



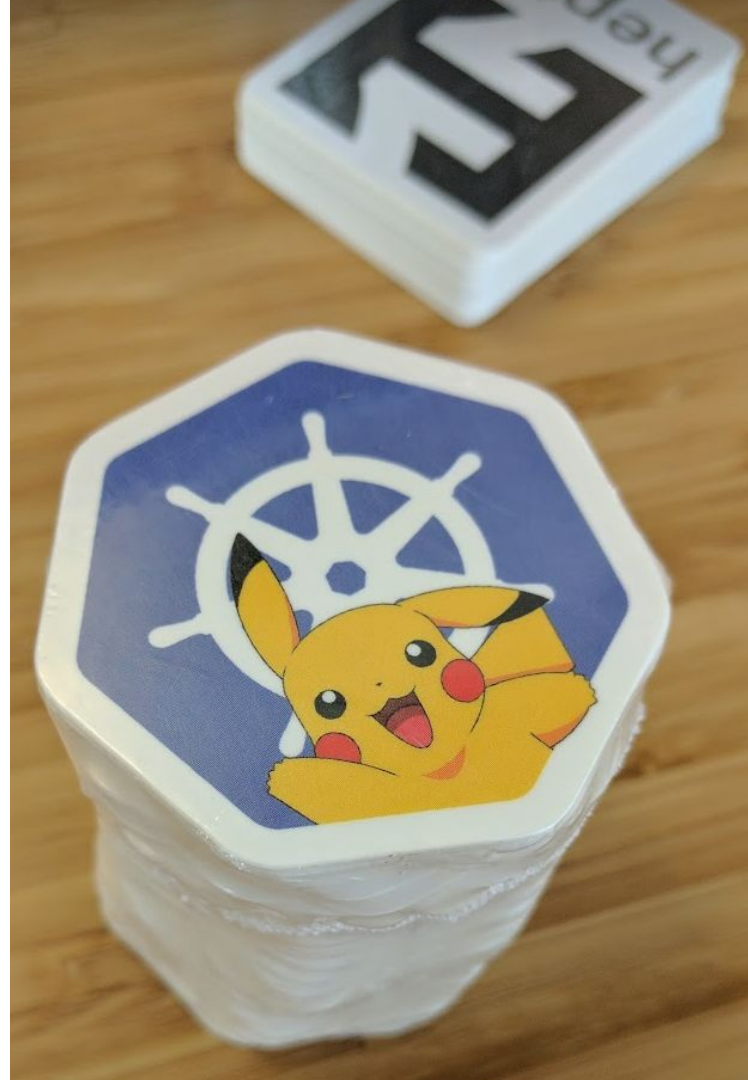
Powered by the future, **delivered today.**

ABOUT US

▶ What is cloud-native?

## About Jorge!

- Ops background from an .edu
- 20+ years as an OSS Community Manager
  - Canonical
  - VMware/Heptio
- OSS Projects
  - Ubuntu
  - Kubernetes
  - Kubeflow
  - Cloud Custodian
- Currently at the CNCF working for
  - Our 184(!) projects
  - And thousands of OSS contributors



## About Colin

- Emacs startup screen contributed to me being here
- Debian, GNOME, Red Hat, OpenShift, Fedora, ostree, bootc
- Somehow ~20+ years later working on the operating system in the FOSS space is still fun!



# One unified model for Linux

The desktop/client as an example use case



# Universal Blue: Year One

- KubeCon | CloudNativeCon NA 2022
- Passion Project
  - Jorge, Marco, Adam, and Wayne
  - I already had a “fix it script”
- Initial prototype finished in a weekend
  - Podman in a for loop!
- “It looks like a community manager wrote this.”

“

The team behind Bluefin has taken care to make the project lightweight from a contribution perspective, fully automating much of the maintenance work, thus allowing developers to focus on innovation rather than upkeep.

Steven J. Vaughan-Nichols – The New Stack

# Universal Blue: Year Two

- The Nvidia moment
  - Thanks Josh Stone (Red Hat) and Alex Diaz (Independent)
- Splitting into base layers, more contributors
- Focused on growth and covering lots of use cases
- SREs/sysadmins rewrite things
- Hyper focus on automation, “punch above our weight”
- Finding our target audience

“

I've seen what the future of operating systems at scale could be, and it starts with Project Bluefin.

Scott McCarty – RHEL Server Senior Principal Product Manager, for InfoWorld

## Universal Blue: Going GA (General Availability)

- Redirecting users away from base images and custom tooling
- Removing low-use images
- Focusing on infrastructure and contributor sustainability
- Automation and explicit removal of tech debt
- Focus on end user experiences instead of “a slightly better Fedora”

“

When I experimented with Universal Blue over the weekend, I was reminded of just how cool the Linux operating system is. All of a sudden, I felt like I was back in the late 90s or early 2000s and was seeing the future of operating systems before my eyes.

# Users don't want images they want experiences

They will insist that they want images





## Recent Games



Titanfall@ 2

▶ LAST TWO WEEKS: 1 MIN

WHAT'S NEW

FRIENDS

NEWS

IN-GAME VIDEOS

ONE IN THE CHAIR

STEAM

MENU



# bazzite

The next generation of Linux Gaming for all of your devices - including your favorite handheld.



## Play Your Favorites

Bazzite comes ready to rock with Steam and Lutris pre-installed, Steam Game Mode, HDR support for AMD GPUs, and numerous community-developed tools for your gaming needs.



## Expanded Hardware Support

Support for handhelds PCs, Nvidia drivers and the latest Mesa for AMD & Intel pre-installed, and numerous tweaks applied as needed to ensure your games just work.

# project Bluefin

The next generation Linux workstation, designed for reliability, performance, and sustainability.



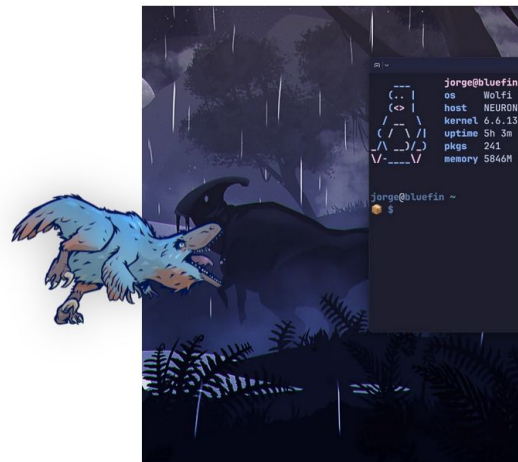
## For You

Bluefin is a custom image of Fedora Silverblue offering the best of both worlds: The reliability and ease of use of a Chromebook and the power of a GNOME desktop.



## For Developers

Container focused workflows to get you started depending on where you're coming from, or bring your own. Wield the industry's leading tools at your fingertips.



# Aurora

Aurora is a clean and reliable desktop operating system, with so much stuff built-in you'll never get configuration fatigue again.



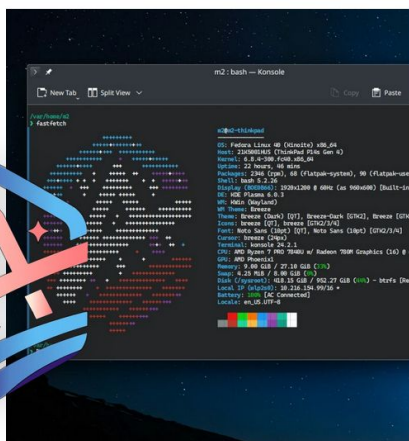
Simply delightful.

Aurora features a vanilla KDE Plasma 6 desktop experience that can be customized indefinitely. Super smooth and delightful.

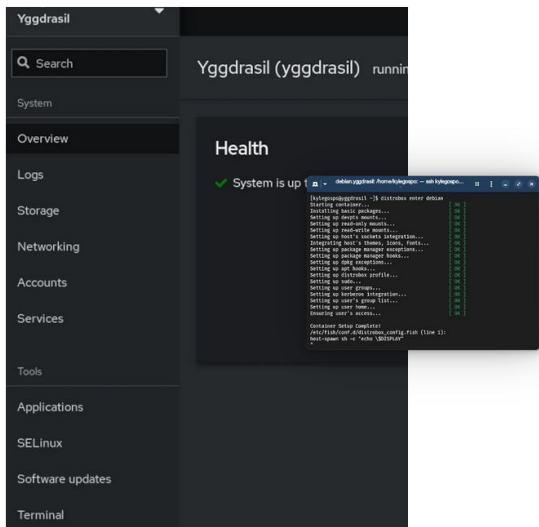


Zero Maintenance

Install the system once and forget about maintenance. Updates are automatic. Upgrade your system in one-click, including all your apps.



[VISIT WEBSITE](#)



# uCore

An OCI base image of Fedora CoreOS with batteries included; a lightweight server image including most used services or the building blocks to host them.



Server-grade

Ready for running containerized workloads on either bare metal or virtual machines, with tools like wireguard, firewalld, cockpit, tailscale, ZFS support, and more.



Compute-ready

Optional support for Nvidia hardware, including containerized CUDA workloads.

[VISIT WEBSITE](#)

# project Bluefin

The next generation Linux workstation, designed for reliability, performance, and sustainability.

Discover

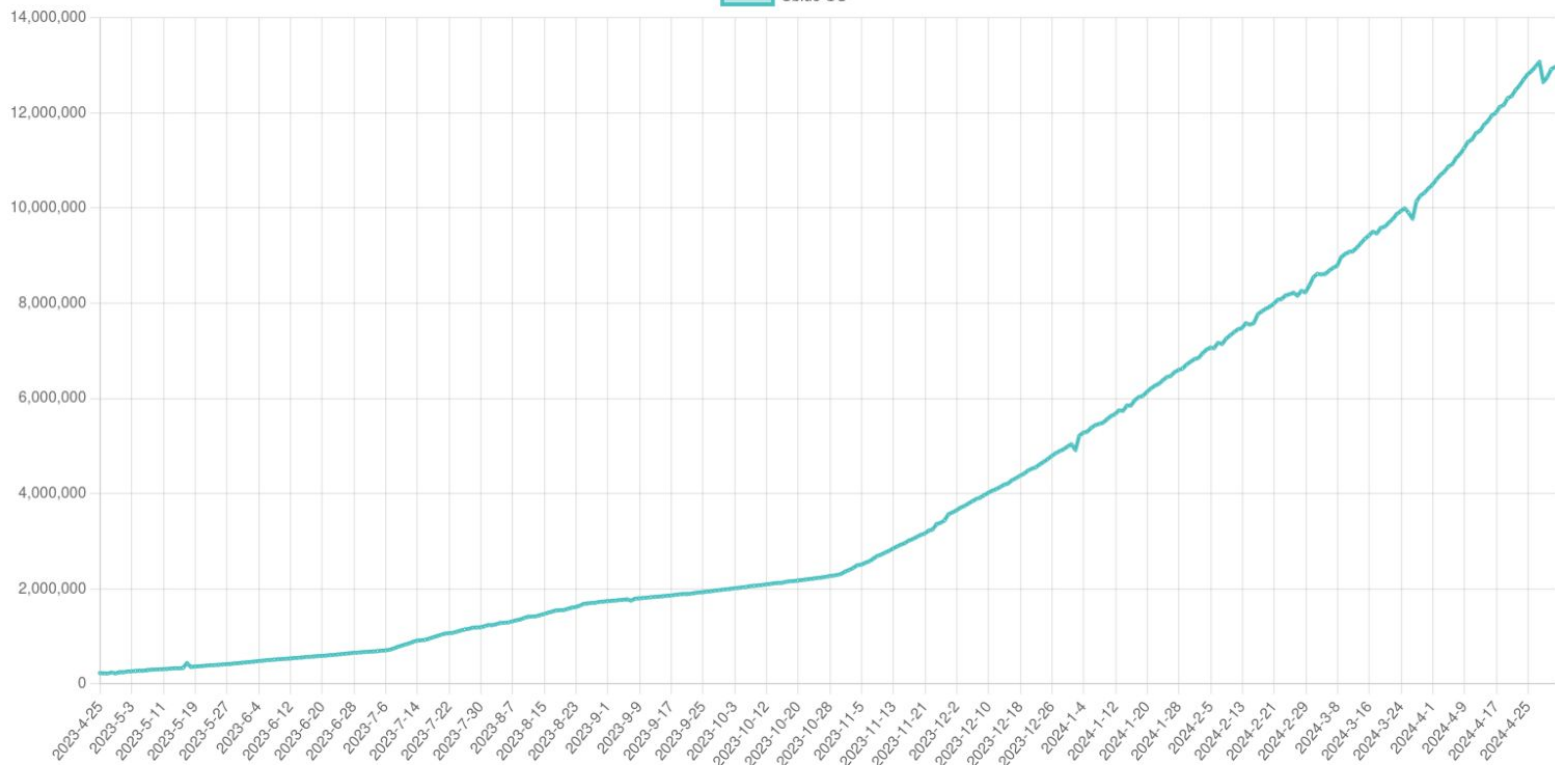
Try Out



# Pulls

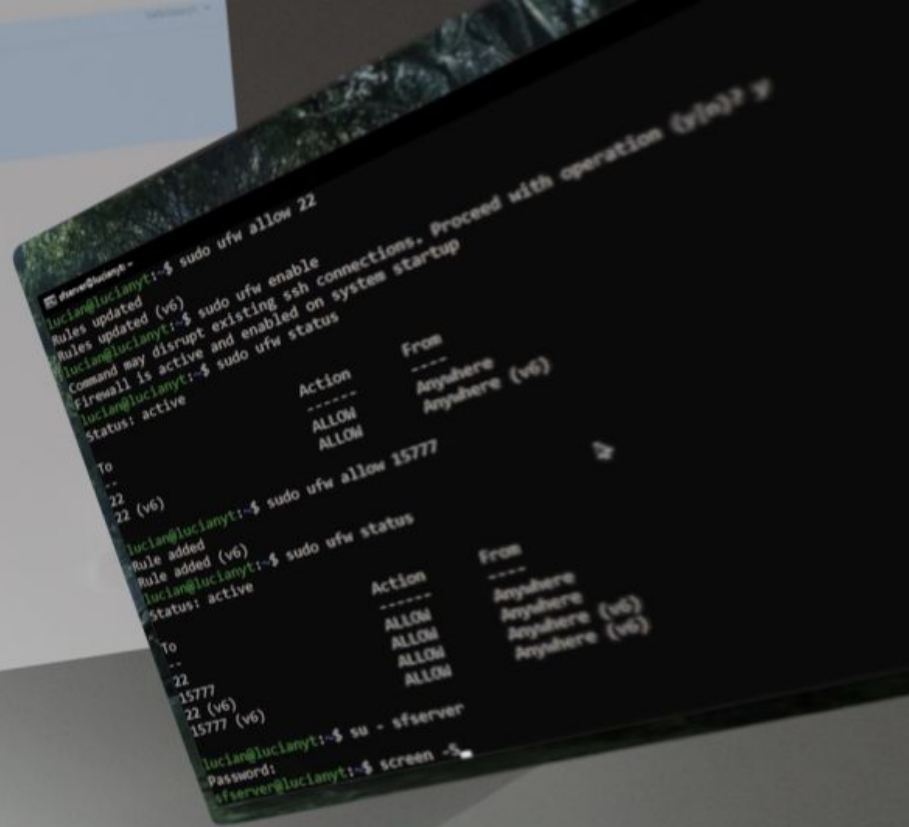
Total

Ublue OS



This charts image pulls of Universal Blue images.  
Pulls are not indicative of users, just successful image updates.





## Bazzite

297 Contributions in the Last 30 Days



1.54 Opened/Closed Issue Ratio

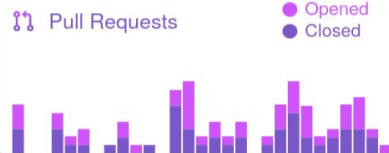
-0.16 (-9.56%) ↓ past month

48 Pull Requests Opened

+21 (77.78%) ↑ past month

550 Commits

+455 (478.95%) ↑ past month



Top Contributors

KyleGospo



github-action



noelmiller



HikariKnight



bsherman



## Bluefin

347 Contributions in the Last 30 Days



0.69 Opened/Closed Issue Ratio

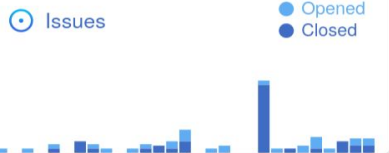
-1.72 (-71.35%) ↓ past month

103 Pull Requests Opened

+52 (101.96%) ↑ past month

69 Commits

+39 (130%) ↑ past month



Top Contributors

m2Giles



castrojo



p5



noelmiller



EyeCantCU





5:06 / 14:35

## Installing Linux on Apple's Stupid Trashcan



**Action Retro** ✓  
113K subscribers

Join

Subscribe

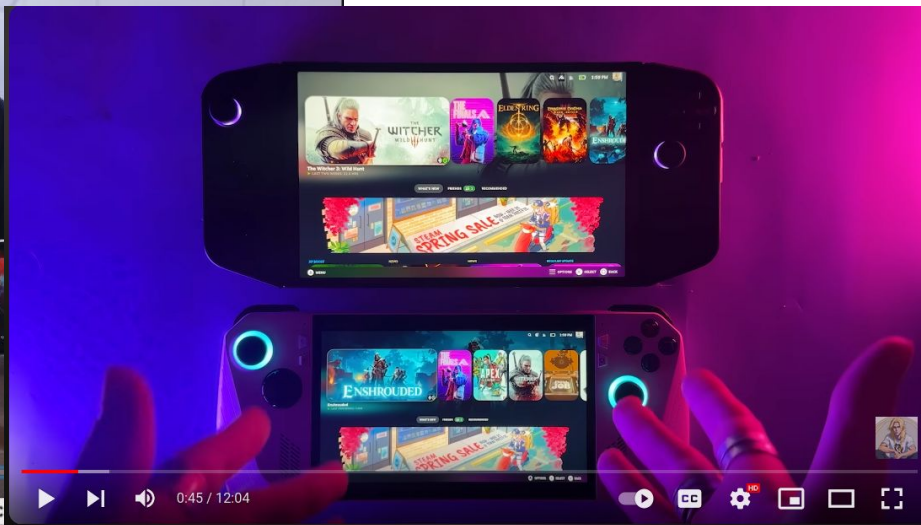
11K



344K views 7 months ago #MacPro #Linux

Use the exclusive code YTB930 to buy FlexiSpot E7 now for the best price!

US: <https://bit.ly/3L3013r> ...more



0:45 / 12:04

## SteamOS is AMAZING on Rog Ally and Legion Go. BazziteOS battery test, Benchmarks, etc...



**Cyber Dopamine**  
11.7K subscribers

Subscribed

1.8K



Share

Download

57K views 1 month ago  
LEGION GO DUALBOOT GUIDE I FOLLOWED (Aru)  
Dual Boot Guide - BazziteOS and Windo...  
...more



## Contributor Distribution

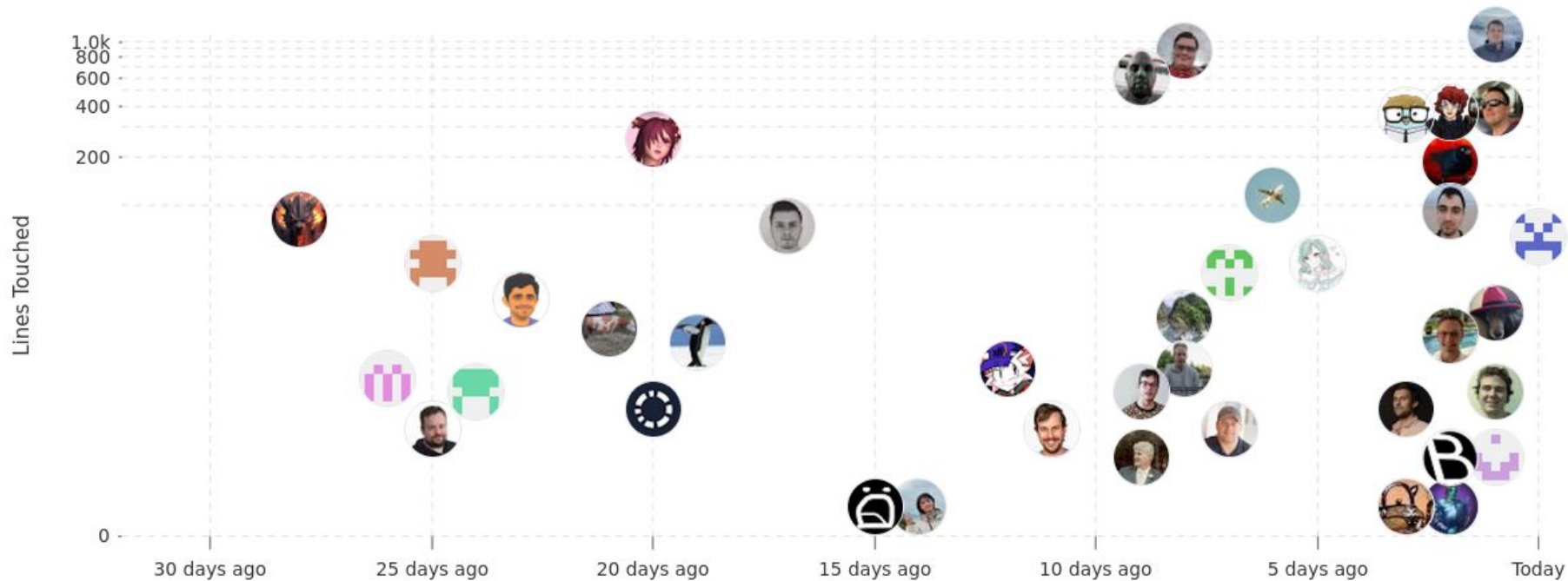
All PRs 84

Open 15

Closed 69

Show Bots

Enhance



Thanks opensauced.pizza



# Universal Blue: The Basics

FROM scratch AS config

- Service units, udev rules, shared justfiles

FROM fedora AS main

- Ingest multiple GUI desktops + QoL

FROM main AS bluefin

- Strongly opinionated image for general use cases

FROM bluefin AS bluefin-dx

- “The perfect UNIX workstation”



# Universal Blue: The GitHub Actions

9

fin 39 #325

Cancel workflow

...



ry

Manually triggered now

Status

Total duration

Artifacts

 castrojo  3e1369c [main](#)

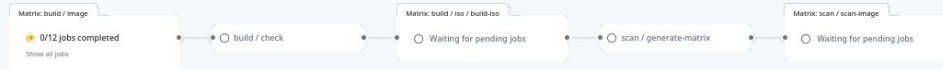
**In progress**

-

-

**build-39-bluefin.yml**

on: workflow\_dispatch



latest

40-stable-20240427

40-20240427

40-stable

40

stable

Published 3 days ago · Digest

...

sha256 : c66c919da92842b6533f79554dab9031136aa4f5798c57b851ba4cc4dbf36da9

Thanks @bsherman, @KyleGospo, @p5, @m2, and others ...

# Universal Blue: Applying application container patterns to OS images

IMAGE	TAG
<a href="#">fedora-coreos</a> - <i>stable</i>	<code>stable-nvidia</code> , <code>stable-zfs</code> , <code>stable-nvidia-zfs</code>
<a href="#">fedora-coreos</a> - <i>testing</i>	<code>testing-nvidia</code> , <code>testing-zfs</code> , <code>testing-nvidia-zfs</code>
<a href="#">ucore-minimal</a> - <i>stable</i>	<code>stable</code> , <code>stable-nvidia</code> , <code>stable-zfs</code> , <code>stable-nvidia-zfs</code>
<a href="#">ucore-minimal</a> - <i>testing</i>	<code>testing</code> , <code>testing-nvidia</code> , <code>testing-zfs</code> , <code>testing-nvidia-zfs</code>
<a href="#">ucore</a> - <i>stable</i>	<code>stable</code> , <code>stable-nvidia</code> , <code>stable-zfs</code> , <code>stable-nvidia-zfs</code>
<a href="#">ucore</a> - <i>testing</i>	<code>testing</code> , <code>testing-nvidia</code> , <code>testing-zfs</code> , <code>testing-nvidia-zfs</code>
<a href="#">ucore-hci</a> - <i>stable</i>	<code>stable</code> , <code>stable-nvidia</code> , <code>stable-zfs</code> , <code>stable-nvidia-zfs</code>
<a href="#">ucore-hci</a> - <i>testing</i>	<code>testing</code> , <code>testing-nvidia</code> , <code>testing-zfs</code> , <code>testing-nvidia-zfs</code>



```
magnum@magnum:~$ cat /etc/os-release
NAME="Fedora Linux"
VERSION="39 (Silverblue)"
ID="fedora"
ID_LIKE="rhel rhcos centos"
VERSION_ID="39"
PRETTY_NAME="Fedora Linux 39 (Silverblue)"
ANSI_COLOR="0;32"
LOGO="fedora-logo-icon"
CPE_NAME="cpe:/o:fedoraproject:fedora:39"
HOME_URL="https://getfedora.org/"
DOCUMENTATION_URL="https://docs.fedoraproject.org/en-US/quick-start-guides/"
BUG_REPORT_URL="https://bugzilla.redhat.com/"
SUPPORT_URL="https://ask.fedoraproject.org/"
PRIVACY_POLICY_URL="https://www.fedoraproject.org/privacy-policy/"
VENDOR="Fedora Project"
VENDOR_URL="https://www.fedoraproject.org/"

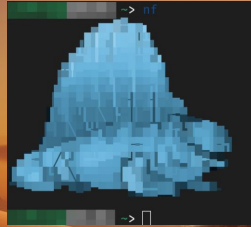
```

```
magnum@magnum:~$ cat /etc/os-release
NAME="Fedora Linux"
VERSION="39 (Silverblue)"
ID="fedora"
ID_LIKE="rhel rhcos centos"
VERSION_ID="39"
PRETTY_NAME="Fedora Linux 39 (Silverblue)"
ANSI_COLOR="0;32"
LOGO="fedora-logo-icon"
CPE_NAME="cpe:/o:fedoraproject:fedora:39"
HOME_URL="https://getfedora.org/"
DOCUMENTATION_URL="https://docs.fedoraproject.org/en-US/quick-start-guides/"
BUG_REPORT_URL="https://bugzilla.redhat.com/"
SUPPORT_URL="https://ask.fedoraproject.org/"
PRIVACY_POLICY_URL="https://www.fedoraproject.org/privacy-policy/"
VENDOR="Fedora Project"
VENDOR_URL="https://www.fedoraproject.org/"

```

```
magnum@magnum:~$ cat /etc/os-release
NAME="Fedora Linux"
VERSION="39 (Silverblue)"
ID="fedora"
ID_LIKE="rhel rhcos centos"
VERSION_ID="39"
PRETTY_NAME="Fedora Linux 39 (Silverblue)"
ANSI_COLOR="0;32"
LOGO="fedora-logo-icon"
CPE_NAME="cpe:/o:fedoraproject:fedora:39"
HOME_URL="https://getfedora.org/"
DOCUMENTATION_URL="https://docs.fedoraproject.org/en-US/quick-start-guides/"
BUG_REPORT_URL="https://bugzilla.redhat.com/"
SUPPORT_URL="https://ask.fedoraproject.org/"
PRIVACY_POLICY_URL="https://www.fedoraproject.org/privacy-policy/"
VENDOR="Fedora Project"
VENDOR_URL="https://www.fedoraproject.org/"

```



```
----- Hardware Information -----
Uptime: 8 hours, 43 mins
CPU: 13th Gen Intel(R) Core(TM) i9-13900K (32) @ 5.50 GHz
RAM: 13.04 GiB / 125.53 GiB (10%)
GPU: NVIDIA GeForce RTX 4090
Disk: 130.91 GiB / 3.64 TiB (4%) - fuseblk
Disk: 460.61 GiB / 1.82 TiB (25%) - btrfs [Read-only]
Disk: 998.50 GiB / 3.58 TiB (27%) - ext4
----- Software Information -----
Kernel: 6.7.12-202.fc39.x86_64
Shell: fish 3.7.0
OS: Fedora Linux 39 (Silverblue) x86_64
```



# Universal Blue: The ISO Generator Action

← Bluefin GTS ISO Build

## ● Bluefin GTS ISO Build #3

Cancel workflow



### Summary

Jobs

- Bluefin GTS
  - build-iso (main, bluefin, 39)
  - build-iso (main, bluefin-dx, 39)
  - build-iso (nvidia, bluefin, 39)
  - build-iso (nvidia, bluefin-dx, 39)
  - build-iso (asus, bluefin, 39)
  - build-iso (asus, bluefin-dx, 39)
  - build-iso (asus-nvidia, bluefin, 39)
  - build-iso (asus-nvidia, bluefin-dx, 39)
  - build-iso (surface, bluefin, 39)
  - build-iso (surface, bluefin-dx, 39)
  - build-iso (surface-nvidia, bluefin, 39)
  - build-iso (surface-nvidia, bluefin-dx...

Manually triggered now



castrojo - 3e1369c main

Status

Queued

Fedora Linux 40 (Silverblue) installation

### build-bluefin-gts-iso.yml

on: workflow\_dispatch

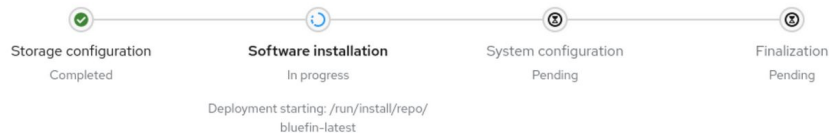
Matrix: Bluefin GTS / build-iso

● 0/12 jobs completed

Show all jobs

### Installing

Software installation: Storage configuration complete. The software is now being installed onto your device.



Thanks Noel Miller (Red Hat) and Jason Nagin (Red Hat)

# Speaking of experiences ...

Building off of base images let's us focus





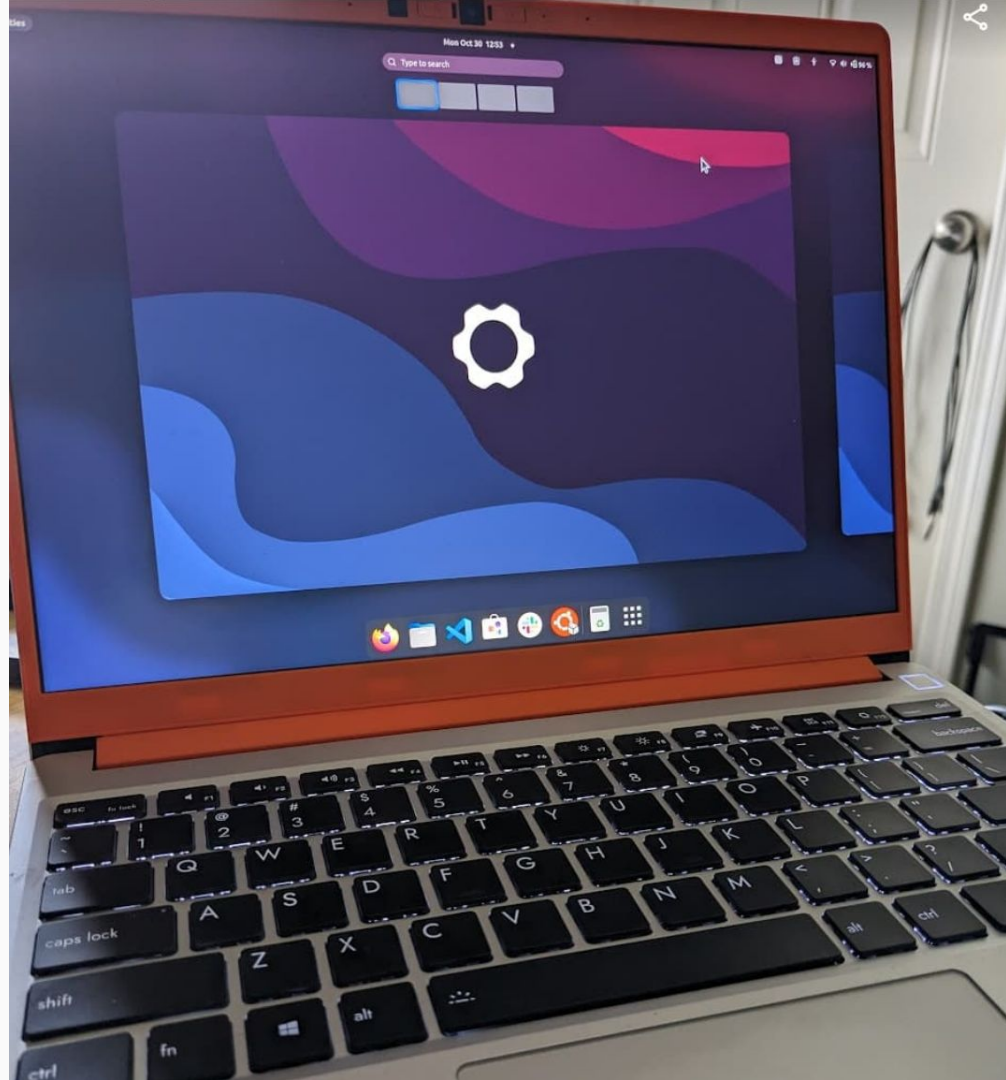
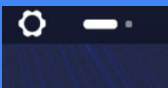
 framework

Pre-existing relationship with Fedora

We polish the minutia

The reliability of a Chromebook with the  
power of Fedora

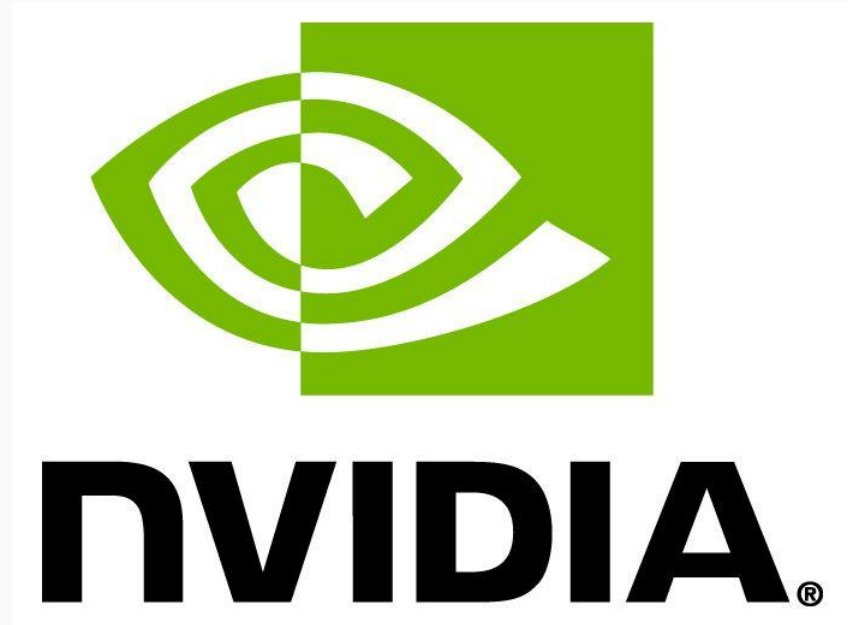
A viable alternative to MacOS for  
systems engineers



# Podman on the Metal



Prototype faster: Include drivers on your custom image



# Prototype faster: ollama integration

The screenshot displays a Linux desktop environment with a terminal window and system monitoring tools. The terminal window shows a Docker command and its output, which is a list of facts about the dinosaur Deinonychus. The system monitoring tools show the current state of various resources and the performance of the AMD Radeon RX 7900 XTX GPU.

**Terminal Window:**

```
jorge@exo:~$ docker exec -it elegant_merkle ollama run llama2
>>> tell me about deinonychus
Deinonychus is a well-known genus of maniraptoran theropod dinosaurs that lived during the Early Cretaceous period, around 115-108 million years ago. Here are some interesting facts about Deinonychus:
1. Large size: Deinonychus was a large predator, measuring around 3-4 meters (10-13 feet) long and weighing up to 50 kilograms (110 pounds). It would have been a formidable hunter, capable of taking down prey much larger than itself.
2. Powerful legs: Deinonychus had powerful legs that were well-suited for running and jumping. The legs were also highly flexible, allowing the animal to make quick turns and changes in direction.
3. Specialized claws: Deinonychus had highly specialized claws that were adapted for grasping and tearing flesh. The claws were curved and hooked, with a central groove that likely helped to grip and hold onto prey.
4. Bipedal locomotion: Like many maniraptorans, Deinonychus was bipedal, meaning it walked on two legs. This is a common characteristic of theropod dinosaurs, although some species may have been quadrupedal (four-legged) as well.
5. Feathered body: Deinonychus had feathers covering its body, which were likely used for display, thermoregulation, and possibly even flight. The presence of feathers in a predator like Deinonychus challenges the traditional view of dinosaurs as scaly and cold-blooded.
6. Ancestral bird: Deinonychus is considered an ancestor of modern birds, with some species being direct ancestors of birds (such as Archaeopteryx). As such, it plays a crucial role in understanding the evolutionary history of birds.
7. Hollow bones: Like many dinosaurs, Deinonychus had hollow bones, which likely helped to reduce its overall weight and make it more efficient at running and flying.
8. Agile predator: Deinonychus was an agile predator, capable of making quick attacks and avoiding danger with its impressive speed and agility. Its powerful legs and specialized claws made it a formidable hunter.
9. Prey capture: The highly specialized claws of Deinonychus were likely used for capturing and holding onto prey, which would have included small animals like lizards, snakes, and mammals.
10. Important for understanding feather evolution: Deinonychus plays a crucial role in understanding the evolution of feathers in theropod dinosaurs and their relationships to modern birds. By studying this genus, scientists can gain insights into how feathers evolved and developed over time.
>>> Send a message (/? for help)
```

**Resources Panel:**

- CPU: 2% 4.73 GHz, 49°C
- Memory: 19% 5.47 GiB/30.6 GiB
- Disk 0 (nvme0n1): 0%
- Disk 1 (nvme2n1): 0%
- Disk 2 (nvme1n1): 4%
- Ethernet (eno1): S: 148 Kbps, R: 4.33 Mbps
- Wi-Fi (wlp12s0): S: 0 Kbps, R: 0 Kbps
- Other (tailscale0): S: 0 Kbps, R: 0 Kbps
- Other (br-41142f3331...): S: 0 Kbps, R: 0 Kbps
- Other (vethf68f298): S: 0 Kbps, R: 0 Kbps
- Other (veth1e0c9aa): S: 0 Kbps, R: 0 Kbps
- GPU 0: AMD Radeon RX 7900 XTX (23°C)
- GPU 1: AMD Radeon Graphics (25°C)

**Performance Panel:**

### GPU 0 AMD Radeon RX 7900 XTX

Overall utilization

The graph shows GPU utilization over time. A significant spike in utilization is visible, reaching approximately 96%.

Utilization: 0%

Clock Speed: 1.00 MHz / 2.30 GHz

Power draw: 7.00 W / 291 W

Memory usage: 7.56 GiB / 24.0 GiB

Memory speed: 96.0 MHz / 1.25 GHz

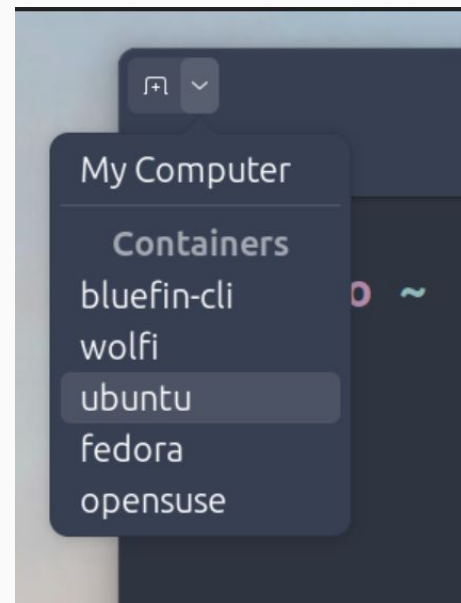
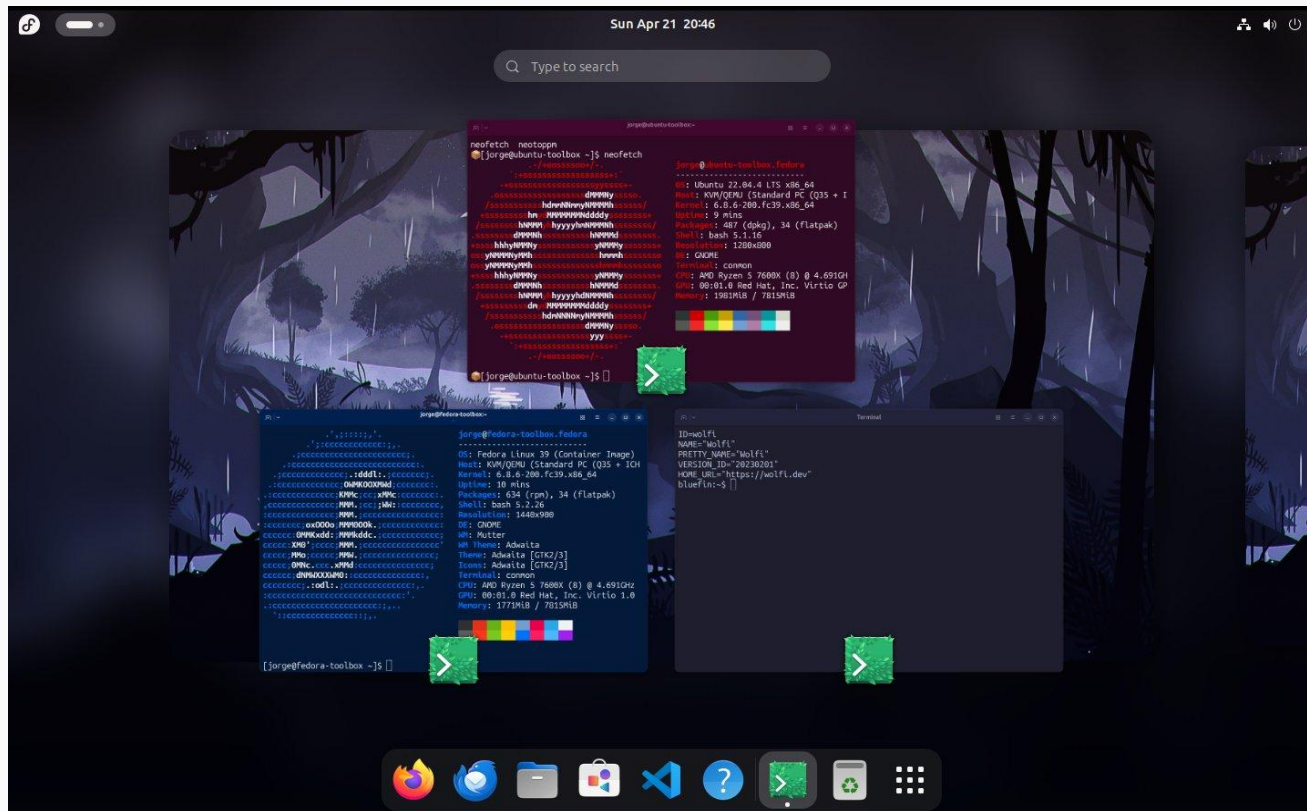
Temperature: 53°C

OpenGL version: 4.6  
Vulkan version: 1.3.287  
PCI Express speed: PCIe Gen 4 x16  
PCI bus address: 0000:03:00.0

Video encode: 0% Video decode: 0%

Memory usage: 24.0 GiB

# Prototype Faster: Ptyxis Terminal and Podman

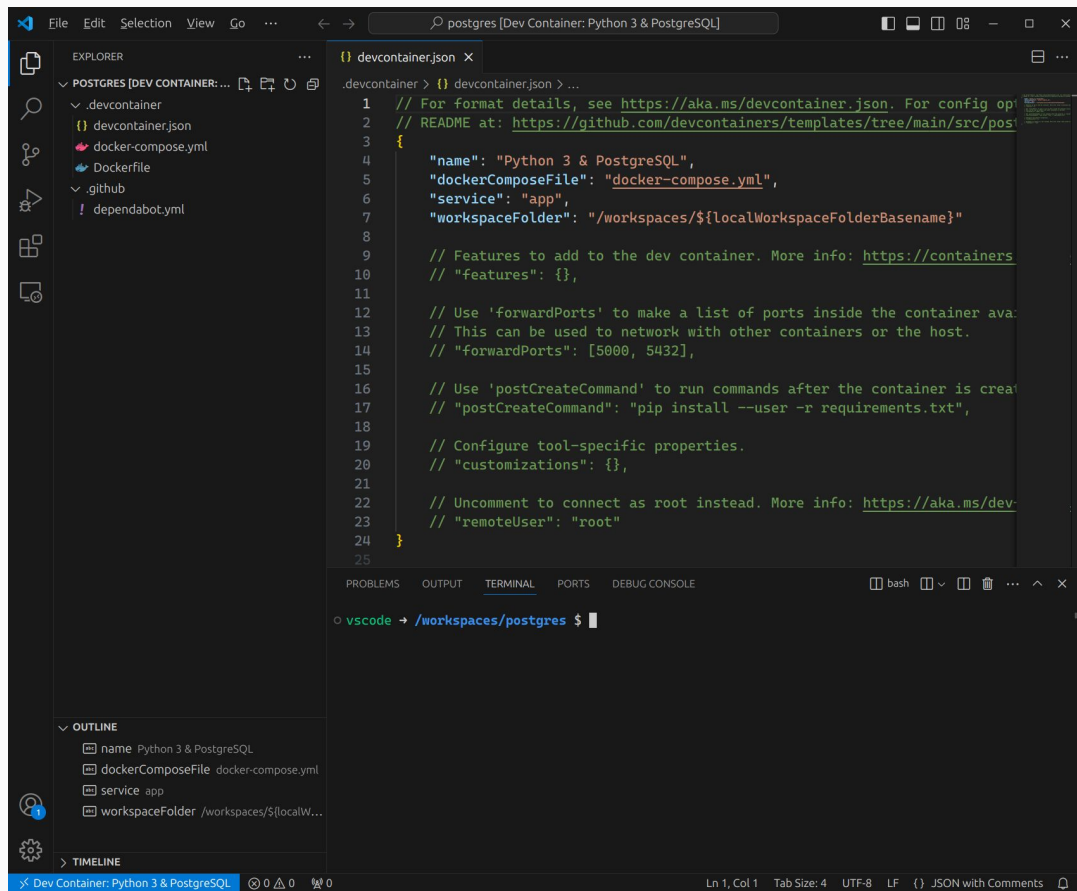


Thanks Luca di Maio (Independent) and Christian Hergert (Red Hat)

# Prototype Faster: The “Developer Experience” Pattern

```
jorge@exo ~  
> ujust devmode  
Developer mode is currently enabled  
Enable or Disable developer mode  
> Enable  
Disable
```

- Built in k8s, QEMU/KVM
- VSCode with devcontainers
- Tailscale
- Homebrew
- Docker
- Virt-manager
- Great monospace fonts
- Quick-fire setup for JetBrains, PyTorch, etc.



The screenshot shows the VS Code interface with a devcontainer.json file open. The file contains configuration for a Python 3 & PostgreSQL dev container. The terminal window at the bottom shows the command prompt in the workspace folder.

```
File Edit Selection View Go ... postgres [Dev Container: Python 3 & PostgreSQL]
EXPLORER
POSTGRES [DEV CONTAINER: ...]
  .devcontainer
  devcontainer.json
  docker-compose.yml
  Dockerfile
  .github
  dependabot.yml
devcontainer.json
  1 // For format details, see https://aka.ms/devcontainer.json. For config options, see https://aka.ms/remoteconfig
  2 // README at: https://github.com/devcontainers/templates/tree/main/src/python
  3
  4 {
  5     "name": "Python 3 & PostgreSQL",
  6     "dockerComposeFile": "docker-compose.yml",
  7     "service": "app",
  8     "workspaceFolder": "/workspaces/${localWorkspaceFolderBasename}"
  9
 10     // Features to add to the dev container. More info: https://containers.dev/features
 11     // "features": {},
 12
 13     // Use 'forwardPorts' to make a list of ports inside the container available locally.
 14     // "forwardPorts": [5000, 5432],
 15
 16     // Use 'postCreateCommand' to run commands after the container is created.
 17     // "postCreateCommand": "pip install --user -r requirements.txt",
 18
 19     // Configure tool-specific properties.
 20     // "customizations": {},
 21
 22     // Uncomment to connect as root instead. More info: https://aka.ms/devcontainer-user-
 23     // "remoteUser": "root"
 24 }
 25
PROBLEMS OUTPUT TERMINAL PORTS DEBUG CONSOLE
vscodet /workspaces/postgres $
```

# Prototype Faster: Swapping out kernels

```
# Install kernel-fsync, if needed
RUN rpm-ostree cliwrap install-to-root / && \
  if [[ "${KERNEL_FLAVOR}" =~ "fsync" ]]; then \
    echo "will install ${KERNEL_FLAVOR} kernel from COPR" && \
    curl -Lo /etc/yum.repos.d/_copr_sentry-kernel-fsync.repo https://copr.fedorainfracloud.org/coprs/s
    rpm-ostree override replace \
      --experimental \
      --from repo=copr:copr.fedorainfracloud.org:sentry:kernel-fsync \
        kernel \
        kernel-core \
        kernel-modules \
        kernel-modules-core \
        kernel-modules-extra \
        kernel-uki-virt \
        kernel-headers \
        kernel-devel \
```

```
RUN if [[ KERNEL_FLAVOR = "fsync" ]];  
then dnf -y install kernel-fsync && dnf  
clean all; fi
```



# Stay Safe: Live mitigation of upstream regressions

```
22 + # # Workaround for podman issue upstream - https://github.com/containers/podman/issues/20872
23 + RUN if [ "$FEDORA_MAJOR_VERSION" = "39" ]; then \
24 +     rpm-ostree override replace https://bodhi.fedoraproject.org/updates/FEDORA-2023-00c78aad58; \
25 +     fi
26 +
```



# Strongest Patterns

- One common language between dev and ops
- Sharing base images leads to efficiency
- Consistent image to the end user
- Hardware Enablement
  - ASUS, Framework, Lenovo, and Valve hardware
  - We ship newer kernels to the Steam Deck than Valve
- Gating regressions at the image level, not needing to do OS/distro work



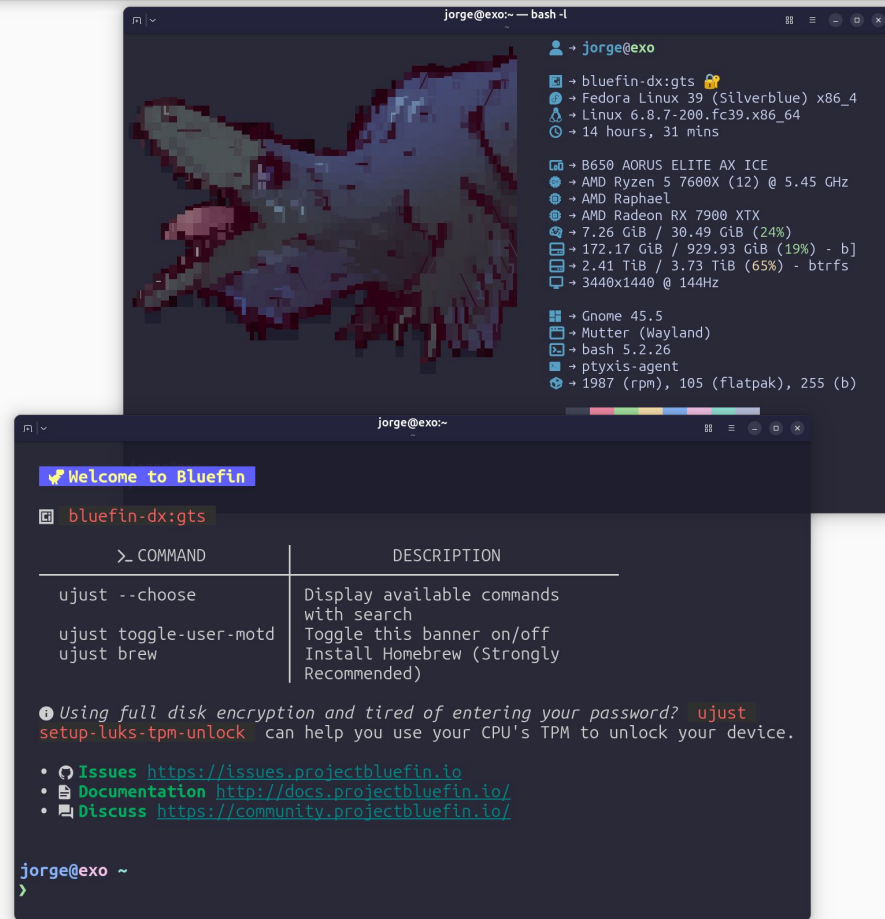
# Purposeful Simplicity

- Admins can go so far with bash and a little Python
- Explicit non-scope mission statements
- Encourage more innovation outside of Universal Blue
- “Not a distro” forces people to go fix deeper technical issues in Fedora itself
- “We are not Bitnami”



# Silly UNIX tricks

- Shared community aliases via `just`
- Dynamic MOTD
- `ujust` update
- `ujust toggle-nvk`
- `ujust setup-cockpit`
- `ujust changelogs`
- `ujust device-info`
- Non-trivial amount of effort in terminal artwork. 😊



The image shows two terminal windows. The top window displays system information for a Fedora Linux system, including hardware details like the AMD Ryzen 5 7600X processor and AMD Radeon RX 7900 XTX graphics card. The bottom window shows a terminal session with a 'Welcome to Bluefin' banner and a table of available commands.

```
jorge@exo:~$ just
```

```
┌─ Welcome to Bluefin ─┐
```

```
└─ bluefin-dx:gts ─┘
```

>_ COMMAND	DESCRIPTION
<code>ujust --choose</code>	Display available commands with search
<code>ujust toggle-user-motd</code>	Toggle this banner on/off
<code>ujust brew</code>	Install Homebrew (Strongly Recommended)

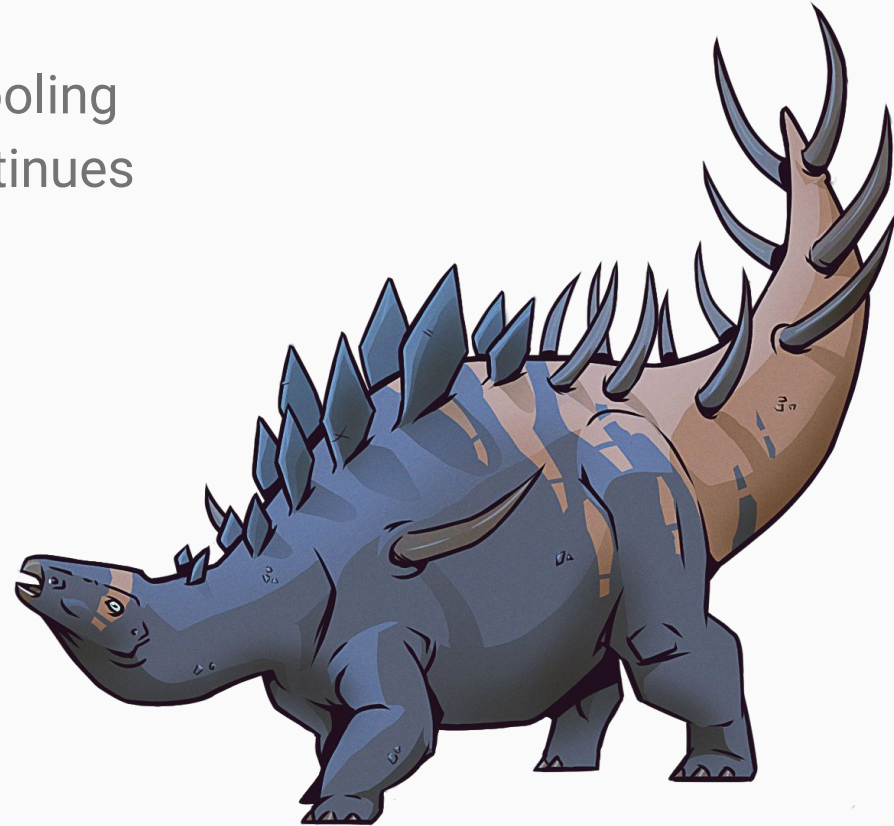
Using full disk encryption and tired of entering your password? `ujust setup-luks-tpm-unlock` can help you use your CPU's TPM to unlock your device.

- Issues <https://issues.projectbluefin.io>
- Documentation <http://docs.projectbluefin.io/>
- Discuss <https://community.projectbluefin.io/>

```
jorge@exo ~
```

# Challenges: The Linux Desktop's Docker Moment (powered by Podman)

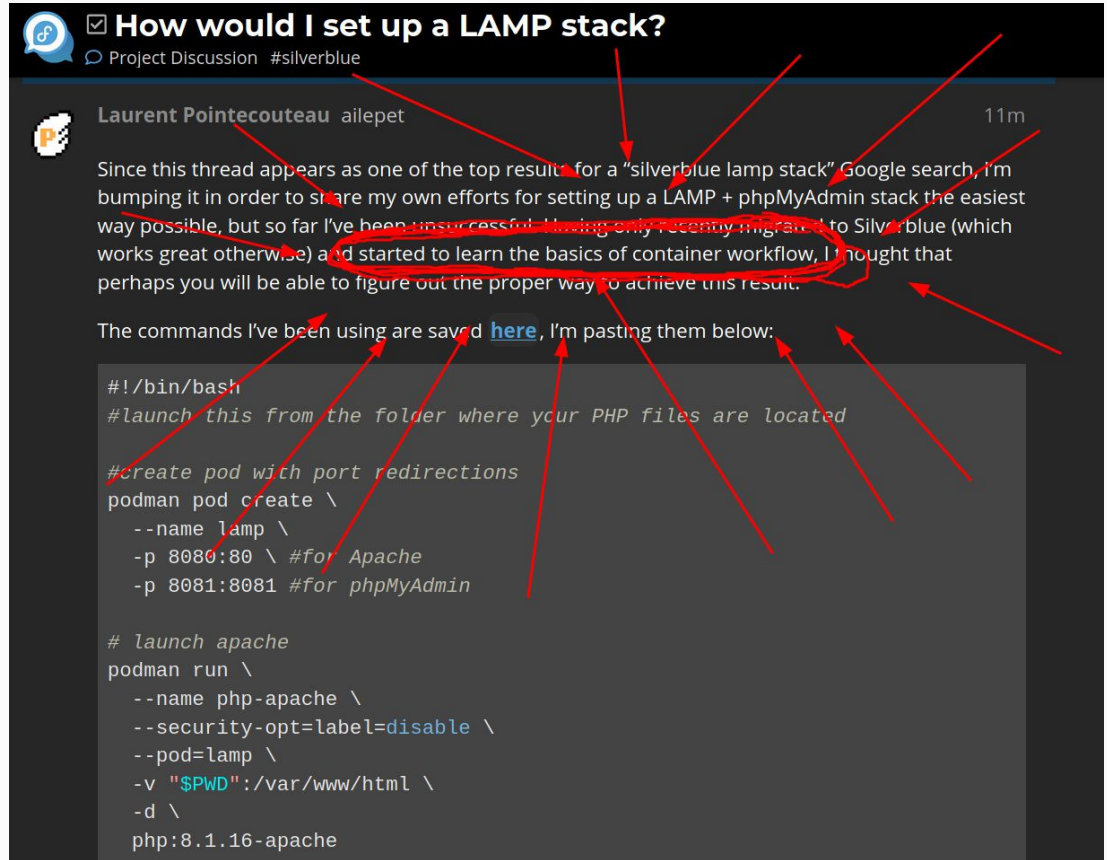
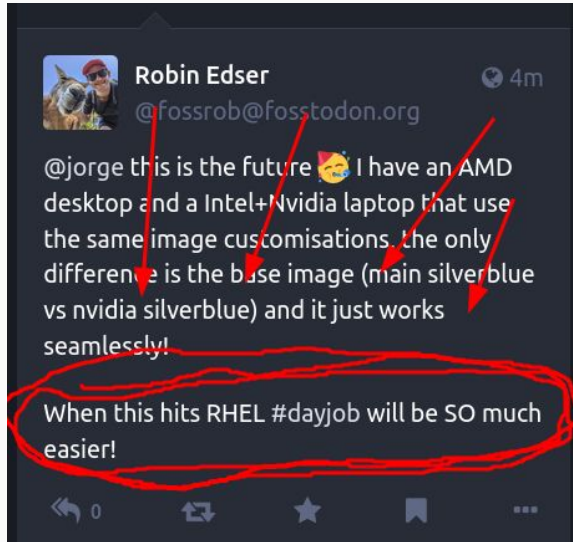
- Runtime --> build time customization
- Cloud Native tooling v. distribution tooling
- Container-focused development continues to challenge new users
  - Podman Desktop
  - Devcontainers
- Sigstore and SBOMs



## Things we'd love to see in container native Fedora

- Container diffs
  - The whole industry needs this
- More consumption of cloud native tooling
- Better automated testing
- Gating kernels via CoreOS cadence
- Command Line experience in general
- Management of /etc

# Benefits for experts AND new explorers



Safety switches lead to positive interactions between users and OSS Contributors in our issue trackers.

They deserve that.





# Intermission

# There's lots of Linux out there

- Gitlab CI, GitHub Action
- Servers: `virthost-bos01...08.examplecorp.com`
- Cloud
- Desktops
- Edge/IoT

# Image-based/Immutable vs General purpose

- (Title is a **false dichotomy** but we'll get to that later)
- Brief history:
  - ...
  - [RHEV Image based hypervisor ISO](#) (rhel6, ~2011)
  - ...
  - Docker invented
  - ...
  - (CoreOS) Container Linux
  - RHEL Atomic Host (rhel7)
  - RHEL CoreOS (rhel8+9)
  - Lots more around: Flatcar, Ubuntu Core, etc.

# Why has OSTree stayed around?

- Fancy wrapper around `link()`, plus bootloaders: But it works
- Mutable /etc 3 way merge is not perfect, but better than alternatives
- Filesystem based adds a ton of flexibility
- Network-efficient static deltas

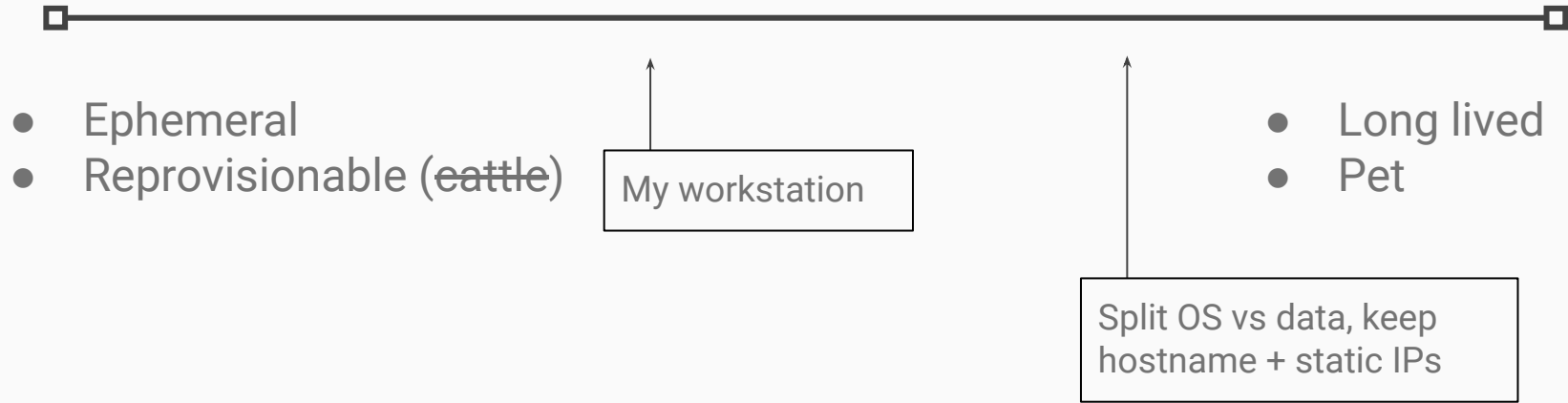
# Lots of comp/co-opetition in the ecosystem

- Ubuntu Core
- SUSE ALP
- Balena
- Systemd: DDIs
- Kairos
- Flatcar
- Yocto generating images
- Google COOS
- NixOS (and Guix)
- Amazon Bottlerocket
- Fedora CoreOS/RHCOS
- Also Fedora Atomic Desktops + ublue
- Talos
- Docker LinuxKit
- Lots more

# virthost-bos01...08 needs good tools

- <https://grahamc.com/blog/erase-your-darlings/> “There are lots of cases in which immutable infrastructure *doesn't* work, and the dirty secret is those servers need good tools the most.”
- Atomic Host and kernel-debug; throwaway or not

# Reality is: there's a spectrum



# CoreOS/Atomic and rpm-ostree

- [ostree is a teenager: AuthorDate: Sun Oct 9 17:03:08 2011 -0400](#) (predates docker, etc.); goal was “image based” by default w/transactional updates
- **Yes, you can “rpm-ostree override replace kernel-debug.rpm” on virthost01, but you can *also* confidently reset back to the “golden image”; having your cake and eating it too**
- High level config (CRDs, Kube driven) vs Ignition vs machine-specific state
- *...vs deeper OS customization and agents*



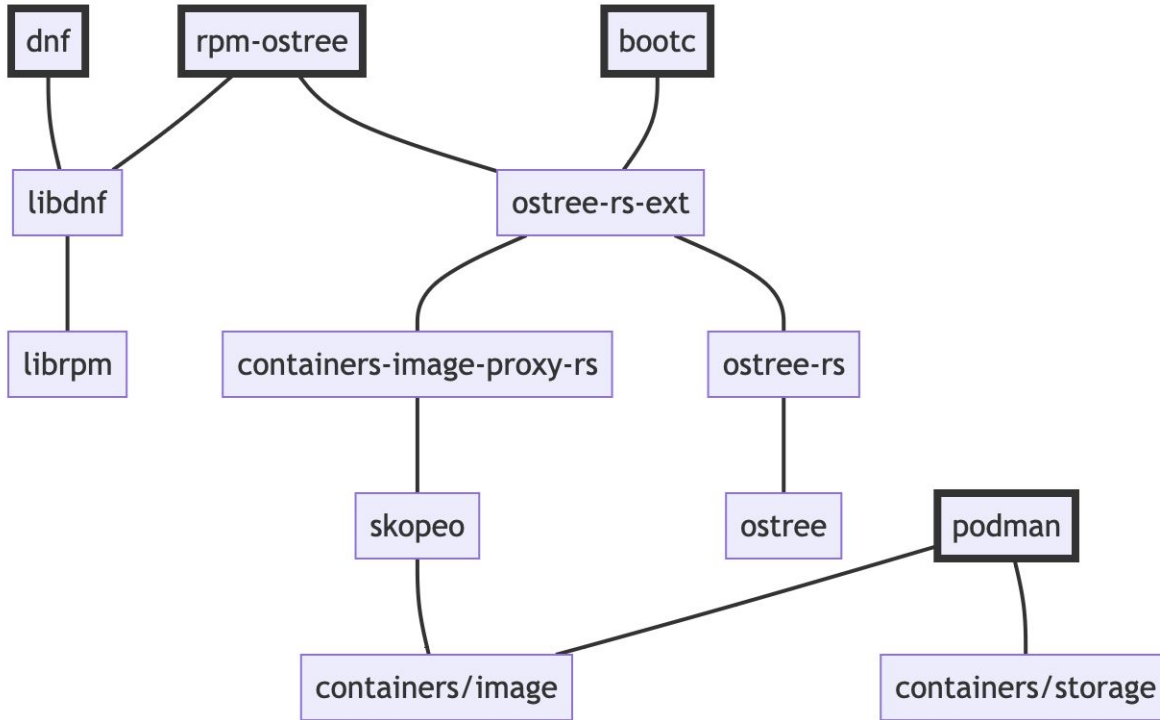
# rpm-ostree learned containers!

- Let's talk about that deep customization
- FROM [quay.io/fedora/fedora-coreos:stable](https://quay.io/fedora/fedora-coreos:stable) or FROM [quay.io/fedora/fedora-silverblue:40](https://quay.io/fedora/fedora-silverblue:40)
- [OCP CoreOS Layering](#)
- Enabled Universal Blue
- But... *but*...

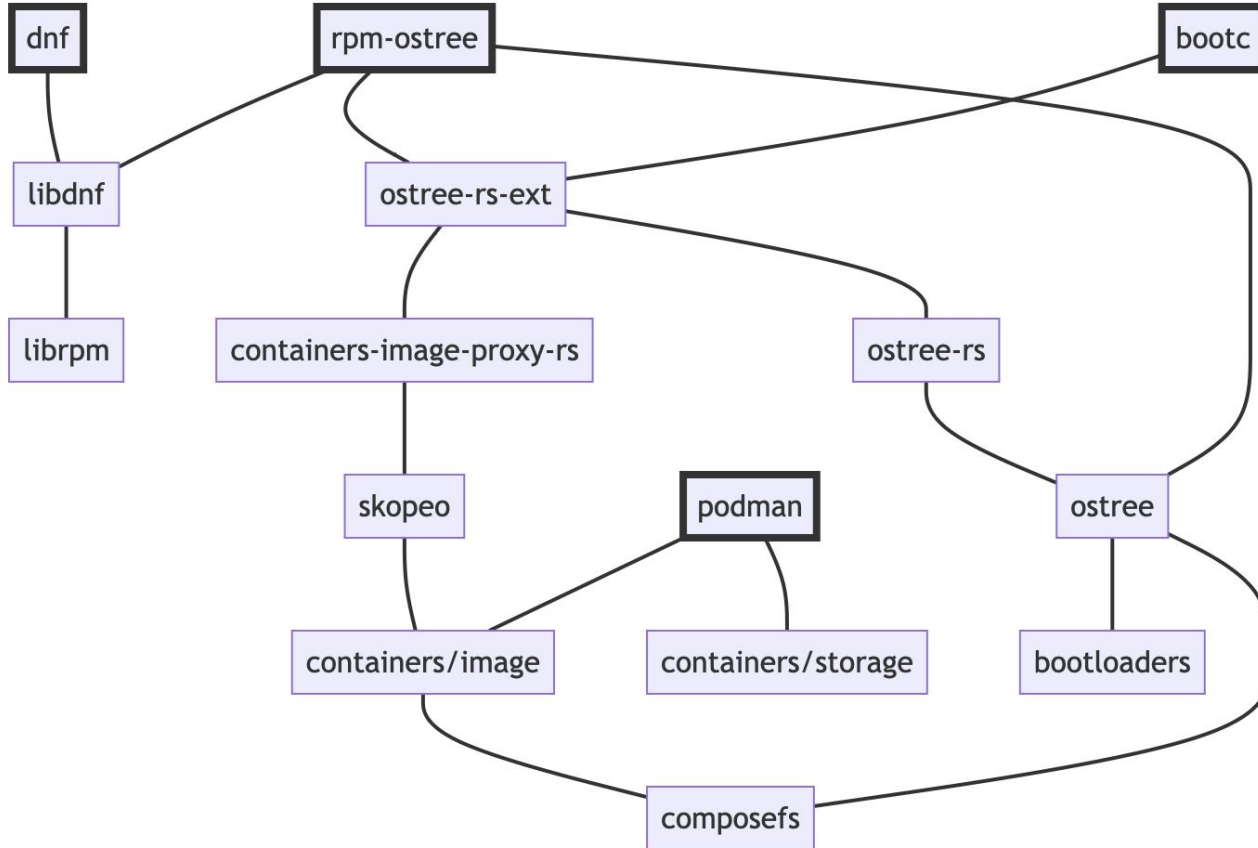
# Changing engines is hard

- Gasoline vs electric ⇔ package vs ostree/container
- The name rpm-ostree is very literal and *no longer makes sense*
- Creation of <http://github.com/containers/bootc> that is all-in on containers but allows **seamless switch from prior ostree-oriented system**
- Thinking hard about a future where we have dnf + bootc, less rpm-ostree

# Architecture diagram



## More realistic architecture diagram



# Demo: local builds w/bootc

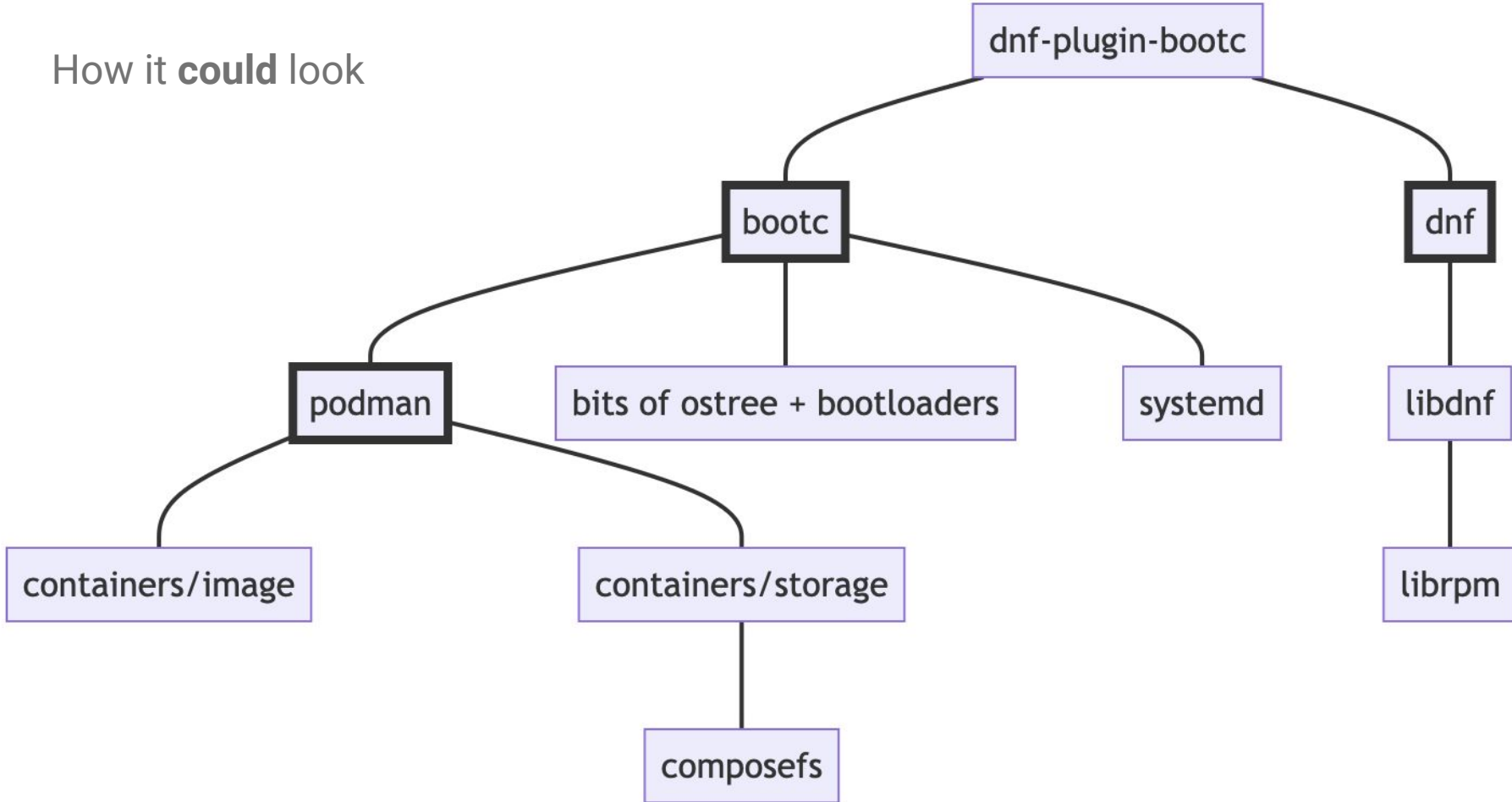
# Next: Containers and Fedora

- Goal: Containers are an equal center of gravity for Fedora derivatives
- But: rpm packages continue to exist; also continue to adopt good ideas from other communities/projects
- Also Kubernetes vs standalone continues to exist.

# Next: Deeper binding bootc+podman

- Deltas!
  - Req: <https://github.com/containers/bootc/pull/215>
- bootc+podman “lifecycle bound” images
- “System extensions” continuation (systemd-sysext binding/frontend)
- Host-toolbox idea

How it **could** look





# Building an ecosystem

- CoreOS is super opinionated: **Thou shalt use Ignition**
- <https://github.com/coreos/layering-examples/tree/main/ansible-firewalld>
- What if we built an [Ansible Galaxy](#) like thing for this?
- What if it was **just normal** to boot Fedora Linux and derivatives as a container?

# Next: Time to do a fedora+centos-bootc?

- bootc has been a side project until recently, we are working to start to build out a fedora-bootc in Fedora+derivatives, look for that soon!



# Sustainability in Open Source