

Snap in openSUSE MicroOS Desktop

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Disclaimers

- This is an opinionated presentation
- They are my views and not affiliated with any project
- If you don't agree with my views, it's ok



What is Snap?



Snap

- Packages for
 - Desktop
 - Cloud
 - IoT
- Easy to install ⚠
- Secure (?)
- Cross-platform
- Dependency-free
- Developed by Canonical



What is snap, snapd, snapcraft?



Snap, Snapd, Snapcraft

- Snap
 - both the command line interface and the application package format
- Snapd
 - the background service that manages and maintains your snaps
- Snapcraft
 - the command and the framework used to build your own snaps



Does Snap Popular?



2019

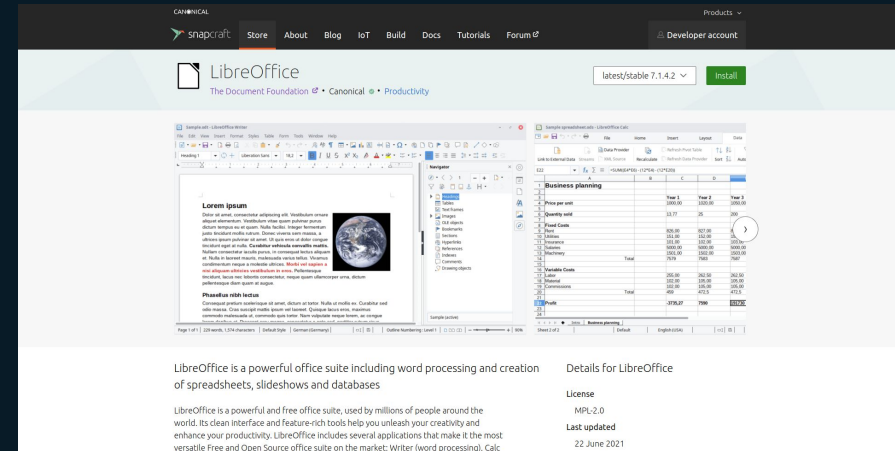
LibreOffice Asia Conference 2019

“LibreOffice Flatpak, Snap and AppImage”

<https://blog.kukuh.syafaat.id/slides/LibreOffice-Asia-Conference-2019/LO-IP-Flatpak-Snap-AppImage.pdf>

<https://www.youtube.com/watch?v=9oP2496lQ9U>

LibreOffice Snap



The screenshot shows the LibreOffice Snap website. At the top, there's a navigation bar with links to Store, About, Blog, IoT, Build, Docs, Tutorials, and Forum. Below this, the LibreOffice logo is displayed with the tagline "The Document Foundation". To the right of the logo, there's a dropdown menu for "latest/stable 7.1.4.2" and an "Install" button. The main content area features a large image of the LibreOffice application interface, showing a word processor window with a document titled "Lorem ipsum" and a spreadsheet window titled "Business planning". Below the image, there's a section titled "LibreOffice is a powerful office suite including word processing and creation of spreadsheets, slideshows and databases". To the right of this section, there's a "Details for LibreOffice" section with information about the license (MPL-2.0), the last updated date (22 June 2021), and a link to the developer account.

LibreOffice is a powerful office suite including word processing and creation of spreadsheets, slideshows and databases

Details for LibreOffice

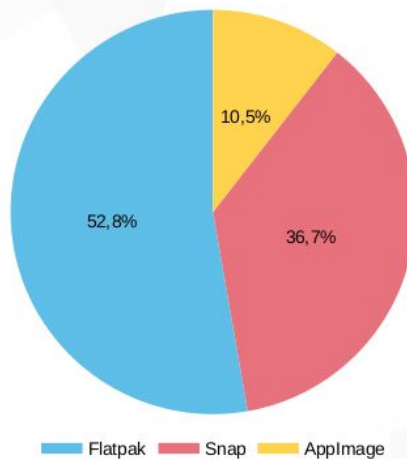
License
MPL-2.0

Last updated
22 June 2021



Using Which? Flatpak/Snap/AppImage?

▼ n = 19



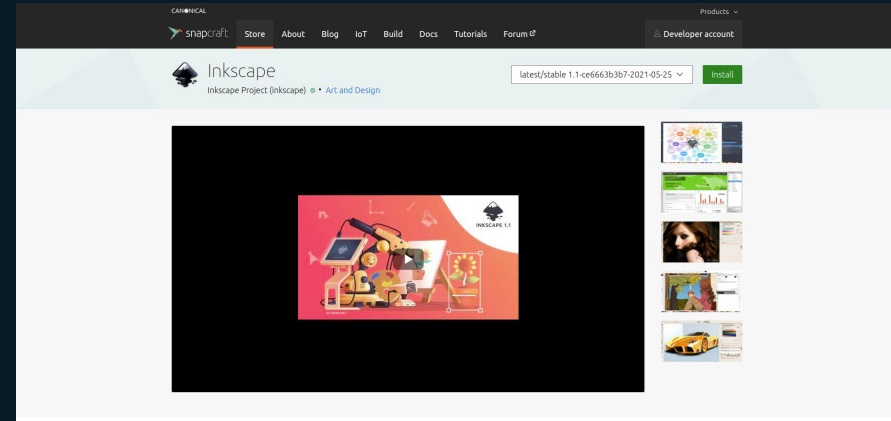
2020

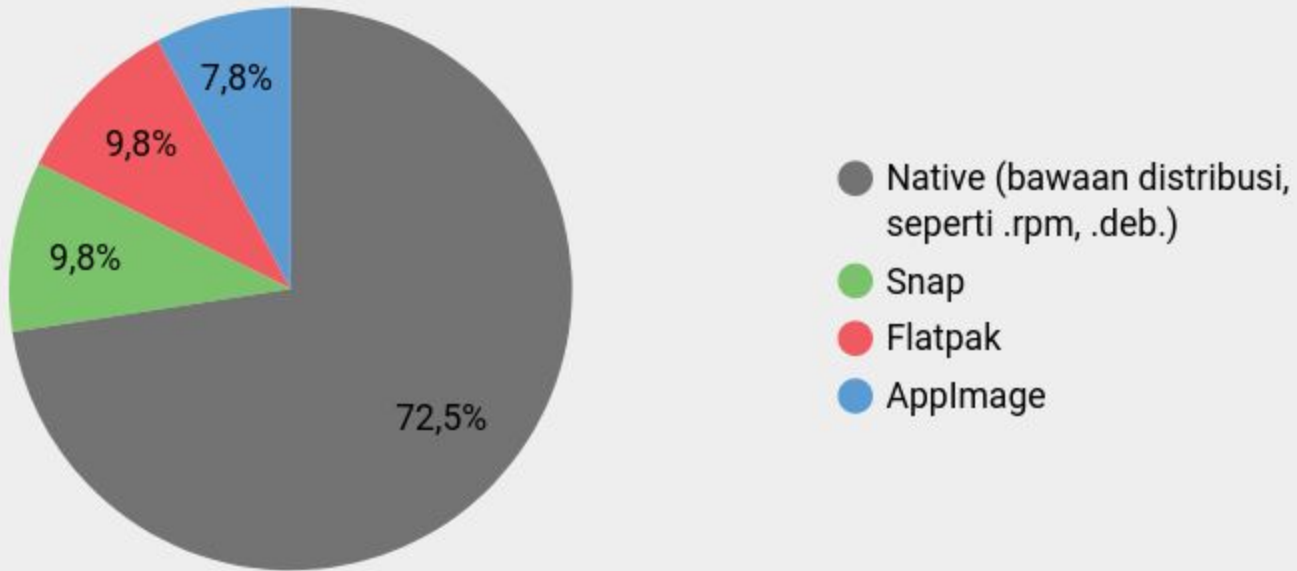
Gimpscape Artweek 2020

“Inkscape Users Survey (Indonesian)” based
on Inkscape l10n

<https://blog.kukuh.syafaat.id/2020/Gimpscape-Artweek/>

Inkscape Snap





2021

Akademy 2021

“KDE is All About the Apps “

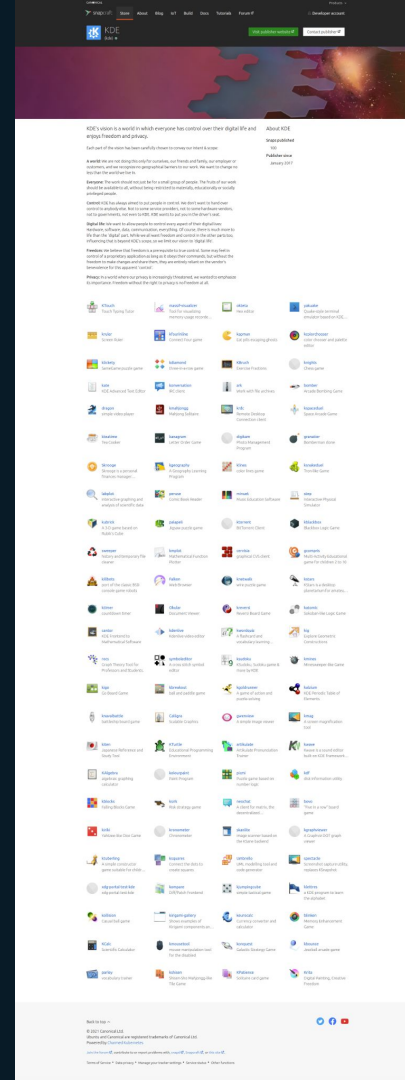
Aleix Pol Gonzalez (KDE)

<https://conf.kde.org/event/1/contributions/6/attachments/6/6/1.1%20aleixpol-appsgoal.pdf>

<https://www.youtube.com/watch?v=j7gkmawsVS8>



KDE in Snap





Snap

- KF5 snaps with over 500 000 active devices
- Okular & Krita over 50 000 active devices
- A lot of applications between 5 000 and 15 000 active devices
- Over 100 published apps

What can we learn from this?



What is MicroOS?



MicroOS

According to openSUSE wiki, openSUSE MicroOS is an operating system you don't have to worry about. It's designed for but not limited to container hosts and edge devices.

openSUSE MicroOS inherits the openSUSE Tumbleweed and SUSE Linux Enterprise knowledge while redefining the operating system into a small, efficient and reliable distribution.



MicroOS

- Get: <http://get.opensuse.org/microos/>
- Wiki: <https://en.opensuse.org/Portal:MicroOS>
- Matrix: #microos-desktop:opensuse.org
- Twitter: @omicroos
- Telegram: https://t.me/openSUSE_MicroOS_Desktop



MicroOS Talks

- openSUSE MicroOS - A New Distro for a New Age
<https://www.youtube.com/watch?v=nlwqzGbX-oc>
- openSUSE MicroOS in Production - Deploying Apps Using Podman
<https://www.youtube.com/watch?v=8gGjcKdOWIc>
- SUSE MicroOS <https://www.youtube.com/watch?v=s5Pj52ffGfw>
- openSUSE MicroOS, a platform for everything from containers, to IoT, and the desktop <https://www.youtube.com/watch?v=HfaXrp4w648>



What is MicroOS Desktop?



MicroOS Desktop

openSUSE MicroOS Desktop is a MicroOS with a desktop-focused variant of MicroOS based on Tumbleweed. MicroOS Desktop is an **immutable**, rolling base as based on Tumbleweed.



MicroOS Desktop

MicroOS + GNOME (Beta)

MicroOS + KDE Plasma (Alpha)



System Role

System Roles are predefined use cases which tailor the system for the selected scenario.

- OS designed for single-purpose systems and optimised for large deployments
- Minimal installation, provides no services by default
- Install software with `transactional-update pkg in`

☐ **MicroOS Container Host**

- MicroOS optimised for hosting container workloads
- Includes Podman Container Runtime by default

☒ **MicroOS Desktop (GNOME) [BETA]**

- MicroOS Desktop with automatic updates and rollback
- Install Apps using `Software`
- Includes Podman Container Runtime by default

☐ **MicroOS Desktop (KDE Plasma) [ALPHA]**

- MicroOS Desktop with automatic updates and rollback
- Install Apps using `Discover`
- Includes Podman Container Runtime by default

☐ **MicroOS with Remote Attestation (Agent) [ALPHA]**

- Same installation as MicroOS role
- Remote attestation agent based on Keylime and TPM2.0 (required hardware)
- Edit `/etc/keylime.conf` and start `keylime_agent.service`

☐ **MicroOS with Remote Attestation (Verifier) [ALPHA]**

- Same installation as MicroOS role
- Remote attestation verifier based on Keylime and TPM2.0 (required hardware)
- Edit `/etc/keylime.conf` and start `keylime_verifier.service`



MicroOS Desktop Talks

- openSUSE MicroOS Desktop - A New openSUSE Desktop Distribution?
<https://www.youtube.com/watch?v=ASSkQH9kNa0>
- Can MicroOS Desktop Be Your "Daily Driver"?
<https://www.youtube.com/watch?v=6F7iCntjWB8>
- MicroOS Desktop: The Road to Daily Driving
<https://www.youtube.com/watch?v=cZLckDUDYjw>



What is Immutable OS?



Immutable OS

- OS that ...
 - ...it can't be changed
 - ...something can't be changed during run time
 - ...you cannot modify
 - ...you cannot install packages
 - ...you will have a hard time installing packages
 - ...you will have a hard time modifying
- / read only
- Snapshot
- Rollback
- Update not touch the running system
- Reboot after update



Immutable OS Example



SILVERBLUE



Immutable OS Comparisons

	MicroOS	Silverblue	Endless
Based	openSUSE Tumbleweed-based	ostree-based (rpm-ostree)	ostree-based (deb-ostree)
Filesystem	BTRFS, with the classic openSUSE subvolumes layout	BTRFS, / and /home subvolumes	Ext4
Package layer	transactional-update tukiit pkcon	rpm-ostree	Not available, truly and fully immutable
Flatpak	Supported Flathub remote	Supported Fedora Flatpak remote	Supported Endless and Flathub remote
Snap	Supported with note 	Silverblue won't snap (https://github.com/coreos/rpm-ostree/issues/1711)	Not supported



Forget to mention



GNOME OS Nightly

Try the latest and greatest GNOME
software in a VM or on real hardware



[Download](#)

This is pre-release software intended for testing and
development. Bad things may happen if you use it in production.



GNOME OS

- Image deliverable of GNOME releases and continuous builds
- Used for testing:
 - Apps
 - UX
 - Hardware
- Using ostree atomic update, with eos-updater and GNOME Software
- I think it's immutable OS, CMIW



Snap in openSUSE Leap, Tumbleweed, MicroOS



Snap in openSUSE (Leap & Tumbleweed)

1. Add repository

```
$ sudo zypper addrepo --refresh  
https://download.opensuse.org/repositories/system:/snappy/{openSUSE_Leap_15.x,openSUSE_Tumbleweed} snappy
```

2. Import gpg key

```
$ sudo zypper --gpg-auto-import-keys refresh
```

3. Dup

```
$ sudo zypper dup --from snappy
```

4. Install snapd

```
$ sudo zypper install snapd
```

5. Enable

```
$ sudo systemctl enable --now snapd  
$ sudo systemctl enable --now snapd.apparmor
```



Snap

- Packages for
 - Desktop
 - Cloud
 - IoT
- **Easy to install** ⚠
- Secure (?)
- Cross-platform
- Dependency-free
- Developed by Canonical



Snap in MicroOS Desktop

Install snap on the system (transactional-update)

```
$ sudo transactional-update shell
# zypper addrepo --refresh
https://download.opensuse.org/repositories/system:/snappy/openSUSE_Tumbleweed
snappy
# zypper --gpg-auto-import-keys refresh
# zypper ref
# zypper dup --from snappy
# zypper in snapd
# exit
$ sudo reboot
```



Snap in MicroOS Desktop (2)

Install snap on the system (tukit)

```
$ sudo tukit --continue execute bash
# zypper addrepo --refresh
https://download.opensuse.org/repositories/system:/snappy/openSUSE_Tumbleweed
snappy
# zypper --gpg-auto-import-keys refresh
# zypper ref
# zypper in snapd
# exit
$ sudo reboot
```



Snap in MicroOS Desktop (3)

- Snap needs /snap
- Remember:
 - Immutable
 - / read only

/dev/loop1	56M	56M	0	100%	/snap/core18/2074
/dev/loop2	219M	219M	0	100%	/snap/gnome-3-34-1804/72
/dev/loop3	66M	66M	0	100%	/snap/gtk-common-themes/1515
/dev/loop4	33M	33M	0	100%	/snap/snapd/12398
/dev/loop0	96M	96M	0	100%	/snap/poedit/30



Snap in MicroOS Desktop (4)

Create subvolume for /snap

```
$ source /etc/profile
```

```
$ sudo mksubvolume /snap
```



Snap in MicroOS Desktop (5)

Enable on systemctl

```
$ sudo systemctl enable --now snapd
```

```
$ sudo systemctl enable --now snapd.apparmor
```



Snap in MicroOS Desktop (6)





Try to install snap app

```
$ snap install hello-world  
$ snap run hello-world
```



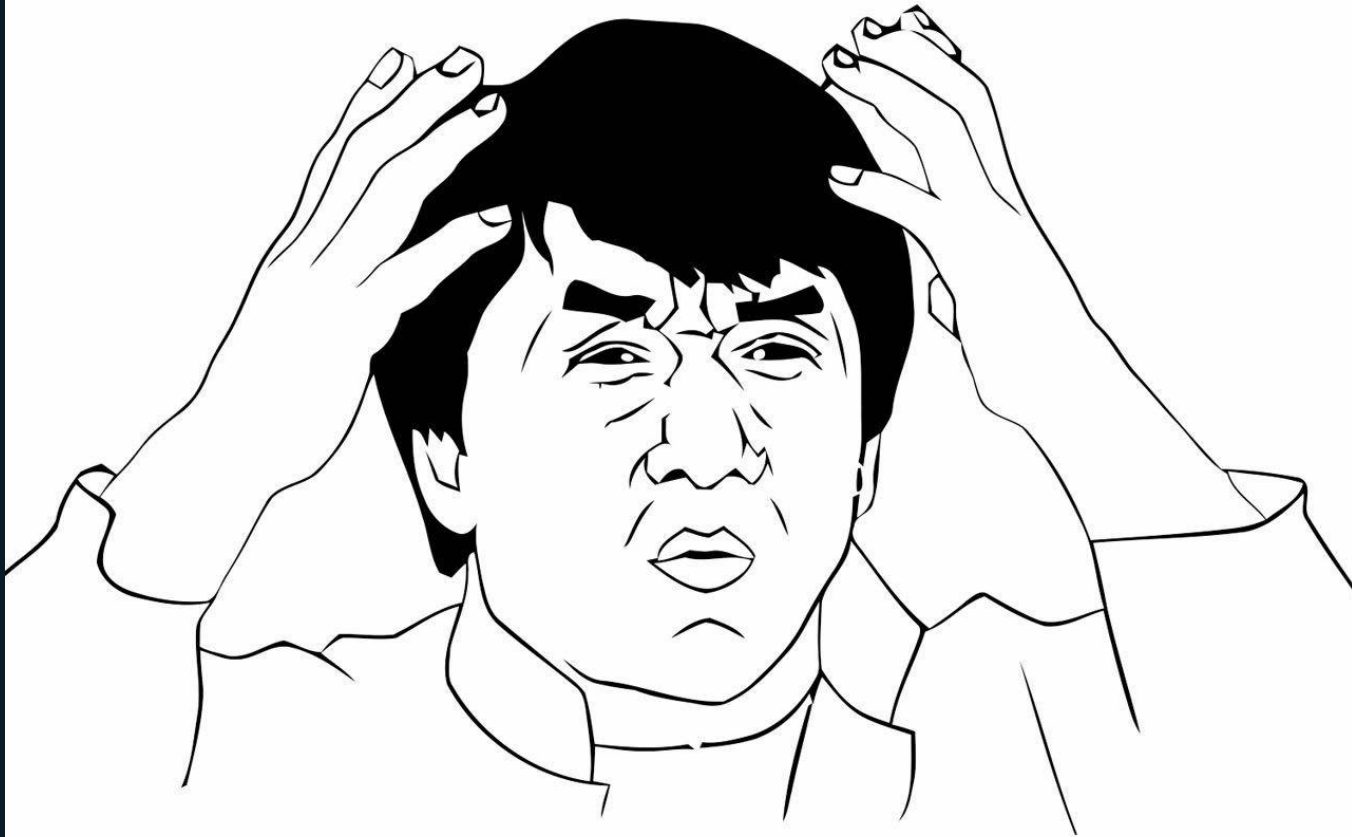
Wait, ...



 cho2@localhost.localdomain:~   

```
cho2@localhost:~> snap install hello-world
error: system does not fully support snapd: cannot mount squashfs image using
"squashfs": mount: /tmp/sanity-mountpoint-565401831: wrong fs type, bad
option, bad superblock on /dev/loop0, missing codepage or helper
program, or other error.
cho2@localhost:~> █
```





Problems



SELinux

```
cho2@localhost.localdomain:~  
cho2@localhost:~> sestatus  
SELinux status:                enabled  
SELinuxfs mount:              /sys/fs/selinux  
SELinux root directory:      /etc/selinux  
Loaded policy name:          targeted  
Current mode:                enforcing  
Mode from config file:       enforcing  
Policy MLS status:           enabled  
Policy deny_unknown status:  allowed  
Memory protection checking:   requested (insecure)  
Max kernel policy version:   33  
cho2@localhost:~> █
```



Installation Settings

Click a headline to make changes.

- Routing
 - IP Forwarding for IPv4: on
 - IP Forwarding for IPv6: on
- Using **NetworkManager** ([switch to wicked](#), [disable services](#))

Booting

- Boot Loader Type: GRUB2
- Trusted Boot: disabled ([enable](#))
- Write Boot Code To: /dev/sda
- Boot Code:
 - Write it into MBR of /dev/sda ([do not write](#))
 - Do not write it into partition with /boot - /dev/sda2 ([write](#))

Kdump

- Kdump status: disabled

Security

- CPU Mitigations: [Auto](#)
- Firewall will be disabled ([enable](#))
- SSH service will be enabled ([disable](#))
- SELinux Default Mode is Enforcing
- PolicyKit Default Privileges: Standard

Default systemd target

- Graphical mode

System

- [System and Hardware Settings](#)



Security Configuration

Firewall and SSH service

- ☐ Enable Firewall
- ☒ Enable SSH Service
- ☐ Open SSH Port

PolicyKit

PolicyKit Default Privileges

Standard ▼

CPU

CPU Mitigations

Auto ▼

SELinux

Mode

Enforcing ▼



Solutions

- Fresh installation
 - Disabled SELinux on installation



Security Configuration

Firewall and SSH service

- ☐ Enable Firewall
- ☒ Enable SSH Service
- ☐ Open SSH Port

PolicyKit

PolicyKit Default Privileges

Standard ▼

CPU

CPU Mitigations

Auto ▼

SELinux

Mode

Disabled ▼



Solutions

- Fresh installation
 - Disabled SELinux on installation
- Current installation with SELinux enforcing/enabled
 - `selinux=0` on kernel
 - Warning: After booting with disabled SELinux you have to autorelabel again, otherwise unlabelled files could lead to unbootable system! See <https://en.opensuse.org/Portal:MicroOS/SELinux>












GNU GRUB version 2.06

```
insmod btrfs
set root='hd0,gpt2'
if [ x$feature_platform_search_hint = xy ]; then
    search --no-floppy --fs-uuid --set=root --hint-bios=hd0,gpt2 -\
-hint-efi=hd0,gpt2 --hint-baremetal=ahci0,gpt2 --hint='hd0,gpt2' ec6b95\
ba-4200-49be-8da9-1b32d497e349
else
    search --no-floppy --fs-uuid --set=root ec6b95ba-4200-49be-8da\
9-1b32d497e349
fi
echo          'Loading Linux 5.13.4-1-default ...'
linux         /boot/vmlinuz-5.13.4-1-default root=UUID=ec6b95ba-4\
200-49be-8da9-1b32d497e349 ${extra_cmdline} splash=silent swapaccount=1\
mitigations=auto quiet security=selinux selinux=0_enforcing=1
echo          'Loading initial ramdisk ...'
```

Minimum Emacs-like screen editing is supported. TAB lists completions. Press Ctrl-x or F10 to boot, Ctrl-c or F2 for a command-line or ESC to discard edits and return to the GRUB menu.




 cho2@localhost.localdomain:~   
cho2@localhost:~> sestatus
SELinux status: disabled
cho2@localhost:~> 




 cho2@localhost.localdomain:~   

```
cho2@localhost:~> snap install hello-world
hello-world 6.4 from Canonical✓ installed
cho2@localhost:~> snap run hello-world
WARNING: cgroup v2 is not fully supported yet, proceeding with partial confinement
Hello World!
cho2@localhost:~> 
```





cho2@localhost.localdomain:~



```
cho2@localhost:~> snap install firefox
firefox 90.0.2-1 from Mozilla✓ installed
cho2@localhost:~> snap run firefox
WARNING: cgroup v2 is not fully supported yet, proceeding with partial confinement

```



Sign in

About Mozilla Firefox



Firefox Browser

Mozilla Firefox Snap for Ubuntu
canonical-002 - 1.0

Updates disabled by your system administrator

90.0.2 (64-bit) [What's new](#)
[Firefox Help](#) [Submit Feedback](#)

Firefox is designed by Mozilla, a global community working together to keep the Web open, public and accessible to all.

Want to help? [Make a donation](#) or [get involved!](#)

[Licensing Information](#)[End-User Rights](#)[Privacy Policy](#)

Firefox and the Firefox logos are trademarks of the Mozilla Foundation.



Welcome to Firefox

[Get started](#)

Fire starts here

Soraya Osorio — Furniture designer, Firefox fan

About



Device Name

localhost >

cho2@localhost.localhost:~

cho2@localhost.localhost:~

cho2@localhost.localhost:~

```
cho2@localhost:~> uname -a
Linux localhost.localhost 5.13.4-1-default #1 SMP Thu Jul 22 15:55:06 UTC 2021
(91a0cca) x86_64 x86_64 x86_64 GNU/Linux
cho2@localhost:~> cat /etc/os-release
NAME="openSUSE MicroOS"
# VERSION="20210728"
ID="opensuse-microos"
ID_LIKE="suse opensuse opensuse-tumbleweed"
VERSION_ID="20210728"
PRETTY_NAME="openSUSE MicroOS"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:opensuse:microos:20210728"
BUG_REPORT_URL="https://bugs.opensuse.org"
HOME_URL="https://www.opensuse.org/"
DOCUMENTATION_URL="https://en.opensuse.org/Portal:MicroOS"
LOGO="distributor-logo"
cho2@localhost:~>
```



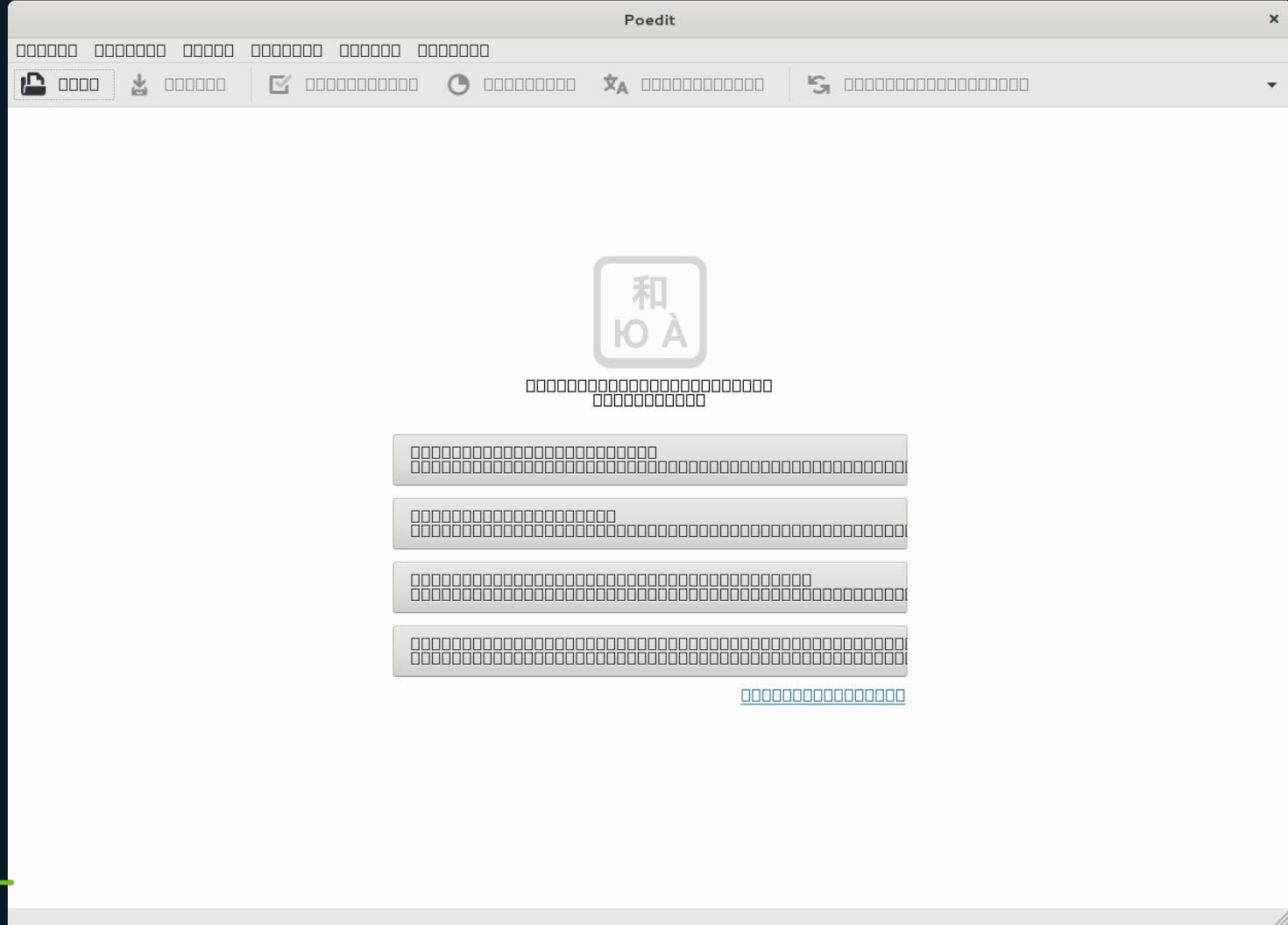
Snap

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- **Easy to install** ⚠
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Other Problems





Solution

```
$ sudo rm /var/cache/fontconfig/*  
$ rm ~/.cache/fontconfig/*  
$ fc-cache -r
```



Batal

Pilih berkas terjemahan

Buka

Rumah

Dokumen

Gambar

Musik

Unduhan

Video

cho2

OneDrive

Dropbox

+ Lokasi Lain

home cho2

Nama

Ukuran

Diubah

Tidak dapat membaca isi dari cho2

Error opening directory '/home/cho2': Permission denied

Ok

Semua Berkas Terjemahan

```
~ > snap run poedit  
WARNING: cgroup v2 is not fully supported yet, proceeding with partial confinement  
cannot perform operation: mount --rbind /dev /tmp/snap.rootfs_SKJP4u/dev: No such file or directory
```



Solution

Because MicroOS is based on openSUSE Tumbleweed, always update the system to the latest snapshot.

Those problems fix after update (including snapd update) in my cases.



Situation



Situation

- I use an app called X
- X is a multiplatform (Mac, Windows, Linux)
- X available for Linux in Snap (official maintainer) and Flatpak (community maintainer)
- X license is MIT
- X source code available on github



Situation (2)

- X has a pro version (paid)
- X pro has a nice feature that simplified workflow for users
- Unfortunately, X pro for Linux is only available on snap



Tradeoff

1. Not use X anymore
2. Use X open source version without a nice feature that simplified workflow for users
3. Use X pro version with a nice feature that simplified workflow for users, but
 - a. install it on another computer/OS
 - b. install it on another Linux that supported Snap
 - c. install a and/or b on a VM that running in immutable OS 🐱
 - d. still install in openSUSE MicroOS Alpha/Beta and always remember it will break anytime 🤔



Further Reading

- <https://dariofaggioli.wordpress.com/2021/06/18/microos-as-your-desktop-prime-time/>
- <https://www.ypsidanger.com/23800-running-snaps-on-opensuse-microos-desktop/>
- <https://blog.kukuh.syafaat.id/2021/Snap-di-openSUSE-MicroOS/>
- https://opensuse.github.io/openSUSE-docs-revamped-temp/microos_getting_started.html#installing-snaps

