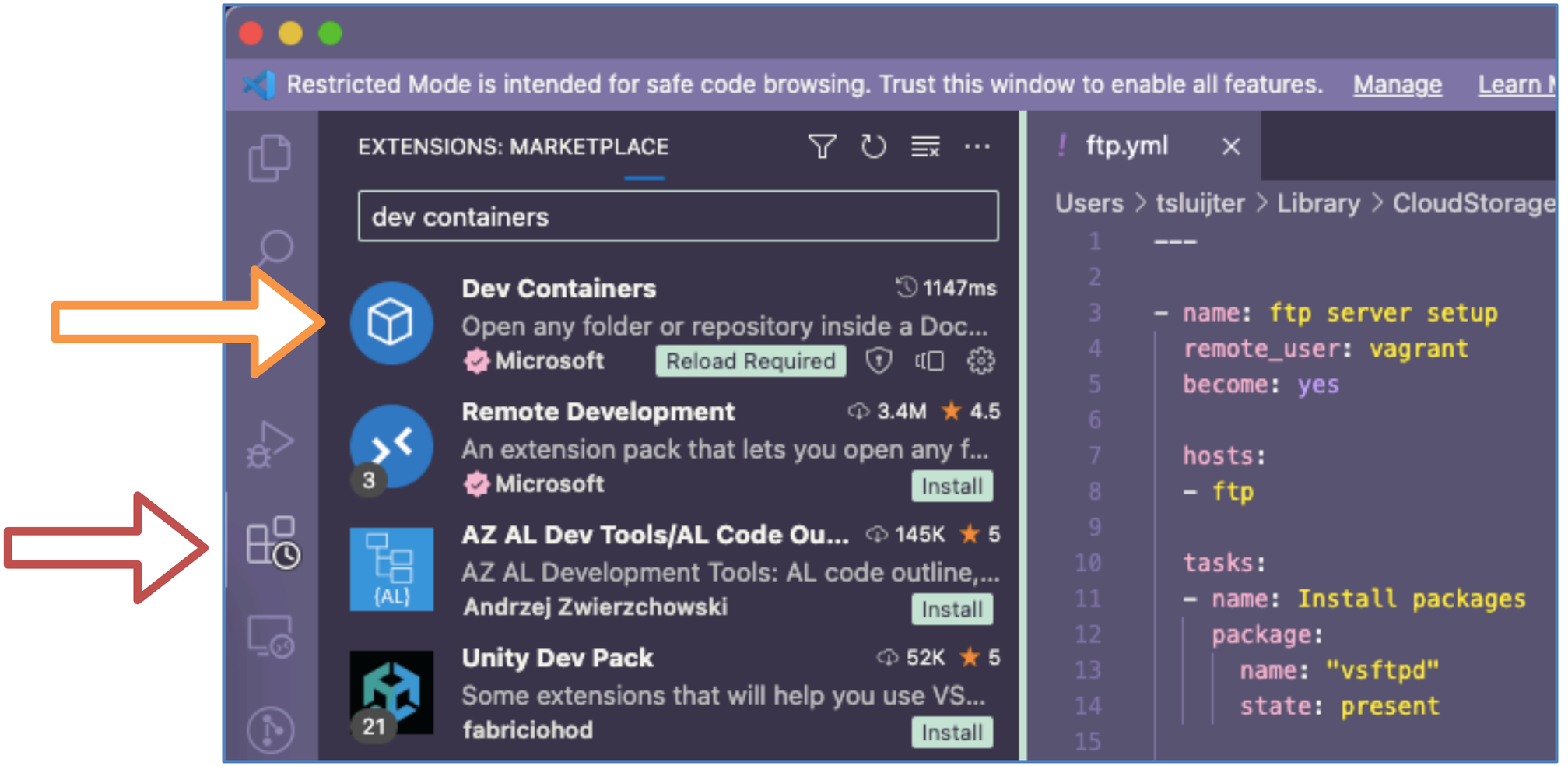
- If it's not running yet,
  - Make sure to start Docker Desktop,
  - Or to have Docker running in Linux.

VS:Code extensions

- After starting VS:Code,
  - Go to the Extensions tab.
  - Search for and install "*Dev Containers*".



VS:Code extensions



Grab a project

- Open a terminal and run:

```
$ cd $HOME; cd Downloads

$ git clone https://github.com/microsoft/
vscode-remote-try-python ./vscode-python
```

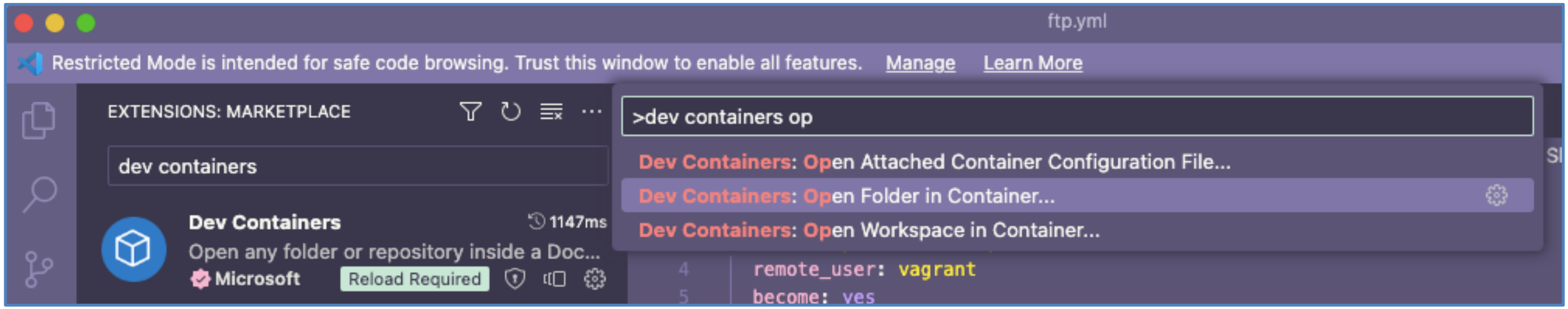
Open code in container

- In VS:Code, press F1 on your keyboard.
  - In the command bar, type:

```
Dev Containers: Open Folder in container
```

- Open the Git repo you just cloned.

Open code in container

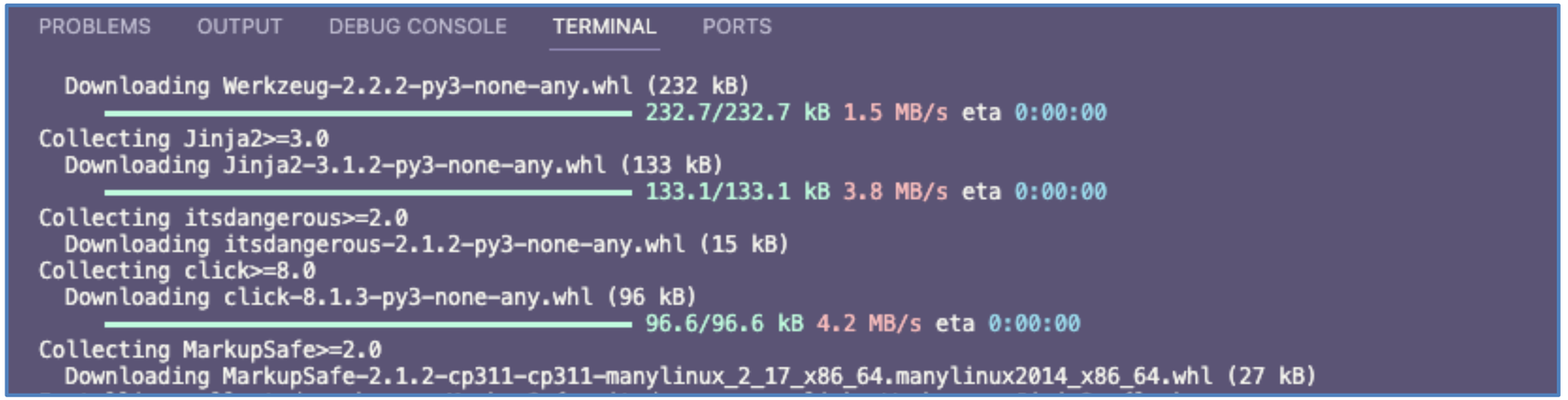


Open code in container

- This process will take a little while:
  - VS:Code is fetching a container image.
  - It's installing all dependencies (*requirements.txt*).
  - It's even adding a few extensions!

- You can see the logs and check "*docker ps*".

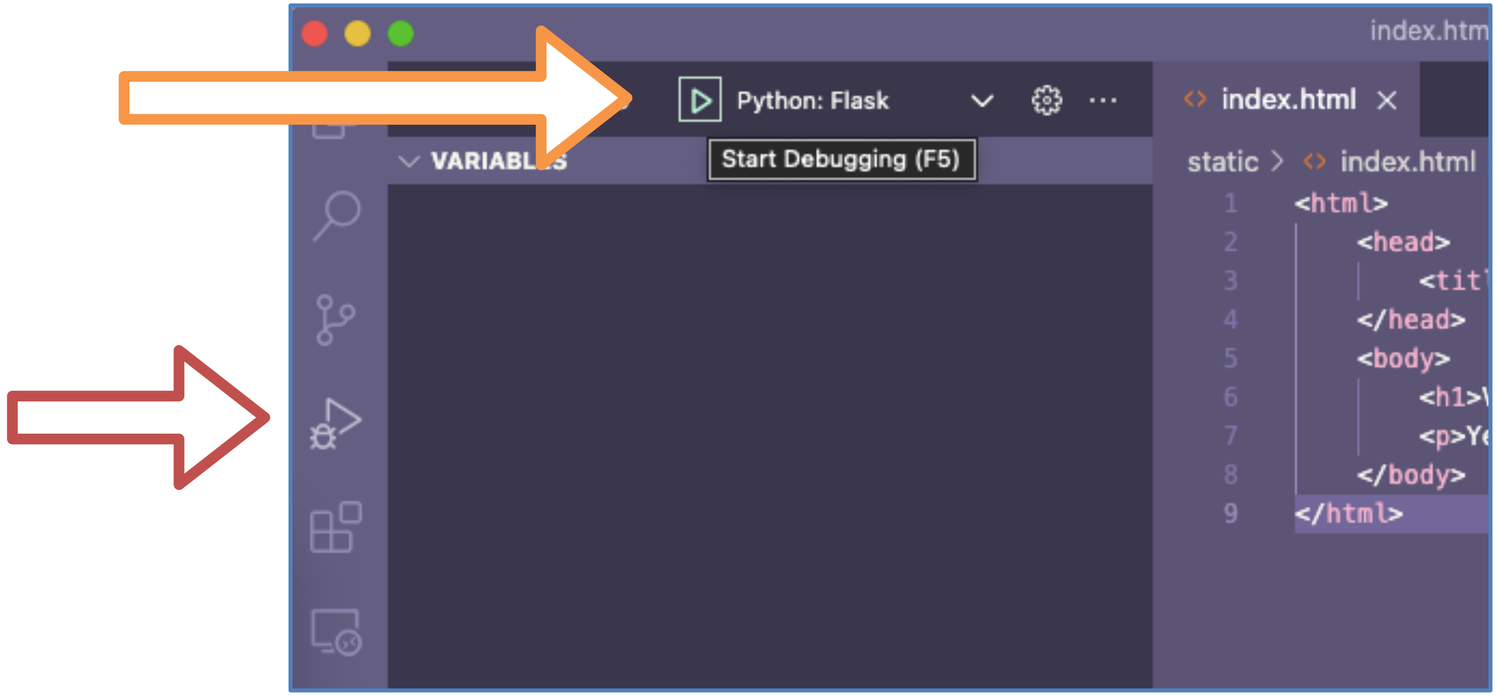
Open code in container

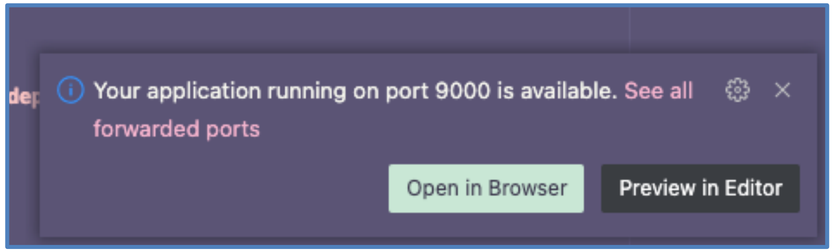


Editing, with help

- You can now make changes in the code,
  - And you can run the app in the container.
  - VS:Code helps you with Python coding.
  - The git client helps you with commits, etc.
  - Plugins help you with security.

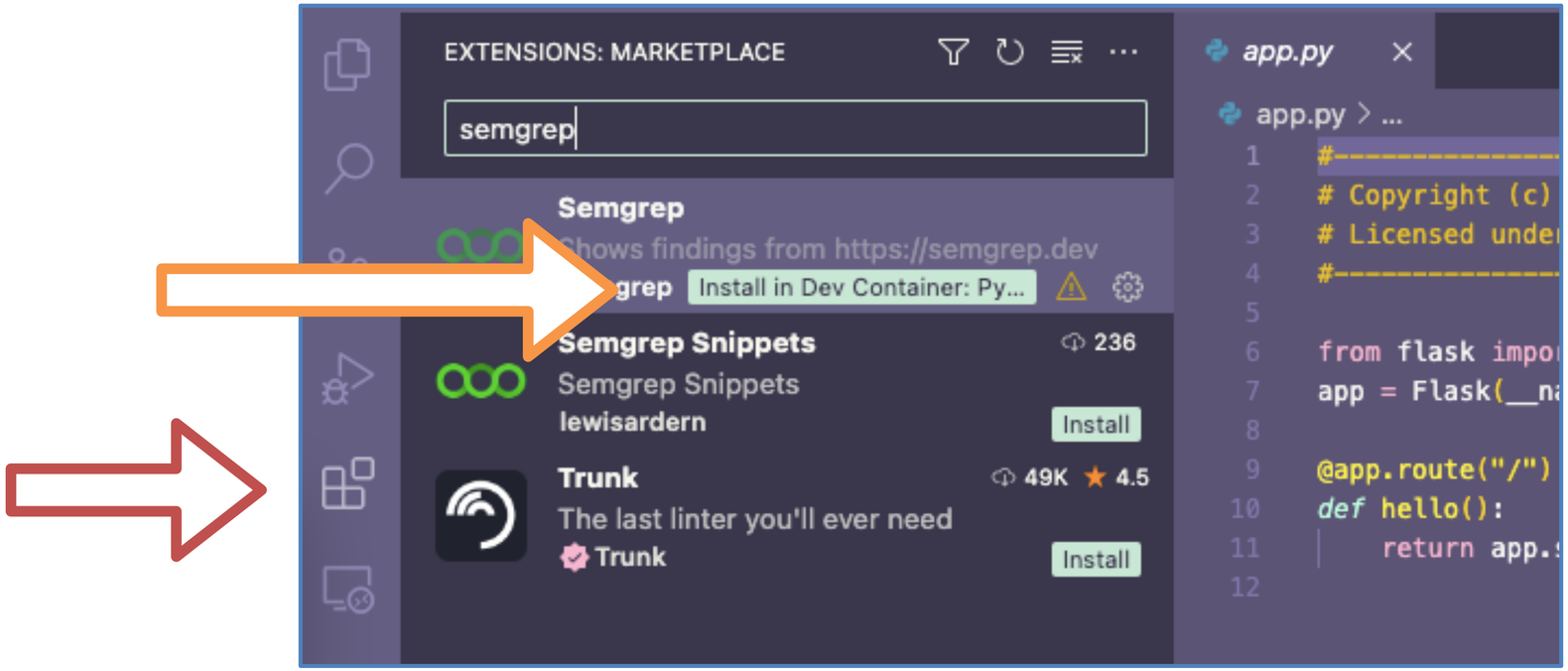
Run and debug





Security checks

- Search for the extension "Semgrep".
  - Click "*Install in dev container*".



Security checks

- We will look at Semgrep later,
  - In the DevSecOps class.
  - It checks your code for security mistakes!

- This example project isn't a good example.
  - You could try it with OWASP SKF Labs. 😷

Closing

Homework

- Remember the CIS Benchmarks?
- Clone the Ansible Lockdown repository
  - https://github.com/ansible-lockdown/RHEL7-CIS

- Read and understand the Ansible Playbooks.
- Harden your Ansible server with the playbooks.
  - DO NOT apply to the target hosts, only to "ansible".

This was it!

- Thank you so much.
  - I've had a lot of fun! 😁

- Good luck, to all of you! 🍀

Reference materials

Resources

- A breakdown of container runtimes
- When not to use Docker
- 3 Types of container runtimes
- Podman and Buildah, for Docker users
- docker-compose, vs podman-compose
- VSCode - Develop with containers

Resources

- Docker cheatsheet
-