

Industrial robotics in transformation



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winner 2022
industrial design

rexroth
A Bosch Company

Get Together for Robotics 2025

Industrial robotics in transformation

01

Who we are?

02

Challenges in industrial robotics

03

Customer needs for open and secure robotic systems

04

Summary

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Bosch Business sectors



Industrial Technology



Mobility Solutions



Energy and Building Technology



Consumer Goods



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**Drive and Control Technology
(Bosch Rexroth)**



**Electric Drive and Control
Technology**

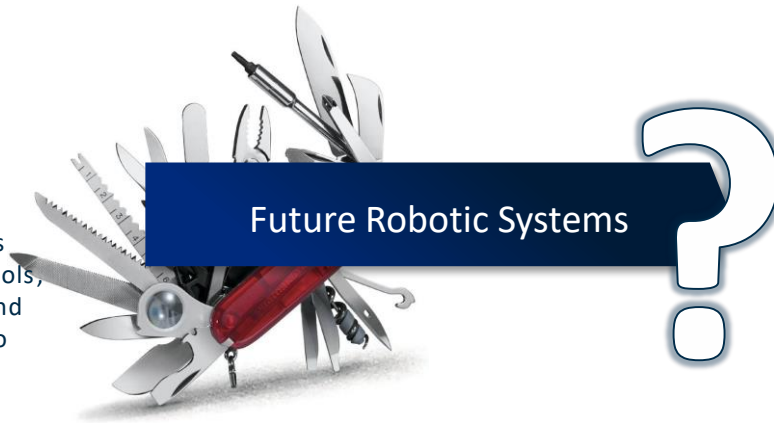
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Closed Systems vs. Swiss pocketknife

Today's Industrial Automation Technology is mostly **CLOSED** and based on **PROPRIETARY** technology and tools.

Closed Systems

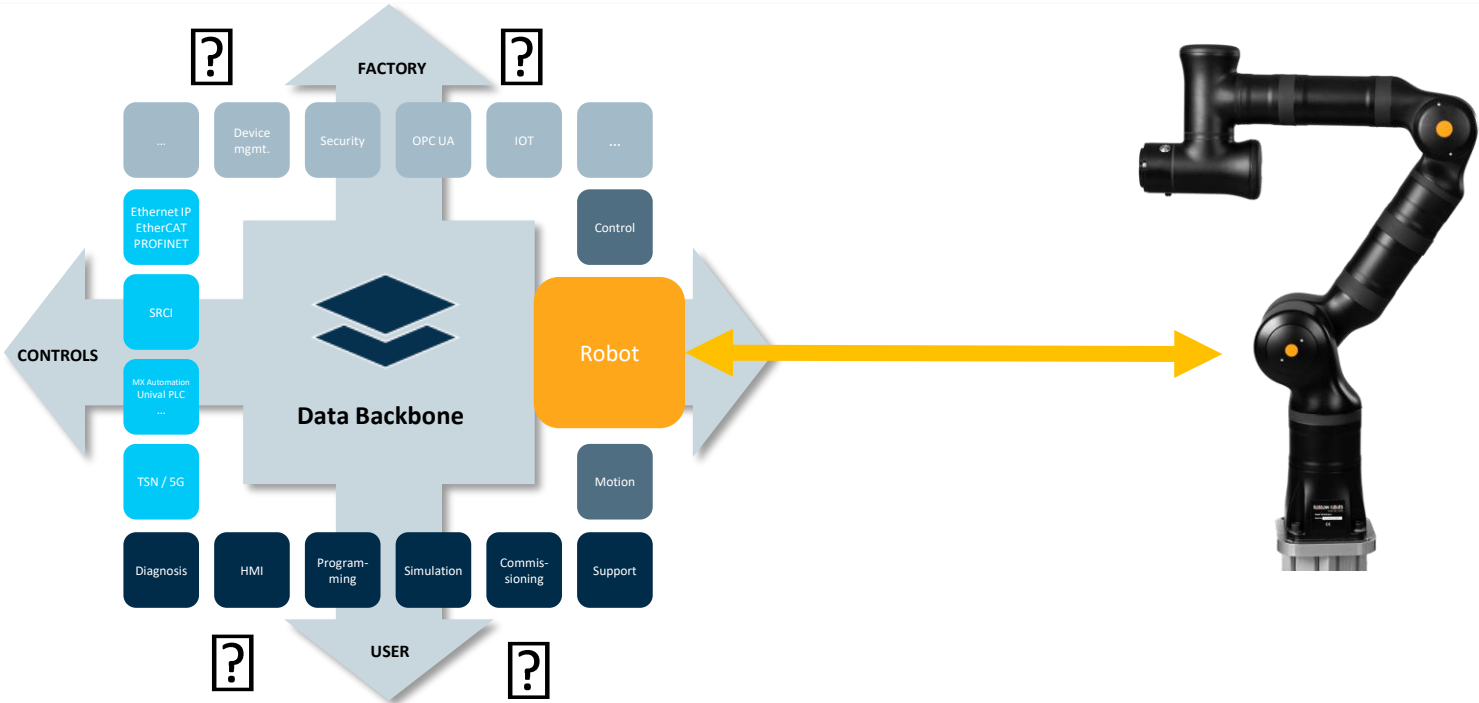
Everybody talks about openness, but no-one is really open regarding tools, standards, interfaces and ecosystems. There is no user journey without a LOCK-IN.



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Robot Controller

Optional:
Line/machine control



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Robot Controller base Topology

Flexible commanding via

- Script based Programming
- Graphical programming
- PLC programming



Robot HMI



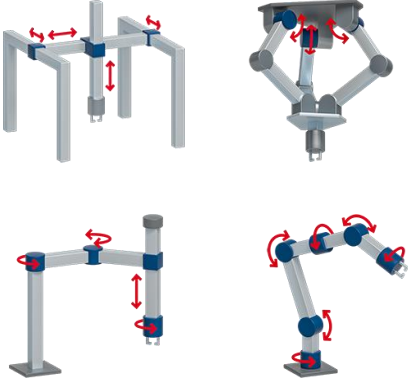
Robot control



Drives



Motors

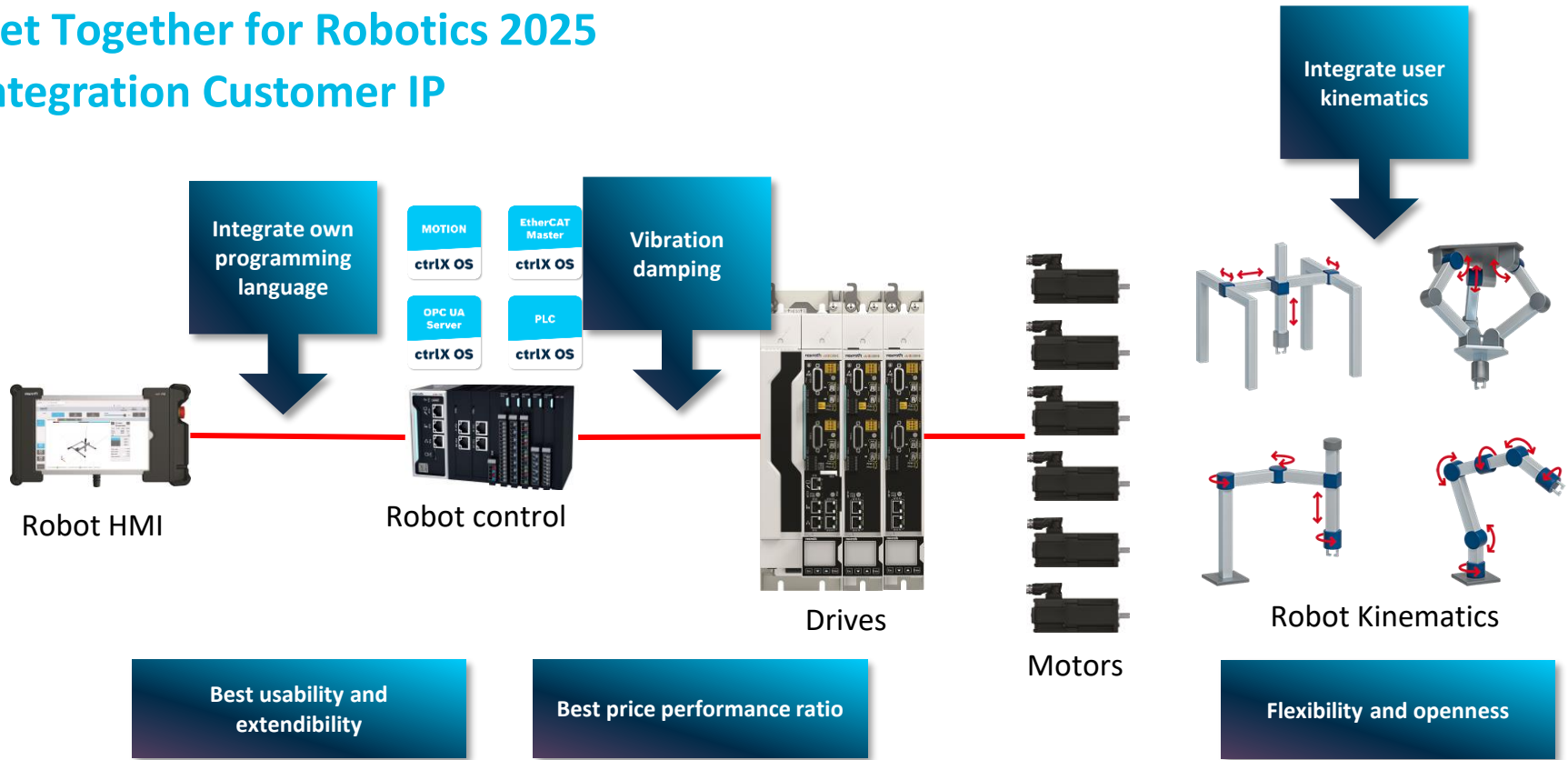


Robot Kinematics

OUT OF THE BOX SOLUTION FOR A FAST TIME TO MARKET BY USING A READY MADE AND PROVEN TOOLBOX

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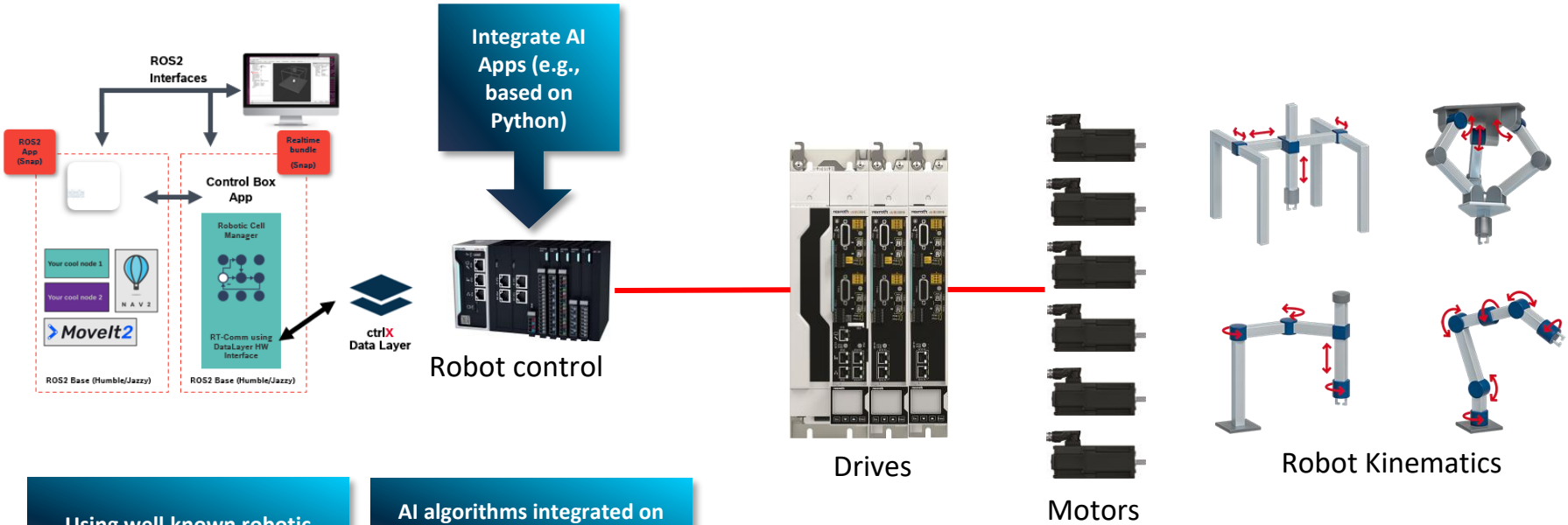
Integration Customer IP



EXTEND THE OUT OF THE BOX SOLUTION FOR A FAST TIME TO MARKET WITH EASY AND SEAMLESS INTEGRATION OF OWN IP

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Open-Source robotic tools and AI methods



Using well known robotic tools of ROS2

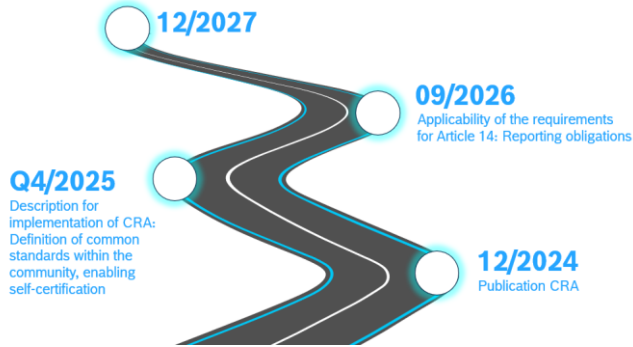
AI algorithms integrated on robot control for path planning and robot perception

EXTEND THE OUT OF THE BOX SOLUTION FOR A FAST TIME TO MARKET WITH MODERN ROBOTICS OPEN-SOURCE TOOLS

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Security and norms as new basic requirement

CRA & IEC 10218



Secure by design & secure by default



Security is a key requirement during development and for the entire product lifecycle



The device is shipped with a minimal network footprint



Only secure protocols (e. g. https) are enabled by default to protect the data which is stored, transmitted or otherwise processed



Authentication and authorization are crucial existing functions



Central software management for fleet management and software rollout

Reduced development effort



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Future proven architecture for Robotics solution



Thank you for your attention!