

# How to make your application into a Flatpak

Owen Taylor  
Red Hat

Flock 2017  
August 29, 2017



# The Flatpak Model



# OS

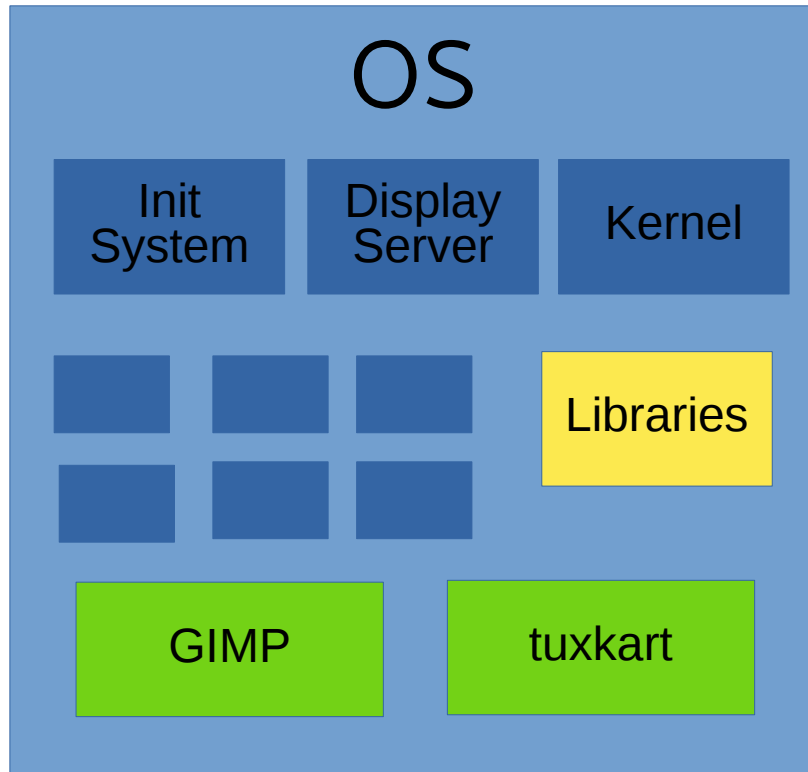
Init  
System

Display  
Server

Kernel

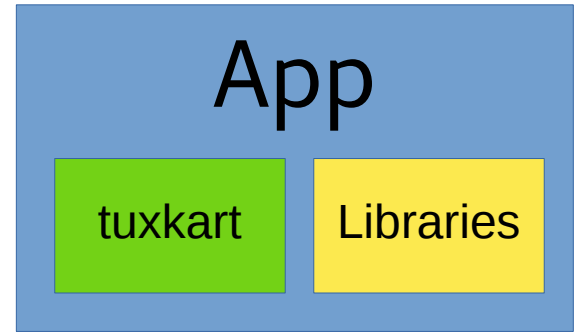
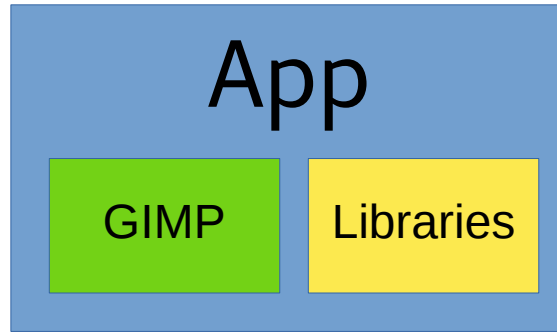
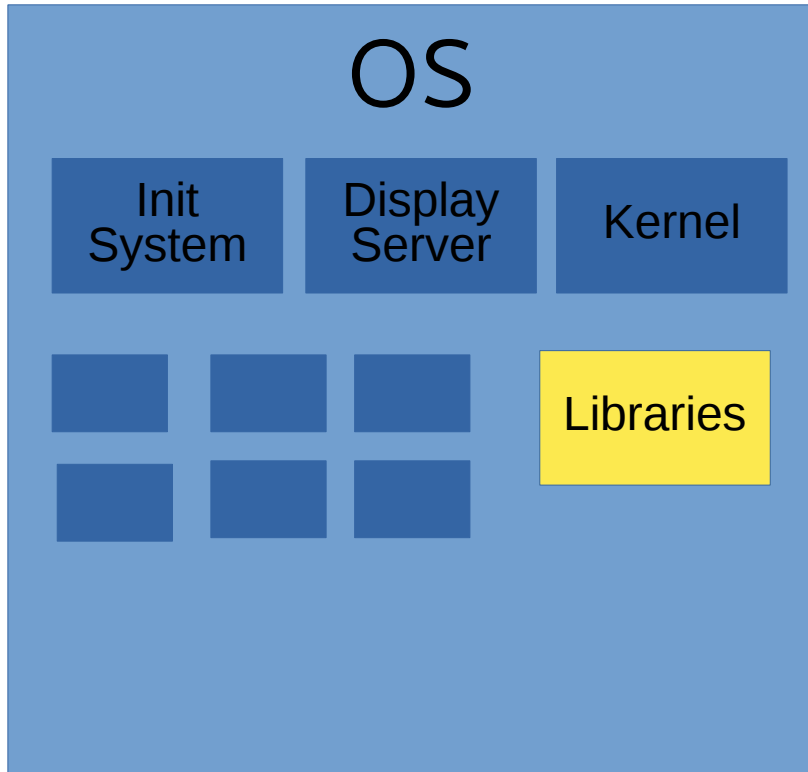
Libraries

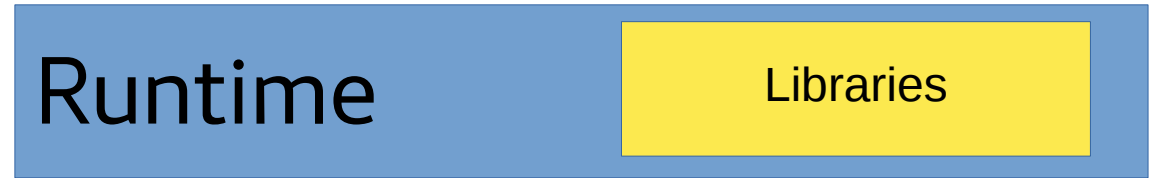
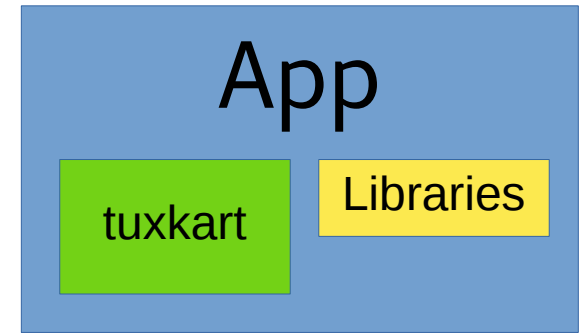
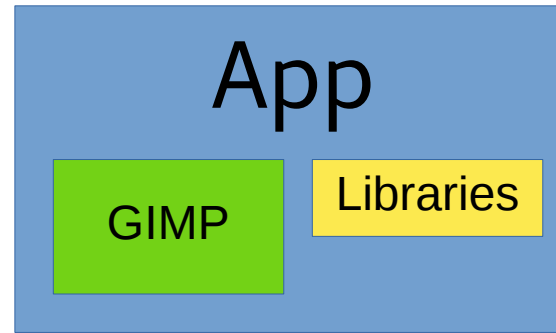
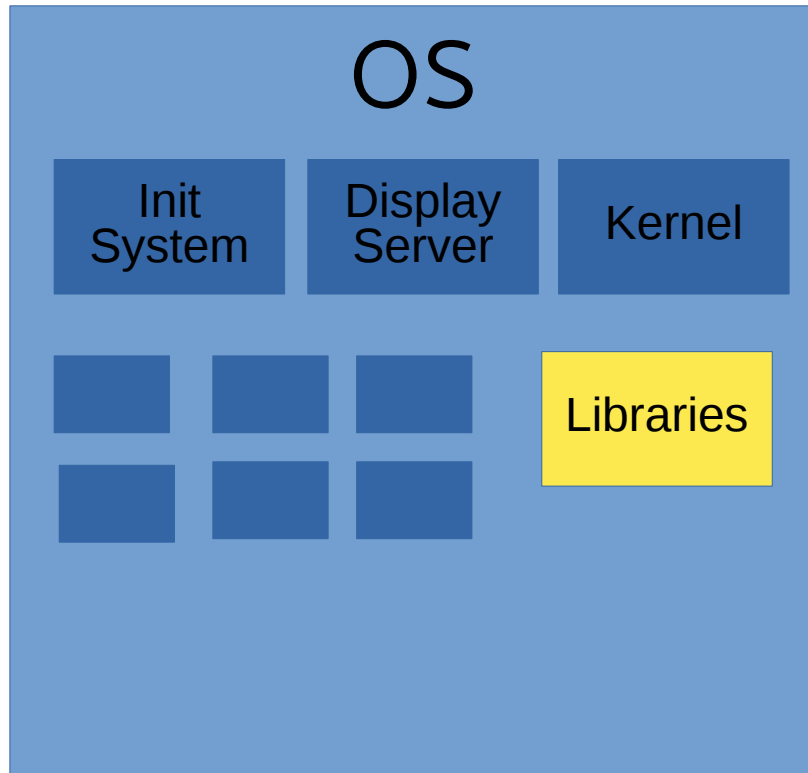




- Applications as OS packages
- Problems:
  - Tied update cycles
  - Distribution specific packages
  - No security

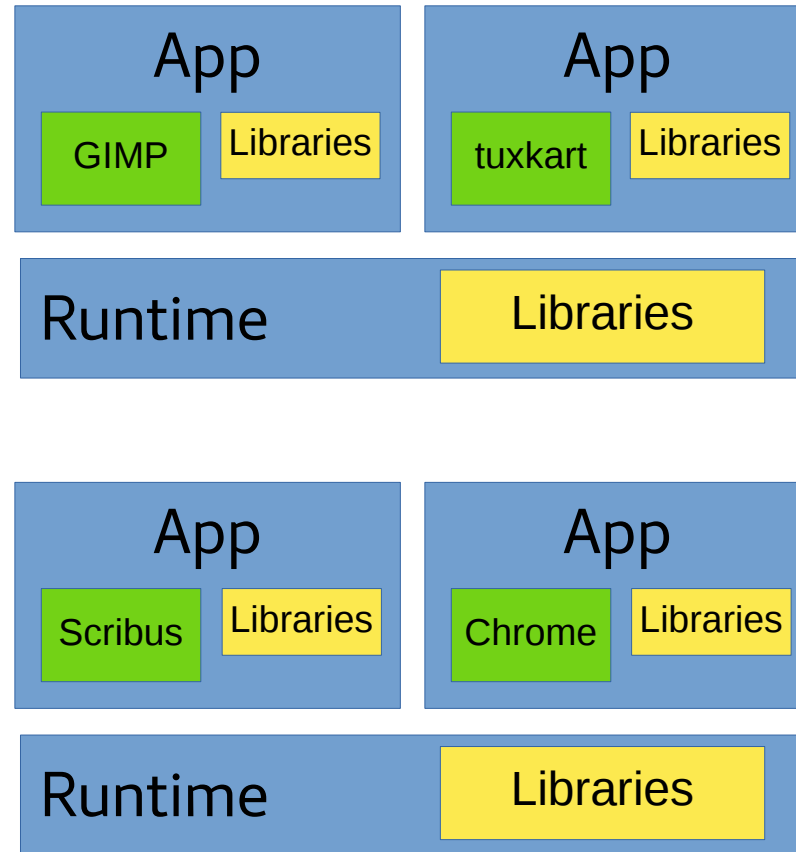
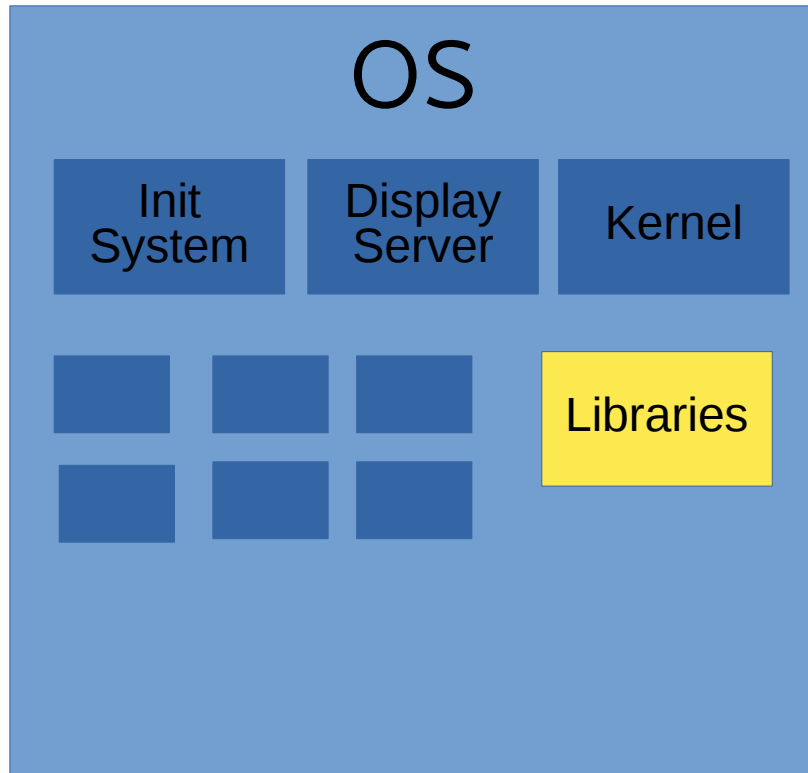






- Avoids duplication on disk and in memory
- Security updates in one place





# Desktop Applications

✓ LibreOffice ✓ GIMP ✓ tuxkart ✓ Eclipse ✓ Google Chrome  
✗ MariaDB ✗ Wordpress ✗ vi





# Where do you get Flatpaks

- From application creators
  - Open source projects
  - Companies
- Or from Linux distributors
- Decentralized



# Where do you get Runtimes

- “Upstream” runtimes
  - org.freedesktop.Platform
  - org.gnome.Platform
  - org.kde.Platform
- Distribution runtimes
  - org.fedoraproject.Platform



# Distribution advantages

- Packaging of older applications
- Existing build recipes
- Security updates mechanism



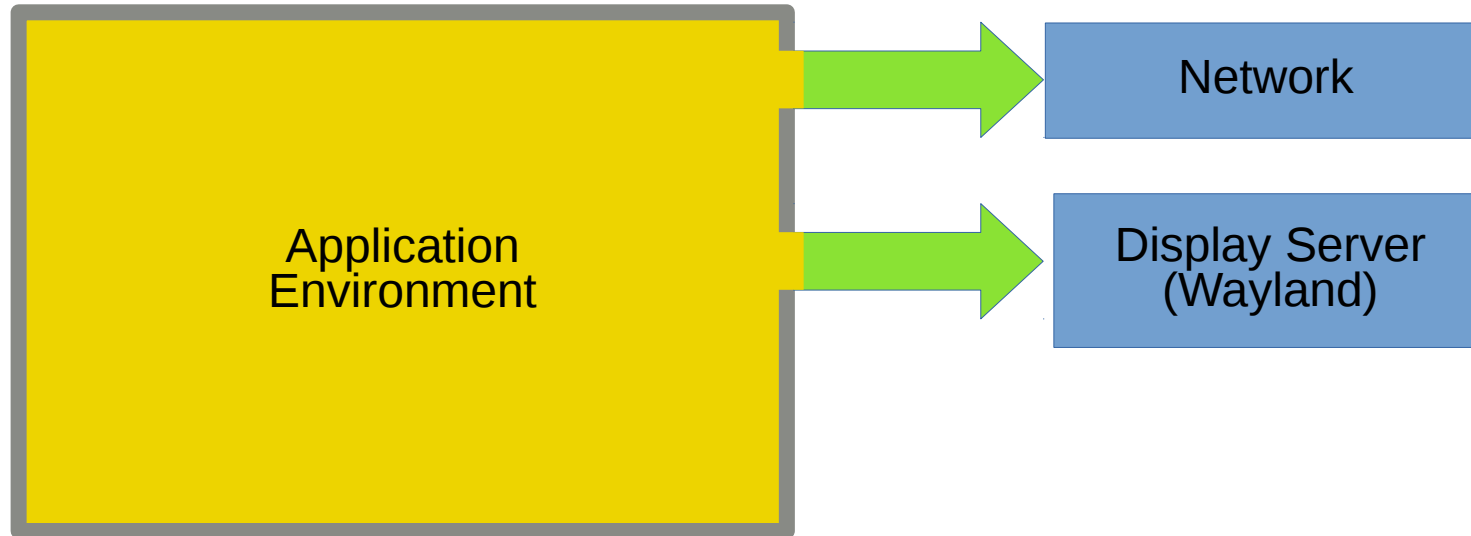
# Security and Permissions

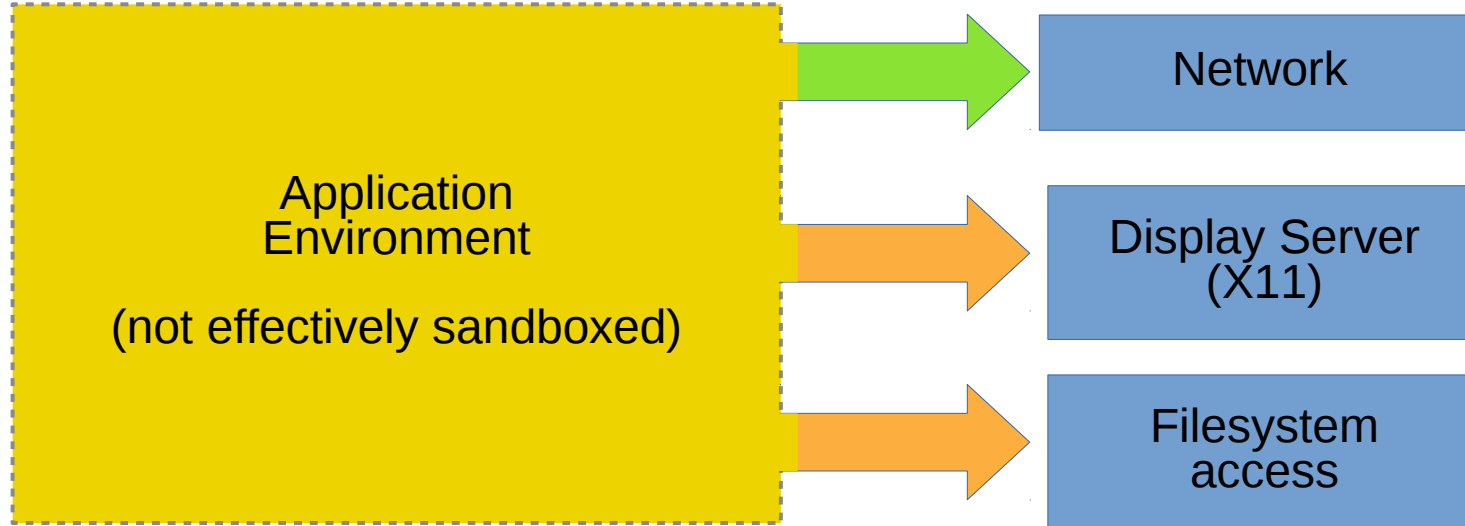


Application  
Environment



# Permissions

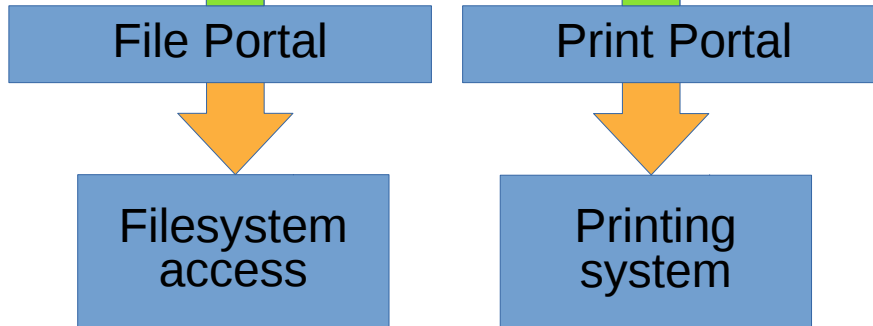




## Permissions



## Portals





# Portals

- Simple, inherently secure system services (D-Bus)
- Safe via user interaction
- Available portals
  - File, Print, Show URI, Network Status, HTTP Proxy Config
- GNOME and KDE backends



# Portal Demo



# Flatpak Implementation

- Each application has it's own Filesystem *namespace*
  - Runtime is available at /usr
  - Application and bundled libraries at /app
- Other kernel security features
  - PID and UID namespaces
  - seccomp



# OSTree

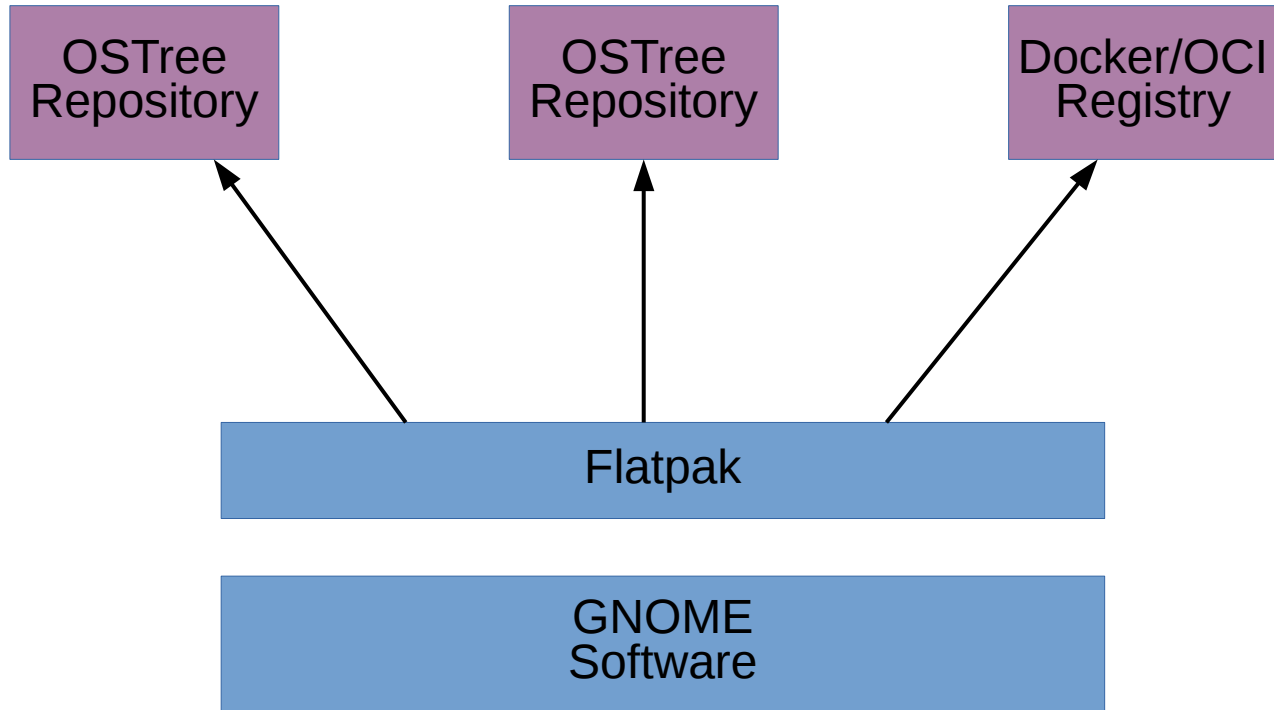
- “git for binaries”
- Deduplication
  - On disk
  - In memory
  - On the network
- Atomic updates



# OCI Images

- Alternate way to distribute a Flatpak
- From Open Container Initiative (<https://www.opencontainers.org/>)
- Evolution of the Docker format
- Advantages:
  - avoids lots of small files
  - allows distribution alongside server containers





# Flatpaks from Fedora Packages



# Why Flatpak if you can RPM?

- Sandboxing
- Reliable upgrades without rebooting
- Ability to try out applications from newer/older Fedora
- Installation on top of Atomic Workstation





Flatpak

=

A module packaged into a container image



# Flatpak

=

A (particular sort of) module packaged into a  
(particular sort of) container image



# The big picture

- Modules:
  - flatpak-runtime module
  - One module per Flatpak application
- Built into OCI Images by the Fedora Layered Image Build Service
- Distributed via [registry.fedoraproject.org](https://registry.fedoraproject.org)



# Why modules

- Natural way to do rebuilds of packages with `-prefix=/app`
- Increased packager flexibility
- Alignment with general modularity efforts
- No extra new infrastructure components



# Fedora Infrastructure

- Module Build Service (MBS) – manages module builds in Koji
- Product Definition Center (PDC) – stores information about module builds
- On Demand Compose Service (ODCS) – creates yum repositories for module builds
- Fedora Layered Image Build Service (FLIBS) – builds containers **and now flatpaks**
- [registry.fedoraproject.org](https://registry.fedoraproject.org) – stores containers **and now flatpaks**



An example Flatpak

Eye of GNOME  
Image Viewer



# eog.yaml

- Module metadata file
- Describes what packages should be built
- And what those packages depend upon



document: modulemd

version: 1

# eog.yaml

data:

summary: Eye of GNOME Application Module

description: The Eye of GNOME image viewer (eog)  
is the official image viewer for the GNOME  
desktop [...]

license:

module: [ MIT ]

dependencies:

buildrequires:

flatpak-runtime: f26

base-runtime: f26

perl: f26

common-build-dependencies: f26

shared-userspace: f26

requires:

flatpak-runtime: f26

profiles:

default:

rpms:

- eog





components:

rpms:

eog.yaml

eog:

rationale: Core application

ref: f26

buildorder: 3

exempi:

rationale: Dependency

ref: f26

buildorder: 2

libexif:

rationale: Dependency

ref: f26

buildorder: 2

glade:

rationale: Build dependency for libpeas

ref: f26

buildorder: 1

libpeas:

rationale: Dependency

ref: f26

buildorder: 2



# Creating eog.yaml

- <https://pagure.io/flatpak-module-tools>

```
$ flatpak-module create-modulemd \  
  --from-package eog -o eog.yaml
```

- <https://github.com/fedora-modularity/depchase>
- Future common module tools



# flatpak.json

- Has flatpak-specific metadata
- Describes the runtime environment



# flatpak.json

```
{  
  "id": "org.gnome.eog",  
  "runtime": "org.fedoraproject.Platform",  
  "runtime-version": "26",  
  "command": "eog",  
  "tags": ["Viewer"],  
  "finish-args":  
    [ "--filesystem=host",  
      "--share=ipc",  
      "--socket=x11",  
      "--socket=wayland",  
      "--socket=session-bus",  
      "--filesystem=~/.config/dconf:ro",  
      "--filesystem=xdg-run/dconf",  
      "--talk-name=ca.desrt.dconf",  
      "--env=DCONF_USER_CONFIG_DIR=.config/dconf"]  
}
```

man flatpak-build-finish



# Local build

```
$ mbs-build local  
  
$ flatpak-module create-flatpak -l eog:f26 \  
  --module eog --info flatpak.json  
[ prints path to org.gnome.eog.flatpak ]
```

```
$ flatpak-install --user <path_to_bundle>  
  
$ flatpak run org.gnome.eog
```



# Koji Build (in progress)

```
$ fedpkg clone module/eog && cd eog  
  
$ mbs-build submit  
  
$ koji-containerbuild flatpak-build candidate \  
    git://pkgs.fedoraproject.org/module/eog#origin/master \  
    --git-branch=master -module=eog:master
```

```
$ flatpak remote-add -registry \  
    fedora-candidate candidate-registry.fedoraproject.org  
  
$ flatpak install fedora-candidate org.gnome.eog  
  
$ flatpak run org.gnome.org
```



# Project status

- Building modules with prefix=/app
- Layered Image Build Service support for Flatpak
  - atomic-reactor
  - osbs-client
  - koji-containerbuild
- OCI Support in docker registry (existing patch)
- Exporting browsing info from docker registry
- Installing flatpaks from a docker registry

Working

Working, unmerged

Needs to be written



# Questions?

<https://fedoraproject.org/wiki/Workstation/Flatpaks>  
<https://flatpak.org>

@FlatpakApps  
irc.freenode.net:#flatpak  
irc.freenode.net:#fedora-workstation

