Proprietary interfaces of robotics and automation components are time-consuming and costly to integrate. In many cases, such high cost and complexity of integration compels the end customer to continue using the self-contained product range of a certain manufacturer (vendor lock-in), even though, from a technical and economic perspective, there are sometimes better alternatives on the market from other vendors. Automation solutions must continue to become ever more flexible. This is because growing product customization together with variable production volumes calls for adaptable manufacturing systems. Adaptability, in turn, requires the increased use of sensors and intelligent software components for data evaluation.

ROS-Industrial

The open source “Robot Operating System” (ROS) offers a host of highly developed software components that offer the potential to increase flexibility in industrial applications to a large extent. Particularly in the areas of 2D and 3D image processing and collision-free motion planning, highly developed components are already available in ROS and established in robotics research since several years. The purpose of the "ROS-Industrial" initiative, which is coordinated in Europe by Fraunhofer IPA, is to support the adoption of ROS in industrial environments and applications. In cooperation with the global developer community, the open-source framework is being further developed with regard to the additional non-functional requirements of industrial users, such as robustness, reliability, and safety.
Benefits of ROS-Industrial for end users and system integrators

- Availability of vendor-neutral open-source drivers
- Simplified exchangeability of hardware and software components through standardized interfaces
- Intelligent software components for flexible production cells
- Significantly reduced installation time and integration effort

Benefits of ROS-Industrial for manufacturers of industrial hardware

- Availability of a feature-rich, open-source software stack to complement their hardware offer
- Compatibility for the products in their portfolio with a wide ecosystem of hardware and software components

ROS-Industrial Consortium

Fraunhofer IPA manages the European consortium with the following objectives:
- Definition of a technical roadmap for the development of ROS software components suitable to the needs of industrial users
- Development of new pilot examples of industrial applications
- Assessment of the technological potential of ROS components through testing
- ROS-Industrial support and training
- Assistance to Consortium members to make their hardware and software offer compatible with the ROS ecosystem

Development Environment

Alongside the actual suitability of the ROS-Industrial software components for industrial applications, the availability of intuitive and efficient development environments are also highly important for acceptance in industry. For this reason, tools for the development, integration and configuration of ROS-Industrial components are under development at Fraunhofer IPA to provide assistance to users in their different roles. Specifically, the focus is on model-driven engineering tool chains offering an intuitive development environment of ROS-Industrial components and applications. This approach ensures both reusable software components through a standardized component model with separation of concerns and less programming errors through code generation.

Tools for component developers

- Model-based development environments for reusable ROS nodes, such as those developed during the BRICS and ReApp research projects. Automatic generation of ROS-Industrial communication interfaces using code generators
- Integration platform for easy integration and testing of ROS-Industrial components

Tools for system integrators and end users

- Environment for application development and for the configuration of existing ROS components in a component catalogue
- Selection guide for system integrators and application developers

App repository

- Categorization of existing ROS components in a component catalogue
- Selection guide for system integrators and application developers

What we offer

Contact us to discuss how to use ROS-Industrial in your applications. We offer the following services:

For component manufacturers

- Development of ROS-Industrial interfaces for industrial hardware components
- Development of simulation models of actuator and sensor components

For system integrators

- Advice on selection of ROS-Industrial components and system design
- Hands-on workshops for the ROS-Industrial development environment
- Prototypical implementation and proof of concept of an application with ROS-Industrial components

For end users

- Advice on use of open-source components in relation to licenses, liability and support
- Development of industrial applications with components from different vendors

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3 Dual Arm Robot and RVIZ Visualisation.
4 AGVs from Bär Automation GmbH using ROS for infrastructure-free autonomous navigation. (Source: Bär Automation GmbH)
5 Gazebo simulation environment and ROS Navigation.