



ROS-Industrial

private and public funding at work to advance ROS worldwide

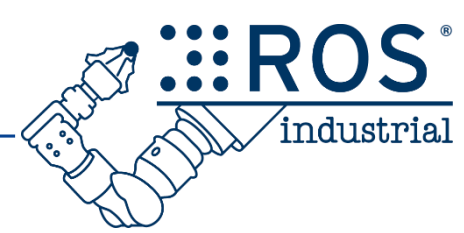
Mirko Bordignon, Matt Robinson, Min Ling Chan

Fraunhofer IPA, SwRI, ARTC-A*Star





Why ROS-Industrial?

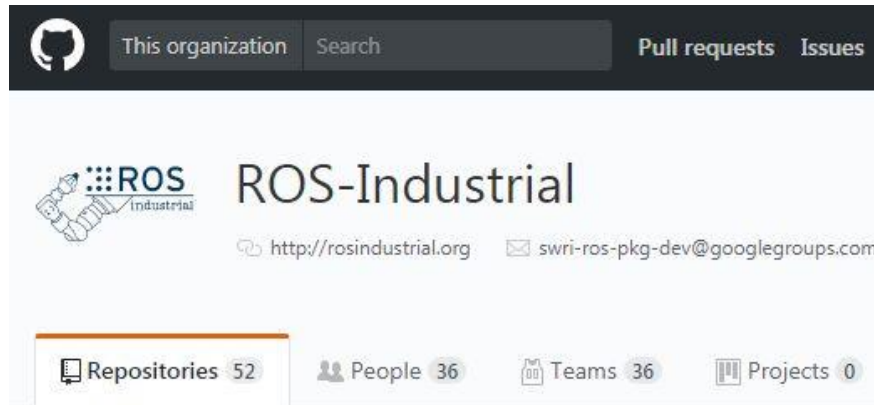


In the world of PLCs and Windows boxes,
not everybody knows about ROS. Goal #1: outreach!





And after the outreach, there is need for:



Technical development



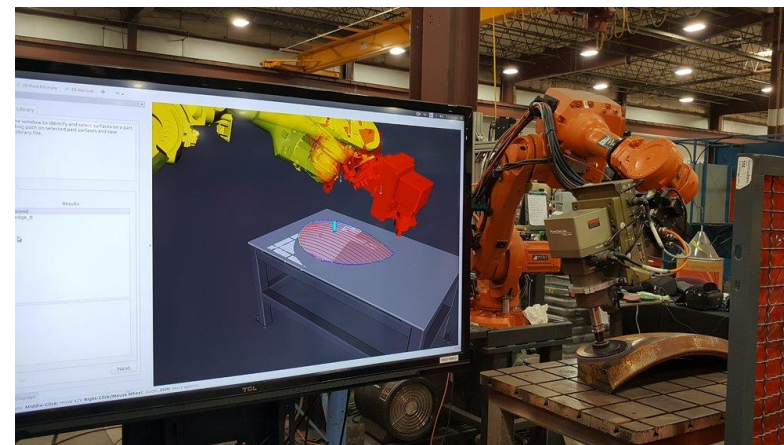
Training

Understanding License Compatibility and Compliance Risks & Processes in Free and Open Source Software

Dr. Catharina Maracke
Software Compliance Academy



Legal & misc information



Application pilots

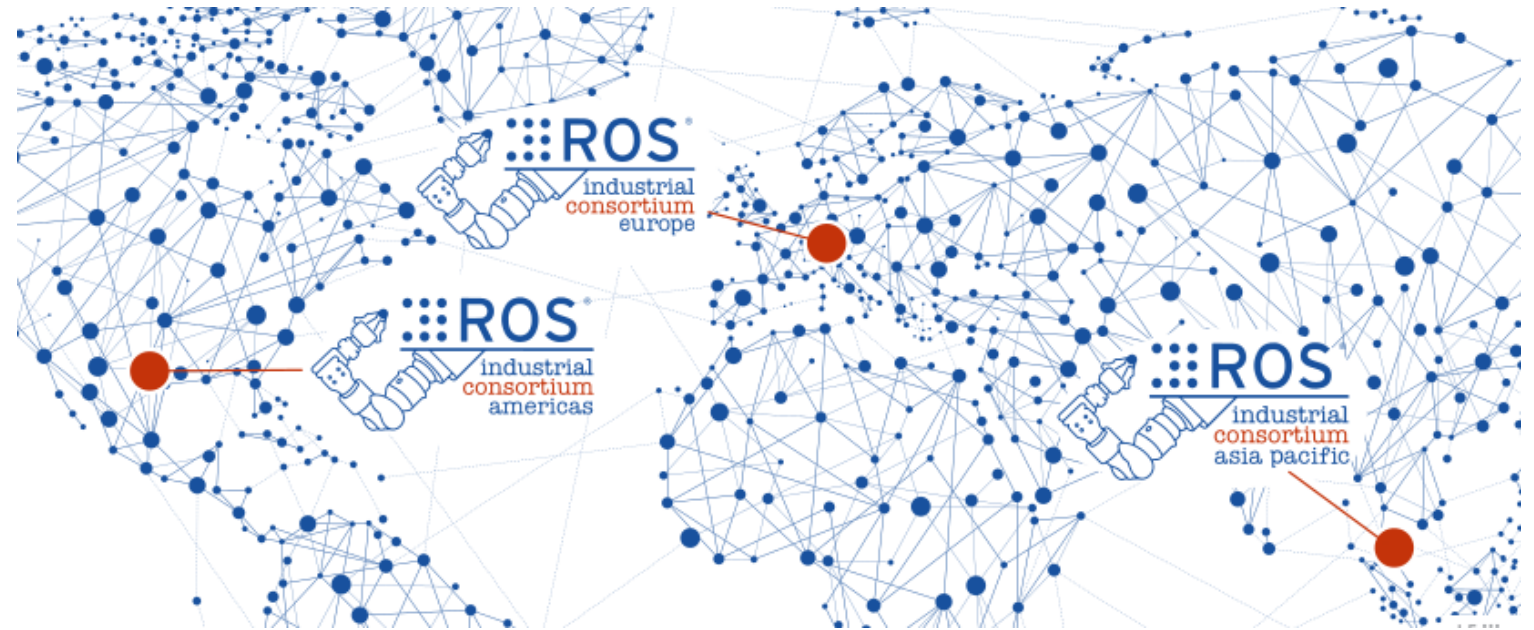




The ROS-Industrial Initiative



- Free and open ROS-I community
- Three regional Consortia providing financial backing



Stewardship by no-profit, applied research institutions





Thank you to our worldwide members!





ROS-Industrial Europe highlights

Mirko Bordignon – Fraunhofer IPA





Make ROS-I **better** (in terms of software quality)
business friendly (components, licensing)
accessible (widely taught, easy for everybody)



This project has been funded by the European Union's Horizon2020 research and innovation programme under grant agreement No 732287

Software Quality

ROS-I best practices and tools: continuous integration, unit testing, code reviews

ROSIN further improves on them with code scanning, automated test generation, model-in-the-loop testing

New components + path for exploitation

3+ Million € available to third parties for ROS-Industrial development

Develop missing components or improve existing ones

Commercial release template (licensing, etc)

Education

Educate students: **summer schools**

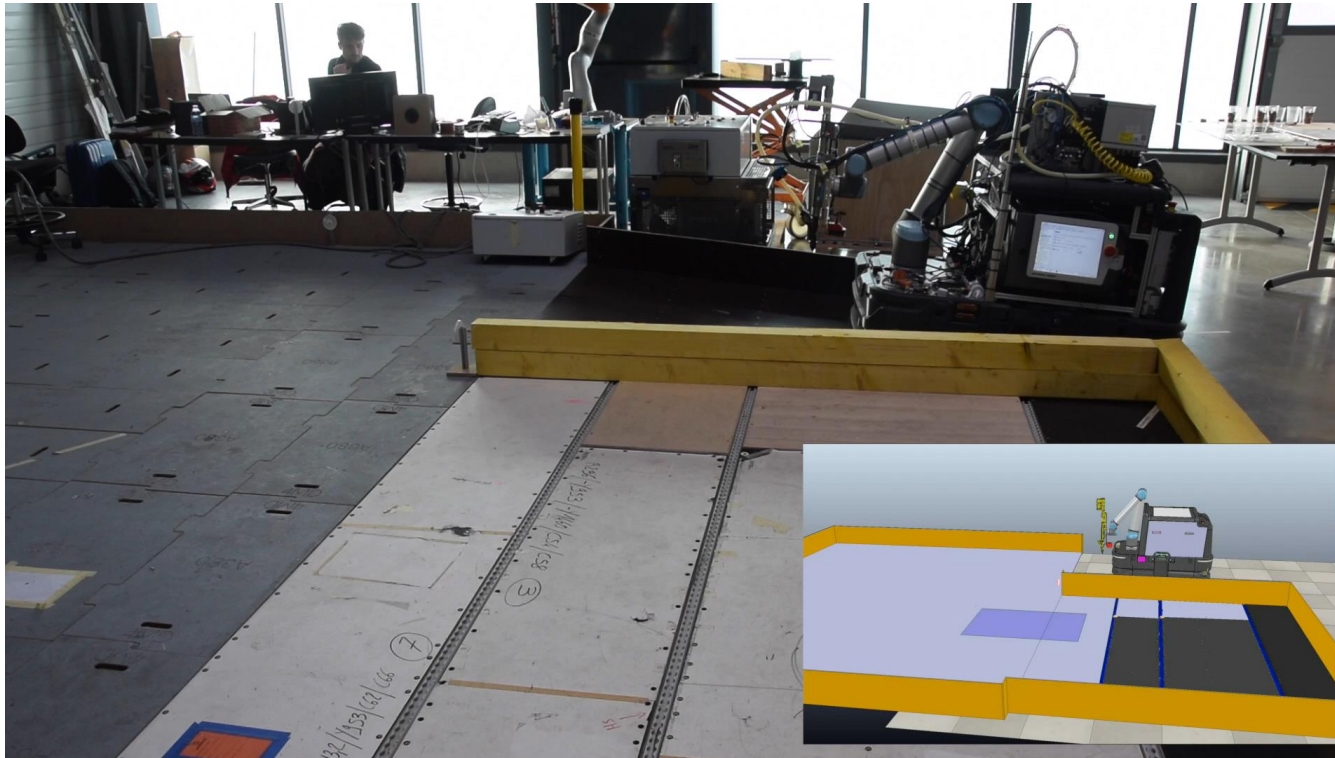
Train professionals: **ROS-I academy**

Open Call to fund your ROS education initiative

Apply for FTP support on rosin-project.eu !

- All EU-based orgs are eligible
- Lump sum cost calculation





- ROS as the vendor-neutral transfer medium for results from R&D into production
- ROS-capable system integrators wanted!

- `airbus_docgen` : HTML documentation generator
- `airbus_cobot_gui` : Modular Qt-Based Framework for Industrial GUI
- `airbus_ssm_core` : SMACH Overhaul using the SCXML Standard

github.com/ipa320/airbus_coop

wiki.ros.org/airbus_coop





Save the date! ROS-I Conference 2017



December 12-14, Stuttgart - Germany



Torsten Kroeger

Professor, Karlsruhe Institute of Technology
former Head of Robotics Software at Google X



Martin Zappe

BU manager Industrial Engineering
Functional Safety & IT Security, ICS AG



Kimberly Hambuchen

Human Robotic Systems Deputy Project Manager
NASA Johnson Space Center

With demos of ROS-native
hardware from:

Automation by innovation.



[Program and reg. link from Oct 5 at rosindustrial.org](http://rosindustrial.org)





ROS-Industrial North America highlights

Matt Robinson – Southwest Research Institute





RIC- Americas Update



- Latest Happenings

- Growth

- New Members – Magna & Cognex
- Launch of the ARM Institute

- Education

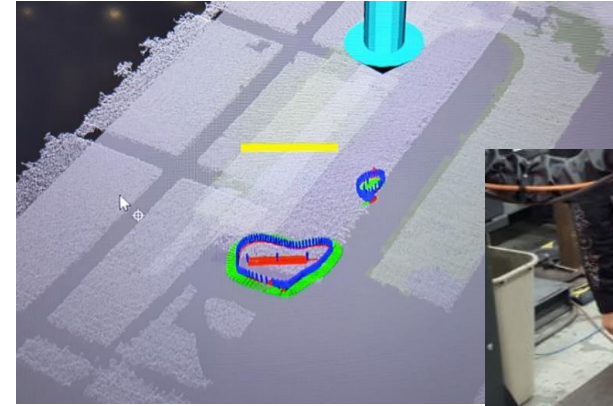
- New Training – Kinetic w/ Advanced Topics

- Focused Technical Project Robotic Blending Milestone 4

- Industrial Grade Sensor
- Improved Segmentation – Curved Surfaces, Concave Perimeters and Holes
- Integrated QA – Closed Loop Inspection
- <https://github.com/ros-industrial-consortium/godel>

- Change

- New Consortium Manager – Matt Robinson





Robotic Blending Tech Demo



 **ROS**®

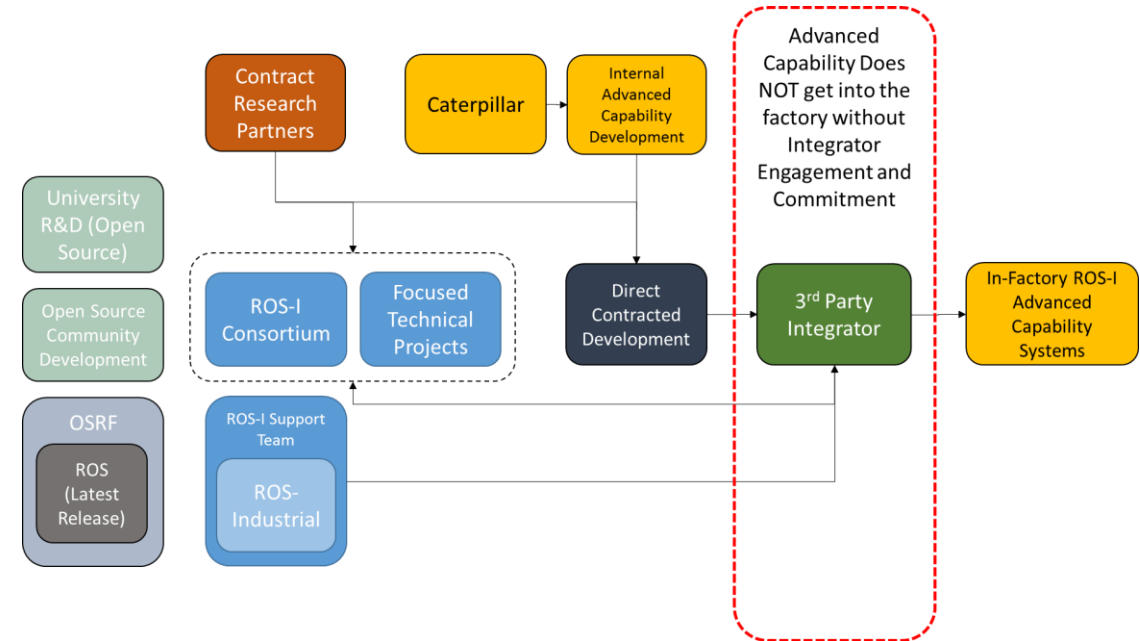




Initiatives and Upcoming Events



- Integrator Outreach
- Upcoming!
 - Training – October 10th – 12th hosted by Caterpillar!
 - World MoveIt! Day – October 18th
 - ARM Institute 1st Membership Meeting Nov. 1st – 3rd
 - Annual Meeting – Late February 2018





ROS-Industrial Asia Pacific highlights

Min Ling Chan –Advanced Remanufacturing and Technology Centre, A*Star





ROS-Industrial AP Consortium so far...

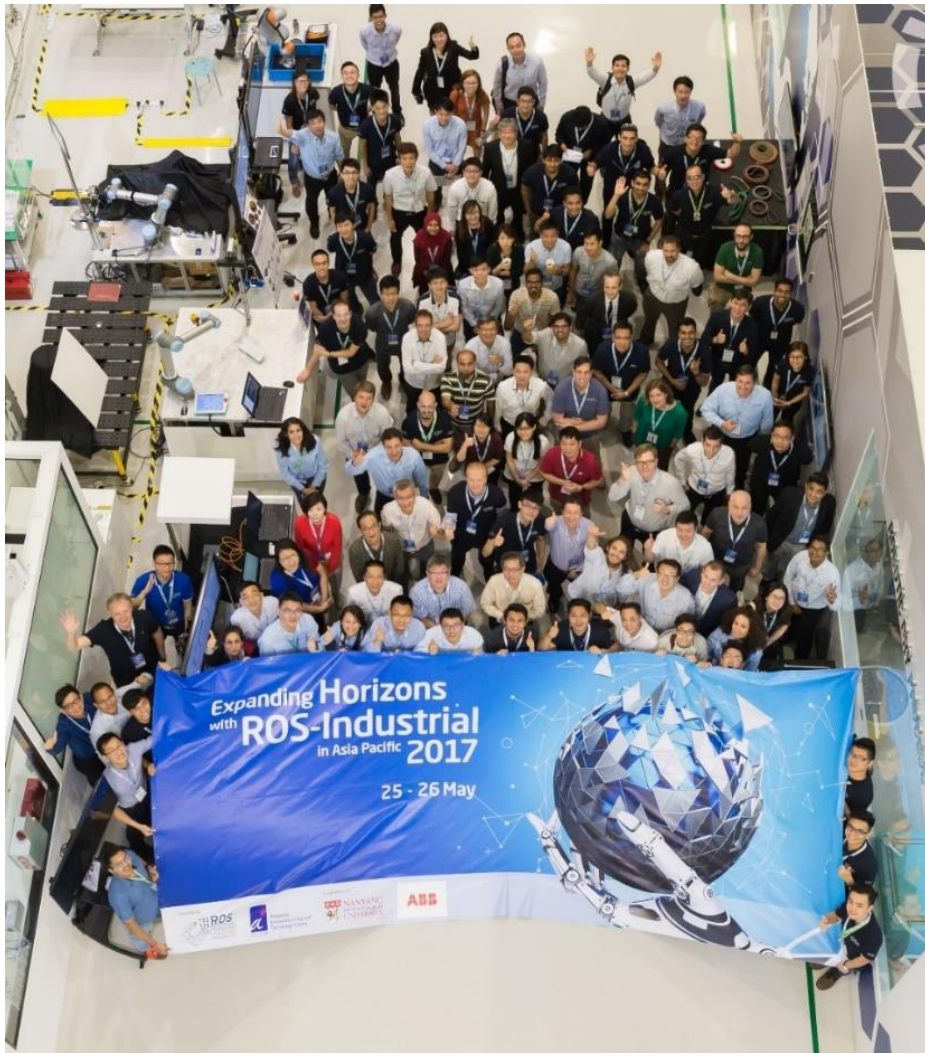


- Began our journey – 1 Year ago
 - 1 Workshop
- Year 2:
 - Our **objective**
 - Increase **industrial use** of ROS-Industrial in AP
 - Increase **robotic talent** by ensuring ROS is a key enabler for students, professionals and industry
 - 1 Workshop
 - 1 ROS-Industrial Basic and Advanced **Training**
 - ROS-Industrial **awareness**
 - ROS-Industrial **FTP** (PackML)





ROS-Industrial AP Activities 2017



ROS-Industrial Basic & Advanced Training (Singapore)

 **ROS-I AP Workshop (Singapore)**

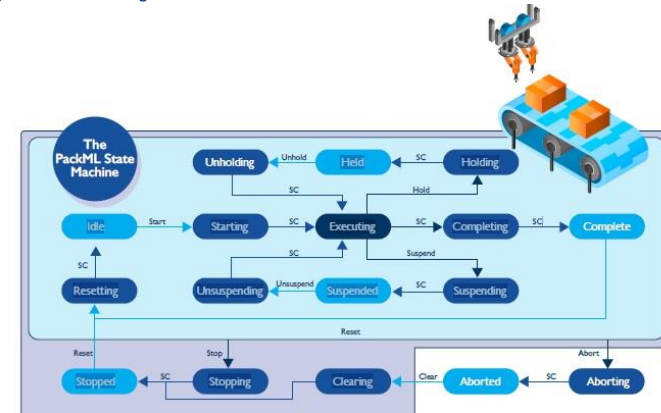




PackML: Scope & Deliverables



- **Collaborators:** 3M, ARTC, SwRI, PlusOne Robotics
- **Problem Statement:** Software development of using PackML state machine to communicate between PLC and ROS.
- **Delivered:**
 - **Tested** with a **remote PLC** using a standard PackML implementation **using OPC-UA** to connect to the PLC
 - **Developed** an open-source C++ library, python (SMACH) to **implement the PackML state machine** abstraction for use in ROS-I.
 - **Integrate RVIZ** plugin for PackML
 - PACKML State Machine
 - Provide options for mode selection
 - Show accumulative timer per state

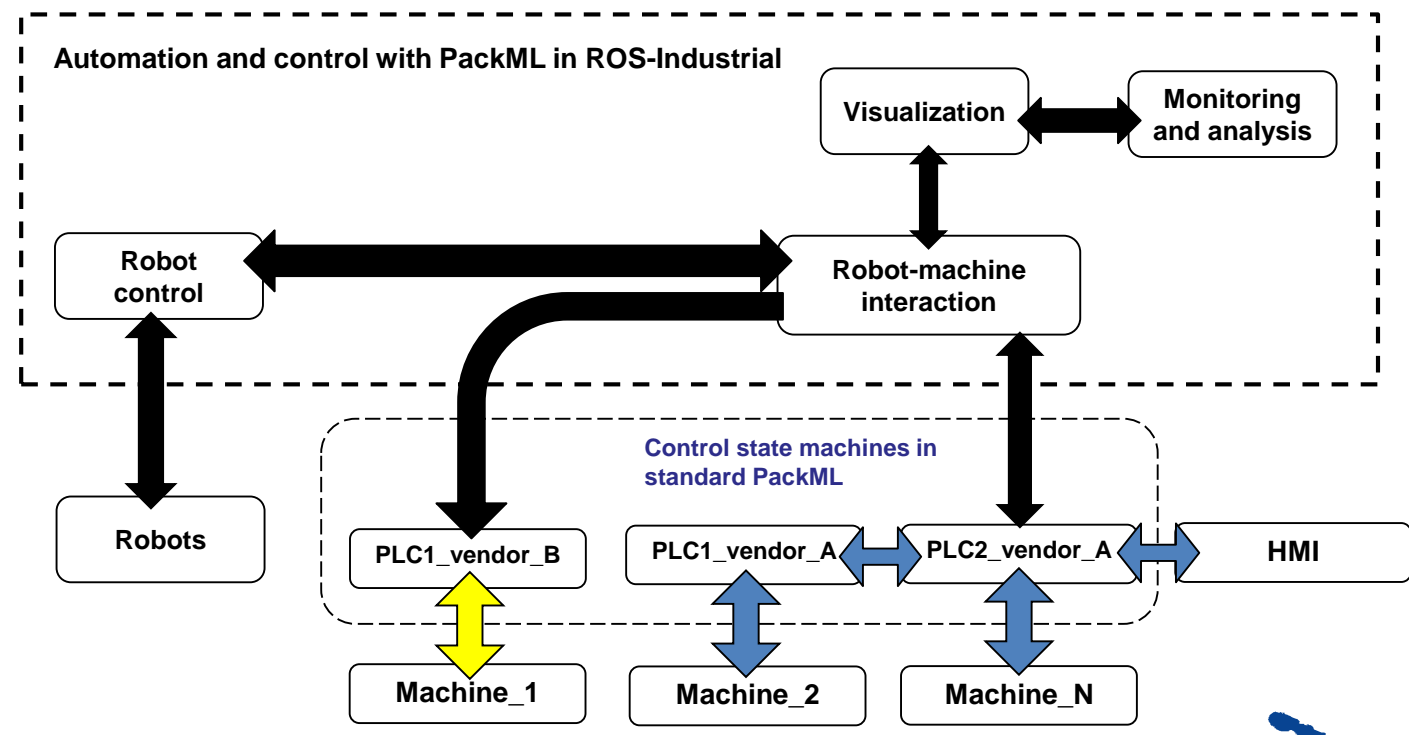
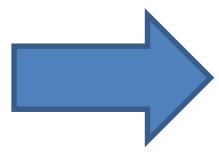
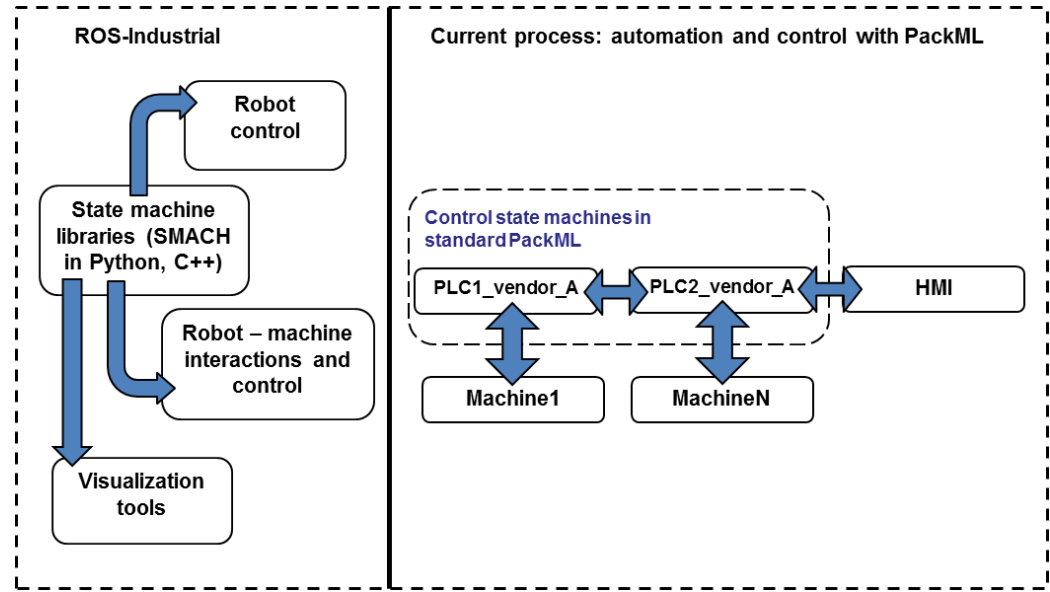


PackML (Packing Machine Language) state machine commonly used by PLCs in packaging





PackML + ROS-Industrial

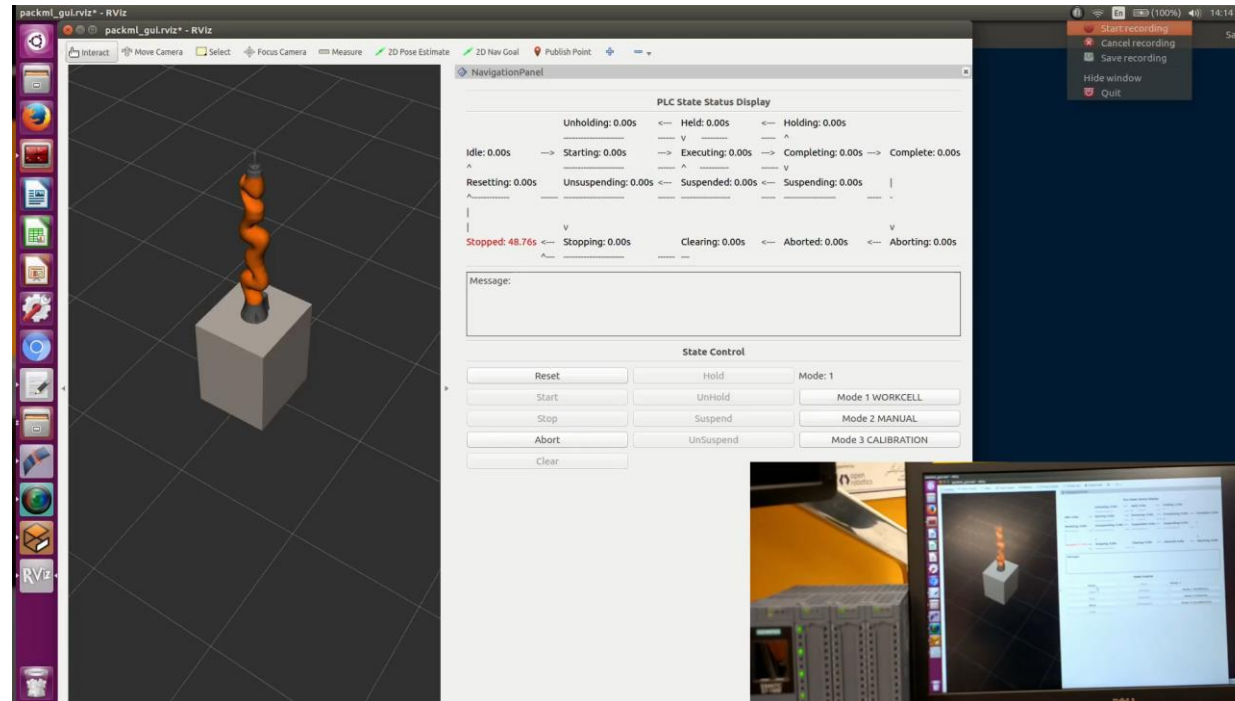




PacKML



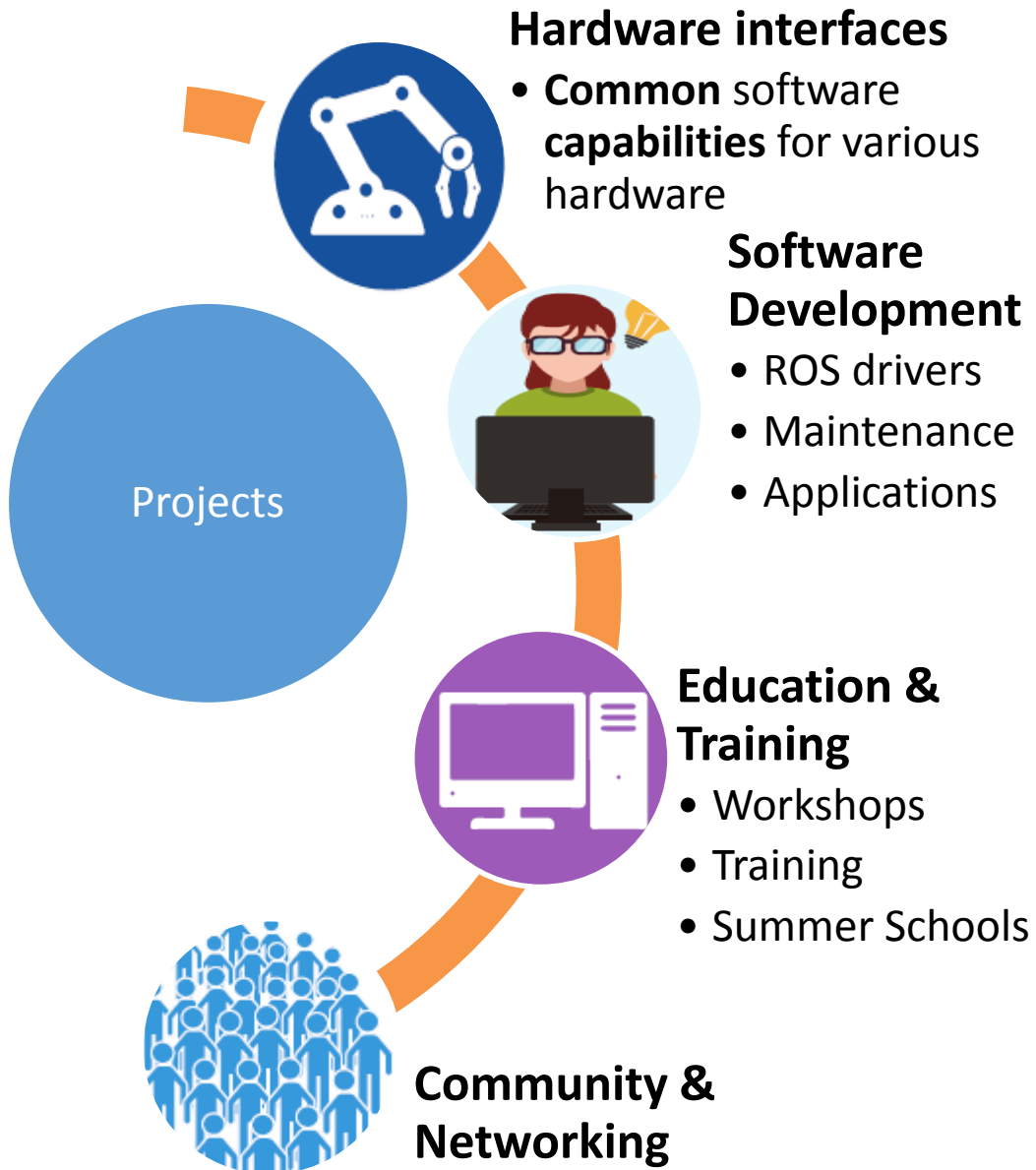
1. PLC as the master sending signals to ROS
2. ROS as the master
 - Signals and messages to the PLC – KUKA via ROS as a middleware



GitHub https://github.com/ros-industrial-consortium/bohr_devel



What can ROS-Industrial AP do for you?



What we help solve:

- **Accelerate robotic adoption, investment in Asia Pacific**
- **Support ROS-Industrial driver development**
- **Certification for HW compatibility with ROS 2.0**





Come visit our booth!





Contact Information



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Fraunhofer IPA

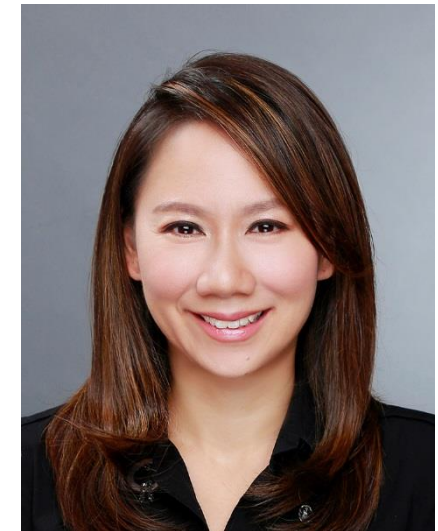
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