

ROS 1 to ROS 2

Overcoming the Challenges of **Developing and Deploying**
a Swarm of AMRs



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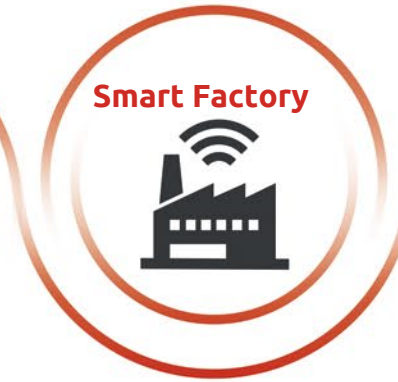
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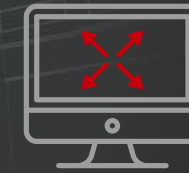
Contact Us ►

The Future of AMR: Swarm Autonomy

A swarm of autonomous mobile robots (AMRs) is able to carry out their jobs with zero to minimal oversight by human operators. Facilities such as schools, hospitals, shopping malls, and factories in particular can use a swarm of AMRs to improve operational efficiency and quality of life. Using Data Distribution Service (DDS) as a backbone, the second-generation Robot Operating System (ROS 2) provides a uniform data exchange environment, like a data river, for AMRs to communicate with each other. Additional equipment that adopts DDS technology can also use the data river to collectively share data.

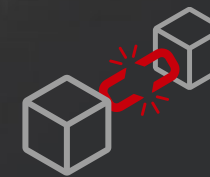


The Challenges of Developing and Deploying a Swarm of AMRs



Complexity

- No integrated hardware and software system
- No real-time capability
- No dedicated ROS 2 QoS



Scalability

- Low accuracy and high error rate
- High cost of development and deployment
- Need for easy and safe deployment on large scale



Upgradability

- ROS 1 to ROS 2 migration
- Lack of good support
- High cost to upgrade

ADLINK
Value Proposition



**Simplified system
integration**



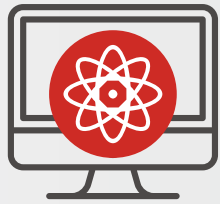
**Enhanced decentralized
performance**



**Quality
assurance**

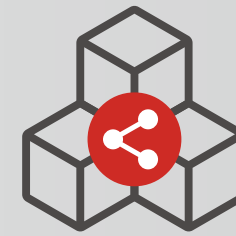
Simplify to Amplify

ADLINK ROS 2 Solutions, Optimized for AMR Navigation



Optimization

- HW/SW integrated controller
- Time sync with GMSL, IMU, IEEE-1588
- Internal process optimization - Neuron SDK with shared memory mechanism



Decentralization

- Neuron SDK with optimized DDS performance
- SWARM & fault tolerance: DDS supported
- Redundancy: DDS OWNERSHIP Qos Policy supported

Easy Implementation

- ROS1 to ROS 2 Migration Guide
- Neuron APP with verified packages
- Neuron Care with customer support



ROS 2 Real-time Controller and Demo Kit



AI



ROScube-X
High-performance AI computing for intelligent robot

- High-performance AI computing
- Low energy consumption
- Real-time capability



ROScube-I
High-performance CPU computing for AMRs

- Supports complex algorithms
- Diverse I/O
- Real-time capability



PRO



ROScube Pico
Module-based kits for rapid development and cost-efficient deployment

- SMARC and Jetson platforms
- Robot development and deployment kit
- Power management capability



DEV



NeuronBot
Demo Kit for robotics companies and educational institutes

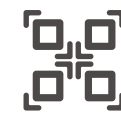
- Integrated vision, control, AI and motion modules
- Designed for rapid prototyping
- Powerful open source ROS libraries



PoC

ROS 2 / DDS Development Platform

Neuron SDK



Neuron DDS+
Ensures real-time, reliable communications and enhances system performance



Neuron RT
High-performance, low-latency real-time system architecture for specialized applications.



Neuron Booster
ADLINK commercial shared memory mode provides ultra-low latency and high throughput



Neuron IDE
Web-based visualization development interface and package management platform

Neuron APP



Neuron Extension
New extension function for customer use



Third-party Widget
Verified, open-source ROS packages that run on ADLINK ROS controller

Neuron Care



Customer Portal
Web-based user portal that allows customers to ask questions about ROScube and Neuron SDK



Neuron Update
Allows customers to continually update their Neuron SDK



ACRN

Real-time Hypervisor for flexible, reliable and scalable development of AI-based robotic applications



Profile 1	Profile 2	Profile 3		
 ROScube-I	 ROScube-I	Service OS ubuntu ^{22.04}	User OS ubuntu ^{22.04}	Real-time OS ubuntu ^{22.04} XENOMAI
ACRN				
ROScube-I				



ROS Migration Guide

How to migrate from ROS 1 to ROS 2

- Why migrate from ROS 1 to ROS 2?
- Who should consider migrating to ROS 2?
- Challenges of migrating
- Solutions and recommendations for migrating
- Gazebo ROS migration
- ROS 2 C++ source code migration example

