



EU OS use case study:

*bootc-based laptop fleet management
with foreman*

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EU OS: Why?

OS to support older Hardware

- With Windows 10 end-of-life, older hardware does not meet requirements for an update on Windows 11 (planned obsolescence of 240 Mio devices).
- With Linux, older (and newer) hardware can be used longer.
 - Schools and universities, libraries, public administration, etc.

OS to support high regulatory requirements (security, sovereignty, privacy)

- With Windows 10 and 11, connected (cloud) services are difficult to control.
- With open source software like Linux, a high level of control is achievable
 - Government: competition authorities, data protection authorities, courts
 - Embassies, secret services, armed forces, critical infrastructure sector

Perceived Problems

- During migration two systems must be supported: Windows and Linux
- Expensive migration: cost-saving effects only for large desktop fleets
- Little in-house know-how and small ecosystems: shortage of expertise
- In the absence of role models: many unknowns and risk to fail
- User aversion against new or non-standard software (or change in general)

Possible Solution

- Synergies between organisations: common approach to Linux and its migration
- Synergies between building blocks: reuse cloud technologies and expertise

EU OS and immutability / bootc

Why immutable?

- Most parts of the Filesystem are read-only during runtime
 - /var and /etc are writeable
- Proven technology used in i.e. mobile OS, embedded, etc...
- Many distributions adapting the immutable way
 - RedHat/Fedora – bootc
 - SUSE – btrfs snapshots
 - Ubuntu – snap
 - ...and many more :-)

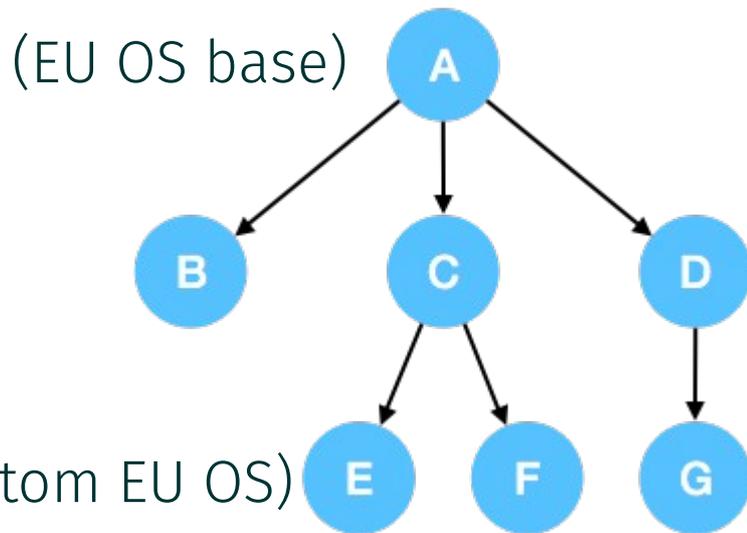
Advantages

- Atomic updates
 - “all or nothing” – prevents from errors during package updates
- Easy rollback in case of issues
 - Just boot back into the last working state
- Reproducible deployments
 - All based on the same image
- Easy version control
- Better security due to read-only fs

What is bootc?

- Toolset to boot a Linux system from an OCI compliant container image
- Key component in a broader mission of bootable containers
- Image build can be achieved via proven tools like podman, docker, ...
 - Its just a Dockerfile deriving from a bootc image
 - Easy to integrate with pipelines
- Images can be inspected, run, derived, etc...
- Unlike typical container image also contains Kernel, Modules etc.

- Bootable Containers (bootc) have each one base container to inherit
- Collaboration on the highest (most generic) level possible
- Subsidiarity on the lowest level (custom EU OS variant)



EU OS common upstream Linux OS	
Country 1	Country 2
Region 1 in Country 1	Sector Education in Country 2
City 1 in Region 1	Primary Schools in Country 2

Bluebuild

- We use bluebuild in a pipeline
 - Declarative description via yaml files
 - Easily extensible with custom modules
 - Many modules available, i.e.:
 - Files
 - Packages
 - Flatpaks
 - Systemd
 - ...and many more
- Publish/install via image registry

```
name: eu-os-demo
base-image: registry.code.europa.eu/eu-os/base
image-version: 2025.10

modules:
- type: default-flatpaks
  configurations:
  - notify: true # notify users
    scope: system
    install:
    - org.mozilla.firefox
    - org.kde.okular

- type: dnf
  repos:
  copr:
  - rriemann/eu-os
  install:
  packages:
  - eu-os-backgrounds
  - plymouth-theme-eu-os
  - freeipa-client

- type: files
  files:
  - source: system
    destination: / # copy files in 'system' to file tree

- type: script
  scripts: [] # list with filenames from folder files/scripts
  snippets:
  - "for h in /home/*; touch /home/$f/.default; done"

- type: systemd
  system:
  enabled:
  - corporate-vpn.service

- type: signing
```



The **easiest** way to build your own desktop Linux images.

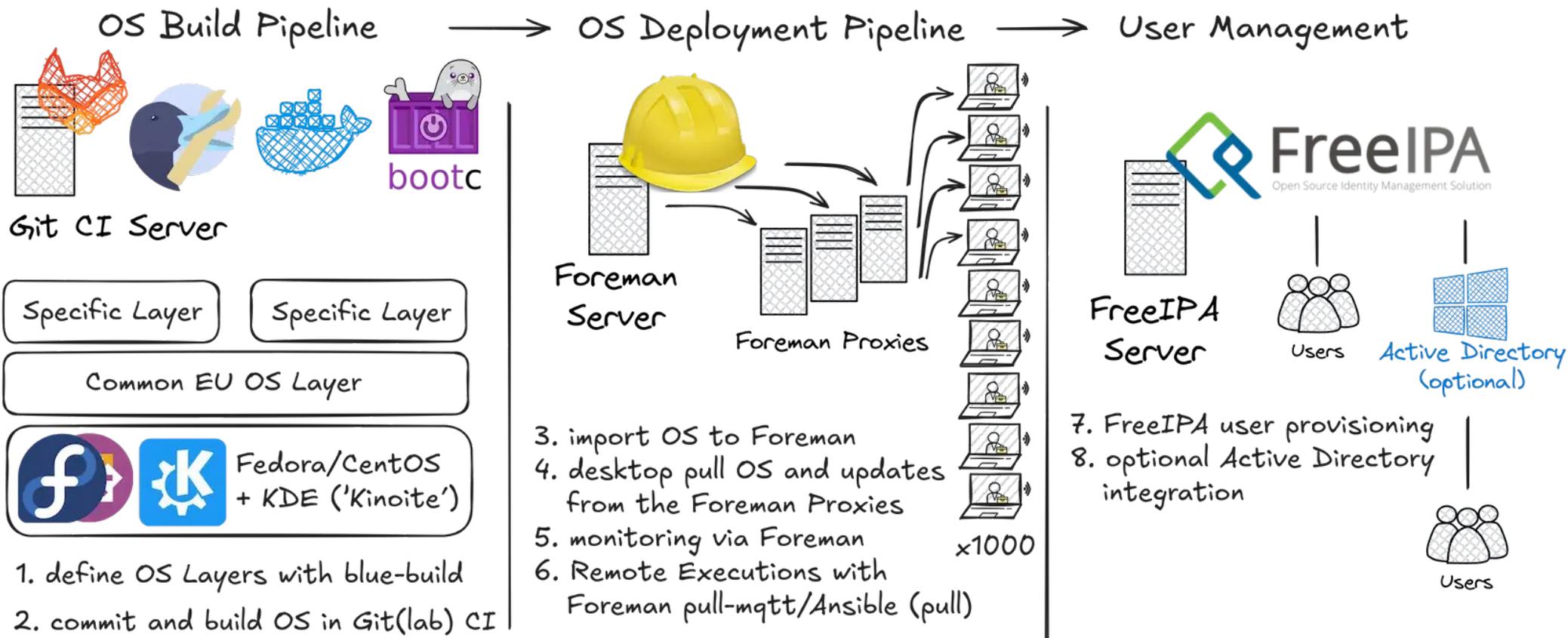
blue-build.org

Full Example: EU OS Base Demo

How to install bootc based systems?

- Build installable ISO via bootc-image-builder
- bootc install from a Live-ISO
- Fully automated via anaconda/kickstart
 - Can be nicely integrated with provisioning tools
 - Installation via PXE or custom ISO from Foreman

EU OS and foreman



Fleet Management via Foreman/Katello

Requirements

- Machines might have only access via VPN
- Machines might be behind firewalls → not reachable from Foreman

Provisioning

- Setup/rebuild new machines via Foreman/Katello
- Setup user-management via FreeIPA
- Configure VPN

Content/Patching

- Image-mode to switch between images

Central configuration via Ansible (?)

Provisioning

- bootc-image coming from Katello-registry (unauthenticated)
- Additional parameters necessary for kickstart
- Adaptations to templates (grub2 & kickstart)

Registration via subscription-manager (image-mode updates)

- Required subscription-manager with bootc-related facts

Connection to FreeIPA-server for usermanagement

- Implemented via snippet in kickstart-template

Provisioning

- Retrieving the image from Katello with authentication
- Discovery-like workflow without bidirectional connection
 - Discovery requires the host to be reachable by the foreman-proxy
 - Other workflows require host creation including network
- Workflow via VPN
- Include VPN-Setup

Configuration

- Workflow to run Ansible via pull-mode with Foreman (REX)

Thank you. Questions?

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Backup

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Possible Solution

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What is EU OS not?

- It is not a project of the European Union, but it should be.
- It is not a new Linux distribution. It is not for private home users.
- It is not a project producing original code. EU OS reuses existing software.

What is EU OS then?

- It is a Proof-of-Concept (PoC) for the deployment of a Fedora-based Linux OS with a KDE Plasma desktop environment and bootable container technology in a typical public sector organisation (corporate environment).
- Private sector organisations with similar requirements may also use EU OS.
- EU OS is also a community and a knowledge data base.

What is already proven?

- Several public sector organisations have migrated to Linux, so that's proven.
 - French Gendarmerie (fleet with 82k seats)
 - Chinese Government (90% of seats in government on Linux, video)
- The European Commission has studied Linux on the desktop already in 2005:
 - ‘In general, the Linux platforms that were tested **show a very fair level of usability and compatibility**. An environment based on **Linux is today technically feasible for limited groups** with specific needs. Although there are many other factors that could play a role in the decision in favour of the implementation of an environment based on Linux, the present testing shows that is **not possible** to implement it at this moment in time **on a large scale**. Amongst the most **blocking factors** is the availability of Commission and local **applications**.’
 - ‘Apart from this technical evaluation, it must be said that the Commission has a political role to play in ensuring that the competition rules are respected.’

Map of Linux-on-the-Desktop in the European Public Sector

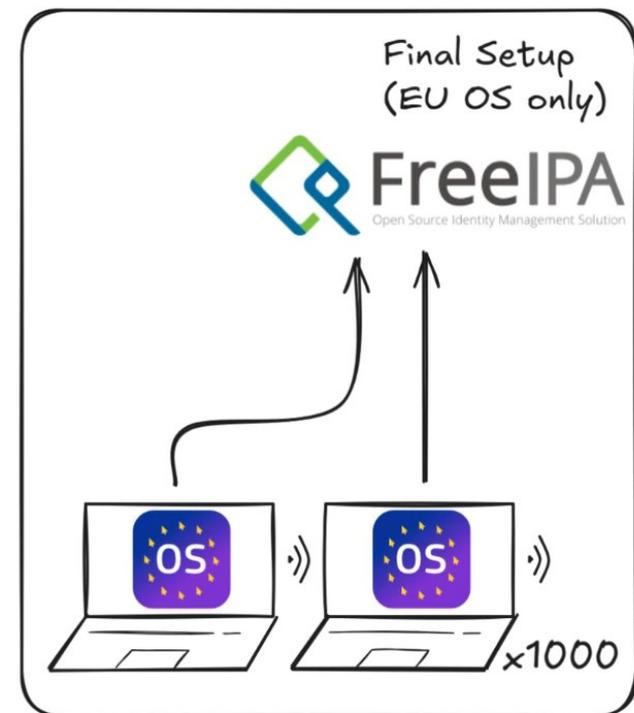
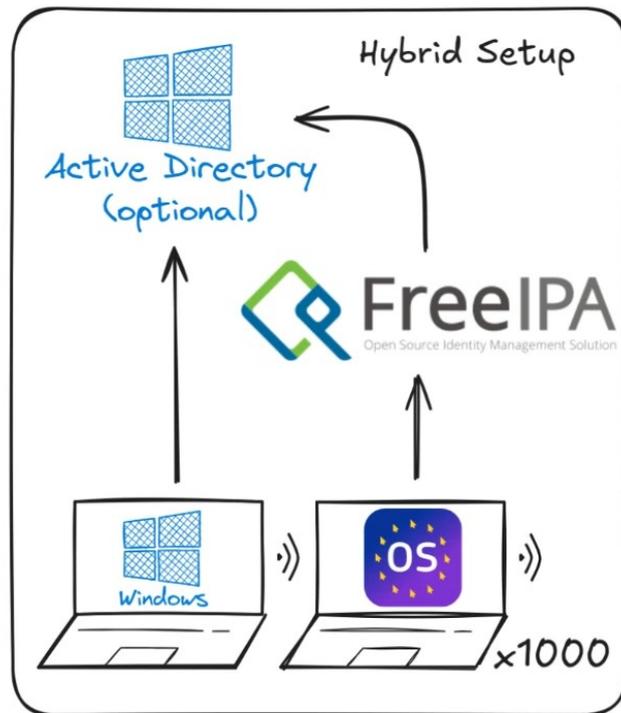
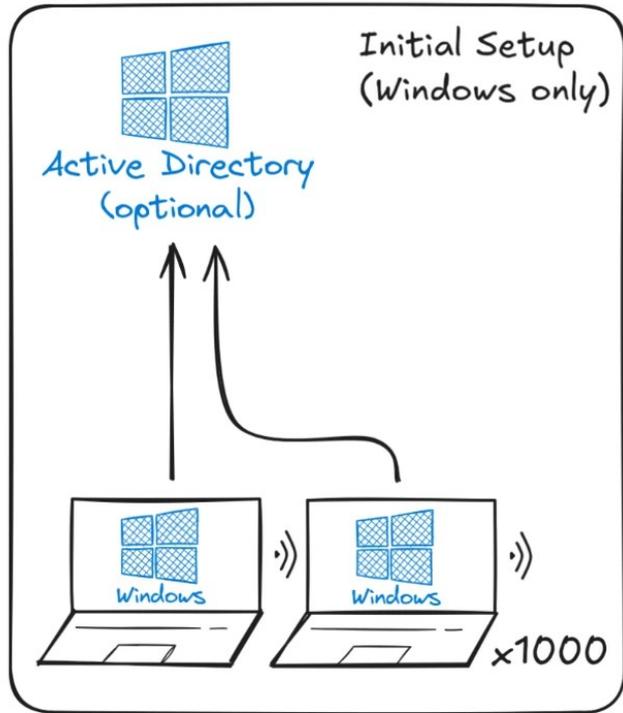


Source: <https://eu-os.eu/use-cases#notable-migrations>

EU OS wants to proof that ...

- enough **synergies** exist, so that migration to Linux (EU OS) is feasible and economically viable in much more public sector organisations
- a migration is doable in **rather 2 years than 20 years** (check out use cases)
- Linux offers today an alternative to Windows that is **more secure, sovereign, sleek** (efficient/eco-friendly)
- Linux deployments can scale to thousands of users

Hence, EU OS PoC is more about **developing a *common* vision for and collaboration in digital transformation** than it is about code or technology.





```
user@laptop> sudo bootc status -v
● Booted ostree
   Commit: b23063e41c9e2bd5fe115d78ef376188e ...
   StateRoot: fedora
  Deploy serial: 0
   Staged: no
  Soft-reboot: yes

Rollback ostree
   Commit: 4e2da3123fc1000924ccee67952e8c13e ...
   StateRoot: fedora
  Deploy serial: 0
   Staged: no
  Soft-reboot: no
```



```
user@laptop> sudo bootc upgrade
user@laptop> sudo bootc switch registry.code.europa.eu/eu-os/eu-ec/jrc:latest
user@laptop> sudo bootc switch registry.code.icc-cpi.int/icc-os/icc-os:latest
user@laptop> sudo bootc rollback
```

bootc-dev.github.io

‘Your laptop is a git repo!’



EU OS: Who and When?

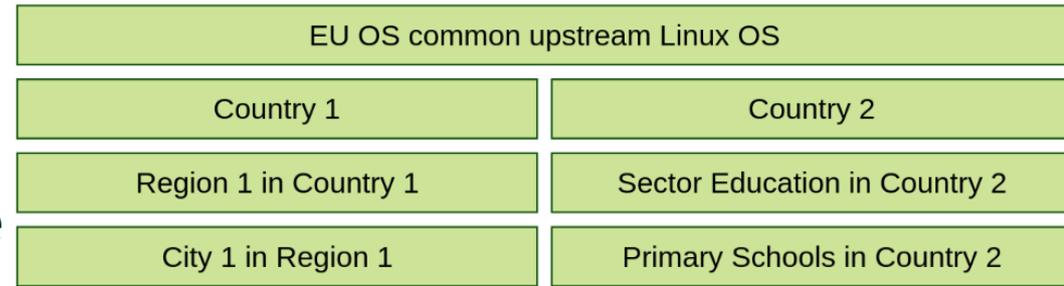
- EU OS community is made up of
 - the project Gitlab <https://gitlab.com/eu-os/>
 - the Matrix chat space with ~ 170 participants <https://matrix.to/#/#eu-os-space:kde.org>
 - the Fediverse account @eu_os with ~ 2,3k followers
- EU OS partnerships with organisations offering pro bono help or a platform
 - French Government Hackdays in June 2025 
 - ATIX/orcharhino <https://orcharhino.com/en/> 
 - B1 Systems <https://www.b1-systems.de/en/> 
 - GONICUS <https://www.gonicus.de/> 
 - international information campaign <https://endof10.org/>
 - pending formalisation: a German public sector agency 
- EU OS would like to have more partners from all over Europe! 



- awareness raising campaign in full swing (social media, personal networks)
 - EU organisations: EDPS, EC DIGIT/CNECT/HR, EC JRC, Parliament, Court, ...
 - International organisations: ICRC, UN, ICC, ICJ (the Hague)
 - EU member states: DINUM , Zendis , Schleswig-Holstein , OSPO 
- **on-going feasibility study with pilot comprising ≈ 150 seats** running EU OS

Based on ...

- open software and open standards: transparency, control, zero-margin costs
- wide-spread container technology (docker): in-house expertise often available
- wide-spread deployment technologies (Gitlab): infrastructure often available
- wide-spread enterprise linux (Fedora, possibly others): existing ecosystem
- hierarchy of shared containers:
 - synergies on many levels (EU, country, region, sector, ...) for building, testing, compliance
 - subsidiarity and flexibility
- Automation tools: scalability for large fleets with many seats (goal: thousands)



EU OS



Some Public Body