blendOS

An immutable & atomic **Arch Linux**–based distribution

Immutability & Atomicity

Immutability

- Read-only **/usr** and **/var/lib/pacman** trees (applications cannot be installed to **/usr** directly)
- Applications installed to home directory (as Flatpaks for instance) or as overlays

Atomicity

- Updates are indivisible transactions
- Are abandoned if interrupted
- Cleanly applied on next boot

Immutability

The approach taken by blendOS to immutability.

01. overlayfs is used to mount read-only filesystems atop **/usr/** and **/var/lib/pacman/**.

02. A read-write filesystem is mounted atop **/usr/local/** for custom system-wide configuration.

03. **/etc/** is kept read-write. Containers can be created to install standard packages.

Atomicity

The approach taken by blendOS to implement atomic updates.

01. Base root filesystem tarball is pulled from Arch Linux's mirrors (if doesn't already exist).

02. Packages from specified "track" in **/system.yaml** are installed, and custom commands are executed.

03. On the next boot, your current root filesystem is swapped with the new one (initramfs hook).

system.yaml

```yaml
repo: 'https://pkg-repo.blendos.co'

arch-repo: 'https://geo.mirror.pkgbuild.com'

impl: 'https://github.com/blend-os/tracks/raw/main'

track: 'plasma'

packages:
  - 'package_1'
  - 'package_2'

aur-packages:
  - 'package_1-git'
  - 'package_2-bin'

services:
  - 'service_1'

user-services:
  - 'user-service_1'

package-repos:
  - name: 'REPO_NAME'
    repo-url: 'REPO_URL'

commands:
  - 'echo command_1'
  - 'echo command_2'
```

/system.yaml

System configuration file.

Parsed by **akshara**, the utility handling atomic updates on blendOS.

Includes:
- name of the desktop 'track' (DE)
- a list of custom-installed packages
- commands to be executed when in read-write

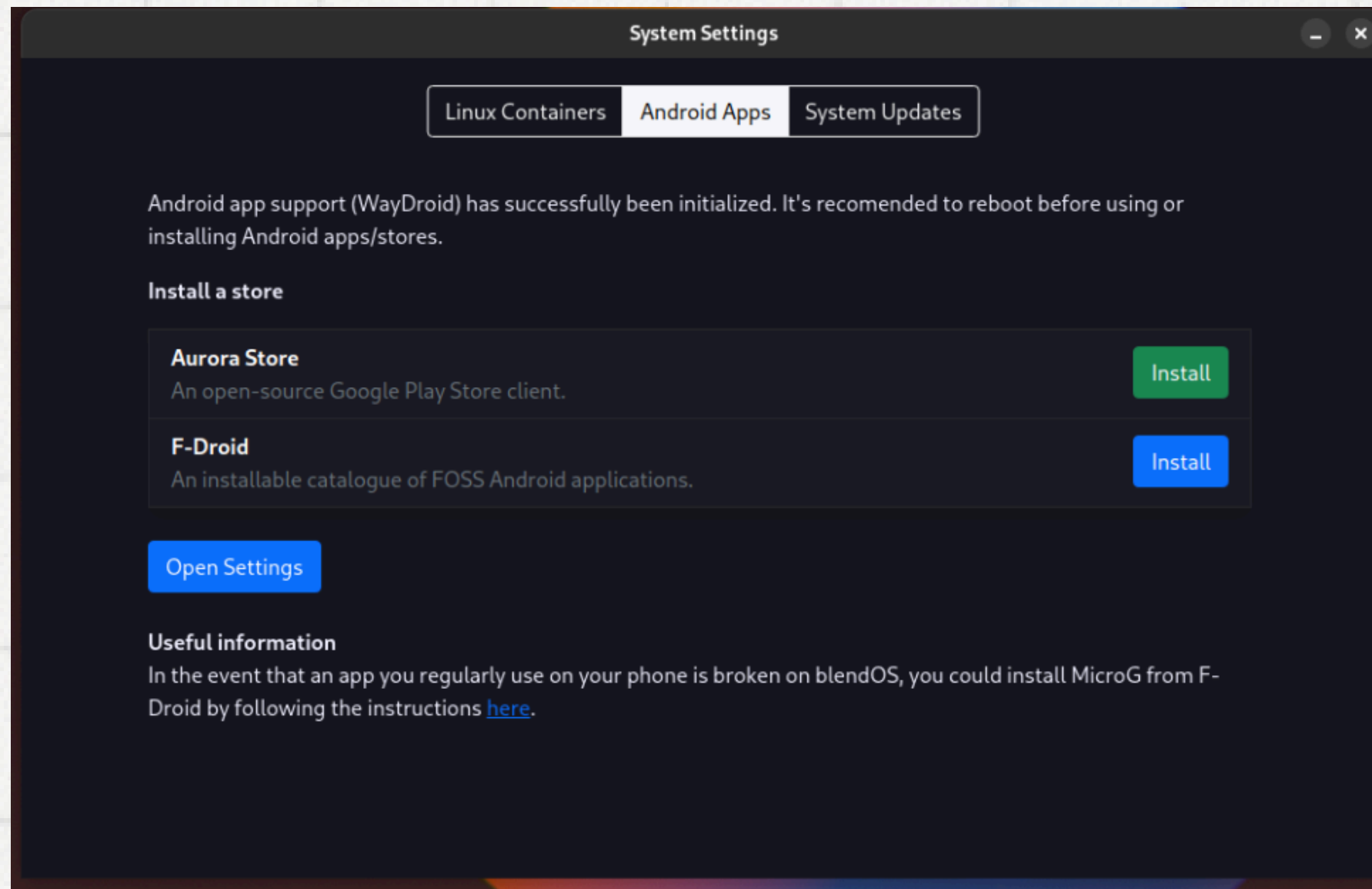https://blendos.co/reference/configs/system/

Containers

- Podman is used to create and manage containers.

- **/usr/bin/** and **/usr/share/applications** within each container are 'watched' by a daemon, such that any newly-installed applications automatically appear in your application menu.
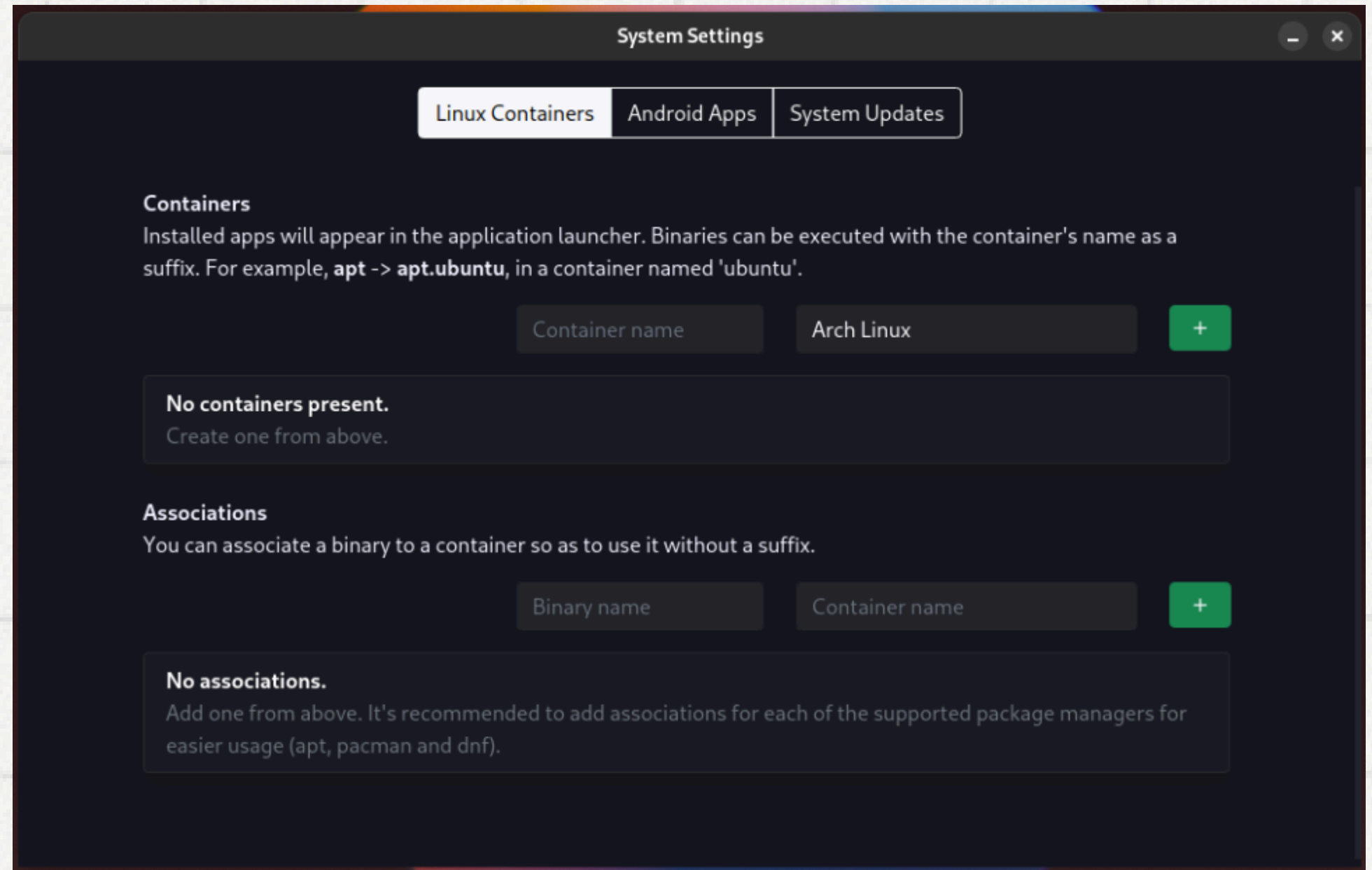
Android Apps

- Android app support is implemented using WayDroid.

- Standard LineageOS WayDroid images are included out-of-the-box.

- The blendOS Settings application exposes options to install F-Droid and Aurora Store.

What we're working on

Common**Arch**

A common base for immutable & atomic Linux distributions, using OCI images.

Native OCI Containers

A tiny subset of the OCI runtime specification has been implemented to boot container images locally.
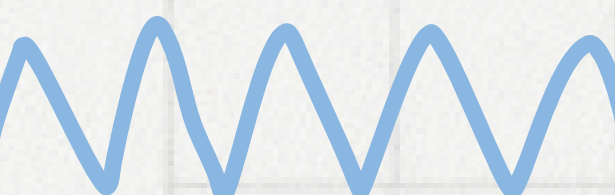
01. OCI container image is pulled to a local directory using Skopeo.

02. Image is unpacked into an OCI runtime bundle using Umoci.

03. Current rootfs is replaced with the rootfs from the bundle on the next boot.

Root

`root` (object, OPTIONAL) specifies the container's root filesystem. On Windows, for Windows Server Containers, this field is REQUIRED. For Hyper-V Containers, this field MUST NOT be set.

On all other platforms, this field is REQUIRED.

- `path` (string, REQUIRED) Specifies the path to the root filesystem for the container.

    - On Windows, `path` MUST be a volume GUID path.
    - On POSIX platforms, `path` is either an absolute path or a relative path to the bundle. For example, with a bundle at `/to/bundle` and a root filesystem at `/to/bundle/rootfs`, the `path` value can be either `/to/bundle/rootfs` or `rootfs`. The value SHOULD be the conventional `rootfs`.

    A directory MUST exist at the path declared by the field.

- `readonly` (bool, OPTIONAL) If true then the root filesystem MUST be read-only inside the container, defaults to false.

    - On Windows, this field MUST be omitted or false.
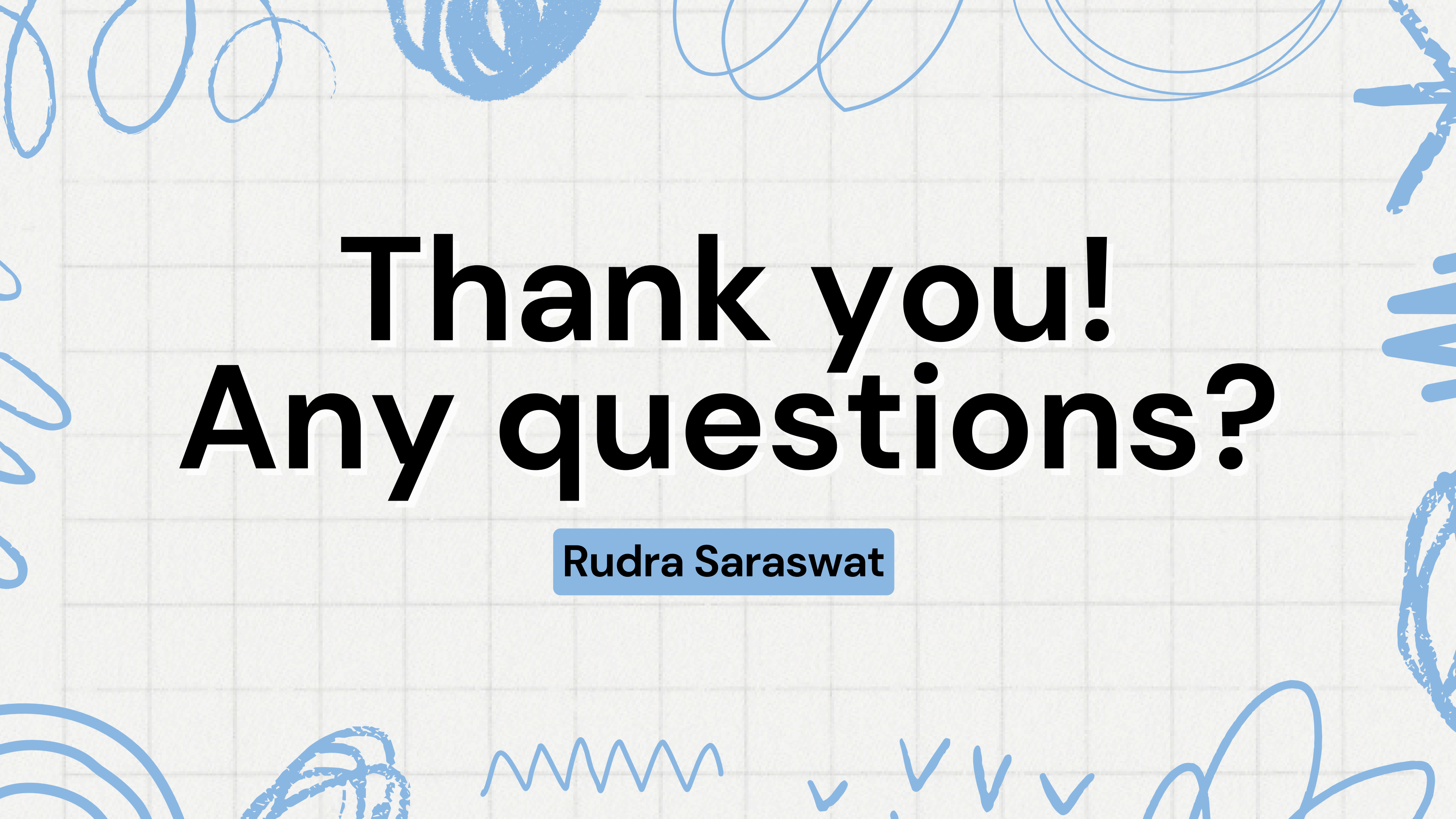
Example (POSIX platforms)

```
"root": {
    "path": "rootfs",
    "readonly": true
}
```

Build your own immutable Arch Linux-based distribution by following the guide at:

https://github.com/CommonArch/distro-template

```
matrix:
    variant: [general, nvidia]
    desktop: [nogui, xfce, mate, budgie, gnome, plasma]
    include:
        - variant: general
        suffix: ''
        - variant: nvidia
        suffix: '-nvidia'
```

Thank you!
Any questions?

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