

Packaging Flatpaks

Building and maintaining flatpaks



Linux Day
Milano 2024

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@kowalski7cc
art by @puzzoz

In the beginning,
we had makefiles

```
# ./configure
Configuring OpenLDAP 2.4.41-Release ...
checking build system type... x86_64-unknown-linux-gnu
checking host system type... x86_64-unknown-linux-gnu
checking target system type... x86_64-unknown-linux-gnu
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for gawk... gawk
checking whether make sets $(MAKE)... yes
checking configure arguments... done
checking for cc... no
checking for gcc... no
configure: error: Unable to locate cc(1) or suitable replacement. Check PATH or set CC.
#
```

[https://stackoverflow.com/questions/31377830/makeno-rule-to
-make-target-install-stop-for-openldap](https://stackoverflow.com/questions/31377830/makeno-rule-to-make-target-install-stop-for-openldap)

Package management in linux





Neu laden Anwenden



Eigenschaften Suche

Alle

Amateurfunk (universe)

Autoren

Autoren (multiverse)

Autoren (universe)

Befehlszeilen

Befehlszeilen (universe)

Bibliotheken

Bibliotheken (multiverse)

Bibliotheken (restricted)

Bibliotheken (universe)

Bibliotheken – Entwicklung

Bibliotheken – Entwicklung (mu

Bereiche

Status

Ursprung

Benutzerdefinierte Filter

Suchergebnisse

Architektur

S	Paket	Installierte Version	Neueste Version	Beschreibung
	mate-terminal	1.26.0+mint1+vanes	1.26.0+mint1+vanes	MATE-Terminal emulator
	mate-terminal-common	1.26.0+mint1+vanes	1.26.0+mint1+vanes	MATE terminal emulator application (common files)
	mate-themes	3.22.23-1	3.22.23-1	Official themes for the MATE desktop
	mate-tweak	22.04.8-0ubuntu3	22.04.8-0ubuntu3	Werkzeug zur Optimierung des MATE-Desktops
	mate-user-guide	1.26.0-1	1.26.0-1	User documentation for MATE Desktop Environment
	mate-user-share		1.26.0-1	Gemeinsame, öffentliche Nutzung von Benutzerdateien

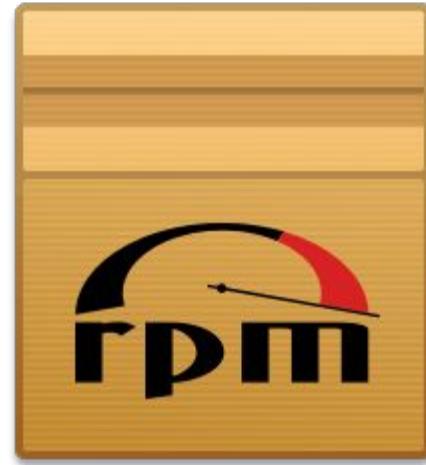
Official themes for the MATE desktop[Bildschirmfoto herunterladen](#)[Änderungsprotokoll abrufen](#)[Internetseite besuchen](#)

This package contains the official desktop themes of the MATE desktop environment.

The themes provided for the MATE desktop partially resemble themes that are well known from GNOME2 desktops. However, the MATE team also prepared some new themes esp. for MATE (Menta, GreenLaguna, TraditionalGreen, TraditionalOk, and BlackMate).

Which problems are solved by package management

- ✓ Centralize software installation and removal
- ✓ Support for remote software repositories
- ✓ Find and fetch required dependencies
- ✓ Provide source for updates
- ✓ Remove user need to search and download software from random websites



HOW STANDARDS PROLIFERATE:

(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC.)

SITUATION:
THERE ARE
14 COMPETING
STANDARDS.

14?! RIDICULOUS!
WE NEED TO DEVELOP
ONE UNIVERSAL STANDARD
THAT COVERS EVERYONE'S
USE CASES.

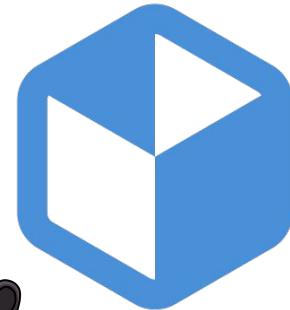
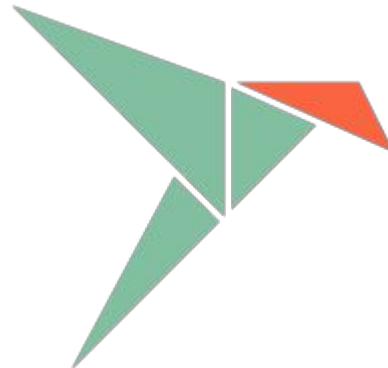
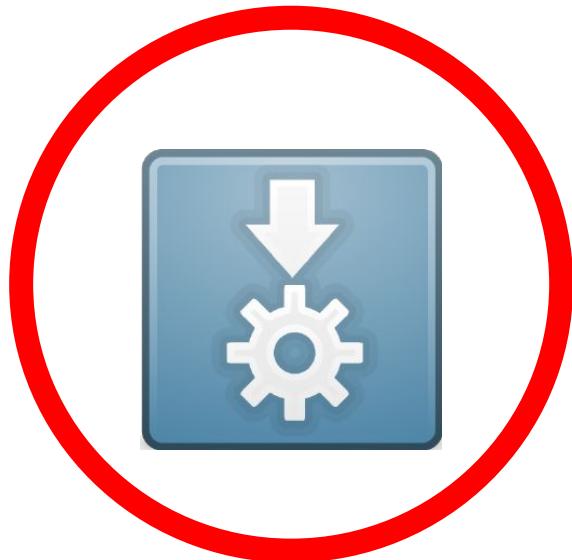


SOON:

SITUATION:
THERE ARE
15 COMPETING
STANDARDS.

“Classic Packages” vs
“Layered Images” vs
Portable Application
Image

Intruder!!!



Flatpak





SIGN UP

LOG IN

Download 

PC App Store

Download 

For windows 10,11 32/64 bit

DOWNLOAD (21.4MB)

Download

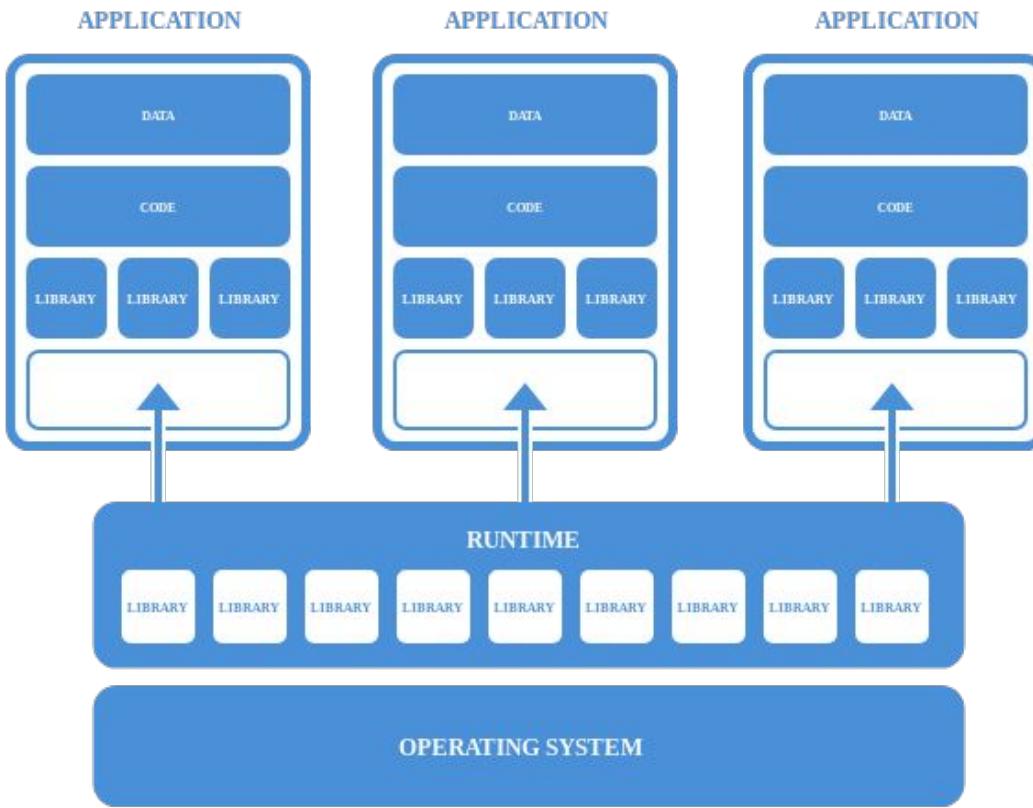
ADS

Flatpak advantages and disadvantages

- ✓ Easy to use for the user
- ✓ Convenient distribution for developers
- ✓ New software on stable/old/LTS distros (RHEL/Debian)
- ✓ Proprietary software friendly
- ✓ Sandboxing, isolates the system from software (when done well)
- ✗ Not very space efficient*
- ✗ Sandbox isolation can be hassle, especially when developing!

What can I package with Flatpak

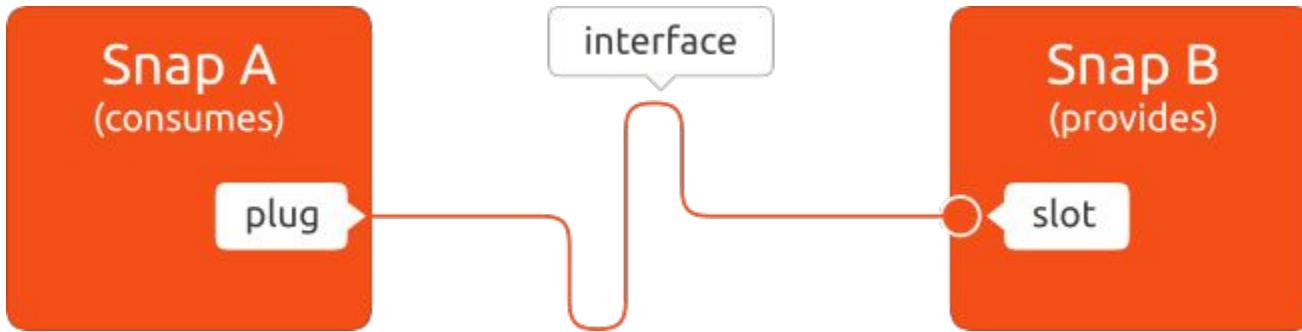
- ✓ Desktop applications
- ⚠ Administrative tools (Polkit + “flatpak-spawn --host” to escape sandbox)
- ⚠ Command line applications (You must use package FQDN)
- ✗ System components (kernel, desktop, bootloader)
- ✗ Drivers
- ✗ Services (use podman, kubernetes or classic packages for that)



<https://docs.flatpak.org/en/latest/basic-concepts.html>

Sandbox security: interfaces, permissions or portals?

Sandbox security: interfaces, permissions or portals?



Getting the interfaces for a snap

Use the `sudo snap connections` command to see which interfaces a snap needs, and which are currently connected:

```
$ sudo snap connections vlc
Interface      Plug          Slot          Notes
camera        vlc:camera    -
desktop       vlc:desktop   :desktop     -
desktop-legacy vlc:desktop-legacy :desktop-legacy -
home          vlc:home      :home        -
mount-observe vlc:mount-observe -           -
```

*Except when in
classic confinement
mode

Sandbox security: interfaces, permissions or portals?

```
flatpak install chiro ~

com.google.ChromeDev permissions:
  ipc          network          cups          pulseaudio
  wayland      x11              devices       file access [1]
  dbus access [2] bus ownership [3] system dbus access [4] tags [5]

  [1] /run/.heimdhalo/kcm-socket, host-etc, xdg-download, xdg-run/dconf,
      ~/.config/dconf:ro, ~/.config/kioslaverc
  [2] ca.desrt.dconf, org.freedesktop.FileManager1, org.freedesktop.Notifications,
      org.freedesktop.secrets, org.gnome.SessionManager
  [3] org.mpris.MediaPlayer2.chromium.*
  [4] org.bluez, org.freedesktop.Avahi, org.freedesktop.UPower
  [5] proprietary

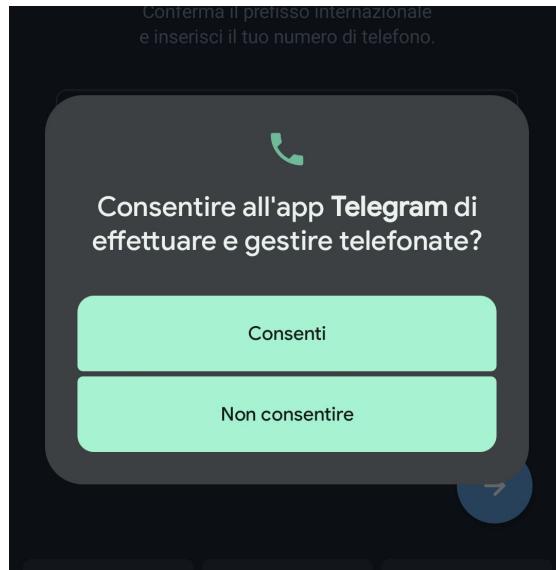
  1.   ID           Branch     Op    Remote     Download
      com.google.ChromeDev    stable      i      flathub    < 121,4 MB

Proceed with these changes to the system installation? [Y/n]: █
```

What about dynamic
permissions?



android



Sandbox security: interfaces, permissions or portals?

The screenshot shows a user interface for managing sandbox permissions. It is divided into two main sections: "Device" on the left and "Filesystem" on the right.

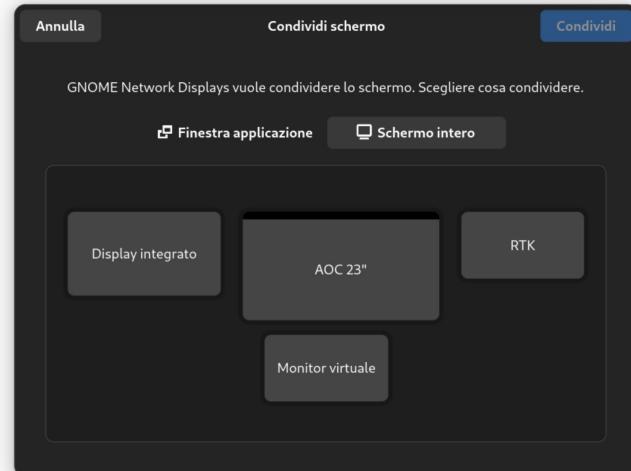
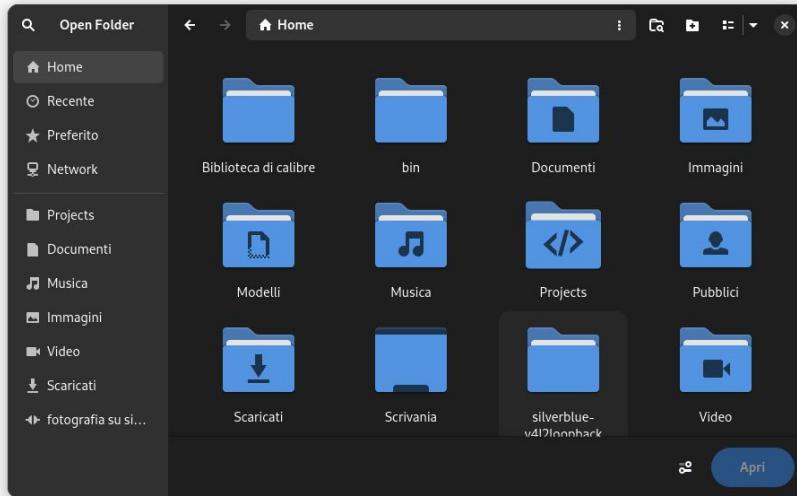
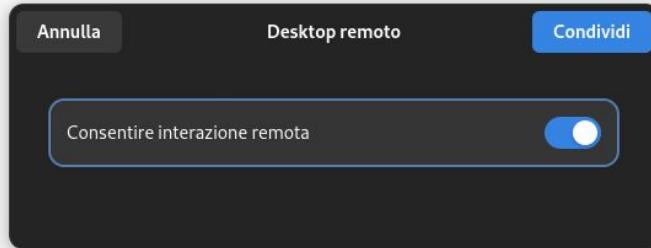
Device

- Elenco dei dispositivi disponibili nella sandbox
 - Accelerazione tramite GPU
device=dri
 - Dispositivi di input
device=input
 - Virtualizzazione
device=kvm
- Socket
 - Elenco di socket noti disponibili nella sandbox
 - Sistema X11
socket=x11
 - Sistema Wayland
socket=wayland
 - Fallback al sistema X11
socket=fallback-x11
 - Server audio PulseAudio
socket=audio-pulseaudio

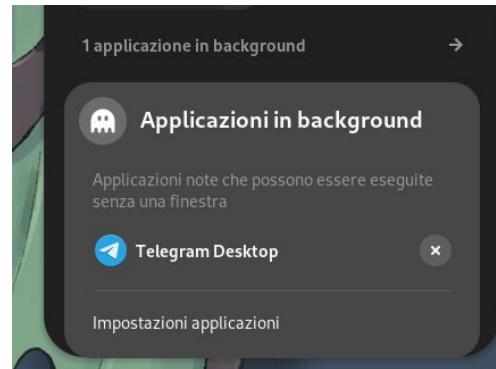
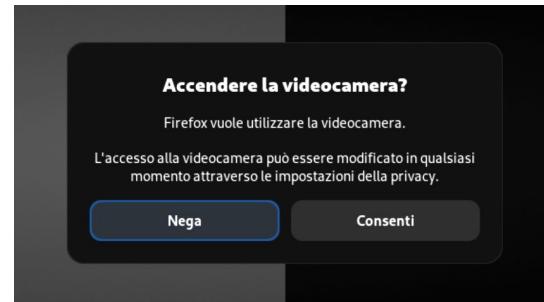
Filesystem

- Elenco dei sottoinsiemi di filesystem disponibili per l'applicazione
 - Tutti i file di sistema
filesystem=host
 - Tutte le librerie di sistema, eseguibili e dati statici
filesystem=host-os
 - Tutte le configurazioni di sistema
filesystem=host-etc
 - Tutti i file utente
filesystem=home
 - Altri file ⚠

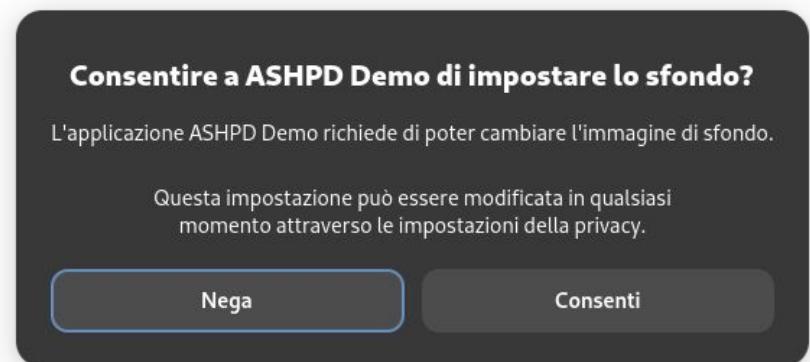
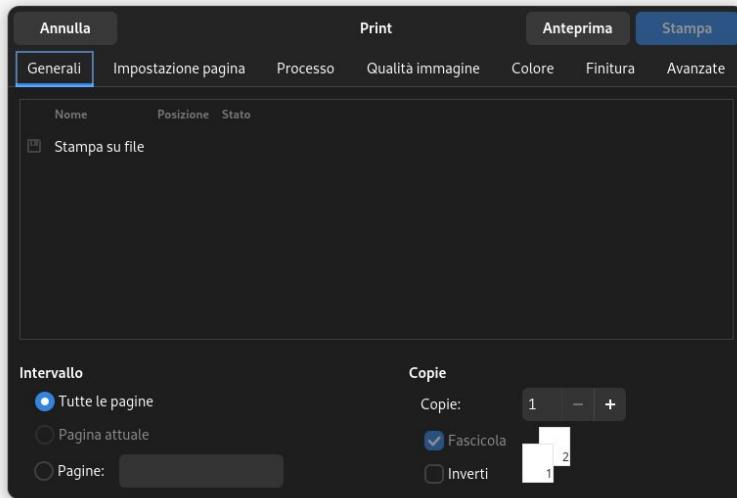
Sandbox security: interfaces, permissions or portals?



Sandbox security: interfaces, permissions or portals?



Sandbox security: interfacce, permessi o portali?



Sandbox security: interfaces, permissions or portals?

The image shows two windows side-by-side, illustrating a comparison between Session Bus and Portals security models.

Session Bus window:

- Parla a**: A text input field with placeholder "e.g. org.freedesktop.Notifications".
- A list of five entries, each with a checked checkbox and a grey rounded rectangle background:
 - com.canonical.indicator.application
 - com.canonical.AppMenu.Registrar
 - org/ayatana/indicator/application
 - org/gnome/Mutter/IdleMonitor
 - org/kde>StatusNotifierWatcher

Portals window:

- Portals**: A title bar with a plus sign icon.
- Background**: A section with the description "Può essere eseguito in background" and a toggle switch that is turned on (blue).
- Notifiche**: A section with the description "Può inviare notifiche" and a toggle switch that is turned on (blue).
- Microfono**: A section with the description "Può ascoltare il microfono" and a toggle switch that is turned off (grey).
- Altoparlanti**: A section with the description "Può riprodurre suoni dagli altoparlanti" and a toggle switch that is turned off (grey).
- Fotocamera**: A section with the description "Può registrare video con la fotocamera" and a toggle switch that is turned off (grey).
- Posizione**: A section with the description "Può accedere alla propria posizione" and a toggle switch that is turned off (grey).

Sandbox security: interfaces, permissions or portals?

Parla a

e.g. org.freedesktop.Notifications

- ✓ org.mpris.MediaPlayer2.Player
- ✓ org.kde.kconfig.notify
- ✓ com.canonical.AppMenu.Registrar
- ✓ org.freedesktop.ScreenSaver
- ✓ org.kde.KGlobalSettings
- ✓ org.kde.StatusNotifierWatcher
- ✓ org.freedesktop.secrets
- ✓ org.kde.kwalletd
- ✓ org.kde.kwalletd5

Possiede

e.g. org.gnome.Contacts.SearchProvider

- ✓ org.mpris.MediaPlayer2.vlc

Session Bus

Elenco di nomi noti sul bus di sessione

Parla a

e.g. org.freedesktop.Notifications

- ✓ org.freedesktop.FileManager1
- ✓ org.gnome.SettingsDaemon.MediaKeys
- ✓ org.gtk.vfs.*
- ✓ org.gnome.SessionManager

Possiede

e.g. org.gnome.Contacts.SearchProvider

- ✓ org.gnome.evince.Daemon
- ✓ org.gnome.evince

How do I build a Flatpak?

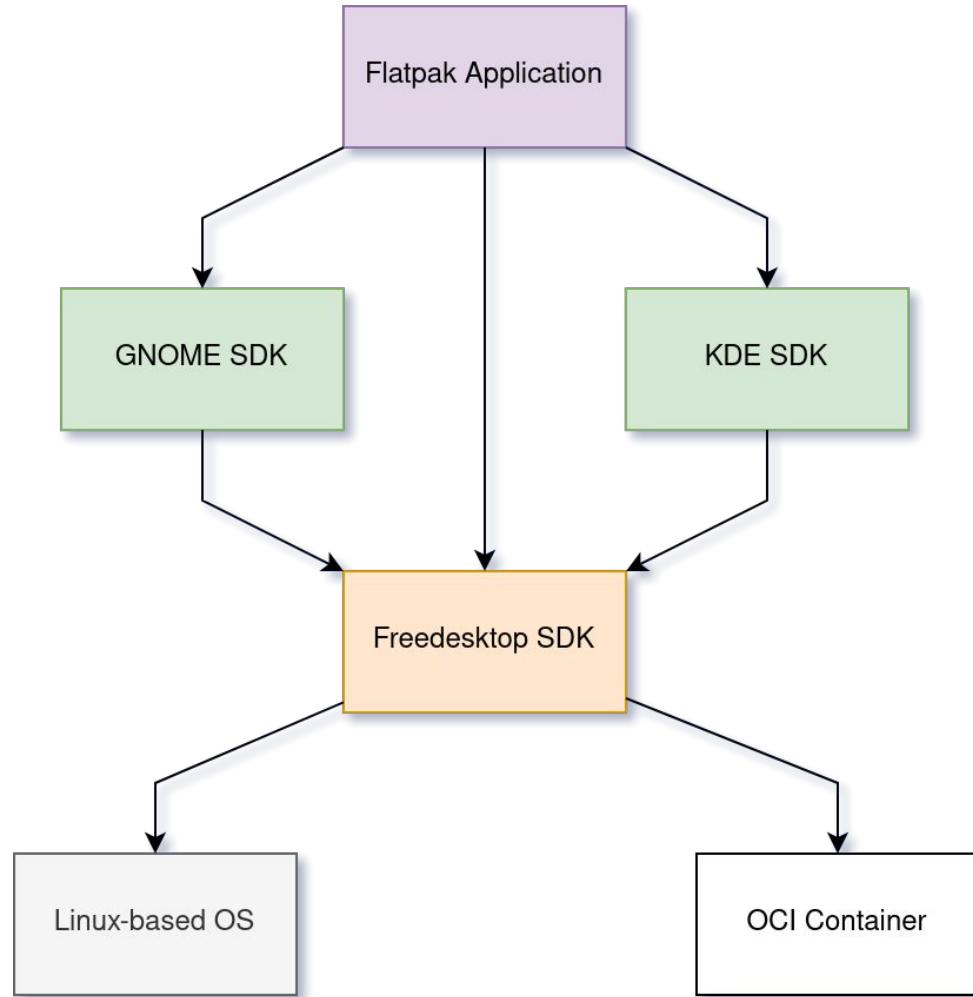


The ingredients for a good Flatpak

- The Flatpak build manifest (Used to compile binaries and package stuff)
- A Desktop file (The application launcher)
- The application icon (256px PNG at least or SVG)
- A Metainfo file (Appstore informations and changelog)
- Screenshots (on the web to attach in the Appstore page)
- Application Sources

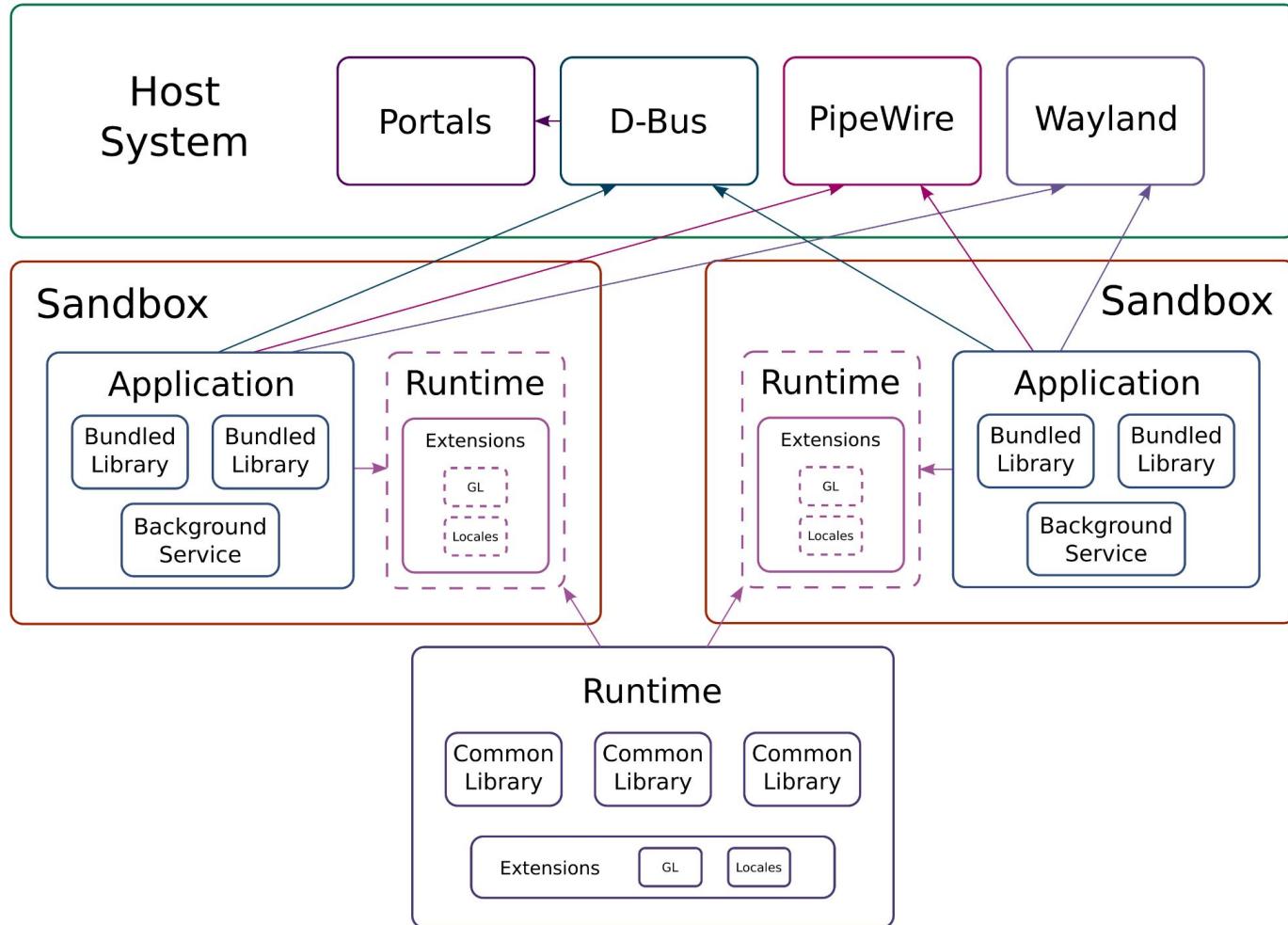
Flatpak are built as layers

1. SDK/Platform runtime
2. (optional) base app to extend
3. Application
4. Extensions



Which SDK/Platform runtime should I use?

- General rule: try to build first on org.freedesktop.Sdk
- Not building or need specific libraries of a DE?
 Use org.gnome.Sdk or org.kde.Sdk
- Never roll your own runtime!
 Except if you're publishing on Fedora flatpak registry
 - Fedora thinks their repositories have better quality
- How do I find SDKs?
 Try with `flatpak remote-ls flathub | grep org.kde.Sdk`





144599f

obs-studio / build-aux / com.obsproject.Studio.json

Code Blame 113 lines (113 loc) · 3.67 KB

```
    "talk-name=org.freedesktop.Flatpak",
18    "--talk-name=org.freedesktop.Notifications",
19    "--talk-name=org.a11y.Bus",
20    "--system-talk-name=org.freedesktop.Avahi",
21    "--env=VST_PATH=/app/extensions/Plugins/vst"
22 ],
23 "add-extensions": {
24     "com.obsproject.Studio.Plugin": {
25         "directory": "plugins",
26         "subdirectories": true,
27         "add-ld-path": "lib",
28         "merge-dirs": "lib/obs-plugins;share/obs/obs-plugins",
29         "no-autodownload": true,
30         "autodelete": true
31     },
32     "org.freedesktop.LinuxAudio.Plugins": {
33         "directory": "extensions/Plugins",
34         "version": "23.08",
35         "add-ld-path": "lib",
36         "merge-dirs": "vst",
37         "subdirectories": true,
38         "no-autodownload": true
39     }
40 },
41 "cleanup": [
42     "/share/man",
43     "*_1ch"
```



master

com.obsproject.Studio.Plugin.MoveTransition / com



flathubbot move-transition: Update obs-move-transition.git to 3.1.0 (#46) ✓

Code Blame 31 lines (31 loc) · 1014 Bytes

```
1   id: com.obsproject.Studio.Plugin.MoveTransition
2   branch: stable
3   runtime: com.obsproject.Studio
4   runtime-version: stable
5   sdk: org.kde.Sdk//6.6
6   build-extension: true
7   separate-locales: false
8   appstream-compose: false
9   build-options:
10      prefix: /app/plugins/MoveTransition
11   modules:
12     - name: move-transition
13       buildsystem: cmake-ninja
14       config-opts:
15         - -DCMAKE_BUILD_TYPE=Release
16         - -DBUILD_OUT_OF_TREE=ON
17       post-install:
18         - install -Dm644 --target-directory=${FLATPAK_DEST}/share/meta
19         - appstream-compose --basename=${FLATPAK_ID} --prefix=${FLATPAK_
20           DEST}/share/meta
```

man 5 flatpak-manifest

Building our flatpak

- `flatpak run org.flatpak.Builder --force-clean --user --install --install-deps-from=flathub --ccache builddir <manifest>`
 - flatpak-builder from distribution repository
 - Also available on flatub as org.flatpak.Builder

Linting our flatpak (essential before subletting to flathub):

- `flatpak run --command=flatpak-builder-lint org.flatpak.Builder manifest <manifest>`
- `flatpak run --command=flatpak-builder-lint org.flatpak.Builder repo repo`

<https://docs.flathub.org/docs/for-app-authors/submission/>

Notes for building Flatpaks

- All the application stuff goes into /app or \${FLATPAK_DEST}
 - /app replicates the system structure like /app/share, /app/bin
 - /app becomes mostly read-only after packaging
- Data with licensing issue can be installed with “extra-data” source type and “apply_extra” script
 - They are run on the installation
- Extension can be added on the filesystem like /app/extension_directory
- Flatpak build is done in an offline sandbox, make sure all the assets are downloaded by the builder
 - If you need libs from eg. pypi use helper scripts to generate manifests!

Demo time



Sharing our application with the world



flathub / flathub

 Type to search[Code](#)[Issues 57](#)[Pull requests 156](#)[Actions](#)[Wiki](#)[Security](#)[Insights](#)

Create a new fork

A *fork* is a copy of a repository. Forking a repository allows you to freely experiment with changes without affecting the original project. [View existing forks.](#)

Required fields are marked with an asterisk ().*

Owner *[Choose an owner](#) **Repository name ***

/ flathub

By default, forks are named the same as their upstream repository. You can customize the name to distinguish it further.

Description (optional)

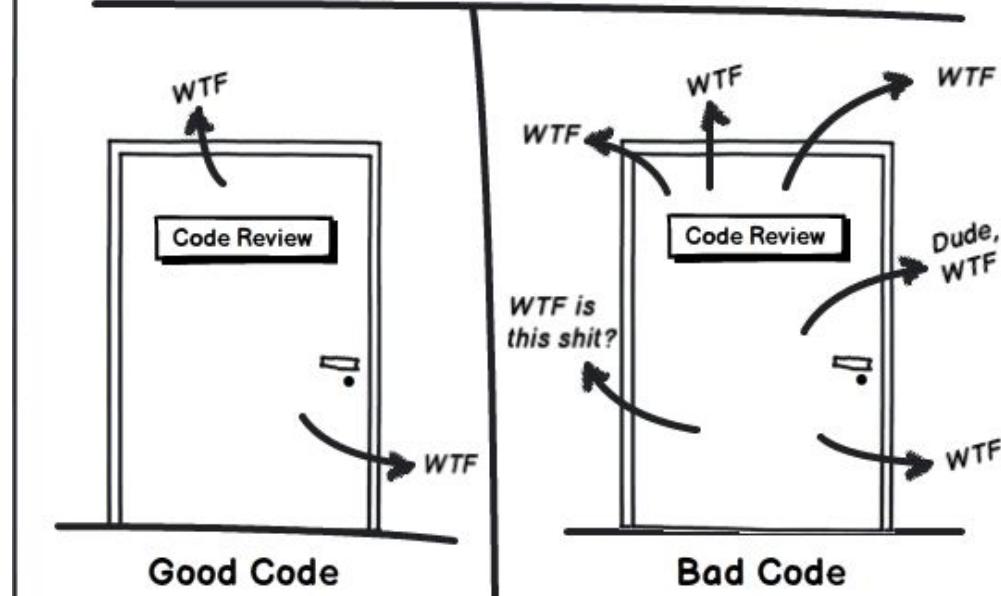
Issue tracker and new submissions

 Copy the master branch only

Contribute back to flathub/flathub by adding your own branch. [Learn more.](#)



Code Quality Measurement: WTFs/Minute



<http://commadot.com>

<https://commadot.com/wtf-per-minute/>

If you're a developer,
publish your flatpak.

If you're a maintainer,
help making flatpak.

If you're a user, ask the
project to support flatpak.

🌐 <https://kowalski7cc.xyz>

🔔 kowalski7cc@mastodon.social



Domande?

