ELISA
Enabling Linux in Safety Applications

WORKSHOP

Interaction between ELISA and Adjacent Communities such as Eclipse, Linaro, Rust, SPDX, Yocto, and more

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Introduction & Motivation

- Safety integrity standards need to adapt to increasingly complex products
- Safety assessment requires system analysis, processes, technical measures and statistical analysis
- Growing industry interest in open source for safety-certified applications
- Current challenges in integrating open-source solutions with safety standards

(China is already making heavy use of Open Source e.g. in Automotive systems)

The Fundamental Challenge

- The need to adapt safety assessment to work with the rate of change and security fixes in open source projects
- Traditional development processes / v-model vs. code centric open source development
- Standard checklist-based approaches vs. collaborative development
- The need for (formal) traceability and documentation in safety-critical systems

Community Challenges For All Projects

- Argument of "OSS development is not organized like commercial software"
- Less influence on maintainers
  (positive & negative – no traditional supplier management)
- Harder to train/direct developers on safety methodology (behind $$$ walls)
- Liability of a community?
  (but commercial provider may be liable – insurance)
- Development process: Requirements, traceability, v-model,…
  mapping safety integrity standards

Let us build dependable systems.

Together!

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Interactions Between the Communities

- Open source communities focusing on safety-critical analysis

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

"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

Premier Members

BOEING

Red Hat

General Members

AISIN

arm

BOSCH

Canonical

CodeThink

Elektrobit

EMQ

HONDA
The Power of Dreams

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KernelCI

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OSADL
Open Source Automation Development Lab eG

UL

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ELISA community members

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(Major) Community Engagements

New stronger engagements considered

Further Linux Community Engagements

- Stress-ng
- gcov, llvm-cov
- tracing & other selected kernel subsystems
- kernel documentation

- Linux plumbers

Further Other Organization Engagements

- IEEE Space Mission Challenges for Information Technology - IEEE Space Computing Conference
- Spacecraft Flight Software (FSW 2025)
- Linaro Connect (May)
- ECLIPSE SDV Community Days

What other opportunites are missing?

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Workshop notes

- RISC-V, open hardware, firmware…
- Safety features in SoCs and there is no standard or anything. Requirements for this is important
- Interface and OS levels with separate chips needs to be addressed
- Safety critical systems group in UK -> Paul to introduce
- Rust Foundation has a safety critical consortium
- Safety critical Rust community just recently formed
- Safety community? perhaps safety-centric events where the community gather
- Researchers to write papers and have the theory written
- Medical devices -> Sweden & Denmark as medical valley. They are using OSS.
- ROS

Related efforts

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AGL

- meta-elisa is based on AGL
- Systems WG has similar architecture as AGL SDV EG
- Space Grade Linux based on similar approach to AGL
- AGL demo today during workshop

Related communities for that topic:

- Yocto, Xen, Zephyr
- Eclipse SDV S-Core
- COVESA?
- SOAFEE?

CHAOSS

- Presented "Best Practices Standard" at CHAOSS Con
- Need to build up on metrics about risk, incorporation into Grimoire & Auger tooling

Related communities for the topics:

- OpenSSF Scorecards
- Trustable in Eclipse SDV
- TODO
- OpenChain

cregit

- Linux Kernel commit traceability & provenance

Related communities for the topics:

- lkml
- kernel docs

Eclipse SDV

- Trustable + Best Practices Standard
- S-Core + AGL SDV EG system Implementation
- S-Core + Arch WG Requirements/AoUs & Interfaces

Related communities for the topics:

- AGL SDV EG

KernelCI

- KernelCI + BASIL → more efficient testing based on requirements
- KernelCI + Cont. Compliance
- KernelCI & gcov/llmv-cov work → extending the code coverage metrics

Related communities for the topics:

- AGL
- CIP Project

SOAFEE

SOAFEE

- Working with Systems on Continuous Compliance to SBOMs

SPDX

- Metadata for System BOM
- Metadata for requirement traceability and reasoning, working with BASIL
- Creation of Safety Profile, to capture safety artifacts not capture in BOMs today (requirements, evidence, standards, etc.)
- Extending to System information beyond software (data, hardware, operations, etc.)

Related communities for the topics:

- AGL SDV EG

Xen

- Example System in ELISA
- AGL SDV EG system architecture

Related communities for the topics:

- SOAFEE?

Yocto

- Automatic SBOM generation at level for Safety Analysis (Build toolchain, artifacts to source level, built image, etc.)
- Fully reproducible builds
- Reference infrastructure for Automotive & Space

Related communities for the topics:

- AGL SDV EG

Zephyr

- Part of example system
- Also considered in AGL SDV EG
- In the cont. Compliance prototype

Related communities for the topics:

- Eclipse SDV S-Core?

Discussion: How to engage with the communities!

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Planned/Initiated Engagements

- Present ELISA at Linaro Connect
- Submit "Safe Systems with Linux" MC to Plumbers
- Safety-Critical Software tracks at OSS-NA, OSS-EU & OSS-Japan?
- ELISA booth at OSS-EU
- Engage further with S-Core and Trustable. Community day presentation?

Workshop notes

- Openchain via Shane
- Medical conferences
- writing things down as people do not always show up in calls.
- Have discussions on mailing lists again
- Doctors where sharing a lot of data even before publications.
  Doctors seem to be very open. Medical devices start ups are often founded by doctors.
  Maybe they are open for OSS and with medical data.

Next steps

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Next steps

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