

Laporan Praktek Topik Khusus 9

Instalasi & Konfigurasi Docker



SEMESTER VI

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**PROGRAM STUDI D4 TEKNOLOGI REKAYASA
PERANGKAT LUNAK
JURUSAN TEKNOLOGI INFORMASI**

A. Landasan Teori

1. Windows Subsystem for Linux (WSL) :

WSL adalah fitur dari sistem operasi Windows yang memungkinkan pengguna untuk menjalankan lingkungan GNU/Linux secara langsung di Windows, tanpa harus menggunakan mesin virtual (Virtual Machine) secara penuh. Versi terbaru, **WSL2**, menggunakan kernel Linux asli yang mendukung sistem file yang lebih cepat dan kompatibilitas lebih baik dengan tool berbasis Linux seperti Docker. Dengan WSL2, pengguna Windows dapat menjalankan container Docker **secara native**, tanpa harus bergantung pada teknologi virtualisasi berat seperti Hyper-V atau VirtualBox.

2. Docker dan Container :

Docker adalah platform open-source yang dirancang untuk mengembangkan, mengirimkan, dan menjalankan aplikasi dalam unit terisolasi yang disebut container. Container berisi semua dependensi aplikasi, seperti kode, pustaka, dan konfigurasi, sehingga menjamin konsistensi aplikasi saat dipindahkan antar lingkungan. Docker bekerja sangat baik di lingkungan Linux karena container dibangun di atas fitur kernel Linux seperti cgroups dan namespaces. Oleh karena itu, menjalankan Docker melalui WSL2 menciptakan kondisi ideal untuk penggunaan container di sistem operasi Windows.

B. Tools

- Ubuntu (melalui WSL2)

C. Langkah Kerja

1. Instalasi dan Konfigurasi

- Create user ubuntu for wsl

```
rziqns@WIN-KL41ST0GR0L: ~  
Please create a default UNIX user account. The username does not need to match your Windows user name.  
For more information visit: https://aka.ms/wslusers  
Enter new UNIX username: rziqns  
New password:  
Retype new password:  
passwd: password updated successfully  
Installation successful!  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 5.10.16.3-microsoft-standard-WSL2 x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:        https://ubuntu.com/pro  
  
System information as of Tue May 13 17:05:28 +07 2025  
  
System load:  0.45          Processes:      9  
Usage of /:   0.4% of 250.98GB Users logged in:   0  
Memory usage: 1%          IPv4 address for eth0: 172.27.244.109  
Swap usage:   0%  
  
This message is shown once a day. To disable it please create the  
/home/rziqns/.hushlogin file.  
rziqns@WIN-KL41ST0GR0L:~$
```

- *sudo apt update* Memperbarui daftar paket dari repository agar sistem tahu versi terbaru dari software yang tersedia.

```
rziqns@WIN-KL41ST0GR0L:~$ sudo apt update  
[sudo] password for rziqns:  
Hit:1 http://archive.ubuntu.com/ubuntu jammy InRelease  
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [129 kB]  
Get:3 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]  
Get:4 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]  
Get:5 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2312 kB]  
Get:6 http://archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]  
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [352 kB]  
Get:8 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [13.6 kB]  
Get:9 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [3366 kB]  
Get:10 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [601 kB]  
Get:11 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [624 B]  
Get:12 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [974 kB]  
Get:13 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [210 kB]  
Get:14 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [21.7 kB]  
Get:15 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [39.6 kB]  
Get:16 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [8716 B]  
Get:17 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [368 B]  
Get:18 http://archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]  
Get:19 http://archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]  
Get:20 http://archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]  
Get:21 http://archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]  
Get:22 http://archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]  
Get:23 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2556 kB]  
Get:24 http://archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [415 kB]  
Get:25 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [18.5 kB]  
Get:26 http://archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [3485 kB]  
Get:27 http://archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [620 kB]  
Get:28 http://archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [676 B]  
Get:29 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1203 kB]  
Get:30 http://archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [297 kB]  
Get:31 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [28.7 kB]  
Get:32 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [46.5 kB]  
Get:33 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.8 kB]  
Get:34 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [592 B]  
Get:35 http://archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [68.8 kB]  
Get:36 http://archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.4 kB]  
Get:37 http://archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [392 B]  
Get:38 http://archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]  
Get:39 http://archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [30.0 kB]  
Get:40 http://archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.5 kB]  
Get:41 http://archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]  
Get:42 http://archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]  
Fetched 37.5 MB in 13s (2944 kB/s)  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
87 packages can be upgraded. Run 'apt list --upgradable' to see them.  
rziqns@WIN-KL41ST0GR0L:~$
```

- *sudo apt install ca-certificates curl gnupg lsb-release -y* Menginstal dependensi penting yang dibutuhkan untuk mengunduh dan menambahkan repository pihak ketiga:
 - ca-certificates: validasi HTTPS
 - curl: unduh file dari internet
 - gnupg: verifikasi integritas file via GPG key
 - lsb-release: mendeteksi versi Ubuntu

```

rzi@WIN-KL41ST0GR0L: ~
rzi@WIN-KL41ST0GR0L:~$ sudo apt install ca-certificates curl gnupg lsb-release -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
lsb-release is already the newest version (11.1.0ubuntu4).
lsb-release set to manually installed.
ca-certificates is already the newest version (20240203~22.04.1).
ca-certificates set to manually installed.
curl is already the newest version (7.81.0-1ubuntu1.20).
curl set to manually installed.
The following additional packages will be installed:
  dirnmgpr gnupg-l10n gnupg-utils gpg gpg-agent gpg-wks-client gpg-wks-server gpgconf gpgsm gpgv
Suggested packages:
  dbus-user-session pinentry-gnome3 tor parcimonie xloadimage sddm
The following packages will be upgraded:
  dirnmgpr gnupg gnupg-l10n gnupg-utils gpg gpg-agent gpg-wks-client gpg-wks-server gpgconf
  gpgsm gpgv
11 upgraded, 0 newly installed, 0 to remove and 76 not upgraded.
Need to get 2249 kB of archives.
After this operation, 0 B of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gpg-wks-client amd64 2.2.27-3ubuntu2.3 [62.7 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 dirnmgpr amd64 2.2.27-3ubuntu2.3 [293 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gpg-wks-server amd64 2.2.27-3ubuntu2.3 [57.6 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gnupg-utils amd64 2.2.27-3ubuntu2.3 [309 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gpg-agent amd64 2.2.27-3ubuntu2.3 [209 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gpg amd64 2.2.27-3ubuntu2.3 [519 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gpgconf amd64 2.2.27-3ubuntu2.3 [94.4 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gnupg-l10n all 2.2.27-3ubuntu2.3 [54.6 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gnupg all 2.2.27-3ubuntu2.3 [315 kB]
Get:10 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gpgsm amd64 2.2.27-3ubuntu2.3 [198 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gpgv amd64 2.2.27-3ubuntu2.3 [137 kB]
Fetched 2249 kB in 3s (734 kB/s)
(Reading database ... 42578 files and directories currently installed.)
Preparing to unpack .../00-gpg-wks-client_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking gpg-wks-client (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../01-dirnmgpr_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking dirnmgpr (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../02-gpg-wks-server_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking gpg-wks-server (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../03-gnupg-utils_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking gnupg-utils (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../04-gpg-agent_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking gpg-agent (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../05-gpg_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking gpg (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../06-gpgconf_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking gpgconf (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../07-gnupg-l10n_2.2.27-3ubuntu2.3_all.deb ...
Unpacking gnupg-l10n (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../08-gnupg_2.2.27-3ubuntu2.3_all.deb ...
Unpacking gnupg (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...
Preparing to unpack .../09-gpgsm_2.2.27-3ubuntu2.3_amd64.deb ...
Unpacking gpgsm (2.2.27-3ubuntu2.3) over (2.2.27-3ubuntu2.1) ...

```

- *sudo install -m 0755 -d /etc/apt/keyrings*
Membuat direktori untuk menyimpan *GPG keyring* Docker, yang digunakan untuk memverifikasi bahwa file dari Docker benar dan aman.

```

rzi@WIN-KL41ST0GR0L: ~
rzi@WIN-KL41ST0GR0L:~$ sudo install -m 0755 -d /etc/apt/keyrings
rzi@WIN-KL41ST0GR0L:~$

```

- *curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/keyrings/docker.gpg*
Download and store Docker's official GPG key

```

rzi@WIN-KL41ST0GR0L: ~
rzi@WIN-KL41ST0GR0L:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/keyrings/docker.gpg
rzi@WIN-KL41ST0GR0L:~$

```

- *echo *
"deb [arch=\$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.gpg]

```
\ https://download.docker.com/linux/ubuntu \
$(lsb_release -cs) stable" |\
sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
Set up Docker repository
```

```
rzi@WIN-KL41ST0GR0L: ~$ echo \
ch=$(d> "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.gpg] \
> https://download.docker.com/linux/ubuntu \
> $(lsb_release -cs) stable" | \
> sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
rzi@WIN-KL41ST0GR0L: ~$
rzi@WIN-KL41ST0GR0L: ~$
```

- *sudo apt update*
Update package index again (now includes Docker repo)

```
rzi@WIN-KL41ST0GR0L: ~$ sudo apt update
Hit:1 http://security.ubuntu.com/ubuntu jammy-security InRelease
Get:2 https://download.docker.com/linux/ubuntu jammy InRelease [48.8 kB]
Get:3 https://download.docker.com/linux/ubuntu jammy/stable amd64 Packages [48.8 kB]
Hit:4 http://archive.ubuntu.com/ubuntu jammy InRelease
Hit:5 http://archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:6 http://archive.ubuntu.com/ubuntu jammy-backports InRelease
Fetched 97.6 kB in 14s (7015 B/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
76 packages can be upgraded. Run 'apt list --upgradable' to see them.
rzi@WIN-KL41ST0GR0L: ~$
```

- *sudo apt install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin*

Install Docker Engine and related components

```
rzi@WIN-KL41ST0GR0L: ~$ sudo apt install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-
compose-plugin
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  dbus-user-session docker-ce-rootless-extras libltdl7 libslirp0 pigz slirp4netns
Suggested packages:
  cgroupfs-mount | cgroup-lite
The following NEW packages will be installed:
  containerd.io dbus-user-session docker-buildx-plugin docker-ce docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin libltdl7 libslirp0 pigz slirp4netns
0 upgraded, 11 newly installed, 0 to remove and 76 not upgraded.
Need to get 120 MB of archives.
After this operation, 440 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 https://download.docker.com/linux/ubuntu jammy/stable amd64 containerd.io amd64 1.7.27-1 [30.5 MB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/universe amd64 pigz amd64 2.6-1 [63.6 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 dbus-user-session amd64 1.12.20-2ubuntu4.1 [9
442 B]
Get:4 http://archive.ubuntu.com/ubuntu jammy/main amd64 libltdl7 amd64 2.4.6-15build2 [39.6 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/main amd64 libslirp0 amd64 4.6.1-1build1 [61.5 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy/universe amd64 slirp4netns amd64 1.0.1-2 [28.2 kB]
Get:7 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-buildx-plugin amd64 0.23.0-1~ubuntu.
22.04~jammy [34.7 MB]
Get:8 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-ce-cli amd64 5:28.1.1-1~ubuntu.22.04
~jammy [15.8 MB]
Get:9 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-ce amd64 5:28.1.1-1~ubuntu.22.04~jam
my [19.2 MB]
Get:10 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-ce-rootless-extras amd64 5:28.1.1-1
~ubuntu.22.04~jammy [6094 kB]
Get:11 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-compose-plugin amd64 2.35.1-1~ubunt
u.22.04~jammy [13.8 MB]
Fetched 120 MB in 18s (6605 kB/s)
Selecting previously unselected package pigz.
(Reading database ... 42578 files and directories currently installed.)
Preparing to unpack .../00-pigz_2.6-1_amd64.deb ...
Unpacking pigz (2.6-1) ...
Selecting previously unselected package containerd.io.
Preparing to unpack .../01-containerd.io_1.7.27-1_amd64.deb ...
Unpacking containerd.io (1.7.27-1) ...
Selecting previously unselected package dbus-user-session.
Preparing to unpack .../02-dbus-user-session_1.12.20-2ubuntu4.1_amd64.deb ...
Unpacking dbus-user-session (1.12.20-2ubuntu4.1) ...
Selecting previously unselected package docker-buildx-plugin.
Preparing to unpack .../03-docker-buildx-plugin_0.23.0-1~ubuntu.22.04~jammy_amd64.deb ...
Unpacking docker-buildx-plugin (0.23.0-1~ubuntu.22.04~jammy) ...
Selecting previously unselected package docker-ce-cli.
Preparing to unpack .../04-docker-ce-cli_5%3a28.1.1-1~ubuntu.22.04~jammy_amd64.deb ...
Unpacking docker-ce-cli (5:28.1.1-1~ubuntu.22.04~jammy) ...
Selecting previously unselected package docker-ce.
Preparing to unpack .../05-docker-ce_5%3a28.1.1-1~ubuntu.22.04~jammy_amd64.deb ...
Unpacking docker-ce (5:28.1.1-1~ubuntu.22.04~jammy) ...
Selecting previously unselected package docker-ce-rootless-extras.
```

- *docker version*

Memeriksa apakah docker sudah terinstall dengan benar

```

rznigs@WIN-KL41ST0GR0L: ~
rznigs@WIN-KL41ST0GR0L:~$ docker version
Client: Docker Engine - Community
Version: 28.1.1
API version: 1.49
Go version: go1.23.8
Git commit: 4eba377
Built: Fri Apr 18 09:52:10 2025
OS/Arch: linux/amd64
Context: default
Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?
rznigs@WIN-KL41ST0GR0L:~$

```

- Perintah ini digunakan untuk memeriksa status layanan Docker jika tidak menggunakan systemctl

```

rznigs@WIN-KL41ST0GR0L:~$ ps aux | grep dockerd
root      1407   0.0  0.0   8916   5212 pts/0    S    17:41   0:00 sudo dockerd
root      1408   0.0  0.0   8916   880 pts/1    Ss+  17:41   0:00 sudo dockerd
root      1409   0.2  1.2 2044500 78176 pts/1    Sl   17:41   0:00 dockerd
rznigs    1613   0.0  0.0   4024   2076 pts/0    S+   17:45   0:00 grep --color=auto dockerd

rznigs@WIN-KL41ST0GR0L:~$ ls -l /var/run/docker.sock
srw-rw---- 1 root docker 0 May 13 17:41 /var/run/docker.sock
rznigs@WIN-KL41ST0GR0L:~$ docker info
Client: Docker Engine - Community
Version: 28.1.1
Context: default
Debug Mode: false
Plugins:
 buildx: Docker Buildx (Docker Inc.)
   Version: v0.23.0
   Path: /usr/libexec/docker/cli-plugins/docker-buildx
 compose: Docker Compose (Docker Inc.)
   Version: v2.35.1
   Path: /usr/libexec/docker/cli-plugins/docker-compose

```

D. Kesimpulan

Praktik instalasi dan konfigurasi Docker menggunakan WSL2 tanpa Docker Desktop menunjukkan bahwa Docker dapat dijalankan secara langsung di Ubuntu WSL2 dengan ringan dan efisien, tanpa ketergantungan pada GUI atau lisensi Docker Desktop. Meskipun WSL2 tidak mendukung systemd, sehingga perintah seperti systemctl tidak bisa digunakan, Docker daemon (dockerd) tetap dapat dijalankan secara manual dan digunakan oleh perintah docker. Setelah daemon aktif dan hak akses user dikonfigurasi (dengan menambahkan ke grup docker), Docker berfungsi dengan baik dan dapat menjalankan container seperti hello-world. Praktik ini cocok untuk lingkungan pengembangan ringan, tetapi memerlukan tambahan konfigurasi untuk otomatisasi daemon dan pengelolaan layanan karena keterbatasan sistem init di WSL2.