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Debian

Podman and Toolbox in Debian (and Potentially Ubuntu): An Efficient Guide

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Date: 2023-05-27

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To set up Podman on Ubuntu, begin by preparing a user and group. Next, install OpenSSH on WSL and generate keys. Then, generate the keys as instructed. If you encounter an error message, refer to the guidance at https://www.garron.me/en/linux/sshd-no-hostkeys-available-exiting.html for a solution. After that, jump into the Ubuntu box and prepare the necessary Podman components. Finally, follow the instructions provided on the Podman site to install it into Ubuntu. Once complete, run the command and you will be able to view the Podman server information.

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A quick guide to podman and tool box in Debian (and maybe Ubunt u)

In the past few years, I have been extensively exploring containerized development environments technologies like WSL2 and Crostini. Additionally, I keep up with ` `systemd` ` , ` `cgroup2` ` , ` `podman` ` , and various other technologies by running Fedora on a NUC. However, during my visit to FOSDEM20 with my Debian laptop, I

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Related questions

What is the best version of podman to use?

In case you are using an older version of podman (pre-3.1.0), it is advisable to continue using the legacy podman-compose 0.1.x branch. This branch employs mappings and workarounds to overcome the rootless limitations. However, if you have access to modern podman versions (>=3.4), you can opt for the latest and stable 1.x branch, was excited to experiment with Podman and Toolbox in their native environment.

Why ` podman ` is important

Back in the day, ` docker ` included both daemon and tools in its bundle. While the bundle was eventually separated, the formulaic use of the ` docker ` command was ingrained in many of us. As a result, it's common to find legacy packages still present in our systems today.

Personally, I recognized the necessity of decoupling to attain rootless containers, registry-side building, and interchangeable runtimes. However, with the abundance of options available, I was cautious about having too many tools with similar functionalities on my system. Consequently, I stuck with the packages provided by ` docker-ce ` .

I think that ` podman ` is a suitable substitute for my requirements. However, if you prefer to experiment with ` toolbox ` , then you must have ` podman ` , even though you'll be pleased with it. This entire stack is integrated and tested in Fedora before being tested in other RPM-based distributions, let alone Debian derivatives. Although it requires some effort, the outcomes and fundamental functionalities are quite similar. Let's get started.

Installing ` podman ` and ` toolbox ` in Debian

as these versions do not have such limitations.

Can I run podman on a Mac?

I suggest exploring podman, a container multi-tool that supports Mac and WSL2 through its remote-client feature. Additionally, you can discover related technologies like conmon by watching the FOSDEM session titled "Podman - The Powerful Container Multi-Tool.

What is compose spec with podman backend?

This project is centered around utilizing Podman as a backend for Compose Spec implementation. Its key feature is the absence of a daemon process model, as Podman is executed directly without the need for a

During my time at FOSDEM, there were two individuals who presented, one from SUSE and the other from Red Hat. They questioned the availability of ` **podman** ` and ` **toolbox** ` on Debian and its derivatives like Ubuntu. Although they believed it was available, they were uncertain. It should be noted that there is a snap by Ondrej with the name "toolbox," but this is not the subject matter being discussed.

- To install ` **podman** ` , one can use openSUSE's Kubic builds which provide ` **deb** ` packages compatible with Debian and Ubuntu. Despite some difficulties during installation, efforts are being made to add this package to Debian's official repository.
- To fetch a release of the shell script ` **toolbox** ` , simply place it in your designated ` **PATH** ` folder. Prior to installation, ensure that you have ` **flatpak** ` installed, as it is necessary for proper functionality. Note that your desktop system may not require additional dependencies, although I did find that I was missing ` **sudo apt install flatpak -y** ` on my reasonably vanilla set up.

Before proceeding, it is vital to note that the rootless magic heavily depends on user namespaces. Therefore, it is crucial to comprehend the security implications

running daemon. Additionally, the project is designed as a standalone python script that can be easily incorporated into your PATH and executed.

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associated with ` **echo 1 | sudo tee /proc/sys/kernel/unprivileged_userns_clone** ` .

What can ` toolbox ` do?

Fedora Silverblue utilizes ` **toolbox** ` to offer a changeable workspace on an operating system that is mostly unchangeable, like Silverblue or CoreOS. For more details, you can refer to Rishi's presentation.

Given that we are utilizing Debian in an environment that I frequently change, the aforementioned aspect holds less significance. However, it is still imperative that our working environment is seamless and uncomplicated to enter and exit.

You may be curious about the distinction between having a pet ` **docker run -it ... /bin/bash** ` or a playground VM with ` **libvirt** ` or ` **lxd** ` in a public cloud, VPS provider, or elsewhere, versus having a customized setup using a combination of ` **pyenv** ` or ` **nix-shell** ` .

Contrary to other options, ` **toolbox** ` applies an environment overlay onto your profile, preserves shell settings, and assists users in troubleshooting as if on the host. Thus, there's no need to concern yourself with tasks such as mounting a ` **9p** ` filesystem, synchronizing files, or adjusting ownership.

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Upon entering the ` toolbox ` setting, it offers a familiar ambiance while any modifications made outside of your profile are confined within the container. To illustrate this point:

```
bureado@crucia:~$ echo hi-from-host > hello
bureado@crucia:~$ htop -v
Command 'htop' not found, but can be installed with:
sudo apt install htop
bureado@crucia:~$ toolbox enter --container debian-too
bureado@toolbox:~$ cat hello && echo hi-from-container
hi-from-host
bureado@toolbox:~$ htop -v
htop 2.2.0 - (C) 2004-2019 Hisham Muhammad
Released under the GNU GPL.
bureado@toolbox:~$ logout
bureado@crucia:~$ cat hello
hi-from-container
```

This demonstration illustrates how I transitioned from using my laptop (` crucia `) to the container (` toolbox `), while maintaining consistency in my profile modifications and shared files. Additionally, any earlier additions (such as the ` apt install htop ` created in ` toolbox `) were also transferred to the container.

The role of ` podman `

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Referring back to our earlier conversation, it's worth noting that ` **toolbox** ` is indeed a script. This script spans over 2.5K lines of code and features nearly 60 references to ` **podman** ` . Therefore, ` **podman** ` deserves recognition as the true hero of this scenario. Running ` **toolbox list** ` would yield the following result:

```
bureado@crucia:~$ toolbox list
IMAGE ID      IMAGE NAME                          CREATED
b31c77acc328  localhost/debian-toolbox:latest     About a
1787a6a86277  localhost/ubuntu-toolbox:latest     3 hours
CONTAINER ID  CONTAINER NAME         CREATED
267d9c17c3f8  debian-toolbox-latest  About an hour ago
baf2ed3ece9b  ubuntu-toolbox-latest  3 hours ago
```

The output of ` **docker ps** ` displays a pair of OCI container images and two running containers. Interestingly, ` **podman** ` is capable of reproducing this exact outcome.

```
bureado@crucia:~$ podman images
REPOSITORY                 TAG        IMAGE ID      C
localhost/debian-toolbox   latest     b31c77acc328  A
localhost/ubuntu-toolbox   latest     1787a6a86277  3
docker.io/library/ubuntu   19.04      c88ac1f841b7  2
docker.io/library/debian   unstable   0e26bcfa03fc  5
```

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```
bureado@crucia:~$ podman ps
CONTAINER ID  IMAGE                            COMMAND
267d9c17c3f8  localhost/debian-toolbox:latest  toolbox
baf2ed3ece9b  localhost/ubuntu-toolbox:latest  toolbox
```

With the help of ` **podman** ` , I can perform various operations, such as ` **start** ` , ` **stop** ` , and ` **run** ` , without requiring root access. Moreover, I can utilize ` **podman** ` to construct and execute a Dockerfile effortlessly, as demonstrated below.

```
bureado@crucia:~$ podman build . -t debian-toolbox
STEP 1: FROM docker.io/library/debian:unstable
STEP 2: ENV NAME=debian-toolbox VERSION=unstable
--> Using cache 96545d7a49c3a47a39cb9f2fc8c6b40d5240b0
...
```

I recommend checking out ` **podman** ` as it provides remote-client support, allowing it to be compatible with Mac and even WSL2.

In addition to ` **podman** ` , there are supporting technologies like ` **conmon** ` that you can explore further by watching the FOSDEM session titled "Podman - The Powerful Container Multi-Tool.

Where did the image come from?

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As you might have observed in my output, there are a couple of containers marked with ` **(debian|ubuntu)-toolbox-latest** ` that rely on two distinct images identified by ` **(debian|ubuntu)-toolbox** ` . This begs the question, where did these images originate? (It's worth noting that this article can be useful for Ubuntu users as well as Debian users.)

The purpose of this image is to mimic your real host working environment for consistency. It requires two specific ` **LABEL** ` statements to be included so that ` **toolbox** ` can process them accurately.

An instance of a Debian image for the toolbox is presented, showcasing the installation of supplementary packages and declaration of labels.

After completing the tasks with ` **podman** ` , you can direct ` **toolbox** ` to identify the image and establish a backup container for you to ` **enter** ` . In summary, the process appears as follows:

```
podman build -t debian-toolbox -f Dockerfile
toolbox create -i localhost/debian-toolbox:latest
toolbox enter -c debian-toolbox-latest
```

Whenever you perform ` **toolbox enter** ` , you have the ability to modify the system without tainting your primary

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one, with the exception of the files in your profile. Through this procedure and examining the code, I gained valuable knowledge about the fundamental technology.

Over the next few months, I'll assess this by comparing it to my current setup, which involves utilizing ` nix ` and ` venv ` in conjunction with exploring novel technology options that are relevant to this area. This may encompass investigating alternative tools in the tech stack, such as ` buildah ` and ` skopeo ` , as well as exploring MicroK8s.

If you discover this to be helpful and/or fascinating, kindly inform me, and feel free to leave any remarks!
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These days, Linux or Mac are the go-to operating systems for development projects. This makes it simple to begin using Podman on these systems, allowing us to concentrate solely on delivering our objectives.

Assuming that we are operating within a Windows environment with WSL2 as its foundation, how can we continue to utilize Podman (as a substitute for Docker) on this system?

After extensively reading numerous articles, I have come to the conclusion that enabling Podman on Windows + WSL2 is a complex process that requires handling multiple exceptional cases. The outcome of this process is uncertain, and I am unsure if it will work as intended.

In order to provide a reference for others to set up a containerized environment for developing container-driven applications, I have written down some tips and tricks that worked for me on Windows 11 with WSL2 (Ubuntu 20).

To begin with, there are four simple steps that I need to run daily for Podman to function properly. After that, we will explore the installation process and functionality of Podman on Windows.

Step 1: Start the Podman machine

Launch your Ubuntu box (WSL2) and enter the command.

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```
> podman machine start
```

You will get an error like

```
INFO[0000] waiting for clients...
INFO[0000] listening tcp://0.0.0.0:7777
INFO[0000] new connection from @ to /mnt/wslg/runtime-(
Waiting for VM ...
Could not access KVM kernel module: Permission denied
qemu-system-x86_64: failed to initialize KVM: Permissi(
Error: dial unix /mnt/wslg/runtime-dir/podman/podman-ma
ERRO[0003] cannot receive packets from @, disconnecting
```

Upon conducting a search on Google, I have discovered the solution to successfully operate it.

```
> sudo chmod 666 /dev/kvm
```

Execute the aforementioned command once more.

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```
> podman machine start
```

The message should be visible if everything is working properly.

```
INFO[0000] waiting for clients...
INFO[0000] listening tcp://0.0.0.0:7777
INFO[0000] new connection from @ to /mnt/wslg/runtime-
Waiting for VM ...
Machine "podman-machine-default" started successfully
```

Step 2: Start ssh service on Ubuntu

Type the command

```
$ sudo service ssh start
```

You should see

```
 * Starting OpenBSD Secure Shell server sshd
```

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Step 3: Podman to bind the Unix socket so that the remote client can connect to

Run the command below

```
> podman system service --time=0 unix:///mnt/wslg/runt
```

Step 4: Connect to Podman by using Podman remote client from Windows 11

```
> podman system connection add wsl --identity C:\Users
```

Then

```
> podman images
```

You should see

```
REPOSITORY                         TAG
docker.io/library/postgres         11
docker.io/library/postgres         12
mcr.microsoft.com/dotnet/sdk       6.0
mcr.microsoft.com/dotnet/core/sdk  3.1
docker.io/library/rabbitmq         3.8-management-alpi
docker.io/library/golang           1.17.3-buster
docker.io/openpolicyagent/opa      0.35.0
docker.io/library/postgres         11-alpine
docker.io/library/postgres         12-alpine
docker.io/library/hello-world      latest
docker.io/library/redis            6.2.5-alpine
docker.io/openzipkin/zipkin        2.22.1
docker.io/mailhog/mailhog          v1.0.1
```

On a daily basis, to commence working in the Podman development environment, that's the task I need to undertake.

Setup Podman on Ubuntu 20 (WSL2) step by step

Preparation your WSL2 with Ubuntu 20

```
> wsl # make sure you have WSL2 run on your machine
```

In case WSL2 is not installed on your device, kindly refer to the installation guide available at https://docs.microsoft.com/en-us/windows/wsl/install.

Then you can run

```
> wsl --list
```

You should see

```
Windows Subsystem for Linux Distributions:
Ubuntu-20.04 (Default)
docker-desktop
docker-desktop-data
```

In case you do not possess ` **`Ubuntu-20.04`** ` , you can acquire it by adhering to the instructions provided on https://www.omgubuntu.co.uk/how-to- install-wsl2 -on-windows-10.

Impressive! You seem prepared for this adventure.

Jump into Ubuntu box and prepare Podman stuff

```
> export NAME=xUbuntu
> export VERSION_ID=20.04
> export WINDOWS_HOME=/mnt/c/Users/
```

The guidance provided by the Podman site was followed to install it on Ubuntu.

```
$ apt update
$ sudo sh -c "echo 'deb http://download.opensuse.org/re
> wget -nv https://download.opensuse.org/repositories/
$ sudo apt-key add - < Release.key
$ sudo apt-get update -qq
$ sudo apt-get -qq -y install podman
$ sudo mkdir -p /etc/containers
> echo -e "[registries.search]\nregistries = ['docker.i
```

Execute the command `` ` > podman info ` `` to view the details of the Podman server.

Prepare a user and group for Podman on Ubuntu

```
$ sudo groupadd podman -g 2000
$ sudo useradd podman -u 2000 -g 2000
```

```
# add your user to podman group
$ sudo usermod -a -G podman $USER
```

Install OpenSSH on WSL and generate keys

```
$ sudo apt-get -qq -y install openssh-server
$ sudo service ssh start
```

Next, the keys can be produced in the following manner.

```
> export WINDOWS_HOME=/mnt/c/Users//
> ssh-keygen -b 2048 -t rsa -f $WINDOWS_HOME/.ssh/id_r
> mkdir ~/.ssh
> cat $WINDOWS_HOME/.ssh/id_rsa_localhost.pub >> ~/.ss
```

At times, an error message with the code ` **`sshd: no hostkeys available -- exiting`** ` may appear. To resolve this issue, refer to the instructions mentioned on https://www.garron.me/en/linux/sshd-no-hostkeys-available-exiting.html.

Install ` quemu ` and ` gvproxy `

```
> apt install qemu-kvm libvirt-daemon-system libvirt-c
```

Upon initiating Podman, in the event of encountering an error, the following occurs.

```
Error: unable to start host networking: "could not fin
```

Firstly, it is necessary to download ` **gvproxy** ` from ` **gvproxy** ` and extract it to ` **/usr/local/libexec/podman** ` for installation on your device. Once it is installed, proceed to open ` **~/.config/containers/containers.conf** ` and add the required information.

```
helper_binaries_dir = ["/usr/local/libexec/podman"]
```

Execute the ` **> podman machine start** ` once more, and the machine should be operational.

Once these steps are completed, launching WSL2 with Ubuntu 20 distribution will only require following the 4 easy steps outlined in this article to get started with your environment. Enjoy your hacking!

There have been various conversations regarding the installation of Podman on Windows along with WSL2 (Ubuntu 20 distro).

- Check out the pull request numbered 12503 on the Podman repository on GitHub.
- The link provided directs to issue #12056 on the Podman GitHub repository.
- This link directs to the issue page of tye repository on GitHub with the issue number 1255.

Other References:

- Check out the blog post on DevCon5's website, published on October 14th, 2021, regarding the use of Podman on Windows.
- Check out the website of Red Hat's Sysadmin for an article about revisiting the replacement of Docker with Podman on Mac.
- Check out the article on the architecture of Mac machines and how to use Podman on them, available on Red Hat's sysadmin website.

- The discussion thread located at the following URL concerns Podman, a container management tool: https://github.com/containers/podman/discussions/12649
- The image used for the cover has been replicated from the website https://mkdev.me/en/posts/dockerless-part-3-moving-development-environment-to-containers-with-podman.

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Enable podman behavior as docker

enable podman behavior as docker

```
sudo sed -i 's/short-name-mode="enforcing"/short-name-
```

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