Systems WG Update

Philipp Ahmann, Robert Bosch GmbH

Aerospace · Automotive · Linux Features
Medical Devices · OS Engineering Process
Safety Architecture · Systems · Tools

Topics

- Working group goal & introduction
- Milestones & achievements in 2023
- Challenges and fails
- Current focus / activities
- Plans for 2024 & collaboration opportunities

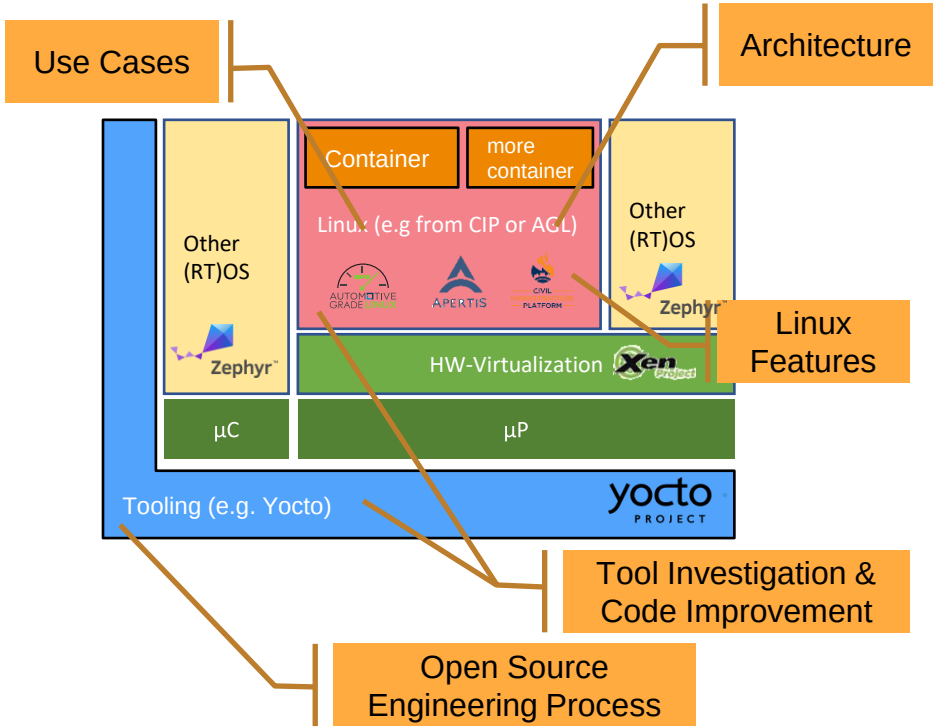
Working Group Goal & Introduction

Working Group Goal

“Enable other working groups within ELISA to put their safety claims towards Linux in a wider system context.“

ELISA Working Groups - Fit in an Exemplary System

- **Linux Features, Architecture** and **Code Improvements** should be integrated into the reference system directly.
- **Tools** and **Engineering process** should serve the reproducible product creation.
- **Medical, Automotive, Aerospace** and future WG use cases should be able to strip down the reference system to their use case demands.



Interaction with Other Communities (Outside ELISA)

- Open source projects focusing on safety-critical analysis

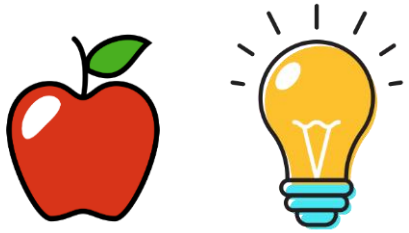
  Xen Project Zephyr™

- Open source projects with safety-critical relevance and comparable system architecture considerations

  AUTOMOTIVE GRADE LINUX SOAFEE SDV Eclipse Software Defined Vehicle

- Further community interactions

  yocto PROJECT SPDX Linaro



"If you have an apple and I have an apple and we exchange these apples then you and I will still each have one apple.
But if you have an idea and I have an idea and we exchange these ideas, then each of us will have two ideas

— George Bernard Shaw

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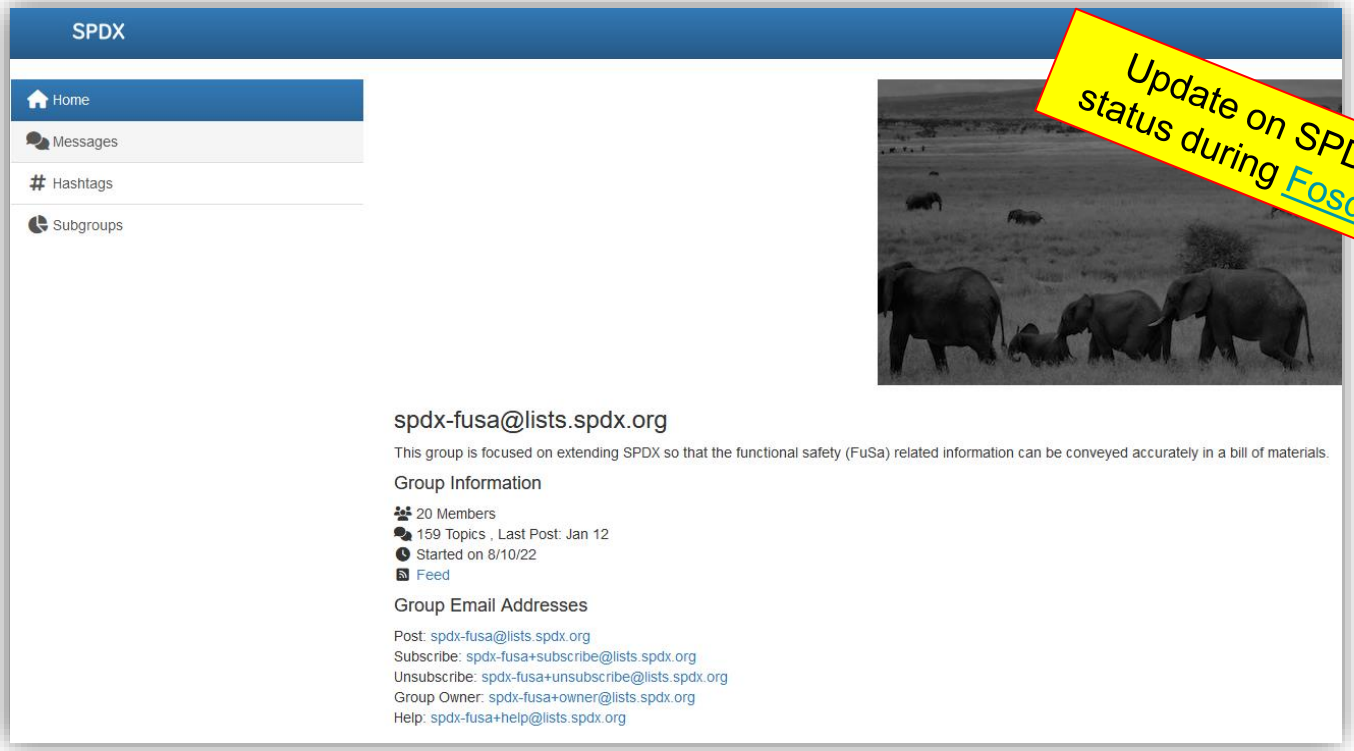
Milestones & Achievements

Milestones & Achievements

- SPDX-FUSA subgroup started
- Systems WG related demos at CES (e.g. by epam)
- Started with Renesas R-Car H3. Migrated towards Xilinx ZCU102
- First hardware demonstrator setup prepared and showcased
- Public events: Presentations at EOSS, Plumbers and Exida Symposium
- Continuous integration enabled for system images

SPDX Subgroup: https://lists.spdx.org/g/spdx-fusa



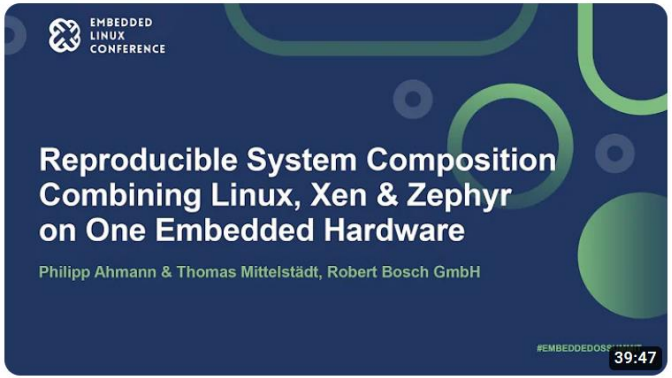
Hardware Demonstrator Setup - Xilinx ZCU102

- Board ZCU102 (link to description)
  - Reference manual (link)
  - SD card 16GB for boot loader
  - USB Stick 16GB for demonstrator setup
  - USB-Ethernet-Adapter (DLINK)
- Environment for setup
  - Local DHCP server (VM with system networkd)
  - Putty for serial console
  - USB Keyboard (for TTY console)
  - HDMI screen

Hardware Demonstrator Setup - Packaging

- Running example system during
  Embedded Linux and OSS Day at Bosch in July.
- Various use cases and setups documented
  (see presentations at EOSS)

Public Events: Presentation at EOSS and Plumbers



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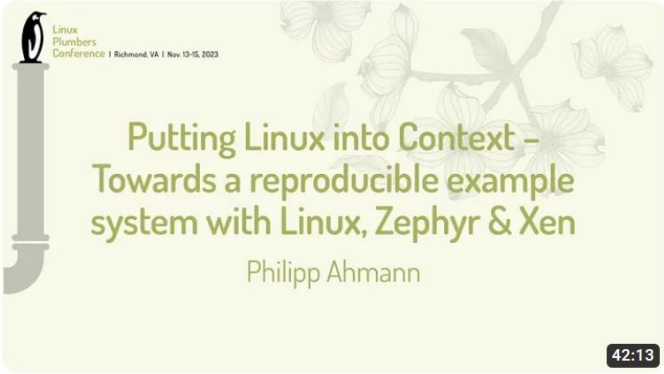

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Challenges & Fails

Challenges & Fails - GPU and System SBOM

- HW with good GPU virtualization support is hard to find (meaning community version without the need of NDA!)
  - AGL demo integration did not work out completely.
    - Just specific use case reproduced from an epam demo (AGL as DomU, not reproducible for others due to license restrictions for GPU binaries)
  - HW accelerated graphics with virtualized GPU is very limited to hardly possible with the ZCU102
- System SBOM not yet part of the CI.

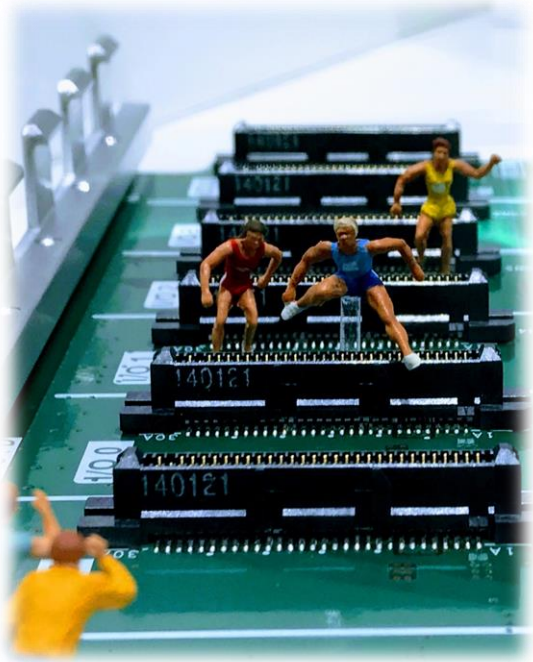

Photo by John Cameron on Unsplash

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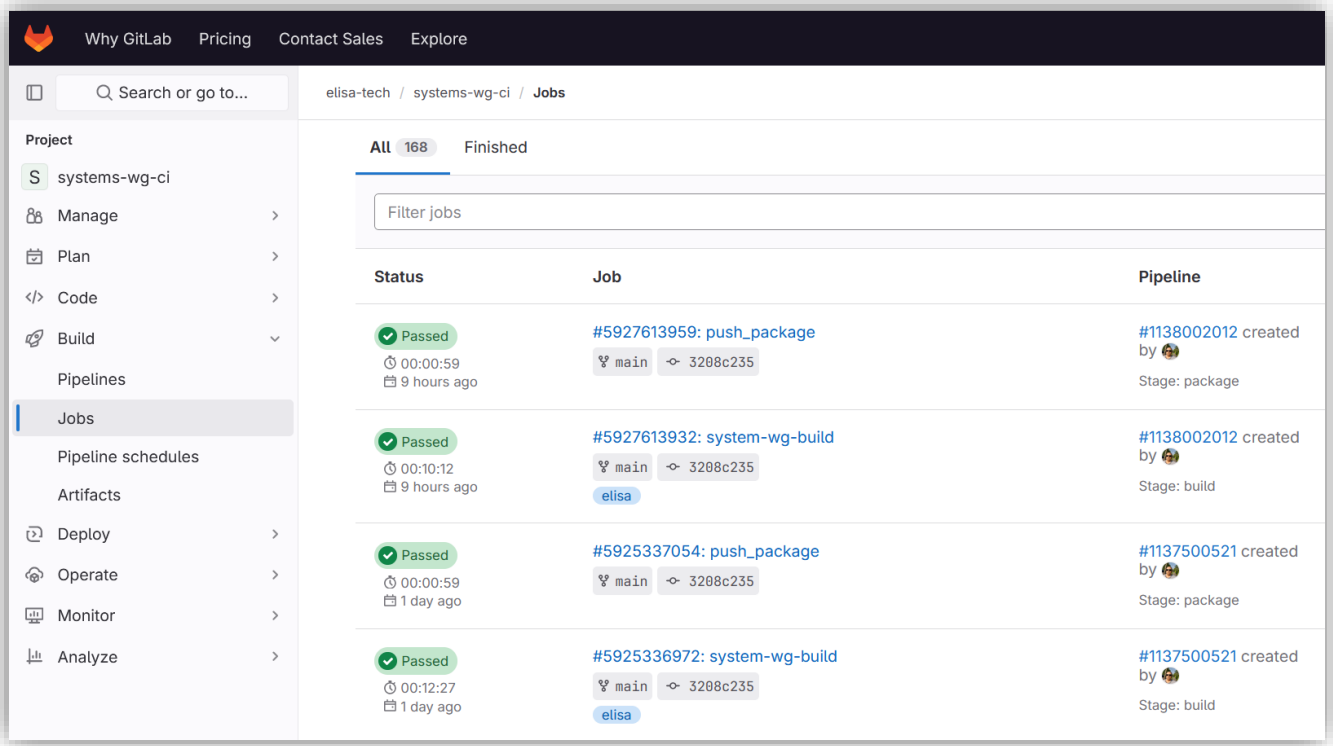
Current Focus / Activities

Current Focus / Activities

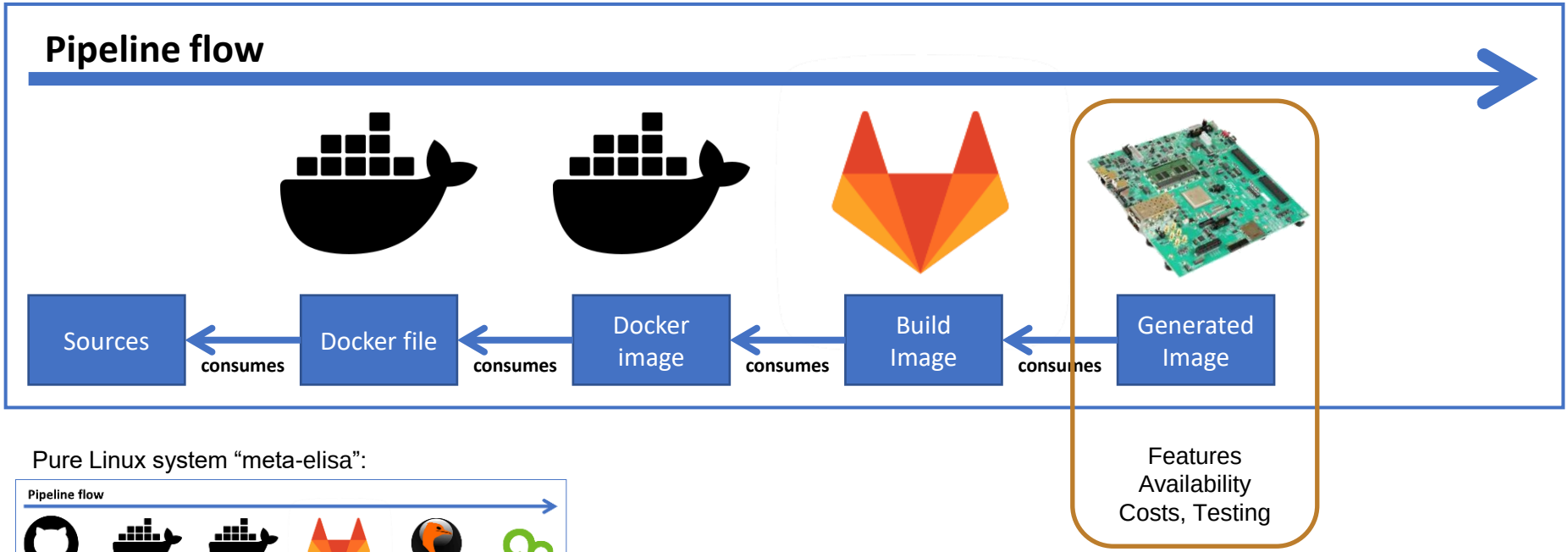
- Enhance CI to include image boot with qemu
- System SBOM generation
- Work on example system to be showcased at exhibitions & fairs

Systems-WG-CI Enhancements

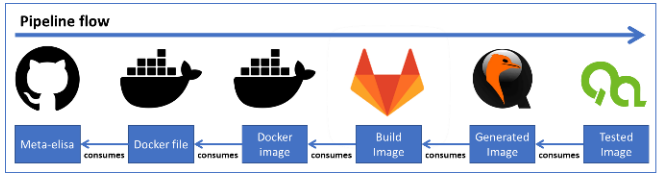


https://gitlab.com/elisa-tech/systems-wg-ci

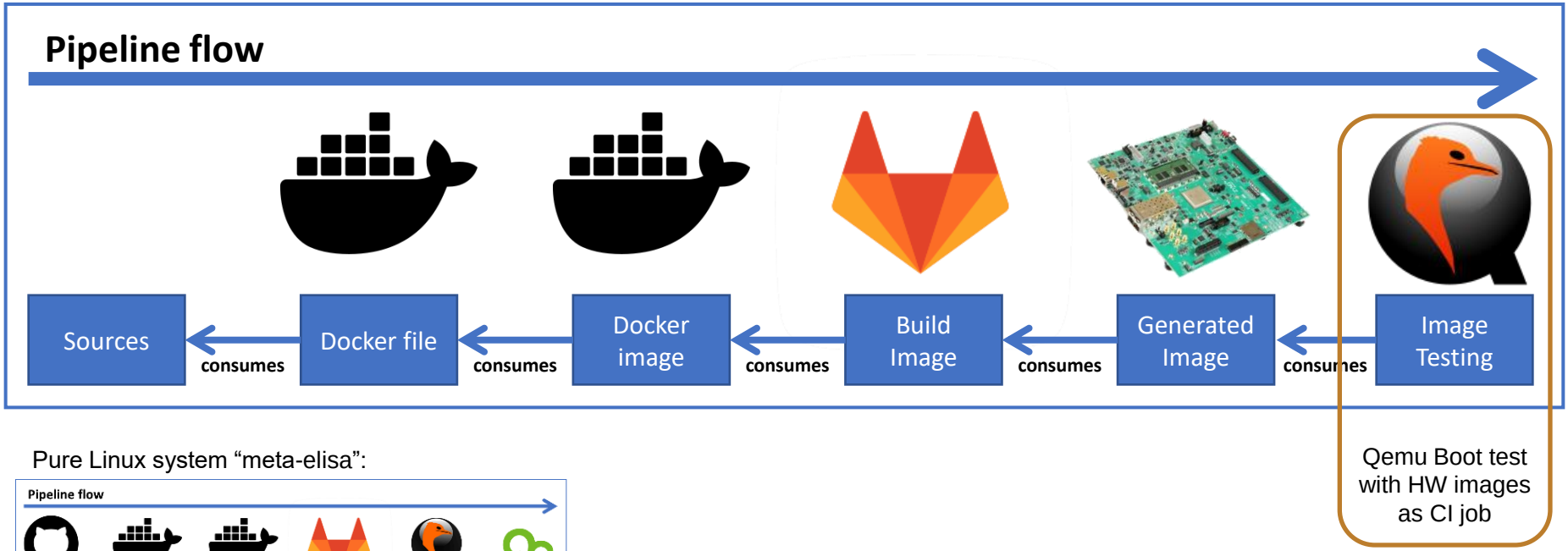
Systems-WG-CI Enhancements



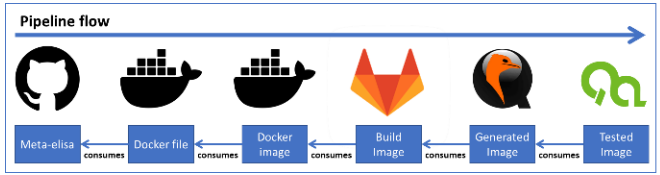
Pure Linux system “meta-elisa”:



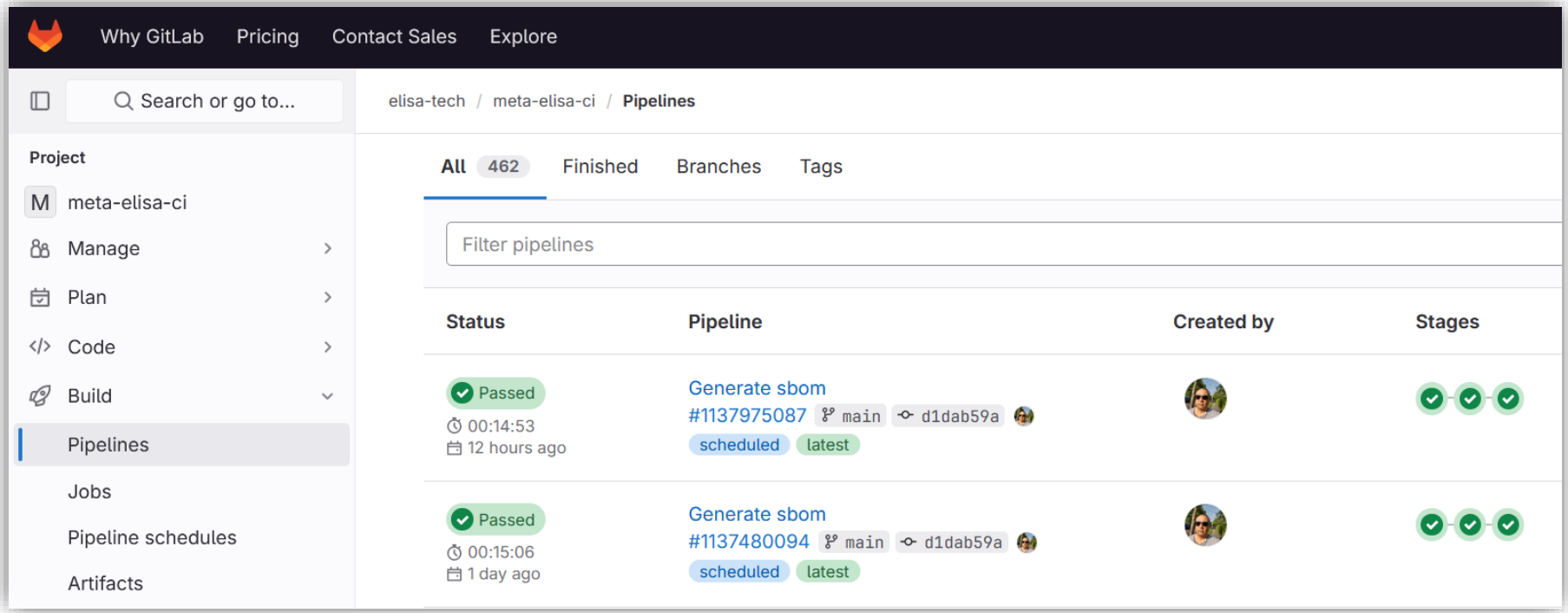
Systems-WG-CI Enhancements



Pure Linux system “meta-elisa”:



AGL SBOM Already Available from Automotive WG



https://gitlab.com/elisa-tech/meta-elisa-ci/-/pipelines

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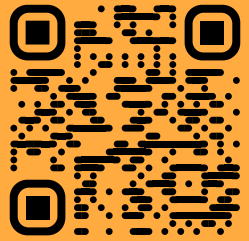
Plans for 2024 & Collaboration Opportunities

Plans for 2024 & Collaboration Opportunities

- Enablement of additional hardware (in best case with Graphics Support)
- Enhance feature set on an example use case
  - E.g. potential outreach to LFEnergy and EVerest project on EV charging?
- Closer interaction with Zephyr community
- AI as part of SBOM and its importance for safety-critical systems?

Plans for 2024 & Collaboration Opportunities



Any suggestions on good community hardware is welcome!

Volunteers to bring the porting of new hardware are needed!

Feedback needed to improve example system documentation!

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Thank you!

(Interested? Join the regular meeting and subscribe to the mailing list!)

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JOIN THE COMMUNITY

ELISA members are defining and maintaining a common set of elements, processes and tools that can be incorporated into specific Linux-based, safety-critical systems amenable to safety certification. ELISA is also working with certification authorities and standardization bodies in multiple industries to establish how Linux can be used as a component in safety-critical systems.
Join us to expand the use of Linux across new industries including healthcare, energy, transportation, and manufacturing. Learn more today to participate and support ELISA.

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